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ART AND NEW TECHNOLOGIES IN LATIN AMERICA

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BY

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ACRONYMS

CCRMA: Center for Computer Research in Music and Acoustics, Stanford University, United States.

CENIDIM: Centro Nacional de Investigación, Documentación e Información Musical Carlos Chávez, Mexico City, Mexico.

CLAEM: Centro Latinoamericano de Altos Estudios Musicales, Instituto Torcuato Di Tella (Latin American Higher Studies Musical Center, Torcuato Di Tella Institute), Buenos Aires, Argentina.

CICMAT: Centro de Investigación en Comunicación Masiva, Arte y Tecnología (Center for Research in Mass Communication, Art and Technology), Buenos Aires.

CR+D: Centre for Research and Documentation, The Daniel Langlois Foundation for Art, Science, and Technology, Montreal, Canada.

DACP: Desarrollo Artístico Cultural Peruano, Lima, Peru.

DSP: digital signal processing.

FACM - UCA: Facultad de Artes y Ciencias Musicales - Universidad Católica Argentina.

DLF: The Daniel Langlois Foundation for Art, Science, and Technology

FM: frequency modulation.

GEMA: Gabinete de Electroacústica para la Música de Arte, Santiago, Chile.

GMEB: Groupe de musique expérimentale de Bourges, France.

GRM: Groupe de recherches musicales, Paris, France.

ICMC: International Computer Music Conference.

IMEB: Institut international de musique électroacoustique de Bourges.

INCIBA: Instituto Nacional de Cultura y Bellas Artes, Caracas, Venezuela.

IRCAM: Institut de Recherche et Coordination Acoustique/Musique.

LADIM: Laboratorio Digital de Música, Caracas, Venezuela.

LIEM: Laboratorio de Informática y Electrónica Musical, Centro de Arte Reina Sofía, Madrid, Spain.

LIPM: Laboratorio de Investigación y Producción Musical, Buenos Aires, Argentina.

LP: long-playing phonograph record.

LNME: Laboratorio Nacional de Música Electroacústica, Havana, Cuba.

MOX: Advanced Computing Center, Los Andes University, Bogota.

n/d: no date available.

NICS: Núcleo Interdisciplinar de Comunicação Sonora, UNICAMP, Brazil.

RDF: Ricardo Dal Farra.

UNESP: Universidade Estadual Paulista, Sao Paulo, Brazil.

VCO: voltage-controlled oscillator.

RÉSUMÉ EN FRANÇAIS

L'histoire de la musique électroacoustique latino-américaine est longue, intéressante et prolifique, mais peu connue, même régionalement. De nombreux compositeurs nés ou vivants en Amérique latine ont été très actifs à ce titre, dans certains pays depuis plus de 50 ans, mais la disponibilité de l'information et des enregistrements de musique électroacoustique à cet égard et dans cette région a posé de sérieux problèmes aux éducateurs, compositeurs, interprètes, chercheurs, étudiants et au public en général.

Compte tenu de cette situation, la question suivante s'est imposée comme point de départ de ma thèse : comment s'est développée la tradition de la création musicale avec les médias électroacoustiques en Amérique Latine. Pour y répondre, j'ai adopté une approche historique en utilisant une méthodologie ethnographique (caractérisée par une immersion à long terme dans le domaine, par des contacts personnels avec des compositeurs et par ma participation et mon souci en ce qui concerne l'évolution des arts faisant appel aux nouvelles technologies en Amérique Latine) dans toute ma recherche.

Ayant commencé à travailler dans le domaine de la musique électroacoustique au milieu des années 1970 dans mon Argentine natale, il m'a été très difficile d'obtenir de l'information sur les activités reliées à ce domaine dans des pays voisins et même dans ma propre ville. Bien que difficile, il était néanmoins possible de trouver les enregistrements de compositeurs vivant en Europe ou en Amérique du Nord, mais plus ardu de trouver ceux réalisés par des compositeurs locaux ou régionaux.

Dans divers pays d'Amérique latine, les universités, les organismes d'état et de grandes fondations privées avaient de temps en temps pris l'initiative de soutenir la recherche en art et le recours aux nouveaux médias, mais la plupart avaient cessé leurs activités avant même de développer les ressources pour documenter les processus et préserver les résultats.

J'ai obtenu chaque enregistrement et information que j'ai rassemblés, depuis le milieu des années 1970, en contactant directement chacun des compositeurs. Avec le temps, j'ai constitué des archives personnelles, modestes mais croissantes, comprenant des notes de programme de concerts, livres, bulletins, magazines et revues, partitions, lettres, courriels et des enregistrements sur bobines, cassettes analogiques et quelques vinyles 33 tours. J'ai décidé de partager mes trésors avec des collègues et étudiants et d'explorer des solutions pour les rendre accessibles au plus grand nombre possible.

Il y a quelques années, l'UNESCO m'a demandé de rédiger des rapports sur la musique électroacoustique latino-américaine et les arts médiatiques. Les textes de cette recherche ont contribué à diffuser de l'information sur le travail de beaucoup d'artistes latino-américains.

Afin de rendre également accessible au public les œuvres musicales, et sauvegarder le matériel, j'ai cherché un endroit où la préservation des enregistrements était non seulement

importante mais aussi possible. J'estimais que la *fondation Daniel Langlois pour l'art, la science et la technologie* à Montréal était le lieu idéal pour mon projet.

Mes activités continues durant près de 28 mois comme chercheur en résidence à la fondation Daniel Langlois m'ont permis de numériser et convertir des enregistrements à partir de différents formats, faire du montage au besoin et verser dans la base de données de la Fondation tous les renseignements sur les pièces (titre, compositeur, année de composition, instrumentation, notes de programme, studio de production, version, durée, bio du compositeur, etc.). À ce jour, janvier 2006, il y a 2152 fichiers audio numériques qui sont archivés¹ au Centre de recherche et de documentation (CR+D) de la fondation.

En complément à cette thèse de doctorat, j'ai développé une collection d'enregistrements musicaux maintenant disponibles au public. Cette collection est constituée du résultat de mes recherches (textes, oeuvres musicales, quelques partitions et photographies historiques, entrevues) et diffusée sur le site Web de la fondation Daniel Langlois.

Les archives comptent des pièces pour médias fixes ainsi que des œuvres mixtes pour instruments acoustiques ou voix et médias fixes ou systèmes électroniques interactifs en direct (1722 compositions). Les archives comprennent aussi des enregistrements audio et audiovisuels d'entrevues avec des compositeurs et des novateurs techniques ainsi que des photographies, des vidéos, et quelques très rares partitions.

Une grande partie de l'information textuelle contenue dans la base de données des fichiers de musique est accessible par le site Web de la fondation Daniel Langlois. L'information complète (ex. notes de programme) et tous les enregistrements sont accessibles au CR+D. Une courte sélection de pièces est aussi accessible pour écoute sur le site Web.

La plupart des compositeurs représentés dans ces archives et dans cette dissertation sont nés dans des pays d'Amérique latine. Il y a aussi quelques compositeurs qui, bien que n'étant pas originaires de la région, ont poursuivi au moins une partie de leur carrière musicale en Amérique latine.

Cette thèse renferme de l'information sur des compositeurs liés à 18 pays d'Amérique latine : Argentine, Bolivie, Brésil, Chili, Colombie, Costa Rica, Cuba, République dominicaine, Équateur, El Salvador, Guatemala, Mexico, Panama, Paraguay, Pérou, Porto Rico, Uruguay et Venezuela. Les archives contiennent des enregistrements de compositeurs de tous les pays mentionnés.

J'espère que ce texte incitera à explorer ce merveilleux univers musical plutôt inconnu, créé par des centaines de compositeurs latino-américains au cours des dernières décennies.

Mots clés : musique électroacoustique ; Amérique latine; art et nouvelles technologies ; éthique ; mémoire ; culture ; contexte ; pionniers ; interdisciplinarité.

¹ Il est à noter que le terme « archives » utilisé dans ce texte indique le lieu où sont entreposés à des fins de conservation un ensemble de documents ou d'information de valeur ou d'intérêt particulier.

SUMMARY

Latin American electroacoustic music has a long, interesting and prolific history, but it's a history that is little known even within the region itself. Many composers born or living in Latin America have been very active in this field, in some countries as far back as some 50 years, but the availability of information and recordings of electroacoustic music in Latin America has been a problem for educators, composers, performers, researchers, students and the general public.

Considering that situation, I took the following question as a departure point for my thesis: How has the tradition of musical creation using electroacoustic media developed in Latin America? To answer that question I have been working with an historical approach using an ethnographic methodology (characterized by a long-term immersion in the field, personal contact with composers, and my involvement and concern with the evolution of the arts using new technologies in Latin America) throughout my research.

Having started to work in the electroacoustic music field during the mid 70s in my native country of Argentina, I found it very difficult to obtain information on related activities in surrounding countries and even in my own city. Although challenging, it was nevertheless possible to find recordings by composers living in Europe or North America, but it was very difficult to locate any by local or regional composers.

In various Latin American countries, universities, state organizations and major private foundations had taken initiatives from time to time to support art research and the use of new media, but most had stopped short of developing the resources to document the processes and preserve the results. Many early tape compositions had been lost or the master recordings damaged, and there no longer existed scores or documentation on these. Fortunately, however, a large number of recordings could still be saved. Tapes were stored in private studios and composers' houses, and many had been sleeping on shelves in institutions for decades, with no action taken to conserve the works or provide access to the people.

Almost every recording and piece of information I have collected since the mid 70s were obtained by searching for and contacting each composer directly. Over time, I began to build a small but growing personal archive of concert programs, books, newsletters, magazines and journals, scores, recording sleeves, letters, emails, as well as electroacoustic music recordings on open reel tapes, analog cassettes and a few vinyl LPs. I decided not only to share this music and related information with colleagues and students, but to explore other ways of making it widely available.

A few years ago, the UNESCO commissioned me to research and write several reports about electroacoustic music and media arts in Latin America. The texts produced as a consequence of that research have been contributing to disseminate information on the work of many Latin-American artists.

In order to provide the public with access also to musical works, while keeping safe the material, I was searching for a place where the preservation of documents was not only important but also possible. I felt that the *Daniel Langlois Foundation for Art, Science, and Technology* in Montreal would be the ideal place to propose my project.

Two consecutive grants as Researcher in Residence at the Daniel Langlois Foundation allowed me to work for some 28 months digitizing and/or converting from different formats, editing and baking as needed, and filling the database of the Foundation with all of the available information on the pieces involved. To date, January 2006, there are approximately 2,152 digital audio files archived² at the Foundation's Centre for Research and Documentation (CR+D).

The collection of musical recordings now publicly available for listening and the dissemination of my findings (texts, musical works, some historical scores and photographs, and interviews) are results of my research and integral parts of the work I developed to fulfill the requirements for my doctoral degree.

The music archive includes pieces for fixed media as well as mixed works for acoustic instruments or voices and fixed media or live electronics/interactive systems (1,722 compositions). The archive also includes audio and audiovisual recordings of interviews with composers and technical innovators as well as photographs, videos and a few rare scores.

Part of the text-based information contained in the music archive's audio files database is available through the DLF Web site. Full information and all musical recordings are available for consultation and listening at the CR+D. A short selection of pieces is also available for listening through the Web site.

In most cases, the composers represented in this archive were born in Latin American countries. There are also a few composers who, although not originally from the region, pursued at least a portion of their musical career in Latin America.

This thesis contains information on composers associated with 18 Latin American countries: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Mexico, Panama, Paraguay, Peru, Puerto Rico, Uruguay and Venezuela. The archive has recordings by composers from all of those countries.

Hopefully, this text will invite you to begin exploring the wonderful and largely unknown world of music created by hundreds of Latin American composers over the past several decades.

Keywords: electroacoustic music; Latin America; art and new technologies; ethics; memory; culture; context; pioneerism; interdisciplinarity.

² In the context of this doctoral thesis, **archive** refers to the place where an ordered group of documents and information of special interest or value are guarded for preservation.

INTRODUCTION

This research is about music ...

More than colours and forms, it is sounds and their arrangements that fashion societies. (p. 6)

Attali, J. (1985). *Noise: The Political Economy of Music*. United States: University of Minnesota Press.

... and its history.

Music is omnipresent in human society, but its language can no longer be regarded as transcendent or universal. Like other art forms, music is produced and consumed within complex economic, cultural, and political frameworks in different places and at different historical moments.

Publisher comments on: Leyshon, A. , Revill, G. and Matless D. [editors] (1998). *The Place of Music*. United States: The Guilford Press. <http://www.powells.com/cgi-bin/biblio?show=Trade+Paper%3AUsed%3A157230314x%3A19.00&slnc=1>

This research is about art, new technologies and Latin America³.

L'art [...] latino-américain reste peu et mal connu. Il est pourtant aussi vaste et complexe que les régions, pays et cultures qui le composent. L'Amérique latine est elle-même un *continent culturel* qui dépasse le contour de ses frontières. (p. 15)

Sulic, Susana (2004). *Sciences et technologies dans l'art contemporain en Argentine. Le paysage abstrait*. France: L'Harmattan.

This work is a journey in sound and words through Latin America's electroacoustic music⁴ world.

³ The term **Latin America** is used to refer to all the American countries south of the United States where Spanish and Portuguese are spoken [more details in Appendix D: Glossary]

⁴ I will be using the term **electroacoustic music** throughout this text to refer to: musical creations that involve electronically modified or generated sounds, which may or may not be accompanied by live

The creation of music using electroacoustic technologies has been of great interest to composers living in Latin American countries at least since the early 50s. However, there is a significant lack of information in this respect, and little research has been conducted in this area.

Latin America has been a fertile region for electroacoustic music creation, but most compositions remain unknown except for a few initiated. The same situation applies to basic information about these works and their composers.

Some pioneer⁵ composers have already died and many early compositions have been lost or the originals (master tapes) damaged, but there is still a huge amount of information and there are artistic works to be compiled, analyzed, documented and archived for preservation. Of course, dissemination of the findings is equally important.

There are unacceptable difficulties for public access to this music and its related resources, even on state-supported centers with hundreds or thousands of hours of musical recordings, specialized libraries, and major human and technical resources. This situation should be reversed, opening the “knowledge box” where part of our culture is hidden.

I believe specific actions need to be taken right now to unfold and keep safe at least part of our memory.

voices or acoustic instruments, and that use a language close to the experimental and/or academic world (adapted from a definition by Otto Luening in *The Odyssey of an American Composer*, New York: Charles Scribner's Sons, 1980).

Experiment can be understood as the act of conducting a controlled test or investigation; the testing of an idea; or a venture at something new or different. **Academic**, in this context, refers to an art that conforms to the standards of a particular school, considering **school** a group of artists who have a common style which may come from geography, movement, period or other attributes. [more details in Appendix D: Glossary]

⁵ In the context of this doctoral thesis, a **pioneer** is considered someone who helps to open up a new path or takes the lead or initiative in a new line of research or technology or art.

Keeping that memory alive, knowing what was done and preserving information and cultural goods seems to be fundamental for every civilization.

The objective of my thesis emerges from this necessity, focusing on a work that can tell us more about the whos, whats, whens and hows of musical creation with electroacoustic media in Latin America.

Even if “electroacoustic music” does not appear explicitly in the title of my thesis, it is implicitly there through the connection between the words: art, new technologies, sound and electroacoustics. I decided to speak of “art and new technologies” rather than “music and new technologies” considering that my research goes beyond music and its historical context, exploring the roots of what we call today electronic arts or new media arts. Pioneering activities centered in the electroacoustic music field are being considered today one of the historical basis of media arts.

My research began more than 20 years ago collecting music recordings on vinyl, open reel⁶, cassette, DAT, CD and other formats, as well as scores, articles, concert programs and related references. The field research led me to explore the musical production and the historical evolution of electroacoustic music in the region through interviews with the composers themselves.

There is a story behind virtually every piece of information gathered, every recording obtained, every date confirmed, and, without question, almost every email exchange or telephone communication. It would astound readers to learn how long it took and how difficult it was to obtain Juan Blanco’s early recordings from Cuba or to contact Joaquín Orellana in Guatemala or César Bolaños in Peru. Today, they and many others are present in this text and in the archive of electroacoustic music recordings I created at *The Daniel Langlois Foundation for Art, Science, and Technology*.

⁶ Reel-to-reel or **open reel** tape recording refers to the form of magnetic tape audio recording in which the recording medium is held on a reel, rather than being securely contained within a cassette [more details in Appendix D: Glossary].

During my long research residence at the DLF while developing the archive, I had unrestricted use of a phone line for international calls. This seemingly minor factor actually allowed me to contact composers for whom I had been searching for many years and in some cases decades. Only someone who has tried to contact a large group of people to research activities that took place 40 or 50 years ago in Latin America can truly appreciate the complexities involved.

I am delighted to having been able to contribute to keeping alive the work and thought of these wonderful artists, for today and for the future. This text presents basic information about hundreds of composers and thousands of pieces. The aforementioned archive has more than 1,700 compositions that are freely available for listening at the Centre for Research and Documentation (CR+D) of the Daniel Langlois Foundation in Montreal, and its accompanying online database includes information about the pieces (e.g. over 140,000 words only for the program notes) and their composers. There is also part of this project accessible to on the Internet: a historical introduction, the full list of compositions available for listening in the CR+D, and a selection of pieces available for listening through the Web site.

The work to develop the archive has been extensive: navigating through myriad technical problems (recovering from massive hard disk crashes, finding tape recorders with old track-formats, re-digitizing material to correct severe DC offsets in brand-new equipment, OS and FireWire conflicts, etc.), defining the best way to work with very noisy old recordings, and the list goes on. But this was nothing compared to the difficulties in obtaining the recordings, contacting the composers and confirming the information I am including.

Together with the empiric research of collecting the electroacoustic music recordings, my ethnographic approach through in-depth interviews with composers from Argentina, Bolivia, Brazil, Chile, Dominican Republic, Mexico, Peru, Puerto Rico, Uruguay and Venezuela was important in shaping my work. Recordings of all these interviews are also available at the CR+D.

In summary, this thesis begins with an introduction to Latin America's electroacoustic music and the special relationship between the region and its artists - even for those who have been living abroad for 40 or 50 years! (Chapter I). Next, I present the adopted research methodology (Chapter II), basic information about the social and economic context (Chapter III), and some early steps on the convergence among art, science and technology (Chapter IV). The main body of my text presents the basic facts of the vast production of electroacoustic music by composers from 18 Latin American countries (Chapter V and VI). The diversity in compositional trends is also briefly discussed (Chapter VII), and there is a full chapter on technological innovation and music-related scientific research (Chapter VIII). Following the conclusions of my research (Chapter IX), some appendixes show the full list of compositions available for listening as part of the *Latin American Electroacoustic Music Collection* at the DLF, the scarce - and difficult to obtain - bibliography on the studied subject, basic economic information on several Latin American countries, a glossary and related information.

Together with this text, the *Latin American Electroacoustic Music Collection* at the DLF is providing the music needed to understand these words, and even more important, it is providing a way to preserve and disseminate part of that musical world.

I expect my thesis will contribute to the knowledge of electroacoustic music created by composers born in (or closely related to) Latin America.

CHAPTER I

LATIN AMERICA. ART, REALITY AND UTOPIA

1.1 Living without leaving

In February 2005 I received a CD from composer Mesías Maiguashca with some of his early compositions involving electronics. Maiguashca, who was born in Ecuador, has been living in Germany for over 30 years. Opening the cover of the booklet coming with his CD I found the following texts written by the composer:

... Coming from a 'third world' country I have been often asked about the role that music should play in a society, about my duties as artist to my society. In my country I have often been reproached for neglecting our 'cultural values' and for having adopted European means of expression. My opinion: of course an individual has rights and duties towards his group. His principal right is liberty: liberty to express his individuality, liberty to live his individuality. His principal duty is truthfulness: truthfulness to himself, truthfulness to his group, truthfulness in all his actions ...

Maiguashca, M. (n/d). *Mesías Maiguashca about Mesías Maiguashca* on *Übungen - Ayayayayay* - "moments musicaux" - *Intensidad y Altura* CD program notes. Germany: Producciones Mañana.

Maiguashca, like many other well-known Latin American composers, found in Europe or North America a place to develop his musical career. His works are performed around the world and recordings of his music are commercially published and easily available. The situation is the same, with some variations, for many other composers living out of their mother country. He, like many of those composers, has a complex relationship with his native Latin America, far and near at the same time.

... It is obvious that the relationship to my land and culture is and remains problematic: on the one side I have a strong attachment to our things and people; on the other side I have a GRUDGE against the order that has organized our society in such and unjust categories ...

... It seems now clear to me that my early desire to leave the country was not only the natural curiosity to see the world but also the logical reaction to the feeling that I had very little or no chance in my society ...

Maiguashca, M. (n/d). *Mesías Maiguashca about Mesías Maiguashca* on *Übungen - Ayayayayay* - "moments musicaux" - *Intensidad y Altura* CD program notes. Germany: Producciones Mañana.

I find the same feeling of frustration and hopelessness in most artists living in Latin America regarding their possibilities to make a living from their creations. Then, many of them emigrate to Europe and North America looking for proper conditions to develop their art and their careers. This has to do, of course, with supporting policies for artistic creation in these countries, but also with the underlying attraction generated by the tradition of preservation, documentation and dissemination of artworks, which shows a continuity path between past, present and future.

In Latin America, in spite of the strong and rich artistic production, there are not many traces of contemporary art practices during the last decades, at least regarding some fields like those involving electronic technologies. Even today, when we have sophisticated computer tools to access information, nothing can be done just with the new tools, without the information itself. Preservation and documentation, hence memory, do not seem to be essential in most countries, provoking in many artists a sensation of emptiness, of lacking history.

Many Latin American composers found themselves without a chance for their professional development in their native land. Some were looking for the perfect place far away, in Europe or North America, but Utopia⁷ was not there either, so a few came back after a while.

⁷ **Utopia**: an ideal and perfect place or state, where everyone lives in harmony and everything is for the best. Infinite Futures (2003) *Glossary: a brief list of key futures concepts*. Address: <http://www.infinitefutures.com/resources/glossary.shtml>.

1.2 Motivation

Latin America is a rich place in interdisciplinary artistic practices. Interesting activities have been developed for several decades, even if most of them remain unknown because of the context and diverse circumstances.

My interest for the arts on the crossroads with sciences and new technologies has lead me to study and work today looking for a better understanding of my past and my roots. It has also encouraged me to search so as to rediscover the multiple paths opened by artists working with new technologies in their exploration of the musical world, in Latin America over the last decades.

I see this process as a way to support the preservation of our collective memory, as well as a stronger basis for my own experimental creative journey to produce new media art works.

Electroacoustic music joins artistic practice with advanced technological developments and, many times, scientific research, too. It is part of what we nowadays call media arts. In fact, electroacoustic music is a pioneer media art form.

Unavailability of musical recordings, bibliography and almost any basic reference to the electroacoustic music activities that were developed since the early 50s in several Latin American countries was commonplace when I started to work on the field several decades ago, and that situation did not change much during the last decades.

Not many people seem to know that, during the early 40s, a Cuban composer developed on the island the concept for an electronic musical instrument that was created some years later and widely used: the Mellotron⁸. It is also often ignored that composers were experimenting

⁸ The Mellotron was an early electromechanical keyboard musical instrument which had a magnetic tape player connected to each key, enabling it to play the pre-recorded sound assigned to that key when the key was pressed. free-definition (undated). *Mellotron - definition, meaning, explanation & information in free-definition.com* [online]. Address: <http://www.free-definition.com/Mellotron.html> [more details in Appendix D: Glossary]

with (then new) electroacoustic technologies to compose their music during the 50s in Argentina, Brazil and Chile; or that during the early 60s a Mexican engineer built an electronic sound synthesizer⁹, a basic resource to produce electronic music; or that a major new media center was active in Argentina for almost a decade during the 60s, serving as an experimental hub for composers from all Latin America; or that hundreds of composers from Latin America were producing thousands of electroacoustic music pieces.

Quoting myself from the CD Program Notes published in 2000 by Computer Music Journal:

For years the electroacoustic music that reached our ears here in the south arrived mostly from recordings made in a few western countries of the northern hemisphere. Just a few times we had the opportunity to listen to the music from the many colleagues from our own environment. With time, however, I discovered here a rich sound world where composers, even with difficulties to access the desired technology, both in my country as well as in the rest of Latin America, were producing an interesting body of musical works for tape, mixed media and live electronics.

I began to wonder why it was so difficult to find electroacoustic music recordings from my colleagues composers from Bolivia, Uruguay, Mexico, Brazil, Peru, Chile, Venezuela, Cuba, Ecuador, Colombia or even Argentina itself. And **what could be done to help change the unidirectional flow of information and music into a multidirectional exchange.**

Dal Farra, R. (2000). CD Program Notes. Ricardo Dal Farra, Curator. Computer Music Journal, vol. 23, no. 4, 121-130. United States: The MIT Press.

If there has been a significant number of compositions realized by Latin American composers using electroacoustic media and contemporary musical languages; if there have been many composers, as well as researchers and technical innovators involved with electronic means to record, generate, and transform sounds to produce a new kind of music; if there have also been labs and centers devoted to this field in different Latin American countries like Argentina, Brazil, Chile, Colombia Cuba, Mexico, Uruguay and Venezuela, among others.

⁹ A synthesizer is an electronic musical instrument designed to produce artificially generated sound. free-definition (undated). *Synthesizer - definition, meaning, explanation & information in free-definition.com* [online] Address: <http://www.free-definition.com/Synthesizer.html> [more details in Appendix D: Glossary]

Why was it so difficult to know about it? What happened with all the artistic production, the research projects, the technical resources, the experience and the accumulated knowledge?

And if all of this is true, if ideas, concepts and knowledge are being lost, if a big part of our memory regarding this field is disappearing, something has been happening that for me (and I wish for many others, too) needs to be solved, at least, as far as we can and consider worthwhile. I believe something must be done to remember, to preserve our memory, to learn from our past, and to project from there our findings and creativity to the future.

With that in mind, consciously or unconsciously, I started to collect information and recordings of electroacoustic music produced by Latin American composers many years ago. At first it was probably my personal interest to know, learn and understand our regional situation regarding the art works produced using new technologies and blurring traditional borders with sciences. Then I started to play that music in my classes and lectures. And later I found opportunities to introduce many compositions by Latin American colleagues in curated concerts, radio series and even some CDs.

Quoting myself again, this time from *A Southerner's Perspective* published in 1996, also by *Computer Music Journal*:

Surely state of the art in life does not exist, but after living where I am for so many years, one knows there are some places (or "states") that are much closer than others to this situation.

Perhaps, and only perhaps, someday composing computer music in Latin America won't be an adventure, and **perhaps, and only perhaps, Latin America's music won't be exotic music anymore but just music.**

Dal Farra, R. (1996). *A Southerner's Perspective*. *Computer Music Journal*, vol. 20, no. 3, 36-37. United States: The MIT Press.

I think these precedent paragraphs depict at least part of the problematic that took me to work on how the tradition of musical creation using electroacoustic media has developed in Latin America.

That tradition or “practice of long standing” (according to the definition given by WordNet 1.6 dictionary, 1997, Princeton University) has been for me a mystery to be explored, researched, unfolded. Many questions arose about it. Is the early electroacoustic music production by Latin American composers being preserved and documented? And if not, how could I help to do that?

My own work as a composer has always been closely related to new technologies. Since the mid 70s I have been creating music for tape, mixed pieces for acoustic and electronic media as well as live interactive works. I gather that my long professional experience has been very important to accomplish this research, both because of my direct creative involvement in the field and also because of my personal knowledge of the work by many colleague composers.

1.3 I don’t want to play the *Dead-end road’s blues* anymore

From musical theatre to multimedia performances, the musical world involving electronic technologies in Latin America has been rich in creativity and ways of expression. Musical scores by composers like César Bolaños and Alcides Lanza, among others, were already including in the 60s the lighting and visual parts to be performed together, largely exceeding the traditional boundaries of concert music notation. Mauricio Kagel broke many of those established musical boundaries throughout his professional career, too. Media arts historical research is slowly starting to recognize in the special relationship between music and electroacoustic technologies a fundamental role in the development of new art forms. The concept of the total artwork at the end of the nineteenth century evolved into myriads of multimedia performance modalities in the twentieth century. It is interesting to see this in the title of a well-known book about the history of art and technology: *Multimedia: From Wagner to Virtual Reality* by Randall Packer and Ken Jordan (W. W. Norton & Company, 2001).

From music to media arts and back into the sound world, one key point to remember is the development of audio recording technologies and how this changed the way to make and to listen to music.

Music, mass communication and new economy trends found their way together making a big world revolution, creating a powerful industry around music recording. For the first time humanity was able to fix a moment in time and to retrieve at least part of it later.

Music is essential, a constituent to each culture. It identifies a group or society. It is also a means of power, colonization and domination that the audio recording technologies have been helping to develop. We all know the tremendous impact of those technologies in the world, involving pleasure, politics, power and money.

The audio recording and the sprouting of the music industry as a worldwide scale business have been defining the taste of hundreds of millions of listeners, conditioned by the iterative broadcasting and recording distribution of a very limited set of musical expressions. Concerning the recording industry, multiculturalism and diversity of styles and aesthetics are extremely restricted and conditioned to the market's laws. The diversity in terms of genres and styles on the available recorded music is more apparent than real. More references about it can be found in chapter III, section 3.3 Culture, identity and information technologies.

The turntable and audio recording technologies, mostly associated to radio production at first, were not only the basis of a global revolution but also the trigger of major transformations in our approach to music creation. Electroacoustic music was born from the explosive social, political and economic changes that marked the turn of the nineteenth into the twentieth century, combined with the aesthetic renovation and strong artistic transformations of that period and the historical appearance of the electromechanical possibilities to fix sounds in time. More references in chapter IV, section 4.1 New technologies, new techniques, new music.

People coming from the music as well as the scientific and technological world met to conceive this music, where knowledge, capabilities and skills from many different disciplines are usually collaborating to develop interesting new paths for experimentation, research and creation. This creative and experimental hub is always in advance of what the music market consumes and does not receive support from the music industry.

Electroacoustic music is a field that joins creativity, technical expertise, new technological development and scientific research, pushing the limits concerning the definition of music, human perception, technological advancement and the interplay between art and science.

If the situation is difficult in countries with good economic resources and organizations taking care of their heritage, it is extreme in regions like Latin America, with historical deep economic and social problems and lack of funds to apply to the preservation and dissemination of its own cultural richness and diversity.

The following paragraph, part of the text *Electroacoustic Music Preservation: a memorandum* distributed by email in April 2005 by several major European institutions interested in electroacoustic music preservation and dissemination clearly exposes the problem:

Electroacoustic music is a major revolution of the twentieth century. It represents a complete change in music, which brought new views on composition, musical thought and musical practice. More than twenty thousand musical works have been composed since the first experiences in the forties and, due to the fragile media on which they were conceived, a real danger exists of losing this unique and original artistic heritage. Within the next ten years, most of the analog media on which electroacoustic music was composed on will be lost due to media decay or technological obsolescence. The same situation exists with the first digital born works, where some of the first works may not be accessible any more. Documentation, preservation and distribution initiatives have to be engaged in order to preserve for future generations this rich and unique heritage.

Teruggi, D. (2005). *Electroacoustic Music Preservation: a memorandum*. Email subject: Electroacoustic Preservation Meeting. France.

Electroacoustic music has been developing for decades in Latin America without sustained initiatives to preserve, document and disseminate the pieces composed. My present work is trying to go a step forward in this direction, developing specific actions to support the conservation and availability of that music.

CHAPTER II

METHODOLOGICAL APPROACH

2.1 Scope of the research

The scope of my research could be summarized in the following two items:

- Production of a comprehensive text about the development of musical creation using electroacoustic media by Latin American composers.
- Production of a recordings archive including musical creations using electroacoustic media by Latin American composers.

The dissemination of results has also been an important aspect of my work. Partial findings of my research are available on the Internet, in a highly visited web site¹⁰.

2.2 Limits of the research

The study focuses on describing the musical production using electroacoustic media by Latin American composers. It also approaches some economic, political, cultural and social aspects of the Latin American context.

Latin America refers to the American countries south of the United States where Spanish and

¹⁰ <http://www.fondation-langlois.org/flash/e/stage.php?NumPage=542> and <http://www.fondation-langlois.org/flash/f/stage.php?NumPage=542>

Portuguese are spoken. The study is limited to: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Mexico, Panama, Paraguay, Peru, Puerto Rico, Uruguay and Venezuela.

The time frame of my research runs from the mid 50s to 2004.

2.3 Methodology

My first steps in this research field started many years ago gathering recordings of musical works created using electroacoustic media and searching information about them and their composers.

I have been revising, expanding, organizing and analyzing all that accumulated material to produce this text and the musical archive hosted at the DLF.

Concerning the main question of my research: How has the tradition¹¹ of musical creation using electroacoustic media developed in Latin America? I have been searching for historical cues that could guide me through my work.

Multiple realities are involved at the macro (e.g. regional) and micro (e.g. local or even personal) level in a research project like this. The socio-economic Latin American context, and the local influences and personal experiences of my life in Argentina are aspects that come together and find their place in this work.

The following graph shows an outline of my research.

¹¹ **Tradition:** a style, technology or lifeway which persists for a long period of time within a given region (Manitoba Heritage Network (2000) A Glossary of Manitoba Prehistoric Archaeology. Address: <http://www.umanitoba.ca/faculties/arts/anthropology/manarchnet/appendices/glossary.html>).

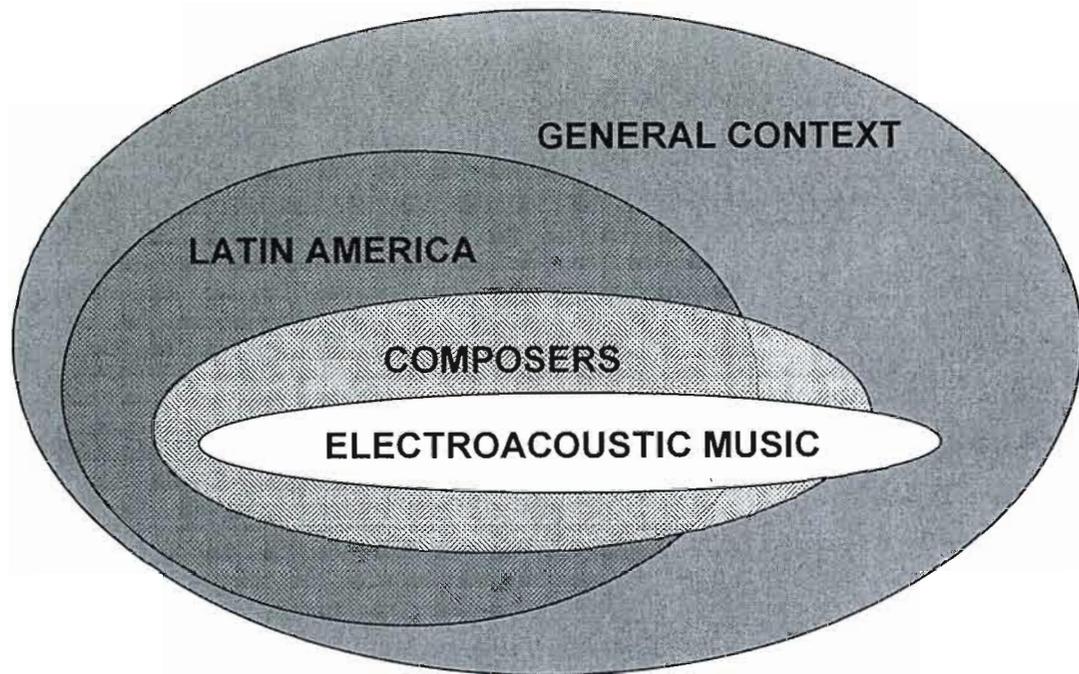


Figure 1. Research context and basic relationships.

My research aims to unfold historical aspects of the musical creation using electroacoustic media in Latin America. Taking into account that any historical approach is partial and is marked with the researcher's vision, I found in the **post-positivist** paradigm the adequate path to follow, considering its implicit subjectivity.

About post-positivism, Frank Fischer wrote the following paragraph in *Beyond Empiricism: Policy Inquiry in Postpositivist Perspective*, including references to 1990 Egon Guba's *The Paradigm Dialog* (United States: Sage) and 1978 Thomas McCarthy's *The Critical Theory of Jürgen Habermas* (United States: The MIT Press):

There is no standard definition of "postpositivism." Most fundamentally, it is grounded in the idea that reality exists, but can never be fully understood or explained, given both the multiplicity of causes and effects and the problem of social meaning. Objectivity can serve as an ideal, but requires a critical community of interpreters. Critical of empiricism, it emphasizes the social construction of theory

and concepts, and qualitative approaches the discovery of knowledge. (Egon Guba, 1990). McCarthy (1978) has defined the task of developing a postpositivist methodology of social inquiry as figuring out how to combine the practice of political and social theory with the methodological rigor of modern science.

Fischer, F. (1998). *Beyond Empiricism: Policy Inquiry in Postpositivist Perspective*. *Policy Studies Journal*, vol. 26. no.1, 129-146. United Kingdom: Blackwell Publishing.

Being **transferability** an important aspect also to be considered, I ponder upon the impact of this research in readers coming from different contexts, perceiving and comparing my results according to their own knowledge and environment. Composers and scholars from the electroacoustic music field working in Latin America, composers and scholars from the same field working in North America or Western Europe, composers and scholars interested in the same field working in other regions of the world with limited access to technology, composers and scholars interested in cross-cultural musical studies, readers interested in early electroacoustic music instruments and related technologies, readers interested in early new media creations, readers interested in Latin American ethnomusicological studies, and readers interested in comparative art history are some people that could partially transfer the results of this research to their own contexts.

Transferability is a process performed by readers of research. Readers note the specifics of the research situation and compare them to the specifics of an environment or situation with which they are familiar. If there are enough similarities between the two situations, readers may be able to infer that the results of the research would be the same or similar in their own situation. In other words, they "transfer" the results of a study to another context. To do this effectively, readers need to know as much as possible about the original research situation in order to determine whether it is similar to their own. Therefore, researchers must supply a highly detailed description of their research situation and methods.

Results of any type of research method can be applied to other situations, but transferability is most relevant to qualitative research methods such as ethnography and case studies. Reports based on these research methods are detailed and specific.

Colorado State University, Writing@CSU: Writing Guide (2004). Transferability: Definition [online]. Address: <http://writing.colostate.edu/references/research/gentrans/com2c1.cfm>

A **constructivist** approach seemed to fit well with an analysis based on interviews, observations and different type of documents. In this specific work, those documents are both in text and sound formats, and to be more precise, they include writings about the composers, their context and their musical work, as well as electroacoustic music recordings.

I find the following definitions of constructivism pertinent for my approach:

A theory about knowledge and learning which asserts that learners construct their own understanding of the world around them.

National School Reform Faculty, National Center (2003). Evolving Glossary of NSRF Terms [online]. Address: <http://www.nsrffharmony.org/glossary.html>

Learning is what changes your current worldview. It builds on what you already think you know.

Internet Time Group (2003). eGlossary [online]. Address: <http://www.internetttime.com/itimegroup/eglossary.htm>

A theory of learning and knowing that holds that learning is an active process of knowledge construction in which learners build on prior knowledge and experience to shape meaning and construct new knowledge. (Lambert & Walker, 1995.)

Equipped for the Future (2002). Glossary of Related Terms [online]. Address: http://www.nifl.gov/lincs/collections/eff/eff_glossary.html

Approach that views knowledge as an active process of subjectively building a system of meanings.

Moore, M. G. and Shattuck, K. (editors). (2001). Glossary of Distance Education Terms. The Pennsylvania State University, World Campus [online]. Add.: <https://courses.worldcampus.psu.edu/public/faculty/DEGlossary.shtml>

My perspective about the proposed subject for this research involves a long personal experience, both as an artist and a researcher. This has given me the opportunity to approach each studied item through a deep connection with the music and the electroacoustic technologies concerned, as well as with the composers and the context.

I have found that multiple characteristics of the process of my research have a strong correspondence with basic elements from the **ethnographic** methodology, which I have adopted as a fundamental way to approach my work. The following two paragraphs about ethnography are very close to my position regarding this research:

Ethnographic research comes from the discipline of social and cultural anthropology where an ethnographer is required to spend a significant amount of time in the field. Ethnographers immerse themselves in the lives of the people they study (in Lewis, I. M. (1985). *Social Anthropology in Perspective*. United Kingdom: Cambridge University Press: p. 380) and seek to place the phenomena studied in their social and cultural context.

Myers, M. D. (section editor). (2004). Qualitative Research in Information Systems [online]. *Association for Information Systems*. Address: <http://www.qual.auckland.ac.nz/>

Ethnography is a long-term investigation of a group (often a culture) that is based on immersion and, optimally, participation in that group. Ethnography provides a detailed exploration of group activity and may include literature about and/or by the group. It is an approach which employs multiple methodologies to arrive at a theoretically comprehensive understanding of a group or culture.

Colorado State University, Writing@CSU: Writing Guide (2004). Ethnography [online]. Address: <http://writing.colostate.edu/references/research/observe/com3al.cfm>

The following table shows some characteristics of the ethnographic research methodology in relationship with my own experience and expertise in the electroacoustic and media arts field.

Table1. Ethnographic research characteristics vs. personal experience and expertise in the studied field.

Ethnographic research characteristics	Personal experience and expertise in the studied field
<ul style="list-style-type: none"> • Long-term, prolonged immersion in the field. 	<ul style="list-style-type: none"> • Involvement with the electroacoustic and media arts field for more than 25 years. • Living in the studied region for about 45 years.
<ul style="list-style-type: none"> • Face-to-face interactions with the people and the culture/tradition observed/researched. 	<ul style="list-style-type: none"> • Personal contact with composers, performers and researchers working on the field.
<ul style="list-style-type: none"> • Concern with the nature and function of phenomena. 	<ul style="list-style-type: none"> • Collection of relevant data for over 20 years. • Many different activities developed around the studied subject.
<ul style="list-style-type: none"> • Experiential, empirical and qualitative research. 	<ul style="list-style-type: none"> • Direct involvement in several processes of preservation, documentation and dissemination of electroacoustic music by Latin American composers. • Experience creating electroacoustic music in the same context.
<ul style="list-style-type: none"> • Framing within a specific context, place and time frame. 	<ul style="list-style-type: none"> • Deep knowledge of place and context. • Contemporary with most of the time frame under study.

<ul style="list-style-type: none"> Recording of interviews and extensive data collection. 	<ul style="list-style-type: none"> Making interviews about the studied subject for more than 10 years. Extensive collection of text (program notes, CVs, articles on journals and newsletters, etc.) and sound data (electroacoustic music recordings.)
<ul style="list-style-type: none"> Use of native language. 	<ul style="list-style-type: none"> Mother tongue: Spanish , verbal language used in most of the studied countries. Familiar with Portuguese, spoken in Brazil. Deep knowledge of the artistic language and related techniques used to create electroacoustic music.

Taking into account the correspondence between my personal experience and the characteristics of ethnography, I have found this methodology to provide the appropriate framework for my research.

Everything has the potential to be data, but nothing *becomes* data without the intervention of a researcher who takes note -and often makes note- of some things to the exclusion of others. (pgs. 5-6)

With experience, most researchers become less compulsive about collecting data and more proficient at using the data they collect. (pg. 10)

Wolcott, H. S. (1994). *Transforming Qualitative Data. Description, Analysis and Interpretation*. United States: Sage Publications.

To summarize, I have been working with a historical approach using an ethnographic methodology throughout my research.

Though vast and complex, the initial collect of recordings was characterized by an empirical process. With those recordings I have developed the core of the Latin American Electroacoustic Music Collection, hosted at the Daniel Langlois Foundation for Art, Science, and Technology in Montreal. I have filled its accompanying database including information about the music and its composers. All that music is now fully available for listening and the online database open for consultation at the Foundation, using its Intranet. The recordings archive as well as the information included in the database (more than 200,000 words) have been through a long process of research, identification, and classification.

To improve the dissemination of the results of my research, a selection of pieces is also available for listening on the Internet as well as part of the information contained in the aforementioned database.

The body of my text has been produced thanks to my long-term immersion in the field, my personal contact with composers and performers, the possibility to share the same native language with most of them, and my involvement and concern with the evolution of the arts and new technologies in Latin America. This text is the product of a long work characterized by an ethnographic methodology of research.

2.4 Ethics¹²

Ethical considerations are of major importance to me in this work, not only to interview or undertake the analysis of the collected data, but in general to approach the subject and unfold at least part of its lost or hidden history.

I expect to contribute to the knowledge of the electroacoustic music created by composers born in (or related with) Latin America, and I have been accomplishing this task with

¹² **Ethics**: a system of moral principles, rules or standards governing the appropriate conduct for an individual or group (adapted from Nonprofit Hub.com, <http://www.nonprophub.com/ethics.htm>).

honesty, searching the truth according to my beliefs, and respecting the confidence of my colleagues.

Ethical issues should always be considered when undertaking data analysis. Because the nature of qualitative observational research requires observation and interaction with groups, it is understandable why certain ethical issues may arise. Miles and Huberman (1994) list several issues that researchers should consider when analyzing data. They caution researchers to be aware of these and other issues before, during, and after the research had been conducted. Some of the issues involve the following:

- Informed consent (Do participants have full knowledge of what is involved?)
- Harm and risk (Can the study hurt participants?)
- Honesty and trust (Is the researcher being truthful in presenting data?)
- Privacy, confidentiality, and anonymity (Will the study intrude too much into group behaviors?)
- Intervention and advocacy (What should researchers do if participants display harmful or illegal behavior?)

Colorado State University, Writing@CSU: Writing Guide (2004). *Ethical Considerations in Ethnography, Observational Research, and Narrative Inquiry* [online]. Address: <http://writing.colostate.edu/references/research/observe/com2d4.cfm>

I am also a composer working with electroacoustic media, therefore a colleague of the artists I am interviewing or asking recordings of their pieces to. It is fundamental for me to reflect my point of view taking much care of the approach each composer has regarding their own work.

The consent from my colleagues has been given to me through the years, only exceptionally in the written form (as it was the case when their music recordings or scores or photos or interviews were uploaded to the Daniel Langlois Foundation web site), but it has always been there, when composers were allowing me to record long personal interviews and submitted their music with confidence, knowing about my long standing commitment towards the recover and dissemination of part of our culture.

In some cases it was the families of composers that had already died that approved and sent materials, being happy with the possibility to disseminate works and information. My

interviews, the data collection, and in general terms, all my research, has been possible thanks to a trustful attitude and the confidence gained through many years of work in the electroacoustic music field.

2.5 The theoretical framework

Walter Benjamin wrote in his *Theses on the Philosophy of History*:

To articulate the past historically does not mean to recognize it ‘the way it really was’ (Ranke). It means to seize hold of a memory as it flashes up at a moment of danger [...] The danger affects both the content of the tradition and its receivers. The same threat hangs over both: that of becoming a tool of the ruling classes.” (pg. 255)

Benjamin, W. [edited by Arendt, H.] (1969). *Illuminations*. United States: Schocken.

I find this statement by Benjamin close to the problematic I was facing, considering the losses I was referring to before as one of the dangers, and the misuse of the present situation by the establishment¹³, distorting the history of art and new technologies in the region, a danger too.

About the relevance of the archival work, regarding history and its connection past-present-future, I think these few lines from Tom Nesmith addresses that point in an interesting manner:

Archival work is driven by an overriding historical imperative. Archivists exist as a distinct profession to identify, protect, describe, make available, and preserve records that have long-term value, as carriers of information from the past that is relevant to the present and the future (pg. 5)

Nesmith, T. (2004). What’s History Got to Do With It?: Reconsidering the Place of Historical Knowledge in Archival Work. *Archivaria*, no. 57, 1-27. Canada: Association of Canadian Archivists.

¹³ In the context of this doctoral thesis, **establishment** refers to a group of people who hold power in a society or social group and dominate its institutions (World English Dictionary-Microsoft, 1999).

Part of my work has been inspired in projects like the International Digital Electroacoustic Music Archive (IDEAMA), co-founded by the Center for Arts and Media Technology (ZKM) in Karlsruhe, Germany, and Stanford University's Center for Computer Research in Music and Acoustics (CCRMA). IDEAMA was started in 1990 and ran for six years. It was created to collect, preserve and disseminate historically significant electroacoustic music.

Around 570 works composed before 1970 were collected and processed to form the IDEAMA target collection. From those, just a few ones were coming from Latin American composers.

Besides both founding institutions, most of the partner organizations made the collection publicly available: the Institut de Recherche et de Coordination Acoustique/Musique (IRCAM), the Institut International de Musique Electroacoustique de Bourges (IMEB) and the Institut Nationale de l'Audiovisuel / Groupe de Recherches Musicales (INA/GRM), all three from France; the Instituut voor Psychoacustika en Elektronische Muziek (IPEM) from Belgium; the Instituut voor Sonologie Koninklijk Conservatorium Den Haag from The Netherlands; the National Center for Science Information Systems (NACSIS) from Japan; the New York Public Library (NYPL) from the United States; the Polskie Radio - Contemporary Music Department, from Poland; and the Stiftelsen Elektro-Akustisk Musik i Sverige (EMS) from Sweden. All of the following affiliate institutions made that collection publicly available, too: the Aalborg Universitet Institut for Musik og Musikterapi and the Danish Institute for Electroacoustic Music (DIEM), both from Denmark; the Bibliothek der Hochschule Musik und Theater, the Bibliothek der Musik Akademie der Stadt Basel, and the Stiftung Haus der Klänge, Mädris-Vermol, all three from Switzerland; the Brandeis University Library, the Library of Congress - Recorded Sound Collection, and the Michigan State University School of Music, all three from the United States; the Centre For Computational Musicology and Computer Music of University of Limerick, from Ireland; the Institut für Computermusik und elektronische Medien (ICEM) der Folkwang-Hochschule Essen, from Germany; the Institut für Elektronische Musik und Akustik (IEM) an der Universität für Musik und darstellende Kunst Graz, from Austria; the Kungliga Musikhögskolan Stockholm from Sweden; the NoTAM - Norsk nettverk for Teknologi,

Akustikk og Musikk, University of Oslo, from Norway; and the Walker Hill Art Center Seoul, from Korea. Even if a few members of the IDEAMA project's International Advisory Board had been born in Latin America, no institution in this region made the collection publicly available.

The IDEAMA project was also showing an alarm light: even with the involvement of several major world recognized institutions, the recovering process was a very difficult task to carry out, and economic resources were falling short.

If that project was so hard to develop, mine was like a utopia at the beginning, but dreams come true sometimes ... usually working very hard.

Together with **electroacoustic music**, **Latin America**, and **art and new technologies**, I consider the following as keywords of my work:

- **Ethics**
- **Memory**
- **Culture**
- **Contextualization**¹⁴
- **Pioneerism**
- **Interdisciplinarity**

The development of musical creation with electroacoustic media in Latin America has different attracting points to me. Taking Latin America as a whole in my study was a major decision, where the adopted definition of **culture** was basic. In that sense, I found in David Fetterman's book *Ethnography: Step by Step* an approach close to my own perspective:

¹⁴ **Context**: everything - social, cultural, political, historical factors - that surrounds a particular event or development of thought. These are the forces of influence at play when the event actually occurs. Greater knowledge of the context of a thing leads to a deeper understanding of and more balanced perspective on its nature (from American Studies, <http://www.trincoll.edu/~tvogel/gloss.htm>).

The most popular ideational definition of culture is the cognitive definition. According to the cognitive approach, culture comprises the ideas, beliefs, and knowledge that characterize a particular group of people. (pag. 27)

A cultural interpretation rest on a foundation of carefully collected ethnographic data. Together with ethnographic methods and techniques, cultural interpretation and a variety of other fundamental concepts shape what ethnography is - notably, a holistic perspective, contextualization, and emic, etic, and nonjudgmental views of reality. (pgs. 28-29)

Fetterman, D. M. (1998). *Ethnography: Step by Step*. United States: Sage Publications, Applied Social Research Methods Series, vol. 17.

The relationship between knowledge and memory, not in its biological meaning but in its historical one, is something that needs to be supported, is one of the foundations of a culture. While musical works created using new technologies in Latin America during the past decades were being lost, I became more and more concerned about it and decided to help to preserve them.

In Latin America there are paradoxes, like in most other regions and cultures. One of those paradoxes has been on my mind for a long time and that is the interest, the involvement, the concern by many artists to work with new and expensive technologies in places where this could be a luxury. Therefore, contextualization is fundamental in my research to generate the guiding rules to understand the significance of this study. A simple and clear statement about contextualization is presented again by Fetterman in his book *Ethnography: Step by Step*: "Contextualization data involves placing observations into a larger perspective." (pg. 29). Those words by Fetterman are as simple as inspiring for me. The following chapter of this thesis approaches some aspects of Latin America's culture, economy, and sociopolitical characteristics, for a better understanding of the research subject context.

Pioneerism is also in the roots of my research, recovering the work of many composers, in some cases almost forgotten. Considering we can all learn from the actions of those that came before us, pioneerism is a key point that runs all along my research.

Interdisciplinarity is another fundamental axis of my work. Electroacoustic music is in itself

an interdisciplinary field. Arts, sciences and new technologies find a fertile place there to meet, to elaborate, to grow, to collaborate and to create.

The electroacoustic media, concepts and techniques related to music are also open to interesting exchanges and integration with other art forms. A good example in this sense is the MIDI standard, developed 20 years ago for music production, which later became the basis for the richest methodologies to link resources and technologies behind different temporal/spatial art forms (e.g. interactive installations).

Interdisciplinarity involves bringing together distinctive components of two or more disciplines. In academic discourse, interdisciplinarity typically applies to four realms: knowledge, research, education, and theory. Interdisciplinary knowledge involves familiarity with distinctive components of two or more disciplines. Interdisciplinary research combines distinctive components of two or more disciplines in the search or creation of new knowledge, operational procedures, or artistic expressions. Interdisciplinary education merges distinctive components of two or more disciplines in a single program of instruction. Interdisciplinary theory takes interdisciplinary knowledge, research, or education as its main objects of study. At any given historical period, the interdisciplinary richness of any two exemplars of knowledge, research, and education can be compared by weighing four variables: number of disciplines, the "distance" between them, novelty, and integration."

Nissani, M (1995). Fruits, Salads, and Smoothies: A Working Definition of Interdisciplinarity. *Journal of Educational Thought*, 29, 119-126. Canada: Faculty of Education, The University of Calgary.

My approach to develop this research has considered the aforementioned keywords together with aspects such as:

- The relationships between art, science and technology.
- The pioneerism and further development in art and new technologies in non-supportive contexts.
- The ignorance we have about the achievements of our own culture.
- Memory, preservation and future.

2.6 Recordings archive and associated database

Almost every piece of information and recording I have gathered these years was obtained by searching for and contacting each composer directly. In many cases the data collection was made through personal contact. Email, letter or telephone communication with the composers and technology innovators mentioned throughout this text was also used extensively. A lot of data found in concert program notes, books, newsletters, newspapers and journals, scores, recording sleeves and other documents was corroborated with the artist whenever it was possible.

Communicational aspects have been a major issue during all this process, as many composers and technology innovators have been extremely difficult to get through to. Most of the pioneers are in their seventies or eighties, and composers are usually thinking of their next works and not many of them take care of their past production.

The results of my research are contained in this text as well as in the database and the materials archived at the DLF in Montreal.

Those materials include:

- A music archive with 1,722 recordings of works, created between 1956 and 2004 using electroacoustic media, by 380 Latin American composers.
- Additional reference material:
 - Audiovisual recordings: 18 audiovisual (17 videos) and 2 audio interviews with composers and technology innovators (more than 10 hours).
 - Images: 12 scores and 17 record sleeves from analog LPs, mostly published during the pioneer years (all materials were digitized).

The database created for this research includes the following information (when available) about each of the pieces archived:

- Title of the work
- Composer's name
- Year(s) of composition
- Recording duration
- Alternative titles
- Movements or parts of the piece
- Version
- Studio of production
- Instrumentation
- Program notes (in English, French and Spanish)
- Source who provided the recording
- Format of the original recording received
- Information about the composer
- ID code of the digital audio file

Numéro ID: 00001699 Création: 6/26/2004 IDal Farra
Modification: 4/12/2005 IDal Farra

TypeOeuvreID: Musique Auteur:
 MediumID: NomAuteur: lanza, alcidos
 SupportID: AlternativeAuteur:
 Encodage: Auteur2:
NomAuteur2:
AlternativeAuteur2:

Titre: interferences II (1967-II) [tape part only]
 Traduction du titre:
 Traduction du titre Ang:
 Titre Alternative:
 Année Pré: 1967 Année In production: Pré:

Son: Collaborateur:
 Durée: Collaborateur ID:
 Studio: Columbia-Princeton Electronic Music Center, New York, United States
 Provenance: composer (alcides Janza)
 Type source: CD-R
 Nom fichier:
 Durée enregistrement:
 Documents relatifs:
 Mouvements:
 Version:

Instrumentation Court:
 Instrumentation Long:

Notes de recherche:
 percussort ensemble and electronic sounds. [tape part only]

Cue	1	2	3	1	2	3	000001699_lanzainterf_IIa.aif
Cue	1	1:05	1	1	3	000001699_lanzainterf_IIa.aif	
Cue	2	1:01	2	2	3	000001700_lanzainterf_IIb.aif	
Cue	3	2:37	3	3	3	000001701_lanzainterf_IIc.aif	

Figure 2. Database entry form (sample page) including fields for: composition title, year(s) of creation, production studio, instrumentation, version, movements or cue parts, duration, recording provenance and original format, database coding, composer's name, register's creation date and last modification, among other information.

Numero ID: 000001916	Titre: Alternancias Auteur: del Monaco, Alfredo		Creation: 7/24/2004 - Dal Farra Modificacion: 1/11/2005 - Dal Farra
Studio			
Copyright			
Bources de financement			
Commentaires de l'auteur			
Commentaires / Notes de programmes	<p>"ALTERNANCIAS" (1971) for Violin, Viola, Cello, Piano and Electronic Sounds on Tape</p> <p>This piece was written at the request of The Gallo Piano Quartet (Venezuela) and premiered by this group at the Venice Biennale of 1971. "Alternancias", as well as "Distalamos" and other works by the composer present different combinations of live instruments with electronic sounds on tape.</p> <p>Consequently, "Alternancias" is based on the union and opposition of different sound media: electronic and live instruments, short and prolonged sounds produced by either similar or opposed articulations, as well as rhythmic and non-rhythmic sequences. There is also a duality when the electronic medium produces sounds similar to instrumental tones, and instruments in turn produce sounds very close to those of electronic nature, and likewise, when instruments play the same tone (unison) from which they depart and return following practices applied by the composer in his electronic music works.</p>		
Instruccion de l'auteur			
Notes FR			
Questions de recherche			
Description			
Fiche technique			
Producteur	<p>Source de description: <input type="text"/></p> <p>Source fiche technique: <input type="text"/></p>		
Producteur ID	<p>The electronic sounds on tape were produced at Columbia-Poncelon Electronic Music Center, New York, 1971.</p> <p>Recording: The Gallo Piano Quartet. Originally recorded in / Fundación Mito-Juan Pina Musica, No. 8, Caracas 1975. (out of print)</p>		

Figure 3. Database entry form (sample page) including fields for: composition title, program notes in English, French and Spanish, composer's name, among other information.

Titre: Zampona Sónica (tape part only)		Modification: 2/2/2005 10:02	
Auteur: Valcarcel, Edgar			
Auteur	Naissance: 1-1-1932	Puno	Pérou
Nom/Auteur	Déces		
Alternative auteur	Compositeur Coll.RDF: X		Pays (stat): Pérou
Biographie	Edgar Valcarcel (born in Puno, 1932) was in Buenos Aires, Argentina, during the early 1960s working at CL.AEM-Instituto Torcuato Di Tella (1963-1964). He composed his first pieces using electronic sounds when he received a Guggenheim fellowship that allowed him to work at the Columbia-Princeton Electronic Music Center in New York.		Pays de carrière: Pérou
			Pays coll.RDF: Pérou
			Pays de naissance: Pérou
Auteur 2			
Nom/Auteur 2			
Alternative auteur 2			
Biographie	"Invention" for tape, was composed there in 1967 working with electronic sound wave generators and filtered white noise, and using editing and looping techniques.		Compositeur Coll.RDF:
			Pays de carrière:
			Pays coll.RDF:
Auteur 3			
Nom/Auteur 3			
Alternative auteur 3			
Biographie	"Canto Coral a Tupac Amaru" for chorus, percussion and tape, was also composed in 1968 while working at the Columbia-Princeton studio.		Compositeur Coll.RDF:
	"Zampona Sónica", for flute and electronic sounds, composed between 1968 and 1976, also make use of the electronic sounds Valcarcel produced during his stay at the Columbia-Princeton Electronic Music Center.		
	Another piece by Valcarcel, "Flor de Banquito" for piano and tape, was composed in 1976 at the McGill Electronic Music Studio in Montreal, Canada, when he was visiting professor at the McGill University.		
	Now at his seventies, Valcarcel feels that the dream to keep working on the electronic music field was impossible to accomplish in his own land (where he lives) because of the dramatic social, economical and cultural		

Figure 4. Database entry form (sample page) including fields for: composition title, composer's name, year and place of birth, place of career, biographical notes in English and French, among other information.

It should be noted that not every audio file in the archive is a complete piece, as there are cases where each movement of a composition is stored as a different file with its corresponding individual information (according to the rules the composer used to store his or her work). Then the archive has 2,152 digital files that correspond to the 1,722 works, where 112 pieces from that list have a total of 542 independently recorded movements or cue parts (that means $1,722 - 112 + 542 = 2,152$).

From the 2,152 digital files, 2,141 are audio files with extension .aif and 11 are audio/video files: 8 of them are .mov and 3 are .mp4.

Regarding the database, from the 1,722 compositions available:

- 1,685 are dated (only 37 pieces remain undated)
- 1,034 have their instrumentation indicated
- 496 have information about their production studio (name and place)
- 365 have program notes in English, 36 in French and 263 in Spanish. Over 140,000 words.
- 379 have some data of their version (if they are mixed pieces: performers; recording place and date, etc.)
- 267 have extra research notes
- 81 have information about their copyright or the publishing house
- 1,295 have biographical information about their composers in English (corresponding to 199 composers), and 132 works have biographical information about their composers in French (corresponding to 3 composers). Over 47,000 words.

A significant number of compositions from the 60s and 70s have been archived as well as many more from the 80s, 90s and recent years. Only a few pieces from the 50s were found and included:

- 1956 - 1959: 4 works
- 1960 - 1969: 83 works
- 1970 - 1979: 161 works
- 1980 - 1989: 292 works
- 1990 - 1999: 747 works
- 2000 - 2004: 393 works

Except for a couple of multi-track works, the digital audio files were archived using the following format: AIFF, stereo, 16 bits, 44.1 KHz.

The music archive includes pieces for fixed media (tape, DAT, CD or similar) as well as mixed works for acoustic instruments or voices and fixed media or live electronics/interactive systems. There are also some multimedia works. In the case of pieces for fixed media and other sound sources (e.g. mixed works), full recordings as well as tape-only parts (i.e. cues on fixed media) are preserved and catalogued.

The work has been extensive: navigating through a myriad of technical problems (recovering from massive hard disk crashes, finding tape recorders with old track formats, re-digitizing material to correct severe DC offsets in brand-new equipment, OS and FireWire conflicts, etc.), defining how to work best with very noisy old recordings (a few pieces were processed using an advanced de-noise system to moderate hiss, always preserving the original recording and following the composer's advice), working with three different computers and nine hard disks to manage the audio and visual files, the database, and the large amount of information and daily international communications, and the list goes on.

Part of the text-based information contained in the music archive's database is available through the Daniel Langlois Foundation web site (<http://www.fondation-langlois.org/flash/e/stage.php?NumPage=542>). A versatile search engine allows the user to explore the data by title, composer and date, directly via Internet. The full database content is available for consultation at the documentation center of the Foundation.

In most cases, the composers represented in this archive were born in Latin American countries. There are also a few composers who, although not originally from the region, pursued at least a portion of their musical career in Latin America. The same criterion was adopted for the full text. The database contains information on composers associated with 18 Latin American countries: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Mexico, Panama, Paraguay, Peru, Puerto Rico, Uruguay and Venezuela. The text of the thesis includes chapters on those countries, too.

The list of composers and compositions included in the archive as well as a number of statistics, such as compositions by decade, compositions by country and composers by country, are available on the Foundation's web site.

The following table shows the number of composers represented in the *Latin American Electroacoustic Music Collection*, hosted at the Daniel Langlois Foundation, and their associated country (i.e. where the composers were born or pursued a portion of their professional careers).

Table 2. Number of composers who have music in the archive of the Daniel Langlois Foundation, and associated country (i.e. where the composers were born or pursued a portion of their professional careers).

Country	Number of composers
Argentina	143
Bolivia	11
Brazil	39
Chile	28
Colombia	24
Costa Rica	5
Cuba	20
Dominican Republic	3
Ecuador	8
El Salvador	1
Guatemala	6
Mexico	41
Panama	1
Paraguay	3
Peru	12
Puerto Rico	5
Uruguay	14
Venezuela	16
Total	380

The amazing production of electroacoustic music in Argentina finds some explanation in the sustained activities held in that country since the 50s, the availability of technological resources in centers created during the 60s, 70s and 80s, and the avidity of many composers to explore new musical trends. More references: Chapter V section 5.2, and Chapter VI section 6.2, Argentina.

The following table shows the number of compositions archived in the *Latin American Electroacoustic Music Collection*, and their associated country.

Table 3. Number of compositions archived at the Daniel Langlois Foundation, and associated country (i.e. where their composers were born or pursued a portion of their professional careers).

Country	Number of compositions
Argentina	735
Bolivia	18
Brazil	166
Chile	99
Colombia	74
Costa Rica	16
Cuba	130
Dominican Republic	10
Ecuador	50
El Salvador	2
Guatemala	18
Mexico	158
Panama	1
Paraguay	9
Peru	67
Puerto Rico	17
Uruguay	87
Venezuela	65
Total	1722

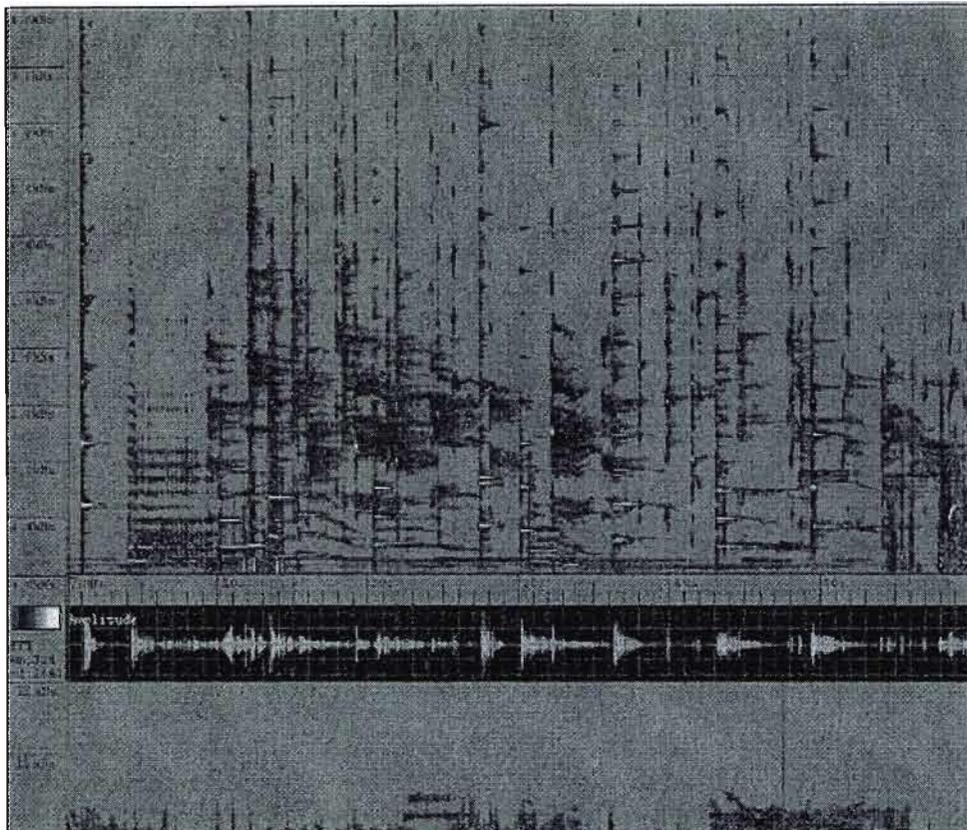


Figure 6. One of the sonograms available in the *Latin American Electroacoustic Music Collection*. It corresponds to César Bolaños piece for guitar and tape: *Interpolaciones*, composed in 1966.

While the lowest visual part is showing the full sonogram for the whole piece, the upper part shows sonograms corresponding to one minute of the piece, changing the image for each new minute of sound. A moving bar over the sonogram image is accompanying the music, allowing the listener to easily track the relationships between the perceived music and the graph.

Part of the information in the archive has been made available online through the Foundation's web site since November 2004, including:

- Introductory text about the musical creation using electroacoustic media by Latin American composers (Flash format to be read online and downloadable Acrobat PDF format of texts written in English, French and Spanish).
- Limited access to the database (work titles; years of composition; composers' names; country associated to the composers).
- The 30 works available for listening on the web, each one with its associated sonograms.

The high rate of international visits to the Foundation's web site has been useful as a way to receive the feedback from the composers, either to send corrections about their information online or to send recordings to be included in the archive. In both cases, the results were positive, as the number of recordings was increased and some problems were detected and fixed.

A first approach to the initial impact of this part of the project could be seen through the following statistics. They show the number of visits to different parts of the online project and the number of downloads of the PDF texts.

Table 4. Monthly statistics: November 2004, first month online.

Page	Visits
Latin American Electroacoustic Music Collection: main page	1126
Latin American Electroacoustic Music Collection: text (Flash format)	603
Latin American Electroacoustic Music Collection: 30 works online	412
Latin American Electroacoustic Music Collection: search engine	353

Text (PDF format)	Downloads
Latin American Electroacoustic Music Collection: English version	29
Latin American Electroacoustic Music Collection: French version	60
Latin American Electroacoustic Music Collection: Spanish version	103

Table 5. Monthly statistics: December 2004, second month online.

Page	Visits
Latin American Electroacoustic Music Collection: main page	464
Latin American Electroacoustic Music Collection: text (Flash format)	221
Latin American Electroacoustic Music Collection: 30 works online	277
Latin American Electroacoustic Music Collection: search engine	251

Text (PDF format)	Downloads
Latin American Electroacoustic Music Collection: English version	12
Latin American Electroacoustic Music Collection: French version	11
Latin American Electroacoustic Music Collection: Spanish version	29

Table 6. Monthly statistics: January 2005, third month online.

Page	Visits
Latin American Electroacoustic Music Collection: main page	762
Latin American Electroacoustic Music Collection: text (Flash format)	211
Latin American Electroacoustic Music Collection: 30 works online	452
Latin American Electroacoustic Music Collection: search engine	321

Text (PDF format)	Downloads
Latin American Electroacoustic Music Collection: English version	41
Latin American Electroacoustic Music Collection: French version	12
Latin American Electroacoustic Music Collection: Spanish version	98

Table 7. Monthly statistics: February 2005, fourth month online.

Page	Visits
Latin American Electroacoustic Music Collection: main page	433
Latin American Electroacoustic Music Collection: text (Flash format)	350
Latin American Electroacoustic Music Collection: 30 works online	270
Latin American Electroacoustic Music Collection: search engine	163

Text (PDF format)	Downloads
Latin American Electroacoustic Music Collection: English version	15
Latin American Electroacoustic Music Collection: French version	4
Latin American Electroacoustic Music Collection: Spanish version	58

Table 8. Monthly statistics: March 2005, fifth month online.

Page	Visits
Latin American Electroacoustic Music Collection: main page	428
Latin American Electroacoustic Music Collection: text (Flash format)	258
Latin American Electroacoustic Music Collection: 30 works online	331
Latin American Electroacoustic Music Collection: search engine	76

Text (PDF format)	Downloads
Latin American Electroacoustic Music Collection: English, French and Spanish versions	69

The full collection of audio, visual and text materials is freely available for listening and consultation at the Centre for Research and Documentation of The Daniel Langlois Foundation for Art, Science, and Technology:

3530, Saint-Laurent Boulevard, Suite 402
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Internet: <http://www.fondation-langlois.org/>

CHAPTER III

CONTEXT

3.1 Art and power

The following lines from *Some comments about electroacoustic music (and life) in Latin America*, an article I wrote in 1994 while living in Argentina, can give the reader a first approach to one central situation related to my regional research about music and new technologies:

For composers like myself who live and work in this region of the planet, it is often very hard to know what is happening (musically and/or otherwise) in a neighboring country, but it is comparatively easy to stay informed about music produced in North America or Western Europe. I know this problem is pervasive in many areas of the world, but I believe we need to do something about it. I wish and do appreciate to have access to music from the “first world”, but I think Latin American composers need to find the way to know each other too. The global village should not work only for some people, knowledge should not travel only in one direction, and the transmission of information should not be controlled by any single network in the globe.

Dal Farra, R. (1994). *Some comments about electroacoustic music (and life) in Latin America*. *Leonardo Music Journal*, vol. 4, 91-98. United States: The MIT Press.

Why do most of us know what has been going on in scientific research, technology development or the arts, just in a few countries? And why do many people from the third world know less about similar aspects in their own environments than from the evolving situation in other countries, mostly from the so-called first world?

The history of the media arts seems to be linked in some way to the economic power that supports it.

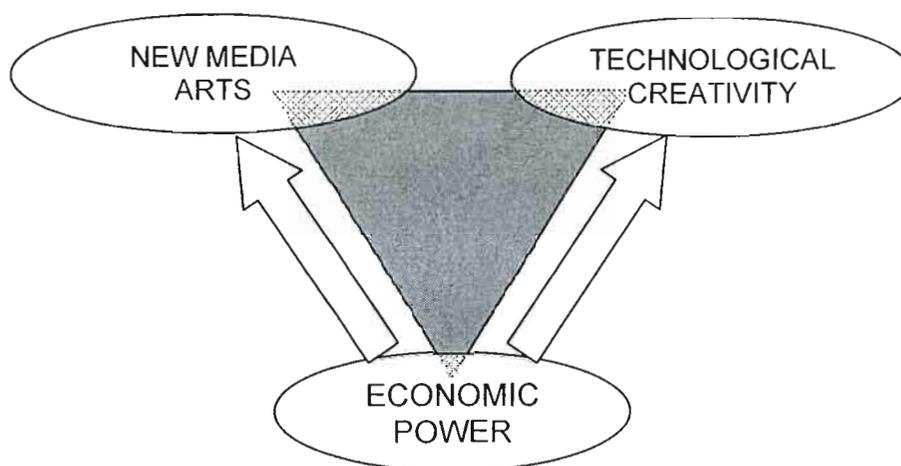


Figure 7. Economic power relationships with art, innovation and technology.

Who writes the history: who knows about it or who has the opportunity to do it? It is possible to find many versions of the history of electroacoustic music but it is very strange to find a reference to something coming from non first-world countries.

One of the authors that addressed the problematic of music and power in western culture is Jacques Attali. In his striking and powerful book *Noise: The Political Economy of Music* he wrote:

With noise is born disorder and its opposite: the World. With music is born power and its opposite: subversion. In noise can be read the codes of life, the relations among men. Clamor, Melody, Dissonance, Harmony; when it is fashioned by man with specific tools, when it invades man's time, when it becomes sound, noise is the source of purpose and power, of the dream - Music.

All music, any organization of sounds is then a tool for the creation or consolidation of a community, of a totality. It is what links a power center to its subjects, and thus, more generally, it is an attribute of power in all of its forms. There, any theory of power today must include a theory of the localization of noise and its endowment with form.

Attali, J. (1985). *Noise: The Political Economy of Music*. United States: University of Minnesota Press.

A milestone, this book about music, history and politics in the western hemisphere is a controversial reading for all those who are interested in the social role and meaning of music and its interrelationships with power. No doubt this book I read almost two decades ago was triggering part of my concerns about the relationships between technology-based art forms, culture and power. It is worth mentioning some excerpts from comments about Attali's book, as they are close to my own approach about music and its role reshaping societies, today more than ever:

It can only revitalize discussion on the connections between political power, ideology, and the role of music in the current cybernetic phase of capitalism's twilight years. - *Border/Lines*

For Attali, music is not simply a reflection of culture, but a harbinger of change, an anticipatory abstraction of the shape of things to come. The book's title refers specifically to the reception of musics that sonically rival normative social orders. Noise is Attali's metaphor for a broad, historical vanguardism, for the radical soundscapes of the western continuum that express structurally the course of social development. - *Ethnomusicology*

University of Minnesota Press (n/d). *Noise: The Political Economy of Music* [online]. Address: http://www.upress.umn.edu/Books/A/attali_noise.html

Even if western society has been considered a visual-based culture, and the mass media explosion of the last decades seems to corroborate it, sound-based art and communication is in the core of this society, too.

After many years of technological development we still use audio-only systems for communication, leisure or information, but I cannot imagine we could come back to the silent movies era. We can leave the television on while we are around, listening from time to time and coming to see the images when we are really interested in but, again, I cannot imagine watching its screen for hours turning on the sound just when we think something will interest me.

Sounds or images? This is not a question for me. I am not talking of which is more relevant here. I am proposing a reevaluation of the role of sound in our societies. And music as a sound-based art form, today reshaped and repackaged in thousands of forms through different electronic technologies, is taking part in the definition of our future. The isolation state a Walkman, Discman or any portable music player produces, even if a hundred people are around, or the common attitudes thousands of music listeners adopt during a rock concert, shows the power of sound and music. Links between music and power have been there for a long time, and Attali explains that in his book, but the explosion of new technologies during the twentieth century is taking those connections far beyond what our imagination can see today.

The development of new technologies has been a central issue related to the evolution of western society. And in some way, each step forward has also been a step backward.

The balance between arts, sciences and new technologies development has been a matter of preoccupation in the northwestern world, as they represent and differentiate groups and their relative power. Paraphrasing Attali, art is a tool for the creation or consolidation of a community. Science is the approved western way to look for knowledge and understanding, and technology the practical application of that knowledge to solve problems or to accomplish our desires.

Electroacoustic music, as one expression of the nowadays called media arts, merges art, science and new technologies in a way that was impossible to imagine before, except for a few visionaries. Electroacoustic music was born in France, Germany and the United States, heart of the northwestern society, but soon started also in other places (Canada, Japan, and several Latin American and European countries) where the intellectual classes were tracking all kinds of new developments.

In most cases electroacoustic music is the product of creative people interested in the advancement of knowledge, but it cannot only be seen as an individual invention: it is the product of historical, cultural and economic factors placed in a larger context, too.

In a more restricted sense, electroacoustic music by Latin American composers exposes a similar preoccupation regarding our contemporary interests in merging art, science and new technologies but in a rather different context than that of the northwestern countries. Unequal opportunities and a strong economic division of classes has been characteristic in most Latin American countries. Poverty and lack of education for the poorest class coexist with European or North American education for the middle-high and high classes still today, leaving a wide gap between them in several countries of the region. Numerous dictatorial governments (e.g. Bolivia: 23 military governments since its independence; Colombia: 23; El Salvador: 45; Guatemala: 28; Paraguay: 17; Peru: 31; Venezuela: 28) in some cases lasting decades (e.g. Argentina: 1955-1958, 1963, 1966-1973 and 1976-1983; Brazil: 1964-1984; Chile: 1973-1990; etc.), and mass murders are also part of the recent history. The applied model of domination in the region has slowly been shifting from the direct violence of the past years to a new combination based on economic factors.

In a general context characterized by strong social and economic differences, lack of support for cultural activities, and very often, restricted individual liberties, musical creation based on experimental uses of electroacoustic technologies was born in Latin America.

3.2 Economy overview

Following I am including some basic statistical information of the economic situation in those Latin American countries considered for this research and in several northwestern countries where pioneering electroacoustic music started decades ago (e.g. Canada, France, Germany, Italy, Sweden, United Kingdom, United States).

The information and all the quotes in this section were gathered from the *The World Factbook 2004* prepared by the Central Intelligence Agency (CIA) of the United States. This publication is in public domain and all its data can be freely copied (<http://www.cia.gov/cia/publications/factbook/index.html>).

The first table shows the gross domestic product per capita (US dollars) in 25 countries, including 18 from Latin America. Gross domestic product or GDP is “the value of all final goods and services produced within a nation in a given year.” GDP - per capita is the “purchasing power parity basis divided by population.” Countries were sorted in descending order placing those with the highest GDP per capita on the top. The rank column at the left shows their positions considering all the countries in the world.

Table 9. Gross domestic product per capita in 25 countries, including 18 from Latin America, ranking the amounts in descending order from the highest to the lowest.

Rank	Country	GDP - per capita	Date of Information
3	United States	\$37,800	2003
11	Canada	\$29,800	2003
19	United Kingdom	\$27,700	2003
20	France	\$27,600	2003
21	Germany	\$27,600	2003
24	Sweden	\$26,800	2003
25	Italy	\$26,700	2003
56	Puerto Rico	\$16,800	2003
64	Uruguay	\$14,500	2004
73	Argentina	\$11,200	2003
79	Chile	\$9,900	2003
82	Costa Rica	\$9,100	2003
84	Mexico	\$9,000	2003
92	Brazil	\$8,100	2004
106	Colombia	\$6,300	2003
108	Panama	\$6,300	2003
112	Dominican Republic	\$6,000	2003
122	Peru	\$5,100	2003
129	El Salvador	\$4,800	2003
130	Venezuela	\$4,800	2003
132	Paraguay	\$4,700	2003
136	Guatemala	\$4,100	2003
149	Ecuador	\$3,300	2003
153	Cuba	\$2,900	2003
162	Bolivia	\$2,600	2004

The table above shows a clear difference between the GDP - per capita amounts corresponding to the first seven countries of the list and those corresponding to Latin America. European and North American countries are ranked between positions 3 and 25, while Latin American countries appear on positions 64 to 162. The only exception is Puerto Rico, ranked in position 56, probably because of its special political and economic status in relationship with the United States.

The next table shows the population below the poverty line in the same 25 countries. “Definitions of poverty vary considerably among nations. For example, rich nations generally employ more generous standards of poverty than poor nations.”

Table 10. Population below the poverty line in 25 countries, including 18 from Latin America; percentages shown in descending order from lowest to highest.

Country	Population below poverty line	Date of Information
Sweden	6.4%	2002 (a)
France	6.5%	2000
Canada	10.3%	2002 (a)
United States	12%	2003
United Kingdom	17%	2002
Chile	20,6%	2000
Costa Rica	20,6%	2002
Uruguay	21%	2003
Brazil	22%	1998
Dominican Republic	25%	NA
Paraguay	36%	2001
Panama	37%	1999
Mexico	40%	2003
Venezuela	47%	1998
Argentina	51.7%	2003
Peru	54%	2003
Colombia	55%	2001
El Salvador	58%	1999
Bolivia	64%	2004
Ecuador	65%	2003
Guatemala	75%	2002
Cuba	NA	
Germany	NA	
Italy	NA	
Puerto Rico	NA	

(a) Information from the Canadian Council on Social Development
(<http://www.ccsd.ca/pubs/2002/olympic/indicators.htm>)

NA = information not available

The table above shows again a very different situation between some European and North American countries (between 6.4% and 17% of the population below the poverty line),

compared to most Latin American countries (between 20.6% and 75%).

The following table shows the population and the number of Internet users in the whole world, the European Union, and the same 25 countries presented in the tables above.

“Population entry gives an estimate based on statistics from population censuses, vital statistics registration systems, or sample surveys pertaining to the recent past.” The inclusion of basic statistical information on “the number of users within a country that access the Internet” is included to give a first approach to the access the population has to a certain level of digital technology. It must be considered that “statistics vary from country to country and may include users who access the Internet at least several times a week to those who access it only once within a period of several months.”

Table 11. Population and number of Internet users in the whole world, the European Union and 25 selected countries, including 18 from Latin America.

Rank by population	Country	Population	Internet Users	Date of Information (Internet)
1	World	6,372,797,742	604,111,719	July 2005 est.
4	European Union	456,285,839	206,032,067	Sept. 2004
5	United States	295,734,134	159,000,000	2002
7	Brazil	186,112,794	14,300,000	2002
13	Mexico	106,202,903	10,033,000	2002
16	Germany	82,431,390	39,000,000	2003
22	France	60,656,178	21,900,000	2003
23	United Kingdom	60,441,457	25,000,000	2002
25	Italy	58,103,033	18,500,000	2003
29	Colombia	42,954,279	2,732,200	2003
33	Argentina	39,537,943	4,100,000	2002
37	Canada	32,805,041	16,110,000	2002
41	Peru	27,925,628	2,850,000	2003
47	Venezuela	25,375,281	1,274,400	2002
62	Chile	15,980,912	3,575,000	2002
64	Guatemala	14,655,189	400,000	2002
67	Ecuador	13,363,593	569,700	2003
72	Cuba	11,346,670	120,000	2001
86	Sweden	9,001,774	5,125,000	2002
87	Dominican Rep.	8,950,034	500,000	2003
88	Bolivia	8,857,870	270,000	2002
100	El Salvador	6,704,932	550,000	2003
102	Paraguay	6,347,884	120,000	2003
124	Costa Rica	4,016,173	800,000	2002
126	Puerto Rico	3,916,632	600,000	2002
132	Uruguay	3,415,920	400,000	2002
134	Panama	3,039,150	120,000	2002

The table above shows again big differences between some European and North American countries, and those from Latin America, as regards access to digital technologies of a certain

level of complexity. While the information about Canada, Germany, Sweden and the United States shows a big part of their population has Internet access (roughly 50%), the ratio changes drastically in Guatemala and Paraguay (roughly 2%), or even in “rich” countries like Argentina, Mexico and Brazil (roughly 10%).

Appendix B presents an economy overview of the same 25 countries mentioned before, with information gathered from the *The World Factbook 2004* by the CIA. Following I am including some excerpts from it:

Argentina benefits from rich natural resources, a highly literate population, an export-oriented agricultural sector, and a diversified industrial base.

Possessing large and well-developed agricultural, mining, manufacturing, and service sectors, Brazil's economy outweighs that of all other South American countries and is expanding its presence in world markets.

Chile has a market-oriented economy characterized by a high level of foreign trade.

The Dominican Republic suffers from marked income inequality.

Ecuador has substantial petroleum resources, which have accounted for 40% of the country's export earnings and one-fourth of public sector revenues in recent years.

Mexico has a free market economy with a mixture of modern and outmoded industry and agriculture.

Peru's economy reflects its varied geography. Abundant mineral resources are found in the mountainous areas.

Uruguay's well-to-do economy is characterized by an export-oriented agricultural sector, a well-educated workforce, and high levels of social spending.

Central Intelligence Agency (2004). *The World Factbook 2004*. United States.

In summary, concerning the situation in most of the studied Latin American countries, we find a lot of poor people in rich places. The distribution of income is highly unequal all around the region and welfare does not work well or does not exist. Many countries in Latin America have important natural resources, and even in places with a good rate of literate population and highly educated people, the general situation and living standards are far from

good or stable. Unpredictability is always there, making mid and long-term planning a major problem. In the south, colonization and external dependence is something a person can feel and not only read about.

I believe those considerations are basic to comprehend the context of my research. Yes, my work is primarily about art and creation and culture, but it is also about the unbalanced and unequal situations that could and I think, must, change.

3.3 Culture, identity and information technologies

I mentioned above the richness, in terms of natural and human resources, available in many places around Latin America, but the region is also very rich in terms of cultural heritage. A trip through Bolivia, Mexico or Peru, for example, will immerse the visitor in a different time dimension where ancient cultures and traditions live together with modern activities and new technologies.

About music and cultural identity in Latin America, composer Coriún Aharonián wrote:

Los rasgos comunes de nuestras sociedades son a veces fáciles de enumerar: la miseria, la dependencia colonial, la explotación. Otras veces son verdaderamente difíciles, porque al poder no le interesa el conocimiento -y por tanto el estudio- de las cosas que no sirvan específicamente para dominar.

Hay rasgos comunes de identidad cultural en Latinoamérica, labrados silenciosamente durante milenios [...] Hay específicamente rasgos comunes de identidad musical. Musical en el sentido más amplio y extenso.

The common characteristics of our societies are sometimes easy to enumerate: misery, colonial dependency, exploitation. Other times they are truly difficult because Power has no interest in knowledge -and therefore the study- of those things that are not specifically useful to dominate.

There are common characteristics of cultural identity in Latin America, worked quietly during millenia [...] There are common characteristics of musical identity. Musical in the widest and extensive sense. [RDF free translation]

Aharonián, C. (2001). El compositor y su entorno en Latinoamérica. *Revista Musical Chilena*. [online] Address: http://www.scielo.cl/scielo.php?pid=S0716-27902001019600006&script=sci_arttext

Concerning the present situation related to the cultural goods production in Latin America, the asymmetrical relationships with other regions and countries in terms of income generation are worth noticing.

Los riesgos están presentes: la concentración asimétrica en la producción cultural y la generación de ingresos. Entre la Comunidad Europea, los EE.UU. y Japón se quedan con el 87 % de las ganancias producidas por los bienes culturales y comunicacionales, quedando el 13% restante a todos los otros países del mundo.

The risks are present: the asymmetrical concentration in the cultural production and its income generation. The European Union, the United States and Japan get 87% of the incomes produced by cultural and communicational goods, being left only 13% to all other countries in the world. [RDF free translation]

García Canclini, N. (2002). *Latinoamericanos buscando lugar en este siglo*. Argentina: Paidós.

The United States gets 55% of the global income in terms of cultural and communicational goods, the European Union 25% and Latin America only 5%.

Esta globalización de las IC -y especialmente la aparición de operadores audiovisuales de escala mundial- plantean un reto formidable para el desarrollo de las identidades y de las culturas de los pueblos. Así, los mass media en particular, y las llamadas industrias culturales en general, tienen una creciente centralidad en la producción y circulación de los bienes simbólicos constitutivos de aquellas categorías de percepción.

Aquí reside uno de los riesgos mas acuciantes: la homogeneización de la oferta cultural en detrimento de la diversidad de contenidos y sentidos [...] En los países de nuestra región, [...] cerca del 90% del flujo audiovisual que se consume tiene un único origen: los Estados Unidos.

The Cultural Industries globalization -and especially today's world-scale audiovisual operators- raises a formidable challenge for regional identities and culture development. Thus, mass media in particular, and cultural industries in general, increasingly centralize the production and distribution of the symbolic goods that constitute those categories of perception.

One of the main risks is then the homogenization of the cultural offer, damaging the diversity of contents and senses. In the countries of our region [...] nearly 90% of the

consumed audiovisual materials has an only origin: the United States. [RDF free translation]

Observatorio de Industrias Culturales de la Ciudad de Buenos Aires (2004) *Industrias Culturales en Argentina. Los años '90 y el nuevo escenario post-devaluación. Documento de trabajo N° 1.* [online] Address: <http://www.buenosaires.gov.ar/areas/cultura/observatorio/publicaciones.php>

In this complex context of unidirectional cultural goods and related information flow, electroacoustic music has been developing in Latin America.

Music as well as other art forms developed in Latin America mostly as a reflection of European or North American models. Recognition and validation outside the region has not been easy for those artists not following the “approved” models; in spite of that, many composers have developed their own language and style, creating works characterized by the use of reiterative elements, austerity, silence, and ideological awareness (see Aharonián, C. [2000] An Approach to Compositional Trends in Latin America. *Leonardo Music Journal*, vol. 10).

CHAPTER IV

THE CONVERGENCE OF ART, SCIENCE AND NEW TECHNOLOGIES

4.1 New technologies, new techniques, new music

Before the first electroacoustic music studios were created in France, Germany, Italy and the United States around the 50s, early XX century works using turntables, radios and musical instruments like the Theremin (or aetherophone) and the Ondes Martenot were paving the way during decades. Of course, those new instruments as well as the renewed use of the old ones came together with a renovation in musical language. Extremes were explored, from total serialism to aleatorism.

Not only music, the arts in general were changing a lot during the first half of the past century.

Other initiatives to join art with engineering and craftsmanship like Bauhaus were, and still are, important antecedents, too. Interdisciplinarity was an idea that Bauhaus turned into reality, as was the coincidence of art, science and new technologies in the electroacoustic music field some years later.

Students at this new school were trained by both an artist and a master craftsman, realizing the desires of Gropius to make "modern artists familiar with science and economics".

Flores, G. (undated). bauhaus [online]. Address: <http://people.ucsc.edu/~gflores/bauhaus/history.html>

Open-minded composers and inventors helped to build the transition from the 19th century western music to the 20th century integration of new languages with experimental electronic technologies.

Edgar Varèse had been already interested in the possibilities of electronic means to create music for a long time when he composed *Ecuatorial* in 1934 for two fingerboard Theremins, four trumpets, four trombones, piano, organ, percussion and bass singer; he later reassigned the theremin parts to two ondes martenot. In 1954 he composed his mixed piece *Déserts* for 14 winds (two flutes, two clarinets, two horns, three trumpets, three trombones, bass tuba, contra bass tuba), piano, percussion, and two magnetic tapes of electronic organized sounds. And in 1958 he created the *Poème Electronique*, played through 450 speakers distributed inside the Philips pavilion at the Brussels World Fair Exposition, together with light actions and projected images.

John Cage composed *Imaginary Landscape No. 1* in 1939 for 2 variable speed phono turntables, frequency recordings, muted pianoforte and cymbal; *Imaginary Landscape No. 4 (March No. 2)* in 1951 for 12 radios, with 24 players and conductor; *Williams Mix* in 1952 for 8 single track or 4 double track tapes; and *Fontana Mix* in 1958, 17 minutes of material, to be used in any time length, longer or shorter, for four single track or two double track tapes (the score may also be used to provide a part or parts for any instrument or combination of instruments).

There were many developments of electronic musical instruments in different parts of the world before we arrived to the digital technologies and its capabilities to sample or synthesize sounds as we know it today. To name just a few pioneer works, to the aforementioned Theremin, developed by Lev Sergeivitch Termen (a.k.a. Leon Theremin) in Russia before the 20s, and the Ondes Martenot developed by Maurice Martenot in France a few years later, I will add the Electronic Sackbut developed by Hugh Le Caine in Canada around the mid 40s, considered today the first voltage-controlled sound synthesizer. Le Caine also developed other instruments like the Special Purpose Tape Recorder (a.k.a. as Multi-track) in 1955 and the Serial Sound Structure Generator in 1967. In the United States, Donald Buchla created

the 100 Series Modular Electronic Music System in 1963 and Robert Moog his first Moog synthesizer in 1964.

But a few years before these instruments were developed the situation to create music using electroacoustic means was other. While Pierre Schaeffer in France was developing the fundamentals of *musique concrète* during the late 40s, a group in Germany was approaching music creation in a radically different way during the early 50s, opposing to the experimentalism and perceptual analysis of natural sound sources a research to achieve a total control over sound creation.

Schaeffer's work was closely tied to the early decades of the radio in France. He was appointed at *Radiodiffusion Française* in 1936, and at *Studio d'Essai* in 1942. In 1946 Schaeffer was invited to be part of *Club d'Essai*, which became the G.R.M.C. (*Groupe de recherche de musique concrete*) in 1951 and the G.R.M. (*Groupe de recherches musicales*) in 1958). His experiences led him to compose the *Etude aux chemins de fer* and other well-known studios in 1948. In Germany, following the lectures of Robert Beyer, and Werner Meyer-Eppeler about the musical possibilities of electronic sound generation, an Electronic Music Studio directed by Herbert Eimert was established at *Westdeutscher Rundfunk* (WDR), Cologne, in 1951. It was at this studio where Eimert composed *Klang im unbegrenzten Raum* and *Klangstudie II* in 1952 and *Glockenspiel* in 1953, Karel Goeyvaerts created his *Komposition Nr. 5* in 1953, and Karlheinz Stockhausen composed the *Study II* in 1954, *Gesang der Jünglinge* between 1955 and 1956, and *Kontakte* between 1959 and 1960.

In the United States, Vladimir Ussachevsky composed electroacoustic pieces like *Transposition* and *Reverberation* in 1951, *Sonic Contours* in 1952, *Incantation* in 1953 and *Piece for Tape Recorder* in 1956; Otto Luening composed *Fantasy in space* and *Low Speed* in 1952. In 1959 the Columbia-Princeton Electronic Music Center was established in New York, with Ussachevsky as its director and Luening, Milton Babbitt and Roger Sessions on the committee of direction. Babbitt composed extensively using the synthesizer developed by the RCA during the 50s: *Vision and Prayer* dated 1961, and *Philomel* dated 1964, are some of those pieces.

In Italy, Luciano Berio and Bruno Maderna founded the Studio di Fonologia at Radio Audizioni Italiane (RAI), Milano, in 1955. And in Canada, Hugh Le Caine collaborated to establish a studio at the University of Toronto in 1959.

Not only in Europe and North America there was interest to develop electronic music around the 50s. In 1955 was created a studio in Tokyo, Japan, at Radio Nippon Horo Kyokai.

Each laboratory had its own approach for sound and music creation, and their equipment was, at least in part, different, too.

The development of electroacoustic music during the second half of the 20th century represents a major result in the long process of convergence between art, science and new technologies. The early decades of the 20th century were a turning point. New aesthetic values and models, scientific theories, technologies and techniques were gradually meeting with a new approach to listen, understand and create music, developing what is known as electroacoustic music.

4.2 Walking down the south. First steps in Latin America

Since the early 50s there were interest and some activities also in Latin America to develop the little explored field of electroacoustic media applied to music creation. Mauricio Kagel composed 8 studies between 1950 and 1953 and then used *musique concrète* created between 1953 and 1954 in one part of his sonorisation for an industrial exhibition in Mendoza, Argentina. He attempted to create a studio in Buenos Aires during the 50s without success.

In Chile, Juan Amenabar and José Vicente Asuar were experimenting in 1956 at Radio Chilena in Santiago. The same year León Schidlowsky composed *Nacimiento*, a tape piece using *concrète* sound sources. In 1957, Amenabar, Asuar and a small group of composers founded the Taller Experimental de Sonido (Experimental Sound Workshop) in Santiago at

the Catholic University, but the initiative had a short life. Amenabar composed *Los Peces* for tape in 1957, using recorded piano sounds arranged according to the Fibonacci series, and Asuar composed between 1958 and 1959 *Variaciones Espectrales* using only electronic sound sources.

In Brazil there were also pioneer activities during the 50s. Reginaldo Carvalho composed his first *concrète* pieces on tape during 1956 in Rio de Janeiro, among them: *Si bemol*, *Temática* and *Troço I*.

In Argentina, the *Estudio de Fonología Musical* was created at the University of Buenos Aires by Francisco Kröpfl and Fausto Maranca at the end of 1958. Kröpfl composed his first works using electronic sounds at that lab between 1959 and 1960: *Ejercicio de texturas* and *Ejercicio con Impulsos*. During that same period César Franchisena was also experimenting with electronic sound sources at the National University of Córdoba radio station and composed *Numancia*, a ballet music for tape, in 1960. Horacio Vaggione also started to experiment with electroacoustic techniques in Córdoba during those years, composing *Música Electrónica I* for tape in 1960 and *Ensayo sobre mezcla de sonidos*, *Ceremonia* and *Cantata I* in 1961. An electronic music lab was created in Buenos Aires during 1963 at Centro Latinoamericano de Altos Estudios Musicales (CLAEM) of the Instituto Torcuato Di Tella (Latin American Higher Studies Musical Center of the Torcuato Di Tella Institute).

In Cuba, Juan Blanco composed in 1961 *Música para danza* for tape, and *Texturas*, between 1963 and 1964, for orchestra and tape. Since then he composed around a hundred works using electroacoustic media, including music for mass public events and large venues, like the five-track 1968 tape piece *Ambientación Sonora*, played during 30 nights along La Rampa Avenue in Havana. In the early 40s, the same composer designed an innovative electroacoustical instrument similar in concept to the Mellotron, created years later.

In Mexico, Carlos Jiménez Mabarak composed a piece on tape in 1960: *El paraíso de los ahogados*. The same year the engineer Raúl Pavón built a small electronic musical instrument featuring an oscillator with multiple waveform outputs, a white noise generator, a variety of

filters, an envelope generator, and a keyboard, therefore one of the first electronic sound synthesizers ever built.

The above is just a brief introduction to the vast electroacoustic music world, with its richness and variety in terms of artistic creation, technology innovation and interdisciplinary integration.

4.3 Influences in Latin American electroacoustic music

During the early years of experimentation with electroacoustic technologies applied to music creation there were strong influences in Latin America coming from Europe. Some composers were interested in the *musique concrète* originated in Paris (e.g. Juan Amenabar) while others were interested in the *elektronische musik* coming from Cologne (e.g. José Vicente Asuar).

When electronic music centers were developed also in the United States, the possibility to access powerful technological resources attracted Latin American composers not only to European centers (e.g. Edgardo Cantón, Beatriz Ferreyra), but also to places like the Columbia-Princeton Electronic Music Center in New York (e.g. Mario Davidovsky, Alfredo del Mónaco, Alcides Lanza, Edgar Valcárcel).

Many composers were traveling from different Latin American countries to study and/or compose at studios in Europe since the 50s, and starting in the early 60s, also to the United States. Some of them stayed there and others came back after a while. In one case or the other they were an influence for the musical production of their Latin American colleagues. If they stayed in Europe or the United States they were an influence: (a) because of the possibilities for creation and dissemination of their work was acting as a model for composers far away and without such facilities; (b) because their links with Latin America allowed a more fluid communication for exchange of ideas and information of the latest trends in Europe and North America; (c) because when visiting their native countries, the emigrant composers used

to lecture, teach workshops and perform both their own music and that composed by colleagues who worked at the same centers they did; (d) because several of them became directors or influential in different centers around the world (e.g. Davidovsky in the United States, Lanza in Canada, Maiguashca in Germany, Teruggi and Vaggione in France), making it easier for composers living in Latin America to visit those labs for studying, composing, teaching or researching.

Latin American composers were moving around a lot during the 60s. Enrique Belloc, Eduardo Bértola, Edgardo Cantón, Beatriz Ferreyra, Enrique Gerardi and Luis María Serra, all of them from Argentina, were studying and composing during the '60s at *Groupe de Recherches Musicales* in Paris. Mario Davidovsky and Alcides Lanza, both from Argentina, Alfredo del Mónaco from Venezuela and Edgar Valcárcel from Peru, were during the same decade studying and composing at the Columbia-Princeton Electronic Music Center. Mauricio Kagel moved from Argentina to Germany in 1957. Hilda Dianda, also from Argentina, was composing in Italy at the Studio di Fonologia Musicale of RAI (Italian Radio and TV) in Milano during 1959, and later in the United States at San Fernando Valley State College in Northridge, California. Cuban composer Aurelio de la Vega founded that studio in Northridge in 1962 and was directing it until 1992. The Chilean composer José Vicente Asuar was in Karlsruhe, Germany, around 1961, helping to organize an electroacoustic studio. Composer Conrado Silva, from Uruguay, studied in Germany during the early 60s. Horacio Vaggione, from Argentina, was first in the United States and then Spain during the 60s and early 70s, until he finally settled down in Paris.

Some of those composers are still living in Europe or the United States while others came back to their native lands after a few months or years, but as it was said before, they were (or still are) an influence for the musical production of their colleagues in Latin America.

The *musique concrète* coming from the GRM and the electronic works from the Columbia-Princeton Electronic Music Center were clearly different during their pioneering years. The compositional techniques and styles the first composers working at each place were applying or developing, adapted to the available equipments, were influential models received by later

generations of composers arriving to those centers, among them, those coming from Latin America.

CHAPTER V

50 YEARS OF MUSIC AND NEW MEDIA IN LATIN AMERICA

5.1 Introduction

This chapter, as well as the following one, aims to approach the electroacoustic music production related to 18 Latin American countries: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Mexico, Panama, Paraguay, Peru, Puerto Rico, Uruguay and Venezuela.

For each of those countries a historical introduction is presented in Chapter V whenever significant activities were developed (e.g. Argentina, Brazil, Chile, Cuba, Mexico). Chapter VI has extensive information about the composers that were born or pursued a portion of their musical career there.

In most cases it was very difficult to collect the data, and it frequently happened that dates and names varied from source to source. The information included was obtained from personal communications and interviews, and also by analyzing letters, emails, concert program notes, scores, recording sleeves and other documents. Sources and dates are indicated whenever possible.

Appendix A lists a series of interviews whose recordings are also available at the Daniel Langlois Foundation for researchers. Most of those interviews were held with pioneers of the electroacoustic music field (e.g. César Bolaños, Alfredo del Mónaco, Héctor Quintanar, Conrado Silva, Horacio Vaggione and Edgar Valcárcel, among others). Those composers have been a source of valuable information not only for their own musical works but also for multiple aspects of the development of electroacoustic music in several Latin American

countries. Those interviews have been a fundamental help to develop these two chapters, and the information and references obtained are presented throughout it. Also relevant were several hundreds of international phone calls I made to find and talk with composers I had been trying to contact, in some cases, for years.

Concerning similarities and differences between the electroacoustic music development in Latin America, as it was said in Chapter II, the amazing production of electroacoustic music in Argentina finds some explanation in the sustained activities held in that country since the 50s, the availability of technological resources in centers created during the 60s, 70s and 80s, and the avidity of many composers to explore new musical trends. Political and economic instability, characteristics of the region, have been deeply affecting the development of most countries. Support for artistic activities has usually been postponed to solve urgent social problems. Anyway, it is possible to find a large production of electroacoustic music and interesting activities related to this field in Brazil, Cuba and Mexico. In Chile there already were pioneering works in the 50s but there was not a strong commitment by many composers until a few years ago. In Colombia and Venezuela there also were pioneering activities during the 60s but again not much happened until the 80s there.

Many times, composers from Peru and Ecuador found the opportunity to work with electroacoustic media out of their native land, making the development in that area more difficult for those countries until recently. Electroacoustic music started in Costa Rica not many years ago, and in places like the Dominican Republic, El Salvador and Paraguay there were only a few and sporadic activities.

Along the following pages, the diversity of Latin America is also shown through the differences in the development of new art forms and technology innovation between each country. But common factors are also amazing, like finding people that left the region sometimes 30, 40 or more years ago to live in Europe or North America, and discovering they still keep strong cultural ties with their native land. To name but a few, conversations with Aurelio de la Vega and Orlando Jacinto García from Cuba (both in the United States for over 40 years), Alcides Lanza from Argentina (in Canada for over 30 years), Tania León from

Cuba, Mesías Maiguashca from Ecuador (in Germany for over 30 years), and Horacio Vaggione from Argentina (in France for over 30 years) made me realize how strong those links are (see chapter I, section 1.1 Living without leaving).

5.2 Argentina

César Franchisena, Mauricio Kagel, and Francisco Kröpfl were some of the composers experimenting¹⁵ with electroacoustic media since the 50s in Argentina. Tirso de Olazabal and Rodolfo Arizaga were also making some experiences during those years.

Mauricio Kagel was working with electroacoustic media between 1950 and 1953 and used recorded sounds and light projections in 1954 for his *Música para la Torre* installation. Tirso de Olazabal was in Paris during the early 50s working with electroacoustic media, and composed *Estudio para percusión* for tape in 1957. Rodolfo Arizaga composed *Délires* for chamber orchestra, choir and Ondes Martenot between 1954 and 1957; *Sonata Breve* for piano and Ondes Martenot, and *El Organillo* for solo Ondes Martenot, both in 1958.

The University of Córdoba and the University of Buenos Aires were the main centers of activities at the beginning.

In 1958 Francisco Kröpfl with Fausto Maranca founded the Estudio de Fonología Musical at the Universidad de Buenos Aires (University of Buenos Aires).

César Franchisena was experimenting during 1959 at Radio Universidad with electronic devices and composed *Numancia* in 1960 at CIAL, Centro de Investigaciones Acústicas y Luminotécnicas (Acoustic and Lighting Engineering Research Center) in the Universidad Nacional de Córdoba (Cordoba's National University).

¹⁵ In the context of this doctoral thesis, **experimenting** can be understood as the act of conducting a controlled test or investigation; the testing of an idea; or a venture at something new or different. [WordReference.com (n/d). [online] Address: <http://www.wordreference.com/definition/experiment>]

Francisco Kröpfl composed *Ejercicio de texturas* and *Ejercicio con Impulsos* using electronic sounds at Estudio de Fonología Musical in Buenos Aires, both in 1960.

Horacio Vaggione composed in Córdoba *Música Electrónica I* for tape in 1960, and *Ensayo sobre mezcla de sonidos* and *Cantata I* during 1961.

Those were the pioneering years of the electroacoustic music in Argentina.

Kagel, who left Argentina in 1957 and is living in Germany since then, composed *Transición I* for electronic sounds in 1958 and *Transición II* for piano, percussion and 2 tape recorders in 1958-1959.

Hilda Dianda composed in Italy *Dos estudios en oposición* for tape during 1959; and Mario Davidovsky realized at the Columbia-Princeton Electronic Music Center in New York the *Electronic Study No.1* in 1960 and *Electronic Study No.2* in 1962, two pieces for tape.

In Buenos Aires, the Centro Latinoamericano de Altos Estudios Musicales (CLAEM) of the Instituto Torcuato Di Tella was a meeting point for students and composers from Latin America. They had the opportunity to learn and exchange ideas with many of the most interesting composers at that moment, many of them coming from Europe and North America, as for example: Luigi Nono, Iannis Xenakis, Bruno Maderna, Aaron Copland, Olivier Messiaen, Vladimir Ussachevsky and Luigi Dallapiccola, among others. The Center was founded in 1962 and directed by the Argentinean composer Alberto Ginastera.

Following is the list of grant holders for CLAEM, according to their corresponding years. While some of them were devoted to compose only for acoustic musical instruments or voices, others were experimenting and composing also with electroacoustic media. Several of the listed composers became later outstanding names of the electroacoustic music scene.

Scholarships 1963-1964

Blas Emilio Atehortúa (from Colombia)
 Oscar Bazán (from Argentina)
 César Bolaños (from Peru)
 Armando Krieger (from Argentina)
 Mario Kuri-Aldana (from Mexico)
 Alcides Lanza (from Argentina)
 Mesías Maiguashca (from Ecuador)
 Marlos Nobre (from Brazil)
 Miguel Ángel Rondano (from Argentina)
 Edgar Valcárcel (from Peru)
 Marco Aurelio Venegas (from Colombia)
 Alberto Villalpando (from Bolivia)

Scholarships 1965-1966

Rafael Aponte Ledée (from Puerto Rico)
 Jorge Arandia Navarro (from Argentina)
 Atiliano Auza León (from Bolivia)
 Gabriel Brncic (from Chile)
 Mariano Etkin (from Argentina)
 Bernal Flores (from Costa Rica)
 Benjamín Gutiérrez Sáenz (from Costa Rica)
 Miguel Letelier (from Chile)
 Eduardo Mazzadi (from Argentina)
 Graciela Paraskevaídis (from Argentina)
 Enrique Rivera (from Chile)
 Jorge Sarmientos (from Guatemala)

1965

Walter Ross (from United States - OAS scholarship)
 César Bolaños (Centro de Experimentación Audiovisual - Instituto
 Torcuato Di Tella scholarship)

1966

Blas Emilio Atehortúa (OAS scholarship)

César Bolaños (OAS scholarship)

Scholarships 1967-1968

Florencio Pozadas (from Bolivia)

Marlene Migliari Fernández (from Brazil)

Jacqueline Nova (from Colombia)

Iris Sangüesa (from Chile)

Joaquín Orellana (from Guatemala)

Oscar Cubillas (from Peru)

Luis Arias (from Argentina)

Mario Perusso (from Argentina)

Luis María Serra (from Argentina)

Regina Benavente (from Argentina)

1967

César Bolaños (OAS scholarship)

Blas Emilio Atehortúa (OAS scholarship)

Gabriel Brncic (OAS scholarship)

1968

Gabriel Brncic (OAS scholarship)

Scholarships 1969-1970

Jorge Antunes (from Brazil)

Alejandro Nuñez Allauca (from Peru)

Antonio Mastrogiovanni (from Uruguay)

Ariel Martínez (from Uruguay)

Coriún Aharonián (from Uruguay)

José Ramón Maranzano (from Argentina)

Eduardo Kusnir (from Argentina)

Pedro Caryevschi (from Argentina)

Luis Zubillaga (from Argentina)
 Jorge Blarduni (from Argentina)
 Bruno D'Astoli (from Argentina - Center for Inter-American Relations -
 Fundación Di Tella)
 Norman Dinerstein (from Argentina - Center for Inter-American Relations -
 Fundación Di Tella)
 Salvador Ranieri (from Argentina)
 Diego Feinstein (from Argentina)
 Rafael Aponte Ledée (OAS scholarship)
 Beatriz Lockhart (from Uruguay - unregistered student)
 León Biriotti (from Uruguay - unregistered student)

Not all the listed composers were at CLAEM during both of their two-year-long scholarships. Venegas was there only during 1963 and Aharonián during 1969. Bernal Flores did not make use of his scholarship.

Argentina was then a prolific place with many composers interested in using the new electroacoustic technologies in their musical creations.

In Buenos Aires composers were working with electroacoustic media at commercial recording studios, home labs, CLAEM and Estudio de Fonología Musical. Virtú Maragno composed *Composición No. 1* for voices, instruments and tape in 1962. Miguel Angel Rondano composed *La batalla de los ángeles*, *Promenade* and *Danza de los resortes* during 1963. Armando Krieger composed *Contrastes* for two pianos and tape also in 1963 (tape part realized by Alcides Lanza). Jorge Arandía Navarro created *Forma Sonora de Ondina* for soprano, children's choir, instrumental group and tape in 1964. Oscar Bazán composed *Simbiosis I* for electric organ, percussion and tape in 1964. Kröpfl composed *Ejercicio de movimientos* and *Ejercicio con ruido coloreado* in 1962, *Diálogos I* during 1964-1965 and *Diálogos II* in 1965, all works for tape. Nelly Moretto composed her *Composición 9b* in 1966. Dated the same year is *El Jardín de Angelo*, a sonorisation by Maranca. Graciela Paraskevaídis created *Combinatoria II* for piano, trombone, percussion and tape also in 1966

and *Subliminal* for piano and tape in 1967. Eduardo Tejeda composed *Estudio Electrónico No.1* in 1968. Pedro Caryevschi composed *Analogías paraboloides* in 1970 and Eduardo Kusnir *La Panadería*, for tape, also on that year.

In Córdoba composers were working mainly at the National University and also at home with their own rudimentary equipment. During the early 60s, Horacio Vaggione's house was a meeting place for a group of young experimentalists, which was the same group that later created the Centro de Música Experimental (Experimental Music Center) at the University. Carlos Ferpozzi composed *La ciudad* for tape in 1962. Vaggione composed *Música electroacústica II* also in 1962, *Ritual* in 1963, *Hierro y espacio II* in 1964, all three for tape; *Salmo* for tape, and the multimedia piece *Untitled*, for 4 instrumental groups, live electroacoustic processing, movements and lights, both in 1965; *Tres piezas electrónicas* and *Cálido II*, both for tape, and *Fausto* for electronic sounds and orchestra, all three pieces in 1966; *Suite para cinta magnética* for tape and *Electrata* for live electronics, in 1967. Pedro Echarte composed *Estudio para la voz humana* and *Estudio II* in 1964, *Ray Conniff en Viet Nam* and *Treno* in 1965, *Twist y Gritos: los Beatles* in 1966, and *Estudio Onírico para Cronopio*, all six pieces for tape. Oscar Bazán composed *Simbiosis II* for tape in 1965. Graciela Castillo composed *Diálogos* for two voices, percussion, typewriters and radios in 1965; *Concreción-65* between 1965 and 1966; *Estudio sobre mi voz*, *Estudio sobre mi voz II* and *Tres estudios concretos* in 1967, all three works for tape. Virgilio Tosco composed *Complejo No.2* for recorders, piano, percussion and white noise in 1965, *Ectoplasma* in 1966, *Homenaje a Poe* in 1967 and *Tres Movimientos para cinta magnetofónica* in 1969, all of them for tape.

Buenos Aires and Córdoba were not the only cities where musical activities with electroacoustic media were developing those years in Argentina. Dante Grela composed his early *concrète* pieces on tape during the 60s working at his private studio in Rosario, province of Santa Fe. Some of his early electroacoustic pieces are: *Música para el film 'C-65'*, 1965; *Música para una exposición de Pop-Art* and *Música para teatro*, both 1966; and *Combinaciones* for mixed choir, percussion and tape, 1968. Also dated 1968 is *Ejercicio I* for tape, his first work using electronic sound sources, realized at the Estudio de Fonología

Musical in Buenos Aires. In 1970 Grela composed *Faena* for voices, free chosen instruments, tape and lights, and in 1972 *Estudio* for tape, produced also at his personal studio, as most of the pieces he composed until today.

Several composers were studying and composing with electroacoustic media abroad during those years.

Edgardo Canton worked many years at the GRM studios in Paris. He composed among other works: *Animal Animal* in 1962, *Etude* and *Tout finit par tomber dans le même trou* in 1963, *Voix Inouies* in 1965, *I palpiti* and *Pi-ouit* in 1966, *Manges par une espèce de Serpent* in 1967, *Une Espèce de Serpent* in 1969, and *A cheval vers la lune s'en va lagune* in 1970.

Beatriz Ferreyra worked at the GRM with Pierre Schaeffer from 1963 to 1970 and was participating in the production for the recording for Schaeffer' *Solfège de l'Objet Sonore*. Among the works she composed during those years are: *Etude aux Itérations*, electroacoustic music, 1965; *Toboggan*, electroacoustic and instrumental music, 1966; *Demeures Aquatiques*, 1967, *Médisances*, 1968 and *L'Orvietan*, 1970, all three pieces for tape, and produced at the GRM studios. Ferreyra has been living in France since then.

alcides lanza went to New York in 1965 to study and work at the Columbia-Princeton Electronic Music Center. lanza composed there his *exercise I [1965-V]* for tape in 1965, *plectros II [1966-I]* for tape and piano in 1966, *interferences I [1966-II]* for two groups of wind instruments and electronic sounds also in 1966, *interferences II [1967-I]* for percussion ensemble and tape in 1967, *ekphonesis II [1968-II]* for voice, piano and tape in 1968 and *ekphonesis III [1969-II]* for wind, keyboard, string instruments and tape in 1969, among other works. He moved in 1971 to Canada, and has been living in Montreal since then.

Enrique Gerardi composed *Música de Escena*, *musique concrète* for theater, and *Divertimento* for tape, both in 1967 while he was at the GRM in Paris. He returned then to Argentina where he has been working as conductor, composer, teacher and music researcher. During those early years Gerardi composed also *Figura-Fondo*, an aleatoric piece for electric

guitar, piano, percussion, tape and painter in 1968, realizing the tape part at CLAEM, and *Sobre Texturas y Gestos* for two flutes, two cellos, piano, tape and improvisation group, producing the tape for this piece in his own studio at home.

Isabel Aretz, composed *Birimbao* for four timpanis and tape at Estudio de Fonología Musical in Caracas, Venezuela, during the 60s.

Eduardo Bértola was living in Paris from 1968 to 1971, and then in Brasília and Belo Horizonte, Brazil, from 1975 until his death. While in Paris he composed *Episode* and *Penetraciones* in 1969, *Dynamus* and *Pexoa* in 1970, and *Penetraciones II* in 1971, all works for tape.

Coming back to Buenos Aires, when CLAEM and the Estudio de Fonología Musical declined during the early 70s, the CICMAT, Centro de Investigación en Comunicación Masiva, Arte y Tecnología (Center for Research in Mass Communication, Art and Technology) was established. Supported by the Buenos Aires City Government, the Center was directed by José Maranzano, Gerardo Gandini, Francisco Kröpfl, Fernando von Reichenbach and Gabriel Brncic (from Chile; see that section). The CICMAT was active for some years during the 70s.

During the early 80s was created in Buenos Aires a new and big cultural center, Centro Cultural Ciudad the Buenos Aires, later renamed Centro Cultural Recoleta. José Maranzano, formerly at CICMAT, was appointed its director and was the engine behind the creation of a new music lab there, with totally new equipments including multi, four and two tracks professional tape recorders, high quality mixer and sound monitors, a Lexicon reverb unit, Eventide's Harmonizer, Sennheiser's Vocoder and a Synclavier digital synthesizer, among other instruments. Those were the beginnings of the studio known today as Laboratorio de Investigación y Producción Musical (Musical Research and Production Lab) or LIPM.

Later Maranzano left the direction of the cultural center and also the active role he had in the contemporary musical life of Buenos Aires for several years. Since then, Kröpfl has been in charge of the electronic music studio there. The equipment from CLAEM that was

transferred to CICMAT was moved to LIPM years later, where it was used for didactic and compositional purposes for some time. A special mention should be made of the Analog Graphic Converter, also known as Catalina, invented by Fernando von Reichenbach during the Instituto Di Tella's days. With that system, composers were able to write a graphic score on a paper roll, being the images captured by a camera that transformed them into signals adapted for musical uses in the analog laboratory.

Several electroacoustic music studios were created in Buenos Aires, Cordoba, Rosario, Santa Fe and other cities around the country during the last decades, most of them close related to state universities.

Today there are studios in several universities but also many private labs, mainly owned by the composers themselves.

5.3 Bolivia

Bolivian composer Alberto Villalpando started his experiences with electroacoustic media in the early 60s while he was studying in Buenos Aires. Together with Argentinian composer Miguel Angel Rondano he created the music for a painting exhibition by Carlos Squirru in 1963, and another sonorisation, *La Muerte*, in 1964. Villalpando has been using electroacoustic media in his music since then, and also promoting this means in Bolivia.

Also working in Buenos Aires, Florencio Pozadas composed his mixed piece for percussion and tape, *CM-Op. 1*, in 1968.

Atiliano Auza did some experimenting with Villalpando during the early '70s, processing acoustic sounds with a Synthi analog synthesizer.

During the 80s, Cergio Prudencio composed a piece for tape in La Paz, and Edgar Alandia Canipa and Agustín Fernandez, both already living in Europe, created several works for tape and acoustic instruments.

Since the early 90s the electroacoustic music scene have been much more active in Bolivia. Sergio Claros Brasil, Oscar García, Jorge Ibañez, Javier Parrado, Juan Siles Hoyos, Nicolás Suarez, Gerardo Yañez, and more recently Julio Cabezas, have been composing tape and mixed pieces. There were concerts and music festivals programming those works, mainly in La Paz. Two workshops on electroacoustic music were taught by Ricardo Dal Farra in La Paz during 1990 and 1994 at the National Conservatory of Music and Puraduralubia, respectively.

5.4 Brazil

Reginaldo Carvalho and Jorge Antunes are two of the main names related to the pioneering years of electroacoustic music in Brazil.

Reginaldo Carvalho composed between 1956 and 1959 his first *concrète* pieces on tape in Rio de Janeiro. After some years in Brasília, Carvalho returned to Rio de Janeiro where he founded the Estudio de Musica Experimental, EME, producing there some new electroacoustic works during the 60s. In 1967 Carvalho was appointed director of the Conservatorio Nacional de Canto Orfeônico de Rio de Janeiro, name that he changed to Instituto Villa-Lobos. This became an important center for studying and promoting new music. Among other, Jorge Antunes and Marlene Fernandes were collaborating at the Institute.

The first tape piece by Reginaldo Carvalho, *Si bemol*, 1956, is considered the first *musique concrète* work realized in Brazil.

Jorge Antunes composed his first electroacoustic piece in 1961 working at his home studio and has been very active working with these media since then. In 1962 he composed a piece

using only electronic sound sources, *Valsa Sideral*, considered the first piece of this kind realized in Brazil.

In 1967 Carvalho invited Antunes to teach at the aforementioned Instituto Villa-Lobos. Then Antunes moved his home studio, the Estúdio Antunes de Pesquisas Cromo-Musicais, to the Instituto and started to teach the first course focused on electroacoustic music in Brazil: Curso de Musica Concreta, Eletrônica e Magnetofônica (*Concrète*, electronic and tape music course).

Antunes also built several electronic music instruments and devices that he used on his early pieces, as an electronic sawtooth wave generator, a spring reverberator, and two different Theremins.

They were not the only Brazilian composers working with electroacoustic media in their music. Willy Corrêa de Oliveira composed *Experiences I: Cavaquinho*, *Experiences II: Percussão*, *Experiences III: Gaita*, and *Experiences IV: Vozes*, all pieces for tape, in 1959. Rogério Duprat and Damiano Cozzella were experimenting on the possible applications of computers in music, creating *Música Experimental* in 1963, a piece structured according to computer calculations. Gilberto Mendes composed *Nascemorre* for mixed choir, two typewriters and tape in 1963; and *Santos Football Music* for instruments (orchestra), audience, dinner and 3 magnetic tapes in 1969. Clodomiro Caspary composed *Estudos Concretos I* in 1966 and *Estudos Concretos II* in 1967, both works for piano and prepared piano on tape. Claudio Santoro composed *Aleatórios I, II, and III* for tape (audiovisual pieces) between 1966 and 1967. Marlene Fernandes composed *Espectros Cromáticos* in Buenos Aires, Argentina, during 1967. Jocy de Oliveira composed *Estoria II* for female voice, percussion and electroacoustic tape in 1967; and *Polinterações* for video, sculptures, projections and electronics in 1970. Hans-Joachim Koellreutter composed *Sunyata* for flute, orchestra and tape in 1968. Fernando Cerqueira composed *Heterofonia do Tempo ou Monólogo da Multidão* for soloist voices, choir, orchestra and tape, also in 1968. Lindemberg Cardoso composed *Captações* for voices, chamber orchestra, turntables and radios in 1969.

Composer Conrado Silva (born in Uruguay, 1940; see that section for references) is also one of the pioneers that helped the development of electroacoustic music in Brazil, country where he has been living since 1969. Silva founded several electronic music studios: at Brasilia University in 1969; at Sao Paulo State University in 1977; and at Santa Marcelina Arts School in 1985.

Brazil has a long tradition not only in music creation with electroacoustic media but also in scientific research and technological developments focused on music composition and performance.

In 1977 Aluizio Arcela presented his thesis *Dynamic Spectra-Generating System for the Synthesis of Musical Signals* explaining a combined system of digital and analog technologies for producing frequency spectra within the range of humanly audible frequencies. His research started in 1975 at the Electrical Engineering Department of the Pontifical Catholic University of Rio de Janeiro.

In 1983 Arcela was invited to join the Brasilia University and start a program in computing there. He asked then to do also research in the field of computer music and to have a laboratory. A short time later the Laboratório de Processamento Espectral (Spectral Processing Lab) was born at that University.

In 1989 he created the Master in Computer Music at the University of Brasilia, the first University-level computer music course in South America.

Three of the pioneers of electroacoustic music in Brazil: Jorge Antunes, Aluizio Arcela and Conrado Silva, have been teaching at Brasilia University during the last years.

Brazil has today a prolific activity regarding musical composition using new media as well as technological and scientific research related to that field. During the last decade is noticeable

the activity developed by several Brazilian researchers, among them: Fernando Iazzetta, Fábio Kon, Jônatas Manzolli, Eduardo 'Reck' Miranda and Marcelo M. Wanderley.

5.5 Chile

Several Chilean composers started their experiences using electroacoustic media in their music during the mid 50s. Some of the first electroacoustic pieces composed in Latin America were produced there.

Juan Amenabar and José Vicente Asuar are the main names related to the pioneer years of electroacoustic music in Chile. Composers Gustavo Becerra-Schmidt, Samuel Claro, Fernando García and León Schidlowsky were also closely related to the beginning of electroacoustic music in Chile.

When Fernando García returned from his travel to Europe in 1953, he told Asuar about the *concrète musique* by Pierre Schaeffer and Pierre Henry he had been listening to in Paris, and the strong impressions this music caused on him. Then Asuar wrote to Pierre Boulez, who visited Chile the following year. García remembers "... when he came, all we met with Boulez so he could tell us what was happening in Europe".

In 1956 León Schidlowsky composed *Nacimiento* for tape, using *concrète* sounds. During that year, Amenabar and Asuar were experimenting with electroacoustic techniques at Radio Chilena in Santiago.

In 1957 the Taller Experimental de Sonido (Experimental Sound Workshop) was established at the Catholic University in Santiago by Amenabar and Asuar, together with a small group of composers: León Schidlowsky, Juan Mesquida, Raúl Rivera, Abelardo Quinteros, Eduardo Maturana and Fernando García. According to Samuel Claro, the official date when the Taller started was May 15, 1957.

Fernando García wrote about the Taller “It was created in 1957 and the idea was not to talk about music and make academic concerts, it was to learn electronics’ mysteries [...] Is true that at the end of that year there was a concert with pieces by members of that group, but that was only an aggregate.” (García, F. 2002. Personal communication). The Taller Experimental de Sonido was active for around one year.

The *Revista Musical Chilena* (*Chilean Music Journal*) published in 1957 its first article on electronic music: *¿Qué es la música electrónica? (What is electronic music?)*, written by composer Gustavo Becerra-Schmidt

In 1957 Amenabar composed his first piece for tape: *Los Peces*, using recorded piano sounds as the only material for his work, and Asuar proposed to write his civil engineering thesis about *Mechanic and Electronic Generation of Musical Sounds*. In 1958 Asuar started to build the first Electronic Music Studio of Chile at the Catholic University. There he composed *Variaciones Espectrales*, probably the first piece composed in Latin America using only electronic sound sources. The composition was premiered in 1959 at Teatro Antonio Varas, in Santiago

Samuel Claro composed *Estudio No. 1* for tape in 1960. He premiered his piece at the Catholic University of Chile on June 8 of that year, during a concert with compositions by Asuar, Badings, Berio, Henry, Schaeffer and Stockhausen.

Asuar and Amenabar were very active composing with electroacoustic media during the following years. During the 60s Asuar spent some time in Karlsruhe, Germany, and later in Caracas, Venezuela, helping to organize electronic music studios in both places. Back in Santiago, he was commissioned in 1969 to create the Sound Technology career at the Arts Faculty of the University of Chile. In the same Faculty, Amenabar was appointed Coordinator of the Recording Studio in 1974.

Asuar started a personal project in 1978 building his own computer music studio. He designed and built a musical instrument based on the Intel 8080 microprocessor: the

Computador Musical Digital Analógico Asuar or *COMDASUAR*, composing several pieces with it. Those works were published the following year on a disc: *Así habla el computador* (*Thus speaks the computer*).

In 1991 Amenabar founded the Gabinete de Electroacústica para la Música de Arte, also known as GEMA, at the Arts Faculty of the University of Chile. The studio is still active today with composers Eduardo Cáceres, Rolando Cori and Mario Mora teaching their classes there.

5.6 Colombia

Ensayo Electrónico composed by Fabio González Zuleta in 1965 is considered the first electronic piece created in Colombia. It was produced using sinewave generators at the studios of the National Radio of Bogota, with technical assistance by Guillermo Díaz.

Also dated 1965 is Blas Emilio Atehortúa's *Cantico delle creature*, mixed piece for bass, two choirs, winds, low strings, percussion and tape, realized also at the National Radio of Bogota. Atehortúa composed in 1966 his first piece for tape, *Syryigma I*, realized in Buenos Aires at CLAEM. During the same year León Simar composed *Ahora vuelven a cantar*, for a theatre play, in Cali.

Jacqueline Nova was the most active and prolific Colombian composer working with electroacoustic media during the 60s and 70s. She won a scholarship to study in Buenos Aires at CLAEM during 1967 and 1968.

Jacqueline created many works using electroacoustic media, among others: *Resonancias I* for piano and electronic sounds, and *Oposición-fusión* for electronic sounds on tape, both in 1968; *LM-A II* for tape, processed voices, strings and percussion in 1969; *Pitecanthropus* for symphonic orchestra, voices and electronic sounds in 1971; and *Creación de la tierra* for processed voice on tape in 1972.

Between 1969 and 1970 David Feferbaum studied electronic music in London at the Royal College of Music. At the Centre for Electronic Music at that College he composed *Electronic Study in Three Movements* for tape, between 1970 and 1971. Later Feferbaum founded his own Center for Electronic Music in Colombia, working in collaboration with Guillermo Díaz.

Mario Gómez-Vignes (born in Chile; moved to Colombia around 40 years ago) was working with *concrète* sound sources during the early 70s in Bogota. Francisco Zumaqué (born in Cerete, 1945) composed several pieces using electroacoustic media during the 70s, one of those was *Improvisación* for woodwinds and tape dated 1972.

After several years without much activity on the field, electroacoustic media started to appear in works by several Colombian composers around the late 80s. Ricardo Arias, Mauricio Bejarano, Luis Boyra, Roberto García, Catalina Peralta and Juan Reyes, are some of those composers.

Journalist and writer Carlos Barreiro-Ortiz (born in Tumaco, 1954) has been active promoting electroacoustic music in Colombia since the 80s. He programmed many concerts and radio series of new music in Bogota. He also founded the Asociación Colombiana de Música Electroacústica (Colombian Association of Electroacoustic Music).

Composer Andrés Posada and software designer Camilo Rueda co-founded the Laboratorio Colombiano de Música Electrónica Jacqueline Nova (Electronic Music Lab Jacqueline Nova) in the Autonomous University of Manizales in 1989. Posada composed at that lab, *Catenaria* for tape, between 1989-1990. The studio was active until 1992.

Rueda has been making significant contributions to the computer music field; one example is PatchWork, the visual music composition language he helped to develop at IRCAM, in Paris, France, during the early 90s.

Mauricio Bejarano has created radiophonic artworks, sound installations and electroacoustic music. He has an extensive catalog of works using electroacoustic media. *Aparato I* for tape, 1990, is one of his early pieces.

Many Colombian composers were studying electroacoustic music composition in Europe or the United States. Catalina Peralta studied in Colombia and Austria, and is at present Professor of Acoustic and Electroacoustic Composition at Los Andes University in Bogota. She composed: *Monólogo nr. 1* for magnetic tape, 1988; and *Soliloquio del Retorno* for percussion and tape, 1996-1997.

Juan Reyes has been active in the field since the late 80s. He studied music and mathematics in the United States. In Colombia, Reyes has been a professor of Music and Arts at Los Andes University in Bogota, and has been working with people from the College of Engineering at the same University, researching digital sound synthesis and signal processing, physical modeling, spectral modeling, and expression modeling. *El Paseo Bolivar (Música por computador para el oyente desprevenido)*, a set of variations based on popular Colombian themes, 1988; and *Las Meninas* for tape, 1991, are two examples of his early works.

5.7 Costa Rica

Not many Costa Rican composers have been working with electroacoustic media in their music.

Luis Diego Herra has been composing several works using electroacoustic means since the early 80s. Alejandro Cardona also has been active composing electroacoustic pieces. Jorge Luis Acevedo and Carlos Castro made some experiences too.

During the last years, Otto Castro has been very active composing and also promoting electroacoustic music as well as other new media art forms.

The group Autoperro has been working with electroacoustic media for over 20 years in Costa Rica. Its musical founding members are: Fernando Arce, who performs analog and digital synthesizers and acoustic sources, and Mauricio Ordóñez who performs acoustic and processed *concrète* sounds.

5.8 Cuba

The main driving force behind the development of the electroacoustic music field in Cuba has been Juan Blanco for over 40 years. He composed his first piece for tape in 1961 and created around 100 works using electroacoustic media.

Before that, in 1942, Blanco registered the description and design of the Multiórgano, a musical instrument based on 12 magnetophonic wire loops running through a playback head that could be loaded with 12 chromatically recorded voices, musical instruments or other sounds.

After the Revolution, Leo Brower and Juan Blanco were closely related to musical experimentation and new media in Cuba. Composers Carlos Fariñas, Roberto Valera, Héctor Angulo, Carlos Malcom and Calixto Alvarez were also active on new musical trends.

During the 70s Blanco attempted to establish an electronic music lab at the Instituto Superior de Arte in Havana. In 1979 he was appointed director of a small studio at ICAP, the Instituto Cubano de Amistad con los Pueblos. That studio became the Laboratorio Nacional de Música Electroacústica or LNME in the early 90s, when the Ministry of Culture assumed the responsibility of it.

The two main studios devoted to electroacoustic music creation are today: the aforementioned Laboratorio Nacional de Música Electroacústica, and the Estudio de Música Electroacústica y por Computadora, EMEC, at the Instituto Superior de Arte, ISA.

In spite of the well-known difficulties the people in Cuba have been going through, electroacoustic music creation has found a fertile field on the island for decades.

Many Cuban composers have worked with electroacoustic media in their music. To name but a few: Sergio Barroso, Aurelio de la Vega, Carlos Fariñas and Orlando Jacinto García; and from a younger generation: Irina Escalante, Mónica O'Reilly and Ileana Pérez.

Barroso, de la Vega, García and Pérez have realized most of their careers out of the island. On the other hand, Fariñas was active composing and promoting electroacoustic music in Cuba since the early 70s.

For the first time in Latin America, an International Computer Music Conference (ICMC) was held in Havana during 2001.

5.9 Dominican Republic

Only a few Dominican composers have been using electroacoustic media in their music.

Ana Margarita Luna composed a mixed piece during the 90s. Dante Cucurullo has several electroacoustic and mixed pieces in his catalog. The most active composer in terms of electroacoustic music creation, performance and research has been Alejandro José, who taught the first electronic music courses in the island during the early 80s.

5.10 Ecuador

Mesías Maiguashca is one of the historical names related to music and electroacoustics in Ecuador. He was already using new media during the 60s, and although he has been

developing his compositional activities outside Ecuador since then, he is still a big influence among the contemporary music composers in that country.

According to Arturo Rodas, it was not until the 80s that composers living in Ecuador started to work with electroacoustic music. He thinks this happened as a side effect to the new music creation explosion that began during the second half of that decade.

During the early 80s Milton Estevez projected the Departamento de Investigación, Creación y Difusión (Department for Research, Creation and Promotion), also known as DIC, at the National Conservatory of Music of Quito. That project became real in 1985, and included an electroacoustic music studio that started to work in 1986. Also part of the original DIC project, the Ecuadorian Festival of Contemporary Music had its first edition in April 1987.

During that period there was a lot of activity around new music in Ecuador. Estevez, Rodas and Diego Luzuriaga were lecturing and teaching new music workshops in different cities around the country. Maiguashca became more involved with the musical life of Ecuador. Rodas published the music journal *Opus* around the end of the 80s.

From a younger generation, composers Jorge Campos, Juan Campoverde, Eduardo Flores, Pablo Freire, Julián Pontón and Marcelo Ruano have been also working with electroacoustic media in their music.

The aforementioned electroacoustic music studio at DIC, National Conservatory of Music of Quito, is at present directed by Julián Pontón.

There is another electroacoustic music studio in Quito. Founded and originally directed by Julio Bueno, it is supported by the Culture Department of Quito's Municipality as part of the Departamento de Desarrollo y Difusión Musical or DDDM (Department for Musical Development and Promotion).

5.11 El Salvador

Only a few Salvadoran composers have been using electroacoustic media in their music. The activities in this field are recent in El Salvador.

Manuel Carcache, Francisco Huguet, Juan Carlos Mendizabal, Gilberto Orellana and Alex Panamá are some composers that produced electroacoustic music works. There were some early experiences by Germán Cáceres too, but he never completed a piece using electronic resources.

5.12 Guatemala

Not many Guatemalan composers have been working with electroacoustic media in their music. However, one of the most important Guatemalan composers, Joaquín Orellana, was already using tapes in his works in 1963.

The Gandarias brothers, David and Igor, have been composing with electroacoustic media since the 70s.

There are also works by Dieter Lehnhoff, Paulo Alvarado, and Renato Maselli.

Engineer Francisco Ruiz (born in Guatemala City, 1977) wrote recently (2004?) a thesis about the relationships between computers and electroacoustic music in Guatemala: *Influencias y Tendencias de la Informática en la Música Electroacústica Guatemalteca*.

5.13 Mexico

According to the complete list of works by Conlon Nancarrow, researched by Kyle Gann, the American born composer was experimenting during the 50s with a tape recorder to see “if he

could get the rhythms he wanted by tape manipulation” (Gann, K. 1997. Conlon Nancarrow: Annotated list of Works. Address: <http://home.earthlink.net/~kgann/cnworks.html>), then his untitled *musique concrète* piece could be the first work of that kind realized in Mexico.

Carlos Jiménez Mabarak is mostly accepted as the first Mexican composer that realized a piece on tape: *El paraíso de los ahogados* in 1960. He also composed: *La llorona*, ballet music for small orchestra, electronic oscillator, tympanis, percussions, piano and strings in 1961, and *La portentosa vida de la muerte* for tape, in 1964, commissioned by the National Ballet.

Eduardo Mata composed his ballet music *Los Huesos Secos* for tape in 1963. Jorge Dájer composed *Acuarimántima* for narrator and tape also in 1963. Guillermo Noriega composed *Estudio sobre la soledad* in 1963, and *Seis estudios sobre el espacio y el tiempo* in 1964. José Antonio Alcaraz composed *Fonolisia* for tape in 1964. Blas Galindo composed *Letanía erótica para la paz* for choir, soloists, orchestra and tape in 1965, and *Tres sonsonetes* for wind quintet and tape in 1967. Manuel de Elías composed *Vitral No. 2* for chamber orchestra and tape in 1967. Héctor Quintanar composed *Aclamaciones* for choir, orchestra and tape in 1967, *Sideral I* for tape in 1968, and *Símbolos* for chamber group, tape, slides and lights in 1969. Carlos Chávez used electronic sounds on tape in his ballet music *Pirámide*, 1968. Francisco Nuñez composed *Los logaritmos del danés* in 1968. Alicia Urreta composed *Ralenti* for tape in 1969. Mario Lavista composed *Espacios imaginarios* for tape in 1969. Manuel Enriquez composed *Viols (Móvil II)* for violin and tape between 1969 and 1972. Those were the early days of electroacoustic music in Mexico.

It took a long time until the first project to build an electronic music lab in the country was realized. Raúl Pavón, an engineer interested both in electronics and music, started to promote the use of electronic musical instruments in Mexico years before the first studio was built. He also built an analog synthesizer during the early 60s: the Omnifón.

After many difficulties and frustrated projects, Pavón together with Héctor Quintanar started to run the first Electronic Music Lab in Mexico as part of the Composition Workshop at the

National Conservatory of Music. The laboratory started its activities in January of 1970, with Quintanar as the Artistic Director and Pavón as Technical Director. Modular Buchla and Moog synthesizers were part of the equipment.

Eduardo Mata, Mario Lavista, Manuel de Elías, Francisco Núñez and Julio Estrada were among the first composers to study and work there.

Quintanar composed several pieces with the instruments at that lab. Some of them are: *Opus 1*, 1970; *Suite Electrónica*, *Ostinato* and *Sideral III*, all three 1971; *Voz* for soprano and electronic sounds, and *Mezcla* for orchestra and tape, both 1972.

During 1974 the Electronic Music Lab was moved from the National Conservatory of Music to the Composers and Authors' Rights Society (SACM), and around 1977 went to the Centro Nacional de Investigación, Documentación e Información Musical Carlos Chávez - CENIDIM (Musical Research and Documentation Center) directed by Manuel Enriquez. In 1992 was moved back again to the National Conservatory of Music.

A few years later other studios were also created in Mexico. During the 80s Francisco Nuñez opened a small analog lab at the Escuela Superior de Música del Instituto Nacional de Bellas Artes, INBA (Superior School of Music of the Fine Arts National Institute). Computers were added later to the lab when Roberto Morales became co-director in 1986.

Another digital lab was created in 1986. Directed by Jorge Pérez, with collaboration by Braun González, that lab mainly oriented to musical education and notation was based at the Escuela Nacional de Música de la UNAM (National School of Music of the National Autonomous University of Mexico).

Also during the 80s, Antonio Russek and Vicente Rojo opened a private studio: Centro Independiente de Investigación y Multimedia, CIIM (Independent Center for Research and Multimedia). As the aforementioned labs, this was established in Mexico City. CIIM published the first recordings with electroacoustic music by Mexican composers in 1984.

Other labs were opened later in different Mexican cities, like the Computer Music Lab in Guanajuato, directed by Roberto Morales and Ricardo Zohn; the Electronic Music Studio at the University of Querétaro, directed by Ignacio Baca Lobera; and the laboratory at the University of Monterrey, in charge of Juan Luis Rodríguez Trujillo;

During more recent years, the Centro Multimedia (Center for Multimedia) in Mexico City, part of the Centro Nacional de las Artes (National Center for the Arts) has begun using electroacoustic media for audio and music projects too.

5.14 Panama

Only a few Panamanian composers have some musical production related to this research, among them: Emiliano Pardo-Tristán, Samuel Robles and David Soley.

5.15 Paraguay

Only a few Paraguayan composers have been using electroacoustic media in their music. Activities in this field are recent in Paraguay.

Luis Szarán, a known conductor and composer, used electroacoustic media in some of his pieces. René Ayala and Hugo Guillermo Villagra Roa have been using electroacoustic techniques and mixing academic and popular languages in their music. Daniel Luzko, a young composer living in the United States, also created some pieces using electroacoustic media.

5.16 Peru

Any history about the pioneering years of electroacoustic music related to Peru start always with two names: César Bolaños and Edgar Valcárcel, but both composers realized all their activities in that field out of their natal country due to the lack of resources in their own place. The only local references to the early days of electroacoustic music in Peru are related to José Malsio (born in Lima, 1925), who was experimenting in Lima with some Philips equipments around 1963.

Bolaños studied in Peru, the United States and then Argentina, where he also was in charge of the first Electronic Music Lab created at CLAEM in Buenos Aires. At CLAEM Bolaños composed his first tape piece, *Intensidad y Altura*, in 1964, being also the first electroacoustic music composition produced at that Center. During the following years he created several tape and mixed pieces, including large multimedia performances. Bolaños was also active researching the application of computers in musical creation. He came back to Peru during the early 70s, without possibilities to continue the interesting developments he started in the electroacoustic music field while working in Buenos Aires.

Valcárcel was also at CLAEM during 1963 and 1964 but composed his first piece using electronic sounds in 1967 at the Columbia-Princeton Electronic Music Center in New York. He also was composing at the McGill Electronic Music Studio in Montreal, Canada, when he was Visiting Professor at McGill University during the mid 70s. Like Bolaños, Valcárcel attempted to impulse the musical creation with electroacoustic media in his natal country but was not possible for him to develop his ideas.

Composers Enrique Pinilla, Alejandro Núñez Allauca and Oscar Cubillas (born in Lima, 1938) were also interested on electronic music during those early years. Pinilla composed a piece for tape at the Columbia-Princeton Electronic Music Center in 1967. Núñez Allauca composed also a piece for tape in 1970 at CLAEM.

Other composers working in the field during the 70s were Pedro Seiji Asato, who created a piece for percussion and tape in 1972, and Arturo Ruiz del Pozo, who studied at the Royal College of Music in London. At that College Ruiz del Pozo composed in 1978 a series of *Canciones Nativas* for tape.

During the last years, several composers from the younger generation have been active working with electroacoustic media, among them: Renzo Filinich Orozco, Gilles Mercier, Rafael Leonardo Junchaya and Nilo Velarde Chong.

5.17 Puerto Rico

Jack Delano (American citizen; born in a town close to Kiev, Ukraine, 1914; died in Puerto Rico) visited Puerto Rico as a photographer during the early 40s and returned later the same decade because of his interest in Puerto Rico's life. Being also a filmmaker and a composer, he produced and directed educational documentaries, and often composed the music for them, too. Working at the Film Section of the Education for the Community Division in the Public Instruction Department, Delano found several limitations, one of which was the budget for the music track of the films.

There was not a Symphonic Orchestra in Puerto Rico until the late 50s. According to the composer Carlos Vázquez, Delano was visiting a technology exhibition in New York where he saw a tape recorder that the aforementioned Education for the Community Division bought. Then he started to experiment with that rudimentary equipment around the late 40s, recording sounds and transforming them, working with similar techniques to those Pierre Schaeffer and Pierre Henry were also developing in Paris at that time. It should be noted that for Delano this arose as a necessity. He was not attempting to develop an innovative musical path; the origin of his experiments was a problem to be solved.

Much later, during the mid 60s, Rafael Aponte Ledée was in Buenos Aires at CLAEM and Luis Manuel Alvarez in Bloomington at Indiana University, both composers working with

electroacoustic media. When coming back to Puerto Rico during the early 70s they were trying to start a small electronic music lab at the University of Puerto Rico. Francis Schwartz was then directing the Music Department there. At the end of 1974 the University finally bought an ARP 2600 synthesizer and some other equipment. According to Carlos Vázquez, that was the first electronic music lab created in Puerto Rico.

Eduardo Kusnir (see his references in the Argentina' section) was Visiting Professor at the University of Puerto Rico from 1976 to 1978. He was then teaching electronic music courses and also in charge of the laboratory. Kusnir also got some new equipment for the studio. Then he left Puerto Rico and went to live in Venezuela.

Since 1978 Carlos Vázquez have been directing the studio at the University of Puerto Rico. He has been also active organizing concerts with electroacoustic music, and was Musical Director of three international symposiums: the first, second and third Muestra Internacional de Música Electroacústica (International Electroacoustic Music Exhibition) held in 1992, 1995 and 1999.

5.18 Uruguay

Composers Coriún Aharonián and Conrado Silva are two of the main names associated with the early years of electroacoustic music development in Uruguay.

Aharonián composed several pieces for theatre using electroacoustic media during the early 60s. Conrado Silva composed in 1964 *Music for ten portable radios*, using computers to organize the compositional material for his piece.

Before that, Luis Campodónico was using a recorded voice on tape on his mixed piece *El misterio del hombre solo*, premiered in 1961.

Several Uruguayan composers were working at CLAEM, in Buenos Aires, during the late 60s. In its Electronic Music Lab Aharonián composed *Que* for tape in 1969; Antonio Mastrogiovanni composed *Secuencial II*, Ariel Martínez *El glotón de Pepperland*, Beatriz Lockhart *Ejercicio I*, and León Biriotti *En la morada de la muerte*, all four works for tape, and realized in 1970.

Renée Pietrafesa, composer, pianist and conductor, composed *A los olvidados* for tape, and *Sugerencias* for soprano, guitar, piano and tape, both in 1972.

Some electroacoustic music works were realized in Montevideo at the cooperative studio ELAC, pequeño estudio de Montevideo.

In 1997 was founded eMe, the Electroacoustic Music Studio of the University School of Music in Montevideo. Composer and percussionist Daniel Maggiolo, one of its co-founders, became director of the Studio in 1998.

It is worth mentioning that there was extensive activity on new music coordinated by a group of Latin American composers between 1971 and 1989: the Cursos Latinoamericanos de Música Contemporánea (Latin American Contemporary Music Courses), a regional cooperative initiative with composers Aharonián and Silva as part of the small core group.

Those intensive workshops, lasting usually around two weeks, were held in different places around the region: Cerro del Toro, Uruguay, in 1971, 1972, 1974, 1975 and 1986; Buenos Aires, Argentina, in 1976 and 1977; São João del-Rei, Brazil, in 1978 and 1979; Itapira, Brazil, in 1980; Santiago de los Caballeros, Dominican Republic, in 1981; San Cristóbal, Venezuela, in 1985; Mendes, Brazil, in 1989; among others.

On these courses there were students coming from Argentina, Bolivia, Brazil, Colombia, Costa Rica, Chile, Ecuador, United States, France, Guatemala, Ireland, Italy, Mexico, Panama, Dominican Republic, Uruguay, Venezuela and other countries. Attendants had the opportunity to participate in lectures, workshops and short courses by professors like: Coriún

Aharonián, Louis Andriessen from The Netherlands, José Vicente Asuar from Chile, Beatriz Balzi from Argentina/Brazil, Jan Bark from Sweden, Françoise Barrière from France, Oscar Bazán from Argentina, Eduardo Bértola from Argentina/Brazil, León Biriotti from Uruguay, Lars-Gunnar Bodin from Sweden, Konrad Boehmer from Germany/The Netherlands, Eduardo Cáceres from Chile, Abel Carlevaro from Uruguay, María Teresa Corral from Argentina, Willy Correa de Oliveira from Brazil, Micheline Coulombe Saint-Marcoux from Canada, Emma Curti from Argentina, Vania Dantas-Leite from Brazil, Brian Dennis from Great Britain, Hilda Dianda from Argentina, Otto Donner from Finland, Julio Estrada from Mexico, Marlene Fernandes from Brazil, Eduardo Fernández from Uruguay, Zoila Gómez from Cuba, Marga Grajer from Argentina, Dante Grela from Argentina, Violeta Hemsy de Gainza from Argentina, Klaus Huber from Switzerland, Nicolaus Huber from Germany, Yannis Ioannidis from Greece/Venezuela, Bernarda Jorge from the Dominican Republic, Hans-Joachim Koellreutter from Germany/Brazil, Leo Küpper from Belgium, Eduardo Kusnir from Argentina, Helmut Lachenmann from Germany, Mario Lavista from Mexico, Jorge Lazaroff from Uruguay, Mesías Maiguashca from Ecuador/Germany, José Ramón Maranzano from Argentina, Ariel Martínez from Uruguay/Argentina, Leo Maslíah from Uruguay, Philippe Ménard from Canada, Gilberto Mendes from Brazil, Emilio Mendoza from Venezuela, Josep Maria Mestres Quadreny from Spain, Gordon Mumma from the United States, José Maria Neves from Brazil, Luigi Nono from Italy, Jocy de Oliveira from Brazil, Joaquín Orellana from Guatemala, Sigune von Osten from Germany, Graciela Paraskevaídis, Roque de Pedro from Argentina, Jorge Peixinho from Portugal, Eladio Pérez González from Paraguay/Brazil, Michel Philippot from France, Renée Pietrafesa from Uruguay, Cergio Prudencio, Folke Rabe from Sweden, Jorge Rapp from Argentina, Fernando von Reichenbach from Argentina, Alfredo Rugeles from Venezuela, Herman Sabbe from Belgium, Tadamasaki Sakai from Japan, Arturo Salinas from Mexico, María Teresa Sande from Uruguay, Dieter Schnebel, Dieter Schönbach and Gabriele Schumacher, all three from Germany, Conrado Silva and Carlos da Silveira from Uruguay, Keith Swanwick from Great Britain, Tato Taborda Júnior from Brazil, Philip Tagg from Great Britain/Sweden, Werner Taube from Germany, Ricardo Teruel from Venezuela, Héctor Tosar from Uruguay, Fernand Vandenbogaerde from France, Jesús Villa Rojo from Spain, Alberto Villalpando from Bolivia, and Wilhelm Zobl from Austria, among others.

The international team that was in charge of organizing the workshops in 1989 was made up by José Maria Neves from Brazil, Coriún Aharonián, Graciela Paraskevaídis from Argentina/Uruguay, Cergio Prudencio from Bolivia and Conrado Silva. Héctor Tosar, Miguel Marozzi, María Teresa Sande, all three from Uruguay, and Emilio Mendoza from Venezuela, were part of the organization team during some time, too.

5.19 Venezuela

The Estudio de Fonología Musical of INCIBA, Instituto Nacional de Cultura y Bellas Artes, organized during 1966-1967 by José Vicente Asuar (see his references on Chile' section) is considered the first electroacoustic music laboratory in Venezuela.

Composer Alfredo del Mónaco started to work actively at that lab since its beginning. According to him the studio had the classic equipment at that time, with "... generators, filters, ring modulator, echo, Moog envelope generator, three Ampex tape recorders plus one four tracks, wide tape, Ampex too" (del Mónaco, A. 2003. Personal communication).

Working in that studio del Mónaco composed between 1966 and 1967 *Cromofonías I*, the first electroacoustic music piece created by a Venezuelan composer. Later, between 1967 and 1968, he composed *Estudio electrónico I*, also for tape.

Composer and musicologist Isabel Aretz (see her references on the Argentina section) composed *Birimbao* for tympanis and tape in 1968, which was the first mixed work realized in Venezuela. Miguel Angel Fuster and Fedora Aleman were also experimenting during those days at the Estudio de Fonología Musical.

Two events were closely related to the creation and development of the Estudio, first the III Festival Bienal de Música de Caracas, and then Imagen de Caracas, a big multimedia show held in Caracas during 1968 to celebrate the 400 years anniversary of the foundation of the

city. *Imagen de Caracas*, conceived by Inocente Palacios, was a complex scenic installation including actors, eight screens for films, three screens for slides, 46 loudspeakers on the ceiling plus four sound towers broadcasting electronic music (composed by Asuar), songs and the narrator's voice.

Asuar left Venezuela in 1968 and most of the equipment of the original studio disappeared.

When the *Estudio de Fonología Musical* declined, between 1969 and 1971, the *Instituto Interamericano de Música Experimental y Estudios Estéticos*, also known as *INTERMUSICA*, was apparently developing a few sporadic activities related to electroacoustic music.

A new studio was founded during the early 70s, the official name was again the same of the old frustrated project of the 60s: *Estudio de Fonología Musical*, but is mostly known as *Instituto de Fonología*. Antonio Estévez was in charge of its development.

During the first years there were limited activities at the *Estudio*.

Antonio Estévez composed then pieces like *Cromovibrafonía Múltiple*, *Cromofonía*, *Espectrofonía*, *Pranofonía* and *Cosmovibrafonía*, this last piece including three tape recorders, piano, vibraphone, tam-tam and gong.

After several problems during that period, two professors coming back from their studies abroad were incorporated to the institute: Raúl Delgado Estévez and Servio Tulio Marin. Together with Antonio Estévez they were teaching courses in composition and electroacoustic music at the Institute.

Raúl Delgado Estévez composed then: *Primeletropus* for piano, flute and synthesizer in 1975; and *Derrota* for narrator and tape, based on a text by Rafael Cárdenas, in 1976. Marín composed the electronic music for the film *Shhh* by Luis Villamizar in 1978.

The equipment at the Estudio included a big modular ARP synthesizer, a 2600 ARP synthesizer, a portable Nagra tape recorder, two, four and eight channels tape recorders, a spectrum analyzer, Dolby noise reduction system modules, echo chambers, equalizers, mixers and good quality microphones, among other resources.

The Institute had multiple problems and during the early 80s entered into a new phase. Composer Aurelio de la Vega (see his references in Cuba' section) was commissioned to assist in the process of buying new equipment for the studio.

Composer Eduardo Kusnir (see his references in Argentina' section) began to teach electroacoustic music at the Juan José Landaeta National Conservatory of Music in 1980, and since 1982 he also started to work at the Estudio de Fonología Musical, which he helped to reorganize. Soon composer Ricardo Teruel became part of the staff of the Estudio too.

Around the mid 80s Kusnir left the Instituto de Fonología and Teruel became its director, but the studio declined with time.

Kusnir kept working at the Landaeta Conservatory teaching electroacoustic music, at first using his own equipment. Later the Conservatory bought a Synclavier II digital synthesizer for its studio.

Around the mid 80s Kusnir founded the Sociedad Venezolana de Música Electroacústica or SVME (Electroacoustic Music Society of Venezuela).

During recent years, Adina Izarra and some colleagues have been developing electroacoustic music activities at Simón Bolívar University in Caracas, creating LADIM, Laboratorio Digital de Música.

CHAPTER VI

COMPOSERS AND THEIR MUSIC

6.1 Introduction

As it was mentioned in Chapter V, these two chapters aim to approach the electroacoustic music production related to 18 Latin American countries: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Mexico, Panama, Paraguay, Peru, Puerto Rico, Uruguay and Venezuela.

While Chapter V was presenting a historical introduction, Chapter VI has extensive information about the composers that were born or pursued a portion of their musical career there.

Composers' names were listed according to their year of birth except when it was not possible to find or confirm the date, and those cases were listed alphabetically at the end of the corresponding section. Information about their compositions involving electroacoustic media was also included (e.g. title, instrumentation, year of composition). The listing of their works is exhaustive, as far as it has been possible to ascertain it.

Many of the compositions listed below are available for listening in the recordings archive I have developed at the Daniel Langlois Foundation for Art, Science, and Technology. The full list is included in a special chapter after the Conclusions.

The information about the composers and their compositions can depict a basic profile of their approach to electroacoustic music. Some of the artists included are mostly devoted to music creation involving new technologies in their production process, while others have a

mixed catalog of instrumental and electroacoustic works. In a few cases, the use of computers, synthesizers or other electronic resources were only part of an occasional experience.

6.2 Argentina

Argentina has been an active and prolific place for the electronic arts. Electroacoustic music experiences started around the early 50s. Sustained activities since the early 60s by a large number of composers produced, after more than four decades, hundreds of works using electroacoustic media. Information about composers that have been creating music with electroacoustic techniques and technologies follows.

Isabel Aretz (born in Buenos Aires, 1909; died in the same city, 2005), musicologist and composer, moved to Caracas, Venezuela, in 1947 and was living there for many years. She returned to Buenos Aires during the mid 90s.

Aretz was among the few composers that worked at the first electronic music studio in Venezuela, founded during the mid-60s: Estudio de Fonología Musical. There she composed *Birimbao*, a piece for four timpanis and tape, in 1968.

Isabel Aretz composed also: *Yekuana* for 8 voices, full orchestra, reciter and tape in 1974; *Kwaltaya*, ethnodrama in three ecstasys for tape and acting voice (*collage* using aboriginal music on the tape part) in 1980; *Gritos en la Ciudad* for small orchestra and tape in 1992; and *Hombre al Cosmos*, for piano and tape, in 1993.

According to Isabel Aretz (Aretz, I. 2003. Phone conversation), the sound materials for all her mixed pieces were produced during the 60s, working at the Estudio de Fonología Musical in Caracas, Venezuela, with José Vicente Asuar. Aretz explained that she wasn't producing

sound materials for a specific piece while working there, but creating many different musical materials with electroacoustic media that were later used in all her mixed pieces listed above.

Eduardo Alemann (born in Buenos Aires, 1922) composed *Balada* for electric guitar with electroacoustic processing (reverb, pitch transpose, flanger, distortion, wah-wah, echo) and strings in 1988.

César Franchisena (born in General Pinedo, Chaco, 1923; died in Córdoba, 1992) was a major influence on the contemporary music scene of Córdoba for several decades.

Franchisena started to experiment with electroacoustic media in Córdoba during the 50s. He was experimenting in 1959 at Radio Universidad with electronic sources and composed in 1960 *Numancia* at CIAL, the Centro de Investigaciones Acústicas y Luminotécnicas (Acoustic and Lighting Engineering Research Center) of the Universidad Nacional de Córdoba (National University of Córdoba).

Among other pieces Franchisena composed: *Intermezzo (Divertimento)* for tape, between 1973 and 1974; *Tres momentos mágicos* for tape in 1973, realized at CICMAT in Buenos Aires; *Tríptico espacial* for oboe, synthesizer and percussion, in 1981; *Configuraciones* for synthesizer and piano, between 1982 and 1983; *El Ucumar* for tape, in 1985; *Horeb (Montaña de Dios)* for tape, in 1986; *Dúo* for flute and computer in 1987; *Canticum* for computer, in 1988; and *Fulguraciones* for computer, between 1989 and 1990.

Eduardo Tejada (born in Buenos Aires, 1923) composed *Estudio Electrónico No. 1* in 1968 and *Estudio No. 2* in 1969, both tape works realized at Estudio de Fonología Musical using electronic sound sources; *At-Ocso* for full orchestra and tape in 1972, using also electronic sounds sources for the tape part realized at the Estudio de Fonología Musical; *Senzar* for tape in 1975, realized at the personal studio of a friend; *Cántico de gloria a Juan Manuel de Rosas*

for tape in 1989, realized at LIPM; and *Poesis* for tape in 1999, realized at E. Belloc personal studio.

Tirso de Olazábal (born in 1924; died in 1960) was working with electroacoustic media in Paris during the 50s. He went in 1952 to France for studying composition, musicology and conducting, and again in 1957, when he was working with Pierre Schaeffer and Pierre Boulez at ORTF for a short time. He also visited the electronic music studios in Köln, Germany, and Milan, Italy.

Tirso de Olazábal composed his *concrète* piece *Estudio para percusión* in 1957.

During the 50s he was very involved with promoting *concrète* and electronic music techniques in Argentina.

Tirso de Olazábal also wrote the book *Acústica Musical y Organología*, widely used in courses of acoustics in Argentina's conservatories since the 50s.

Hilda Dianda (born in Córdoba, 1925) was also working with electroacoustic media during the 50s. She composed *Dos Estudios en Oposición* for tape in 1959, while working at the Studio di Fonologia Musicale of RAI (Italian Radio and TV) in Milano. This piece was produced using only electronic sound sources.

In 1964 Dianda composed *A 7* for cello and tape, working at the Electronic Music Lab of San Fernando Valley State College in Northridge, California. The tape part for this mixed composition was produced using the cello as the only sound source, recording Emma Curti on the instrument and later applying electroacoustic techniques to the raw materials. The number 7 on the title comes from the number of sound sources on concert: 3 stereo tape recorders plus the cello performer.

During 1975-1976 Hilda Dianda composed ... *Después el silencio* ... using electronic sounds and analog techniques from CICMAT, in Buenos Aires; and in 1984 she created *Encantamientos*, a long work structured in three movements, using the Synclavier digital synthesizer from LIPM.

Nelly Moretto (born in Rosario, 1925; died in Buenos Aires, 1978) composed *Composición 9a* for two instrumental groups, tape, dance and lights in 1965; *Composición 9b* for tape in 1966; *Coribattenti* for string quartet and tape in 1967; *Composición No. 13: In Memoriam J. C. Paz* for trumpet and tape in 1972; and *Composición No. 14: Bah! le dije al tiempo* for violin, trumpet, piano and tape, between 1974 and 1975.

Rodolfo Arizaga (born Buenos Aires, 1926; died in Escobar, 1985) studied Ondes Martenot in Paris with Ginette Martenot and introduced the instrument in Argentina when he returned to the country during the mid 50s.

Among other works Arizaga composed: the first version of *Délires*, cantata for soloist, female chorus (three voices), celesta, vibraphone, harp, Ondes Martenot, 3 violins, 3 violas and 3 cellos, between 1954 and 1957; *Sonata Breve* for piano and Ondes Martenot, and *El organillo* for solo Ondes Martenot, both in 1958. He also used Ondes Martenot on his piece *El ombligo de los limbos, la momia y una encuesta*, dated 1969.

Enrique Gerardi (born in Buenos Aires, 1926) is a composer, conductor, researcher and teacher with activities in different experimental musical fields. Gerardi was Professor of Musical Acoustics and History of Music at the Catholic University of Argentina, Professor of Technical Elements of Music at the Gilardo Gilardi Musical Conservatory of La Plata, and professor of Musical Acoustic Foundations at the National University of La Plata.

He composed *Música de Escena, concrète* piece for theater, and *Divertimento* for tape, both in 1967; *Figura-Fondo*, aleatoric piece for electric guitar, piano, percussion, tape and painter in 1968; *Sobre Texturas y Gestos* for two flutes, two cellos, piano, tape and improvisation group, and *El Tercer Canto 1970* for instrumental ensemble, tape and improvisation group, both in 1970; *Solo en Presente, concrète* music for dance, in 1971; *Las Nubes, concrète* music on tape, in 1973. During 1999 he composed *Primera Improvisación*, an algorithmic piece produced using the M software.

Gerardi was also working extensively on his digital orchestra compositions; some of them are: *Octeto*, 1986; *Danza 1, Placas, Dudas, Pentaton, Tetraton, 12 por 8, Casirock, Oncenas* and *Balanceo*, 1987; *Obertura I, VI Balada, Moto, Shimmy, Intermezzo, Virtuoso, Elegía, Warm Music, Danza 2, Andante, 10 por 8, Preludio, Raro, Mas Raro, Largo* and *Rápido*, 1988; *Danzas, Música entre Músicas, Obertura II* and *En secreto*, 1989; *Lejanía*, 1990; *Combinatorias 2*, original for piano dated 1985, version for digital piano, 1990; and *Música entre Músicas/2*, 1995.

Gerardi also made translations from English or French to Spanish of complete books by Joseph Schillinger, James Tenney and several other musicians and theoreticians, just to use that in his courses and classes of composition.

Augusto Rattenbach (born in Buenos Aires, 1927) composed *Pulsaciones* for tape in 1974; *Selva I* for electronic sounds, and *Impulsos* for soprano, tape and chamber ensemble, both in 1976; and *Selva II* for soprano, clarinet, violin, cello, piano and tape in 1978.

Rolando Mañanes (born in Juan N. Fernández, 1928) composed *A propósito de Hamlet* in 1986, realized at LIPM; *Viento prenatal* for tape in 1996, realized at GMEB in Bourges, France; and *Un día después* for tape in 1997.

Virtú Maragno (born in Santa Fe, 1928; died in Buenos Aires, 2004) composed *Composición No. 1* for voices, instruments and tape in 1962. The tape part includes, among other sounds: the voice of cosmonaut Yuri Gagarin, heart beats of Laika (the first dog in space), and satellite messages.

Jorge Arandia Navarro (born in Buenos Aires, 1929) composed among other works: *Forma Sonora de Ondina* for soprano, children's choir, instrumental group and tape in 1964.

alcides lanza (born in Rosario, 1929) is an internationally recognized composer and pianist, active also as conductor, teacher and concert organizer.

He graduated with a degree in electronics at the High School, and began studies in architecture which were not completed but which influenced his style of writing music.

I use ideograms, graphics, drawings (my "little drawings") with the intention to give a direct representation of my music and to replace more conventional systems of notation. [RDF free translation]

lanza, a. 1972. *alcides lanza, auto-retrato*. Manuscript.

Being awarded a Guggenheim Fellowship, he moved to New York in 1965 to study electronic music at the Columbia - Princeton Electronic Music Centre. In 1971 he moved to Canada to teach composition and electronic music at McGill University, in Montreal; and from 1974 to 2003 he was the director of its Electronic Music Studio.

lanza composed many works involving electroacoustic media, among them: *exercise I [1965-V]* for tape in 1965; *plectros II [1966-I]* for tape and piano, and *interferences I [1966-II]* for two groups of wind instruments and electronic sounds, both in 1966; *interferences II [1967-I]* for percussion ensemble and tape, and *strobo I [1967-V]* for double bass, miscellaneous percussion instruments and tape, in 1967; *ekphonesis I [1968-II]* for string and/or keyboard

instrument and tape, and *ekphonesis II* [1968-III] for voice, piano and tape in 1968; *out of...* [1978-I] for electronic sounds, *ekphonesis III* [1969-II] for wind, keyboard, string instruments and tape, and *penetrations III* [1969-V] for eight sound sources, rhythm boxes and tape, in 1969; *penetrations IV* [1970-IV] for electronic sounds, and *kron'ikelz* [1970-II] for two narrators, chorus, orchestra and tape, in 1970; *plectros III* [1971-I] for piano and electronic sounds in 1971; *penetrations VII* [1972-III] for actress-singer and tape in 1972; *plectros IV* [1974-I] for two pianists of opposite sex and tape in 1974; *acúfenos III* [1977-I] for flute, piano and tape, and *eidesis IV* [1977-II] for wind ensemble and electronic sounds, in 1977; *ekphonesis V* [1979-I] for actress/singer, electronic sounds and electronic extensions in 1979; *acúfenos V* [1980-II] for trumpet, piano and tape, in 1980; *modulos II* [1982-I] for guitar solo and electronic sounds (optional vocal part) in 1982; *modulos III* [1983-III] for guitar and chamber ensemble (tenor saxophone, violin, cello, percussion, piano) with tape, and *sensors IV* [1983-V] for chorus, electronic sounds and computer, both in 1983; *arghanum I* [1986-I] for accordion, clarinets, vibraphone and digital synthesizer, and *modulos IV* [1986-I] for guitar, electronic sounds and electronic processing, both in 1986; *arghanum II* [1987-I] for flute, double bass, violin, clarinet, sax, piano, digital synthesizer and percussion, *arghanum III* [1987-II] and *arghanum IV* [1987-II], both for digital and analog sounds, all three in 1987; *...there is a way to sing it...* [1988-III] for digital and analog sounds, and *ekphonesis VI* [1988-II] for actress/singer, electronic sounds and electronic extensions, both in 1988; *un mundo imaginario* [1989-II] for choir and tape in 1989; *arghanum V* [1990-I] for accordion (or piano) and tape, and *the freedom of silence* [1990-II] for voice, piano and tape, both in 1990; *son glosas, claro...* [1991-I] for digital synthesizers and tape in 1991; *vôo* [1992-I] for acting voice and tape in 1992; *piano concerto* [1993-I] for MIDI piano and chamber orchestra in 1993; *in...visible* [1994-I] for choir and computer generated tape in 1994; *ektenes III* [1995-I] for clarinet, electroacoustic music and digital signal processors in 1995; *...the people sang...* [1996-I] for voice and tape, and *the big dipper* [1996-II] for accordion and tape, both in 1996; *ontem* [1999-I] for voice, tape, tablas and DSP in 1999; *aXions* [2002-I] for voice, violin, double bass percussion and tape, *expansão* [2002-III] for actress-singer, DSP and tape, and *...como rocas al sol...* [2002-V] for accordion and tape, all three pieces in 2002; *aXents* [2003-I] for acoustic ensemble

instrumental and tape in 2003; ... '*cantos' rodados [2004-I]* for accordion and tape in 2004; and *diastemas [2005-I]* for marimba and electroacoustic sounds in 2005.

Regina Benavente (born in 1930) composed *Música concertante para clarinete y cinta magnética* during 1968.

Virgilio F. H. Tosco (born in Achiras, province of Córdoba, 1930; died in Córdoba City, 2000) was Professor of Composition, Harmony, Fugue and Musical Forms at the National University of Córdoba. Tosco was also Coordinator of the Arts area at the Centro de Investigaciones (Research Center) of the Humanities and Philosophy Faculty of the same University between 1992 and 1995.

He was among the small group of composers that created the Centro de Música Experimental (Experimental Music Center) at the National University of Cordoba during the mid 60s, being his Secretario Coordinador (Secretary Coordinator) between 1965 and 1971.

Tosco composed *Complejo No.2* for recorders, piano, percussion, sound objects (aluminium, bronze and wood) and white noise in 1965, premiered during the Primeras Jornadas de Música Experimental held in Córdoba in 1966. He also composed several tape pieces: *Ectoplasma* in 1966, *Homenaje a Poe* in 1967, *Tres Movimientos para cinta magnetofónica* in 1969, *Estudio No. 3 Sobre un Objeto Sonoro* and *Atmósferas II*, both in 1971. In 1969 Tosco created the theatrical piece *Ritual del Hombre* for actors, image projections and tape. Most of Tosco's electroacoustic works were realized at the Laboratorio de Música Experimental de la Escuela de Artes de la Universidad Nacional de Córdoba (Experimental Music Laboratory, School of Arts, National University of Córdoba), and also at his own house and at Horacio Vaggione's.

Mauricio Kagel (born in Buenos Aires, 1931), an internationally recognized composer, was experimenting with electroacoustic media in Argentina during the early 50s. According to 1968 Hugh Davies' *Répertoire international des musiques électroacoustiques / International Electronic Music Catalog*, Kagel realized 8 electroacoustic studies between 1950 and 1953 (working at first directly on disc). Then during 1953-1954 he created *Música para la Torre* (also known as *Musique de Tour*), a sonorisation around 108 minutes long for an industrial exhibition in Mendoza, Argentina, including an essay in *musique concrète* (*No. 1 para orquesta; No. 2 estudio para batería; No. 3 ostinato para conjunto de cámara; No. 4 ensayo de música concreta*).

Kagel was trying to establish an electronic music studio in Argentina during the 50s, but he couldn't realize that project.

He directed many films and was among the founders of the Cinemateca Argentina (Argentina Film Library). Kagel speaks about film as a kind of modern opera. He also wrote articles on film and photography for a journal.

Before he moved to Germany in 1957, where he has been living since then, Kagel was working at Teatro Colón (Colon Theatre) in Buenos Aires.

Among his many musical works, Mauricio Kagel composed: *Transición I* for electronic sounds in 1958; *Transición II* for piano, percussion and two tape recorders in 1958-1959; *Antithese*, in two versions: music for electronic and public sounds, and play for one actor with electronic and public sounds, both in 1962; *Phonophonie* for one baritone solo, one off-stage voice, and two tapes (3-6 perc, 3 speakers or singers [2 male and 1 female voice or vice versa] needed for production of the tape) in 1963; *Tremens*, scenic montage of a test for two actors, electrical instruments, percussion, tapes and slides projections, *Variaktionen über Tremens* for two actors, tape and slide projections (or film projections ad lib.), and *Musik aus Tremens* for electric guitar, electric bass guitar, electric double bass, Hammond organ, one percussionist and tape, all three pieces in 1963-1965; *Camera Oscura*, chromatic play for light sources and actors (part of *Journal de Théâtre*) for three actors, three loudspeaker

groups (behind the stage, at the side of the stage, behind the auditorium), two or three tape players, three spotlights and three silent colour films, in 1965; *Kommentar + Extempore* (also part of *Journal de Théâtre*) for one female and one or two male actors, and one-three tapes, in 1966-1967; *Unter Strom (Live Current)* for three performers (Spanish guitar, electric guitar, electric bass guitar), miscellaneous experimental sound generators and props as well as microphones, loudspeakers and amplifiers, in 1969; *Acustica* for experimental sound generator and loudspeaker, two-five performers with wind, plucked, and percussion instruments (there is also a version without taped sounds), in 1968-1970; *Exotica (for non-European instruments)*, six players with a minimum of 60 assorted plucked, string and wind instruments, plus tape, in 1971-1972; *Kantrimusik*, pastorelle for voices, instruments and four tapes (of country sounds), in 1973-1975; *Présentation* for speaker, piano and tape, in 1977; *Umzug (Removal)*, dumb show for stagehands, eight performers and tapes, also in 1977; *Die Erschöpfung der Welt (The Exhaustion of the World)*, scenic illusion in one act (11 scenes) for voices, instruments and tapes, in 1976-1978; *Die Rhythmusmaschinen (The Rhythm Machines)* for five rhythm-generators/tapes and two percussionists, in 1977-1978; *Blue's Blue* a musico-ethnological reconstruction for four players (clarinet and/or sax[es], glass trumpet [a trumpet sound produced by singing into a drinking glass; guitar; violin/double bass) and tape, in 1978-1979; *Der Tribun*, radio play for a political orator, marching sounds and loudspeakers, in 1979; *Aus Deutschland (from Germany)*, lieder opera in 27 scenes for voices, orchestra and tapes, in 1977-1980; *Szenario (Scenario)* for strings (min.12.10.10.8.6) and tape, in 1981-1982; *Mio Caro Luciano*, tape collage, in 1985; *Atem* for solo wind player (1 player with any 3 instruments) and tape, in 1969-1990; *...nach einer Lektüre von Orwell (...after reading Orwell)*, radio play in meta-Germanic, with two optional modes of performance, one for 22 (33 or 44) silent performers and tape, and the other for scenic environment without performers: two video tapes, 11 television monitors, 22 (33 or 44) chairs (each illuminated with a spotlight) and tape, in 1993-1994.

Francisco Kröpfl (born in Timisoara, Romania, 1931; lives in Argentina since 1932) started to experiment with electroacoustic media during the 50s. Together with **Fausto Maranca** he founded the Estudio de Fonología Musical at the University of Buenos Aires during 1958,

one of the first electroacoustic music studios in Latin America. That lab was operational until 1973. Walter Guth, Jorge Menyhart and Jorge Agrest were some of its technicians. Among the composers that were working at that studio were: Eduardo Bértola, Alberto Coronato, Dante Grella, José Maranzano, Jorge Molina, Nelly Moretto, Jacqueline Nova, Carlos Rausch, Jorge Rotter and Eduardo Tejada.

Kröpfl was also Musical Director of the Electronic Music Lab at CLAEM - Centro Latinoamericano de Altos Estudios Musicales (Instituto Torcuato Di Tella) between 1967 and 1971, and Director of the Contemporary Music Department at CICMAT - Centro de Investigación en Comunicación Masiva, Arte y Tecnología (Center for Research in Mass Communication, Art and Technology) between 1972 and 1976. At the Buenos Aires City Cultural Center, he has been directing the Music, Sound and Image Department (today Music Department) since 1982, guiding also one of the main electroacoustic music labs in the region: LIPM - Laboratorio de Investigación y Producción Musical (Musical Research and Production Laboratory).

Attracted by the electronic generation of sounds, he composed *Ejercicio de texturas* and *Ejercicio con Impulsos* for electronic sounds, both 1959-1960, at the Estudio de Fonología Musical in Buenos Aires.

Among other works, Kröpfl composed: *Dimensión 1960 II* for piano, electric guitar and tape in 1960; *Exercise with colored noise* (or *Ejercicios con ruido coloreado* or *Ejercicios con ruido blanco*) in 1962; *Música para 3 percussionistas y sonidos electrónicos* for 3 percussionists and electronic sounds in 1963; *Diálogos I* during 1964-1965 and *Diálogos II* in 1965, both works for tape; *Diálogos III* and *Mutación I*, both for tape, and *Música para el audiovisual En el Reino Helado de Flash Gordon* for synthesizer, all three works in 1968; *Música para sintetizador* for synthesizer in 1970; *Tónicas y giros* for tape in 1973, realized at CICMAT; in Buenos Aires *Nocturno* and *Scherzo*, both for tape, realized in 1977 at the Columbia-Princeton Electronic Music Center in New York; *Incursiones en el AREM* for synthesizer and computer in 1994; *Mutación II* for tape in 1985, realized using sounds produced by a Synclavier II digital synthesizer; *Orillas*, based on a poem by Rodolfo Alonso,

and *Cuenca. Presagio de pájaros*, both for tape, in 1988; *Metrópolis - Buenos Aires*, soundscape from the city realized at LIPM in Buenos Aires, and *Cronique* for tape, both in 1990; *Música interactiva* for synthesizer and computer, and *Música para percusión II* for percussion and electronic sounds, both in 1992; *Relato*, version for tape only in 1992, and version for live synthesizer and tape in 1993; *El pájaro (in memoriam)* for tape in 1995; *Vientos* for tape in 1996; *Al Sur* for tape in 1997; *El regreso* and *El vuelo*, both for tape, in 2000.

Antonio Tauriello (born in Buenos Aires, 1931) composed *Dos estudios d'apres Max Ernst* in 1986.

Rodolfo Alchourrón (born in Buenos Aires, 1934; died in the same city, 1999) composed, among many other pieces: *La historia de un hombre* for jazz octet, 3 singers and electronic music in 1972.

Edgardo Cantón (born in Los Cisnes, Córdoba, 1934) composed among other works: *Animal Animal* in 1962; *Etude* and *Tout finit par tomber dans le même trou* in 1963; *Voix Inouies* in 1965; *I palpiti* and *Pi-ouit* in 1966; *Manges par une espèce de Serpent* in 1967; *Une Espèce de Serpent* in 1969; *A cheval vers la lune s'en va lagune* in 1970; *The big Baby's Gang* in 1972; *Langue agile, oiseau d'argile* in 1973; *Alto y falto* in 1977; and *Promenade d'ete d'Ulis Nasa* in 1984.

Mario Davidovsky (born in Médanos, Buenos Aires, 1934) composed several well-known musical pieces for electronic generated sounds and acoustic instruments, mainly during the 60s and 70s.

Among other works Davidovsky composed: *Electronic Study No. 1*, 1960; *Electronic Study No. 2*, 1962; *Contrastes* for string orchestra and tape, 1964; and *Electronic Study No. 3*, between 1964 and 1965. His series of *Synchronisms* includes: *Synchronisms No. 1* for flute and electronic sound, 1962; *Synchronisms No. 2* for flute, clarinet, violin, cello and tape, 1964; *Synchronisms No. 3* for cello and electronic sound, 1964; *Synchronisms No. 4* for chorus and tape, 1966; *Synchronisms No. 5* for 5 percussion players and tape, 1969; *Synchronisms No. 6* for piano and electronic sound, 1970; *Synchronisms No. 7* for orchestra and tape, 1974; *Synchronisms No. 8* for woodwind quintet and tape, also 1974; *Synchronisms No. 9* for violin and tape, 1988; *Synchronisms No. 10* for guitar and tape, 1992. He received the Pulitzer Prize in 1971 for his composition *Synchronism No. 6*.

Since the early 60s Mario Davidovsky lives in the United States.

Jorge Edgar Molina (born in San Luis, 1934) composed two electroacoustic pieces for tape in 1972: *Estudio Electrónico No. 1* and *Estudio Electrónico No. 2*, both realized at Estudio de Fonología Musical with electroacoustic analog equipment; and *Ántropos* in 1989, realized in Santa Fe at EFME, Estudio de Fonología y Música Electroacústica of the Instituto Superior de Música at Universidad Nacional del Litoral (Phonology and Electroacoustic Music Studio at National University of Litoral).

Miguel Angel Rondano (born in Godoy Cruz, Mendoza, 1934) composed several pieces using electroacoustic media during the early 60s.

Rondano composed, in 1963: *La batalla de los ángeles* for tape; *Promenade, 2 Times* and *Danza de los resortes*, all three pieces for ballet; *La Pirámide de Saturno*, sonorisation for a sculpture; and music for a painting exhibition by Carlos Squirru, this last one with Alberto Villalpando. In 1964: *4 pintores, hoy* for film; *Ouroboros*, ballet music; and the sonorisation *La Muerte*, with Alberto Villalpando. In 1965: *Microsucesos*, musical theatre/happening; *Buen Viaje*, sonorisation; and *Kesa y Morito* for theatre. In 1966: *Julia* for film; *Panto-danza*

... *y embolsados* for theatre; *Help Valentino*, for theatre/film; *Barbazul*, sonorisation; and *Wig's happening*, musical theatre.

He composed some of his works at CLAEM, like *Dance Bouquet* for tape in 1965, and *La fiesta, hoy* in 1966.

Alicia Terzián (born in Córdoba, 1934) composed *El enano* for tape (dance ad libitum) in 1964; *Génesis* for tape (dance ad libitum), and *Sinfonía en Dos Movimientos* for tape and slides (dance ad libitum), both in 1972; *Bestiela* for dance or mime and tape in 1981; *Canto a mi misma* for 20 strings and live electronics, and *El otro Judas* for actors, choir and tape, both in 1987; and *Buenos Aires me vas a matar* for piano, tape and voice in 1990.

Roque de Pedro (born in Comodoro Rivadavia, Chubut, 1935) composed *Respuestas instantáneas* for piano, guitar, instrumental and vocal group, orchestra and 3 photocopy machines in 1971; *El mal de no creer* for tape in 1973; *Curriculum vitae* for tape and *Divertimento para el sonido de un día 14-XII-1972* for tape and 5 performers, both in 1976.

Rufo Herrera (born in Córdoba, 1935) composed *Ambitus Mobile I* for three instrumental groups and tape in 1970. Herrera moved to Brazil in 1963.

Oscar Bazán (born in Cruz del Eje, 1936; died in Córdoba, 2005) was one of the composers that created the Centro de Música Experimental (Experimental Music Center) at the National University of Córdoba during the mid 60s.

Bazán composed: *Simbiosis I* for electric organ, percussion and tape in 1964, realized at CLAEM, in Buenos Aires; and several works for tape: *Simbiosis II* in 1965, realized at Centro de Música Experimental in Córdoba; *Austeras* and *Episodios*, both in 1973; *Parca* in

1974, all three pieces realized at CICMAT in Buenos Aires; *Los números* in 1975; *El círculo invisible* in 1987; *Austeras II* in 1985, realized at LIPM in Buenos Aires; and in 1989 a piece for electronics, and participation: *El valle de las profecías*. Also from the mid 60s is his piece *Kung 'hen*, for voices and tape.

Enrique Belloc (born in Buenos Aires, 1936) studied with Pierre Schaeffer at the GRM in Paris during the 60s. He composed: *Faber Farven* for tape in 1985; *Homenaje a Pierre Schaeffer* for live samplers and synthesizers in 1989; *Para Bla, un saludo a Barbara Belloc* in 1993, *poPierre* in 1994, *Rugosidades del inconsciente colectivo* and *Suite Acusmatica* in 1995, *Objetos Reencontrados* in 1997, all of them works for tape; *Espacios Acusmáticos* for eight channels tape in 1998; *Canto Ancestral: Onoma, Poieo, Tibet, Sueños* for tape in 1999; *Tríptico de Bahía Blanca* for tape in 2000; and *Remix Portraits* in 2002.

Gerardo Gandini (born in Buenos Aires, 1936) composed *RSCH:escenas* for tape, piano and speakers in 1984.

Carlos A. Ferpozzi (born in Córdoba, 1937) was among the small group of composers that created the Centro de Música Experimental (Experimental Music Center) at Universidad Nacional de Córdoba (National University of Córdoba) during the mid 60s.

Ferpozzi has been teaching Harmony, Music History, Morphology, Counterpoint and Musical Analysis at that University. Since 1994 he is working also as researcher at CIFYH, Centro de Investigaciones de la Facultad de Filosofía y Humanidades (Research Center of Philosophy and Humanities Faculty) and the Secretaria de Ciencia y Tecnología (Secretary of Science and Technology) of the same University, focusing on *Geometría Fractal en la Música. Sus algoritmos autogenerativos para la composición y el apoyo de las nuevas tecnologías en este campo* (Fractal Geometry on Music - Autogenerative Algorithms for Musical Composition).

He wrote papers and articles about: *Series Numericas Generativas, Sistemas Estocásticos y Simulación de Inteligencia* (Generative numerical series, stochastic systems and intelligence simulation); *Armonías Apriorísticas Generadas por un Objeto Fractal* (Aprioristic harmonies generated by a fractal object); *¿Holismo Caótico o Caos Estructurado?* (Chaotic holism or structured chaos?); *Dimensiones Hausdorff y Holomovimiento* (Hausdorff dimensions and holomovement); *Métodos Generativos Unificados en Estética Formal. Sonido, Color y Forma* (Generative methods unified in formal aesthetics. Sound, color and form); and *Introducción al Estudio del Algoritmo Lorenz como Caos Organizado* (Introduction to the study of Lorenz algorithm as organized chaos). Together with César Franchisena he wrote also about: *Automatización de Estructuras Sonoras* (Sound structures automation) and *Sonorización con Ordenadores* (Sonorisation using computers).

Ferpozzi composed *La ciudad*, a *musique concrète* piece, in 1962. During the following years he created, among other works: *Ensayo electrónico concreto No. 1* in 1969; *Ensayo Electrónico No. 2* and *Ensayo Electrónico No. 3*, both for tape, *Pieza para piano preparado y cinta magnética* for prepared piano and tape, and *Tres Micro Estructuras para Orquesta de Cámara y Cinta Magnética* for chamber orchestra and tape, all four pieces in 1971, realized at the Laboratory of the Experimental Music Center.

Since 1980 he has been active in composition again. Ferpozzi composed *Criptofonías* for piano, percussion and electronic sounds in 1980, realized at the personal studio of César Franchisena, and *Sintagma* for electronic sounds, in 1986. During the following years, working with the compositional software *Sinapsis* developed by composer/researcher Eleazar Garzón on what he named *cybermusic*, Ferpozzi composed pieces like: *Contrapunto Holístico* in 1989, *Contrapunto Fractal No. 1* in 1994, *Danza Automática* in 1995, *Signus* in 1996, *Pequeño Concierto para Corno e Instrumentos Exóticos* in 1997, and *Pasacaglia* in 1998. Some of his recent electroacoustic music pieces are: *Estudio sobre ritmos homológicos*, 1998; *Ibis de los espacios virtuales*, 1999; *Algoritmo polivalente*, a piece created to demonstrate correlations between sound, color and form based on B. Mandelbrot's fractal

algorithm, and *Pagoda (4 aforismos)*, both 2000; *Sortilegios*, 2001; and *Atractores extraños*, 2002, experimental piece based on autogenerative processes.

Beatriz Ferreyra (born in Córdoba, 1937) composed at GRM *Demeures Aquatiques* in 1967, *Médisances* in 1968 and *L'Orvietan* in 1970, all three tape works. In 1972 she composed *Siesta Blanca* and in 1974 *Canto del Loco*, both tape pieces produced at studios of GMEB. In 1976 Ferreyra composed *Tierra Quebrada* for violin and tape, and between 1980 and 1984 her *Jeux des Rondes* for piano and tape. During 1982 she composed *Boucles, Rosettes et Serpentins* at GMEB, *La Calesita* at the Blanc-Mesnil Conservatory and *Cercles des Rondes*. Dated 1983 is *Bruissements*, for oboe and tape. *Passacaille deboitée pour un lutin* for lute and tape, 1984, and *Petit Poucet Magazine* and *The U.F.O. forest*, 1985, were both produced at GMEB. Dated 1987 is *L'Autre... ou le chant des marécages*. Between 1988 and 1997 Ferreyra composed *Souffle d'un petit Dieu distrait*. Among her recent works: *Río de los pajaros azules* was composed at Dartmouth College in 1999, *Río de los pajaros escondidos* at GRM between 1999 and 2000, and *Jazz 't for Miles* in 2001.

Marta Lambertini (born in San Isidro, Buenos Aires, 1937) composed *Estudio de materia* for tape in 1973.

Jorge Villar (Buenos Aires, 1937) composed, among other works: *La melodía perdida* in 1994; *Transparencias Feéricas* in 1995; *La lenta y dolorosa transición de las especies* in 1996; *Las campanas de Loreto*, *Cuatro historias viscerales*, *Blue Diamond*, *Cabbudy*, *Mecanismo de relojería*, and *Innominada*, all six pieces in 1997; *Mortui Vivos Docent* 1997 *Verano del 98*, and *Apenas insinuado*, both in 1998; *Disrritmia* in 2000; *Pequeño poema* in 2001; *Tres piezas antiguas y caóticas (con microsomas)* in 2002; and *El Club de la calle 42* in 2003; all pieces for tape or CD. He also composed *Etnics*, *En viaje*, *Fantasma del Alma* and *Sinfonía Mecánica*.

Eduardo Bértola (born in Coronel Moldes, Córdoba, 1939; died in Belo Horizonte, Brazil, 1996) composed *Episode* and *Penetraciones* in 1969, *Dynamus* and *Pexoa* in 1970, and *Penetraciones II* in 1971, all works for tape realized at GRM in Paris.

After his stay in Paris from 1968 to 1971 he returned to Buenos Aires and worked at CICMAT, where he composed pieces like: *Elictros* in 1972 and *Gomecito contra la Siemens o El Diablo de San Agustín* in 1974, both works using electronic and *concrète* sound sources. *Tramos* for tape, 1975, composed also at CICMAT, is considered one of his main works of those years; it was produced with radiophonic materials and the recording of a mass public demonstration on the streets.

Between 1975 and 1978 Bértola lived in Buenos Aires and Belo Horizonte, Brazil. While being in Argentina during 1977, he composed *Trovas, Crónicas e Epigramas* and *Historias para un movimiento imaginario*, both pieces for tape.

From 1979 to 1984 he lived in Brasilia, Brazil, and composed *Dilemas para um Sintetizador*, for tape, in 1981.

From 1985 until his death in 1996 he lived in Belo Horizonte, where he founded the Laboratory of Composition with Electroacoustic Media in 1985, studio he directed until 1990.

Eduardo Kusnir (born in Buenos Aires, 1939) has been active in electroacoustic music developing activities in Argentina, Puerto Rico and Venezuela.

In Caracas he was teaching electroacoustic music at Juan Jose Landaeta National Conservatory of Music and also at the Estudio de Fonología **Musical**, which he helped to reorganize during the early 80s. Kusnir founded the Sociedad Venezolana de Música

Electroacústica or SVME (Electroacoustic Music Society of Venezuela) during the mid 80s.

Among other works, he composed: *La Panadería* for tape, at CLAEM, in 1970; *Ofrenda* for tape at IPEM, Ghent, Belgium, in 1972; *Orquideas Primaverales* and *Como un suspiro caído del cielo*, tape pieces, realized at CICMAT in 1975; *El Encanto del Cisne* for tape and slides in 1978; *Blancanieves*, electroacoustic theatre, between 1980 and 1996; *Abajo el terror* for tape, realized at the Landaeta Conservatory of Caracas, Venezuela, in 1984; *Cómo es Lily* for tape, realized at LIPM in 1985; *Lily en el fuego* for tape in 1986; *Todavía sin nombre* for mezzo-soprano and tape, realized at the Landaeta Conservatory and *El arpa y su hechizo* for harp and synthesizer, both in 1987; *Miranda en Francia* for tape in 1989; *Simple* for double bass, narrator and tape in 1990; *El retorno* for tape, *Melodía* for double bass and tape and *Tap-Tap-Tap* for tape, in 1992, 1993 and 1995 respectively, all three produced at CEDIAM in Caracas, Venezuela; *Trencito al Caribe [homenaje a Pierre Schaeffer]* for tape and *Juegos I* for piano and tape, both realized in Puerto Rico during 1996; *Juegos II* for four handed keyboard and tape, and *Soplos I*, musical theatre through Internet, both in 1998.

Luis Arias (born in Buenos Aires, 1940) composed among other works: *Canon III* for 2 violins, 2 violas, piano, percussion and tape, in 1965; and *Gradientes II* for 2 flutes, 2 clarinets, alto sax, bass clarinet, violin, cello, piano, and live electronic processing, in 1968.

Graciela Paraskevaidis (born in Buenos Aires, 1940), composer, musicologist and educator, wrote extensively about Latin American music.

She composed, among other pieces: *Combinatoria II* for piano, trombone, percussion and tape in 1966 at the Electronic Music Lab of CLAEM; *Subliminal* for piano and tape in 1967 at her home studio in Buenos Aires; *Aphorismen* for two actors, piano, percussion and tape in 1969 at her home studio in Freiburg, Germany; *huauqui* for tape in 1975 at Elac, pequeño

estudio de Montevideo; and *A entera revisacion del publico en general* for tape in 1981, also produced at Elac, pequeño estudio de Montevideo. Paraskevaídis lives in Montevideo, Uruguay, since 1975.

Armando Krieger (born in 1940) composed *Contrastes* for two pianos and tape in 1963. The tape part of that piece was realized by composer Alcides Lanza.

José Maranzano (born in Santiago del Estero, 1940) received an scholarship to study at CLAEM during 1969 and 1970.

During the 70s he was part of the directive group of CICMAT and later director of Centro Cultural Ciudad de Buenos Aires, which changed its name for Centro Cultural Recoleta some years later.

Among other works Maranzano composed *Mnemón* for tape in 1970, realized at CLAEM, and *Memento*, for orchestra and tape, in 1975.

Graciela Castillo (born in Córdoba, 1940) was among the small group of composers that created the Experimental Music Center (Centro de Música Experimental) at the National University of Córdoba during the mid 60s. She is at present Professor of Composition and Music Analysis at the same University.

Among other works she composed: *Diálogos* for two voices, typewriters, radios, and percussion, and *Homenaje a Eliot*, open work for voices, *concrète* sounds and music theatre actions, both in 1965; *Concreción-65*, *musique concrète* on tape, between 1965 and 1966; *Colores y masas*, *concrète* music for paintings by José De Monte, in 1966; *Estudio sobre mi voz*, *Estudio sobre mi voz II*, and *Tres estudios concretos*, all three pieces for tape, in 1967; *El Pozo*, original version for voices, two wind instruments, typewriters and percussion, 1968

(the score was published in J. Cage's book *Notations*), second version for instruments and tape, around 1969; *Y así era* for tape in 1982, produced at LIPM; *Memorias*, a series of three electroacoustic pieces for tape including: *La casa grande*, *Memorias* and *Memorias II*, all in 1991; *Tierra* for tape in 1994; *Iris en los espejos* for tape, and *Iris en los espejos II* for piano, keyboards and processed sounds, both in 1996, realized at ARTHE Group Lab in Córdoba; *De objetos y desvíos* for tape between 1998 and 1999, produced at her personal studio; *Los 40 pianos de San Francisco* for prepared piano and processed sounds in 1999; *Alma mía* for tape in 2000, produced at IMEB in Bourges, France; *Ofrenda* and *Ofrenda II*, both for flute and processed sounds, in 2001; *Retorno al fuego*, produced at her personal studio, and *La vuelta (Tango)*, both for tape, in 2002.

María Teresa Luengo (born in Quilmes, Buenos Aires, 1940) studied composition at the Catholic University of Argentina. During 1990 she designed the curriculum for the Electroacoustic Music career developed at the National University of Quilmes and became its first director.

She composed among other works: *Absolum* for tape in 1973, realized at CICMAT in Buenos Aires; *Now* for CD in 2001, and *El Pensamiento Fugaz y la Eternidad* in 2002 for electronic sounds, both realized at her personal studio; *Saltos transparentes III* for piano and electronic sounds, and *Tierra que habla. Somuncura I* for electronic sounds, both pieces in 2004.

Carlos Cutaia (born in Buenos Aires, 1941) was at CLAEM – Instituto DI Tella between 1965 and 1969. Among other works he composed *Paisaje Nocturno* for piano, electric bass and computer. Cutaia also performed with some of the best-known Argentinian rock groups during the 70s.

Dante Grela (born in Rosario, 1941) composed his early concrète pieces on tape during the 60s working at his private studio in Rosario. He has an extensive catalog of musical works worked with electroacoustic media.

Some of his works are: *Música para el film 'C-65'*, 1965; *Combinaciones* for mixed choir, percussion and tape, and *Ejercicio I* for electronic sounds on tape, both 1968; *Faena* for voices, free chosen instruments, tape and lights, 1972; *Voces* for tape, female voice, trombone, piano and percussion, 1976; *Frases* for electronic sounds, flute, bassoon, double bass, piano and percussion, 1978; *Glaciación* for tape, 1979; *Configuraciones espaciales* for electronic sounds, 1982; *Composición* for flute, clarinet, tenor sax and electronic sounds, 1983; *Relieves* for tape, 1985; *Intangibles Universos* for processed voice and electronic sounds, 1986; *De los Mundos Paralelos*, version for piano and chamber group, and version for piano and electronic sounds on tape, both 1989; *Composición* for electronic sounds, 1991; *Sonoridades* for electronic sounds on tape, guitar, or guitar and electronic sounds, 1993; *Tiempos* for electronic sounds, 1997; and *Mixturas* for clarinet, alto sax, violin and electronic sounds, 2002. Grela realized most of his pieces at his personal home studio in Rosario.

Dante Grela is Profesor of Composition, Acoustics, Orchestration and Electroacoustic Music at the Escuela de Música de la Universidad Nacional de Rosario (Music School of National University of Rosario), and Director of the Electroacoustic Music Studio at that University. He also teaches at other institutions and has been researching on *Cultural identity and Latin American musical creation in the XX century* (Grela, D. 2004. Personal communication).

Carlos Roqué Alsina (born in Buenos Aires, 1941) composed *Juego de Campanas* for three or more bells and tape in 1969; *Etudes* for orchestra and tape in 1978; *Hinterland* for piano, percussion and tape in 1982. He lives in Europe.

Pedro Echarte (born in Bell Ville, Córdoba, 1942; died in Ibiza, Spain, 2005) composed *Estudio para la voz humana* and *Estudio II* in 1964, *Ray Conniff en Viet Nam* and *Treno* in

1965, *Twist y Gritos: los Beatles* in 1966, and *Estudio Onírico para Cronopio*, all six pieces for tape; he also composed *Estudiantina*, film music, in 1965, and *El Gran Bonetón* for theatre, in 1966.

Jorge Rotter (born in Buenos Aires, 1942) composed among other works: *Solo para violín y cinta magnética* in 1968, and *Montaje I* in 1992.

Luis Maria Serra (born in Lanús, 1942) studied at CLAEM – Instituto Di Tella between 1967 and 1968; in 1969 went to Paris to study at GRM with Pierre Schaeffer, François Bayle and Bernard Parmegiani.

During the 70s he founded together with Susana Barón Supervielle and Lionel Filippi the studio ARTE 11 - Atelier de Realizaciones Técnico Electroacústicas. Serra together with Susana Espinosa and Jorge Padin were on the steering committee until the studio closed in 1978.

Among other works he composed: *Tenebrae Factae Sunt* for tape in 1968; *Canto de los Suplicantes* for orchestra, chorus and tape, and *Invocation* for tape, both in 1969; *Abismos* for piano and tape in 1970; *Ipse* realized at ARTE 11, and *Soles* realized at GMEB in Bourges, France, both pieces for tape, in 1971; *Q'ura K'ura* for tape in 1973, realized at GMEB in Bourges; *Visiones* for tape in 1976, realized at ARTE 11; *Cántico de las Creaturas* for tape between 1981 and 1983, realized at his personal studio; *Obertura y Alabanza* in 1984; *Melólogo I* and *Poblaciones*, both in 1987; *A.M.A. DEUX* in 1991; *Impromptu* for tape in 1993; *Marina – de un tiempo de verano* in 1998; and *Invierno de plata* in 2002.

Luis María Serra is also widely recognized for his film music.

Alberto Paulín (born in Comodoro Rivadavia, 1943) composed *El grito de Tinta* for soloists, 2 reciters, chorus, orchestra, Synclavier digital synthesizer and tape; *Baguala* for tape; and *Pasaje de ida*, a story in sound, realized at GMEM - Groupe de musique expérimentale de Marseille.

Horacio Vaggione (born in Córdoba, 1943) is an internationally recognized composer with an impressive catalog of electroacoustic music works.

He composed his early pieces in Cordoba: *Música Electrónica I* for tape in 1960; *Ensayo sobre mezcla de sonidos*, *Ceremonia* and *Cantata I* in 1961; *Música electroacústica II*, *Hierro y espacio* and *Ananke* in 1962; *Ritual* in 1963; *Hierro y espacio II* in 1964; *Sonata 2*, *Sonata 3* and *Sonata 4*, all three for piano and tape, *Salmo* for tape, and the multimedia piece *Untitled*, for 4 instrumental groups, live electroacoustic processing, movements and lights, in 1965; *Tres piezas electrónicas* and *Cálimo II* for tape, and *Fausto* for electronic sounds and orchestra, all three in 1966; and *Tierra-Tierra* for tape between 1966 and 1967.

After those early years in Cordoba, Vaggione composed among other works: *Suite para cinta magnética* for tape, and *Electrata* for live electronics, both in 1967; *Inauguración de la Conexión* for live electronics in 1968; *Interfase* for live electronics in 1969, realized at Studio ALEA in Madrid, Spain; *Modelos de Universo II* for instruments (flute, clarinet, violin, cello, piano) and computer generated sounds on tape in 1970; *Kalimo* for live electronics, and *La máquina de cantar* for computer, both in 1971; *Kala* for live electronics, and *Modelos de Universo III*, version for computer solo, both in 1972; *Triage* for 20 tapes and live electronics in 1974, realized at Mills College, California, United States; *Ending* between 1975 and 1976; *Comme le temps passe* for ensemble and electronics, and *Four Streams* for ensemble and electronics, both in 1977; *Autour-Frames* for piano and 4 synthesizers in 1978; *L'Art de la mémoire* for live electronics, between 1970 and 1979; *Daedalus* for electronic and instrumental ensemble in 1980; *Septuor* for electronic ensemble in 1981; *Octuor* for computer generated sounds on 8 tracks tape, realized at IRCAM in Paris, in 1982; *Fractal A* for computer generated sounds on 16 tracks tape in 1982; *Charybde* for tape in 1983; *Fractal*

C for computer generated sounds on 16 tracks tape, and *Strata* for tape, both in 1984; *Thema* for saxophone and tape in 1985; *Set* for bassoon and tape, and *Tar* for bass clarinet and tape, both in 1987; *Scir* for bass flute and tape in 1988; *Holos* for percussion, live electronics and tape between 1989 and 1990; *Ash* for tape in 1990; *Till* for piano and tape in 1991; *Kitab* for bass clarinet, double bass, piano and live electronics in 1992; *Leph* for piano and live electronics in 1993; *Schall* for tape in 1994; *Rechant* for tape in 1995, realized at INA-GRM in Paris; *Myr-S* for cello and live electronics in 1996, realized at IMEB in Bourges; *Frayage* and *Nodal*, both for tape, in 1997; *Agon* for tape, and *Champs parallèles* for tenor sax and UPIC system, both in 1998; *Préludes Suspendus II* for tape in 2000; *Phases* for clarinet, piano and live electronics, and *24 Variations* for tape, both in 2001; *Petite Suite* for tape, *Atem* for French horn, bass clarinet, double bass, piano and live electronics, and *Harrison Variations*, all three for tape, in 2002.

Some of Vaggione's articles and reports are: *Composición musical y ordenador*, published in Boletín del Centro de Cálculo nº 18, Universidad de Madrid, 1970; *Un sistema de síntesis numérica por ordenador*, published in Boletín del Centro de Cálculo nº 23, Universidad de Madrid, 1972; *Mixing procedures formalized: a graph theory approach*, Research Report, Contemporary Music Center, Mills College, Oakland, California, 1974; *Sur Fractal C*, Research and creation report, IRCAM, Paris 1983; *Poly-phonies: critique des relations et processus compositionnels*, doctoral thesis, Département Musique, Université Paris VIII, 1983; *The Making of Octuor*, published in Computer Music Journal, Vol.8 No. 2, The MIT Press, United States, 1984; *Projet Informatique Musicale. Propositions pour la création d'un Centre d'informatique musicale à l'Université de Paris-VIII*, report, Contrat d'Etudes Compagnie IBM France - Université de Paris-VIII, 1985; *On Object-based Composition*, in O. Laske (editor): *Composition Theory. Interface Journal*, Vol. 20 No. 3-4, Amsterdam, 1991; *Determinism and the False Collective. About Models of Time in Early Computer Aided Composition*, in J. Kramer (editor): *Time in Contemporary Music Thought. Contemporary Music Review*, Vol. 7 No. 2, London, 1992; *Computer Music: The relationship between Micro and Macro-Time*, in S. Macey (editor): *The Garland Encyclopedia of Time*. Garland, New York, 1993; *Timbre as Syntax: an Spectral Modeling Approach*, in S. Emmerson (editor): *Timbre in Electroacoustic Music. Contemporary Music Review*, Vol. 11 No. 1,

London, 1994; *Articulating Micro-Time*, published in *Computer Music Journal*, vol.20 No.1 20, The MIT Press, United States, 1996; *Singularité de la musique et analyse: l'espace d'intersection*, in *Analyse en Musique Electroacoustique*, Bourges, Editions Mnemosyne, 1996; *Son, temps, objet, syntaxe. Vers une approche multi-échelle dans la composition assistée par ordinateur*, in *Musique, rationalité, langage. Cahiers de philosophie du langage* No.3, published by L'Harmattan, Paris, 1998; *Transformations Morphologiques*, in *Actes des Journées d'Informatique Musicale (JIM) 1998*, LMA-CNRS, Marseille, 1998; *Composing with Objects, Networks and Time Scales*, published in *Computer Music Journal*, Vol.4 No.3, The MIT Press, United States, 2000; *Some Ontological Remarks about Music Composition Processes*, published in *Computer Music Journal*, Vol.25 No.1, The MIT Press, United States, 2001; *Composing Musical Spaces by Means of Decorrelation of Audio Signals*, published in the *Proceedings of the European Digital Audio Effects Conference (DAFx) 2001*, University of Limerick, Ireland, 2001; *Décorrélacion temporelle, morphologies et figurations spatiales*, in *Actes des Journées d'Informatique musicale (JIM)*, Marseille, GMEM, 2002.

After some time in the United States and Spain, Horacio Vaggione established himself in Paris many years ago.

Julio Martín Viera (born in Buenos Aires, 1943) composed: *Mutación*, electronic music, between 1973 and 1974; *Skolyon*, electronic music, in 1975; *Divertimento I* for piano, five percussionists and tape in 1986; *Divertimento II (El Reloj)*, electronic music, in 1987; *Divertimento III* in 1993, all three pieces realized at LIPM in Buenos Aires; and *La nuit*, realized at GRM in Paris, France.

He is Director of the Musical Production Department at Centro Cultural Recoleta (Recoleta's Cultural Center) in Buenos Aires, from which the Musical Production and Research Lab, LIPM, is part.

Lionel Filippi (born in Buenos Aires, 1943) composed, among other works: *Canto Americano* for tape in 1972; *Voyage* for tape in 1973; *Voyage II* for chamber ensemble and tape, and *Jardines* for tape, both in 1974; *Voces* for double string orchestra and tape between 1974 and 1975; and *Ceremonias* for tape between 1876 and 1977.

During the 70s he founded together with Susana Barón Supervielle and Luis María Serra the studio ARTE 11 - Atelier de Realizaciones Técnico Electroacústicas. That studio was closed in 1978.

Mariano Etkin (born in Buenos Aires 1943) composed *Dividido Dos* for amplified accordion and electronic sounds in 1971.

Eduardo Piantino (born in Rosario, 1943) composed *Ambulat Hic Armatus Homo* in 1987.

Stella Perales (born in Rosario, 1944) composed *Planos Imaginarios* for tape in 1987, and *Un solo tiempo ...* for tape in 1991, both realized at TADMER, Taller de Electroacústica from the Instituto Nacional del Profesorado de Música de Rosario, in Rosario, Argentina.

Carlos Simkin (born in 1944) composed *Contradicciones* in 1986, and *Música para saxo y sonidos electrónicos* in 1990.

Elsa Justel (born in Mar del Plata, 1944) lives in France since 1988. She studied music in Argentina at the Provincial Conservatory of Mar del Plata and National University of Rosario, and later in France at the University of Paris VIII, from where she obtained her Ph.D in Aesthetics, Science and Technology of Arts.

Among other works she composed: *Ischihualasto* for tape, between 1988 and 1989; *Sikxo* for saxophone and tape in 1989; *Tiempo de Antorchas* for oboe and tape, and *Batucada* for percussion and tape, both in 1990; *Verás llorar la Biblia ...* for tape, between 1990 and 1991; *Fy Mor* for tape in 1991; *La ventana deshabitada* for harpsichord and tape between 1990 and 1992; *Latido Estival* for tape in 1992; *All+* for double bass and interactive system in 1993; *Sakhra* for tape, between 1993 and 1994; *Thun* and *Talla*, both for tape, and *Feuillage de Silence* for flute, oboe and tape, all three works in 1995; *Chi-pa-boo* for tape in 1996; *Alba Sud* for tape between 1997 and 1998; *Mats* for tape in 1999, and *Debris*, also an electroacoustic music work, in 2003.

Carmelo Saitta (born in Stromboli, Italy, in 1944) lives in Argentina since 1951. Among other pieces he composed: *Collage* in 1973, *Dos estudios electrónicos* between 1975 and 1976, *Primera composición electrónica* in 1977, and *La maga o el ángel de la noche* in 1989, all four works for electronic sounds; *U mare strombolicchio e' chidda luna* for three percussionists and tape in 1993; *Pliegues, borras de humo, sueños* for tape in 1996; and *D'apres Pliegues* for piano and tape in 2002.

Jorge Rapp (born in Buenos Aires, 1946) have been composing electroacoustic music since the early 70s, when he received an scholarship from the National Endowment for the Arts of Argentina (Fondo Nacional de las Artes) and CICMAT - Center for Research in Mass Communication, Art and Technology (Centro de Investigación en Comunicación Masiva, Arte y Tecnología) to study composition.

Among other works, Rapp composed these electroacoustic pieces for tape: *Estudio I* in 1973, realized at CICMAT; *Un tiempo, un lugar...* in 1975, realized at personal studio and CICMAT; *Cotidiana* in 1978, realized at personal studio; *El Prolongado Cuento* in 1979, realized at the Musical Studies Center (CEM - Centro de Estudios Musicales); *Dos piezas para una puerta o viceversa* in 1980, realized at CEM; *Aquí, allá y en todas partes* in 1984, realized at CEM; *Estudio Electrónico II* in 1985, realized at LIPM; *Divertimento para dos*

guitarras encintas in 1988, realized at CEM; *Evocaciones* in 1989, realized at CEM; *Break Up* in 1992, realized at CEM; *Biosfera Uno* in 1994, realized at CEM; *Tramas* in 1996, realized at CEM; *Objetos animados* in 1996, an *hommage* to Pierre Schaeffer, realized at CEM; *Tiempos Virtuales* in 1997, realized at LIPM and CEM; and *Tres Momentos*, version stereo realized at CEM in 1999, 8 channels version realized at LIPM in 2000.

Rapp is also founder and director of the Sound Laboratory at the Musical Studies Center (CEM - Centro de Estudios Musicales) in Buenos Aires, and President of FARME - Buenos Aires (Buenos Aires chapter of the Argentina's Federation of Electroacoustic Music) since 2001.

Eleazar Garzón (born in Pozo del Molle, Córdoba, 1948) graduated as Professor in Harmony and Counterpoint at the School of Arts of the National University of Cordoba (UNC). He also studied stochastic music and new compositional algorithms with César Franchisena.

Garzón composed, among other works: *Radizapping* in 1987; *Machu Picchu* for tape in 1989; *Espejo Humeante* in 1990 and *Espejo Humeante (II)* in 1991; *Nasca* for tape in 1992; *Coñi* for tape in 1993, *La morada del cóndor*, also for tape, in 1994, realized at the studio of the School of Arts; *Gritos* in 1997; *Concierto para arpa y sonidos electrónicos* in 1996; a soundscape, *Nubwaora* and *Eleas*, both in 1999. *Virtual Strings*, *orLEGm's Creatures*, and *Xibalba*, based on *The holy wood* by Marilyn Manson and *Tenebrae Responsories for Holy Saturday* by Carlo Gesualdo, all three pieces in 2000; *Heteróclita* in 2001; *Dollar o'mine*, and *El otro lado*, for tape, realized at LIEM (Laboratorio de Informática y Electrónica Musical), Spain, both in 2002; *Winter*, realized between 2002 and 2003; and *Antártida* composed in 2003. Other pieces by Garzón are: *Ancestros* and *Rugosidades en los pliegues de Oniria*.

He has also composed music for theatre and video. Some of those works are: *Doors*, dated 1993, and *Las instalaciones en Córdoba*, dated 1996.

At present Eleazar Garzón is Professor of Composition, as well as Counterpoint, at the aforementioned School of Arts. He is also Researcher at the Philosophy and Humanities Faculty of National University of Córdoba. His actual research line is aimed to the development of genetic algorithms (artificial life) applied to computer-assisted musical composition.

Garzón has been also developing software for musical application, like Sinapsis and Musario. More references on Garzón's research projects could be found in chapter VIII, section 8.2 Recent research.

José Luis Campana (born in Buenos Aires, 1949) composed *Imago* for 16 voices and tape; *D'un geste apprivoisé* for bassoon and CD; and *Tangata vocale* for voice, 5 instruments and CD. Campana lives in France.

Daniel Cozzi (born in Cañada de Gómez, Santa Fe, 1949) composed among other pieces *Etnográficas I* for viol, double bass, percussion and tape.

Ricardo Mandolini (born in Buenos Aires, 1950) composed extensively with electroacoustic media. Some of his works are: *Ejercicio CICMAT* for tape, produced at CICMAT in 1977; *El Cuaderno del Alquimista* for tape, produced in Ghent, Belgium in 1979; *Estallido Breve* for tape, produced at EMS, Sweden in 1981; *Círculos Fosforescentes en Fondo Negro* for tape, composed in 1982; *De mi huían los pájaros* in 1983; *Andrómeda* for percussions and tape, dated 1984; *Las Doradas Manzanas del Sol*, produced with the UPIC system in Paris during 1985; *Microrreflexiones*, version for tape, produced at GRM in Paris during 1989; *Los enemigos del hombre de conocimiento* for tape, and *La Legende des Clones*, both composed in 1995. He has been living in France for many years.

Miguel Angel Sugo (born in San Juan, 1951) composed *Ticia Jus* for string orchestra, two flutes, oboe, clarinet, sax, trombone, percussion and tape.

Alejandro Viñao (born in Buenos Aires, 1951) is another composer with a significant catalog of works including electroacoustic and computer media.

Some of his works are: *Una orquesta imaginaria*, four channel electroacoustic composition, 1979; *Go* eight channel electroacoustic composition, 1981; *Hendrix Haze*, four channel electroacoustic composition, 1983; *Triple Concerto* for flute, cello, piano and computer, 1984; *Toccata del Mago* for 8 strings (4 violins, 2 violas, 1 cello and 1 double bass) and computer, 1986-1987; *Son Entero* for 4 singers (S.A.T.B.) and computer, 1985-1988; *Tumblers* for violin, marimba and computer, 1989; *Chant D'Ailleurs*, 1991-1992, *Borges y el Espejo*, 1992 and *Hildegard's Dream*, 1994, all three pieces for soprano and computer; *Phrase & Fiction* for string quartet and computer, 1994-1995; *Apocryphal Dances* for symphony orchestra and computer, 1996-1997; *Rashomon: the opera*, opera for five singers, mixed choir and computer, 1995-1999; and *Eipitafios* for mixed choir and computer, 1999.

Alejandro Viñao lives in London, England.

Eduardo Checchi (born in Buenos Aires, 1952) composed *Reflejos* in 1991, *Mainumbi* in 1992, *Dominium* in 1996, *Soplosop* in 1997 and *Facundia* in 1998, all five works for tape.

Ricardo Pérez Miró (born in Paraná, 1952) is founder and director of EFME – Phonology and Electroacoustic Music Studio at National University of Litoral (Estudio de Fonología y Música Electroacústica - Universidad Nacional del Litoral) and professor of Musical Composition with Electroacoustic Media at the same University.

Among other works he composed: *Improvisaciones Polifónicas II* in 1983-1984, realized at his private studio; *Vértex* in 1988, realized at EFME; *Lugares* in 1989; *Otros Lugares* in 1994; *Viento del ruido* in 1998 (revised 2002); *Preámbulo* in 2001; *Per Suonare* and *Donde crecen los trigales* in 2002; all eight pieces for tape. Dated 1990 is his mixed piece *Cheveux d'eau (sans parapluie)* in two versions, one for voice, cello, trombone, guitar, percussion and tape, and the other version for clarinet, bass clarinet, bassoon, cello, double bass and tape.

He also composed *Entre la noche y el océano* in 1999, working as guest composer at the Electronic Music Studio of McGill University in Montreal, Quebec, Canada, based on sound materials previously digitized at LIPM in Buenos Aires.

Daniel Teruggi (born in La Plata, 1952) studied composition and piano in Argentina. In 1977 he moved to France and studied at the Paris Conservatory (Conservatoire National Supérieur de Musique de Paris) in the department of Electroacoustic Composition and Musical Research. In 1998 he obtained a PhD in Aesthetics, Science and Technology of Arts at Paris VIII University.

In 1981, Teruggi became member of the INA-GRM where he first was in charge of the pedagogy of digital systems for composers, and then became Artistic Director of the group. Director of the Groupe de Recherches Musicales since 1997, he is actually Research Director in the INA.

He also teaches Sound and Visual Arts at the Paris I Sorbonne University, and is director of a Seminar on new technology at the Paris IV University.

Among other works he composed: *Pingata* for tape in 1979; *Deux études de composition* for tape in 1980; *Tempo Lontano* for tape in 1982; *Eterea* for tape, and *E cosi via* for piano and tape, both in 1984; *Leo le jour* for tape in 1985; *Aquatica* for tape, and *Le cercle* for flute, clarinet, cello and tape, both in 1986; *Xatys* for saxophones and real time digital processings with Syter in 1987; *Wind Trip* for saxophone, clarinet, French horn, tuba and DX7 in 1988;

Focolaria and *Terra* for tape in 1989; tape music for *L'enchanteur pourrissant* by Guillaume Apollinaire, from *Le théâtre des poètes* series, in 1989; *Mano a Mano* for tape, collaboration with Jean Schwarz, in 1991; *Syracus* for boobams, udu drums, Syter and tape in 1992; *Instants d'hiver* for tape in 1993; *Saxtenuto* for sax and tape, and *Tempo di Basso* for tenor saxophone, double bass, bassoon and tape, both in 1994; *Gestes de l'écrit*, produced with the UPIC system, *Tempo Primo*, and *Variations morphologiques*, all three works for tape, in 1995; *Summer Band* for *bandoneón* and tape in 1996; *Fugitives voix* for recorded sounds on fixed media, and *Reflets éphémères* for 16 instruments and recorded sounds on fixed media, both in 1997; *Crystal Mirages* for piano and recorded sounds on fixed media, and *Images symphoniques* for recorded sounds on fixed media, both in 1998; *The Shinning Space* for 8 tracks media in 1999, and *Phonic Streams* for piano, percussion and recorded sounds on fixed media, both in 1999; *Struggling* for percussion and recorded sounds on fixed media, and *EST* for soprano saxophone and recorded sounds on fixed media, both in 2000; *Gira, Gira* for octophonic media in 2001; *Jon-ty* for recorded sounds on fixed media, *Up-IX* for piano and recorded sounds on fixed media, *La voir a sons* for 5 percussionists, harmony orchestra and electroacoustics, and *Les baigneuses*, electroacoustic music for the film by Vivienne Candas, all four pieces in 2002.

The work for tape known as *Sphæra*, is a four section version dated 1993 based on the original pieces realized between 1984 and 1989: *Eterea*, *Aquatica*, *Focolaria* and *Terra*.

Most of Teruggi's works involving electroacoustic media were realized at the GRM studios, but since 2000 he has been composing several pieces at his personal studio.

Ofelia Carranza (born in Córdoba, 1953) composed *Renacer* for tape in 1994.

Oscar Edelstein (born in La Paz, Entre Ríos, 1953) composed *Noneto 1987* for 9 wind instruments and tape, and *Viril Occidente I*, both in 1987; *Viril Occidente II* in 1990; *Los megabytes* for chamber orchestra, mixed choir and tape in 1993; *Carnaval para una Lulú*

mecánica, opera on tape (electroacoustic music), in 1994; *El tiempo*, for musical theatre (electroacoustic), in 1995; and *Klange, Klange Urutau* for 4 singers, 3 keyboards, guitar, double bass, bass, percussion and tape in 1997. He also composed the electroacoustic opera *Tiradentes*, among other works.

Daniel Schachter (born in Buenos Aires, 1953) is professor at the National University of Lanús, and artistic co-director of the Sonoimágenes festival.

Among other works he composed: *Ecos* for amplified piano and electronic sounds in 1990; *Hálito* for amplified flute and electronic sounds in 1991; *A I*, real time electroacoustic music, in 1992; *Seine sans e* and *Tiempo quebrado*, both for tape, and *Tiempo ausente* for flute, violin, bassoon, cello, piano and tape, all three works in 1993; *En pos del tiempo* for flute and real time generated electronic sounds, *Espejos virtuales*, realized at GRM in Paris, and *Intramuros*, all three pieces in 1994; *Intramuros II* in 1995; *Fuga tras un objeto oculto* in 1996; *... raíces lejanas, tal vez* in 1997; *LuzazuL* in 1998-1999; *Lineas y puntos de otro tiempo* in 2000; *Efecto tango* in 2001 (revised 2002), all this eight pieces for tape; *FlaX* for flute and live electronics in 2002.

Héctor Fiore (born in La Plata, 1953), performer, teacher and composer, specializes in interactive composition. Many of his works involves image projections as well as real time musical performances using computers.

Fiore have been composing for loudspeakers, tape or live electronics and acoustic instruments, and involving live and recorded music with images. For some of his works he tracks movements the performer does on the computer screen to generate images and act over the musical material, while on other pieces, the live music is generated interactively reacting to dance movements, light and shadow, or other acoustic sounds being performed.

Among other pieces, Fiore composed: *Cuatro minutos antes* for tape in 1986; *Tectona* for tape, *el rancho* for oboe, string quartet and tape, and *a bylo to tak...*, all three works in 1989; *Puerto rico*, *Ciao Bambina*, and *Kai generated*, all three for computer, and *Las vaquitas son ajenas* for charango, computer and tape, in 1990; *Czarny Kwiat*, with R. Black, interactive work for double bass and computer in 1993; *Son de uno*, interactive work for percussion and computer in 1994; *candombe* and *bolero2b*, both for computer, in 1995; *Unbolero* for wind electronic instrument and computer, and *Drawing Music 1* for computer and digital drawing projection, both in 1996; *Un romance en tiempo de candombe* for computer, and *MWX str* for wind electronic instrument and computer, both in 1997; *Varyasyonlar 1* for wind electronic instrument and computer, *Tan go zando 1 & 2* for wind electronic instrument & ensemble, *Tan go zando 3* for wind electronic instrument and string orchestra, and *Esculturas para tocar* for acoustic guitar, electric guitar and wind controlled synthesizer, all in 1998; *Pinturas para tocar* for electronics, *Hulasa* for live electronics, *Tunes* for instrumental ensemble and computer, *Drawing Music 4* for voice, piano, computer and digital drawing projection, *Czekam na odpowic*, text by W. Szymborska, for actress, computer and live electronics, *Electronic songs* for electronic instruments, *Varyasyonlar 2* for wind electronic instrument and computer, *Wiersze na flet*, interactive piece for flute and computer, *Son sin marimba*, interactive piece for percussion and computer, all nine works in 1999; *Mam bo chce*, by Fiore and Prado, for flute, electronic wind instrument and digitizer, *Visual el. songs II* for CD, flute, electronic wind instrument, computer and digital image projection, *Son de luz* for digitizer and electronic wind instrument, *Hombre del río* for processed acoustics instruments and film projection, *Argumentum ex cracoviensi* for CD, *SdU Fragments (el marimbon)* for marimba and electronics, *Drawing Impro* for acoustics instruments, computer and digital drawing projection; *Open Head Impro* for processed open head of a flute and voice, all eight pieces in 2000; *Remixed moments* for loudspeakers and interactive processed noises, *Ga, Gam, Games* for live electronics, flute and percussion, *Kompozycja na flet i komputer* for flute, computer and digitizer, *Procesion* for wind controller, computer and percussion, *Accents* for computer controlled by a wind instruments & percussion, *Musica Ritual* for flute, computer, digitized movements & percussion, *Wariacje na Liber tema Tango*, by Markova and Fiore, for digitizer, computer and moving performance, and *Songo R* for wind controller computer and percussion, all eight pieces in 2001; *Lux sonoris* for digitizer, computer and

dancer performance, *Juego de niños*, text by S. Carden, for voice, computer and digitized movements, *Eclosion* for oboe, percussion, piano, double bass, flute and interactive computer system, *Frozen motives* for wind controller and interactive computer system including old friends playing, all four works in 2002.

Fiore lives at present in Poland.

Michael Rosas Cobian (born in Buenos Aires, 1953) composed among other works: *Rumbos* for tape, and *Anaconda* for flute and tape, both in 1990; *Womb (etudes)* for tape, and *Urbis #2 (passing moments/riffs & riffs)* for bass clarinet and tape, both in 1991; *Urbis #3* for electric guitar, live electronics and tape in 1992; *Lucero* for charango and tape in 1993; *Urbis #4* for tape, and *Gato's Raid* for marimba and tape, both in 1994. Rosas Cobian lives in England.

Fernando Maglia (born in Bahía Blanca, 1954), composer and concert guitarist, has been working with electroacoustic media in his last works, among them: *Otras etnias* for harpsichord and (computer) processed sounds; *Siete veces siete* for guitar and (computer) processed sounds; and *La edad de la luz* for B flat clarinet, percussion and (computer) processed sounds; all pieces 2002.

Eduardo Kacheli (born in 1954) composed, among other works: *La rueda del tiempo*, realized at his personal studio in 1998; and *El viaje de Ulises* for tape in 2000. He is Assistant Professor of Composition at the Electroacoustic Music career of the National University of Quilmes.

Eduardo Schlatter (born in 1954) composed *Estero-Tipos* for percussion and tape between 1983 and 1984; and *Glamour* for tape and voice, based on a poem by Oliverio Gironde, in 1988.

Teodoro Cromberg (born in Buenos Aires, 1955) composed *Arco voltaico* for cello and tape in 1994; *Marimbagenes* for marimba and tape; and *Añoranza de lo dionisiaco*.

Pablo Di Liscia (born in Santa Rosa, 1955) is Director of the Program in Electronic Composition, and Professor of Electronic Composition and Computer Music at Quilmes National University.

Among other works he composed: *Diálogo con mi anciano* for guitar and tape in 1989; *Alma de las Orquestas* for tape in 1993; *Tiempos magnéticos* for flute, piano and electronic sounds in 1996; and *Prólogos* for tape in 2002.

About *Tiempos magnéticos* (*Magnetic times*) Di Liscia wrote:

This composition explores a continuum going from the perception of a series of short pieces to the perception of one piece divided in several sections. The dialog between instruments and electronic sounds is stated as the main feature to shape the macro and micro-form, and it uses several possibilities of combination and ways of linking.

[...] The electronic music fixed on magnetic media (tape music) is often overlooked at present because its apparent lack of flexibility. The combination of instrumental and electronic media provides one important basis to overcome this limitation. Instead of making the electronic media to imitate instrumental behavior, this piece keeps for each media its own "performance time" and state a dialectics between these. This is what the title *Magnetic times* stand for.

Stanford University (1996-2000). Klub Karma archive. [online] Address: <http://ccrma.stanford.edu/events/klub.html#tm>

Di Liscia has been also developing software for digital signal processing, musical analysis, and composition.

Pablo Furman (born in Buenos Aires, 1955) emigrated to the United States in 1976. He currently teaches composition, music theory, electro-acoustic music, music of Latin America, and coordinates the music composition program at San Jose State University in California, United States. As composer, his research has focused on specific aspects of precompositional activity such as sound spectral analysis (and development of new instrumental color), pitch material development, and structural optimization.

Among other works he composed *Synergy* for amplified flutes and electronics in 1989; *Strata - An Imaginary Landscape* in 1990; *Sureña* for amplified violin and electronics in 1993; and *Music for alto saxophone and electronics* in 1995; *Concerto for Ensemble and Electronics* and *Matices Coincidentes* for quartet and electronics, both in 2000; among other works. He lives in the United States.

Ricardo Palazzo (born in 1955) composed *Tres piezas para flauta y sonidos electrónicos* in 1982; and *Omaggio* for violin, clarinet, piano and electronic sounds in 1985.

Ricardo Ventura (born in 1955) composed *Desnudo de mujer sobre sofá azul* in 1999.

Daniel Zimbaldo (born in 1955) composed *Naturaleza muerta* in 1984; and *La llave de cristal* for tape in 1994. He lives in Spain.

Elena Buiani (born in 1956) composed the electroacoustic piece: *Alerta, Peligro ... Planeta Azul*.

Alberto Perduca (born in 1956) composed *Con el resto* in 1991 at LIPM.

Luis Mucillo (born in 1956) composed *Isla de Cristal* in 1982, and *Au dela des portes d'ivoire* in 1984, both for electronic sounds.

Fernando López Lezcano (born in Buenos Aires, 1956) started working with electroacoustic music by building his own analog studio and synthesizers around 1976.

Among other works, López-Lezcano composed: *Búsqueda* for tape in 1986; *Hot'n Cold* for stereo tape in 1991; *Three Dreams* for quadraphonic tape in 1993; *Espresso Machine II* for electronic cello, MIDI controlled synthesizers and PadMaster (controlled by a Radio Drum), between 1993 and 1995; *Knock knock... anybody there?* for quadraphonic tape in 1994; *With Room to Grow* for MIDI controlled instruments and PadMaster in 1996; *House of Mirrors* for MIDI controlled instruments, soundfile playback and PadMaster between 1996 and 1997.

About *House of Mirrors* he wrote:

[...] Is an improvisational tour through a musical form and a four channel sound environment ... The sound of doors opening and closing define the transitions between rooms, corridors and open spaces, where soundfile playback and MIDI controlled synthesis mix to create different atmospheres sharing a common thread of pitches, intensities and timbres. The journey through the House of Mirrors is controlled in real time through an interactive improvisation software package - PadMaster - developed by the composer over the past three years. The Mathews/Boie Radio Drum is the three dimensional controller that conveys the performer's gestures to PadMaster. The surface of the Radio Drum is split by PadMaster into virtual pads, each one individually programmable to react to baton hits and gestures, each one a small part of the musical puzzle that unravels through the performance. Hits can play soundfiles, notes, phrases or can create or destroy musical performers. Each active pad is always "listening" to the position of the batons in 3D space and translating the movements (if programmed to do so) into MIDI continuous control messages that are merged with the stream of notes being played. The virtual pads are arranged in sets or scenes that represent sections of the piece. As it unfolds, the behavior of the surface is constantly redefined by the performer, as he moves through the predefined scenes. The performance of "House of Mirrors" oscillates between the rigid world of

determinism as represented by the scores or soundfiles contained in each pad, and the freedom of improvisation the performer / composer has in arranging those tiles of music in time and space.

López Lezcano, F. (undated). Recent compositions. [online] Address:
<http://ccrma.stanford.edu/~nando/music/>

He lives in the United States, working at CCRMA - Center for Computer Research in Music and Acoustics of Stanford University as Lecturer and Systems Administrator.

Miguel Calzón (born in Buenos Aires, 1956) composed *Three Winters* for clarinet, cello and electronic sounds in 1991; *La vida perdurable* for tape in 1993, realized at his personal studio with Yamaha SY77 and TG77 synthesizers controlled by MIDI; and *El tamaño del mundo* for tape in 1994.

Carlos Grätzer (born in Buenos Aires, 1956) received his musical training from his father, composer Guillermo Graetzer (born in Austria; emigrated to Argentina in 1939), one of the main names in musical education and composition teaching during the second half of the XX century in Argentina.

For a few years Carlos Grätzer worked both in the animated films making and music field; and since 1980 he devoted exclusively to music composition. In 1984 he moved to Paris where he is living at present.

Among other works, Grätzer composed: *Nio Aeln* for tape in 1989; *Failles Fluorescentes* for alto sax and electroacoustics in 1990; *D'un souffle retrouvé* for flute and electroacoustics during 1992-1993; *Ráfagas de tiempo* in 1994, and *Ausbruch* in 1997, both pieces for tape.

Pablo Ortiz (born in Buenos Aires, 1956) composed among other works: *Two studies for DX7*, for tape, 1986; *Ciego como una cebolla* for oboe, bass clarinet, trumpet, marimba and

DX7, 1990; and *Júbilo Secreto* for violin and tape, 1995. He lives in the United States and teaches at UCD - University of California, Davis.

Oswaldo Vázquez (born in Buenos Aires, 1956) composed among other works: *Estudio electrónico* and *Fragmentos para Leonin '85*, both realized at LIPM, in Buenos Aires; *Fragmentos..... '86*; *SONS* and *Haiku* for digitized voices and electronic sounds.

Claudio Alsuyet (born in Florida, Buenos Aires, 1957) composed *Máquina de Estampillar* for tape in 1990; *Solo Saxo Barítono* for sax and live electronics in 1991; *Cellci* for cello and tape between 1993 and 1994; *7 Pos-tales* for mezzo-soprano, eight voices with electroacoustic live processing, piccolo, flute, clarinet, bass clarinet, French horn, violin, cello, piano and percussion between 1994 and 1995; and *Eternidad* for voices and tape in 2002; among other works.

Ricardo Dal Farra (born in Buenos Aires, 1957) has been conducting activities in the merging fields of arts, sciences and new technologies for more than 25 years as composer, multimedia artist, educator, researcher, performer and curator.

His music has been played in concerts and symposiums in more than 40 countries and has been recorded in 15 different editions. He has also performed using live interactive systems since the late 70s. Dal Farra's work has been distinguished with grants and commissions by the International Computer Music Association, the International Arts Biennial of San Pablo, Brazil, the National Endowment for the Arts from Argentina, the Concours international de musique électroacoustique de Bourges - France, the National Rostrum of Composers from Argentina, and the Centro di Sonologia Computazionale from the University of Padua in Italy, among others. He has been invited to present his music, research and educational developments at CCRMA - Stanford University, New York University, Dartmouth College, The Julliard School of Music and Brooklyn College in the United States, the University of

Brasilia and Itaú Cultural in Brazil, The National Conservatory of Music of La Paz in Bolivia, the University of Puerto Rico, IRCAM and GRM in France, and The Banff Centre in Canada, among other institutions.

After some early works created during the 70s, mostly involving live electronics, Dal Farra composed: *Estudio sobre un ataque de timbal*, *Estudio sobre fragmentación del material* and *Estudio sobre ritmo y espacio*, all three works for tape, in 1982; *Audiciones* for tape, and *Estudio elíptico* for live electronics, both in 1983; *Música para Hall* for guitar and live electronics in 1984, with Carlos Costa; *Primer instante* for tape in 1985; *Double*, *Toccata*, *Clones*, *PH* and *Integrados*, all for guitar and live electronics, with Arturo Gervasoni; *Ancestros* for ancient woodwinds from the Andes and live electronics, *Karma* for tape, realized at the Center for Computer Research in Music and Acoustics (CCRMA) of Stanford University, United States, and *Procesos*, also for tape, all eight works in 1986; *G* for MIDI guitar, digital synthesizer and live electroacoustic processing, and *Hay alguien ahí fuera con quien hablar?* for guitar and live electronics, both with A. Gervasoni, and *Para todos ellos* for MIDI guitar, digital synthesizer, live electronics and slides, all three in 1987; *...due giorni dopo* for tape, realized at Centro di Sonologia Computazionale, Università di Padova, Italy, and *Uhuru* for MIDI guitar, digital synthesizer and live electroacoustic processing, collaboration with A. Gervasoni, both in 1988; *SP4* for live electronics or tape, *Xastock* for tenor sax and live electronics, *EGT* for guitar and live electronics, and *Come'n Go* for komungo and live electronics, all four works in 1989; *Tramas* for small orchestra and live electronics, and *Interacciones*, first piece performed in Argentina using real time interactive computer generated sounds and images, both pieces in 1990; *Disolución IV* for guitar and live electronics, with A. Gervasoni, *Ashram* for mukha veena and tape or live electronics, and *Furioso* for oboe and live electronics, with León Biriotti, all three pieces in 1991; *Teragon* for a live/interactive computer music system, and *Memorias* for tape, realized at CCRMA, Stanford University, both in 1992; *Mel18* for live/interactive computer music system, in 1994; *Breve Vida* for tape in 1995; *Tierra y Sol* for CD in 1996; *Words through the Worlds* for CD in 1997; *On the Liquid Edge*, sound installation, in 1998; *Homotecia*, original version for bandoneon and CD in 1992, version for flute or oboe and CD in 1994, version for guitar or piano and CD in 1995, version for string quartet and CD in 2001, version for small

ensemble and CD in 2002, version for marimba and CD in 2003 and version for violin and CD in 2004; "Con.mocion", sound+images installation, in 2002; *Civilizaciones* for 6 percussionists with optional live electronics, original version dated 1983, revised in 2000, and new version with extended live electroacoustic sound processing and multichannel spatial distribution in 2003; and *Liquid Mountains* for e-drink, in 2004; among other works. Most of these pieces were realized at the Estudio de Música Electroacústica (Electroacoustic Music Studio) founded by Dal Farra in Buenos Aires during the mid 70s.

Dal Farra has been professor of Music Technology at National University of Tres de Febrero; Professor of Acoustics at the National Conservatory of Music and Professor of Electroacoustics at Buenos Aires Municipal Music Conservatory. Former Professor of Composition and Improvisation at the National University of San Martin; Professor of Multimedia at IMD Institute and ORT Technical School, and Professor of Music and Sound on Films at the Art Panamerican School.

As Coordinator of the Multimedia Communication Area at Argentina's National Ministry of Education, Science and Technology (1996 - 2003) he was directing the team that developed national standards for multimedia education, as well as standards for the sound and music, graphic, audiovisual and image synthesis sectors, approved at the national level too. Dal Farra co-designed and developed educational programs focused on contemporary arts, sciences and new technologies at the secondary, college and university level; among them: the Musical Production specialty at ORT Technical School and the Electronic Arts bachelor at the National University of Tres de Febrero, among others.

He has been Consultant/Director of Musical Production specialty at ORT Technical School - Buenos Aires (1992 - 1999) and Director of the Electroacoustic Music Studio (1978 - 2003). He is also appointee Director of the Electronic Arts Experimental and Research Center (CEIArtE) - Buenos Aires (since 2002), and Researcher/Consultant for UNESCO's Digi-Arts worldwide project (since 2002).

Dal Farra has been directing radio series devoted to electroacoustic music at the National Radio of Argentina and the Municipal Radio of Buenos Aires for more than 10 years. He is a member of the Board of Advisory Editors of the Journal of New Music Research since 1988, and International Editor for Leonardo Music Journal - International Society for the Arts, Sciences and Technology since 1995. He is also a fellow of Colegio de Compositores Latinoamericanos de Música de Arte.

As researcher, Dal Farra is the author of *Historical Aspects of Electroacoustic Music in Latin America. From the pioneering to the present days* and *La música electroacústica en América Latina*, both texts commissioned by UNESCO. He developed during 2003-2005 the *Latin American Electroacoustic Music Collection* (with recordings from his personal collection) at *La fondation Daniel Langlois pour l'art, la science et la technologie*. He also wrote extensively about new media arts, electroacoustic music and education in the confluence of the arts, sciences and technology.

Ricardo De Armas (born in 1957), composer, sound designer and cellist, composed among other works: *Pequeños diseños sonoros* in 2000; *Visage* and *Escenas algorítmicas* in 2001; *Sin título, Objetos y diseños breves, 011220* and *La noche en que los bits se convirtieron en alondras* in 2002; and the multimedia piece *El niño de los potes perfumados* in 2003.

Juan Carlos Figueiras (born in Buenos Aires, 1957) composed *Antiguo y perpetuo* for sax and tape in 1993; *Canción guerrera* for sax, flute and tape in 1994, realized at LIPM, Buenos Aires; *Barlovento* for chamber group and interactive system in 1996; *Planos* for tape, also in 1996; and *Riesgo permanente* for flute, oboe, bass clarinet, piano, vibraphone and electronic sounds in 2002.

Claudio Lluán (born in Rosario, 1957) composed *Vestigios* for tape, and *Antiguas preguntas* for female voice, 8 instrumental groups and electronic sounds in 1991.

Gabriel Valverde (born in Buenos Aires, 1957) composed *Una música, un rumor, un símbolo* for tape in 1984, realized at GMEB in Bourges, France; *Ekstasis* in 1985 and *Cúmulos* in 1988, both works realized at LIPM; *Terra Incognita* between 1992-1997 for string trio and computer generated sounds. He is co-founder and director of CEAMC - Centro de Estudios Avanzados en Música Contemporánea (Center for Advanced Studies in Contemporary Music).

Marcelo Ajubita (born in Venado Tuerto, 1958) composed *Ambientes infectados* for tape in 1994.

Miguel Bellusci (born in Buenos Aires, 1958) composed among other pieces: *Kölnisch Wasser*, an electronic composition based on water sounds realized at the Musikhochschule in Cologne, Germany, between 1993 and 1994; *Laura en sueños* for glass instruments and electronic; *Inconsequenza* for soprano and tape; and *Unzeiten* for 7 female voices, 3 trombones and tape. He lives in Germany.

María Eugenia Luc (born in 1958) composed *Standard* for electronic sounds in 1988; *Estudio electrónico II* for electroacoustic media in 1991; *Dao* for electroacoustics and video in 2002, with Juan Crego (video); *Sâma* for electroacoustics, violin, dance and video in 2003, with Josu Rekalde (video) and Idoia Zabaleta (dance); and *La ciudad Infinita* for electroacoustics, dance and video in 2004, with Juan Crego (video) and Idoia Zabaleta (dance). She also composed *Centauros II* for piano and electroacoustics.

Sergio Fidemraizer (born in 1958) composed *Recorda-Te' N* for tape in 1994.

Carlos Cerana (born in Buenos Aires, 1958) composed *Huellas digitales* for clarinet and tape in 1991; *Tres piezas breves* for clarinet and live processings; and *Carrefour* for tape, realized at LIPM, Buenos Aires, in 1996.

Gerardo Dirié (born in Córdoba, 1958) composed *Tu casa o este océano* in 1990; and *El sueño de la mula negra* for voice, viola, electric viola, flute and electronic wind instrument (EWI). He lives in the United States.

David Horta (born in Buenos Aires, 1958) composed *Siete elementos* for tape in 1992; and *Paradiddles* for drums and tape in 1994.

Edgardo Martínez (born in 1958) composed among other works: *Vino nuevo en odres viejos* in 1993, realized at his personal studio and EFME in Santa Fe, Argentina; *Movimientos urbanos* in 1994; *Escenarios Diferentes* and *Piano para pieza*, both in 1995, all pieces for tape. He also composed *Puelpürum* in 2002.

Martín Matalón (born in Buenos Aires, 1958) composed among other works: *La rosa profunda*, music for a Jorge Luis Borges exhibition at the Public Information Library of Georges Pompidou Center in Paris, in 1992; *Monedas de Hierro* for ten instruments and electronics in 1993; *Metropolis*, music for the film by Fritz Lang, for 16 instruments and electronics in 1995; *Le tunnel sous l'Atlantique* for tape, also in 1995; *Las siete vidas de un gato*, music for the film *Un perro andaluz* by Luis Buñuel, for eight musicians and electronics (flute, clarinet, trumpet, two percussionists, piano, violin, cello and tape) in 1996; *Rugged lines memos* for nine instruments (flute, clarinet, bass clarinet, sax, trumpet, 2 percussionists, piano and double bass) and electronics in 1999; and *Traces I* for cello solo and live electronics in 2004.

Luis Mihovilcevic (born 1958) composed, among other works: *Adagio expansivo* for synthesized strings in 1989; *Las obsesiones de Pierre Delval*, first obsession for tape only, second obsession for tape and piano, third obsession for tape, cello, soprano and piano, in 1993; *Violeta, Ensueño Alquímico de una Flor silvestre*, opera for soprano and tape, between 1993 and 1994; *La Ira de Fassbinder* for tape in 1993; *Síntesis en cuatro sueños* for piano and tape in 1994; *La pequeña lulu* for piano, percussion and synthesizers, *Arcano 72* and *Arcano 82*, both for tape, all three pieces in 1995; *Una esquina de la eternidad* for electronic instruments, and *Pérez Molek Ausstellung mit roth* for tape, both in 1997; *El radar de Tasmania (a Andrei Tarkovski)*, version one for tape only, and *Pidamos lo imposible* for tape and actor, both in 1998; *Pour le Piano (Fin de siglo)*, for digital piano controlled by a computer sequence, and *Scatt* for tape, both in 1999; *Mayo* for tape, *Coyoacan*, versions for tape only, tape and piano, tape and vibraphone, *La Gran Lalula*, musical theatre with tape, actors and live instruments, and *La Máquina surrealista* for electronic instruments, all four works in 2000, *BIG BANG* for tape in 2001; *Verano Argentino* for tape between 2001 and 2002; *Las Jornadas de diciembre* for tape, between 2001 and 2003.

Daniel Miraglia (born in Buenos Aires, 1958) composed *Mona Lisa acelerada* in 1996; *Metamorfosis* for electronic sounds in 1997-1998; *Presencias Reales* for electronic sounds in 2000; also *MXWV* for tape, and *Voces* for tape and synthesizers, among other works.

Guillermo Pozzati (born in Buenos Aires, 1958) composed *El adiós* for tape in 1990, and *Stanford* in 1992, both for tape. Among his developments and writings: *Gen: A Lisp Music Environment*, published in *Computer Music Journal* Vol. 24 No. 3, 2000, The MIT Press, United States.

Cecilia Candia (born in Avellaneda, Buenos Aires, 1959) composed among other works: *Tintas* for oboe and tape in 1991; *Del Big-Bang a la Torre de Babel* for piano and tape in 1996; *El círculo de piedra*, with Ana Foutel, for piano and tape in 1997; and the music on tape for the musical theatre *Ecos del proceso sonoro de K*, for instruments and tape, a piece she directed in 2000. All tapes were realized by Candia in his personal studio in Buenos Aires, except that for *Tintas*, realized in a recording studio in Rome, Italy.

Candia was also part of the experimental group *Compañía de Música Imaginaria*, with Myriam Belfer, Javier Mariani, Ana Foutel, Miguel Luchilo, Alejandro Labastía and Marcelo Cavalli, that performed and recorded improvised pieces like: *ID2* for oboe, clarinet, piano, EPS and K2000; *Köchenseq* for recorder, sampler delay, EPS and K2000; *Pieza 1 - 1993* for three EPS; *Trío* for piano, clarinet and Poly 800; *ID3* for voice, clarinet, EPS and K2000; and *Mininga* for voice, EPS and two K2000; among other works.

Javier Leichman (born in Buenos Aires, 1959) composed *Veranito* for tape in 1992; and *Mía, mía* for tape in 1994.

Sergio Poblete (born in Córdoba, 1959) is Professor of Electroacoustic Techniques and Materials at the School of Arts, National University of Córdoba. Since 1992 he is also in charge of the Laboratorio de Electroacústica e Informática Musical (Computer and Electroacoustic Music Laboratory) at the same School.

Among other works Poblete composed: *Sonus* for tape in 1990; *Strings* for string quartet and tape in 1991; *Los pliegues del cielo* for tape in 1996, based on computer processed flute, Polynesian's angklang and digital synthesizer sounds; and *Huellas de fuego* for computer processed clarinet, trompe (Mapuche's mouth harp) and Yamaha TG-77 digital synthesizer in 1997; all works realized at the Computer and Electroacoustic Music Laboratory of the School of Arts of Córdoba's National University. In 1998 he composed *Dharma*, and in 1999 *Actions*, both tape pieces realized in his personal studio and Phonos-IUA, at Pompeu Fabra

University in Barcelona, Spain. In 2001 Poblete revised *Actions* that turned then to *Actions V*, premiered in Cordoba with the Cybernephone 6, using 100 loudspeakers. He composed in 2002 *Correspondencias* for sax, percussion, electroacoustics and computer animated images.

Some of his writings are: *Medios analógicos y digitales utilizados en la música electroacústica (Analog and Digital Media in Electroacoustic Music)*, and *Diseño de objetos sonoros mediante técnicas de síntesis y procesamiento digital de señales. Control algorítmico de los eventos (Sound objects design through synthesis and digital signal processing techniques - Algorithmic control of events)*, both dated 1998; and *La Música electroacústica en relación al pensamiento sobre el arte contemporáneo (Electroacoustic music and contemporary art thinking)*, dated 2001.

Jorge Sad (born in Buenos Aires, 1959) is Professor at the Electroacoustic Music Atelier of Alberto Ginastera Conservatory, and since 1997, Director of IIESMUMD - Instituto de Investigación Experimental en Sonido y Música por Medios Digitales de la Facultad de Informática de la Universidad de Morón (Digital Sound and Music Experimental Research Institute at University of Morón).

Among other works Sad composed: *Hara* in 1986; *Los giros del alma del toro* in 1989; *Tonal Nagual* in 1990; *El libro de los seres imaginarios* for computer generated tape, realized at Montreal University in 1992; *Il codice assente* for clarinet, flute, electric guitar and synthesizer in 1994; *Vox I* and *Vox II*, both for computer generated tape, realized at CCRMA, Stanford University, United States, in 1995; *Klang/Clan* for 4 instrument and tape in 1996; *Aspavientos* for computer generated sounds on tape in 1998, realized at IIESMUMD; *La ida hacia abajo de la tierra de la tarde* for flute and live electronics in 1999; *Improvisación* for 4 instruments and live electronics in 2000; and *Escrita...al borde del mar* in 2001. He also composed *El alma mula* for cello and live electronics.

Since 1995 Sad is directing the Colectivo de Creación Sonora (Sound Creation Collective) a group of musicians with who he produced a series of works for acoustic instruments and live electronics.

Sergio Schmilovich (born in Buenos Aires, 1959; he recently turned his artistic name to Smilovich) is composer, flutist and sound engineer.

Among other works he composed: *La confesión* for tape in 1990, *Memorias del poeta* for tape, based on a text by poet Pablo Neruda, in 1992, *Mare Nostrum III* for flute and tape, including the processed voice of Arab singer Amal Murkus on the tape part, and *Danzas*, both in 1993, all four tape pieces realized at the laboratory of the University of Tel Aviv, Israel; *Oktubre* for tape in 1998, an *hommage* to Che Guevara based on texts he wrote during his last days in Bolivia, realized at Estudios Grial in Buenos Aires; *Cuarto Paraíso* for tape and *Otoño* (five hours of electroacoustic music!) in 2000; *Evolución* for tape and *Evolución para contrafagot y cinta* for double bassoon and tape, both in 2001; *Lacrimosa a Salvador Dalí* for tape in 1989, new remixed version 2003; and *Fantasia para arpas* for tape, also 2003, using sound materials recorded at the University of Tel Aviv during 1993.

Schmilovich moved to Montreal in 2003.

Juan Ortiz de Zárate (born in Buenos Aires, 1959) composed *A Christmas Carol* for flute, clarinet, violin, cello, mezzo-soprano, piano, 2 percussionists and electroacoustics in 1998.

Pablo Cetta (born in Buenos Aires, 1960) studied engineering and music. He was Director of the Laboratory of the Centro de Investigación Musical of the University of Buenos Aires between 1989 and 1991; and since 1988 Director of Centro de Estudios Electroacústicos at UCA - Catholic University of Argentina.

Cetta has been teaching in several institutions, including University of Buenos Aires between 1988 and 1991, the National Conservatory of Music between 1991 and 1992, the National University of Quilmes between 1991 and 1994, Centro de Estudios Avanzados de Música Contemporánea between 1995 and 2001, and Escuela Nacional de Experimentación y Realización Cinematográfica since 2002. He is Professor of Contemporary Music Analysis and Electroacoustic Music Composition at the Musical Arts and Sciences Faculty of Argentine Catholic University (Facultad de Artes y Ciencias Musicales de la Universidad Católica Argentina, FACM - UCA) since 1994.

Among other pieces Cetta composed: *Bosco: jardín al compás del deseo* for tape in 1991, realized at LIPM; *... que me hiciste mal...* for tape in 1992, realized at Center for Music Experiment in UCSD, San Diego, United States; *En esta calle* for tape in 1993, realized at LIEM - Laboratorio de Informática y Electrónica Musical in Madrid, Spain; *Todo se vuelve presagio* for Disklavier, MIDI keyboard and computer, and *... y sin embargo te quiero...* for tape, both pieces in 1996; *Como ausente* for piano and electronic sounds, realized at Centro de Estudios Electroacústicos FACM-UCA, Catholic University of Argentina, and *Todo se vuelve presagio 2* for piano, recorded piano and electronic sounds, realized at Centro de Estudios Electroacústicos FACM-UCA, both in 1998; *Cómo explicar el rojo*, version for clarinet and electronic sounds, realized at Laboratorio de Informática y Electrónica Musical, Madrid, in 1999; *Cómo explicar el rojo* version for alto saxophone and electronic sounds in 2000; and *En la oscuridad* for bass clarinet and real time sound processing in 2002.

Cetta started his activities as researcher in 1987. Some of his recent research projects were: *Estructuración del timbre en la música de cámara (Timbre structuralization in chamber music)*, involving musical analysis, notation, performance and composition; and *Un modelo para la simulación del Espacio en Música (A model for simulation of Space in Music)*, focusing on the development of programs for spatial localization of sound using the HRTF (Head Related Transfer Functions) technique applied to the composition of chamber music with electronic sounds. More references about the activities of Dr. Cetta as researcher could be found in chapter VIII, section 8.2 Recent research.

Alejandro Iglesias Rossi (born in Buenos Aires, 1960) has been composing several works using electroacoustic media during the last years. Some of his works are: *Legüeras soledades* for sax and sampler, 1989; *Bagual oscuro* for djembé and live electronics, 1991; *Angelus*, 1996, *Ascención (Las Tierras Nuevas)*, 1998, and *Tres Epístolas (del secreto de las alas ocultas a la luz del sol de medianoche)*, 2000, all three works for tape.

Angelus has been awarded the First Prize of the International Rostrum of Electroacoustic Music (Amsterdam 1996) organized by the International Music Council of the UNESCO. Iglesias Rossi wrote about this piece:

The hebrew word MALAJ, as well as the latin word ANGELUS, generally translated as ‘messenger’, describe entities that have been one of the key concepts of biblical thinking. A mystic judeo-christian tradition has seen on those entities the laws, the numbers, the ‘ideas’ (in the platonic sense), ‘masses of knowledge’ that are the constitutive principles of the Universe. Even being prototypes, or protoanalogies, they are living and conscious beings that communicate with men. Taking as subject of contemplation the Vision of Prophet Ezekiel, this tradition concluded that the two key ways by which the ‘messengers’ communicate with men are the analytic science, represented by the wheels of the ‘Merkabá’ (the Carriage of God), and the artistic vision, symbolised by the Four Livings with faces of eagle, bull, lion and man. The biblical images on which is based this piece are Ezekiel 1, St.Luke 1, 26-28 and Apocalypse 12.

Iglesias Rossi, A. (2003). Program Notes. [personal communication].

Luis María Rojas (born in Bolivar, 1960) is researcher, musical software developer and composer.

Some of his pieces are: *Juego con Dados* for computer and string trio, 1996; *Iluminado por la duda* for tape, 1997; *La cacerola* ballet music on tape, 1998; *Dos visiones apresuradas de la misma cosa - part I*, electronic music on tape, 1998; *Variaciones negras* for soprano sax and computer, 1999; *Elefante* for video and real time digital sound processing, 2000; *Música desilusionada* for soprano sax, cello, double bass, three computers and video projection, with images by Laura Rojas, 2001; and *c3seg* for string quartet and video game, 2003.

Rojas developed Texture 3.0, a compositional tool that “generates musical information by stochastic means” (Rojas, L. M. 2003. Personal communication); and SMSrt, a Xavier Serra’ SMS based software.

Rojas is teaching Electroacoustic Media at the Musical Conservatory of Bahia Blanca, Argentina.

More references on Rojas’ research projects could be found in chapter VIII, section 8.2 Recent research.

Mario Verandi (born in San Nicolás, Buenos Aires, 1960) composed *Figuras Flamencas* for tape, realized at the Electroacoustic Music Studios at Birmingham University in U.K.; *The peak that flew from afar*, installation, objects and tape in 1992; *The ten thousand things* installation, objects and tape in 1994; *Web Composition* in 1995; *A Tear on the Desert*, *Dancescape* and *Heartbreaker* in 1996; *Faces & Intensities* in 1997. He is living in England.

Javier Garavaglia (born in Buenos Aires, 1960) composed among other works: *AM STEG (Spaces)* for stereo tape between 1993 and 1996; *pizz* for quadraphonic tape in 1993; *Gegensätze (gegenseitig)* for alto flute (G), quadraphonic tape and live-electronics in 1994; *Arte Poética (I)* and *Arte Poética (II. Stanza)*, both works for quadraphonic tape and based on the poem *Arte poética* by Jorge Luis Borges, in 1995; *Spectral Colours* for ensemble and tape, *Arte Poética (stanzas III to VII)* for quadraphonic tape, and *Contraries (resonances)* for alto flute, quadraphonic tape and live-electronics, in 1996; *T.A.T (a man’s life)* for four tracks tape, viola, bass-clarinet and live-electronics, during 1997-1998; *COLOR-CODE*, music for the concert-installation *Color Code*, for four tracks tape, viola, live-electronics (using Max/MSP) and computer generated graphics on two canvas, in 1998; *Poppekstive* for 8 tracks tape in 1999; *NUANCES* for orchestra and electronics, and *GRANULAR GONG* for eight tracks tape, both in 2000; *INTERZONES (A/E-B)* for accordion, electric bass and six

tracks tape in 2001; *INTERZONES (A/E-B)*, second version, for piano, double bass and electronics during 2001-2002; and *NINTH* music for viola and computer, in 2002.

He was living in Germany during the 90s and is now teaching in the U.K.

Ezequiel Viñao (born in Buenos Aires, 1960) composed *La noche de las noches* for string quartet and tape in 1987; *El Simurgh (Book I)* for piano and computer in 1991; and *The Simurgh (Book II)* for violin and computer in 1992. He lives in the United States.

Mario Mary (born in Buenos Aires, 1961) graduated in composition at National University of La Plata, Argentina. Since 1992 he continued his studies in Paris at GRM, the Music Conservatory of Paris, IRCAM and the University of Paris VIII, from which he received his doctoral degree in Aesthetic, Science and Technology of Arts.

While working at IRCAM in 1995 he realized the *AudioSculpt Cross-Synthesis Handbook*.

His music has been distinguished with first prizes in several international competitions of electroacoustic music, as for example: Luigi Russolo, Italy, 1994; Pierre Schaeffer, France, 1998; TRIME, Argentina, 1998 and 2001, Musica Nova, Czech Republic, 2002; and Bourges 2003.

Mario Mary composed, among other works: *Doble Mensaje* in 1989, and *Endorfina* in 1990, both pieces for tape; *Cohesión* for French horn, violin, double bass and tape in 1991; *De l'autre côté du silence* for tape, realized at the Music Conservatory of Paris in 1993; *Timbres partiels* for flutes, clarinets, cellos, percussion and live electronics, realized at IRCAM in 1994; *Noch dazu* for guitar and computer, realized at Elac, Austria, in 1995; *Portraits témoins* for 8 channels tape, in 1997, commissioned by GRM; *Objets croisés II* for cello and tape in 1998; *Aarhus* for violin and tape, realized at DIEM, Denmark, in 2000; *La corde cachée* for guitar and tape, realized at Paris VIII University in 2003; and *Signes émergents*,

electroacoustic piece on 8 tracks, commissioned by GRM. This last piece has two parts: *Haulie*, composed in 2002, and *Bouge, bouge!* in 2003, which could also be played as independent works.

Since 1996 Mario Mary is teaching Sound Synthesis and DSP at Paris VIII University. He also started an annual Computer Music Concert Series in Paris in 1998.

Ricardo Nillni (born in Buenos Aires, 1960) composed among other works: *Sonambula* for tape in 1987; *Entropogel* for tape in 1988; *Gaps* for G flute and tape in 1990; *Mnèse* for 12 instruments and computer in 1991; *Veladuras* for tape in 1993; *Autour des Tores* for bass clarinet and tape in 1995; and *On swings and folds* for tape in 1999. He lives in France.

Gonzalo Biffarella (born in Sancti Spiritu, Santa Fe, 1961) composed: *Matacos* for tape in 1991, realized at his personal studio; *Mestizaje* for tape, between 1993 and 1994, realized at LIPM in Buenos Aires; *Rastros* for tape in 1996, realized at his personal studio in Córdoba and LIPM; *Homenaje a E.C.* for two guitars and tape in 1994; *Plegaria* for tape, realized at Bourges, France, and *La Rue de la Cage Verte* for guitar and tape, both in 1995; *Los Siete Espejos* in 1999; *Entre 2 mundos*, for cello and digital media, in 2000.

Luis Naón (born in 1961) composed several pieces working with electroacoustic media, among them: *Reflejos...* for clarinet, French horn, cello and 2 synthesizers in 1985; *Locomotoras* for tape in 1989; *Muertango* for clarinet and tape in 1988; *Declives* for tuba, percussion and electronic system in 1992; *Macristalhias* for violin and tape, *Sikureada múltiple* for 2 sikus, synthesizer, cello and vibraphone, and *Ka, cinco poemas musicales* for violin, cello clarinet, French Horn, percussion and 2 synthesizers, all three pieces in 1993; *La esfera y la piedra* for tape in 1994; *Clastrum* for percussion and tape between 1996 and 1997; *Urbana* for accordion, percussion and live electronics, and *Lascaux Urbana*, electroacoustic music on eight tracks tape, between 1997 and 1998; *Méta-Urbana* for real

time system, meta MIDI instruments and sound spatialization in 1999; *Lettre inachevée* for vibraphone and live electronics; and *Tango del Desamparo* for piano, cello and tape. He lives in France.

Arturo Gervasoni (born in 1962), composer, guitar performer and educator, graduated in Musical Composition at National University of Córdoba.

He composed several pieces for guitar and electroacoustic processings in collaboration with Ricardo Dal Farra during the 80s. Some of these works are: *Música para Hall II*, 1985; *Integrados*, *PH*, *Double*, *Toccata* and *Clones*, all pieces 1986; *Hay alguien ahí fuera con quien hablar?*, 1987; and *Disolución IV*, 1991. Also in collaboration with Dal Farra he composed *G* in 1987, and *Uhuru* in 1988, both for MIDI guitar, digital synthesizer and live electroacoustic processings.

Living in France since 1990, Gervasoni composed several mixed pieces during the last years, among them: *Etoiles liquides* for cello and tape in 1998; *SSSSCHCHSS* for female voice and electronic sounds, *Treize pieces pour instrument solo et bande*, *Cinco Piezas* for child voice and tape, *Après?* for choir, children choir, soloist, piano, vibraphone, marimba, percussion, double bass and tape, all four works in 2001; *L'ombre du souffle* for flute and electronic sounds between 2002 and 2003; and *Circundantes en Eco* for guitar and electronic sounds in 2003. He also composed *D'eux*, an electroacoustic piece for a dance spectacle, in 2002.

Claudio Calmens (born in Bahía Blanca, 1962) have been composing and performing experimental music, including works with electroacoustic media.

Some of his works are: *Sol Freud*, 1996, a literary-musical work stemming from compositional principles of pataphysique; *Gotas y Metal*, an aleatoric sound piece consisting in metal objects (vessels) drummed on by drops of water on the live stage, 1997; *El Zapallo Que Se Hizo Cosmos (The Pumpkin That Became Cosmos)* also 1997, using voice processing,

and based on a text by Macedonio Fernández; *Poemus 1, 2, 3, 4, 5*, composed between 1997 and 1998 for narrator and either computer or digital recording, with texts of Oliverio Girondo; *Futilidad (Futility)*, a story created around a phonetic game involving a single consonant ("f") which either occurs or predominates in the majority of the words of the text; *Sweet Vivi* for electric guitar + midi, 2000; and *Higer Falls*, electro acoustic piece, 2001.

José Halac (born in Córdoba, 1962) composed, among other works: *Invocándote* for voice, electric guitar, electric bass, synthesizers and drums, in 1986; *Ritos Metálicos* for voices and tape in 1987; *India vieja que pretende volverse joven chupando sangre de cóndor*, and *Ritos Metálicos 3* for soprano, flutes, percussion and tape, both in 1990; *India vieja, sincretismo #1* for tape, realized at Brooklyn College - Center for Computer Music, and *Aplastamiento de las Gotas* for prepared piano and computer generated tape, both in 1991; *Uitotos, sincretismo #2* for string quartet and computer generated tape, *Maturity, sincretismo #3* for voice, electric viola, trombone, percussion and tape, *Cafe Angel* for voice and tape, and *Maturity, sincretismo #3* for voice, trombone, electric viola, drums, Jamaican flute, tape and synthesizers, all four pieces in 1992; *Ball, sincretismo #4* for trombone and tape in 1993; *Entrepieles* for alto/soprano sax, piano, cello, flute, clarinet, percussion and interactive computer systems in 1994; *Todo lo que amaron nuestros ojos* for tape in 1996; and *The Breaking of the Scream* for CD in 1999.

About his piece *The Breaking of the Scream* Halac wrote:

[...] was composed based on a poem by Argentine poet Pablo Anadón, and a *baguala*, a traditional folk song from the NorthWest area of Argentina. The poem, originally in Spanish, is titled *Seasons of the Tree* and is centered around the idea of the departure of the loved one and the painful remains of the sentiments no longer recognized. The *baguala* describes the sexual desire of a man that calls himself an "old tiger". These two sources merge in the piece with screams, the composer's voice singing and reciting the poem and the digital manipulation of all the material.

Halac, J. (2003). Program Notes. [personal communication].

Halac lives today sharing his time between New York and his natal land, Córdoba.

Claudio Ferrari (born in Rosario, 1962) composed *Tiempo blanco* in 2001; and *De Planos y Lejanías*.

Octavio López (born in Buenos Aires, 1962) composed *The magic mirror* for bass clarinet, percussion, cello and electroacoustic system in 1996; *Compenetración Iridiscente* for flute, percussion and tape in 1997; *Ensaio diario de um drama* for trombone, piano, percussion and electronics in 1998; *In Braque* for electric harp and electronics in 1999; and *Quim(h)eras* for electroacoustics and video (music for *Wax Experiments*, experimental film by Oskar Fischinger, 1921-1926) in 2002. He lives in France.

Juan Namuncurá (born in Bolivia, 1962; has been living most of his life in Argentina) composed *Butalón 246*.

Antonio Moliterni (born in Buenos Aires, 1963) composed among other works: *Página blanca* for electronic media in 1990; *Vestigios* for bass clarinet, piano and electronic media in 1994; *Ciclópeo* for bass clarinet and tape in 1996; *What's that sound from under the door* for tape in 2000; and *Touch & go* for clarinet, piano and electronic media in 2001.

Jorge Haro (born in Buenos Aires, 1963) composed *Eriales* (part IV) in 1996.

Fabián Luna (born in Buenos Aires, 1963) is a composer, multimedia artist and software developer, currently teaching Music Technology and Multimedia at the ORT Technical High School in Buenos Aires.

Among other works he composed: *Estudio No. 1 (København)* for tape in 1988; *3 Cascadas en Transición* for live electronics in 1994; *Emulaciones* in 1997, *Dinámicas Expansivas* in 2000, and *Accéssus* in 2002, all three pieces for tape or CD.

Other works by Luna are: *Entornos Replicantes*, a series of sound installations developed between 1996 and 2002; and *Literalmente 0*, an experimental web site related to image, animation, text and sound exploration, dated 2000-2002.

Luna developed several multimedia and musical applications using HMSL - Hierarchical Music Specification Language (Cascadas 1992-1998; Asimov 1996-1998; Replicantes 1998; Celdim 1998-1999), Max (Conversiones 1999; Editor SysEx Universal 2001-2002), HyperCard (MIDI utilities 1996-1998) and VisualBasic (Astrolabio 2001-2002; Babel 2001-2002; SINTDSP 2001-2002), among other programming environments.

Fernando Polonuer (born in Buenos Aires, 1964) composed *Del ser o la nada y esa desesperada búsqueda* for tape in 1996; *Tus palabras cercanas* for tape in 1997; *Breve reseña sobre los sueños, el vacío y la enfermedad* for tape in 1998; and *Rotaciones*.

Gustavo Chab (born in Buenos Aires, 1964) composed *Mirada roja* for tape in 1992; *Futura* for violin, tape and live electronics; *Subterráneo*, *concrète* music on tape; *Espacios Ausentes* for voice, tape and live electronics; *Géminis* on tape; *Serena* for flute in G, tape and live electronics.

Andrea Pensado (born in La Plata, 1965) has been composing with electroacoustic media and performing using live interactive musical systems.

Pensado studied Musical Education at the National University of La Plata in Argentina. Then she moved in 1987 to Poland to study at the Cracow Academy of Music, where she graduated

in choral conducting in 1992 and composition in 1995 after having studied with Barbara Buczek and Boguslaw Schaeffer. There she studied also computer music with Marek Choloniewski. During 1997 Pensado came back to Buenos Aires and during 1998 co-founded an interdisciplinary duo, Qfwfq, with Gregory Kowalski (images).

Among other pieces Pensado composed: *Desencuentros* for piano and live-electronics in 1993; *CIØAV* for computer, 3 percussionists, voice and live-electronics, with 8 channels spatialization digitally controlled in real time, in 1994; *Ostatni sen karalucha (El último sueño de una cucaracha)* for tape in 1994; *Al rumga* for trombone, voice and live- electronics in 1995; *¿Nsmentrí?* for bass clarinet, alto saxophone, trumpet, violoncello, double bass, and tape in 1997; *¡Dale que va!* for bass clarinet and real time digital sound processing with MAX/MSP in 2002.

The duo Pensado created with Kowalski, QfwfQ, works with live computer based interactive audiovisual systems, and often in collaboration with solo performers. Among other works they created: *Paulinska 28*, sound and images project for bass clarinet (with live-electronics), in 1998; *Delirium is a disease of the night* for soprano saxophone, live electronics (Max controlling DSP in real time) and Xpose, and *Carcajadas Ajadas III* for piano and accessory instruments, voice, live electronics and images (interactive), both in 1999; *The Blue Smoke Producing Factory* for two Mac computers (one running the software Image/ine and the other with Max/MSP), actor, light sensors (I-Cube system) and performer, between 1999 and 2000 (the performer processes his own image with his voice and also generates and processes sounds and images with an instrument built with 2 light sensors); *Vox ex Machina* for voice and movements, installation with light sensors and two computers (Image/ine and Max/MSP), in 2000; *ABX*, based on *The Seven Sermons of the Dead* by Carl Gustav Jung, for two performers in two interactive zones of light sensors, in 2001; and *Event 1*, where movements of lights held by the performers trigger/modulate sounds and images in real time, in 2002.

Since 2002 Pensado and Kowalski live in Salem, United States, and at the moment they concentrate in the search of relevant parameters for performance, articulated through new gestures and means (e.g. different type of sensors).

Oswaldo Budón (born in Concordia, Entre Ríos, 1965) studied music at Universidad Nacional del Litoral in Argentina, McGill University in Canada and Université de Paris VIII in France. He composed, among other works: *Para el trato con el desierto* for tape in 1992; *Wind ... again*, electroacoustic music, in 1993; *de diez dedos cantando* for MIDI guitar and interactive computer in 1994; *Territorios* for percussion ensemble (eight parts) and tape in 1996; *Fuyante* for percussion quartet and tape, also in 1996 but revised in 1998; *para cantar* for voice, percussion and digital voice processing, and *Esquisse d'un musique lointaine* for flute quartet, trombone and three computer operators, both in 2001. All electronic parts of these pieces were created at the Electronic Music Studios of McGill University in Montreal.

Budón lives at present in Montevideo, Uruguay.

José Mataloni (born in Córdoba, 1965) composed among other works: *Ya nunca más me verás como me vieras* in 1996; *Continentalia*, electroacoustic, in 1999; *Tiempo Dos*, electroacoustic-sound art, *Piazzollage*, sound art - electroacoustic tango, and *Primera carta*, all three in 2000; *Tausend Ja Tango*, electroacoustic tango - sound art, *Ensoñación Porteña*, electroacoustic tango - sound art, *Sonidos Lejanos*, electroacoustic-sound art, and *Portalis*, sound-art, all four pieces in 2001; *Magma*, electroacoustic, *Navidad del Agua*, electroacoustic, *El Sueño del Gallo*, sound art, *Monstruo Mecánico*, electroacoustic-sound art, *Paz!*, electroacoustic-sound art, and *Die Arcana (Tarot I)*, *hörspiel*, all six works in 2002; “Vida Mía Remix”, electroacoustic tango - sound art, in 2003; and *Transvolución* in 2004.

Mataloni organized several contemporary music encounters, as for example the Cycles of Experimental Music I-IV and the Competition-Forum for Electroacoustic Music I-IV (1998-2001). He was living in Germany for some years.

Raúl Minsburg (born in 1965) is at present professor and researcher at the National University of Lanús, and artistic co-director of the Sonoimágenes festival.

Among other works Minsburg composed: *La huella de Vincent* for electronic sounds, 1992; *El otro espejo*, electroacoustic music, 1994; *Un oído en el desierto*, electroacoustic music, 1995; *Voces del recuerdo*, electroacoustic music, 1995-1996, realized at Birmingham University; *Las Formas del Silencio*, electroacoustic music, 1996; *Días despues...*, electroacoustic music, 1997-1998; *Cientos de voces*, electroacoustic music, 1999; *Tiempos imaginarios* for 4 musicians and tape, also 1999; *Entre sueños*, electroacoustic music, 2001; *El mismo camino*, electroacoustic music, 2003; and *A tu memoria (para Naum Minsburg)*, electroacoustic music, 2005.

Martín Fumarola (born in 1966) has been Associate Composer to the LEIM (Laboratorio de Electroacústica e Informática Musical) at the School of Arts, National University of Córdoba until 2002. He is now a freelance composer.

Among other works he composed the following tape works: *Argos* in 1988; *Estatismo* in 1989; *In-Movile* in 1992-1993, *Set In* in 1994; *El peregrinar de la araña* in 1995; *Callejuelas*, realized at LIEM-CDMC in Madrid, Spain, in 1996; *Shaguir*, realized at the Theremin Center for Electroacoustic Music and Multimedia in Moscow, Russia, and "Omen", both in 1998; *SC* in 1999; and *CS* in 2002, realized at his personal studio.

Some of his research papers are: *Delimitación de constantes compositivas en la música electroacústica argentina del interior del país, Informe Final*, research grant 1997-1998, National Endowments for the Arts, Argentina; *A compositional strategy thought in terms of stories*, published in the Proceedings of III Simposio Brasileiro de Computação e Musica held in Recife, Brazil, 1996; *An Approach to a Latinamerican Computer Music*, published in the Proceedings of the International Computer Music Conference held in Hong-Kong, 1996;

and *Electroacoustic Music Practice in Latin America: An Interview with Juan Amenabar*, published in *Computer Music Journal* Vol. 23 No. 1, 1999, The MIT Press, United States.

Fumarola has been also active in promoting electroacoustic music through curated concerts and lectures.

Daniel D'Adamo (born in Buenos Aires, 1966) composed, among other works: *D'ombra*, for bass clarinet and computer, in 1997. During the last times he has been working at LEAD-CNRS, in France, researching on musical structure perception as part of a program for research in cognitive sciences.

Damián Keller (born in Buenos Aires, 1966) has been developing an interdisciplinary research work on instrumental timbre and formal structures using tools extracted from psychology of perception, signal processing and musical analysis.

Keller composed: *Canon* in 1987; *Targo* and *Desencuentros* in 1988; *Criasom* in 1989; *Exilios* in 1991; *Incuasi-Promptum* in 1992; *Duo* in 1993; *Brasil(espacio)ia* in 1994; *La Patente* for CD, *Arrow of time* for trombone and electronics, and *To Lions Gate* for CD, all three in 1997; *Lo femenino en la pena* for CD in 1998; *touch'n'go (toco y me voy)* for eight-channel computer-generated tape and hypertext between 1998 and 1999; *Drop* for 8 channels tape, and *Waltz No. 6*, installation, collaboration with A.L.F.S. Keller (video, visual design) and Thor Sunde (sculpture), both in 1999; *The Trade/Oro por baratijas* for CD, *Metrophonie* for 4 channels tape, and *La Conquista*, installation, collaboration with A. Capasso (video, visual design), all three works in 2000; and *Instábilis*, installation, collaboration with K. Lins (visual design), in 2001; among other pieces.

In collaboration with C. Rolfe, Keller developed MacPOD, a real-time granular synthesis software.

More references on Keller's research could be found in chapter VIII, section 8.2 Recent research.

Juan María Solare (born in Buenos Aires, 1966) studied piano, composition and conducting at the National Conservatory of Music in Argentina.

Among other pieces he composed: *Mentira*, realized at Deutsche Welle' studios, Germany, in 1996; *Assurancetourix* for tape, based on samples of the voice of Ligia Liberatori, in 1999; *Solidità della nebbia* for basset horn and electronic sounds, between 1999 and 2000; *Was a saW* for electronic sounds (sawtooth waves), *Voi ch'intrate* for tape, *The void profound of unessential night* for electronic sounds (sine waves), *Celsius 24 (Wolhtemperierter Raum)*, sound installation for the Altes Rathaus in Worpswede, *Engarces* for electronic sounds, *Trituration* for electronic sounds, and *Drooping Drops* for bassoon, piano and tape, all seven works in 2001; and *Preludio granular y Fuga* for tape, and *Circa Cis* for choir (and tape ad libitum) in 2002.

About *Solidità della nebbia* (*Solidity of mist*) for basset horn and electronic sounds he wrote:

[...] was realized at the Studio of the *Musikhochschule* in Cologne (with the technical assistance of Marcel Schmidt and under the guidance of Hans Ulrich Humpert). The piece is almost completely based upon samples of basset horn, performed by Michele Marelli, and of his voice.

The title is taken from a picture by Luigi Russolo (1885-1947), a painting where the colour blue predominates, Russolo, besides being painter, was a musician (or at least inventor), and one of the impulsers of Futurism. He was one of the first that already in 1913 imagined a music based on taking noise as raw material and organizing it. And he didn't limit himself to imagine this, but he constructed a group of apparats (*intonarumori*) that put in practice his ideas. That line of thought is retaken with Edgar Varèse, later with the *musique concrète* and the electronic. Forcing things, all present computer music is in debt with futurist ideas. To intitle this piece *Solidità della nebbia* implies thus an acknowledgement.

Solare, J. M. (2003). Program Notes. [personal communication].

Another work by Solare is *Collar*, part of a trilogy that he conceived in 2001 including: *Perlas Esparcidas* (Pearls) for unaccompanied trumpet (or English horn or basset horn), *Engarces* (Threadings) for electronic sounds, and *Collar* (Necklace) for trumpet (or English horn or basset horn) and electronic sounds. *Collar* is the superposition of *Perlas Esparcidas* and *Engarces* (thus Pearls + Threadings = Necklace).

Solare lives in Germany.

Juan Pampin (born in Buenos Aires, 1967) composed *Apocalypse was postponed due to a lack of interest* for computer generated sounds on tape in 1994, using Bill Schottstaedt's CLM language in a NeXT workstation to generate, transform and mix all the sounds; *Transcription I* for computer driven Disklavier in 1996; *Metal Hurlant* for metallic percussion and computer generated sounds in 1996; *Toco Madera* for wooden percussion duo and computer generated sounds in 1997; and *Skin Heads* for percussion trio and electronic sounds.

About *Toco Madera* Pampin wrote:

I sculpted new sounds with the computer from a set of nine wooden percussion instruments recorded in the studio. I wanted to keep the rustic quality of wood sounds, to operate on them respecting their soul. This task was achieved using spectral analysis of the instrumental sounds to extrapolate their salient acoustic qualities, and digital filters to carve their matter. Throughout the piece, these transfigured wood sounds interact with the original instrumental set, performed by two percussion players, to create a multilayered musical space that reflects the textural traits of the natural wooden sculpture.

Pampin, J. (1997). CCRMA 1997 Summer Concert. Digital music under the stars. [online] Address: <http://ccrma.stanford.edu/events/concerts/Summer-1997.html#toco>

Pedro Ochoa (born in 1968) composed *Noche y fuego* in 1997; *El caminante* in 2000; and *Tierra viva* in 2003.

Federico Martínez (born in Buenos Aires, 1968) composed *El nombre* in 1999.

Ernesto Romeo (born in Buenos Aires, 1968) musical focus is on composing and performing live using electronic musical instruments. He is also teaching music technology at the ORT Technical School and in his personal studio.

As soloist or with his duos Klauss or Marienbad, he has been performing live extensively using a complex stage setup with electronic musical instruments ranging from the 60s till today, including several modular analog synthesizers, analog audio processors, analog sequencers, a mellotron and tape effects, as well as samplers, digital processors and synthesizers, and several computers. His music oscillates between pop, experimental and electroacoustic languages.

Among his pieces: *Estacionarias*, 2000; and *Estética* for processed electric violin, synthesizer and modular system, 2003.

Pablo Loudet (born in La Plata, 1969) is Professor of the Workshop of Electroacoustic Music and Assistant Professor of Experimental Sound Practice at the Fine Arts Faculty, National University of La Plata, since 1999. He is also Professor of Computers Applied to Musical Education at Chascomús Conservatory since 2001.

Among other pieces, Loudet composed: *Estudio para cinta y guitarra eléctrica* for electroacoustic media and guitar in 1998; *Llanuras* and *La espera*, both for electroacoustic media, in 1999; *Germinal*, for electroacoustic media, between 2000 and 2001; and *Comeme, bebeme*, electroacoustic music for dance, in 2002.

He also composed some works for digital orchestra as *Estudio para tres* and *Dos piezas* (*Baguala* and *Milonga*) both in 1996; and *La estructura*, for digital orchestra and improvisation group, in 1997.

Emiliano Causa (born in La Plata, 1970) studied graphic art, composition, sax and information systems' engineering. He is researcher and professor at the Multimedia Production career at the Fine Arts Faculty of the University of La Plata.

Some of Causa's electroacoustic pieces are: *Hambre Hombre* and *Organismos Sonoros*, both 1999, and *Fragmentación e Interferencia*, 2000, all three pieces for tape. In 2000 he composed *Estoy así...*, a mixed work for tape and alto sax.

Causa started to work with video art and electroacoustic music in 2001, and during 2002 founded the group Proyecto Biopus (with Christian Silva, Tarcisio Pirotta and Julián Isacch) to work on interactive artworks and web-art developments, bringing together multimedia and artificial intelligence concepts.

Among Causa's video art works, based on his electroacoustic pieces: *Dos Discursos* and *Acecho: Persecución y Muerte*, both 2001, have music by Causa and animated images by Causa and Christian Silva. In 2002 Causa directed *Organismos*, working also on its animation algorithms and sound design (music by Matías Romero Costas; animation by Tarcisio Pirotta, Christian Silva and Julián Isacch).

He also directed interactive multimedia works, as for example the CD-ROM *Sonomontaje*, 1999, collaboration with Carmelo Saitta, Daniel Reinoso, Christian Silva, Pablo Loudet and Leonardo Garay; and the web-art pieces *Enjambre* and *Vasarely Genético*, both 2002, collaboration with Christian Silva, Tarcisio Pirotta and Julián Isacch.

Causa has been active developing software for music, digital audio signal processing and multimedia, and is currently working in artistic applications of interactive technologies.

More references on Causa's research could be found in chapter VIII, section 8.2 Recent research.

Francisco Colasanto (born in Buenos Aires, 1971) is researcher and composer. Among other works he composed *Baile* for double bass clarinet and electronic sounds; *Transición*; and the sound installation *Templo - movimiento perpetuo* created in 2000. More references on Colasanto's research could be found in chapter VIII, section 8.2 Recent research.

Daniel Judkovski (born in Buenos Aires, 1971) composed *Apariciones* for tape in 1996.

Mariano Martín Cura (born in Buenos Aires, 1971) composed *Juego de Orquesta*.

Miguel Galperín (born in Buenos Aires, 1972) composed *Viendo* for tape, 1998; *Subtítulos No. 1*, 1999, also for tape; *Elevator Music for Spaces (50s)* and *Elevator Music for Spaces (Beethoven)*, both 2001, for three pianos and homemade electronic instruments.

Patricia Martínez (born in Buenos Aires, 1973) is active as composer, performer and improviser, playing piano, synthesizers and electronics. She was director of different ensembles of experimental and improvised music in Argentina, France and Holland, and is since 2001 conducting the group Zhéffiro.

Among other pieces Martínez composed: *Fines, De cielos y profetas*, recorded at ARTE 11, Buenos Aires, and *Resplandor de lo ausente*, all three acousmatic pieces, 1992; *El alma al cuerpo* for piano and tape, 1993; *Duelo intenso*, acousmatic, realized at UNQui, Argentina, *Puentes ilusorios entre lo eternamente separado* for percussion and tape, *De la luz la*

sombra, acousmatic, *Del cuadro a la postergación*, acousmatic, realized at the G.M.E.B. in Bourges, France, all four pieces 1994; *Auto rre trato* for clarinet and synthesizer, *Hasta que el mar se quiebre* for tape, and *Restos de nada*, acousmatic, all three pieces 1996; *FRICS-project* for clarinete, piano and syntheziser, 1997; *se desprende y cae* for violoncelo and electronics, between 1997 and 1998, realized at the IRCAM in Paris, France; *Express*, music for radio, between 1998 and 1999; *The last rite*, musical theater for ensamble, two actors and tape, between 1996 and 1999; *despuesdelaconsumacion* for ensemble and electroacoustic sounds (14 performers), 2000; *Quién me diese alas como de paloma* for for conductor, cello, bass clarinet, clarinet, bass trombone, eletric guitar, CD player, piano and percussion, between 1998 and 2001; *Mueca* for electronics and video, 2001; *Espejos de tiempo*, acousmatic, 2002.

Nicolás Varchausky (born in Buenos Aires, 1973) is Professor at National University of Buenos Aires, National University of Tres de Febrero, National University of Quilmes, and Film University (Universidad del Cine).

Among other works he composed: *Terrero* for two guitars and electronics in 1996-1997; *Blanco de Zinc* for electroacoustics in 1998; *Intervenciones* for mixed media and video in 1999; *Letanías* and *La Bonaerense/La Federal*, both for electronics, in 2000; *La Estrella Federal*, electronics, using 8 loudspeakers, and *Warnes* for 2 violas, 2 cellos, 2 double bass, and electronics, both in 2001; *Proyecto Ascensor*, installation, in collaboration with P. Zicarello, *Proyecto Torre*, an installation with public participation, and *Blanco de Plomo* for two percussionists and electronics, in 2002.

Mariano Fernandez (born in Buenos Aires, 1974) composed *Refugio y Temblor* for tape between 1997 and 1998 (prized at the International Rostrum of Electroacoustic Music); *Huellas del olvido* in 1998, also for tape; *Las gárgolas invisibles*, and *Como una luna en el agua*, both 1999, for quad tape and realized at *Studio du Nord*, Lille III University, in France; and *Tawantinsuyu, sangre y piedra*, for voice and tape, 2003.

Gustavo Delgado (born in Florida, Buenos Aires, 1976) composed *Fantasia en el sur* in 1996, realized at his personal studio, and *entrecuerdas* in 1997, both pieces for tape. Other works by Delgado are *Sin escape aparente*, *Sinfonía para una multitud* and *Perdido en un circuito abierto*.

Many other Argentinian composers have been working with electroacoustic media in their music. Because of the difficulties to find or confirm the date of birth for some of them, the following are listed alphabetically: **Pedro Caryevschi** composed *Analogías Paraboloides* for tape at CLAEM in 1970. **Sebastián Castagna** composed *Intemperie* for tape in 1997. **Marcelo Cosentino** composed *Espectro embudo* for piano, bass clarinet, drums and tape in 1994. **Marcelo Delgado** composed *Lito* for clarinet and tape in 1994; and *Un compositor improvisado* for oboe, clarinet, piano and two synthesizers in 1998. **Adriana de los Santos** was working with **Rubén Guzmán** to create *Firt 119* for piano, electroacoustics and video in 2002. **Christian Dergarabedian** composed *Una gota de agua en el océano* and *Espacio para estar solito*. **Arnaldo di Pace** and **Pablo Martínez** composed *Suite de Medea [Ritos]*, version 2003 for sampler and live sound processing. **Hugo Druetta** composed *Bailón* and *Las últimas luces*, both works for tape, in 1994. **Susana Espinosa**, founding director of the *Audiovisión* Bachelor at the National University of Lanús, composed *Ya...* version 2003, a real time collective creation using vocal sounds and electroacoustic processing based on the homonym poem by Juan Verón. **Claudio Garbolino** composed *Ostinato roto* for tape, realized at his home studio, in 1996. **Pablo Genoud** composed *Verbogatos*. **Silvia Goldberg** composed *Remansos* in 1993; and *Evocación I* for tape in 1996. **Pedro Gómez** composed *Seducción y escape* for tape in 1996. **Aitana Kasulin** composed *Endecha* for flute, tape, two dancers and video in 1998. **Fernando Larraburu** and **Hugo Pascaner** composed *Transformaciones modulares* in 1989, while working at LIPM. **Fernando Laub** composed *Caos: en el mundo de las ideas* for tape in 1996; and *Materialismo*. **Esteban Lopez Blanco** composed *El Grito* in 1989. **Carlos Lucero** composed *Sirenas*. **Tomás Luzián** composed *Estudio Electrónico No. 1* in 1984. **Jorge Naparstek** composed *Agua sobre el cielo* for sax

and tape in 1994. **Carlos Rausch** composed *Para Gerardo - Phonos II* for tape and fute in 1973, at the Columbia-Princeton Electronic Music Center in New York. **Patricia San Martín** composed *Expansión* in 1991. **Julieta Szewach** composed *El Cementerio Marino* for two pianos, magnetic tapes and water. **Federico Uslenghi** composed *Analogías Nro. 1* for CD in 2002.

There are also works involving electroacoustic media by **Gabriel Cerini**, **Luis Jorge Gonzalez**, **Bernardo Kuczer**, **Eduardo Luisi**, **Ana María Rodriguez**, **Damián Rodriguez** (born in Rosario, Santa Fe, 1963), **Guillermo Fabian Senn** (born in Esperanza, Santa Fe, 1977), **Alberto Soriano**, and **Claudio Tripputi**, to name but a few.

6.3 Bolivia

Atiliano Auza (born in Sucre, 1928) did some experimenting with electroacoustic media during the early 70s together with Alberto Villalpando. They were using a Synthi synthesizer to transform some quenacho improvisations recorded by a visiting flutist from Uruguay (quenacho is a very low register quena; a notched end-blown flute typical from the Andes region).

Florencio Pozadas (born in 1940; died in 1970) composed *CM-Op.1* (stands for Cinta Magnética = magnetic tape) for percussion and tape in 1968. The tape part was realized at CLAEM, in Buenos Aires.

Alberto Villalpando (born in La Paz, 1942) is considered one of the main driving forces of contemporary music in Bolivia.

He started his experiences with electroacoustic music in Buenos Aires, Argentina, first at the National Conservatory of Music during 1962, and later at Centro Latinoamericano de Altos Estudios Musicales (CLAEM) of Instituto Torcuato Di Tella during 1963 and 1964.

Back in Bolivia in 1965, Villalpando kept working using tape techniques in his music.

During 1970 he composed two mixed pieces, *Mística No. 3* for double string quartet, French horn, flute, double bass and tape, and *Mística No. 4* for string quartet, piano and tape. Both pieces use the same tape part, produced with a Synthi synthesizer.

While in a Symposium in Italy, Villalpando met Belgian composer Leo Küpper who invited him to work at his personal electronic music studio. Villalpando traveled then to Brussels where he composed his tape piece *Bolivianos...!* in 1973.

During the mid 70s Villalpando composed *Yamar y Armor*, ballet's music for voice, tape and orchestra, with texts by Blanca Wiethüchter. He included tape recorded electroacoustic sounds together with the orchestra on the first and third act, and a long tape solo starting the second act.

Years later Villalpando started to explore the possibilities of MIDI and composed *Desde el Jardín de Morador*, 1990, and *De los Elementos*, 1991.

Between 1996 and 1997 Villalpando composed *Qantatai* for chorus, narrators and electronic sounds. In 2002 he composed *Piano 3* for piano and two synthesized pianos, and *La Lagarta*, a 70 minutes ballet work in three acts for narrators and electroacoustic sounds, based on texts by Blanca Wiethüchter.

Edgar Alandia Canipa (born in Oruro, 1950) moved at an early age from Bolivia to Italy, and developed his musical career there. He studied in Italy at the Santa Cecilia Music Conservatory, graduating as composer and conductor. Since 1983 Alandia is director of the

Nuove Forme Sonore ensemble. At present he is professor of composition at the (“F. Morlacchi”) Music Conservatory of Perugia.

Alandia has been using live electronics in several of his compositions, among them: *Memorias* for string quartet, tape and live electronics, 1987; *PERLA...fabula triste*, chamber opera for reciter, soprano, baritone, string quartet, trombone and live electronics, 1989; *Soundfences* for trombone and live electronics, also 1989; *Undfen* for trombone and live electronics, 1990; *Mientras* for trombone or trombone with live electronics, 1994; *Sottili canti...invisibili* for reciter, piano, tuba and live electronics, 1995; *...sottile canto III* for tuba and live electronics, 1997; *iba por los montes...mientras yo dormía* for violin and live electronics, 1998; *de...homenaje* for soprano and live electronics, and *Oruro 3.706 mt. SNM*, chamber music theatre with “music...words...images...” for actor, soprano, violin, piano, trombone, tuba, tape and live electronics, both 1999. He also composed *Solo* for soprano and tape, 1996.

Gerardo Yañez (born in 1952) composed *Imantata (Lo Escondido)* in 1991; *Pedazo de Infinito* in 1992; and *Calcuta* in 1993.

Nicolás Suarez (born in La Paz, 1953) obtained his Master and Doctor of Music degree at the Catholic University of America in Washington D.C., United States.

He composed *Sexta Mayor* in 1992 and *Chica Aruma* in 1994, both for tape. *Chica Aruma* means “at midnight” in Aymara language. The composer wrote about this piece:

It is based on an exploration of the language of the Aymara indigenous people from the Andes region of Bolivia. Text editing and sound manipulation in time and pitch are the main structural resources, and were achieved using a small Macintosh computer and a percussion module.

Suarez E., N. (undated). Program Notes. [personal communication].

Cergio Prudencio (born in La Paz, 1955) is the founder and director of the Orquesta Experimental de Instrumentos Nativos or OEIN (Experimental Orchestra of Native Instruments). He composed *Awasqa* for tape in 1986, and *Tres movimientos coreográficos* in 2000, edited version of a work originally part of the dance performance *La casa de fulano*.

Agustín Fernández (born in Cochabamba, 1958) studied music in Cochabamba, then in La Paz with Alberto Villalpando, and later in Japan with Takashi Iida and Akira Ifukube. He moved to England in 1984 to study first at the University of Liverpool, where he received his Master in Music, and then to City University in London, for his Ph.D. studies.

Fernández composed *Teoponte*, a music theatre work for 6 mixed voices and tape in 1988; *Ángel Herido* for charango and tape in 1989; and *Silent Towers* for tape in 1990.

At present he teaches composition at Newcastle University in Belfast.

Oscar García (born in La Paz, 1960) has been director of the Orquesta Contemporánea de Instrumentos Nativos (Contemporary Orchestra for Native Instruments), founding director of Taller Boliviano de Música Popular Arawi (Arawi Bolivian Workshop of Popular Music), and contemporary music director of ensemble Madera Viva.

He composed, among other works: *ES ZAS* in 1993, collaboration with Sergio Claros Brasil; *Soplosorbos* and *El puro no*, both pieces for voice and tape, based on texts by Oliverio Girondo, and composed in 2000; *Cordimento I* for tape in 2001; and *Irupampa* for guitar and tape in 2002.

Jorge Ibañez (born in La Paz, 1960) began musical studies with his parents, then he went to the Regional School of Music in Cusco, Peru, and later to the National Conservatory of

Music in La Paz. He was professor of piano several years at that Conservatory in Bolivia before he moved to the United States to study at Longy School of Music, then at the New England Conservatory of Music, and later at Carnegie Mellon University, where he received his Master in Music.

Among other pieces, Ibañez composed: *Paisaje Sonoro Nocturno I (Soundscape I)* and *Paisaje Sonoro Nocturno II (Soundscape II)* in 1993, both realized at Carnegie Mellon University working with a Yamaha DX7 synthesizer; and *Estudio Ocarino* in 1998, realized at Boston University working with electronic samples of different kind of ocarinas.

At present Ibañez lives in Miami, United States, and teaches at Broward Community College.

Juan Namuncurá (born in Cochabamba, 1962) moved to Argentina when he was 4 years old. He composed *Pu Choroy Piré* and *Butalon 246*.

Sergio Claros Brasil (born in La Paz, 1963) composed *Hambre* in 1992, for a multimedia piece created in collaboration with photographer/videographer/painter **Gastón Ugalde** (born 1946); and *ES ZAS* in 1993, in collaboration with Oscar García.

Javier Parrado (born in La Paz, 1964) composed several works using electroacoustic media: *Tiempo*, for 4 channels' tape, in 1990, when he was still a student; *Inti Yana* for CD, in 1994; *Panel del carnaval I* for cassette tape or MIDI sequence plus MIDI SysEx data to use with a KS32 Ensoniq synthesizer and optional acoustic or sampled percussion, in 1998; and *Ánima del primer día* for musician (flute and soprano sax) and tape, in 2001. Parrado realized all the electroacoustic parts of those pieces at his home personal studio.

Julio Cabezas (born in 1965) graduated in Composition at the National Conservatory of Music in La Paz. He studied with composers Alberto Villalpando, Cergio Prudencio and Nicolás Suarez. Cabezas also graduated in sound engineering at Universidad del Valle.

He composed in 2002 a microtonal work for tape: *Variaciones para un oído aparentemente destemplado*, premiered that same year in Sucre.

Cabezas has been teaching music at the National Conservatory of Music, Valle's University, and Eduardo Laredo's Institute in Cochabamba.

Juan Siles Hoyos (born 1966) composed an *Estudio Electroacústico* in 1991.

6.4 Brazil

Hans-Joachim Koellreutter (born in Freiburg, Germany, 1915; died in Sao Paulo, 2005) composed *Sunyata* for flute, orchestra and tape in 1968.

Claudio Santoro (born in Manaus, 1919; died in Brasília, 1989) composed *Aleatórios I, II, III* for tape (audiovisual pieces) between 1966 and 1967; *Intermitências II* for chamber orchestra in 1967, using 4 microphones and a group of loudspeakers to amplify the acoustic instrument resonances; *Mutationen I* for modern harpsichord with pedals and tape in 1968; *Mutationen II* for cello and tape in 1969; *Mutationen III* for piano and tape in 1970; *Quadros sonoros*, for tape and paintings with photosensors, between 1967 and 1970; *Mutationen IV* for viola and tape between 1971 and 1972; *Mutationen V* and *Mutationen VI*, both for violin and tape, in 1972; *Mutationen VII* for string quartet or any combination of *Mutationen II, IV, V* and *VI* and tape in 1973; *Mutationen VIII* for piano, string quartet and tape (combining *Mutationen II, IV, V* and *VI*) in 1975; *Struktur von Zement und Eisen* for tape between 1972 and 1975; *Estudo* for tape, *Mutationen X* for oboe and tape, *Mutationen XI* for double bass

and tape, and *Mutationen XII* for string quintet or string orchestra and tape, all three works in 1976.

Gilberto Mendes (born in Santos, 1922) composed *Nascemorre* for mixed chorus, 2 typewriters and tape in 1963; *Santos Football Music* for instruments (orchestra), audience, dinner and 3 magnetic tapes in 1969; *Vai e vem* for soloists, chorus, pre-recorded percussion and turntable, also in 1969; *Atualidades: Kreutzer 70 - Homenagem a Beethoven*, for dinner (a violinist and a pianist) and tape in 1970; *O Objeto Musical - homenagem a Marcel Duchamp*, for fan and electric shaver in 1972; among other works.

Ernest Widmer (born in Aarau, Switzerland, 1927; died in Aarau, 1990) lived in Brazil many years. In Bahia, he was the director of the Music School of Bahia Federal University (1963-1965, 1967-1969 and 1976-1980), the artistic director of the Festival for New Music (1969-1973) and the artistic director of the Bahia Art Festival (1974-1982).

Widmer composed *Rumos* for big vocal and instrumental masses and tape; and *ENTRONcamentos SONoros* for piano, 5 trombones, strings and tape, both pieces in 1972.

Hubert Hans Hoffmann (born in 1929) composed *Mensagem celestial* for synthesizer in 1995.

Reginaldo Carvalho (born in Guarabira, 1932) composed between 1956 and 1959 at the Estúdio de Experiências Musicais (Musical Experiences Studio) in Rio de Janeiro his first *concrète* pieces on tape. In 1960 he moved to Brasília, the new capital city of the country, where he composed new *concrète* works at Radio Educadora. Later he returned to Rio de Janeiro where he founded the Estúdio de Música Experimental (EME), producing there some new electroacoustic works in 1966. At that time Carvalho was appointed director of the

Conservatorio Nacional de Canto Orfeônico de Rio de Janeiro, name that he changed by Instituto Villa-Lobos. This became an important center for studying and promoting new music. Among other, Jorge Antunes and Marlene Fernandes were also collaborating at the Institute.

Some of the electroacoustic pieces on tape by Reginaldo Carvalho are: *Si bemol*, 1956, considered the first *musique concrète* work realized in Brazil; and later the same year *Temática* and *Troço I*. During 1957 he composed *Troço II*. All of these works were based on piano sounds.

Carvalho started to experiment then with other sound objects and composed *Estudo I* in 1958 working with glass sounds, and *Estudo II* in 1959 with sounds coming from wood objects. Between 1963 and 1964 he composed *Estudo III* based on water sounds, and during 1964 the *Estudo IV* working with plastic objects. Also dated 1963-1964 is *Alegria de Natal*, a piece for mixed chorus and tape.

During 1964 he also composed *Fumaça: Ressonancias* and during 1965 *Piano Surpresa No. 1* and *Piano Surpresa No. 2* (also named *Estudo incoerente*) for tape. In 1966 he composed *A Pulserinha*, *A Tesourinha*, *Cleta* and *Cemiterio sem Flores*, and the following year *Caleidoscópio III*, all of these works for tape.

Carvalho lives today in Piauí, Teresina.

Clodomiro Caspary (born in 1932) composed *Estudos Concretos I* in 1966 and *Estudos Concretos II* in 1967, both works for piano and prepared piano on tape.

Rogério Duprat (born in Rio de Janeiro, 1932) was experimenting together with **Damiano Cozzella** (born in Sao Paulo, 1930) possible applications of computers in music. These experiences appeared in *Música Experimental*, a 1963 piece structured according to computer

calculations. Duprat also composed *Ludus Mardalis 1-2* for tape in 1967; and *Concerto Alimentar* in 1969.

Frederico Richter (born in Novo Hamburgo, 1932) composed *Suite Eletrônica* in 1979; *Introdução e Elegia por um Herói Moribundo* for violin and tape, *Study Spectrum Shaper* and *Sonhos e Fantasia*, in 1980; *Mean Time Far Away*, using Le Caine's Polyphone (considered the world's first voltage-controlled polyphonic synthesizer), and *Metamorfoses*, both in 1981; *Monumenta Frac Tallis-Thomas*, fractal music for organ and tape, and *Musica Fractal I* for string orchestra and tape, both in 1990;

Henrique 'de Curitiba' Morozowicz (born in Curitiba 1934) composed *Metáforas* for chorus and tape in 1973.

Rufo Herrera (born in Argentina, 1935; see that section) composed *Ambitus Mobile I* for three instrumental groups and tape in 1970.

Jocy de Oliveira (born in Curitiba, 1936) composed *Estoria II* for female voice, percussion and electroacoustic tape in 1967; *One player and four keyboards* for four keyboards in 1968; *Polinterações* for video, sculptures, projections and electronics in 1970; *Dimensões para 4 teclados* for piano, celesta, harmonium and harpsichord, *Wave Song*, version I for piano and live electronics, in collaboration with Ron Pellegrino, *Estoria IV*, version I for 2 female voices, electronic violin, bass guitar, percussion and live electronics, and version II for female voice and tape, and *Ouço vozes que se perdem nas veredas que encontrei*, version I for soprano and delays, all dated 1981; *Memorabilia* for soprano, electronic violin, bass guitar, percussion and synthesizers, composed in 1983; *Mobius Sonorum* for electronic violin and tape or digital delays, 1984; *Memoria* for two female voice and digital delays, 1985; *Encontrodesencontro* for piano and tape / for two to four pianos / piano and live electronics

or computer processors, 1985; *Realejo Dos Mundos* for female voices and synthesizers, 1986; *Ritual* for soprano and synthesizers, 1987; *O contar de uma raga* for electronic violin and synthesizer, 1987; *Solaris* for oboe and tape, 1988; *Raga in the Amazon* for oboe, mukha veena, ajeng, synthesizers, 1989; *Guayupia* for soprano coloratura, bass, flute, oboe and electroacoustic tape, 1990; *A prostituta sagrada* for soprano with or without flute and tape, 1990; *Mulher dos cabelos dourados* for actress, soprano, clarinet, percussion and tape, 1994; *La Loba* for actress, clarinet and electroacoustic tape, also dated 1994; *For cello* for cello and electroacoustic tape, 1995; *Sonar* for bass clarinet and electroacoustic tape, 1997; *Palmyra* for oboophone and electroacoustic tape, also dated 1998; *Naked diva* for soprano / actress and electroacoustic tape, 1998. Some of the named pieces are part of larger opera / multimedia works by Jocy de Oliveira, as for example: *Music in Space*, a planetary opera for voices, electronic violin, electroacoustic means, bass guitar, percussion, laser, projections and holography, 1982-1983; *Fata Morgana*, magic opera for voices, electronic violin, live electronics and dancers, 1987; *Liturgia do Espaço*, opera for 4 sopranos, 1 electronic violin, 2 oboes, live electronics, computer images in real time and dancers, 1988; *Illud Tempus*, for one soprano, one actress, clarinet, percussion and electroacoustic means, 1994; and *As Malibrans*, for 3 singers, one actress, oboe, clarinet, cello and piano with electroacoustic means, and computer generated sounds, 1999-2000.

Raul do Valle (born in Leme, 1936) studied electroacoustic music at GRM from 1976 to 1978. Since 1983 he has been Coordinator of NICS - Núcleo Interdisciplinar de Comunicação Sonora (Interdisciplinary Nucleus of Sound Communication). In 1994 he was elected member of the Academia Brasileira de Música (Brazilian Academy of Music).

Among other works he composed *Encadeamento* for tape in 1979; and with Jônatas Manzolli, *Mural* and *Non Sequitur*, both in 2003.

Ricardo Tacuchian (born in 1936) composed *Estruturas Sincréticas* for winds, percussion, slides and electronics in 1970.

Willy Corrêa de Oliveira (born in Recife, 1938) composed *Experiences I: Cavaquinho*, *Experiences II: Percussão*, *Experiences III: Gaita*, *Experiences IV: Vozes*, all tape pieces, in 1959; and *Materiales* in 1981.

Lindembergue Cardoso (born in Livramento, 1939) composed *Captações* for voices, chamber orchestra, turntables and radios in 1969.

Conrado Silva (born in Uruguay, 1940; see that section for references) have been living in Brazil since 1969 and is one of the pioneers that helped the development of electroacoustic music in that country.

Silva founded several electronic music studios in Brazil: Brasilia University, 1969; University of Sao Paulo State, 1977; Santa Marcelina Arts School, 1985; Syntesis, 1986. He is Associate Professor at the Music Department of the University of Brasilia.

Fernando Cerqueira (born in Ilhéus, 1941) composed *Heterofonia do Tempo ou Monólogo da Multidão* for soloist voices, choir, orchestra and tape in 1968.

Jorge Antunes (born in Rio de Janeiro, 1942) composed his first electroacoustic piece in 1961 working at his home studio: *Pequena peça para mi bequadro e harmônicos*, and has been very active working with these media since then.

In 1962 Antunes composed his first piece using only electronic sound sources, *Valsa Sideral*, considered the first piece of this kind realized in Brazil.

During 1963 Antunes composed *Música para varreduras de freqüência*, in 1964 *Fluxo luminoso para sons brancos I*, and the following year *Contrapunctus contra contrapunctus*. This last piece, together with *Valsa Sideral*, were included on the first analog long play published in Brazil with electroacoustic music.

Still working at his home studio, during 1966 Antunes composed *Três Estudos Cromofônicos*: 1- *Estudo para círculos verdes e vermelhos*; 2 - *Estudo para espirais azuis e laranjas*; 3 - *Estudo para pontos amarelos e violetas*.

In 1967 Reginaldo Carvalho invited Antunes to teach at Instituto Villa-Lobos. Then Antunes moved his home studio (Estúdio Antunes de Pesquisas Cromo-Musicais) to the Instituto, composed *Canto selvagem*, and started to teach the first course in Brazil focused on electroacoustic music: *Curso de Musica Concreta, Eletrônica e Magnetofônica (Concrète, electronic and tape music course)*. Also on that same studio at the Villa-Lobos Institute, he composed *Movimiento browniano* and *Canto do Pedreiro*, both in 1968. All of named works by Jorge Antunes until here are tape pieces, but he also composed mixed and multimedia works, such as: *Ambiente I* for tape, lights, static and kinetic objects, incense and food, 1965; *Canção da Paz* for baritone, piano and tape, also 1965; *Poema Camerístico* for speaker, bassoon, piano and tape, *Pequena Peça Aleatória* for masculine voice, piano and Theremin, *Dissolução* for strings orchestra and tape, and *Cromoplastofonia I* for full orchestra and tape, all four works, 1966; *Missa Populorum Progressio* for choir and tape, and *Insubstituível Segunda* for cello and tape, both 1967; *Invocação em defesa da maquina* for percussion and tape, 1968; *Concertatio I* for vocal group, instruments and tape, 1969; *Proudhonia* for mixed choir and tape, and *Idiosynchronie* for orchestra with electroacoustic processings, both 1972; *Catastrophe Ultra-Violette* for male choir, orchestra and 3 tapes, *Intervertige* for string quartet, wind quintet, 2 percussionists and electronic equipment, and *Source* for voice, flute, viola, cello, piano, synthesizer and tape, all three works 1974.

Jorge Antunes was also one of the composers that had the opportunity to study at the already legendary CLAEM - Instituto Di Tella in Buenos Aires during the 60s. There he composed *Cinta Cita* for tape in 1969 and *Auto-Retrato Sobre Paisaje Porteño* in 1970.

Other works by Jorge Antunes are: *Para Nascer Aqui*, 1971, realized at the Institute of Sonology in Utrecht, The Netherlands; *Canto Esthereofônico* for clarinet, bassoon, French horn, viola, cello, double bass, percussion and tape, 1978; *Sinfonia Das Diretas* for 300 car horns, alto sax, electric guitar, electric bass, electric piano, drums, percussion, reciter, mixed choir, popular choir and tape, 1984; *Interlude No. 1 pour Olga* and *Agenda pour un petit futur* for tape, both realized at *Les Ateliers UPIC* in Paris during 1993; *Le cru et le cuit* for percussion, some Brazilian sound sources and tape, composed between 1993 and 1994; *Mixolydia* for Theremin and tape, *Ballade Dure*, realized at GRM in Paris, *Vitraux MCMXCV* and *La beauté indiscreète d'une note violette*, both produced at Studio Charybde of GMEB, all four pieces 1995; *Hombres tristes y sin título rodeados de pájaros en noche marilla, violeta y naranja*, composed at LIEM in Spain, and *Rituel Violet* for tenor sax and tape, both 1998. Between that year and 1999 Antunes composed *Cantata Dos Dez Povos* for solo vocal quartet, 11 reciters, mixed choir, symphonic orchestra and three tapes; and between 1999 and 2000 his *Sinfonia em Cinco Movimentos* for symphonic orchestra, mixed choir, solo tenor and tape.

Antunes also built several electronic music instruments and devices that he used on his early pieces, as an electronic sawtooth wave generator, a spring reverberator, and two different Theremins.

Aylton Escobar (born in São Paulo, 1943) composed *Assembly* for amplified piano and tape in 1972; *Onthos* for chamber orchestra and tape in 1973; *Quebradas do Mundaréu* for tape in 1975; *Poética II* for flute and tape in 1978; *Poética III* for clarinet and tape in 1979; *Poética IV* for tuba and tape in 1980; *Poética V* for harp and tape in 1980; *Poética VI* for cello and tape in 1981. Other works by Escobar are: *Noneto* for soloist voice and tape; *Cromossos* for instruments, voices, radios, tape, mobiles, mimes and audience; and *Dois contornos sonoros* for mixed voices and portable radios.

Roberto Martins (born in 1943) composed *Rosa tumultuada* for chorus and tape.

José Maria Neves (born in São João del Rei, 1943; died in 2002) composed *Un-X-2* in 1971, a piece realized in Paris, and *Encomendação, S/1* and *Trans-form-action*, among other works.

Aginaldo Ribeiro (born in 1943) composed *Kuadrus* for oboe and tape in 1977.

Vânia Dantas Leite (born in 1945) composed *Vita Vitae* for flute, clarinet, viol, cello, actress and tape in 1975; *A-Jur-Amô* for voice and tape in 1978; *Di-Stances* in 1982; *Te quiero verde* for percussion, electric guitar, tape and reciter in 1983; *Karysma* for oboe and tape in 1984; *Flutcherliss* for electric guitar, synthesizer and projection in 1987; *Canto de Orfeu* for voice and tape in 1988; and *Sforzato/Piano* for tape in 1994.

Luis Carlos Csëko (born in 1945) composed *Sound* for voice and tape in 1992.

Jaceguay Lins (born in 1947) composed *Noturno* for two mobile radios and whistles.

Gil Nuno Vaz (born in 1947) composed *Seis poemas* for three equal female voices and tape in 1972.

Ilza Maria Costa Nogueira (born in 1948) *Metástase* for chorus (SATB) and tape.

Aluizio Arcela (born in João Pessoa, Paraíba, 1948), mainly a researcher with works in the computer music, digital images and multimedia fields also composed some musical pieces: *Cinco Hierarquias Espectrais* in 1993; and */cartas/rs95.car* in 1995. In 1997 he presented at the IV Brazilian Symposium on Music and Computers (IV Simpósio Brasileiro de Computação e Música) an on-line concert with *Three-Threaded Invention*, written for one sonic client and three graphic servers. Arcela described the work as “a client-server application for music where graphic servers are arranged in a way to provide visual counterparts to the real-time events generated by a sonic client.”

Arcela's research started in 1975 in the electrical engineering department of the Pontifical Catholic University of Rio de Janeiro.

During the 80s Arcela was invited to join the Brasilia University where he founded the Laboratório de Processamento Espectral (Spectral Processing Lab). At the same University he created the Master in Computer Music in 1989, the first University-level computer music course in South America.

Arcela developed software for sound synthesis, algorithmic composition and computer image generation based on musical intervals. More references on his research could be found in chapter VIII, section 8.2 Recent research.

Lourival Silvestre (born in 1949) composed *Tempo Grande* for flute, piano and tape in 1973.

Ronaldo Miranda (born in 1948) composed *Canticum Itineris* for voices, old instruments and tape in 1979;

Rodolfo Caesar (born in Rio de Janeiro, 1950) is Lecturer at the School of Music of Universidade Federal do Rio de Janeiro (UFRJ) in Brazil, where he coordinates LaMuT, the Laboratório de Música e Tecnologia (Music and Technology Lab). Caesar works also as researcher at the Conselho Nacional de Pesquisa (National Research Council).

He has an extensive catalog of electroacoustic music. Among other pieces Caesar composed: *Curare* in 1975; *Les deux saisons* and *Tutti Frutti* in 1976, both acousmatic works on tape realized at GRM in Paris, France; *Curare II* in 1978, also an acousmatic work on tape realized at Sistema Globo de Rádio, in Rio de Janeiro; *Fragmentos Do Paraíso* for two magnetic tapes and slides in 1980; *Candomblet*, a multimedia piece for tape and dancer, and *Tremola Impressão*, acousmatic work on tape realized at Estúdio da Glória in Brazil, both in 1981; *Vibrata* for tape and one percussionist, and *Espiral* for two synthesizers and tape, with Vânia Dantas Leite, both in 1982 and realized at Estúdio da Glória; *Mosaic Blues*, computer music for tape realized at GRM' Studio Numerique 123 in 1983; *Ricercare - Fuga* for dancers and tape, and *Divertimento* for DX7 synthesizer, both in 1985; *Presença* for cello and tape in 1988; *A carne da pedra* for DAT, and *Arcos I* for cello and tape, both realized at the University of East Anglia - Norwich in 1989; *Neolitica* and *Canto*, both acousmatic pieces on CD, also realized at the University of East Anglia - Norwich, in 1990; *Canons/Chaos* for CD, and *Canibali* for three percussionists, produced interpolating MIDI files of Balinese music using Max software, both in 1991; *Volta Redonda* for CD, between 1992 and 1993; *A noite em concha* for CD, and *Industrial Revolutions* for Kurzweil K2000 or CD, both in 1993; *Nemietoia* for CD in 1994; *Círculos Ceifados* for CD in 1997; *Divertimento IV* for live electronics in 1999; *Ranap-Gaô* for CD in 2000; *Lições Americanas: Ho Ho Ho* for CD and video, with Simone Michelin, *Dueto 1+1* for piano, CD and video, with Vânia Dantas Leite, and *Clips* for CD and video, all three pieces in 2002, and realized at his personal studio.

Some of his published research papers are: *A eletrônica de uma poética em Ranap-Gaô* published in the proceedings of V Forum de Linguagens Musicais, 2002, Sao Paulo; *Novas tecnologias e outra escuta: para escutar a música feita com tecnologia recente* published in the proceedings of I Colóquio de Pesquisa e Pós-graduação da Escola de Música/UFRJ, 1999,

Rio de Janeiro; *Composição, pesquisa e a internet* published in the proceedings of XI Encontro Anual da ANPPOM, 1998, Campinas - SP; *Novas interfaces e a produção eletroacústica* published in the proceedings of IV Simposio Brasileiro de Computação e Musica, 1997, Brasília; *Um encontro da composição com a bio-acústica via FM* published in the proceedings of X Encontro Anual da ANPPOM, 1997, Goiânia - GO; *Artefatos Fm Para A Producao de Ritmos Pseudo-Naturais* published in the proceedings of III Simposio Brasileiro de Computação e Musica, 1996, Recife; *O zig-zag conceitual no estúdio de composição* published in the proceedings of II Simpósio Brasileiro de Computação e Música, 1995, Canela - Rio Grande do Sul; *Perfil e Copacabana: dois aplicativos para a composição eletroacústica com o protocolo MIDI* published in the proceedings of VIII Encontro da ANPPOM, 1995, João Pessoa - Paraíba. He also wrote *Composição e natureza*, published in the book *A doutrina dos sons de Goethe a caminho da música nova de Webern*, seleção, tradução e comentários de Marcia Sá Cavalcante Schuback, Editora UFRJ, 1999, Rio de Janeiro.

Rodolfo Caesar also developed Copacabana and Perfil, two MIDI-based software applications for electroacoustic music composition.

Rodolfo Coelho de Souza (born in 1952) is a Professor at Parana Federal University. He was the International Computer Music Association Vice-President for Americas.

Among other works he composed: *Chroma* in 1986; *Cinco Canções Japonesas* in 1987; *Diálogos* for tape, and *Metrópolis*, both pieces in 1990; *Chuva Oblíqua* in 1992; *O que acontece embaixo da cama enquanto Janis esta dormindo?* electroacoustic music, in 1997; *Colorless Green Ideas Sleep Furiously* for piano and tape in 1998; *Clariagua* for clarinet and tape, and *Improviso em forma de pássaro preto*, both in 1999; *Concerto para Computador e Orquestra* for computer and orchestra in 2000; and *The Book of Sounds III: Cuica*, electroacoustic music.

Gilberto Carvalho (born in 1952) is Professor at the School of Music of UFMG in Brazil, and Coordinator of Laboratório de Composição, Síntese e Processamento do Som - Centro de Pesquisa em Música Contemporânea (Composition, Synthesis and Sound Processing – Contemporary Music Research Center).

Among other works he composed: *Maelstrom* for MIDI piano and computer in 1994; and *Poema Negro*, with Maurício Loureiro, for clarinet and electronic sounds.

Carvalho in collaboration with Hudson Lacerda were developing: MUSAS (Musical Space Analyzer and Synthesizer). More references on Carvalho's research could be found in chapter VIII, section 8.2 Recent research.

Paulo Chagas (born in Salvador, Bahia, 1953) composed *Air (up into the silence)* for contralto voice and tape in 1981; and *Ellipse* for tape in 1986. He lives in Germany.

Didier Guigue (born in France, 1954; lives in Brazil since 1982) is active as musicologist, composer and performer.

Among other pieces he composed: *Quatre fois* for one (contra) bass recorder or flute, and electronics ad lib in 1980; *Vox Victiæ* for tape (and piano ad lib) between 1996 and 1997; *A Quele que ficou sozinho* for tape, based on poems by Augusto dos Anjos, in 1997; *Loupe-enfermoir* for contrabassoon, voice and DSP, and *Des Aiguilles/Quelques peignes* for 8 contrabassons and DSP, both composed between 1980 and 1999.

Mauricio Alves Loureiro (born in 1954) composed *On behalf* for piccolo clarinet and tape in 1991.

Denise Garcia (born in São Paulo, 1955) composed *Trem-Pássaro*, part of a sound installation, *Vozes da Cidade*; *Um dia feito d'agua*, all three works in 1993; and *Infobodies* for soprano, recorded part and video in 1999.

Igor Lintz Maues (born in Sao Paulo, 1955) studied composition, electroacoustic and computer music and musicology in Sao Paulo, The Hague, Utrecht and Vienna. He is since 1991 Lecturer at the University of Music and Performing Arts in Vienna.

Some of his works are: *Good Mornig, You Have Been Selected*, radio performance, 1976; *15015* for tape, 1981; *Estudo sobre a letra P* for electronics, 1982; *Muirte Claus (in memoriam the AIDS victims)* for voice and electronics, 1983; *P.R.E.M.E.* for tape, 1986; *Tati* for double bass, tape and live-electronics, with Catalina Peralta, *Früher gab es keine Welt* for electronics, *Der Schädliche Raum - Klangraum III* for tape, and *Der Schädliche Raum* for choreography, video, tape and two instrumental groups, with A. Sodomka and M. Breindl, all of them 1989; *Durch unsere Stadt zum Tor hinaus* for tape, 1990; *Tropical birds in the pet shop* for tape, and *Jede Frau trägt einen Schrei*, a multimedia piece, both 1991; *Der Indianer mit dem Kassettenrecorder* for choreography and tape, 1989-1992; *Ein/In-Aus/Out* for choreography and tape, 1992, with Helmuth Reiter; *Trugklang* for viola and electronics, and *Triflauto Soliloquy* for flute and UPIC, both 1993; *Umformung* for four sound mobiles or tape, 1994; *Looking for S.R. oder die Kunst der Wirklichkeit* for tape, 1995; *Entstehung* for viola, piano and electronics, with N. Polymenakos, *Klanggesetzt* for tape, and *Senderos-Remix in Commemoration to the 80th. Anniversary of Juan Blanco*, all three works 2000.

Igor Lintz Maues wrote in 1989 an interesting work about the electroacoustic music in Brazil for his Master graduation at Escola de Comunicações e Artes, Universidade de São Paulo: *Musica Eletroacustica No Brasil. Composição Utilizando o Meio Eletrônico (1956-1981)* (*Electroacoustic Music in Brazil. Composition with Electronic Media 1956-1981*).

Lintz Maues lives in Austria.

Wilson Sukorski (born in 1956) defines himself as "composer, electronic musician, multimedia performer, developer and producer of musical contents for radio/video/film, designer and builder of innovative musical instruments and digital audio researcher."

He has been composing electroacoustic music and creating music for videos and films, as well as sound installations.

During the 80s Sukorski was developing automatic systems for musical composition, some of his projects were *Música Pessoal* and *Música Fractal*, both Prolog-based expert systems.

Among other works he composed: *MEL I* in 1978, *MEL II* in 1979, and *MEL III* in 1981, all three tape pieces realized at Laboratório de Música Eletroacústica do Instituto de Artes do Planalto; *Voice Solo* for countertenor, electronic sounds and live processing of the voice in 1989; *Technicki #1*, his first attempt to compose cyberpunk music, and *Technicki #2*, both in 1993; *A Batalha de Adrianopolis*, and the interactive opera *TemperaMental*, collaboration with Livio Tragtenberg and poet Décio Pignatari, both in 1994; *Amazing Amazon*, created with genetic algorithms, in 1996; *Arvore (after Walter Smetak)* in 1997; music for the film *São Paulo, A Symphonia da Metrópole (SPASM)*, with Livio Tragtenberg, in 1997 (performing on the original film version dated 1927, directed by Adaberto Kemeny and Rodolfo Rex Lustig); *Popular Mechanics*, electronic piece created using Csound, *Vertigo*, an electro acrobatic, theatrical and musical performance with the Fratelli acrobats, an actress and live electronic music, and *Cognitive Dissidents* for soprano, electronics, piano, keyboards and percussion, based in the book *Virtual Light* by William Gibson, all three works in 1998; *Suite for Dedalus* and, in collaboration with Livio Tragtenberg, the music for the film by Tata Amaral *Através da janela* in 1999;

Also by Sukorski are works like: *Super Cordas*, automatic ambient, installation for six big strings; Fora da Banda project *Dialogando Com o Invisível (homage to György Kepes)*, a natural-reactive sound installation with MIDI sensors; *Banamnemonics*, primitive electro trash music show, collaboration with Téo Ponciano; *E-Romance*, classics of universal

romantic poetry performed by computers using LPC resynthesis techniques, collaboration with Ruggero Ruschioni; *Leibniz An Electronic Opera*, an opera with virtual actors and live electronics, also in collaboration with Ruggero Ruschioni.

Wilson Sukorski is an external associated at Division of Sistemas Digitais (DSD), Laboratório de Sistemas Integráveis of University of Sao Paulo, Brazil.

Lelo Nazário (born in 1956) composed *Discurso a os Objetos #2* in 1978.

Mikhail Malt (born in 1957) composed *lambda 3.99* for tape in 1994.

Celso Aguiar (born in Palo Alto, United States, 1957; grew up in Salvador, Bahia, Brazil) composed *Piece of Mind* for stereo tape in 1995; *Ayahuasca* for stereo tape in 1994; and *Todo Azul, Escrevo com Lápis Azul, Num Céu Azul* for tape in 1996.

José Augusto Mannis (born in 1958) composed, among other works: *Cyclone* for tape in 1983; *Synergie* for eight tracks tape, and *Synapses* for French horn and live electronics, both in 1987; *Duorganum II* for tape in 1989; *Reflexos* for marimba, vibraphone and tape, and *3 Fragmentos* for Takamine MIDI guitar and live electronics, both in 1991. He also composed pieces for radio, video and theatre.

Mannis is Director of CDMC, Centro de Documentação de Música Contemporânea (Contemporary Music Documentation Center) at UNICAMP - Universidade Estadual de Campinas.

Chico Mello (born in 1958) composed *Todo Santo* in 1989; and *IK NIH* for trombone, percussion and live electronics in 1993.

Harry Lamott Crowl Jr. (born in 1958) composed *Convivium* for tape in 1986.

Paulo Motta (born in Volta Redonda, 1959) composed *Estudo n.o 1 para timbres eletrônicos*, *Estudo n.o 2 para timbres eletrônicos*, *Estudo para fita magnética, piano acústico e percussão*, *Estudo para fita magnética, piano acústico e percussão amplificados e aparelhos eletrônicos*, *Estudo para timbres eletrônicos, piano acústico amplificado e aparelhos eletrônicos*, all five works in 1984; *Nataraja* and *Quasar*: for tape, and *Estudo para fita magnética e piano acústico amplificado*, all three pieces in 1985; *Axioma* for tape, micro-computer and amplified acoustic piano, *Autoisi Potamoisi* for tape and acoustic amplified piano, *Stelaro II* for tape, *Index* for tape, prepared piano, analog synthesizer, electric guitar, amplified percussion, electronic percussion and electronic devices, *Uma imagem sonora* for analog synthesizers, and *SoloPiano* for acoustic amplified piano and effects processor, all six works in 1986; *Continuum* for acoustic amplified piano and sine wave generator, and *Reindex* for acoustic piano, amplified metalophone, analog and digital synthesizers, electric guitar and digital delay, both in 1988; *Interconexões I* for tape, acoustic and electronic instruments, *Interconexões II* for acoustic instruments, electronic instruments and digital delay system, both in 1989; *Fluxus* for analog and digital synthesizers and keyboard instruments in 1990; *Campos sonoros* for analog and digital synthesizers and/or keyboard instruments in 1991; *Seccionable I* and *Seccionable II* for electroacoustic media in 1997; *Colóquio* for tape in 1998; *Sonus Urbis: uma trajetória histórico-sonora eletroacústica da cidade de Juiz de Fora, de 1700 a 2000* for tape, between 2000 and 2001.

Anselmo Guerra de Almeida (born in 1959) composed *Proporções* for tape in 1985; and *O Acorrentamento de Prometeu*.

Eduardo Guimarães Alvares (born in 1959) composed *Estórias* in 1987.

Vanderlei Lucentini (born in 1959) composed *Eclipsis* in 1994, and *Azul* in 1995, both pieces for tape; and *Walter Track 1* for performer and live electronics in 1997.

Sílvio Ferraz (born in 1959) composed *Casário, terreiro com igreja ao fundo* for tape in 1995; and *Graffite* for dancer and two computers in 2000, collaboration with Fernando Iazzetta.

Paulo Álvares (born in 1960) composed *Zero* for piano, MIDI keyboard and live electronics in 1993.

Tato Taborda (born in 1960) composed *Veredas* for guitar and tape.

Luis Roberto Pinheiro (born in 1960) composed *Fuzuê* in 1995.

Arthur Kampela (born in 1960) composed *Textórias* for computer processed guitar in 1994.

Livio Tragtenberg (born 1961) has been very active composing music for films and theatre, using both acoustic instruments, sound objects and electroacoustic media.

Among his works: *Cidade das Estranhezas* for tape, string quartet, sax, trombone and percussion, 1992; *Missa dos Vermes* for sax and electronics, 1993; music for the film *São*

Paulo, A Symphonia da Metrópole (SPASM), 1997, with Wilson Sukorski; music for the film *Através da janela* by Tata Amaral, 1999; and the interactive opera *TemperaMental*, in collaboration with Wilson Sukorski.

Luiz Augusto (Tim) Rescala (born in Rio de Janeiro, 1961) composed *Primeiro Estudo Poético* for four percussionists and tape in 1980; *Musica para Berimbau e Fita Magnética* in 1980-1981; *Ponto, Linha e Plano* for clarinet and computer in 1990; *Midistudo* for samplers in 1991; and *Midimambo* for samplers in 1992.

Jônatas Manzolli (born in Olimpia, SP, 1961), composer and mathematician, is active both as composer and researcher.

Among other works, Manzolli composed: *Catedral Aquática* for tape, and *Welcome* for tape, voice and chamber ensemble, both works in 1987; *Ajubá-Ihê* for tape, flute and piano in 1988; *Fractal Computer Trio* for tape, trombone and 2 computers in 1989; *Chaos Prologue* for computer and chamber ensemble, and *Butterflies' Wings* for tape, both in 1990; *Os Sete Toques do Berimbau* for tape and chamber ensemble, *Servo-dança* for computer controlled piano, and *Quadrilátero I* for tape and computer, all three works in 1991; *Mantiqueira* for tape and *Turbulências*, both in 1992; *Similaridades Singulares*, *Linhas Imaginárias*, *Pêndulos*, *SpaSoS SparSoS*, *Aglomerados*, and *Frias Latitudes*, all six works for tape, in 1993; *Quadrilátero III* for vibraphone and computer, *Luvras de Pelica I* for interactive glove, and *Caminhantes* for chorus and tape, also these three pieces in 1993; *Névoas & Cristais* for vibraphone and computer, *Quadrilátero II* for interactive glove and tape, and *Blue Blues* for orchestra, choir and electronics, all three works in 1995; *Berocan* for tape solo, and *Palavras ao Tempo* for interactive poems, computer and tape, both in 1996; *AtoContato* for tape, dance and interactive tap shoes, and *Aqua viva*, both in 1998; *ETNIAS* for chamber orchestra, choir, dance, images and tape in 1999; *Objetos Afetos* for tape and poem in 2001.

His research is focused on mathematical model applications of complex systems to music composition and interactive systems. Two of his recent works are: the evolutionary compositional system *Vox Populi* and the application of neuroinformatic technology in the *RoBoser* project. The *RoBoser* system was used to compose the soundscape of *Ada: the intelligent space* presented at the World Expo 02 in Neuchatel, Switzerland.

More references on Manzolli's research could be found in chapter VIII, section 8.2 Recent research.

Flo Menezes (born in São Paulo, 1962) composed, among other works: *PAN* for orchestra and electroacoustic sounds on tape in 1985-1986; *Phantom-Wortquelle*; *Words in Transgress* for electroacoustic sounds in 1986-1987; *PAN: Laceramento della Parola (Omaggio a Trotskji)* for electroacoustic sounds in 1987-1988; *Profils écartelés* for piano and electroacoustic sounds in 1988; *Contextures I (Hommage à Berio)* for electroacoustic sounds in 1988-1989; *Kontexturen II – Schachspiegel* for electroacoustic sounds and slides in 1989-1990; *Contesture III - Tempi Reali, Tempo Virtuale* for two pianos and live electronics in 1990; *La Ricerca Panica di Eco* for electroacoustic sounds in 1991; *Contesture IV - Monteverdi altrimenti*, original version for viola, cello, trumpet, piano, synthesizer, bass instrument (bass clarinet in B or double basse), two tapes (two channels each) and live electronics in 1990, and definitive version for trumpet soloist and ensemble (clarinet/bass clarinet, trombone, piano/synthesizer, soprano sax, two percussion players and two tapes) in 1992-93; *A Dialética da Praia* for two percussion players (ca. 70 instruments) and electroacoustic sounds in 1993; *La (dé)marche sur les grains* for electroacoustic sounds in 1993; *Parcours de l'entité* for amplified flutes, metal percussion and electroacoustic sounds in 1994; *A Viagem sobre os Grãos* for two percussion players and electroacoustic sounds during 1993-1996; *TransFormantes III* for vibraphone and live-electronics in 1997; *ATLAS FOLISIPELIS*, version one for oboe, English horn, oboe d'amore, membrane percussion, electroacoustic sounds on tape and live-electronics ad libitum, and version two for two percussion players (membrane percussion) and electroacoustic sounds (eight channels), both in 1996-97; *Sinfonias* for electroacoustic sounds (eight channels) in 1997-98; *Pulsares* for

one pianist (piano, prepared piano, resonance piano, ring-modulated piano, virtual piano, harpsichord), orchestra, electroacoustic sounds (four channels) and live-electronics in 1998-2000; *Harmonia das Esferas*, a pure electroacoustic version of *Pulsares* in 2000; *Coiores (Phila: In Praesentia)* for one clarinetist (clarinet in B and bass clarinet in B), one percussion player, electroacoustic sounds (four channels) and live-electronics in 2000; *Stream from Outer Space* for electroacoustic sounds, and *L'itinéraire des résonances* for one flutist, two percussion players, electroacoustic sounds (four channels) and live-electronics, both in 2001.

In 1994 Menezes founded the Studio PANaroma de Música Eletroacústica da Unesp/FASM. And in 1995 he created the CIMESP (International Electroacoustic Music Competition of São Paulo). Menezes is currently Professor of Electroacoustic Music and Composition at the State University of Sao Paulo (Unesp).

Sérgio Freire (born in 1962) is Professor at the School of Music of UFMG in Brazil. Among other works he composed: *Baurembi* for tape in 1988; *Soprando esse bambu só tiro o que lhe deu o vento* for tape in 1991; *Monologue* for guitar and live electronics in 1993; *Delirium tremens* for cavaquinho and tape in 1997; *A semente e a casca* for clarinet, cavaquinho and tape, and *Improvisação sobre sons de Smetak* for clarinet, cavaquinho and live-electronics, collaboration with Maurício Loureiro, both in 1999

Antonio Celso Ribeiro (born in 1962) composed *Curupira* for percussion, tape and dance in 1995; and *Anjos de rua* for tape and actors in 1996.

Eduardo 'Reck' Miranda (born in Porto Alegre, 1963) is an active researcher and composer.

Some of Miranda's compositions are: *Noises*, electroacoustic solo piece, 1992; *The Turning of the Tide* for prepared violin and electroacoustics, 1992; *Electroacoustic Samba II*,

Electroacoustic Samba III and *Electroacoustic Samba IX*, electroacoustic solo pieces, 1993-1995; *Deep Resonance* and *Italo Calvino takes Jorge Borges on a taxi journey in Berlin* both electroacoustic solo works composed in 1993; *Aquarium*, electroacoustic piece, 1999; *Olivine Trees*, electroacoustic music, 1994; *The Flying Scotsman*, *Goma Arábica* and *Electroacoustic Samba IX*, all three electroacoustic works composed in 1995; *Requiem per una veu perduda* for electroacoustics on tape, mezzo-soprano and live electronics, 1997; *Grain Streams* for electroacoustics on tape, piano and live electronics, 1999; *Sacre Conversazione* for electroacoustics on tape, voice quartet and live electronics, 2000; *Le Jardin de Jérôme*, electroacoustic music, 2001.

Miranda lives at present in the U.K. where he is Head of Computer Music Research and Reader in Artificial Intelligence & Music at the School of Computing, Communications and Electronics of the University of Plymouth.

More references on Miranda's research could be found in chapter VIII, section 8.2 Recent research.

Edson Zampronha (born in Rio de Janeiro, 1963) works on contemporary music, musical semiotics and musical technology. He holds a Ph.D. in Communication and Semiotics - Arts - at the Pontifical Catholic University of São Paulo (PUC/SP).

Zampronha is Professor of Musical Composition at the São Paulo State University (UNESP) since 1992, and is Coordinator of the Researcher Group on Music, Semiotics and Interactivity at the same university.

He composed, among other pieces: *Modeling V*, electroacoustic work composed at Studio PANaroma, in São Paulo, Brazil, between 1995 and 1996; *Modeling VIII*, for percussion and computer, realized at the composer's studio in São Paulo, in 1996; *Modeling XI*, electroacoustic work composed at LIEM-CDMC (Laboratorio de Informática y Electrónica Musical - Centro para la Difusión de la Música Contemporánea) in Madrid, Spain, during

1999; *Fragmentation*, electroacoustic work composed at the Laboratorio de Lenguajes Sonoras of PUC/SP, São Paulo, also in 1999; *Recycling, Collaging, Sampling*, for percussion ensemble and electroacoustic sounds, realized at the composer's studio in São Paulo during 2000; *Weave Knot Flow* (original: *Trama Nudo Flujo*), electroacoustic work composed at LIEM-CDMC in Spain, during 2000; *Modeling*, with Bebel de Barros, for choreography and electroacoustic sounds, realized at the composer's studio in São Paulo during 2001; *Five Points of Listening from a Visual Object*, with María José G. Lobato, interactive multimedia installation composed at María José G. Lobato's studio in Madrid, Spain, during 2001; *Marble*, for tuba and electroacoustic sounds, realized at Estudio de Sonido de la Fundación Phonos - Instituto Universitario del Audiovisual of Pompeu Fabra University in Barcelona, Spain, also during 2001; and *Plucked Room*, a sound installation, in 2003.

Zampronha wrote about his work *Modeling VIII* for percussion and computer: "The score is generated in real time by the computer and creates another type of performance in which the performer plays by reflex. The score is fully controlled by an arrangement of equations from chaos theory". And about "Weave Knot Flow", an electroacoustic piece: "Diverse timbres are synthesized by means of equations from chaos theory and they are used for the creation of textures, connections and transformations of a set of sounds into another" (pieces' program notes - personal communication).

Also a researcher, Zampronha has been working as invited researcher at the University of Helsinki, Finland, during 2000, and as visiting professor at the Valladolid University, Spain, for 2002 and 2003. His main areas of work are: sound generation (new ways and conditions for sound production), sound materials (search of rich and complex sound materials and the laws that controls their nature), musical organization, musical signification, and musical representation.

Zampronha wrote the book *Notação, Representação e Composição - um novo paradigma da escritura musical*, published in Sao Paulo by Annablume in 2000. He is also the editor, with Maria de Lourdes Sekeff, of *Arte e Cultura - Estudos Interdisciplinares II*, book published by Annablume/FAPESP in 2002.

Marcelo Birck (born in 1965) composed *Interludiko* in 1990.

Aquiles Pantaleão (born in 1965) composed *Materialma* in 1995; *Concreta* in 1997; *Three Inconspicuous Settings* in 1998; *in respect of ordinary things* in 1999; and *Vacchagotta está onde está, ou não?* for tape between 1999 and 2000.

Rodrigo Cicchelli Velloso (born in 1966) composed *Latitudes Emaranhadas* between 1992 and 1993; *Multiple Reeds* for saxophone and tape between 1993 and 1994; and “*Harmônico* for piano and recorded part in 1996.

Ignácio de Campos (born in 1966) composed *Expasum* for tape in 1997;

Fernando Iazzetta (born in Sao Paulo, 1966), researcher, composer and teacher, developed: GenComp, a graphic environment for creation and representation of music based on genetic algorithms; and with Fabio Kon: MaxAnnealing, a tool for algorithmic composition based on simulated annealing.

Iazzetta teaches Electroacoustic Music at the Music Department of the University of São Paulo where he coordinates LAMI - Laboratório de Acústica Musical e Informática (Computer and Musical Acoustics Laboratory) and is a Research Associate at the Graduate Program on Communication and Semiotics at PUC-SP. His research is directed towards the study of new forms of music technology and music interaction.

Among other pieces Iazzetta composed: *Urbanas III* for glass instruments, lights and tape in 1988; *Momentos I*, fractal music on tape, collaboration with Fabio Kon, in 1993; *InterAto* for

clarinet, alto sax alto, trumpet, trombone, French horn, piano, percussion and computer controlled interactive electronics system, and *Gérmén*, electronic piece generated with assistance of GenComp software, both in 1996; *Promenade* for two percussionists and tape, *PerCurso* and *Crowd*, both for tape, all three in 1997; *Corda e Cabaça*, electroacoustic piece, in 1999; *Graffite* for dancer and two computers in 2000, collaboration with Silvio Ferraz; *Vaga* for live electronics in 2001; and *Tangerina* for clarinet and live electronics in 2002.

More references on Iazzetta's research could be found in chapter VIII, section 8.2 Recent research.

Guto Caminhoto (born in 1967) composed *Momento Angular* in 1995; *Monólogo* and *Música da morte* in 1996, all three pieces for tape. Also *Variações para Sequencer e Sintetizador*.

Victor Lazzarini (born in Londrina, 1969) composed *Vozes Dentro* for tape, 1994-1996; *Noite* for tape, 1995; *The Trane Thing* for sax and live electronics, 2000; *Mouvements* for tape, 2003; *And through the rhythm of moving slowly* for clarinet, baritone sax, violin, viola, cello, double bass and live electronics.

Fábio Kon (born in São Paulo, 1969) has a bachelor degree in Percussion from the São Paulo State University, and a PhD degree in Computer Science from the University of Illinois at Urbana-Champaign, where he studied Algorithmic Composition with Prof. Heinrich Taube. At present Kon is Professor at the Department of Computer Science of the University of São Paulo, in Brazil.

Fabio Kon developed with Fernando Iazzetta: MaxAnnealing, a tool for algorithmic composition implemented in the Max programming environment.

Kon composed some electroacoustic pieces, among them: *Maricores* in 1993; and *Influenza Influences* in 1995. During 1994 he composed *Momentos I*, in collaboration with Fernando Iazzetta. This work was one of the results of a research project about *The Use of Fractal Geometry on Music Analysis and Composition* developed by Kon. The piece is divided in four movements, each one based on distinct fractal patterns.

More references on Kon's research could be found in chapter VIII, section 8.2 Recent research.

Marc Lannelongue (born in 1970) composed *Pendant ce temps* for tape in 1993.

Many other Brazilian composers have been working with electroacoustic media to realize their music. Because of the difficulties to find or confirm the date of birth for some of them, they are listed alphabetically. **Marlene Fernandes** composed *Espectros Cromáticos* in Buenos Aires, Argentina, during 1967. **Silvia Matheus** composed *Influx* for tape. **Marcos Olívio** composed *Diálogos* in 1980. **Correia Vasconcelos** composed *Concertante* for percussion, orchestra and tape in 1970.

There are also works involving electroacoustic media by **Eduardo Campolina**; **Sérgio Igor Chnee**, **Jaime Mirtembaum**; **Amaro Borges Moreira Filho**; **Hélcio Müller**; **Jamary Oliveira**; **Eduardo Paiva** (born in 1959); **George Randolph**; **Antonio Carlos Tavares**; **Vera Terra**; **Geraldo Henrique Torres Lima**; and **Bernadete Zagonel**, to name but a few.

6.5 Chile

Juan Amenabar (born in Santiago, 1922 ; died in in the same city, 1999) started to work in *Los Peces* during 1953, finishing that piece in 1957. *Los Peces* is an electroacoustic work

based on tape manipulations of recorded piano sounds. Amenabar used Fibonacci series to structure the piece.

During 1957 he co-founded the Taller Experimental de Sonido at the Catholic University, in Santiago.

During the following years Amenabar composed several pieces using electroacoustic media: *Klesis* in 1968, *Música continua* in 1969, *Preludio en High Key* and *Sueño de un niño* in 1970, *Amacatá* in 1972, *Ludus Vocalis* in 1973, *Central El Toro* for a documentary film in 1974, *Contratempo, senza tempo* and *Juegos* in 1976. After that year he kept composing mostly for acoustic instruments.

In 1991 Amenabar founded the Gabinete de Electroacústica para la Música de Arte, also known as GEMA, at the Arts Faculty of the University of Chile.

Gustavo Becerra-Schmidt (born in Temuco, 1925) wrote in 1957 the first article on electronic music published by *Revista Musical Chilena: ¿Qué es la música electrónica? (What is electronic music?)*.

Becerra-Schmidt has been using electroacoustic media in his music since the pioneering years. According to comments by Chilean composer Carlos Botto, some of his instrumental works composed during the 50s already presented an approach to the typical *concrète* and electronic sounds worlds.

Among other works, Becerra-Schmidt composed: *Macchu Picchu* for orchestra, soprano, reciter, chorus, countertenor and audio frequency oscillator, and *Juegos* for piano, 12 ping pong balls, tape and one brick, both in 1966; *Concierto n° 2* for guitar with contact microphone and echo, and *Tres piezas* for clarinet and tape, both in 1968; *Historia de una Provocación* for chamber group and tape, in 1972; *Los Sátrapas* for soprano, synthesizer, projections and instrumental group, in 1973; *Corvalán* for soprano, electroacoustic media and

multimedia, in 1974; *Progresiones*, a multimedia work including film projections, slides and electronic music, in 1976; *Exposición concertante*, interactive electronic music for 11 synthesizers and sensors, in 1980; *Preludio y Balistocata* for piano and computer, in 1981; *Oda al Mar* for reciter and computer, in 1986; *Interior* for computer, in 1987; *Naechtlicher Rat*, for one actress, two actors, MIDI guitar, vibraphone and tape, in 1988; *Dialog*, version for guitar, flute and tape, in 1989.

Since the early 70s Becerra-Schmidt has been living in Germany.

Miguel Aguilar-Ahumada (born in Huara, 1931) composed *Texturas* for piano and *concrète* sounds on tape, and *Composición sobre tres sonidos* for tape, both in 1965.

León Schidlowky (born in Santiago, 1931) composed *Nacimiento* for tape in 1956. The piece is structured in three parts: *Exposición - Desarrollo - Catástrofe* (*Exposition - Development - Catastrophe*).

Schidlowky was saying about *Nacimiento* in 2002:

It was an experimental piece, a functional work, a piece for the Mime Theatre of Nois Vander. The production equipment were two tape recorders where the different sound materials were recorded. A tape loop running all through the piece with the sound of a heart beat was the basic element used, combined with musical materials and nature sounds then changed and distorted. I had the original idea and it was realized with the assistance of Fernando García and my wife Sussane Schidlowky, who has already died.

Schidlowky, D. (2002). *Schidlowky - Nacimiento*. Email subject: Respuesta a su pedido. Germany. [information provided by León through his son David]

Composer Fernando García, who helped Schidlowky to realize the tape of *Nacimiento* remembers:

It was composed in 1956 as incidental music for the homonymous piece by Mime Company of Nois Vander. My participation on that essay was only as an assistant of León, giving to him the tools that he asked me and that we were collecting.

García, F. (2002). *Schidlowsky - Nacimiento*. Email. Chile

Schidlowsky also composed: *Documenta 73*, graphic music for tenor, tape, keyboard instruments, percussion instruments, multimedia, 1973; *Eleven Tombs-Stones*, graphic music for tape, contralto, brass quintet and percussion, 1974; *Structures and One Scene* for choir, tape, percussion, multimedia, 1975; *Citizen 1230316*, radiophonic poem, 1976; *Golem*, graphic music for seven singers and tape, 1976; and *Tetralog*, graphic music for tape, strings, winds, percussion, voices, multimedia, 1977.

José Vicente Asuar (born in Santiago, 1933) was experimenting with *concrète* music techniques before devoting himself to explore the possibilities of electronic sound sources in 1958.

In 1957 he proposed to write his civil engineering thesis on *Generación Mecánica y Electrónica del Sonido Musical (Mechanic and Electronic Generation of Musical Sounds)*; in 1958 started to build the first Electronic Music Studio of Chile at the Catholic University; and in 1959 completed and premiered *Variaciones Espectrales*, probably the first piece composed in Latin America using only electronic sound sources.

In 1961 he composed *Preludio La Noche* and *Serenata para mi voz y sonidos sinusoidales* in Karlsruhe, Germany, where he was helping to establish an electronic music studio. He also was working there on *Estudio Aleatorio*, but that piece was never concluded.

Asuar came back to Chile in 1962. In 1965 he went to Venezuela, commissioned to build an electronic music studio in Caracas. There he composed *La Noche II*, *Divertimento* and *Guararia Repano*, this last work being prized later at the international electroacoustic music

competition in Bourges, France. During his stay in Caracas, Asuar was also working on a big multimedia spectacle created to celebrate the 400 years of the city.

Back in Chile in 1968, Asuar started to develop a Sound Technology career at the University of Chile. He was in charge of it from 1969 to 1972. During a stay in the United States in 1971 he composed *Buffalo 71*, while working at the electronic music studio of State University of New York (SUNY) at Buffalo.

Around 1969 he became interested in the possibilities of using computers in music. In 1970, with the assistance of professors and students of the Sound Technology career, he finished a piece for orchestra scored with the help of an IBM360: *Formas I*. Another project, this time using the computer to control electronic instruments, was developed in 1972: *Formas II*.

In 1978 Asuar started his own computer music studio based on what he called *COMDASUAR* or *Computador Musical Digital Analógico Asuar*. He created several pieces using the instrument he designed and built himself. *Una flauta en el Camino* (or *COMDA 2*), *Elegía* (or *COMDA 5*), both 1982, *En el Jardín* (or *COMDA 7*), 1986, and *En el Infinito* (or *COMDA 8*), 1987, were all composed with that system.

Iris Sangüesa (born in Osorno, 1933) composed *Integración* for tape, dancer, and lines and color projections, a piece she realized in 1968 at the Electronic Music Laboratory of CLAEM - Instituto Torcuato Di Tella, in Buenos Aires.

In 1994 Sangüesa composed *Llaman las llamas* for synthesizer, piano, voice, narrator, double bass and percussion (cymbals and tam-tam), based on a text by Chilean poet Marcos Llonca. She also composed *Permanencia I* for tape in 1997-1998, and *Permanencia II-Espiral* in 1999-2000, both pieces for tape, and realized at her home studio and at LIPM, in Buenos Aires; and *Oda a la Humanidad* for 6 voices, mixed choir, chamber orchestra and tape, 2002.

Sangüesa was living in Argentina between 1985 and 2001 but is now back in Chile.

Samuel Claro Valdés (born in Santiago, 1934; died in the same city in 1994) composed just a few pieces; one of them was the *Estudio No. 1*, for tape, realized in 1960. According to Claro it was done with very primitive elements and is structured as four small fragments or “electronic impressions” joined with a sinewave glissando sound. Originally conceived as the incidental music for a film, the full project was never realized.

Alfonso Letelier (born in Santiago, 1939) composed *Bonatina* for oboe and tape in 1970.

Gabriel Brncic (born in Santiago, 1942) moved from Chile to Argentina in 1965 to study at CLAEM - Instituto Di Tella, in Buenos Aires. During 1966 he was working with engineer Fernando von Reichenbach, Technical Director of the Institute, testing his new invention: the Analog Graphic Converter. Brncic composed the electronic part of his mixed piece *Dialexis* using this new device, partially similar to the UPIC system developed by Xenakis years later.

Between 1967 and 1970 Brncic was assistant professor of electroacoustic music at CLAEM. He also began to experiment with computer applications in music, programming in Fortran. From 1971 to 1973 he was Director of the Electroacoustic Music and Sound Lab at Centro de Investigación en Comunicación Masiva, Arte y Tecnología or CICMAT, a lab supported by the Buenos Aires City Government at the time. Later Brncic moved to Spain, where he is still living.

In 1975 he started to teach composition at the Phonos Electroacoustic Music Studio in Barcelona. Later Brncic became Director of that studio, and since 1993 is Artistic Director of the Phonos Foundation.

Some of Gabriel Brncic works are: *Quodlibet II* for live electronics, and *Dialexis* for 8 percussionists and tape, both 1966; *Volveremos a las Montañas* for flute, clarinet, piano,

vibraphone and tape, 1967; *Quodlibet VIII* for oboe, English Horn and tape, 1968; *Batucada amenazante para los que huyen*, electronic work composed in 1969-1970; *Donald Blues* and *Agua*, both for tape, 1971; *Arpegios* for tape, 1972; *Música de 1973* for prepared piano, synthesizer and tape, 1973; *Chile Fértil Provincia* for percussion, viola, double-bass and tape, 1975-1976; *Quodlibet 4* for piano and tape, 1976; *Destierro*, 1979; *Cielo* for viola and tape, 1981; *Triunfo por las madres de Plaza de Mayo* for guitar, voice and tape, and *Polifonía de Barcelona* for chamber group and live electronics, both 1983; *Concierto gótico* for viola and tape, 1985; *Clarinen Tres* for clarinet and tape, 1986; *Ciudad Encantada* for tape, 1987; *Passacaglia* for two synthesizers, and *Historia de dos ciudades*, radiophonic work, both 1988; *Dulcian Concert* for bassoon and tape, 1989; *Viaje al invierno* for flute and tape, 1990; *Partita para Oboe* for oboe soloist, clarinet, violin, viola and tape, 1991; *Dos Esbozos para antiguos instrumentos electrónicos* for tape, 1994; ... *que no desorganiza cap murmuri* for recorder and tape, 1995; *Vuelta de Paseo* for soprano, harp and tape, 1998; *Coréutica* for viola and tape, 1999; *Ronde-Bosse* for viola, harp, tape and live electronics, 2002;

Between 1982 and 1991, Brncic also developed some software to assist in the creation of musical structures: *Ronde-Bosse (Alto relieve)*.

Jorge Arriagada (born in Santiago de Chile, 1943) studied composition and orchestra conducting in Chile. In 1967 Arriagada went to France with a fellowship, and in 1970 founded the *Studio de Musique Expérimentale du Centre Américain* in Paris.

During the early 70s he was working at the studios of GMEB - *Groupe de Musiques Expérimentales de Bourges*, France. He also went to Stanford University, in the United States, to study computer music. Later he devoted mainly to film music composition.

Among other electroacoustic music pieces, Arriagada created: *A4* for tape, and *Pièce* for violin and tape, both in 1969; *Quatre moments musicaux* for tape in 1970; *Arriaxton*, improvisation with Anthony Braxton for sax and synthesizer, in 1972; *Étude, Suite à 'N'*

parties and *Indio*, all three tape works in 1972; *Chile 1973* and *Les Quatre Saisons*, both for tape, in 1973; and *Sable et au delà* for tape in 1974.

Iván Pequeño (born in 1945) composed *Ahora*, 1973, and *Y movieron con sus alas el tiempo estancado*, 1976, both for tape.

Guillermo Rifo (born in Santiago, 1945) composed *Intento* for flute and tape in 1984.

Ernesto Holman Grossi (born in Viña del Mar, 1950) composed *OIREB-A* for tape in 1994. The piece was realized at his personal studio.

Santiago Vera-Rivera (born in Santiago, 1950) composed *Cirrus* for tape in 1978 working with sounds coming from voices, piano, ARP2600 and Moog electronic sound synthesizers, and a fragment of Debussy piece *La Mer* (1905).

Fernando Carrasco Pantoja (born in Quirihue, 1953) composed *NILNOVISUBSOLE* for tape, in 1994, piece realized at GEMA; and the electroacoustic piece *AJAR* in 2000.

Jorge Martínez Ulloa (born in Santiago, 1953) composed many pieces using electroacoustic media, among them: *A.M.* for tape and radio, *Ojorojo* for tape, *Eppur si muove* for tape, and *Harmonicus* for tape, all four piece 1982; *Triángulo Andino* for Andean aerophones and tape, and *Distributore di suono*, both 1983; *77 Haiku* for tape, and *Erótica*, multimedia, both 1984; *Cadenas* and *Grappoli*, both for tape, 1985; *Anamorphosis* for ensemble and tape, and *Omeostati*, both 1986; *Torre di campani virtuali* and *Come una Fontana*, both multimedia, 1987.

Martínez began to compose *Astillas de bambú* in Florence, Italy, during 1989, and finished it in Santiago, Chile, during 1994. He used C as the programming language for this work.

Other compositions by Martínez are: *Phonel* for reciter, singer, synthesizers and vocoder, 1996; *Forma* for alto sax and tape, 1998; *Leitmotiv No. 6* for cello and tape, *Leitmotiv No. 7* for trombone and tape, and *Unísonos* for tape, all these works 2000; *Tinku* for tape, and *Proteo*, multimedia.

Mario Arenas Navarrete (born in Quillota, 1953) composed *Búsqueda y Retorno* for recorder and tape in 1997, and *Cielo Quebrantado* for symphonic orchestra, computer, animated lights and walking musicians in 1998.

Rolando Cori Traverso (born in Santiago, 1954) composed his first piece using electroacoustic media, *Trozo experimental* for flute, guitar and tape, in 1981. He was at that time a student in the Experimental Music course taught by Juan Amenabar.

In 1989 Cori composed *Fiesta*, for tape, at the Musikhochschule Freiburg' studio in Germany, while he was studying with Ecuadorian composer Mesías Maiguashca. He worked on this piece with *concrète* sound sources, a multi-track tape recorder and analog manipulation techniques. In *Fiesta* the composer used recordings from the Freiburg's carnival, Gregorian chant, traditional Chilean singing and guitar sounds.

Cori composed *Variaciones sobre el himno de la Universidad de Chile* for trumpets, piano, percussion and ad libitum tape (with recorded loops from a choral and orchestral version of the University anthem) in 1994. He realized that piece in Chile.

Bailecitos for voice, guitar, tape and projected images, was composed by Cori in 1999, working at his home music studio at that time in Chapel Hill, North Carolina, United States.

For the tape part he processed sound recordings, using Sample and Hold algorithms to control their filtering, with a Kurzweil K2000 system.

At present Cori is teaching electronic music composition at the Gabinete Electroacústico para la Música de Arte, the electroacoustic music lab founded by Amenabar at the University of Chile.

Eduardo Cáceres (born in Santiago, 1955) composed several pieces involving electroacoustic media: *Encuentros para un fin de siglo* for tape in 1984; *Conga Conga* for two congas, tumba, Lexicon reverb and mixer, and *La otra concertación* for acoustic and electroacoustic voice, electric bass and Indian tablas, both in 1989; *Amadeus ... libranos del mal* for piano and tape in 1991; *Sudales* for piano, percussion and tape, *Tubular II. Los Pensamientos* for bass chromatic zamponas and tape, *Timo* for voices and electronically processed percussions, *Nosferatur* for voices, clarinet, cello, percussions, accessories, piano and electroacoustic processings, and *Fausto* for flute, sax, voices, piano, percussion, accessories and electroacoustic processings, all five pieces in 1992; *Metalmambo* for tape in 1994; *Nomades* for processed sounds, sampler and synthesizer in 1996; and *Lerulerulà* for tape or live electronics in 2000.

Félix Lazo (born in Santiago, 1957) composed *Exzummo*, multimedia, in 2002-2004; *Les filles du Mara*, multimedia, in 2003-2004; and *Earth*, electroacoustics, in 2004. Lazo is a composer and visual artist.

Boris Alvarado (born in 1962) composed *Shu-Shu* in 2000, and *El mar estaba sereno* in 2001, both realized at Studio Azul, in Viña del Mar, Chile.

Edgardo Cantón Aguirre (born in Paris, 1963) studied composition at the University of Chile, electroacoustic music at the Edgar Varèse Conservatory in Paris, France, and digital arts at the Institute Phonos - Universidad Pompeu Fabra in Barcelona, Spain.

Cantón composed several electroacoustic pieces for tape: *Aurora* and *Lovecraft*, both in 1994; *Preludio des éléments*, *Saint Michel en Carretera Nocturna*, *Encuentro* and *Recuerdo*, all four works in 1996; and *Los sueños de Attar* in 2002-2003. In 1999 he composed *Memoria de los Andes II*, a mixed piece for male chorus and electroacoustics.

He is at present Professor of Composition and Electroacoustic Music at the University of Chile, in the Music and Sonology Department of the Arts Faculty.

Federico Schumacher (born in Santiago, 1963) studied music at the Faculty of Arts of the University of Chile, electroacoustic music and composition at Evry Conservatory in France, with Nicolàs Verin, computer assisted electroacoustic and instrumental composition at Nanterre's Conservatory in France, with Philippe Leroux and Jean Luc Hervé, and electroacoustic composition at Pantin's Conservatory, also in France, with Christine Groult.

Schumacher composed, among other works: *La Senda era tan Larga*, electroacoustic music based on the homonymous poem by Vicente Huidobro, and *La Música del Cuerpo*, electroacoustic music for quadrasonic media, two MIDI keyboards and real time improvisation, both 1998; *Palabras del Sur*, electroacoustic music, and *Música para espantar Dictadores*, for a group of eleven instrument players and amplification system, both 1999; *Ameriasia*, *Corazón de Látex* and *Gato en el Agua*, all three electroacoustic music pieces, 2000; *On the radio, oh, oh, oh*, electroacoustic sound collage, 2001; *Ayes y Lamentos...* for double orchestra, electroacoustic sounds and amplification system, 2000-2002; *100 Flores*, stereo acousmatic work, 2001-2002; *Estrellas Compactas*, stereo acousmatic work, 2002-2003; *Jardín de la Noche* for five instruments, electronic sounds, sound objects and mobile phones, and *MingaSola I*, electroacoustic music on eight tracks, 2004.

Miguel Chuaqui (born in Berkeley, California, United States, 1964; grew up in Santiago, Chile) composed: *Hyperbole*, version for flute, clarinet, violin, cello, piano and live electronics in 1995; *De Metal y Madera* for flute, cello, percussion and electronic sounds in 1999; *Resonance*, electronic piece for modern dance choreography in 2000; *Feel Free*, electronics on compact disc in 2002.

He is currently in the faculty of the University of Utah, United States, and directs the Ussachevsky Electronic Music Studio there.

Carlos Silva (born in 1965) composed *Entorno II* for soprano sax and tape, 1998.

Mario Mora (born in Lebu, 1967) composed: *NUD* for flute and tape in 1994; *SAX* for alto sax and tape in 1995; and *NEXT* for soprano sax and computer in 2001. All of these pieces were produced at Gabinete de Electroacustica para la Musica de Arte (GEMA) at the University of Chile. At present Mora is teacher as well as researcher at GEMA.

Cristián Morales Ossio (born in Arica, 1967) composed, among other works: *Zampler*, mixed piece for zampoñas quartet, string quartet and tape, 1992; *Cygnus* for tape, realized at GEMA, in Santiago, 1994; *Oda* for tenor recorder, viola and tape, 1997; *Una voz* for bass flute, violin, French Horn, two double-basses and electroacoustics, 1999; *Arial doble: bifurcaciones* for two pianos and live electronics, 2001; *Ris-Ras*, electroacoustics, 2002; *Materiales* for three percussionists and tape, 2003; *Tam-tam* for two flutes, tam-tam and live electronics, 2004.

Francesca Ancarola (born in Santiago, 1968) composed *Arenas* for tape, 1991, and *Loop*, 1992.

José Miguel Candela (born in Santiago, 1968) composed, among other pieces: *Multicolor II* for string quintet, flute, oboe, bassoon, two synthesizers and drums in 1992; *El Pentágono* for string quartet and synthesizer in 1993; *Azul* for two pianos with live electronic processings in 1995; *Chacabuco*, electronic music for dance in 1996; *Hombres en Círculo Durante el Hechizo del Tiempo* for eight strings with electronic interventions (for dance) in 1999; *La Variante*, electronic piece, realized at CMT, Centro de Música y Tecnología (Music and Technology Center) of the Sociedad Chilena del Derecho de Autor (Chilean Society for Author's Rights), also in 1999; *Bajan Gritando Ellos*, electroacoustic piece, *Cuartetos de cuerda y electroacústica para danza* and *Ciclo Dj: Dj1, Dj2, Dj3, Dj4*, all three dated 2000; *Delta*, electroacoustics, 2002; *Contenedor*, electroacoustics, 2002-2003; and *TTK*, 81 micro-pieces for sax (soprano, alto, tenor and baritone) and electroacoustics, 2002-2004.

Cecilia García-Gracia (born in Buin, 1968) composed: *Venus y Adonis* and *La Violación de Lucrecia*, both electroacoustics, 1999; *Algo sigue su curso*, electroacoustics, 2001; *Omaira*, electroacoustics, and *Ñanco* for cello and electroacoustics, both 2002; *Wérica*, electroacoustics, 2003; *Territorio Incierto* and *Máxima Seguridad*, both electroacoustics, 2004.

Paola Lazo (born in Santiago, 1969) composed *Apolo - 23*, electroacoustics, 1999; *TOTTO*, multimedia, 2002; and *Medusa II* for percussion and electronics, 2004.

Juan Carlos Vergara Solar (born in Santiago, 1969) composed *Golpe de Luz* for tape, realized at GEMA, Santiago, 1995; *Almo* for tape, 1996; *Tiempo Real*, and *Trance*.

Andrés Ferrari (born in 1971) composed *Inflexiones*, and *Fuerzas de Roce*.

Rodrigo Cadiz (born in 1972) is an engineer and composer. Some of his pieces are: *G-3* for guitar trio and computer music, 2001; *Centers*, computer music, 2002; and *Particles* for trombone, live electronics and digital video, 2003.

Antonio Carvallo (born in 1972) composed *Nuevamente* for reciter and electronic media, 2000.

Felipe Otondo Ruiz (born in Santiago, 1972) studied music, acoustics, psychoacoustics, and acoustical engineering in Chile and Denmark.

He composed *JOJO* for tape in 1998, inspired in the play *JOJO* by Michael Ende and realized at the Austral University in Chile; *Birds in a Cage full of silence* for tape in 1999, realized at Aalborg University in Denmark; *Guitar ex Machina* for electro-acoustic guitar and 4 channel tape or vice versa in 2000, and *Impermanences I* for solo cello and computer in 2001, both realized at the Carl Nielsen Academy of Music in Denmark; *Constellations I* for tape, realized at the Technical University of Denmark, and *Objetos Encontrados* for tape, both in 2003; *Pi*, multimedia, *Trama* for clarinet and live electronics, *Zapping Zappa* for tape, *Lydbillede*, multimedia-installation, and *Tres estrategias diagonals para una instalación sonora*, multimedia-installation, all five pieces in 2004.

Otondo was Research Assistant in Acoustic Technology, Ørsted-DTU (Technical University of Denmark), as part of the European Commission project MOSART (Music Orchestration Systems in Algorithmic Research and Technology), and has been working also as Research Assistant at that University as part of the European Commission project DOREMI (Directionally Optimised Representation of Musical Instruments).

José Miguel Fernández (born in Osorno, 1973) composed among other pieces: *El Cruce*, electroacoustics, in 1996; *Resonancia de Csound* in 1997; *Attract* for clarinet and computer in 1999, using samplers, MIDI sequences, a pitch to MIDI converter, two digital audio processors for echo and reverb effects, and the Max/MSP environment for control; *Dual* for percussion and computer, using MAX/MSP too, and *9dn.13*, an acousmatic piece, both in 2002; *76-195*, electroacoustic music, in 2003; and *Sincro* for ensemble and live electronics, in 2004.

Adolfo Kaplan (born in 1973) composed *Tras la puerta*, 2001; *La Sombra del Sonido*, 2002; *Les trajectoires du rêve*, 2003; and *Hors chant*, 2004.

Oscar Carmona (born in 1975) composed *Kinesis*, electroacoustics, 2000; and *Cygnus X-1* for piano and electroacoustics, 2003.

Roque Rivas (born in 1975) composed *Happy Days*, electroacoustics, 1995; and *Estudio Nocturno*, electroacoustics, 2001.

Juan Parra (born in 1979) composed *Tellura*, electroacoustics, 2003.

Matías Troncoso (born in 1981) composed several electroacoustic pieces, such as: *Vehasam*, 2002; *Letanía*, 2003; *Mitra*, 2003; *Corpus*, 2004; *En*, 2004; and *Nimio*, 2005.

There are many other Chilean composers that have been working with electroacoustic media in their music. Some of them are: **Juan Pablo Abalo**; **Alejandro Alborno**; **Andrés Alcalde**; **Pedro Alvarez**; **Fernando Antireno**; **Francisco Concha**; **Sergio Cornejo**;

Marcelo Espindola; Pablo Fredes; Roberto Garreton; Mario Gómez-Vignes; Alejandro Guarello; Nicolás Láscar; Cristián Lopez; Gabriel Mathey; José Pérez de Arce who was using recordings of pre-Columbian instruments in some of his tape pieces, such as: *Taira*, *Tiahuanaco*, *Cuasmal II*, *Arica*, *Cuasmal III*, *Chinchorro* and *Nicoya*; **Jorge Sacaan**.

6.6 Colombia

León Simar (born in Liège, Belgium, 1909; died in Santiago de Cali, Colombia, 1983) composed *Ahora vuelven a cantar* in 1966 for a theatre play. The piece was realized in an improvised studio in Cali.

Fabio González Zuleta (born in Bogota, 1920) is considered the first Colombian composer to experiment and use electroacoustic media in his music. He created *Ensayo Electrónico* in 1965. This composition, produced using sinewave generators, is the only electronic work by González Zuleta. It was realized at the studios of the National Radio of Bogota, with technical assistance by **Guillermo Díaz**.

Blas Emilio Atehortúa (born in Santa Elena, 1933) composed *Cantico delle creature*, mixed piece for bass, two choirs, winds, low strings, percussion and tape in 1965. The piece was realized at the studios of the National Radio of Bogota, with technical assistance by Guillermo Díaz.

Atehortúa is a prolific composer with an extensive catalog of instrumental and vocal music. He was, as many of the relevant Latin American composers of the last decades, granted with scholarships to study at CLAEM in Argentina. He was there during 1963-1964 and again during 1966-1967. It was during his stay in Buenos Aires in 1966 that Atehortúa composed *Syrigma I*, his first electroacoustic piece for tape. Other works by Atehortúa are: *Sonocromías* for tape, also 1966; *Himnos de Amor y Vida* for soprano, two pianos, two percussionists and

tape, 1967; *Cuatro danzas para una leyenda guajira* for tape, 1970; *Elegía No. 2, a un hombre de paz* for baritone, bass, two choirs, winds, percussions and tape, and *Psico-cosmos* for orchestra, percussions and tape, both 1972.

Jacqueline Nova (born in Ghent, Belgium, 1935, moved to Bucamaranga, Colombia, a few months later; died in Bogota, 1975) is considered one of the big names among the composers of new music of Colombia and the most active and prolific composer working with electroacoustic media during the 60s and 70s.

Nova began her piano studies at an early age and entered the National Conservatory of Music of the National University in 1958, where she received her Master in Composition degree in 1967. On that same year she won a scholarship to study in Buenos Aires at CLAEM.

Jacqueline Nova composed tape and mixed pieces as well as multimedia works using electroacoustic media. After more than 25 instrumental and vocal pieces, she composed her first works using electroacoustic media in 1968: *Resonancias 1* for piano and electronic sounds, and *Oposición-fusión* for electronic sounds on tape.

Dated 1969 are her works: *Luz-sonido-movimiento* for tape; *LM-A 11* for tape, processed voices, strings and percussion; the *WZK* and ? radiophonic experiences; *Espacios* for sound, light, voice, movement, darkness, silence ..., electronics; *Resonancias 1* (second version) for prepared piano, electronic sound clusters and distortion; *Signo de interrogación* for sound recording engineer - experience with different sound sources; *14-35* for orchestra and processed voices on tape; and the music for the theatre piece *Julio César*, using voices and electronic sounds.

During 1970 Nova composed *Sincronización* for voice, piano, harmonium, percussion and electronic sounds; *Uerjayas* (Canto de los nacimientos) for voices and electronic sounds; and *HK-70* for piano, double bass, percussion and prerecorded materials (radio tuner, electronic

sounds and voices). Dated 1971 is *Pitecanthropus* for symphonic orchestra, voices and electronic sounds.

Dated 1972 are *Hiroshima*, oratorio for symphonic orchestra, countertenor, contralto, 16 female voices, choir and electronic sounds, and *Omaggio a Catullus*, for percussion, piano, harmonium, spoken voices and electronic sounds. Also from that year is one of Nova's best known works: *Creación de la tierra* (also known as *Cantos de la Creación de la Tierra*) for processed voice on tape. The only sound material for this piece comes from an original text by people from a community of the northeastern region of Boyacá, in Colombia, and speaks about Earth creation. This tape piece was produced at Estudio de Fonología Musical of the University of Buenos Aires, Argentina.

Nova composed in 1974 the electroacoustic music for the film *Camilo el cura guerrillero* by Francisco Norden, and also for *Las camas*, an installation by sculptor Feliza Bursztyn presented at the Modern Art Museum from Colombia.

Jacqueline Nova directed *Asimetrías*, a radio series with 22 sessions of new music analysis broadcast by the National Radio in Bogota (Radiodifusora Nacional) between 1969 and 1970. During those years she also was lecturing and writing articles on new music and electroacoustic media as well as organizing concerts.

Francisco Zumaqué (born in Cerete, 1945) composed several pieces using electroacoustic media, as *Improvisación* for woodwinds and tape in 1972; *Pikkigui (canto al chontaduro)* for tape in 1974? and *Cantos de Mescalito* for baritone, percussion, tape and synthesizer in 1975.

Lucio Edilberto Cuellar (born in Santafé de Bogota, 1954) have been studying and working in the United States since 1979. He works actively with sound synthesis, algorithmic composition and multimedia.

Some of his works are: *Suite sudamericana*, tape piece for a dancer produced at the Electronic Music Lab of Georgia State University, United States, 1990; *Relojes cósmicos bailando al son de una cadencia celestial*, tape work for a modern ballet group produced at the same lab, 1992; *9 para 3* for tape, guitar and piano, produced at Robert Scott Thompson's studio in Atlanta, Georgia, also 1992; *Tangaku*, an algorithmic (computer calculated) piece for 2 guitars and flute or 3 guitars, 1993; *A Armero* for alto sax, live electronic processing and computer generated sounds on tape, and *En el principio*, tape piece with computer generated sounds for a dancer, both 1995; the 1996 video-multimedia *Metamorfosis I*, and *Entre Realidades* for guitar and live electronic processing, 1997, were all realized at the studios of the Center for Experimental Music and Intermedia of North Texas University, United States. *Androide* for computer generated sounds on tape, and *Suite* for flute, trumpet, two percussionists, piano, cello and computer generated sounds on tape, both 1998, were composed at Cuellar's home studio in Denton, Texas. The video-multimedia *Metamorfosis II*, 2000, was realized at the Center for Experimental Music and Intermedia of North Texas University.

The tape part of *Estruendos*, for computer-processed and generated sounds on tape, guitar and symphonic orchestra, was realized at the composer's home studio in 2001. Also *Tierra vieja y tierra nueva* for computer-generated and processed sounds on tape, 2002, was realized at Cuellar's studio. *Alele oioa*, computer-generated and processed sounds on tape for video-multimedia, was produced at the composer's home studio (audio part) and at North Texas University (visual part) in 2003.

Cuellar wrote an historical approach to electroacoustic music in Colombia: *The Development of Electroacoustic Music in Colombia, 1965-1999: An Introduction*, published by Leonardo Music Journal in his volume 10, 2000 (International Society for the Arts, Sciences and Technology. United States: The MIT Press).

Andrés Posada (born in Medellín, 1954), a prolific composer of instrumental music, also composed using electroacoustic media: *Catenaria* for tape between 1989-1990; *Rotaciones*

for tape in 1990; *Benkos*, a piece for dance, with 5 actors and electroacoustic music on tape in 1992; and *Esa vana costumbre*, electronic music for dance, in 1998.

Posada was the founding director of the *Laboratorio Colombiano de Música Electrónica Jacqueline Nova* (*Electronic Music Lab Jacqueline Nova*), located at the Autonomous University of Manizales, since 1989 until 1992. This is one of the first electroacoustic music labs founded in Colombia.

Mauricio Bejarano (born in Bogota, 1955) is Associate Professor at the Conservatory of Music, National University of Colombia, where he teaches Music Creation, Acousmatic Music and Soundscape.

He has been exploring different creative fields including graphic arts, painting, poetry, sculpture, as well as acousmatic music.

He has created radiophonic artworks, sound installations and electroacoustic music. Among other works Bejarano composed: *Aparato I* for tape in 1990; *Cage*, with Ricardo Arias, Roberto García and Juan Reyes, a three hours long radiophonic work realized at UN Radio (Universidad Nacional – National University) in Bogota, Colombia, in 1992; *Música y Espacio*, radiophonic work, in 1992, boadcasted by Emisora Javeriana; *Negro Liminar*, and octophonic interactive work premiered at Planetarium of Bogota, and *Jagua(r)* for tape, both in 1995; *Aguas Urbanas*, *Aguas Faunas* for multitrack and interactive system, and *Tierra de Navegación* both in 1996; *Esquisios* (*Sketches*), realized at GRM in Paris working with the Syter system and in his private studio in Bogotá, bewteen 1994 and 1998; *D'agua*, also realized at GRM with the Syter, *Paisajes mínimos*, *Clepsidra #1*, *Clepsidra #2*, all four pieces in 1997; *Sin título No.1*, *Faúnica*, *Primer palimpsesto*, *Phonocamptica prima* and *Cuatro postales de Bogotá* (1.*Interior*; 2.*Reloj*; 3.*Pasaje*; 4.*Estación*) all five pieces in 1998.

Bejarano also wrote several articles and essays about electroacoustic music. Some of them are: *Acusmática, un arte de laboratorio*, *Ciencia y Tecnología*, Colciencias, Bogota, 1996;

Música Concreta, el arte de los sonidos fijados, 1948-1998, on A Contratiempo #10, journal of the Ministry of Culture, Bogota, 1998; *Paisajes sonoros, Tarjetas postales y mermeladas*, published on the book *La imagen de la ciudad en las artes y en los medios*, Universidad Nacional, Bogota, 2000.

Together with Roberto García and Juan Reyes, Bejarano produced the 33 años de Música Electroacústica Colombiana CD, a research work including historical pieces by González Zuleta, Atehortúa, Feferbaum and Jaqueline Nova, together with compositions with the new generation of composers.

An active promoter of electroacoustic music, he organized many concert series and events as: *Anagrama*, 1993 and 1995; *La Primera Oreja*, 1997; and *La 3ra. Oreja*, 1998 and 1999.

Gilles Charalambos (born in St. Etienne, France, 1958), a well-known video artist living in Colombia, has also been working with electroacoustic media in his work. An example is: *Avalancha desde la edad de piedra*, video-art, 1990.

Roberto García Piedrahita (born in Bogotá, 1958) studied piano and music pedagogy at Universidad Pedagógica Nacional de Colombia. In 1981 he moved to Barcelona, Spain, to study electroacoustic music composition at Fundació Phonos with Chilean composer Gabriel Brncic.

With Ricardo Arias and Luis Boyra, García founded in 1986 the group Sol Sonoro, devoted to improvising with electroacoustic media. Sol Sonoro performed in several festivals in Spain, France and Colombia.

Since 1993 is professor at the Conservatory of the National University of Colombia in Bogota, where he coordinates the activities at the Musical Computing and Electroacoustics Lab.

During 1998 and 1999 he was working at the Ministry of Culture of Colombia at the Communications Department.

He has been very active organizing concerts and electroacoustic music activities during the 90s. Together with Ricardo Arias and **Inés Wickmann** he organized in 1995 the Primer Festival De Los Tiempos Del Ruido, a multidisciplinary competition held in Cali and Bogota, with lectures, concerts and a sound art expo at the Planetarium of Bogota. La Primera Oreja (1997), La Tercera Oreja (1998 and 1999) and Libre Improvisación are some of the concert series he was co-organizing too.

García composed among other works: *La distancia mas recta entre dos puntos es una línea corta* and *Martes 13* both in 1995; *...del verbo...* in 1996; *No*, in 1997; *...del imperativo* for tape during 1996-1998; *MASsIVER!* and *XXiXCVii* both in 1998; *PA(I)S-AJES*, together with Mauricio Bejarano, also in 1998; and *PinPon Romero*.

García also created some radio events and sound art, sometimes together with Reyes and Bejarano.

He also developed computer programs for real time sound manipulation and score and graphics generation.

With Mauricio Bejarano and Juan Reyes, García produced the 33 años de Música Electroacústica Colombiana compact disc, a research work including historical pieces by González Zuleta, Atehortúa, Feferbaum and Jaqueline Nova, together with compositions of the new generation of composers.

Arturo Parra (born in Bogota, 1958), guitarist and composer, obtained a doctorate in music from the Université de Montréal in 1998

On a recently released CD (*Parr(A)cousmatique: Mixed music for guitar and tape*), he played the guitar on five mixed works he created in collaboration with other composers. With Stéphane Roy, *La basilique fantôme*, dated 1998-2000; with Mauricio Bejarano, *D'or et de lumière*, dated 1997-2000; with Francis Dhomont *Sol y sombra... L'espace des specters*, dated 1998-2000; with Gilles Gobeil, *Soledad*, dated 1998-2000; with Robert Normandeau, *L'envers du temps*, dated 1998-2000.

Parra settled in Canada in 1989.

Composer **Juan Reyes** (born in Barranquilla, 1962) obtained degrees in Mathematics and Music Composition from the University of Tampa, in the United States. He also studied computer music at the Center for Computer Research in Music and Acoustics (CCRMA) in Stanford University with John Chowning, Perry Cook and Chris Chafe.

Reyes has been professor of Music and Arts at Universidad de los Andes in Santafé de Bogotá, Colombia. His main research interests, worked in conjunction with the College of Engineering at Los Andes University, expanded from digital sound synthesis to signal processing, physical modeling, spectral modeling, algorithmic composition and lately expression modeling. More references on his research could be found in chapter VIII, section 8.2 Recent research.

During the 90s Reyes was active promoting computer music in Colombia. He served since 1989 as co-organizer of the International Contemporary Music Festival of Bogotá, held every two years. From 1993 to 1997 he organized the first, second and third Acousmatic series of Santafé de Bogota.

Among other works, Reyes has composed: the incidental music for a multimedia drama based on Albert Camus' *Caligula*, and *El Paseo Bolivar (Música por computador para el oyente desprevenido)*, a set of variations based on popular Colombian themes, both in 1988; *Dialogos por Paz* in 1990, in memory of the assassinated political leader of Colombia, Luis

Carlos Galán; *Las Meninas* for tape, in 1991, as part of an intermedia happening for dancers, actors, painter and electronic media, based on the Velazquez masterpiece painting of the same name; *Homenaje a Cage*, with Ricardo Arias, Mauricio Bejarano and Roberto García, a three hours long radiophonic work realized at UN Radio (Universidad Nacional – National University) in Bogota, Colombia, in 1992; *Rocas*, for tape, in 1993; *Boca de Barra*, a piece with sonic events based upon visual images produced by elements and objects of a natural landscape in 1994; *Choi-Hung*, for tape, composed in 1996 at MOX - Advanced Computing Center at Los Andes University in Bogota; *Straw-berry*, for tape, composed in 1997 also at MOX; *SanSounds*, realized between 1998 and 1999 at MOX too; *Joselito*, for tape, in 1998; *SygFrydo*, a digital media composition generated by means of physical, spectral and expression modeling, in 1998; *ppP*, composed between 1999 and 2000 working with physical modeling of piano; *Los Vientos de Los Santos Apostoles*, sound installation, in 2000; *Oranged (Lima-Limon)* and *Wadi-Musa (or the Monteria Hat)*, both in 2001; *Chryseis* and *Feather Rollerball*, both in 2002.

Lately, Reyes has been living in California and Colombia on and off.

Guillermo Carbo (born in Barranquilla, 1963) composed, among other pieces: *Trípode* for double bass, tape and electroacoustic device in 1992; *Cordales* for string instruments and tape; and *Frecuencia modulada*.

Catalina Peralta (born in Bogota, 1963) studied music in Colombia and Austria. She is at present professor of Acoustic and Electroacoustic Composition at Universidad de los Andes in Bogota.

Among other works Peralta composed: *Monólogo nr. 1* for magnetic tape in 1988; *Episodios sin conexión en la vida de un artista*, also for magnetic tape, between 1988 and 1989; *Monólogo en la ciudad muerta nr. 2* for flute, magnetic tape, double bass and percussion, *Tati -niveles-* for double bass, magnetic tape and live electronics, based on texts by Edgar

Plata, and *Through the space, hearing your voice. Phantasmagory of oscillating voices I* for two magnetic tapes in a quadraphonic system, all three pieces in 1989; *Recitativo elettronico I* for viol, tape and live electronics, between 1989 and 1990; *Exploración I op. 17* for flute accompanied by itself (live electronics), in 1990; *Réquiem sobre una muerte imaginaria* for flute and live electronics, in 1991; *Recitativo elettronico II* for magnetic tape, between 1995 and 1996; *Soliloquio del Retorno* for percussion and tape, between 1996 and 1997; *Recitativo III per due istrumenti*, viol and cello with live processings, between 1990 and 1998; *Soliloquio del Retorno II, IIb y IIc* for tape, between 1997 and 1999; *Turtur-Tetrix... casi un diálogo allá afuera* for tape, and *De Igitur o La Locura de Elbehnon: Estudio Antiguo-Introducción* for tape (computer music, narrator-baritone, and live processing of viol and cello), both between 2000 and 2001; *...Per Duo Basso, quasi recitativo* for cello and double bass with ad libitum amplification, in 2002.

About her piece for flute and live electronics, 1991, revised 1999, *Réquiem sobre una muerte imaginaria (Requiem on an Imaginary Death)* Peralta wrote:

This work is dedicated to flutist Gabriel Ahumada. It was first performed on January 24, 1991 with W. Musil providing the live electronics and with the support of the Institute of Electroacoustic and Experimental Music of the Upper School of Music and Representational Arts of Vienna ... The work is structured in eight interconnected sections. The first part becomes a *solitaire* symbol in which the flute talks to itself in three voices and the sound is transformed through extension techniques that lead it to the *naturale*. The Cadence in *solo, con moto*, of the third section is preceded by isolated sonorous gestures and ascendant glissandos and provides the impulse for the live electronic responses in *tunnel up*. Conversely, *tunnel down*, provides the framework for the end of the fourth part, *pedal*. Sustained notes intertwine and create dialectic tensions in the instrument in confrontation with the electronic reaction. A rhythmic *presto*, gives way to an *undulatory movement* that becomes diluted in a disappearing space.

Peralta, C. (2003). Program Notes. [personal communication].

Germán Toro (born in Bogota, 1964) composed *Vocal I* for tape in 1990, and *Estudio de ruidos y campana*, also for tape, in 1996.

Harold Vasquez-Castañeda (born in Cali, 1964) composed *Desértico* for clarinet and electronics in 2000.

Ricardo Arias (born in Bogotá, 1965) is a composer and performer interested in improvisation and collective composition.

With Roberto García and Luis Boyra he founded in 1986 the group Sol Sonoro, devoted to improvising with electroacoustic media. The group performed in several festivals in Spain, France and Colombia. Since 1996 Arias lives in New York where he is active performing and improvising music mixing acoustic sources and electronic media.

Among other works, Arias composed: *Nos Vidrios* for tape and amplified glass in 1986, realized at Phonos, Barcelona, Spain; *Pterodáctilos*, with Roberto García, for tape, also in 1986; *Ondas de silencio y de constelaciones*, with Sol Sonoro group, for tape, live electronics and slides, realized at Phonos in 1987; *Un Pan Que Se Exprime*, with Roberto García, for tape, and *Gertrudis* for two voices, live electronics, video camera and television, both pieces also realized during 1987 at Phonos; *Ad-hoc (dos camellos)* for tape, *Spiralling* for tape and amplified objects, *SIOPE*, with Luis Boyra, Roberto García, Carlos Gómez and Gabriel Jakovkis, for live electronics and voice, and *SOPAS*, with Sol Sonoro, for tape, amplified glass, water, anilines, lights, etc., all four pieces in 1988; *daffodil* for tape in 1989, realized at C.I.E.J. in Barcelona; *Idea Fixa*, with Sol Sonoro, for three computers controlling at least three sound sources, in 1990; *Homenaje a Cage*, with Mauricio Bejarano, Roberto García and Juan Reyes, radiophonic work (three hours long), in 1992, realized at UN Radio (Universidad Nacional - National University), Bogota; *Acción Patriótica*, radiophonic piece, 1993, also realized at UN Radio; *Pataplankton* for tape, between 1987 and 1994; *94 elecciones* for tape in 1994, realized at Colcultura, Bogota; *Miscelánea en General* for interactive *mapófono* and three electroacoustic improvisers in 1999, realized at Harvestworks, New York; *Hevea brasilensis* for two CDs and amplified objects in 2000, realized at Música Superficial, New York; *Miscelánea en General*, interactive installation for two compact discs, three tape

recorder heads and computer in 2001; and *Chiribiquete* for 42 audio channels, 16 loudspeakers and five electroacoustic improvisers, realized at Engine 27, New York, in 2003.

Some of Arias' writings are published in *Experimental Musical Instruments* and *Leonardo Music Journal*.

Rodolfo Acosta (born in Santafe de Bogota, 1970) composed among other works: *Si tan solo fueramos libres* for tape in 1993; *Carceris Tonalis* for amplified objects with live electronics, electric guitar with live electronics, 2 percussion groups, 2 amplified guitars and 3 amplified voices, in 1995; *In abyssus humanæ conscientiæ* for tape, and *La muerte de Stephen Albert* for flute and optional live electronics, both in 1996; *Suspensión I*, a mixed-media piece for flute, tape and live electronics between 1995 and 1998; *Us a calm mystery?* for tape, and *Doft*: for bass clarinet, percussion and live electronics, both in 2000.

Ricardo Escallón (born in Bogota, 1971) is composer and professor of sound design and audio post-production for movies at the Film and TV Department of the National University of Colombia. He also teaches audio post-production in the Audio Engineering program at the Javeriana University in Bogota.

Among other works Escallón composed *Gracias! Dalila* for tape, 1996.

Ana Maria Romano (born in 1971) studied composition at Universidad de los Andes in Bogota.

Among other pieces she composed: *Carreras de aves y pájaros* for tape, in 1995; *Umbrales II* for tape, in 1996 (revised in 1998); *Espacios de tiempo* for tape, in 1997; *Eco y reflejo* for tape and two percussionists, in 1977; *Eco sin reflejo* for tape, in 1998, all these five pieces were produced at the Estudio de Composición e Investigación Electroacústica at Universidad

de los Andes; *Como el sueño, sigiloso contempla el silencio* for mezzo-soprano, Yamaha AN1x synthesizer and live electronics, in 1998-1999; *Sin coincidencias* for tape, in 2002-2003; *Sin coincidencias II* for feminine voice and live electronics, in 2003.

Roberto Brandawayn Bacal (born in Bogota, 1972) composed *La versión semioficial de Crick-Crack-Chomp-Chomp* between 1995 and 1997.

Andrés Burbano (born in Pasto, 1973) composed among other works: *Therem-in* in 1997; *-extensión* in 1998, and *Silencios*, among other pieces.

Jorge Gregorio García (born in Bogota, 1975) composed *Lusitania* for tape, 1997; and *Pieza electroacústica No. 2*, 2004.

Olga Godoy (born in Bogota, 1975) composed *Fin* in 1997, and *NN No. 1* in 1998.

Alexandra Cárdenas (born in 1976) composed *Salute Per Aqua* for electroacoustic sounds and image, 2003; *desde el primer trazo* for percussion ensemble and multimedia, 2003; and *Needle Battle* for electroacoustic sounds, 2004.

Santiago Lozano (born in 1976) composed: *La guerra y la salud*, electroacoustics, 1999; *Palinuro*, for orchestra, tape and two narrators, based on a text by Fernando del Paso, 2001; *Responsorio*, 2004; and *Móviles* for flute, electric guitar and live electronics; *(Dial) La Place*, interactive PC composition; *Música de viento* and *Responsorio*, both electroacoustic pieces.

Daniel Zea (born in 1976) composed *Cambuche*, 2004.

Ramiro Muñoz (born in Bogota, 1977) composed *Una esquina para Poe* in 2000, and *Efervescencias* in 2002.

Germán Osorio (born in Bogota, 1977) composed *Meridiano* in 1997, and *Estudio para piano No. 1* in 1998.

Juan Pablo Carreño (born in Bucaramanga, 1978) composed *Amarilla al sol*, 2004.

Alejandro Olarte (born in Bogota, 1978) composed *Veneno* in 1997, and *Tres Opúsculos* in 1998.

Daniel Felipe Leguizamón (born in Bogota, 1979) composed several pieces using electroacoustic media: *Espejismos* and *Agresión y lamento*, both 2002; *Canto* and *Canto Fúnebre*, both 2003; *Vivo*, *Insulsa* and *La Macarena*, all three in 2004.

Many other composers have been using electroacoustic media in their music. **Omaira Abadia** composed *Rostró de cariatíde* in 1990. **Fabio Fuentes** composed *Pieza para oboe y computador*. **Victor Hernandez** composed *El designio de la paz*. **Andrés Pinzón Urrea** composed *LotéoFAGOI*. **Héctor Wolfgang Ramón** composed *Diraes* in 1994. **Andrés Rojas** composed *Ce sont des rêves liquides*.

Luis Boyra, with Ricardo Arias and Roberto García, founded in 1986 the group Sol Sonoro devoted to improvising with electroacoustic media. The group performed in several festivals in Spain, France and Colombia. Among other works he composed: *Ondas de silencio y de constelaciones* for tape, live electronics and slides, with Sol Sonoro, realized at Phonos, Barcelona, Spain, in 1987; *SIOPE* for live electronics and voice, with Ricardo Arias, Roberto García, Carlos Gómez and Gabriel Jakovkis, and *SOPAS* for tape, amplified glass, water, anilines, lights, etc., with Sol Sonoro, both pieces in 1988; and *Idea Fixa*, with Sol Sonoro, for three computers controlling at least three sound sources, in 1990.

Alba Fernanda Triana Orozco (born in Bogota) studied composition at the Music Department of the Pontificia Universidad Javeriana of Bogota, and at the California Institute of the Arts in the United States. She has taught music theory and composition at Javeriana and Pedagógica universities in Bogota, and coordinated the Music Theory department at PNB - Ministry of Culture of Colombia. At present she is at the University of California in San Diego for her PhD studies. Some of her pieces are: *Una Jugada de Dados Jamás Abolirá el Azar*, 1996, including piano, a percussion group, spoken voices with live electronic processing and spatialization, mounted in collaboration with Rolf Abderhalden; *A la Mesa*, 1998, interdisciplinary performance, based on *Texto de Electra* by German writer Heiner Müller, including music, movement, text and spatialization (premiered the same year in Cerro de Monserrate, Bogota); *Bedroom*, 2000, an audiovisual Internet piece; *Estudio No. 1* for recorded electronics, and *Heart Piece*, interdisciplinary performance based on the text *Heart Piece* by Heiner Müller, integrating music, movement, text, video and spatialization, where the music part includes recorded electroacoustic music, live sound transformations and interactive languages, both 2001. She also composed, with **Luis Fernando Henao** (born in 1967), *Suite Logique* for DAT tape, 1992.

There are also works involving electroacoustic media by **Guillermo Gavia**, **Francisco Iovino**, **Gustavo Lara** and **Gustavo Parra**.

6.7 Costa Rica

Luis Diego Herra (born in San José de Costa Rica, 1952), mostly known by his chamber and orchestral music, composed *Hálitos* for brass quintet and tape in 1982, receiving in 1984 the National Prize for this work.

Herra is also a conductor and educator, and has been teaching composition, musical analysis, orchestra and choir conducting, and computer music basics. From 1995 to 1999 he was Dean of Fine Arts at the University of Costa Rica. He is also a founding member of Centro de Música Contemporánea de Costa Rica (Contemporary Music Center).

Some of his recent works are: *Olimpia*, 2002; *Señales* and *El pescador y la muerte*, both 2003; *Zurquí* and *Rinocerontes*, both 2004.

Alejandro Cardona (born in San José de Costa Rica, 1959) studied composition privately and at Harvard University from 1977 until 1981. He also earned a Master degree in image synthesis and computer animation from Portsmouth University and the Utrecht School of the Arts.

Some of his pieces are: *Lamento*, for CD, 1997; *Esperanza* and *Celebración*, both for CD and composed in 1998; *América Angostura (gentes y paisajes imaginarios)* and *Texturas, una ventana a Centroamérica*, both interactive sound installation created in 1999.

Otto Castro (born in San José de Costa Rica, 1972) is an active composer that has been working with electronic and *concrète* sound sources in his music.

Castro has been composing music for theatre, performance shows and video using electroacoustic technologies and techniques. Some of his works are: *Fotos 1*, 1997; *TV 1* and

Espirales, both 1999, *Jardín Tóxico* and *Encuentros Televisivos*, both 2001, and *Arquetipos Marinos*, 2004. In 2002 he directed and composed the music for *Mala Fe*, a 60 minutes performance with electroacoustic music, projections, texts and dance, created in collaboration with poet Luis Chávez, dancer Humberto Canessa and plastic artist Lucía Madríz.

Also active promoting electroacoustic music and new media in Costa Rica, during August 2003 Otto Castro organized the first Electro Music World Fest, and during the following year the Festival Fusión CR 2004.

Carlos Castro (no place or date of birth information available), president of Centro de Música Contemporánea de Costa Rica, composed *Gobierno de Alcoba*, an opera for tape and four singers that received the National Prize for Music in 1992.

Autoperro defines itself as a paramusical entity devoted to electroacoustic music. It was founded in 1980 at the School of Architecture by **Fernando Arce** and **Mauricio Ordóñez** (on the musical side) together with Douglas Morales.

Some of Autoperro's works are: *RaDio PLDiN*, 1996-2002; *ZaRGZS*; *HuMDL*; *BSTRFeDÚN*, *TXaLPART*, *KurSSK*, *TeRMNL*, *eXCS*, *CaNGR SoP*, *aNTICoMB*, *aLGo PoDR 2*, and *MeTRóPoLiS*, all of them 2002.

6.8 Cuba

Cuba has been an active place for electroacoustic music for many years.

Argeliers León (born in 1918) composed *Saturnalia* for tape in 1984.

Juan Blanco (born in Mariel, 1919) has been the main force around the development of electroacoustic music in Cuba.

In 1942 Blanco registered at the patent's office the description and design of a new musical instrument he named Multiórgano, based on 12 loops using magnetophonic wires (magnetic tape recording was in development at that time) with chromatic recordings of voices or any instruments. This predated the Mellotron by many years, but the original instrument invented by Blanco was never built.

Blanco composed his first electroacoustic piece for tape in 1961 using one oscillator and tape recorders: *Música para danza*. He composed between 1961 and 1962 *Estudios I y II*, between 1962 and 1963: *Ensamble V*, and during 1963: *Interludio con Máquinas* and *Ensamble VI*, all of them for tape. Between 1963 and 1964 he composed *Texturas*, a mixed work for orchestra and tape.

In 1964 Blanco organized the first public concert with electroacoustic music in Cuba at Unión Nacional de Escritores y Artistas de Cuba, premiering his works: *Estudios I y II* and *Ensamble V*.

During the 60s Blanco began to create electroacoustic music for mass public events and large public spaces. Some examples are: *Música para el Quinto Desfile Gimnástico Deportivo* for symphonic orchestra, sound toys group and tape, dated 1965; *Ambientación Sonora*, tape work played through a special network for spatial sound distribution (designed by Blanco with the assistance of engineer Eugenio Besa) at the Cuba Pavillion of Expo 67 in Montreal, Canada, dated 1967; *Ambientación Sonora*, a five-track work played during 30 nights along the Avenida La Rampa during the Congreso Cultural de La Habana, dated 1968; *Ambientación Sonora*, another five track work played during 30 nights along the Avenida La Rampa during 30 nights con motivo del centenario de V. I. Lenin, dated 1970; and *Ambientación Sonora*, a multiple-tape work (12 tracks in total) played at the Cuba Pavillion of Expo 70 in Osaka, Japan, dated 1970.

Other pieces composed by Juan Blanco during those years are: *Poema Espacial No. 1 (Las Lomas)* for three tracks tape, 1967; *Poema Espacial No. 2*, 1967, and *Poema Espacial No. 3 (Dai Viet)*, 1968, both for four tracks tape; *Contrapunto Espacial No 2 (Erotofonías I)* for two string orchestras of 30 players each one, five percussion groups, guitar soloist, sax soloist and tape, 1968; *Contrapunto Espacial No 3* for 24 instrumental groups distributed around all the theatre, 20 actors, one child, soloist sax and two tapes, 1969; *Poema Espacial No. 4 (26 de julio)*, 1969, and *Poema Espacial No. 5 (Viet Nam)*, 1970, both for four-track tape; and *Imprecación* for two wind orchestras, 10 groups with percussion instruments and four tracks tape, 1970.

After many attempts to start an electronic music lab at Instituto Superior de Arte (ISA) during the 70s, Blanco was appointed director of a small studio at ICAP in 1979. Many of the today well known Cuban composers were learning and experimenting at the ICAP studio under the guidance of Juan Blanco.

The first LP with music by Blanco is *Música Electroacústica*, released by EGREM during the mid 80s and featuring *Cirkus Toccata*, a piece for tape and two percussionists (playing pailas and tumbadoras) dated 1984; *Tañidos* for tape, dated 1983; and *Espacios II* for tape and guitar, dated 1986.

Two pieces that were also composed during that period are *Suite de los Niños* for tape, 1984, produced at the studios of the Groupe de Musique Expérimentale de Bourges (GMEB), and *Suite Erótica* for tape, 1979-1986, a long piece that Blanco built using three previous works. Both were released on a second LP in 1987.

The International Electroacoustic Music Festival *Primavera en Varadero* was launched by Blanco during the mid 80s. This was a major help to introduce computer music in the island, as well as some hardware and software essential to it. The time for computer music had arrived then in Cuba.

During the early 90s Blanco got a NeXT computer and began to compose with it. *Contrastes I, Paisaje, Variantes I* and *Treno por las Víctimas del Estrecho de la Florida*, 1992, *Contrastes II, Cinco Epitafios* and *Loops*, 1993, *Para Enterrar la Esperanza* and *Variantes II*, 1994, are some of the pieces he composed using that system.

The Ministry of Culture assumed responsibility of the ICAP studio during the early 90s and renamed it Laboratorio Nacional de Música Electroacústica (LNME).

Juan Blanco composed around 100 pieces using electroacoustic media, both for tape as well as mixed works, using spatial distribution of the sound sources in large open spaces in many of them, and developing complex multimedia installations and spectacles. A prolific composer, teacher and researcher, he was the Honorary Director during the International Computer Music Conference (ICMC) held at Havana in 2001.

Among Blanco's recent pieces are: *Espacios IX*, composed between 1999 and 2000, *Microtonales*, 2000, and *Microtonales II*, 2001, all of which are works for computer or tape and live Theremin; and *Tecnocrónicas* for Theremin, computer and live electronics, composed with Edesio Alejandro in 2002.

The electronic music production of **Aurelio de la Vega** (born in Havana, 1925; living in Los Angeles, California, United States, since 1959) was closely related to the Electronic Music Studio at California State University, Northridge, which he founded and directed from 1962 to 1992. Two purely electronic music works were composed there by de la Vega: *Vectors* (monaural tape, 1963) and *Extrapolation* (stereo tape, 1981). His works for instruments and pre-recorded electronic or electronically treated acoustical sounds include: *Interpolation*, for clarinet and stereo tape, 1965; *Tangents*, for violin and stereo tape, 1973; *Para-Tangents* for C trumpet and stereo tape, 1973; *Inflorescencia (Inflorescence)* for soprano, bass clarinet and tape, based on a poem by the composer, 1976; and *Asonante (Assonant)* for soprano, dancer(s), flute, trumpet, trombone, piano, violin, cello, double bass and stereo tape, also based on a poem by the composer, 1985. Revista Musical Chilena published in 1965 his

article *En torno a la Música Electrónica (Regarding electronic music)* where he explains some of his thoughts about electronic music, speaks of *Vectors* (that is the last expanded movement of a piece entitled *Coordinates*, which is no longer in his catalogue of works), and tells about the equipments at that time of the aforementioned studio. At present, Aurelio de la Vega is Distinguished Emeritus Professor of California State University, Northridge, where he taught music composition for thirty three years.

Héctor Angulo (born in Santa Clara, 1932) composed, among other works: *Otra vez Jehová* in 1967; *El metro*, *La curva* and *Mutatis mutandi*, all three electroacoustic pieces in 1969; and *Bucólica*, with Juan Marcos Blanco, for sax and tape.

Carlos Fariñas (born in Cienfuegos, 1934; died in Havana, 2002) was also a big name in the Cuban musical world as well as in the international scene.

He started to experiment with electroacoustic media during the mid 60s. During 1972 he composed *Diálogos*, for tape, together with Sergio Barroso. In 1975, commissioned by the National Ballet of Cuba, Fariñas composed *Yagruma* for symphonic orchestra, with 11 percussionists, and electroacoustic media. In 1976 he presented his electroacoustic piece *Corales* at the Bourges festival, in France.

In 1982 Fariñas developed his first projects to create an electroacoustic music studio. Finally approved in 1989, those projects became the beginning of the Estudio de Música Electrónica y por Computación, EMEC, that he directed at the Instituto Superior de Arte (Superior Institute of Art), ISA.

Among other pieces, Fariñas composed: *Madrigal*, a multimedia for two narrators, dancer, projections, lights and tape in 1980; *Aguas Territoriales* for tape in 1983; *Primer día de Mayo* for tape in 1984; *Impronta* for four percussionists, piano and tape in 1985; *Cuarzo* -

Variaciones fractales in 1991, and *Orbitas elípticas* in 1993, both computer assisted electroacoustic music works.

Carlos Fariñas realized *Cuarzo - Variaciones fractales* at EMEC/ISA working with the Musical Fractals software developed by Rubén Hinojosa from the Software Group of EMEC (EmecSoft). *Orbitas Elípticas* was also realized at EMEC, this time working with Orbis Musicae, provisional name of an algorithmic compositional software also developed in Cuba.

Jesús Ortega (born in La Habana, 1935) composed, among other pieces: *Prólogo* for tape in 1970; *Picassianas I* tape in 1981; *Picassianas II* for guitar and tape in 1982; *Invocación (Por la Paz Mundial)* and *Picassianas III*, both in 1985; *Fanfarria de Primavera* in 1986; *Son Mac-Plus* for computer and tape, and *David en el parque de diversiones (Suite para niños)*, both in 1988; *Sax-Son* for alto sax and tape in 1991; *Impromptu* in 1992. Other pieces by Ortega are: *Concertante* for Macintosh and tape; *Traigo mi son*, with Juan Blanco; *Aves* for flute and tape; and *Canto a la vida* for four percussionists and tape, also composed with Juan Blanco.

Calixto Alvarez (born in Santa Isabel de las Lajas, 1938) composed among other works: *Música en cinta* for tape in 1971; *Canon I* for piano and tape in 1978; *Canon II* for piano and tape in 1979; *Música pop*, also for piano and tape, in 1982; *Fuenteovejuna* for chamber orchestra and tape in 1983; *Venus & Adonis*, opera for 2 sopranos, 2 tenors and electroacoustic instruments, based on texts by William Shakespeare, in 1988; *Ciclos en la vía* for tape in 1993; *El Barbero de Sevilla* for flute, clarinet and tape, and *Julio César* for tape, both in 1996.

Jorge Berroa (born in 1938) composed *Mezcla No. 1* for tape in 1982.

Roberto Valera (born in Havana, 1938) composed *Ajiaco* in 1990; *Palmas* for tape in 1992; *Período Espacial* in 1993; *Loa del Camino* in 1999; and *Las sombras no abandonan* in 2001.

Although most of the music composed by **Leo Brower** (born in Havana, 1939) is for acoustic instruments, he has also worked with electroacoustic media in a few pieces like: *Exaedros I* for 6 instruments or any multiple of six and tape, 1969; *Asalto al cielo* for tape, and *Sonata para piano e forte* for piano and tape, both 1970; *Per suonare a due* for guitar and tape, 1972; and *Metáfora del amor*, also for guitar and tape.

Guido López Gavilán (born in 1944) composed *Victoria de la esperanza*, multimedia piece for symphonic orchestra, choir, soloists, actors, film, dance and electroacoustic sounds in 1985; and *Rajo* for string orchestra, percussion, soprano, baritone, choir, narrator and electroacoustic sounds in 2001 (new version).

Sergio Barroso (born in Havana, 1946) works extensively with electroacoustic media in his music. Some of his works are: *Concierto para dos pianos, percusión y público* for two pianos, one of them on tape, three percussions and audience, 1969; *Yantra III* for guitar and tape, 1972; *Yantra IV* for flute and tape, 1975; *Noema II* for tenor, violin, double bass, guitar, piano and tape, 1975; *Yantra VI* for piano and tape, 1976-1979; *Yantra IX* for saxophones (soprano and alto) and tape, 1979; *Yantra X* for bassoon and tape, 1982; *En febrero Mueren Las Flores* for violin and tape, and *Soledad* for tape, both 1987; *Canzona* for DX7II(E!), TX802 digital synthesizers and tape, 1988; *La Fiesta* for keyboard-controlled synthesizers and tape, 1989; *Tablao* for guitar and tape or tape only, and *La Fiesta Grande*, a piece for orchestra and solo keyboard-controlled synthesizers, both 1987; *Crónicas de Ultrasueño*, for oboe and keyboard controlled synthesizers, and *Sonatada*, for keyboard controlled synthesizers, both 1992; *Charangas Delirantes*, for keyboard controlled synthesizers and tape, *Viejas Voces*, for viola and tape, and *Jitanjáfora* for violin solo, orchestra and keyboard

controlled sampler, all three 1993; *Concerto for viola and orchestra* for solo viola, orchestra and keyboard controlled sampler, 1995-1996.

Barroso performs using live electronics, and has gone on tours around Europe and the Americas. He lives in Vancouver, Canada.

Sergio Vitier (born in 1948) composed *Poema 1* for tape in 1972.

Juan Piñera (born in Havana, 1949) has written concert music as well as works for radio, television and movies. Among other works, he composed: *Pirandelliana* for tape and two actors in 1983; *Tres de Dos* for tape, with Edesio Alejandro, and *Voix des deux*, both in 1984; *Del espectro nocturno* for guitar and tape in 1986; *Germinal* for tape in 1987; *Del lucero favorable* for guitar and tape, between 1987 and 1988; *Imago* for guitar and tape in 1989; *Cuando el aura es áurea o La muy triste historia de los ocho minutos con treinta y ocho segundos* for soprano sax and tape in 1991; *Pámpano y Cascabel* for guitar and tape in 1995; *La bals (En un minuto, Vals olvidado, El manubrio azul)* between 1996 and 1998; and *Opus 28 No. 15, o de la gota de agua* for tape.

Armando Rodríguez (born in Havana, 1951) studied guitar and musical composition at the National School of Arts in Havana, where he received the Cuban National Artists and Writers Musical Composition Award in 1978.

Among other pieces Rodríguez composed: *Music For Different Timbres* for tape in 1989; *Spatial Projection* and *Progression*, both for tape, and *Occupied Space (Espacio Ocupado)* for guitar and tape, all three pieces in 1990; *The Hexagonal Galleries (Las Galerías Hexagonales)* for 3 performers and tape, and *From Darkness to Light* for double bass and tape, both in 1992; *A Quiet World* for voice and tape in 1993; *That Day (Ese Día)* for voice and tape in 1994; and *A storm was coming over the quiet pond* for open instrumentation in

1995 (on that year Armando Rodriguez premiered a version for piano and tape of this piece at the Miami-Dade Public Library, in United States, during the Subtropics Festival). Rodriguez wrote about his work:

During the last years I have worked on the development of new forms of musical expression that includes conceptual contents, textural and abstract forms, electro-acoustic music and multi-media.

I live in the United States since 1985, where I have collaborated with visual artist Kate Rawlinson and composer Gustavo Matamoros, with whom I co-founded the experimental music ensemble PUNTO, dedicated to explore new ways of artistic communication.

Rodriguez, A. (2003). Program Notes. [personal communication].

Julio Roloff (born in Havana, 1951) composed, among other works: *Halley 86* for tape in 1984, and *Quintaesencia* for piano and tape. He lives in the United States.

Juan Marcos Blanco (born in Havana, 1953) composed, among other works: *Zafra 70* for tape, in 1970; *Bucólica*, with Héctor Angulo, for sax and tape; and *Ritual* for tape.

Orlando Jacinto García (born in Havana, 1954), composer, conductor and music educator, is Professor of Composition, Director of Composition Programs, and Director of Graduate Music Programs at the School of Music, Florida International University (FIU), in Miami. He also founded the original FIU Electronic Music Studio.

Among other works, García composed: *Reflejos de Modelos Repetivos* for guitar and tape, and *Retratos #1* for piano and tape, in 1989; *Improvisation with Metallic Materials* for wind synthesizer and tape, *Sitio Sin Nombre* for solo soprano and tape, *Music for Nada* for solo soprano and tape or tape only, *3 Pieces for Double Bass/Tape* for double bass and tape, and *Collage* for guitar, violin, viola and tape, in 1990; *Metallic Images* for percussion and tape, and *transparente como el cristal* for live electronics or tape, both in 1991; *al borde del Avila*

for mezzo-soprano, flute, oboe, harp, piano, double bass and tape, in 1992; *soy (I am)* for double bass, piano and tape in 1993; *Imágenes (sonidos) sonoros congelados* for violin and tape, *Collage 2* for four instruments and tape, and *como un coro de clarinetes celestiales* for tape, all three pieces in 1999; *como los colores del viento nocturno* for viola and tape (with wind chimes) and *Why References?* for piano and/or Disklavier and tape, both in 2002; *nubes nocturnas* for solo trombone and tape, *mixtures* for solo cello and tape, and *cuando el mar besa el malecón* for solo flute and tape, all three pieces in 2004.

García emigrated to the United States in 1961 and has resided in Miami since 1977.

Edesio Alejandro (born in Havana, 1958) composed among other works: *Viet* for tape in 1978; *Tres de Dos* for tape, with Juan Piñera, in 1984; and *Tecnocrónicas*, with Juan Blanco, for Theremin, computer and live electronics in 2002.

Fernando Rodríguez (born in Matanzas, 1958) studied at Laboratorio Nacional de Música Electroacústica in Havana. Among other pieces he composed: *La tierra que nos vió nacer* for tape, in 1981; *El otro huevo de la serpiente* in 1983; and *Dieciséis repeticiones sobre un tema de J.S.Bach* in 1993.

Marietta Veulens (born in 1959) composed *Paz, meditación y metáfora* for tape in 1981.

Miguel Bonachea (born in 1960) composed in 1984 *El peldaño omitido* for tape.

José Manuel García (born in 1960) composed *Nidia* for tape in 1984.

Ileana Pérez Velazquez (born in Cienfuegos, 1964) is at present Assistant Professor of Composition, Music Technology and Music Theory at the Music Department of Williams College, Massachusetts, United States. She is a graduate of music composition and piano from the Instituto Superior de Artes in Havana. Perez earned her Master's degree in Electroacoustic Music from Dartmouth College and a Doctoral degree in Music Composition from Indiana University in Bloomington, both in the United States.

Some of her electroacoustic music compositions are: *Natura* for soprano and tape, 1990; *La Voz interior* and *Crisálida*, both for tape, 1991; *Realidades alternas*, multimedia for tape, video, dance and photograph, 1992; *Yoruba* for tape, *Conversations* for bass clarinet, saxophones, bassoon and tape, and *Celia* for tape, all three 1994; *Caxionics* for saxophone, electronics and CD-ROM, collaboration with Neil Leonard III, and *Piedras* for chorus and tape, both 1995; *Crystals* for soprano and tape, and *Un ser con unas alas enormes* for violin and tape, both 1996; *Cuando la inocencia retorna en forma de poesia* for piano and tape, and *Entre azul y transparencia* for soprano and tape, both 1997.

Teresa Nuñez (born in 1966) composed among other works: *Divertimento* in 2000, *Con puntos y comas* in 2001, and *Miniatura* in 2002, all works for computer realized at Estudio de Música Electroacústica y por Computadora, EMEC - ISA.

Divertimento was composed using four FM synthesized timbres produced with Sample Generator, a software developed at EMEC-ISA by Rubén Hinojosa.

Eduardo Morales (born in Havana, 1969) composed *Asi se muere* for tape, and *La noche oscura* for tenor, percussion and tape, both in 1994. He lives in Madrid, Spain, since 1996.

Alain Perón (born in Havana, 1969) composed *De dos para uno* for guitar and tape in 1997.

Yaniel Matos (born in 1975) composed *Celletronic live*, for live electronics, in 1998; and *Estudio de un sueño*.

Mónica O'Reilly (born in Havana, 1975) studied electroacoustic music at the Laboratorio Nacional de Música Electroacústica in Havana during the early 90s.

Since 1995 she is professor at the Instituto Superior de Arte, ISA in Havana, and is also part of the Estudio de Música Electroacustica y por Computadora team there.

O'Reilly composed among other pieces, the following electroacoustic works for tape: *Moniobra* in 1998, realized at EMEC-ISA; *El segundo de un compay eterno*, also realized at EMEC-ISA, *Mundo Interior*, with Irina Escalante, and *Psss*, both realized at the Laboratorio Nacional de Música Electroacústica, all three works in 2000; *Bbpino*, realized at LNME, and *Un besito a papito*, realized at EMEC-ISA, in 2001; *El indio está que pela*, *Tres little escenas de Mr. Pérez*, *Martí: muerte y razón* and *Gestual*, all four works realized at EMEC-ISA, and *Gallos*, realized at LNME, all five pieces in 2002.

Irina Escalante (born in Camagüey, 1977) composed several electroacoustic music works: *La Primavera del Angel*, realized at Estudio de Música Electroacustica y por Computadora, EMEC – ISA in 1999, using electronic sounds coming from a Yamaha DX7 digital synthesizer, later processed on a PC using SoundForge software; *Mundo Interior*, with Mónica O'Reilly, realized at Laboratorio Nacional de Música Electroacustica, LNME (National Lab of Electroacoustic Music) in 2000, using electronic and acoustic instruments sounds; *Sirarisuira*, also realized at LNME using electronic sound sources in 2000; *Congas*, *Liturgias* and *Momentum*, all three pieces realized at EMEC - ISA in 2001.

Many other composers have been using electroacoustic media in their music. **Ailem Carvajal** composed *Gotas* at EMEC-ISA in 1996. **Mirtha de la Torre** composed *El primer abrazo* for tape in 1984. **Rubén Hinojosa** composed *El fin del caos llega quietamente* in 1998; *Piano Fractal*, *Satélites*, *Oro - ña*, *Camello*, *Scratch* and *FX 1050*, among other works. He also developed the Sample Generator software used by several composers in their music creations, as for example: Carlos Fariñas and Teresa Nuñez. **Bárbara Llanes** composed *Exodo* for soprano and tape in 1998. **Pedro Pablo Pedroso** composed *Espacio Cerrado* for violin on tape and electronics in 1990; *Nexos II: Escenas de la Vida* for amplified flute and electronics in 1993; and *Paisaje 1994: Música para las Demoliciones* for tape in 1994. **Carlos Puig** composed *Stealing* in 1993. **Yosvany Quintero** composed *Moto Perpetuo*. **Julio García Ruda** composed *La noche de los tiempos*, first piece realized at EMEC-ISA, and *Variaciones Fractales* in 1989. **Tania León** (born in Havana) composer, conductor, educator and music advisor living in New York since 1967, composed *Axon* for violin and interactive computer in 2002. There are also works involving electroacoustic media by **José Loyola**, **Jorge Maletá**, **Raylor Oliva**, and **José A. Pérez Puentes**, to name but a few.

6.9 Dominican Republic

Ana Margarita Luna (born in Santiago de los Caballeros, 1921) composed *Beyond the stars ...* for voice, piano, violin, cello and tape in 1994 at McGill University, in Montreal, Canada.

Alejandro José (born in San Francisco de Macorís, 1955) has been crossing the sea to live on his native Dominican Republic or Puerto Rico on and off, teaching and composing electroacoustic music in both places until recently. He moved to United States in 2004 to work at The Center for the Improvement of Human Functioning International in Wichita, Kansas. He works there as a resident composer and scientific researcher, focusing on psychoacoustics and music therapy, among other music and sound-related areas.

José began to compose electroacoustic music around 1976 in his native land; later he studied for some years in Puerto Rico and returned to the Dominican Republic from 1982 to 1984. During that time he taught the first electronic music courses in the Dominican Republic. Those classes were at the National Conservatory of Music. José was using then his own equipment, including an ARP 2600 electronic sound synthesizer, a couple of four track tape recorders, an eight channel mixer, an equalizer and a reverb unit, among other resources. After that experience he went back to Puerto Rico, where he was mostly based until 2004. There he directed the Psicosonía Institute, an organization devoted to research the sound and music influence and effect on the human being.

Alejandro José composed several pieces for tape, among them: *Tangentes* in 1988, *Pulsar: El Caribe* in 1991, *Ecofonía I* in 1992, and *Con el Pulso de una Estrella* in 2002-2003. In 1995 he composed *Todo es Uno*, for tape and slides. All the sounds on this piece come from two sources: the energy signal from a pulsar (pulsing star) 175 light-years from Earth, recorded by the Arecibo Radio Telescope in Puerto Rico, and the transference to sound of several aminoacid structures from the human body. In 1999 he composed *Toccatta de Mente*, for mind-controlled electronic devices.

Being also a professional oboe performer, José became a wind controller virtuoso too. For that electronic musical instrument he composed in 1989 *Cuatro Estudios para Wind Controller*.

Dante Cucurullo (born in San Juan de la Maguana, 1957) composed several works using electroacoustic media. Among other pieces, he created a cycle of seven electroacoustic *interrogantes*; a cycle of *Afirmaciones* where electronic, *concrète* and instrumental sources are mixed; the two-parts electroacoustic piece *Millennium Hope*; and *El Encantador de Aguas* for tenor sax and synthesizer (on tape or CD) in 2000.

His piece *interrogante* #5 was premiered in 1985 during the II Festival Internacional de Música Electroacústica (II International Festival of Electroacoustic Music) held in Varadero, Cuba; and *interrogante* #7, based on sounds of human snores, was premiered in 1986 during

one edition of the Cursos Latinoamericanos de Música Contemporánea (Latin American Workshops of Contemporary Music), held that year in Uruguay. *Millennium Hope* was performed at the electroacoustic music festival Synthèse, in Bourges, France, in 1999.

6.10 Ecuador

Many of the Ecuadorian composers that have been working with electroacoustic media in their music have also been pursuing most of their professional careers outside their native country.

Mesías Maiguashca (born in Quito, 1938) has been working extensively with electroacoustic media in his music for many years.

He studied music in Quito, New York (Eastman School, 1958-1963), Buenos Aires (CLAEM - Instituto Torcuato di Tella, 1963-1965) and Cologne (Musikhochschule Köln, 1966-1968).

Maiguashca composed *Segundo cuarteto de cuerdas*, a piece for string quartet involving live electronics, in 1967. The same year he created his first work on tape, *Dort wo wir leben*, producing it at the studio of the Musikhochschule Köln using *concrète* and electronic sounds. In 1969 he composed *Hör Zu*, also a tape piece using *concrète* and electronic music. Scored for 6 vocalists and electronics, *A Mouth-piece* is dated 1970. His well-known piece *Ayayayayay* for *concrète* and electronic sounds is dated 1971.

Maiguashca composed many mixed pieces, most of them using live electronics. Some of those works are: *Übungen* for violin, clarinet, cello and 3 synthesizers, *Übungen* for violin and synthesizer, and *Übungen* for cello and synthesizer, all three 1972-1973; *Öldorf 8* for violin, clarinet, cello, organ, synthesizer and tuba, 1972-1974; *Solitarum* for 6 vocalists and electronics, 1975; *Lindgren* for bass melody instruments and tape, 1976; *... y ahora vamos por aquí...* for 8 instruments and tape, 1977; *Agualarga* for 2 keyboards and electronics,

1978; *Intensidad y Altura* for 6 percussionists and tape, 1979; *FMelodies I* for computer sounds and instrumental ensemble, 1980; *Ecos* for 36 musicians, 32 sound objects and electronic sounds, 1981-1982; *FMelodies II* for cello, percussion and tape, 1983-1984; *Video-Memorias* for speaker, computer-synthesizer and cello, *Vorwort zu Solaris* for cello, trumpet, percussion, sax and tape, *Vorwort zu Solaris* for Baroque Ensemble and tape, *moments musicaux/The Wings of Perception I* for string quartet and tape, and *Nemos Orgel* for organ and tape, all five 1989.

Maiguashca has also been using other electronic media in his work. In 1985 he created *Barcarola Bitística* for 2 micro-computers and video monitor; between 1987-1988 the computer installation *A Mandelbox*; and in 2002: *La celda*, musical theatre for an actor, video projection and 8 loudspeakers.

His cycle of pieces *Reading Castañeda*, 1993, includes: *The Wings of Perception II* for tape, 1989-1992; *Die Zauberflöte/Sacateca's Dance* for flute, tape, radio baton and computer, 1985-1992; *El Oro* for speaker, flute, cello and tape, 1992; *The Spirit Catcher* for cello, tape, radio baton and computer, 1992-1993; and *The Nagual* for metal objects, radio baton, computer and tape, 1993.

Other pieces by Maiguashca are: *Como...* for tape, 1988; *Die Feinde, eine Minioper* for 2 tenors, string quartet, 2 bass clarinets and electronics, 1995-1997; *Tiefen* for 8 loudspeakers, 1998; *El Tiempo* for 2 flutes, 2 clarinets, 2 cellos, 2 percussionists and electronics, 1999-2000; *La noche cíclica* for violin, cello, marimba, keyboard and 4 amplitude modulators, 2001; and *La noche cíclica* for 4 PowerBooks, 2002.

Maiguashca has been living in Germany since the mid 60s.

Milton Estevez (born in Checa, Pichincha, 1947) composed several pieces using electroacoustic media, being of special mention his works for orchestra and tape.

He composed *Patch 13* for tape, keyboard and percussion in 1984; *Cinco Desencuentros con Episodio Cualquiera* for orchestra, voiced flutes, percussion and electroacoustics in 1986; *Apuntes con refrán* for orchestra and electroacoustics in 1987, commissioned by IBM Ecuador; “Evbrevés” for orchestra and electroacoustics in 1988; and *Cantos Vivos y Cantos Rodados*, version 1 for chamber ensemble and tape in 1996-1997.

Estevez revised in 1994 the original version of *Patch 13*, premiered in 1984 by Diana Arismendi on keyboard and Jorge Dayoub on percussion. He wrote on the program notes for this piece:

Originally conceived for tape solo, the electro-acoustic texture uses almost one exclusive material: a combination (*patch*) of sound generators and controls, designed on the panel of the old *AKS* analog synthesizer, at the *Centre européen pour la recherche musicale - CERM* in Metz, during the research of a personal sound-catalog.

The catalog number (13) for the combination was adopted to label the work. Shaped in different ways, the material became a sort of *delirious percussion*, which alternates with calm appearances through a four “movement” global organization.

At Mesías Maiguashca’s suggestion (then he was professor at the *CERM*), an instrumental texture was superposed to the synthetic one. Both textures dialogue sometimes by analogy (wood-block appearances, for instance) or contrast (some independent keyboard events ...). A fourth alternative “movement” (*ossia*) for the instrumental texture (to be played instead of the original IV “movement”, if wanted) was composed in Louisville, 1994.

Estevez, M. (2004). Program Notes. [personal communication].

Using the same tape part that *Patch 13*, Estevez composed *Cinco Desencuentros con Episodio Cualquiera* for full orchestra and electroacoustics in 1986. The piece was premiered in November of that year in Quito by the National Symphonic Orchestra of Ecuador, with Alvaro Manzano as conductor.

Estevez proposed the creation of the Departamento de Investigación, Creación y Difusión or DIC (Department for Research, Creation and Promotion) at the National Conservatory of Music of Quito. His project was accepted and the DIC was founded in 1985. The original

project included an electroacoustic music studio, but this was not ready until 1986. The electroacoustic studio was possible thanks to a donation by IBM Ecuador.

During April of 1987 the Ecuadorian Festival of Contemporary Music had his first edition, also as part of the *DIC* project in Quito.

Estevez premiered on this Festival another work for orchestra and electroacoustics, *Apuntes con Refrán*. The piece was also performed by the National Symphonic Orchestra of Ecuador, with Alvaro Manzano conducting. The electroacoustic texture for this piece was worked by Estevez at his home studio using an FM synthesizer Yamaha DX7 together with a QX7 for sequencing and a Revox B77 tape recorder.

Evbrevés was the third work for orchestra and electroacoustics Estevez wrote and premiered in three years. The tape part for this piece was made at *DIC*' studio during 1987-1988. He used an FM module Yamaha TX802, a Peavey mixer, one multi-track Tascam tape recorder and a Revox B77. This work was premiered in Quito during May 1988, once again by the National Symphonic Orchestra of Ecuador, with Alvaro Manzano conducting.

During the 90s Estevez composed *Cantos Vivos y Cantos Rodados*, for ensemble and electroacoustics, between 1996 and 1997. The tape part was realized at the Computer Music Laboratory of the School of Music, in University of Louisville. He used a PC computer with an E-mu Proteus and a DAT. Estevez says about his composition:

Perhaps one feature of Ecuadorean music is the “anomalous” friction (to the illustrated ear, that is) between sound worlds of different origins. In this work, this process reaches some importance, as counterpoint between systems: native, European, and MIDI “parvenu” materials, instrumental gestures, and atmospheres, cast on two textures, acoustical and electro-acoustical.

The “anomaly” also reaches the rhythmic shape through non-symmetrical construction.

Electroacoustics is used in both, a “good” and a “bastard” sense: although most it shows consistent electro-acoustical sounds, when instrument writing is impossible for human musicians, the electro-acoustical texture takes over with samples in order

to keep the music gestures (vertiginous relay of “flutes” at the end, for instance) over the safeguard of “pure” means.

Estevez, M. (2004). Program Notes. [personal communication].

Estevez lives at present in Louisville, United States.

Arturo Rodas (born in Quito, 1954) studied music and law in his native country before going to Europe to complete his studies in composition and electroacoustic music during the early 80s. In France he studied electronic music at Centre Européen de Recherche Musicale in Metz, as well as concrète music composition at the Conservatoire National de Paris.

Back in Quito, Arturo Rodas was editor of the monthly musical magazine *Opus* from 1986 to 1989. He wrote several articles and essays for this magazine published by the Musicoteca del Banco Central of Ecuador and also a book about contemporary music, *Nuestros Dias*, published by the Ecuadorian Centro de Investigacion y Cultura. Since 1990 Rodas has been living in Europe again, working as a free-lance composer and teacher based in London.

Rodas composed *Voudriez-vous fermer les yeux un instant s'il vous plait?* for tape, 1983; *Obsesiva* for orchestra and computer-generated sounds, commissioned by IBM Ecuador, 1988; and *El llanto del disco duro*, *Bailecito* and *Fermez les yeux s.v.p.* (according to Rodas this new piece replaces the aforementioned work dated 1983), all three tape pieces, 2001.

About *Bestiario* or *Bestiary*, a work in progress by Rodas, he explains:

It consists in a set of electroacoustic pieces which can be seen as commentaries on the acoustic *solis* from another set. The later, called *Fauna*, being a collection of solo pieces for most of the instruments of the orchestra. Both sets form a cycle called *The book of the orchestra*. The electroacoustic pieces articulate the acoustic pieces. In other words, *Bestiary* articulates *Fauna* and the two sets become *The book of the Orchestra*.

The form is akin to Mussorgsky's *Pictures at an exhibition* in which the pictures are articulated by the promenades. The difference is that, in my work, the "pictures" are

played by various instruments and the "promenades" are electronic thoughts on the "pictures". As it is the case with Mussorgsky's work, most of the pieces (pictures) can also be played separately.

The *solis* in *Fauna* are: one piece for piccolo; one piece for flute in C; one piece for flute in G; three pieces for B flat clarinet; two pieces for oboe; one piece for english horn; one piece for B flat bass clarinet; one piece for bassoon; one piece for contrabassoon; one piece for trumpet piccolo in D; one piece for B flat trumpet; one piece for tenor trombone; one piece for tuba; one piece for violin; and one piece for viola; among others.

Some of the finished pieces or "comments" of *Bestiario* are:

1. comments on tuning, trumpets, "unreal" percussion;
2. comments on flutes, tuning;
3. comments about the viola, and the trumpet *solis*;
4. comments about the contra bassoon and the oboe *solis*;
5. comments about trumpet trio, viola, timpani, other "concrète" formants;
6. mainly comments about the *solis* for english horn and violoncello;
7. comments about bassoon, english horn (again), harp, trumpets, etc;
8. and comments about cello, timpani, trumpet.

Rodas, A. (2003). Program Notes. [personal communication].

Diego Luzuriaga (born in Loja, 1955) composed works such as *Los ojos de mis sueños* for tape, commissioned by the Gent Electronic Music Studio, 1984; *Apabatapabata* for tape and *Ludus Spectralis* for flute, marimba and tape, both produced at the CERM studio in Metz, 1986; *Brasilia* for flute, percussion and synthesizer, 1986; *Pythagoras* for tape, produced at the Manhattan School of Music, 1987; *Flauta y Viento* for flute and tape, tape part produced at Columbia University Electronic Music Studio, 1992; and *Viento en el viento*, for 2 flutists, percussion, electronic keyboard and computer, commissioned by Ensemble Intercontemporain and IRCAM and created at IRCAM, 1994.

About *Viento en el viento* Luzuriaga wrote:

Viento en el viento is a seventeen-minute-long piece for two flutists (one playing piccolo, flute, and alto flute; the other playing flute, alto flute, and bass flute), one percussionist (playing tam-tam, three tom-toms, three suspended cymbals, bass drum, snare drum, chimes & glass chimes, bamboo chimes, triangle, and crotales), and one

keyboard player playing two keyboards which trigger several types of electronic sound files and real time electronic processes.

The following is an excerpt from the program notes I wrote for the premiere of *Viento en el viento* in Paris:

Soy viento en el viento (I am wind in the wind) is a verse from a poem I wrote in July 1993 when I spent five weeks at the Bellagio Center (a magnificent Rockefeller-Foundation-owned villa on lake Como, Italy) as an artist-in-residence. The poem tried to convey a feeling I had after a stormy afternoon while walking in the exuberant gardens of the villa. The poem talks about the feeling of being completely "transparent", being at the same time both a part of the universe and the whole of it.

I perceive the piece *Viento en el viento* as a large empty space being sculpted by wind. The *zampoña*, long panpipes from the Andes, served as a source of acoustic, spatial, and poetic images. Being a "breathy" instrument, the *zampoña* conveyed for me the fascination I always felt for air and wind with all its sounds and spaces.

The image "I am wind in the wind" represents for me a state of physical and spiritual transparency. Being air in the air, being nothing and at the same time being the whole universe--a concept quite familiar to Eastern mystics--is an experience I have had several times in my life, out of a natural and unconscious predisposition. These fleeting moments of transparency, being powerful and transcendent, have become references for my creative work and for my life.

Being a subjective concept based on personal experience, this transcendental transparency is difficult to define, but I would say that it is a state of high awareness of my Self as a physical, spiritual, and emotional being in total connection with my own past and present, and with the past and present of the rest of humanity, and in total connection with the physical surroundings (in the case of the Bellagio experience, a humid, exuberant garden, full of summer sounds, smells, and shining colors).

Luzuriaga, D. (2005). Program Notes. [personal communication].

Luzuriaga lives in Philadelphia, United States.

Jorge Campos (born in Quito. 1960) moved from Ecuador to Russia in 1987 to study composition and musicology. In 1993 he started to work at the Theremin Center in Moscow. He moved from Russia a few years ago.

In December of 1984, Campos composed in Quito his first electroacoustic piece for tape: *Achachachay*. This work was premiered on January 25, 1985, during a concert organized by the National Conservatory of Music of Quito held at *Nuevo Salón de la Ciudad*, in Quito's Municipality. According to Campos, *Achachachay* is a *concrète* music work based on "sounds of crickets, dogs, birds, water drops, street ambients, sporadic shouts" and "is a bit close to what is called a soundscape nowadays. It was realized at some Quito radio studios using very rudimentary equipment" (Campos, J. 2002. Personal communication).

The composer started working with electroacoustic media again when he moved to Moscow. There he composed *In Memoriam* and *Méditations* in 1993, *El jardín de las delicias* in 1994, *Eine Kleine Nachtmusik* in 1994, *Bora - Bora* in 1994, *Serpenwaves* in 1995, *Kon Tiki* in 1996, and *Orphée* in 1998, all of them tape pieces produced at the Theremin Center.

Campos produced some of his recent works for tape in American and French studios: *Tri udara*, 1999, at *Conservatoire de Musique de Blanc Mesnil* in France; *Cats music* and *VCCA-tape music*, both produced in 2000 at the Virginia Center for the Creative Arts in Virginia, United States; *Nuit d'été* composed at Centre d'Etudes et de Recherche Pierre Schaeffer in Paris, 2002; and *Serpencicleta* composed at Université de Marne la Vallée in France, also in 2002.

Campos composed mixed pieces for acoustic instruments and tape as well as works involving live electronics, using one or more Theremins and digital interactive musical controllers like the Power Glove. Some of these pieces are: *Sonate* for alto, piano, percussion and tape, 1993; *Yaravi* for flute, percussion, tape and dancer, 1993; *Séquences* for Theremin, trumpet and tape, also 1993; *De Profundis* for string quartet, percussion, two trumpets and tape, 1994, commissioned for the Alternative Festival of Moscow; *Berceuse (o Lullaby)* for piano, percussion, tape and three dancers, 1995; *Glissandi* for six Theremins and two dancers, 1996; *Esquitofrenia* for reciter, bass clarinet, percussion, tape and video projection, with texts by Ramiro Oviedo and video by Omar Godinez, 1996, commissioned by Ecuador's Embassy in Moscow; *El Cuarto Menguante (or New Moon)* for soprano, bass clarinet, Power Glove and five dancers, with poems by Rima Dalos, 1997; and *Travesía* for reciter, flute, sax, piano,

tape and two dancers, with texts by Alejandro Velasco, 1997, commissioned by the Maïakovski Museum of Moscow.

Between 1994 and 1998 Campos was composing also for films, television and video. *Les ombres de Koleichuk*, in collaboration with the Contemporary Art Center of Moscow, and concert versions of *Orphée* and *Kon Tiki*, with video and spatialized sound, all of them 1998, are some of his works on this field.

Eduardo Flores Abad (born in Guayaquil, 1960), a graduate from the Folkwang-Hochschule in Germany who lived in Turkey for several years, composed *Los amantes* for stereo tape in 1993; *Cuatro piedras*, *Las consecuencias* and *Ojo mirando la fiesta por un hueco*, originally integrated under the title *La tentación de Antonio* as a three parts dance and tape work, also in 1993 (*Las consecuencias* was revised in 1994 changing spatialization and reverb factors); *Ritmo en el ritmo* for quad tape in 1994; *Taleas* for quad tape in 1995-1996; *A ras del cuero #1* for stereo tape in 2000-2001; *A ras del cuero #3* for cello and stereo electroacoustics in 2001; and *Líneas Flotantes* for alto sax and quad electroacoustics in 2002.

Flores wrote some software like *Edita 1.0*, *FModula* and *LogFunk*, originally to be used in his own music classes.

During several years Flores was visiting professor at the Conservatory of the State University Dokus Eylül at Smyrna city, in Turkey. At present he is living in Germany.

Pablo Freire (born in Quito, 1961) has been working with electroacoustic media on some of his compositions. *Zeluob 3* for tape, 1990, and *Sonata del silencio* for sax, 3 guitars, percussion and tape, are two examples of that.

To compose *Zeluob 3* Freire worked with the integral serialism techniques developed by Pierre Boulez, hence the anagram in the name of the piece (*Zeluob* is Boulez backwards).

The number 3 plays a fundamental role on this composition, both in the macro and microstructure. Sonorities from Andean panpipes are present on this Freire's work, also percussive sounds processed to evoke the Amazonic Tunday, a drum made from a hollow trunk. *Zeluob 3* was composed using a Yamaha TX802 FM digital synthesizer, an Akai S900 sampler and a Yamaha QX1 sequencer.

Julián Pontón (born in Tucán, 1961) has been composing with electroacoustic media during the recent years. Presently, he is in charge of the Departamento de Investigación, Creación y Difusión, also known as DIC (Department for Research, Creation and Promotion) of the National Conservatory of Music of Quito.

Sismos en Son de Homenaje for mixed choir, orchestra and tape was composed by Pontón at DIC, working with electronic part of the piece with the MetaSynth software. The piece was premiered in Quito by the Orquesta Nacional de Quito (National Symphonic Orchestra) and the Coro Ciudad de Quito (Quito City Choir) from Quito's Municipality in 2000.

Pontón also composed *Aire ... Como ... Pan* for tape, based on the poem by Pablo Neruda *Oda al Aire*. The piece uses voices in German, French, Quichua, Korean and Spanish. It was realized between 2000 and 2002 working at DIC in Quito and at Laboratorio de Informática y Electrónica Musical (Computer and Electronic Music Lab) also known as LIEM, in Madrid, Spain.

During a residency in Germany, Pontón composed *Oda al instante en que dejamos de ser víctimas* for flute, tape and live electronics, between 2002 and 2003.

Marcelo Ruano (born in Quito, 1962) composed *Millay* for tape, a piece that has been presented also as a mixed work performed together with a live violin solo improvising all along the tape; the name means "water" in the old Quichua language. He also composed *La*

Epopéya Alfárida, ballet music for tape and MIDI instruments, and *Obertura Plaza Grande* for tape, MIDI instruments and symphonic band.

Juan Campoverde Quezada (born in Cuenca, 1964) composed mostly chamber works but has been using computer-assisted composition techniques on some of his pieces. He is living in the United States, and teaches at DePaul University.

Campoverde applies generative logarithmic processes where rhythmic and harmonic structures becomes part of a “digital draft” that later allows him to elaborate, speculate and choose “manually” the specific materials for the piece (Campoverde, J. 2002. Personal communication). He uses this approach in *Iluminaciones* for string quartet, working mainly with OpenMusic and Max/MSP, and also in *Topografías IIb* for guitar and computer. On this second work some formal decisions are taken in real time from sounds being produced live by the guitar and the digital counterpart in a flexible but controlled exchange. The computer sounds are produced processing prerecorded guitar samples as well as filtering, pitch-shifting and delaying live guitar sounds.

6.11 El Salvador

Gilberto Orellana (born in Santa Ana, 1938) composed *Variaciones sobre un tema de Fantasía en el Bosque*, an electroacoustic piece based on the orchestral work by his father (also named Gilberto Orellana): *Fantasía en el Bosque*.

Juan Carlos Mendizabal (born in San Salvador, 1968) was commissioned by the University of Santa Clara in 1994 to write a multimedia piece (involving dance and theatre) about the massacre happened in a little town called El Mozote, high in the mountains of El Salvador, during December, 1981.

La masacre del Mozote was premiered live in 1995. The composer wrote about his work:

The result was a 45 minute long electroacoustic piece that aims at going beyond the statistics and the rhetoric towards a fuller understanding (mental, emotional and physical) of what happened at El Mozote. In the piece, samples and electronic sounds combine with acoustic guitars and newscasts from the war, all collaborating to take the listener in a journey from the safety of the present to a forgotten moment in recent history when the deepest and darkest forces of the human heart were unleashed. Mendizabal, J. C. (undated). The Massacre of El Mozote. [online] Address: <http://www.deconstructionist.com/blacknote/elmozote.htm>

This was my first fully realized exploration of a synthesis of a “classical approach” with the sounds and tools of modern electronic ambient/techno/industrial music.

Mendizabal, J. C. (2002). JC/Kyron - Bio & Gear Explanation. [personal communication].

Other musical works by Mendizabal involving electroacoustic media are: *5 Vidas y un Preludio* for tape, 1995, composed and premiered in El Salvador; *Chimps in Space*, 1994; *Jungle Monkeys*, 1995; *Cortex Burn*, 1996; *Trip Tech - Children of the Secret*, 1999; *Kyron - Kaos Drone* and *Kyron - Music Boxes*, both 2002.

Juan Carlos Mendizabal moved to San Francisco, United States, during the early 80s.

Fracisco Huguet (born in San Salvador, 1976) composed *Estudio 3* for cello and tape and *Tiento 2* for tape, both in 2003. He is living in Switzerland.

6.12 Guatemala

Joaquín Orellana (born in Guatemala City, 1937) studied violin and composition at the National Conservatory of Music in Guatemala between 1949 and 1959. He also studied at Centro Latinoamericano de Altos Estudios Musicales (CLAEM) - Instituto Torcuato Di Tella in Buenos Aires, Argentina, between 1967 and 1969.

Orellana has been working with electroacoustic media in his music since the early 60s. His conception and development of new instruments derived from the marimba plays a major role on his musical trajectory. As remarked by several researchers, during the last decades his music reflects a compromise with the social situation of Guatemala's poorest class, focusing on the traditional folk culture, local expression and sound environment.

Orellana composed, among other works: *Contrastes* (ballet) for orchestra and tape in 1963, producing the tape part at a commercial recording studio in Guatemala; *Metéora* for tape in 1968, realized at CLAEM, in Buenos Aires; *Humanofonía* for orchestra and tape in 1971, tape part also realized at a commercial recording studio in Guatemala, and *Humanofonía* for tape only, being this the same recording used for the original orchestra and tape homonymous work; *Malebolge* (also known as *Humanofonía II*) and *Entropé* in 1972, both for tape; *Primitiva I*, *Asediado-Asediante* and *Itero-tzul* in 1973, all of them for tape; *Sortilegio* for tape in 1978; *Rupestre en el futuro* for tape in 1979; *Imágenes de una historia en redondo (imposible a la equis)* for tape in 1980; *Híbrido a presión* for 2 flutes, special instrument and tape in 1982; *Evocación profunda y traslaciones de una marimba* for full Guatemalan marimba, choir, 5 recorders, reciter and tape in 1984; and *Híbrido a presión II* for 2 flutes, special instrument and tape in 1986.

David de Gandarias (born in Guatemala City, 1952) is composer and musical engineer. He graduated at the National Conservatory of Guatemala in piano and at the Gioacchino Rossini Conservatory of Pesaro, Italy, in electronic music. He also studied at the Centro di Sonologia Computazionale (CSC) of the University of Padova, at the electronic music lab of the Santa Cecilia Conservatory in Rome, and at DDR - GEM (Galanti Electro Musical; now called Generalmusic Corp.) in Mondaino, Emilia Romagna, Italy.

He has been working as composer, musical engineer, percussionist, pianist and producer for radio, television and musical recordings.

De Gandarías' work is highly related to the social situation in his country and to the search of a personal language based on the roots of his native land, taking as a starting point the research of folk traditions.

Among other works, he composed: *Juego de Magos y Gorilas* for tape in 1977; *Juguemos a jugar jugando*, for a children's play, tape, in 1979; and *Objetos Rituales*, ballet music on tape in 1981, all three works realized at Estudios Sincro in Guatemala; *Pisaurus Piece*, multimedia for soprano, sax, tape, scenography and lights, in 1987, realized at LEM - Electronic Lab for Experimental Music at G. Rossini Conservatory in Pesaro, Italy; *Trans-tres* for tape, flute, clarinet and double bass in 1985, electronic part also realized at LEM; *Sinergia* for computer in 1996, composed as the sound part of Walter Branchi's multimedia for 2 mimes, 6 lights and sound column, and realized at the composer's personal studio in Guatemala; *Percursos de Hormigo, Senderos de Silicio*, a piece for Guatemala's full marimba and computer in 1997, where the electronic part was also realized at the composer's personal studio; and *LABUGA*, a multimedia show realized between 1999 and 2002, including live acoustic instruments, electronic processing, computer music, theatre, dance, digital video and lights.

About *LABUGA*, David de Gandarias says:

[...] Is the first artistic work of interethnic and intercultural participation between garifunas and mestizos of Guatemala; staging this piece were working for over three years a group of artists and intellectuals garifunas from Livingston, Izabal, together with a group of researchers and artists mestizos from Guatemala City. *LABUGA* is then the place where fuses - without hierarchies - the aesthetic cultural heritage of the garifuna, rural and traditional, with the technical and poetic thinking principles typical from the mestizo, urban and present.

De Gandarias, D. (2003). Program Notes. [personal communication].

Igor de Gandarias (born in Guatemala City, 1953) shows in his works a strong interest on the cultural roots of Guatemala. He studied at the National Conservatory of Guatemala, at the Art Department of the Faculty of Humanities in San Carlos de Guatemala's University, and

later in the United States at the Catholic University of America, the University of Maryland and the Peabody Conservatory, specializing in composition and electroacoustic music.

Igor de Gandarias has been working with electroacoustic media in his music since the early 70s. Among other pieces he composed: *Cadenas cromáticas* for slides and tape in 1982; *Conquista 2* for chirimía, drum and digital equipment in 1988; and *Circunstancial II* for double mixed chorus, tzijolaj, tun, rock trio and tape in 1990. In 1995 de Gandarias composed *La Feria Fantástica*, electroacoustic music on CD realized in Maryland, United States; he created a second version of that piece in 1998, integrating and synchronizing in a video the same original music. On *La Feria Fantástica* the composer includes field recordings from the Jocotenango's fair, the most important religious feast of Guatemala's City. He realized this piece working with a Fairlight III Series audio workstation.

According to Igor de Gandarias, he also applied typical concepts and procedures used in electroacoustic music composition in some of his instrumental pieces. Two examples are: *Guarimba* for orchestra, 1994, and *Dialogante* for Hammond organ and piano, 1995.

The book *Tradición Popular en la música Contemporánea Guatemalteca* by Igor de Gandarias was published in Guatemala in 1998. He analyzes in that text two of Joaquín Orellana's compositions created using electroacoustic resources.

Dieter Lehnhoff (born in Guatemala City, 1955) is musicologist, conductor, and composer. He studied in Salzburg and then at the Catholic University of America in Washington D.C., where he earned his M.A. and Ph.D. He presently directs the Institute of Musicology at Rafael Landívar University in Guatemala, and is also Music Director of the Metropolitan Orchestra and National Choir of Guatemala. Besides his three electro-acoustic works listed below, he has composed choral, symphonic, and chamber music.

His first work created with electroacoustic means was *Sanctus*, produced at the Electronic Music Studio of the Salzburg Mozarteum and premiered in April 1975 at the auditorium of

the Austrian Broadcasting (Österreichischer Rundfunk, ÖRF). The composer wrote about *Sanctus*:

In this piece, an introductory monastic chant is driven away by the irruption of vocal sonorities which -as they build up to a climax- stress the recurrent human indifference and irreverence, before the ancient text of the Sanctus is recited in hieratic reiterations over a disquietening soundscape of whistling projectiles, distant explosions, and the cracking of firearms.

Lehnhoff, D. (2003). Program Notes. [personal communication].

In August 1999, on a commission from the Guatemalan Asociación de Amigos del País, Lehnhoff created two works on CD at Audio Track Studios in Guatemala City. The first one, *Memorias de un día remoto*, “recalls the sounds of a distant day in ancient Mayan life, with the gathering of warriors, their fighting in the jungle, and the capture, humiliation, and ritual execution of prisoners for the bloodthirsty gods” (Lehnhoff, 2003. Personal communication). The second, *Rituales nocturnos*, “evokes the mysterious atmosphere of a Mayan high priest’s rainmaking rituals. His chants and incantations, joined by the ever-quickening, frantic clatter of turtle shells, rattles, and slit drums, finally lead to the breaking of the clouds, as four children tell their tale, all at once, in four different Mayan languages in welcome of the blessing” (Lehnhoff, 2003. Personal communication).

The *concrète* sources for both works includes original Mayan whistle playing as well as chants and tales recollected in the jungles of southern Mexico and in the Guatemalan highlands. Under the title *Escenas primigenias*, both works were published on the CD *Orígenes* issued by Asociación de Amigos del País (Guatemala City: HGG 10699 CD, 1999). They have also been performed at the National Theatre of Guatemala, and at international festivals such as *Foro de Compositores del Caribe*.

Paulo Alvarado (born in Guatemala City, 1960) is a composer, musical producer and cello performer. He is active in different musical fields, from rock to contemporary music, and has been working with electroacoustic media in his compositions.

Apart from working with electroacoustic media, installations, and experimental music, Alvarado wrote 50 songs, chamber and symphonic pieces and music for theatre and dance. Some of his compositions are: *Teléfono* and *Teatro*, both 1988 electroacoustic music pieces, realized at his personal studio in Guatemala; *El Manifiesto Consumista* for voices, effects and three actors, 1989; *Cuarteto #3* for string quartet (with auxiliary tape), 1990; *Una ciudad deshauciada*, electroacoustic music, 1995; *Concierto* for marimba and orchestra (and auxiliary tape), 1996; *Octágono* for marimba, 6 instruments and tape, 1997; *5.50 BG* for street sounds and synthesizer, 1998; *Mientras exista* for 4 voices, guitar, percussion sequencer and auxiliary recording, 1999; *Mi Familia* for voices and synthesizer, 2000; and *Voces en el Umbral* for voices, percussion and synthesizer, 2002.

Renato Maselli (born in Guatemala City, 1964) composed among other pieces: *Expectations* for tape in 1996, and *Landscape* for dance, tape and electronics in 1997, both works produced at the Sonology Institute in The Netherlands; *Puntos* and *Líneas*, with Dennis Leder, both for images and electronics, composed in 1998 and produced at his home studio in Guatemala; *Real-ity* for dance, tape and images, and *Zonas adyacentes*, both pieces composed in 2001 and also produced at his home studio; *Gracias* for tape, also dated 2001, produced in The Netherlands at STEIM.

6.13 Mexico

Carlos Chávez (born in Mexico City, 1899; died in the same city, 1978) used electronic sounds on tape in one of the four acts of his ballet music *Pirámide*, composed in 1968.

Blas Galindo (born in San Gabriel, Jalisco, 1910; died in Mexico City, 1993) composed *Letanía erótica para la paz* for chorus, soloists, orchestra and tape in 1965; and *Tres sonsonetes* for wind quintet and tape in 1967.

Conlon Nancarrow (born in Texarkana, Arkansas, United States, 1912; moved to Mexico during the 40s; died in Mexico city, 1997) is widely known and recognized for his study series for player piano.

Some of his works have been performed in concerts through computer controlled electromechanical systems developed by Trimpin. There are also computer generated versions from several of his works (*Study #21, Study #37*) by composers like Rick Bidlack and Robert Willey.

As it was said before, Nancarrow was experimenting with a tape recorder during the 50s to see “if he could get the rhythms he wanted by tape manipulation”. His untitled *musique concrète* piece would be the first work of that kind produced in Mexico.

Carlos Jiménez Mabarak (born in Tacuba, 1916; died in Mexico City, 1994) composed *El paraíso de los ahogados* in 1960, considered the first piece involving electroacoustic media produced by a Mexican composer.

He also composed: *La llorona*, ballet music for small orchestra, electronic oscillator, timpanis, percussions, piano and strings in 1961, and *La portentosa vida de la muerte*, in 1964.

Jorge Dájer (born in Durango, 1926) composed *Acuarimántima* for narrator and tape in 1963.

Manuel Enriquez (born in Ocotlán, Jalisco, 1926; died in Mexico City, 1994), composer, conductor and performer, was one of the big names of Mexican new music during the last decades.

Among many other works, he composed several tape and mixed works such as: *Viols (Móvil II)* for violin and tape between 1969 and 1972; *3 x Bach* for violin and tape, and *Mixteria* for actress, four musicians and electronic sounds, both in 1970; *La reunión de los saurios* for tape in 1971; *Láser I* for tape in 1972; *Trauma* for actress, four musicians and electronic sounds in 1974; *Contravox* for mixed choir, percussions and tape in 1976; *Conjuro* for double bass and tape in 1976-1977; *Canto de los volcanes* for tape in 1977; *Díptico I* for flute, piano and tape in 1979; *Misa prehistórica* for electronic sounds in 1980; and *Interecos* for percussion and electronic sounds in 1984.

Guillermo Noriega (born in Mexico City, 1926) composed two tape works during the early 60s: *Estudio sobre la soledad* in 1963, and *Seis estudios sobre el espacio y el tiempo* in 1964.

Francisco Savín (born in Mexico City, 1927) composed *Quasar I* for electronic organ and tape in 1970.

Raúl Pavón (born in Mexico City, 1930), engineer and composer, was a real pioneer of electroacoustic media and music in Mexico.

He was technical director of the first Electronic Music Lab in Mexico, created as part of the Composition Workshop at the National Conservatory of Music. With Héctor Quintanar as the artistic director, this laboratory started its activities in January of 1970. Modular Buchla and Moog synthesizers were part of the equipment.

Pavón started to promote the use of electronic musical instruments in his country years before that first studio was built. He even built a synthesizer during the 60s, the Omnifón.

He also composed some works, such as: *Fantasia Cósmica* for film, transparencies and electronic music, 1982; *Suite icofónica*, mixed media, 1983; *Una antifantasia*, 1986; *Fantasia de la muerte*, 1987; and *Fantasia abstracta*, 1989; all pieces for visual media and music on tape.

Raúl Pavón also wrote during the early 80s one of the first original books in Spanish about electronic music: *La Electrónica en la Música ... y en el Arte (Electronics in Music ... and the Arts)*, published in 1981 by CENIDIM).

Alicia Urreta (born in Veracruz, 1930; died in 1986) composed, among other works: *Ralenti* for tape in 1969; *Natura mortis o la verdadera historia de Caperucita Roja* for narrator, piano and tape in 1971; *Estudio sobre una guitarra* for tape in 1972; *Cante, homenaje a Manuel de Falla* for actor, cantoor, 3 dancers, slides, percussion and tape in 1976; *Salmodia II* for piano and tape in 1980; *Selva de pájaros* for tape in 1978, *Dameros II* in 1984 and *Dameros III* in 1985, both works for tape.

Mario Kuri-Aldana (born in Tampico, Tamaulipas, 1931) composed *Señora de los Santiagos* for tape in 1973.

Héctor Quintanar (born in Mexico City, 1936) created several pieces using electroacoustic media during the 60s and 70s. He composed *Aclamaciones* for choir, orchestra and tape in 1967, commissioned by the Public Education Secretary of Mexico and premiered at the Fine Arts Palace of Mexico City by the National Symphony Orchestra, directed by Carlos Chávez, in July of that same year.

He composed *Sideral I* for tape in 1968; and *Símbolos* for chamber group (violin, clarinet, sax, French horn, trumpet, trombone, piano), tape, slides and lights in 1969.

In 1970 he became artistic director of the first Electronic Music Lab in Mexico, created as part of the Composition Workshop at the National Conservatory of Music.

Quintanar composed with the electronic instruments at that lab pieces like *Opus I* in 1970; *Suite Electrónica*, *Ostinato* and *Sideral III*, all three in 1971; *Voz* for soprano and electronic sounds, and *Mezcla* for orchestra and tape, both in 1972.

Other works by Quintanar are: *Play back*, for violin, piano, percussion, tape, slides, photographs and lights, 1970; *Diálogos* for piano and electronics, and *Dúo* for percussion and electronics, both 1975.

More references on Pavón's research could be found in chapter VIII, section 8.1 Technology innovators. Early developments.

José Antonio Alcaraz (born in Mexico City, 1938) composed *Fonolisia* for tape in 1964.

Manuel de Elías (born in Mexico City, 1939), composer and conductor, founding president of the Colegio de Compositores Latinoamericanos de Música de Arte, includes on his extensive catalog some pieces composed with electroacoustic media during the 60s and 70s. Some of them are: *Vitral No. 2* for chamber orchestra and tape, 1967; *Parámetros I* for tape, 1971; and *Non nova sed novo* for tape, 1974.

Eduardo Mata (born in Mexico City, 1942; died 1995) composed his ballet music on tape *Los Huesos Secos* in 1963.

Julio Estrada (born in Mexico City, 1943) composed *eua'on* for tape in 1980, using the UPIC graphic compositional system. The only sound source he used on this work was his own digitized voice. The title comes from the Náhuatl language.

Another work by Estrada is *Pedro Páramo*. Composed between 1992 and 2000, this chamber opera in two acts is scored for six voices, six instruments, noise maker, tape and choreography.

Jaime González Quiñonez (born in Mexico City, 1943) composed *Pieza electrónica* for tape in 1971.

Juan Cuauhtémoc Herrejón (born in Mexico City, 1943; died in Mexico City in 1993) composed *Shankar*, *El mensaje de una flor*, *Raga*, *Cinco ensayos electrónicos* and *Poema a Ulises*, all five electronic works in 1973; and *Alcidia* for improvisation group and tape in 1977.

Mario Lavista (born in Mexico City, 1943) composed among other works: *Espacios imaginarios* for tape in 1969; *Alme*, tape recording from a live performance, in 1971; *Contrapunto*, collage on tape with music by The Beatles, Rolling Stones, Mahler, etc. in 1972; and *Semana Santa entre los Coras*, tape for a movie with the same name, in 1980.

Francisco Nuñez (born in La Piedad, Michoacán, 1945) composed, among other works: *Los logaritmos del danés* in 1968, *A Sacris* in 1971, and *Vita* in 1972, all three works for tape; *Reforma* for orchestra and tape also in 1972; *Provocación rítmica* and *Cantos*, both pieces for tape in 1973; *Juegos sensoriales* for tape in 1987; *Tientos en eco II* for flute and synthesizer

in 1988 and *Tientos en eco II* for flute, piano and synthesizer in 1989; *Follajes*, for violin, cello, double bass and electronics, 1990.

He founded a small analog lab at Escuela Superior de Música del Instituto Nacional de Bellas Artes - INBA (Superior School of Music of the Fine Arts National Institute) during the early 80s.

Max Lifchitz (born in Mexico City, 1948) composed, among other works: *I got up* for trombone, double bass, percussion and tape (or live electronics), and *Black pearls* for tape, both in 1974.

Arturo Marquez (born in Alamo, Sonora, 1950) composed among other pieces: *Mutismo* for 2 pianos and tape in 1983; *Di-verso* mixmedia for voice, dance and electronic sounds in 1984; *Master pez II* for electronically modified harp and optional score projection in 1985; *Sin título* for tape, realized working with photographic cameras electronically modified, *Mascletá y fuga* for synthesizers or piano and tape, with fireworks, and *Poesía de la voz* for tape, with voices electronically modified, all three in 1988; *Son a Tamayo* for harp, DAT tape, optional percussion and optional video in 1992; *Danzón No. 1* for flute, alto sax and tape in 1992.

Victor Manuel Medeles (born in Ajijic, Jalisco, 1943) composed *Fluorescencias* for flute and tape in 1986; and *Invenções a una voz* for voice, harp, percussion and tape in 1988.

Federico Álvarez del Toro (born in Tuxtla Gutiérrez, Chiapas, in 1953) composed among other works: *Gneiss* for orchestra, tape and four soloist voices, with texts by the composer, in 1980; *Ozomatli* for mixed choir, metals, percussions and tape in 1982; and *El espíritu de la*

tierra, symphony in three movements for marimba, orchestra and tape, between 1983 and 1984.

Jorge Córdoba (born in Mexico City, 1953) composed among other pieces: *Juegos sonoros* for prepared piano and tape in 1983; *Alternativas sobre un cuadro de Rodolfo Nieto* in 1987; *Jardines Interiores* for winds, percussions and tape in 1988; and *Impulsos V* for orchestra and tape, with the recorded voice of painter Rodolfo Morales, in 1992.

Guillermo Dávalos (born in Gaudalajara, Jalisco, 1953) composed *A dúo* for guitar and tape in 1980; *Diálogo* for flute and tape in 1982; *Astral* for tape in 1982; and *Bali* for synthesizers in 1986; among other works.

Ricardo Martínez (born in Monterrey, 1953) composed: *Encounter* for electroacoustic sounds on tape in 1978, manipulating recordings of birds songs; *Proyección I* and *Proyección II* for electroacoustic sounds on tape in 1978, working with an ARP 2600 synthesizer; *Earth I* and *Earth II* for electroacoustic sounds on tape in 1979, using a Synclavier digital synthesizer; *Arco iris* for electroacoustic sounds on tape, also in 1979, realized with an analog Buchla synthesizer and Synclavier; *Gardenia I* and *Gardenia II* for electronic sounds on tape in 1981, produced with and ARP 2600; *Looking for a shadow* for electroacoustically processed guitar and tape in 1983; *Exploración II* and *Exploración III* for electronic sounds on tape in 1990, realized with a Korg Wave Station digital synthesizer; *Exploración VIII*, *Exploración IX*, *Exploración X* and *Exploración XI* for electronic sounds on tape in 1995, produced with Mini Moog analog synthesizer; *Exploración XVI*, *Exploración XVII*, *Exploración XVIII*, *Exploración XIX* and *Exploración XX* for electroacoustic sounds on tape in 1998, working with an Apple running Softsynth software.

Antonio Russek (born in Torreón, Coahuila, in 1954) has been working with electroacoustic media in his music for many years and has an extensive catalog of electroacoustic, mixed and live electronic works.

Among other pieces, Russek composed: *Atmósfera I*, *concrète* music on tape in 1977; *Estudio Electrónico No.1* for electronic sounds on tape in 1979; *Estudio Electrónico No.2* for electronic sounds on tape, also in 1980; *Aleaciones I* for electronic sounds on tape in 1980, and *Aleaciones II* in 1981, both in collaboration with Samir Menaceri; *Para espacios abiertos* for tape and 8 speakers, to be performed on open spaces, in 1981; *Reincidencias* for tape, produced at CENIDIM with the analog Buchla synthesizer, and *Summermood* for amplified bass flute with real time electroacoustic processings, both also in 1981; *Coexistencias* for prepared piano and tape in 1984, with Mario Lavista; *Discursos* for actor and tape, also in 1984; *Canon al aire* for eight timpanis and tape, and *A4* for live electronics, collaboration with Samir Menaceri, Roberto Morales and Vicente Rojo, both in 1985; *Conjetura (Estudio para computadora No. 5)* for tape in 1986; *Punto de Fuga II*, open air performance with music and visuals, collaboration with Samir Menaceri, Roberto Morales, and Vicente Rojo, in 1987; *A toute vitesse* for tape in 1988, created with the UPIC system in Paris, France; *Luz de invierno* for cello with real time electroacoustic processings and tape, in 1988 too; *Ohtzalan* for electronic sounds on tape in 1990; *Diez miniaturas* for tape between 1980 and 1990; *Concretando* for tape, and *Nextalgia*, electronic FM sounds generated with a NeXT computer at CCRMA (Stanford University, United States), both in 1993; *Viernes Santo* for CD in 1997, realized at LIEM in Madrid, Spain; *Babel de nuevo* for CD in 1998; *Siete laberintos de cristal* for electronic sounds on CD, and *Desiertos* for percussion and electroacoustic system, both in 1999; *Babel de Nuevo II*, acousmatic music, in 2000; *La Torre* and *LU*, both acousmatic pieces (on eight audio channels), in 2001; *Divertimento I*, acousmatic music (on eight audio channels) in 2002; *Convexo* for eight audio channels and four video channels, *En Círculos I* and *En Círculos II*, all three in 2003; *El Ángel*, acousmatic music (on eight audio channels), *De Cuerpo Entero*, acousmatic music, *Laps & Loops*, open piece for six audio channels and real time video, and *Unplugged*, all four in 2004.

Guillermo de Mendía (born in Mexico, 1955) composed *Life is nothing but a dream* in 1993.

Bernardo Feldman (born in Mexico City, 1955) composed: *Manel xochitl, manel cuicatl* for soprano, flutes, oboe, clarinet, violin, viola, two cellos, double bass and four tracks tape, in 1985; *¡Oh, cetecho!* for real time computer processing from voices of people in the street, in 1987; *Onírica*, version for piano, harp or flute, effect processor and DAT in 1988; *Kolidingscopes* for harp and DAT, in 1989; and *A hierro forjado* for violin and DAT, in 1993; among other works.

Roberto Medina (born in Morelia, Michoacán, 1955) composed, among other pieces: *Estudios* and *Visiones cautivas*, both in 1989; and *Marina* in 1990; all three works for tape.

Arturo Salinas (born in Monterrey, Nuevo León, 1955) composed: *Nijawi* for tape in 1976; *Damaru* for tape and optional images in 1979; *Vindu* in 1981, *Umbral* in 1986, *Lumil* in 1991, and *Nunutsi* in 1997, all four works for tape.

He was also working with sound installations; some examples are: *Dao*, 1974; *Úmai*, 1985; *Estrellas para Gabriel*, 1988; and *Espacio nocturno*, 1993

Lilia Vázquez Kuntze (born in Mexico City, 1955) composed among other pieces: *Efluvios selváticos* for tape in 1983.

Javier Alvarez (born in Mexico City, 1956) has been using extensively electroacoustic media in his musical compositions. Among others, his works received awards at the Bourges Competition in 1985, 1987 and 1989 and the Prix Ars Electronica in 1988, 1993 and 1995.

Some of the pieces composed by Alvarez are: *Te espera esa chispa* for 8 amplified voices, tape, trombone, 2 percussionists, prepared piano and double bass, 1982; *Tid tuq* for tape, 1983; *Temazcal* for amplified maracas and electroacoustic sounds, 1984; *The Panama Files* for electroacoustic sounds, 1986; *Papalotl* for piano and electroacoustic sounds, 1987; *Edge Dance* for electroacoustic sounds, 1987; *On going on* for baritone saxophone and electroacoustic sounds, 1987; *Así el acero* for amplified tenor steelpan and electroacoustic sounds, 1988; *Acuerdos por Diferencia* for harp and electroacoustic sounds, 1989; *Mambo* for soprano, tenor, baritone, bass, clarinet, sax, flute, trombone, cello, electric bass, percussion, piano, keyboard and slides, 1990-1991; *Mambo à la Bracque*, for electroacoustic sounds, *Shekere*, for shekere gourd, bass drum and sampler interactively controlled, and *Gramática para dos* for synthesizer, all three works 1991; *Mannan* for kayagum (a Korean zither) and electroacoustic sounds, 1992; *Mambo Vinko* for trombone and electroacoustic sounds, 1993; *Also Sprach Dámaso* for any melody instrument and electroacoustic sounds, 1993; *Calacas Imaginarias* for chamber choir and electroacoustic sounds, 1994; *Pyramid*, music for young performers, synthesizers and/or instruments and electroacoustic sounds, 1996; *Offrande* for tenor and baritone steel pans & electroacoustic sounds, 2001; and *Cactus Geometries* for electroacoustic sounds, 2002.

After many years in England, Alvarez returned to live and work in Mexico in 2004.

Samir Menaceri (born Carhaix, France, 1956) composed several works involving electroacoustic media, among them: *Aleaciones I* in 1981 and *Aleaciones II* in 1982, both in collaboration with Antonio Russek; *Cantos acuáticos* and *Aphelion* in 1984; *A4* for live electronics, collaboration with Roberto Morales, Vicente Rojo and Antonio Russek, in 1985; *Punto de Fuga II*, open air performance with music and visuals, collaboration with Roberto Morales, Vicente Rojo, and Antonio Russek, in 1987; *Mantis* in 1988; *M* and *Extinción* in 1990. He also composed *La Condenación de Fausto* in collaboration with Roxana Flores, Carlos Robledo and Antonio Russek.

Menaceri was part of the group MASOS, together with Roxana Flores and Vicente Rojo. In 1989? they created *Diálogo de sordos*, *Encuentro*, *Inicio*, *Marcha*, *Reposo* and *Rito*, all pieces published in the LP: *Música para después de la batalla*.

He has been living in Mexico for many years.

Carlos Sandoval (born in 1956) composed *Homenaje* in 1991; and *Liz Mix* for tape in 2002.

Eduardo Soto Millán (born in Mexico City, 1956) composed among other works: *Composición I*, version for piano and tape, in 1981; *Mexihco* for tape and *Marceleste* for amplified bass flute in C and tape, both in 1986; *Madrágora* for synthesizer, percussion and tape in 1990; and *Amanita* for two harps and DAT tape in 1991.

Soto Millán is the author of *Diccionario de Compositores Mexicanos de Música de Concierto. Siglo XX*, published in Mexico by FCE and Sociedad de Autores y Compositores de Música (volume I, 1996; volume II, 1998).

Ignacio Baca Lobera (born in Mexico city, 1957) is Professor of Composition, Analysis and Electronic Music at the Autonomous University of Querétaro.

Among other pieces Baca Lobera composed: *Sin Título* for oboe and tape in 1997; *Music for William* for tape in 1999; *Five pieces*, electronic music on tape, between 1999 and 2000; *Notes from the Basement* for flute and tape, and *Recall* for guitar and tape, both in 2000; *Estudio de Resonancia I* for piano and tape, *Estudio de Resonancia II* for tape, *Archipiélago* for bass clarinet and tape, *Abs I* and *Abs II* for tape, and *Variación* for harpsichord and two boom-boxes, all six pieces in 2001; *Flauta y cinta* for three processed flutes, *Cinta 2* for tape, *Un dia como cualquier otro* for percussion and tape, and *AXS* for sax and tape, all four works in 2002. All these pieces were realized at his personal studio.

Since 1997 Baca Lobera is fellow of the National Systems for Creators of FONCA in Mexico. He was also named fellow of the Guggenheim Foundation in 2001.

Roberto Morales-Manzanares (born in Mexico City, 1958) has been working extensively in the computer music field, composing, researching and performing with acoustic instruments and live electronic systems too.

Among other works he composed: *Rey Lear* for synthesizers, piano, flute, harp and maracas in 1980; *Agua derramada* for synthesizers and tape, and *Jabirú* for chamula harp, tape and synthesizer in 1984; *Conversa* for synthesizer and fretless electric bass in 1985; *Sombras* for synthesizer, and *Relámpagos azules* for flute, percussion, synthesizer and tape in 1986; *Desvelo 13* for computer and orchestra, *Shidve* for synthesizers and computer, *Nahual II* for chamula harp, synthesizers and computer or CD, and *Cempaxuchitl (Introspección y pensamientos)* for flute, WX11 MIDI wind controller, Yamaha SY77 synthesizer and SPX90 effect processors, all four in 1990; *Servicio a Domicilio* for piano, synthesizer and computer in 1991; *Mineral de Cata* for pre-hispanic flutes and computer in 1993; *Nueva* for computer (using the Escamol system) and disklavier in 1994; *La Travesía* for orchestra and tape in 1997; *Espacios Virtuales* for dancers, sensors, computer and MIDI flute in 1996; *Murmullo a voces* for tape, *Pellegrina* for CD and concert guitar, *Trio de Cuatro* for flute, clarinet, piano and computer, and *Con Carne* for Disklavier keyboard and computer, collaboration with Jonathan Berger, all four in 1998; *Armónicos y Subarmónicos* for flute and computer, and *Concierto No.1 para contrabajo, computadora y orquesta* for double bass, computer and orchestra, both in 1999; *Arquetipos* for orchestra and computer (live) in 2001; and *Flor Granular* for piano using Buchla sensors and computer (live) in 2003. One of his newest works, *Cenzontle* for flute, video and electronics, was awarded in 2005 at the 32e Concours international de musique et d'art sonore electroacoustiques de Bourges, France, in the multimedia category.

Morales developed the aforementioned Escamol system, “an algorithmic tool for composition

which uses non-deterministic automata controlled by rules” (Morales, E. and Morales, R. (1995). *Learning Musical Rules*), and published several research papers about mathematics, computing and music. More references on his research could be found in chapter VIII, section 8.2 Recent research.

Gonzalo Macías (born in Humantla, Tlaxcala, 1958) composed among other pieces: *Uno de los caminos* for percussion and tape in 1990; *La Mise à Mort* for tape in 1994; *Improvisación II* for guitar and tape in 1998; and *El sensor* for tape in 1999.

Antonio Navarro (born in Guadalajara, Jalisco, 1958) composed among other pieces: *Constelaciones* for two guitars and tape in 1980; and *Iluminaciones* for piano and live synthesizer in 1984.

Ana Lara (born in Mexico City, 1959) composed *Tras la ventana* for electroacoustic sounds in 1994, and *Viejas historias*, ballet music with electroacoustic sounds on tape, in 1998.

Víctor Rasgado (born in Mexico City, 1959) composed *HueHue cuicatl* for tenor and tape, and *Clamoreo* for clarinet and tape, part of the opera *Anacleto Morones*, both in 1991; *Mictlán* for percussion and tape in 1992; *Amnios* for tape in 1995; *¡Lo que tuve que tirar!* for soprano, amplified double bass and tape in 1996.

Guillermo Galindo (born in Mexico City, 1960) has been composing extensively with electroacoustic media in his music.

Among other works, Galindo composed: *Valentina Cubista* for piano and tape in 1994; *Detachment/ Desprendimiento* for computer controlled Disklavier using just intonation in

1999, realized at The Banff Centre in Canada; *Dualidad* for marimba and pre-recorded sounds in 1999; *Haiku II* for flute and recorded ambiance in 1999 (revised 2000); *Cisma* for bass, flute and pre-recorded sounds in 2001; *Ajolote Virtual*, created for Don Buchla's infrared control beams instrument Lightning, in 2001; *Sacrificio*, a work exploring socio-cultural subjects, including sound transformation via video and performance art, in 2002; *Transmission Series*, a group of pieces exploring the sonic space and using four FM radio transmitters, created in collaboration with Chris Brown, and *Hybd Sn_d* multidimensional diorama, live transformation of specific sonic spaces, both in 2002.

Galindo also composed three electroacoustic operas: *Califas 2000-Part I, Jurassic Aztlan* in collaboration with writer/performance artist Guillermo Gomez Peña, *Decreation Fight Cherries* with poet Anne Carson, and *Califas 2000-Part 2, Jurassic Aztlan* also with Guillermo Gomez Peña. Dioramas and sound installations: *No Dogs Allowed in Heaven*, sound installation in collaboration with Fernando Hernandez and José Manuel Galindo; *(T)our Time*, 1997, sound installation for towers around the world; *MAIZ*, 2002, an interactive noise maker robot. And music for videos, films and dance: *Kiyohime*, an electroacoustic dance suite dated 1997, among others.

Nowadays Guillermo Galindo lives in the United States.

Salvador Rodriguez (born in 1960) composed *Reflejos* for piano and tape in 1994.

Vicente Rojo (born in Mexico City, 1960) composed *Algas marinas* in 1981, *Imafén* in 1982, and *Vulcán* in 1980-1983, all three works for tape; *Envolvente* for narrators, violin, percussion and synthesizer in 1984; *Trío* for live electronics, collaboration with Antonio Russek and Roberto Morales, and *A4* for live electronics, collaboration with Antonio Russek, Roberto Morales and Samir Menaceri, both in 1985; *Nadie es inocente* and *Claroscuro* in 1988, and *Otoño perdido* in 1990, all three works for tape; *Marabunta*, for sax, live electronics, synthesizer, and tape in 1990; among several other works involving electroacoustic media.

Rojo was part of the group MASOS, together with Roxana Flores and Samir Menaceri. In 1989 they created *Diálogo de sordos*, *Encuentro*, *Inicio*, *Marcha*, *Reposo* and *Rito*.

Antonio Fernández Ros (born in Mexico City, 1961) composed: *Para no volver* in 1991, *Con jícamo* and *Retrato interno de familia* in 1992, all of them for tape; *Aritmética del sol* for bongos and tape in 1994; *Terracota* for tape in 1995; *La doccia*, installation for 24 speakers and 24 tracks in 1996; and *Ahí dentro estaba todo* for tape in 1997.

María Granillo (born in Torreón, Coahuila, 1962) studied music at CIEM and UNAM in Mexico, and later in London, England, where she obtained a Master of Arts from Guildhall School of Music working in electroacoustic music.

Among other works, she composed: *Quien me compra una naranja* for soprano and tape in 1991; *Matrika* for tape in 1992; and *Canciones de cuna* for voice, flute, cello, piano, percussion and synthesizers, in 1995.

Alejandro Escuer (born in Mexico City, 1963) composed *Herrajes* for solo flute and recorded flutes ensemble in 2000, and *Octum* for eight spatialized flutes in 2001.

The early works by **Manuel Rocha Iturbide** (born in Mexico City, in 1963) with electroacoustic media are: *Los números de Pitágoras*, for computer generated sounds, 1988, realized with a digital system by artist Juan Luis Diaz; *Trance lumínico* for saxophone, xylophone, vibraphone and computer, *Avidya*, electroacoustic composition for digital tape and video, and *Estudio antimatérico no.1* for digital tape, realized with an Oberheim Xpander synthesizer, all three works composed in 1989. The following year he composed *ATL* for digital tape, and then in 1991: *Frost clear energy saver* for refrigerador, double bass and digital tape, and also *Bandas de pueblo* for French horn, trombone, tenor saxophone, soprano

saxophone, trumpet, percussion, Mexican village band and digital tape. In 1992 he composed *Estudios Arbóreos*, working with the UPIC system, and then in 1993 *Ligne d'abandon*, a digital tape piece for an exhibition with installations by artist Gabriel Orozco. Between 1993 and 1994 Rocha composed *Transiciones de fase*, an interactive work for trumpet, French horn, trombone, tuba and computer; and then two tape pieces: *SL-9* in 1994 and *Móin Móir* in 1995.

During 1998 Manuel Rocha created *Pocos Cocodrilos Locos*, *Four electroacoustic interludes based on Mathias Goeritz* and *Compresión Tiempo-Espacio de un Habitat*, all three pieces for digital tape. Dated 1999 is *Off side*, an electroacoustic work with slide show. In 2001 he composed: *Rebicycling*, for four digital tracks and video, *Semi No Koe* for flute and digital tape, *Cantos Rituales* for live electronics, and *Parlantes* for live electronics with video. Dated 2002 is *Mucho más ricos* for digital tape; and dated 2003 his piece ... *EVEN* ...

Gabriela Ortiz (born in Mexico City, 1964) composed among other works: *Magna Sin* for steel drum and tape in 1992; *Five Micro Etudes* for tape in 1993; *Things like that happen* for cello and tape, and *El Trompo* for vibraphone and tape, both in 1994.

Pablo Silva (born in Mexico City, 1964) studied music at Escuela Nacional de Música in Mexico and at California Institute of the Arts in Los Angeles, United States. He was coordinator of LIEMM, the Laboratory of Musical Computing and Electroacoustic Music (Laboratorio de Informática Musical y Música Electroacústica) at the aforementioned Escuela Nacional de Música, from 1995 to 2001.

Silva composed, among other pieces: *Where to?* piece for live electronics using synthesizers and computer, in 1991; *Now I Know, Now I Sing, Now I Dance* for clarinet, 2 marimbas and synthesizer in 1993; *Weave* for synthesizer, MIDI wind controller, MIDI keyboard controller and computer, also in 1993; *Nocturno v.3.0*, electroacoustic piece, in 1999; *De silentii natura, de corporum natura*, for percussion and electronic media in 2000; and *Sobre el Agua* for tape,

in 2004. All the electroacoustic parts for these pieces were realized by Silva at his personal home studio.

He performs live electronics and interactive systems in group improvisations, too.

Carole Chargueron (born in Bollène, Vaucluse, France, 1966) composed *Agnioétiomix* for tape in 1999; and *Fluide* for flute and tape in 2001. She lives in Mexico since 1998.

Alejandra Odgers (born in 1967) composed *Nitiicasi* for flute, bass flute and electroacoustic sounds in 2000.

Odgers has been researching the development of electroacoustic music in her native country and wrote for her graduation thesis at Escuela Nacional de Música: *La Música Electroacústica en Mexico* (2000), an extensive catalog listing composers names, their works, and related information.

Rodrigo Sigal (born in Mexico City, 1971), composer and sound recording engineer, collaborated with the creation and start-up of the Laboratorio de Música por Computadora del CIEM - Centro de Investigación y Estudios Musicales (Computer Music Lab at the Musical Research and Studies Center) in Mexico between 1994 and 1998. He finished his PhD Thesis *Compositional Strategies in Electroacoustic Music* in 2003 at City University, London.

Among other pieces he composed: *El firmamento* for piano and tape, and *El firmamento II* for flute, clarinet and tape, both in 1997; *Lagarto* for ensemble and tape in 1998; *Dolor en mi* for guitar and tape (live electronics optional) in 1988; *Fe* for piano and tape, and *Babel* for flute and tape (live electronics optional), both in 1988; *Cycles* for electroacoustic sounds in 1999; *Real scream*, soundscape on CD between 1998 and 2001; *Tolerance* for cello and electroacoustic sounds in 2000; *Twilight* for bassoon and electroacoustic sounds in 2001;

Rimbarimba for marimba and electroacoustic sounds; *Friction of things in other places* for electroacoustic sounds, both in 2002; *Liquid Fear* for ensemble, electroacoustic sounds and video in 2003; and *Boredom of familiarity* for tape, *Power nap* for woodwind quintet and tape, and *Sonic farfalla* for flute and tape, all three pieces in 2004.

Sigal is also active in promoting electroacoustic music through concerts and seminars.

José Ricardo Cortés (born in Mexico City, 1972) studied at the National School of Music of UNAM in Mexico City. He has been teaching multimedia and music technology.

Marcelo Gaete (born in 1972) composed *4 rooms* for cello, DAT and video, and *Partitura visual* for clarinet, flute, two violins, tape (to be spatialized) and video, both in 1999. He is Director of Kalispherion, a group of experimental and contemporary music that performs multimedia works involving musicians, visual artists, actors and choreographers.

Rogelio Sosa (born in Mexico City 1977) composed *Nocturnal* for tape in 1999; *Maquinaria del Ansia* for tape, and *Tenso* for amplified guitar and tape, both in 2000; *Tenso II* for electroacoustic sounds, and *Ejecta* for trombone and electronics, both in 2001; and *Espasmo fulgor* for violin and electronics in 2002.

Many other Mexican composers have been using electroacoustic media in their music. **Lan Adomián** composed *Interplay* for orchestra and tape in 1975. **José Amozurrutia** composed *Transferencia* for prepared piano and tape recorders in 1976. **Guillermo Acevedo** composed *Punto de Partida* for tape in 2002. **Alejandro Esbrí** composed *Fusiones* for tape and corporal expression group, and *Fisiones*, an electronic suite on tape, freely related to Julio Cortázar's *Rayuela*, both in 1984; *Preludio al fin de los tiempos* for tape, in 1988; *Deseos dorados*, ballet music on tape, in 1991; and *Elegía (para Juan Herrejón)* for tape in 1993.

Pablo García composed *Gutura* for tape in 2000; and *Gongaplause* in 2003. **Alejandra Hernández** composed *Pies, para que los quiero* for *zapateado*, electroacoustic sounds, lights and video in 1998-1999. **Miguel Hernández** composed *Plaza Bolívar* for tape in 2002. **Daniel Lara** composed *Amplitud Modulada* for tape in 2002. **José Ramón Mondragón** composed *Salón de Belleza* for tape in 2002. The group MU created *Mielina* and *Mu 03* in 2004, and *Mu 09* in 2005. **Alberto Nuñez** composed *Malena en la fábrica* for tape in 1972. **Víctor Rivas** composed *Metagloborfis* for tape in 1998. **Jorge Reyes** composed *Zocaloop* for tape in 2002. **Aldo Rodríguez** composed *Divertimento* for flute, piano and electronic media in 1987; *Dos canciones* for tenor with electronic processing and piano in 1990; *Evento II* for soprano, narrator, 10 strings guitar and computer, and *Ocaso del tiempo o el tiempo aclara lo que el otro tiempo nubla* for piano, synthesizers and computer, both in 1991. **Víctor Romero** composed *Voces Canto I* for tape in 2000. **Luis María Sánchez** composed *Radio 1* for tape in 1997. **Salvador Torre** composed *Bird* for alto sax and tape in 1990. **Mauricio Valdés** composed *Tientas* for tape in 2001.

There are also works involving electroacoustic media by **Andrés Argil, Federico Alvarez del Toro, Alfredo Antúnez, René Baruch, Gerardo Cárdenas, Ricardo Cinta, Alma Siria Contreras, Raúl Cortés, Juan Fernando Durán, Leandro Espinoza, Ernesto García de León, Francisco González Christen, Arturo Jiménez, Fernando Javier López, Antonio López-Ríos, Juan Ramón Meza, Ricardo Miranda, Ricardo Niño, Hilda Paredes, Gabriel Pareyón, Jorge Paz, Jorge Ritter, Marcela Rodríguez, Bonifacio Rojas, Hugo Rosales, Carlos Sánchez, Rocío Sanz, Alejandro Saqui, Gerardo Tamez, Nicandro E. Tamez, Verónica Tapia, Raúl Tudón, Cynthia Valenzuela, Hebert Vázquez, Mariana Villanueva, Sergio Villarreal and Alberto Zapata**, to name but a few.

6.14 Panama

Emiliano Pardo-Tristán (born in Santiago de Veraguas, 1960) composed *MICROETUDES* for vibraphone and electronics in 2002, working the electronic part with the Csound software.

Pardo-Tristán also includes this piece as part of his *COLLAGE* for violin, vibraphone, guitar, double bass, batá drums and electronic music, created also in 2002. Pardo-Tristán is living in Philadelphia, United States.

According to information provided by Pardo-Tristán in January, 2003, there were not electronic music studios or concert activities including electroacoustic music in Panama.

Samuel Robles (born in Panama City, 1974) have been composing also some works using electronic media: *The tell-tale heart* for piano and tape, realized at his personal studio in Panama during 1998, and *Voices trapped*, using his own voice as sound source, later computer processed with C-mix, realized in the United States in 2000.

David Soley (born in Ancon, 1962; a U.S. territory at that time) has worked with computers in his music: *Torso-trozos* for tape, 1993, and *Línea* for Zeta violin, Radio Baton, sampler, sample playback and tape, originally composed 1986-1987, and revised during 1994-1995. Soley wrote:

The title “Línea” (Spanish for “line”) reflects the basic idea of the work. A line, first heard in the viola after a very brief electronic introduction, is used to derive various figures, ornaments, harmonies and other lines throughout the course of the work. Línea utilizes a 5-string Zeta violin/viola, an E-mu E-IV sampler, a DAT player, E-mu Proteus sample playback and Max Mathews’ Radio-Baton. Created by Max Mathews, the Radio Baton is a controller for live computer music performances. It tracks the motions - in three dimensional space - of the ends of two batons which are held in the hands of a performer. The 3-D trajectories of each baton are used to control the performance. The Baton is a MIDI instrument and is intended to work with other MIDI devices including synthesizers and computers.

Soley, D. (1997). Computer Music @ CCRMA, Volume Two. CCRMAV02. United States: CCRMA.

David Soley moved to the United States in 1979.

6.15 Paraguay

Luis Szarán (born in Encarnación, 1953) is conductor, composer and researcher. He is one of few musicians that has been working with electroacoustic media in Paraguay. Mostly devoted to compose acoustic music, he also created: *Reencuentro* for violin, clarinet, cello, piano and synthesizer in 1983; and *Mimesis* for cello and synthesizer in 1992.

René Ayala (born in Asunción, 1957) has been working with electroacoustic media in his music for several years.

Among other works, Ayala composed: *Vida, Pasión y Muerte a la Medianoche* in 1981; *Cuando la lluvia cae* in 1986; *Espejos, Graffiti* and *Anguekoi*, all three pieces in 1987; music for the video *Perdidos* by Ray Armele in 1990; *Pay*, with coreography by Francisco Carballo, in 1993; *Hilos* in 1994; *Ombyka* in 1995; *Quitando envolturas* in 1996 and *Sintonía de dos mundos* in 1997, both with coreographies by Mari Carmen Niella; music for the videos *En el camino a Sawho yamaxa* and *Xakmok Kasek*, by Malú Vázquez and José Elizeche, in 2001; and *Salmos*, also in 2001. He also composed *Desconcierto para chapa y percussion* and *Las Sirenas*.

Ayala created Campanellas in 1983, first a musical group, turned later in an evolving project based mainly on electroacoustic and experimental music, integrating contemporary academic music languages together with jazz, rock, and Latin American folk.

Daniel Luzko (born in Encarnación, 1966) is composer, pianist and conductor. He composed among other pieces: *Ballet Suite* and *Dimensions*, both in 1991, and *Study for Sound Design* in 1993, all three works for tape. He also composed *Adriana* for violin (with sound distortion) in 1997.

Hugo Guillermo Villagra Roa (born in Asunción, 1982) is a young composer coming from the rock scene who is also working in experimental music with electroacoustic media. He composed *El Duende* in 2001 and *La Guerra* in 2003.

6.16 Peru

Celso Garrido-Lecca (born in Piura, 1926), a well-known composer of symphonic and chamber music, composed in 1971 an electronic piece for tape, *Estudio N° 1*, while he was in Chile (the composer lost that tape when he left the country in 1973). In 1972 he composed *El movimiento y el sueño*, a piece he revised and re-orchestrated in 1984 for two narrators, mixed choir, instrumental ensemble and tape (including *concrète* sounds).

Enrique Pinilla (born in Lima, 1927; died in Lima, 1989) composed *Prisma* for tape in 1967, the piece was realized at the Columbia-Princeton Electronic Music Center in New York. Another piece by Pinilla, *Trio para flauta, percusión y cinta magnética* for flute, percussion and tape, is mentioned in some documents but probably was never realized.

César Bolaños (born in Lima, 1931) went to New York during the 50s to study at the RCA (Radio Corporation of America) Institute of Electronic Technology. Then in 1963 he received a fellowship to study in Buenos Aires at CLAEM with Ginastera, Nono, Messiaen, Copland, Maderna and Asuar, among others.

At CLAEM Bolaños composed his first tape piece in 1964, *Intensidad y Altura*, being also the first electroacoustic music composition produced at that Center, while its lab was still during its first stage of building.

Intensidad y Altura is based on the homonymous poem by César Vallejo. At that time the CLAEM had three tape recorders of diverse quality (one Ampex stereo, one Grundig stereo and one Philips mono), a white noise generator, a band-pass filter and a speed variation device. Bolaños used as sound sources three voices, white noise and different metal plates.

During the next several years Bolaños worked extensively with electroacoustic and computer techniques in his music, composing tape and mixed pieces, using live electronics and also multimedia. Some of his works are: *Lutero*, electroacoustic music on tape for theatre, and *Yavi*, electroacoustic music for a short film, both 1965; *Dos en el Mundo*, electroacoustic music for a full-length movie, *Las Paredes*, electroacoustic music on tape for theatre, and *Interpolaciones* for electric guitar and tape, all three works 1966; *Espacios I*, *Espacios II* and *Espacios III*, electroacoustic pieces for dance, 1966, 1967 and 1968 respectively; *Alfa-Omega*, based on biblical texts, for two reciters, theatrical mixed choir, electric guitar, double bass, two percussionists, two dancers, magnetic tape, projections and lights, 1967; *I-10-AIFG/Rbt-1* for three reciters, French horn, trombone, electric guitar, two percussionists, two technical operators (lights panel, lights keyboard and six radios), nine synchronized slide projectors, magnetic tape, amplification for the acoustic instruments and black lights for the individual scores, 1968, with general coordination based on a “programmed automatic light signal system controlled by perforated paper” (Bolaños, C. 2004. Personal communication); and *Flexum* for magnetic tape and wind, string and percussion instruments, 1969.

During his years at CLAEM Bolaños was teaching composition from 1964 to 1970, and composition with electronic media from 1964 to 1967. He was also there in charge of the design and building of the first electronic music lab.

Being also an active researcher, Bolaños was working on electroacoustic and music between 1964 and 1970, sound and image between 1965 and 1968, and also on computers and music between 1969 and 1970 (Bolaños, C. 2004. Personal communication). On this last research he worked together with mathematician Mauricio Milchberg with support by Honeywell Bull and later by Olivetti Argentina.

Bolaños and Milchberg were using computers during the late 60s to build compositional structures. ESEPCO, the generic name they used for those works, stands for “estructura sonoro-expresiva por computación” (computer sound-expressive structure). *Sialocibi* (ESEPCO I) for piano and one reciter-mime-actor, and *Canción sin palabras* (ESEPCO II) for piano with two performers and tape, subtitled *Homenaje a las palabras no pronunciadas*, both 1970, are two works representative from this period.

After 1970 Bolaños returned to Peru and devoted himself mainly to musicological research. An exception to that, between 1986 and 1993 he was teaching a sound course (“Sonorización”) at the Faculty of Communication Sciences in the University of Lima.

Bolaños wrote several books, among them: *Técnicas del montaje audiovisual*, published by the National University of Litoral, Santa Fe, Argentina, in 1969.

Olga Pozzi Escot (born in Lima, 1931), composer and theorist, studied music in Peru, United States and Germany. She composed, among other works: *Interra II* for piano (left hand) and pre-recorded piano on tape in 1980; and *Mirabilis I* for live and pre-recorded viola.

She has been living in the United States for many years.

Edgar Valcárcel (born in Puno, 1932) was also one of the Latin American composers that studied in Buenos Aires at CLAEM during the early 60s (1963-1964), but it was when he received a Guggenheim fellowship to work at the Columbia-Princeton Electronic Music Center in New York that he composed his first pieces using electronic sounds. *Invencción* for tape was composed there in 1967, using electronic sound wave generatos and filtered white noise, and applying tape editing and looping techniques. Valcárcel also composed at that center his *Canto Coral a Túpac Amaru* for choir, percussion and tape in 1968.

In *Zampoña Sónica* for flute and electronic sounds, composed between 1968 and 1976, Valcárcel also made use of electronic sounds he produced during his stay at the Columbia-Princeton Electronic Music Center.

In 1976, during his stay in Montreal as Visiting Professor at the Faculty of Music of McGill University, Valcárcel composed *Flor de Sancayo* for piano and tape, realized at the Electronic Music Studio of that University.

Now at his seventies, Valcárcel feels that the dream to keep working on the electronic music field was impossible to accomplish in his own land (where he lives) because of the dramatic social, economical and cultural situation there. In spite of that, he never loses his expectations (Valcárcel, E. 2003. Personal communication).

Pedro Seiji Asato (born in Lima, 1940) composed *Quasar III* for tape and percussion in 1972. He was experimenting serial and dodecaphonic techniques during the 70s, but since then turned his language using only a modal approach to composition.

Alejandro Núñez Allauca (born in Moquegua, 1943) was studying in Buenos Aires at CLAEM during the 60s (1969-1970). He composed *Gravitación humana* for tape there, in 1970. Another piece by Núñez Allauca is *Variables* for six and magnetic tape, dated 1967.

Arturo Ruiz del Pozo (born in Lima, 1949) studied at the National Conservatory of Music in Lima and later at the Royal College of Music in London. There he studied composition and electronic music. He received in 1976 the scholarship that led him to England, where he received a Master in Music degree in 1978.

Del Pozo composed his *Canciones Nativas* (including *Lago de Totoras*, *Despegue* and *Noche*, among others) in 1978 working at the Royal College of Music; and in 1985 *Nocturno*, for 3 performers and electronic sounds.

Rajmil Fischman (born in Lima, 1956) left his native land to study and develop his musical career mainly in Israel and England, where he is living now.

Fischman studied electrical engineering as well as composition, and has been working with computer media since the mid 80s. He composed: *Spacezoo* for computer generated tape in 1988; *Los Dados Eternos* for oboe, tape and real time processing in 1991; *Dreams of Being* in 1991, and *Sin Los Cuatro* in 1994, both for tape; *Cold Fire* in 1994, *The Day After ...* in 1995, and *Dance Suite* in 1996, all three pieces for string quartet and tape; *Alma Latina* in 1996-1997, *Beikvot Havolcano* (joint composition with Israeli Tsippi Fleischer) in 1997, *Barren Lands* also in 1997, and *Kol HaTorr* in 1998, *Erwin's Playground*, *And I Think to Myself ...*, both in 2001, *A Short Tale* in 2002, all of them for tape; *No Me Quedo ... (plantado en este verso)* for saxophone, bassoon, violoncello, percussion and tape in 2000, among other pieces.

Research papers by Fischman has been published by the Journal of New Music Research, Organised Sound and Leonardo Music Journal. He also contributed with two chapters to *The Csound Book* edited by Richard Boulanger, published in 2000 by The MIT Press.

He also has been developing some musical software. More references on Fischman research projects could be found in chapter VIII, section 8.2 Recent research.

José Sosaya (born in San Pedro de Lloc, La Libertad, 1956) has been composing several works using electroacoustic media, among them: *En tomo ...* for guitar, effects' processor and tape in 1994; *Evocaciones* in 1994, realized at LIEM - Laboratorio de Informática y Electrónica Musical in Madrid, Spain; *Impresión* in 1996; and *Voces* in 2000.

Sosaya founded an Electroacoustic Music Laboratory at the National Conservatory of Music of Peru in 1995, and was directing it until 1996.

Gilles Mercier (born in Paris, France, 1963) studied music in Peru and France. He created more than 36 pieces working with electroacoustic media, among them: *Deformaciones* for digital tape or CD or Yamaha SY77 Synthesizer and Cakewalk sequencer in 1993; *Interacciones Iniciales* for digital tape or CD or Yamaha SY77 Synthesizer, Cubase sequencer and WTF30 in 1996; *Mutaciones Tímbricas "A" y "B"* for digital tape or CD in 1997; *Dimensiones Suspendidas*, *Mulchmus*, *Evo 3214*, and *Presidio* (recorded live in studio), all four pieces for digital tape or CD, in 1998; *Esperalba* and *Intubici* for CD in 2003.

Gilles Mercier lives in Lima and has been active in the electroacoustic music scene of Lima since the late 80s.

Nilo Velarde Chong (born in 1964) is professor at the National Conservatory of Music and the Orson Welles Institute in Lima.

He composed: *Glissando 5* during the first electronic music workshop at the National Conservatory of Music in Lima, in 1995; *Místico*, working with sound samples from the human body, in 2001; and *Clarinelec* for processed clarinet and synthesizer in 2004.

Rafael Junchaya (born in Lima, 1965) composed *Piedra del Q'osqo* for tape in 1991; *Ccoyllurcha* in 1993; *In-vita* in 2000; *Madrigal* in 2002; *Die Erscheinung* in 2003; and *Variantes Motímbricas* for clarinet, trumpet and synthetic sounds.

Renzo Filinich Orozco (born in 1978) has been very active composing with electroacoustic media during the last years. His works are also known by the name of his project: *Metástasis*.

Some of his pieces are: *axons*, *clasifonía 1*, *anisotropía*, *12 minutos exactos*, and *poema sonoro "vida"*, all of them dated 2003; and *Imagenes sonoras sobre la carretera (Efecto Doppler)*, *Sensaciones*, *Altiplano*, *Vida Artificial*, *Psicodelia Vocal*, *Sequenza X*, and *Noise, What Is Noise?* all of them 2004.

There are also works involving electroacoustic technologies and techniques by **Jaime Oliver** (e.g. *Silbadores*), **Edgardo Plasencia** and **Jorge Villavicencio Grossmann**. Closer to the electronic music scene are composers like **Carlos Vásquez**, active also in multimedia artistic activities with DACP (Desarrollo Artístico Cultural Peruano).

6.17 Puerto Rico

The *Catálogo de Música Clásica Contemporánea de Puerto Rico* by Degláns and Pabón Roca, published in 1989 in Puerto Rico by Pro-Arte Contemporáneo, includes several pieces using electroacoustic media composed by **Héctor Campos Parsi** (born in Ponce, 1922; died in Puerto Rico, 1998). Nevertheless, the information provided had been controversial when checked with other Puerto Rican colleagues.

Among other works by Campos Parsi, that catalog mentions: *Spectra* for tape, 1956; *En el principio la noche era serana*, incidental music on tape, 1960; *El Inciso*, incidental *musique concrète* on tape, 1962; *Kollagia* for orchestra and tape, 1967-1969; *Arawak* for tape, *El casorio*, incidental music for tape, and *El hombre terrible del 87*, incidental music for guitar, mandolin and tape, all three 1970; *De Diego*, a work for pre-recorded voices and electronic effects on tape, 1974; *Poema Total* for mixed choir and electronic sounds on tape, 1975; and *Las Troyanas*, incidental music for an indigenous group and tape, 1984. Puerto Rican composers R. Aponte Ledée and C. Vázquez mentioned that Campos Parsi started to

experiment recording sounds from an electronic organ on tape (clusters) without further manipulation around the early 70s.

Rafael Aponte Ledée (born in Guayama, 1938) was among the composers studying and composing at CLAEM, in Buenos Aires. He was there during the 1965-1966 period.

Among other works Aponte Ledée composed: *Presagio de pájaros muertos* for actor and tape in 1966, realized at CLAEM; *Estravagario. In Memoriam Salvador Allende* for orchestra and tape in 1973; *Cuidense de los ángeles que caen* for tape, and *Los huevos de Pandora* for clarinet and tape, both in 1974.

Luis Manuel Alvarez (born in Puerto Rico, 1939) composed, among other pieces: *La Creación*, for orchestra and tape, in 1974; *El Guerrero* for piano and tape, *Los Duendes* for tape, *Vida Campesina* for synthesizer, guitar, cuatro and percussion, and *La calle. Poemario de Dalia Nieves* for narrator, synthesizer, guitar, cuatro and percussion, all four works in 1975. In 1982 Alvarez composed *Desde adentro* for soprano, piano and tape, being the tape part realized at the Electronic Music Laboratory of the University of Puerto Rico.

Francis Schwartz (born in Texas, United States, 1940) grew up in his native land and studied music in the United States and France. From 1971 until 1980 he was the Chairman of the University of Puerto Rico's Music Department, where he established the first Electronic Music Laboratory and a Workshop for Experimental Music.

Schwartz has an important catalog of compositions including music for tape only, mixed pieces for instruments and tape, and multimedia works. Some of them are: *Auschwitz*, for tape, aromas, lights, dancer, temperature manipulation and slides, 1968; *Triangular Study*, for trumpet, harp and tape, 1971; *Yo protesto*, for orchestra and tape, 1974; *Time, Sound and the Hooded Man* for actors, tape and videotape, *Dolor de Muelas* for voice and tape, and

Caligula, versions for tape, and piano and tape, all three 1975; *Hommage a K...* for one soloist, tape and aromas, 1978; *Musique pour Juvisy* for tape, videotape and synth, collaboration with C. Miereanu, and *Mon Oeuf*, polyartistic creation including video, aromas, electronic sounds, temperature manipulation and special architecture, both pieces 1979; *Ergo sum*, for flute and tape, 1980; *Grimaces* for chamber ensemble, tape and participating public, 1984; *Aires Granadinos*, versions for electronics only, piano and tape, voice and tape, and violin and tape, 1995; and *Tongues* (or *Lenguas*), 1998.

Esther Alejandro (born in New York, 1947) studied composition and musical education at the Conservatory of Music of Puerto Rico. She composed, among other pieces: *Hecatombe*, *concrète* music, in 1978; *Quietud* for synthesizer in 1985; and *Choteo* for voice and synthesizer.

Carlos Vázquez (born in Mayagüez, 1952) is a very active and prolific composer that has been teaching and working extensively with electroacoustic media in his music. He is Professor at the University of Puerto Rico (UPR), and since 1978 Director of its Electronic Music Laboratory, now re-named as Centro de Tecnología Aplicada a la Música (Center for Music Applied Technology).

Vázquez has been Musical Director of three international symposiums: the first, second and third Muestra Internacional de Música Electroacústica (International Electroacoustic Music Exhibition) held in Puerto Rico in 1992, 1995 and 1999.

Some of his pieces are: *¡Ñoño, los coños no son moños!* for tape, and *Sobre la inmiscusión* for tape, both 1975; *Falafel* for percussion, tape and live electronics, 1979; *La Cara de un Angelito* for chorus and tape, 1980; *Alborada isleña* for tape and computer, 1982; *Caballo de Palo* for soprano, percussion and tape, 1985; *Mágicas Antillas* for tape, 1991; *Juracán* for live electronics, 1992; *El Encanto de la Noche Tropical I: El Yunque* for tape, 1993; *Los Ciclos de Luisa* for tape, dancer and slides, 1994; *Cantos de Alborada* for piano, double bass

and electronic sounds, 1995; *Saxofonía* for sax and tape, 1996; *Mascarada* for soprano, tape and images, *Variaciones On Line* for CD, and the multimedia work *Un Boricua en Madrid*, all 1999; *Tzintzuntzan* for bass clarinet, marimba, violin, double bass, recorded electronic sounds, live electronics and images, 2001; *Esa medalla me quema en el pecho...* for tape, 2000; *Los jardines de la noche* for marimba and tape, 2002; and *Aquel Album*, 2003.

Falafel, *La Cara de un Angelito*, *Alborada isleña*, *Caballo de Palo*, *Juracán*, *Los Ciclos de Luisa*, *Cantos de Alborada*, and *Tzintzuntzan*, were all realized at the electronic music lab of the University of Puerto Rico.

José Montalvo (born in Mayagüez, 1951) composed *Cuatro Estudios* for oboe and synthesizer in 1983. He lives at present in the United States.

William Ortiz Alvarado was born in Puerto Rico (Salinas, 1947), but grew up in New York City. Among other works, he composed: *Marcos* for cassette tape in 1975; *Composición electrónica* for tape in 1978; and *Síntesis* for guitar and tape, *124 E. 107th St.* for percussion, tape and narrator, and *3 Estudios para Computadora* for tape, all of them in 1979.

Roberto Sierra (born in Vega Baja, 1953) composed *Entre terceras* for 2 synthesizers and computer in 1988.

Raymond Torres Santos (born in Río Piedras, 1958) composed several computer music studies on tape between 1982 and 1983, and also: *Allí donde se bifurcan los senderos* for live electronics, *Enchanted Islands* for piano and tape, and *Vestigios Mágicos* for tape, all three pieces in 1984; *Otoao* for tape, realized at UCLA Electronic Music Studio in California, United States, and *Areytos: A Symphonic Picture* for orchestra and computer generated

sounds on tape, both in 1985; and *Presagios Celestiales* for live synthesizers, drum machine and computer in 1988.

6.18 Uruguay

Héctor Tosar (born in Montevideo, 1923; died in the same city, 2002) was one of the big names of contemporary music in Uruguay. His extensive catalog includes several pieces for synthesizer, among them: *Moto perpetuo*, 1983; *La Gran Flauta*, *Música Festiva* and *Homenaje a Debussy*, all three 1988; and *Voces y Viento*, 1989.

León Biriotti (born in Montevideo, 1929), oboist, conductor and prolific composer of instrumental music, composed some works using electroacoustic media. Among them: *En la morada de la muerte* for tape in 1970; *Metamorfosis según Kafka* for oboe and piano, or oboe and tape, in 1974; *Prelude à l'après-midi d'un dinosaure* for oboe and live electronics in 1988; *Pulsars* for Yamaha WX11 MIDI wind controller and WT11 tone generator in 1989; *Furioso* for oboe and live electronics, collaboration with Ricardo Dal Farra, and *Self-Portrait with Family* for one performer playing oboe, multiple instruments and live electronics, both in 1991; *Self-Portrait*, for oboe and live electronics in 1994.

When using electroacoustic media in his presentations, Biriotti also likes to perform with a MIDI wind-controller.

The last piece composed by **Luis Campodónico** (born in 1931; died in Paris, 1973), *El misterio del hombre solo*, seems to be the first time sounds recorded on tape were included together with live acoustic instruments on a musical piece in Uruguay. For this scenic work based on loneliness, madness and death Campodónico used acoustic instruments, singers, actors, mimes, dancers, lights, metronome and also a tape with a recorded text. Nevertheless there was not electroacoustic processing on the recorded speech sounds.

This work by Luis Campodónico was premiered during 1961 at SODRE, Montevideo. From 1961 until his death he left composition and turned to literature. Campodónico lived in Paris from 1956 to 1961 and again from 1964 until his death in 1973.

Antonio Mastrogiovanni (born in Montevideo, 1936) composed in 1970 *Secuencial II* for tape at CLAEM, Buenos Aires, where it was premiered the same year. In 1972 he composed *De Cobres* for two French horns, trumpet, trombone and electronics, including two stereo tape recorders, microphones, mixer as well as a high-pass and low-pass filter. The following year he composed *Cuauhtémoc* for tape and voices, working in México at Laboratorio de Música Electrónica del Taller de Composición del Conservatorio Nacional de Música. In 1975 he composed *Aulos* for three live oboes or one live and two pre-recorded oboes. León Biriotti premiered this piece in Córdoba, Argentina, during 1976, playing the three oboes.

Renée Pietrafesa (born in Montevideo, 1938) is active as composer, pianist, organist and conductor.

She composed, among other works: *A los olvidados* for tape, and *Sugerencias* for soprano, guitar, piano and tape, both in 1972; *Nuestro tiempo, X, Y y entonces Z* and *Meditación*, all three pieces for tape in 1973; *Attente, Canto para curar enfermos (En homenaje a los indios huitcholes)*, *Con pies y sin cabeza* and *Danza de los pájaros pintados y asombrados*, all four tape pieces in 1974; *Helicoidal, París no* and *Viaje de Quetzalcóatl a Mitlan*, all three pieces for tape in 1975; *Musique flasch, París evasión, París l'autre, Tamboriles* and *Cuatro estructuras para cinta magnética*, all pieces for tape, in 1976; *Altos de cobre, Cosas chichimecas, En el zoo, Estructuras I, Estructuras II, Estructuras III, Estructuras IV* and *Tango y texto*, all eight tape pieces in 1977; *Estudios para piano preparado y cinta magnética*, for prepared piano and tape, also in 1977; *Contemplación y sueño* for piano and synthesizer, *De l'ortogonal à la courbe* for tape, *Existamos aquí* for piano, tape recorder and audience, and *Naissance dans la caverne solaire*, all four pieces in 1978; *Crucifixión, o*

bebederos de palomas for tape in 1979; *Prometeo* for dancers, slides and tape, *Fantasías para cinta magnética* for tape, and *Canto* for oboe and tape, all three in 1980; *Mushuc Huaira Huacamujum* between 1981 and 1982; *Integración 7 (religiosa o del más acá)* for voice, 4 performers and tape in 1984, tape part realized at the composer's studio; and *Beauté magique* for soprano, flute, oboe, clarinet, French horn, sax, trumpet, trombone, two violins, cello, double bass, tympanis, gong, tape and synthesizer in 1989, based on the text 18 (*Découverte de l'Inconnu*) from *Cantos de Maldoror* by Isidore Ducasse, Conde de Lautréamont.

Coriún Aharonián (born in Montevideo, 1940) has been composing with electroacoustic media since the 60s. He is a well-known teacher, writer and promoter of new music, and was also one of the main forces behind the *Cursos Latinoamericanos de Musica Contemporanea* (Latin American Contemporary Music Courses) mentioned above.

Aharonián composed his first electroacoustic work in Montevideo during 1960 for the theatre piece *Inspezione* by Ugo Betti; then in 1962 he composed electroacoustic music for a short film by José Carlos Alvarez and José Pedro Boggiani; from 1963 to 1966 he was composing music for several theatre pieces using electroacoustic media (*La fuente del arcángel* in 1963; *Suddenly last Summer* in 1964; *Le tuer sans gages* in 1965; *Water 2000* in 1966. During 1966 he also composed *Hecho 2 (en tres partes y en re)*, a musical theatre piece for prepared piano, xylophonic claves, sine and square wave electronic generators, tubular bell, 4 idiophones and/or membranophones, 6 tape recorders, and paint brushes. Then in 1967 Aharonián composed *Música para aluminios*, for three instrumentalists and tape, being the tape part realized at studio 21 of SODRE radio station in Montevideo.

During 1969 he was in Buenos Aires studying at CLAEM and composed *Que*, for tape, at its Electronic Music Lab. During 1971 produced two short studies at GRM in Paris, France. Then in 1974 he composed *Gran tiempo* and *Homenaje a la flecha clavada en el pecho de Don Juan Díaz de Solís*, both for tape, at the Charybde studio of the Groupe de musique expérimentale de Bourges (GMEB).

¡Salvad los niños! 1976, and *Esos silencios*, 1978 (revised 1981), were composed working at ELAC, pequeño estudio de Montevideo, according to Aharonián “a small and modest cooperative studio” (Aharonián, C. 2003. Personal communication).

Then, in 1984, Aharonián composed *Apruebo el sol* at EMS (Elektronmusikstudion) in Stockholm, Sweden; and in 1995 *Secas las pilas de todos los timbres* for tape, realized at the Studio für Elektroakustische Musik of the Akademie der Künste in Berlin, Germany.

Aharonián also composed music for theatre using electroacoustic media, like: *Rhynoceros* in 1975; *Chaika* and *La trastienda*, both in 1977; *Sacco y Vanzetti* in 1983; *Las ranas* in 1991; and *Molière* in 1998.

He lives in Montevideo.

Sergio Cervetti (born in Dolores, 1940) moved to the United States in 1962, spent some time in Europe a few years later and lived in New York, where he composed most of his electronic music works, from the 70s to the late 90s. He has been living in Pennsylvania since 1998.

Cervetti composed several pieces using electroacoustic media: *Studies in Silence*, a taped version of modified piano and voices in 1968; *Oulom* for tape, in 1970; *Grafitti* for orchestra, spoken choir and tape in 1971; *Raga III* for tape, in 1971; *Bits & pieces and Moving Parts* for tape in 1977 (the tapes of all those works were realized at the Columbia-Princeton Electronic Music Center). Then he composed *El río de los pájaros pintados* for bandoneón and tape, and *Stella Vindemiatrix*, produced using a Synclavier synthesizer, both in 1979, and *Something Borrowed, Something Blue...* for tape between 1979 and 1980, all three tapes realized at the University of Victoria Electronic Studio, in British Columbia, Canada. Since then Cervetti realized his compositions with electroacoustic media working at his personal studio; some of them are: *Diminished Landscape*, 1984; *Transatlantic Light* and *The Hay Wain (El Carro de Heno)* for tape, used by Oliver Stone in his 1994 film *Natural Born Killers*, both pieces 1987;

Inez de Castro, ballet music, 1988; *Inventory*, 1990; *Pornography*, music for the film by Tom D'Iesso *Rift*, and *Fields of Grace*, both 1991; *Quest* for tape, 1993; *The Guardians* for tape and *Alignements*, both 2001.

Ariel Martinez (born in San José, 1940) has been living in Argentina for many years.

He composed several works involving electroacoustic media during the 70s, among them: *El glotón de Pepperland* for tape, realized at CLAEM in Buenos Aires, and *Nosotros y ellos* for flute, oboe, clarinet, violin, viola, violoncello and electroacoustic processing, both in 1970; *Cabotaje IIIa (En medio)* for tape, and *Tromboffolón I* for trombone, tuba and tape, both in 1971; *Cabotaje IIIb* for flute and tape, between 1971 and 1972; *Cabotaje IIIc* for 3 flutes and tape, between 1971 and 1976; and *Tromboffolón II* for trumpet, French horn, trombone and tape, between 1971 and 1978.

Cabotaje IIIa was the last piece produced in the electronic music lab at CLAEM, during December of 1971.

Conrado Silva (born in Montevideo, 1940) became interested in new music during the 50s and was studying in Germany between 1962 and 1964. He composed in 1964 *Musik für Zehn Kofferradiogeräte (Music for ten portable radios or Música para 10 radios portátiles)*, using a computer to organize the compositional material for this piece.

Silva lives in Brazil since 1969, where he is Associate Professor at the Music Department in the University of Brasilia. He has been a major force on the development of electroacoustic music in Latin America, not only for his compositional and teaching activities but also because of the aforementioned Cursos Latinoamericanos de Música Contemporánea (Latin-American Courses for Contemporary Music) he created, which were landmarks of new music in the region, and the several electronic music studios he founded in Brazil: Brasilia

University, 1969; University of Sao Paulo State, 1977; Santa Marcelina Arts School, 1985; Syntesis, 1986.

Some electroacoustic works by Silva are: *Antígona*, an electroacoustic incidental piece for theatre, 1965, realized at the studios of SODRE radio station; *Brinquedos I (Crónica)*, electroacoustic incidental music, 1971; *Cor incurvatum*, electroacoustic incidental music, 1972; *Ulisses*, electroacoustic incidental music, and *Celebração* for 4 mixed choirs and synthesizer, both 1973; *Equus*, suite, electroacoustic incidental music, dated 1975, for the homonymous play by P. Schaeffer; *Polaris* for voice, flute, guitar, piano, double bass and synthesizer, and the electroacoustic piece *Natal del-Rei*, both 1980; *Fonoarticulações* for voice, tape and live synthesizer, based on sound materials by Dieter Schnebel, 1980; *Mars* for live electronics, *Para Sinthy*, ritual for synthesizer, and *Círculo Mágico Ritual* for 20 synthesizers, all three pieces 1985; *Ludus absque fasciem* for live electronics, and *Eixos I* for symphonic orchestra and synthesizer, both 1986; *Ganis* for live electronics, 1987; *Pericón* for live digital instruments, 1988; *Galaxias II* electroacoustic piece, 1991; the opera *Espaços Habitados* for female voice, actor and live digital equipment, 1994, based on texts from the book *Galaxias* by Haroldo de Campos; *Fragmentos do Apocalipse*, 2001, and *Fragmentos do Gênesis*, 2002, both electroacoustic pieces realized at Estúdio de Música Eletroacústica da Universidade de Brasília; and *Antenas de Miramar*, multimedia piece, 2005.

Silva has been Vice-President of ICMA, the International Computer Music Association.

Beatriz Lockhart (born in Montevideo, 1944) composed *Ejercicio I* for tape during 1970 in Buenos Aires.

Carlos da Silveira (born in Montevideo, 1950) composed *Así nomás* in 1977.

Leo Maslíah (born in Montevideo, 1954) composed, among other works: *La Construcción* in 1979, a piece based on a text by Kafka, and realized with two cassette tape recorders; *Llanto* in 1980, realized at ELAC studio in Montevideo; *Radio Huesca* in 1992; *Tiruriru* between 1992 and 1993; *Africa tuya* in 1993; *Rigor vitae, curriculum mortis* and *Eccétera*, both in 1995; all pieces for tape.

Fernando Condon (born in Montevideo, 1955) composed *Suiana Wanka* between 1981 and 1982 and *En familia* in 1988.

Daniel Maggiolo (born in Montevideo, 1956; died in Montevideo, 2004) was since 1988 the Director of eMe, the Estudio de Música Electroacústica (Electroacoustic Music Studio) at the University School of Music sited in Montevideo; and since 2000 Director of the Escuela Universitaria de Música (University School of Music).

Most of Maggiolo's electroacoustic music works are for tape only: *sólo que desde adentro*, 1977; *habrá que ver*, 1978; *esos laberintos, tan nuestros*, 1980; *y en eso te vi, tan perdida*, 1989; *en el hecho mismo de la passion*, 1991; *nuestra magia cotidiana*, 1992; *adormecido por el aire del atlántico [... se van, no vuelven más...]*, 1989-1995; *de los vientres, de las más*, 1997; *afuera el aire es tan sólo otra illusion*, 1991-1998.

Dated 1999 is *a pesar de todos los naufragios*, mixed piece for percussion and tape; and dated 2000-2001 *por si acaso fuera cierto*, for female voice and electroacoustic sounds, based on poems by Fernando Beramendi and Oliverio Girondo.

Eduardo Paz Carlson (born in 1958) is a prolific composer that created numerous works using electroacoustic media.

He composed: *la batalla desesperada* between 1976 and 2003; *Así nomás* in 1977; *congelados, los pies del sol 1, plaza de comidas* and *infinidad de productos*, all four pieces between 1977 and 2003; *hotel de paso* between 1978 and 2002; *visión 2* between 1991 and 1996; *spiritu sanctus in corde 2* between 1991 and 2002; and *saturnina* between 1995 and 2003; among many other works

Paz Carlson wrote about himself and his music:

First of all, I believe that an artist must remain silent. The less he talks about himself and his work the better. What is important is the listener, the observer, the reader. They are the ones who must talk, analyze and as a last resort, create the work [...]

It is difficult to date correctly each piece because all were composed in segments of works done in different times (between 1977 and 2004). I cannot affirm that all my "electroacoustic musika" work is really "electroacoustic" well... the reason is because I don't have a very clear vision of what electroacoustic music really is. It can be said that I "descend" from Varese, Stockhausen, Eno, Fripp, Canas [...]

By writing MUSIKA with a K expresses that I don't consider myself a real musician, or as how the academy considers the status of a musician. However, do I compose electroacoustic music? Maybe yes, I don't know [...]

There are all sorts of transfigured sounds. In the majority of my works I make a mixture of every different sound which I have at hand at the moment [...]

Paz Carlson, E. (2004) Eduardo Paz Carlson [online]. Address: http://retary.net/idea/idea7/idea_7/eduardo/eduardo.htm

Luis Jure (born Montevideo, 1960) is professor at eMe, the Estudio de Música Electroacústica de la Escuela Universitaria de Música (Electroacoustic Music Studio of the University School of Music) since 1999. He composed *Takanimba. A night in Soweto* in 1988 (revised in 1991), *Eyeless in Gaza* in 1992 and *mar de fondo* in 1999 (revised 2001), all of them electroacoustic works for tape.

Pablo Sotuyo (born in Montevideo, 1963) composed among other pieces: *Sonorización* for live digital synthesizer (Yamaha DX7) in 1989; *El Canto del Caracol*, electroacoustic ballet, in 1991; *MIDI Buffer Full No.1* for two MIDI pianos and computer, and *Aleph* for computer, both in 1996; *Estudio sobre Physical Modelling* for computer (working with Csound), and *Bereshit 1.1* for electronic media, both in 1997; *Bereshit 1.2* for electronic media in 1998; *Bereshit 1.3* for electronic media in 1999; *Quem é você?* and *Marinas*, both for electronic media; and *Meditações de Thessalus* for oboe and electronic media, all three works in 2000; *Ambienta2001* for electronic media, *O Homem das Massas* for chorus and electronic media, *Dominica in Palmis* for organ and electronic media, and *Feria Secunda Majoris Hebdomadae* for tenor, guitar, glockenspiel and electronic media, all four pieces in 2001; *Dominica Resurrectionis* for voices, guitar, organ, small orchestra and electronic media in 2002.

Pablo Sotuyo lives in Brazil.

Many other composers have been using electroacoustic media in their music. **Carlos Pellegrino** composed its electroacoustic pieces: *Sin* in 1974, and *Voci silenti* and *Trovatura*, both in 1979. **Marino Rivero** (born in Tacuarembó) composed *Juegos extraños* in 1977, tape realized at the School of Arts of New York University, and *Impresiones de Toledo* between 1986 and 1988, both works for bandoneon and tape. **Fernando Ulivi** composed *Estudio sobre un cuento corto de Felisberto Hernández*, electroacoustic piece dated 1982.

There are also works involving electroacoustic media by **Alejandro Barbot**, **Jorge Camiruaga**, **Leonardo Croatto**, **Ernesto Donas**, **Ulises Ferretti** (born in Florida, 1953), **Jaime Kuckierwar**, **Diego Legrand**, and **Alberto Macadar**, to name but a few.

6.19 Venezuela

Alberto Grau (born in 1937) composed *Epilogo* for tape in 1981.

Alfredo del Mónaco (born in Caracas, 1938), one of the big names on the contemporary music scene of Venezuela.

After composing *Cromofonías I* during 1966-1967, and *Estudio electrónico I* during 1967-1968, del Mónaco moved to New York to study and compose at the Columbia-Princeton Electronic Music Center from 1969 to 1974. There he composed *Metagrama* for tape in 1969-1970, and *Estudio electrónico II*, also for tape, in 1970. *Metagrama* is based on the manipulation of the voice of Venezuelan choreographer-dancer Sonia Sanoja; she read the poem by Alfredo Silva Estrada used to compose the piece. In 1970 del Mónaco created also *Tres Ambientes Coreográficos para Sonia Sanoja*, joining two sonic atmospheres to *Metagrama*. About that three-parts choreographic piece the composer explained:

Uno de ellos es un fondo sonoro plano con total libertad sobre el cual ella podía construir, el segundo también era otro fondo sonoro plano con un sonido blanco que se disuelve y regresa con distinto color, muy libre, un fondo sonoro para que ella pudiera hacer todo lo que quisiera, y el tercero era *Metagrama*, de modo que quedaban los tres ambientes juntos.

One of them is a flat sonic background with total freedom on which she was able to build [dance], the second was also another flat sonic background with a white sound that dissolves and returns with different color, very free, a sonic background so that she could do everything what she wanted, and third was *Metagrama*, hence the three sonic atmospheres were together. [RDF free translation]

Del Mónaco, A. (2003). On *Tres Ambientes Coreográficos para Sonia Sanoja*. [interview by RDF].

Later del Mónaco composed *Alternancias* for violin, viol, cello, piano and electronic sounds on tape, and *Dualismos*, for flute, clarinet, trombone piano and electronic sounds on tape, both in 1971; *Syntagma (A)* for trombone and electronic sounds on tape, between 1971 and 1972; *Trópicos* for tape in 1972; and *Estudio electrónico III*, also for tape, in 1974. The composer completed in 1974 his Doctoral Thesis based on that last electronic music work.

Del Mónaco made his first experience on computer music working with an IBM 360 (“...those were the punched cards’ days”, he remembers), finishing a sinewave-based work on December 25 of 1971: *Synus 12/25/1971*, for tape. For him that “was a test ... and no more” (del Mónaco, A. 2003. On *Synus 12/25/1971*. Interview by RDF).

Years later he came back to the electroacoustic world composing *Lyrika* for oboe with electronic extensions ad libitum, in 1992. This work can be performed as an oboe solo or oboe plus tape piece. The mixed version uses a prerecorded tape (made by the performer) with background multiphonics played very softly (*pppp*) from around the second part until almost the end of the composition.

Alfredo del Mónaco lives in Caracas, Venezuela.

Federico Ruíz (born in Caracas, 1948) composed among other pieces: *Actualidades* for three narrators and tape in 1982; *La factoría celeste* in 1984 and *Aproximación a Bach* in 1985, both for electronic sounds; *Rebelión de compases* for mezzo-soprano, synthesizer and multi-effects processor, with texts by Manuel Feo-La Cruz, in 1988; and *Stabat Mater* for mezzo-soprano, flute, oboe, double bass, synthesizer and electronic processing, in 1989.

Alfredo Rugeles (born in Washington D.C., 1949), composer and conductor, studied music at Escuela Juan Manuel Olivares in Caracas and later at the Robert Schumann Institute in Düsseldorf, Germany. During more than 10 years he has been directing the Festival Latinoamericano de Música, a major event in the Latin American new music scene.

Rugeles composed among other works: *Thingsphonia* for tape in 1978; *Hace veinte años* in 1988; and *Oración para Clamar por los Oprimidos* for voice, flute, oboe, harp, double bass and synthesizers in 1989.

Rugeles lives in Venezuela.

Josefina Benedetti (born in New Haven, Connecticut, United States, 1953) composed *La Muerte del Delfin* for tape and slides in 1994. She lives in Venezuela.

Alfredo Marcano (born in Maracaibo, 1953) composed *Trio* for flute, oboe and electronics in 1989; and *Y fue Seragua* for percussion and pre-recorded sounds.

Alvaro Cordero (born in Barquisimeto, 1954) composed *Deambulando* for harp and electronic processing in 1988; and *Un pájaro* for tape in 1990.

Victor Varela (born in Caracas, 1955) composed *Procesador I* for tape in 1986; *Praeludium I* for oboe, live electronics and tape in 1988; *Omaggio a Cortázar* for mezzo-soprano and computer in 1993; and *Logarítmica* for one percussion player and tape in 1994. He lives in Sweden.

Ricardo Teruel (born in Caracas, 1956), composer, electronic engineer and piano, English concertina and homemade instruments performer, started to teach electronic music at the Instituto de Fonología of Centro Simón Bolívar in Caracas in 1983, and is the Director of the Electronic Music Lab there since 1988. He is also Professor of Composition and Electronic Music at IUDEM - Instituto Universitario de Estudios Musicales (Universitary Institute of Musical Studies), where he began to teach in 1990.

Among other works Teruel composed: *Nuestra cultura vegeta* for tape, realized at the Instituto de Fonología of Simón Bolívar Center in 1976; *Hojas de olvido* for electronic sounds on tape, realized at his personal home studio with an ARP 2600 analog synthesizer

and two cassette recorders in 1981; *Pobre música electrónica pobre* for recorded voices simulating electronic sounds and theatrical actions, and *A ver si nos entendemos* for piano and electronic sounds on tape, both in 1983; *Glooskap y Lindú*, recorded narration with electronic sounds, *Un minuto de silencio por favor (o ni en sueños)* for recorded electronic sounds, and *Um-um-é-hum-ah* for electronic sounds on tape, all three pieces in 1984; *Orquestada No.7: La Gran Aldea* for symphonic orchestra and electronic sounds on tape in 1985; *Huellas de Voces Perdidas*, 12 pieces for Roland JX-3P synthesizer, with PG200, *La Cacería del NHOC* for electronic sounds on tape, and *Suave, suave, fluye suave; fluye, fluye, suave fluye* for four hands piano and electronic sounds on tape, all three works in 1986; *Piés-ligeros* for electronic sounds on tape, and *Pájaro bobo*, also for electronic sounds on tape, both pieces in 1987; *Estacionaria* for B flat clarinet and electronic sounds on tape (or tape only), *El Macromicrobio* for double bass and electronic sounds on tape (or tape only), *A la luz del encanto* for oboe and electronic sounds on tape (or tape only), *Cuentas Claras* for symphonic band and two optional synthesizers, *Archivos* for one to five keyboard synthesizers and programmable electronic drum machine, and *Llamadas* for B flat trumpet and electronic sounds on tape (or tape only), all six pieces in 1988; *Santuario* for voice, flute, double bass, keyboard synthesizer, programmable percussion and reverb, *Expectativa* for two synthesizers or two pianos, programmable percussion and symphonic orchestra (being played also as the first movement of *Concierto de las Tres Esferas*), *Triángulo Mágico* for two synthesizers and symphonic orchestra, collaboration with Beatriz Bilbao (being played also as the third movement of *Concierto de las Tres Esferas*), and *Polvo y cenizas* for reciter processed voice and electronic sounds on tape (or tape only), all four works in 1989; *3 Piezas para Liralata y sonidos electrónicos grabados* for seven strings liralata (homemade instrument) and electronic sounds on tape in 1996; *Perceptiva 1* for electronic sounds on tape in 1998; *Energías Liberadas* for sound objects and recorded sounds, and *Trances* for different instruments and recorded electronic sounds (*Trance 1: Fuego* for tenor English concertina and recorded electronic sounds; *Trance 2: Tierra* for rustic home made m'bira -sansa, kalimba- and recorded electronic sounds; *Trance 3: Agua* for tenor English concertina and recorded electronic sounds; *Trance 4: Aire* for home made *campanelli cortinero* -curtain-rod campanelli or glockenspiel- and recorded

electronic sounds), both in 1999; and *Grabados*, a group of pieces for English concertina and/or home made instruments and recorded sounds, in development since 2000.

Gustavo Matamoros (born in Caracas, 1957) composed extensively using electroacoustic media. His creations include mixed pieces, compositions for tape, performances, installations, radiophonic works and multimedia shows.

Among other pieces Matamoros composed: *Cervatana Music* for flute and live processing in 1982; *142857* for tape in 1986; *Truly Yours* for xylophone and tape in 1987; *Con el dedo en el timbre*, multimedia work involving one reed instrument (or a MIDI wind controller), one string instrument, one percussion instrument, dancer, video, lights and tape, in 1990; *To the Victims...* for snare drum and tape, *Sin Ninguna Imperfección...* for up to eight instruments and tape, *In Memory of Gentle Giant II*, and *Auto-Retrato* for live electronics with video, all four pieces in 1991; *Heavy Metal* for amplified music stand and tape, and *37, for instance, or 36, to John Cage* for string orchestra and tape, both in 1992; *Una Guitarra...Toca Sola* for live electronics and text, and *Dreamcatcher* for string quintet, vocoder and tape, both in 1993; *Music On A Budget*, and five short pieces: *Variations on a Shoe String* for amplified pencil and shoe string, *Sound Consumption* for amplified burning match, *More for Less, or Time is Money* for as many musicians as possible, *Pocket Change* for amplified loose coins, and *Cheaper Imitation: Stars & Strips Forever More* for electronically processed tape, also in 1993; *Ventanas de Contacto* for amplified double bass and gated tape in 1994; *RE: TdM(are)*, for *Anthony deMare* for piano, voice, gates and tape, and *Private Thoughts/Public Forum* for 3 readers, gates and 3 channels of tape, both in 1995; *Piano, ma non tango* for piano, gate and tape, and *Mapa/Memoria* for 6 channels of sound, gates, microphones and dancer, both in 1996; *Trump(s) Car(d)* for brass quintet, drum set, gates and tape in 1997; *Sing and Follow the Leider* for voice, musical saw, gated tape in 1998; *Fishtank: Music BorderLine* and *F"ishtank: B(ey)ON'K(ey) West*, two evening-long pieces constructed by the overlapping of several unrelated sound and video pieces, both also in 1998; *In my Mind as I Work* for gated saw and wooden plank in 2000; *Electra* for five channel gated soundscape for play, *An Old*

Shoe... for saw and tape, and *Sounds Gathered* for any number of participants recorded, all three works in 2001; and *FTNK GTR: Evidence No 1* for gated Fishtank GTR in 2003.

He has been composing also a series of *Portraits (Retratos)* working with sound materials coming from the same portrayed people; some of them are: *Retrato: Flores Chaviano* for guitar and tape, and *Retrato: Joseph Celli* for oboe and tape, both 1990; *Retrato: Bob Gregory* for reader and tape, 1990; *Retrato: Luis Gómez-Imbert* for doublebass and tape, and *Retrato: Ricardo Dal Farra* for tape and real time processing, both 1992.

Some of his *Sound Paintings on Tape* are: *Sound Painting with Dreams and Spirits*, a 15-minute loop, 1997; *Sound Painting with Piano*, a ten-minute loop, 1998; and *Sound Painting with Harp and Gongs*, an eight-minute loop, 1999. Among his radiophonic works are: *La Pieza/NMA-Miami Version*, 1988; *Tracing the Radio Landscape* and *Preparing The Air To Let The Rhythm Be Heard And Help The City With Its Dancing*, both 1992.

About his installations, some of them are: *R con R*, with Fred Snitzer, a collaborative installation incorporating toy trains & sound, 1989; *Ferrocarril*, with Fred Snitzer, a collaborative installation incorporating computer-controlled toy trains & sound, 1990; *Hold On!!!*, sound installation, 1991; *The Garden*, with Kate Rawlinson and Diane Dawes, a collaborative installation incorporating sound, painting & sculpture, 1992; *The Ear of the Beholder*, an interactive mixed-media sound sculpture, 1993; *An Interaction of Ideas, an installation of sound and computer images*, with Tom Schmitt, a collaborative installation, 1994; *Field*, with Larry Cressman, a collaborative installation incorporating sticks, glass, custom multiple speaker system & sound, 1994; *¿METAPHOR?*, sound installation, 1995; *Fishtank GTR*, a four gate triggering instrument for improvisation, and *William Tells of Rights*, recorded text broadcast through a snare drum, both 1997; *Dreams & Spirits*, an outdoor sound installation that consists of sounds captured with the aid of antennae, 2000; *Dreams Gathered*, encoded dreams of North Miamians set free as projected images and broadcast sounds using two window sites at opposite sides of 125 street, 2001; *Symbiosis by Osmosis*, four channel sound installation planted in a garden, idling bus sounds from the nearby bus stop, 2002; and *Breezeway*, six speaker sound model of public art project, 2003.

Matamoros lives in the United States. He is the Artistic Director of the Subtropics New Music Festival held in Miami each year since 1989, and also founding director of the Sound Arts Workshop since 1996.

Fernando Freitez Gassán (born in Barquisimeto, 1958), composer, guitar and cuatro venezolano performer, and electronic engineer, studied electroacoustic music with Ricardo Teruel during the 80s. He was recording engineer for the Lara' Symphonic Orchestra and Professor of Electroacoustics at CONSERMUS - Regional Conservatory of Music Jacinto Lara.

Some of Freitez electroacoustic music works, composed mainly during his studies with Teruel, are: *Estudio No. 1* and *Tarde con Chicharras*, both pieces for electronic sounds, created in 1987, and produced using ARP 2500 and 2600 synthesizers; *Seis por izquierdo* for cuatro venezolano and electronic sounds, 1988; *El Maromero*, *La persistencia de la memoria*, *Sombras móviles* and *Mambo del gallinero*, all four piece for electronic sounds, also 1988, and produced with the ARP 2500 and 2600 synthesizers from the Instituto de Fonología; *La caja de sorpresas*, 1989, a work for tape based on sound recordings taken from a music box; *El duende de las cuevas* for Flamenco guitar and sound recordings from different editions of Flamenco music.

At present Freitez Gassán is Professor of Electroacoustics at Vicente Emilio Sojo Conservatory in the city of Barquisimeto, Venezuela.

Adina Izarra (born in Caracas, 1959), composer and educator, studied at the National Conservatory of Music Juan José Landaeta in Caracas, and later at York University, England, where she obtained her PhD in Composition.

She composed, among other pieces: *Tapices* for tape in 1985; *Merenguitos* for two percussionists and tape in 1987; *8ritornello8* for live synthesizers and *Vojm* for amplified vojnm (female voice), both in 1988; *Luvina* for bass flute and delay in 1992; and *De Visée* for theorbo and laptop, realized at LADIM, Caracas, in 2004.

In *Vojm* the singer uses three microphones, one going through a delay line, another one going through a digital reverb chamber set to its maximum reverb time, and the third one is to be used ad libitum, just for ambience, according to room acoustics.

Arcángel Castillo Olivari (born in Mérida, 1959) composed *Chaos Metamorphosis* in 1997, and *EverybodyDrinksMerlot* in 1999, both computer music works; *Save Twilight*, computer music on CD based on poems from *Salvo el Crepúsculo* by Julio Cortázar, in 2000; and *Soleando* for violin and multimedia (real time sound processing with a computer, and DVD combining video, photography and computer graphics) in 2002.

About *Save Twilight*, the composer explains: “This work is like a poetic reading with electronic music, trying to emphasize Cortázar’s poems.” (Castillo Olivari, undated. Personal communication).

Julio D'Esquivan (born in Caripito, Monagas, 1960) composed *Salto Mortal* for tape in 1989; and *Sin ti por el alma adentro* for flute and tape in 1987.

Jacky Schreiber (born in Caracas, 1961) composed *Seseribo* for electroacoustic sounds on tape in 1983; *Questions to myself...and someone else* for electroacoustic sounds on tape in 1985; *Peace of the worlds* for percussion and electroacoustic sounds on tape in 1986; *When the firemen arrive...everything will be over...* for flute, baritone sax and electroacoustic sounds on tape in 1988; *Luna en Tralfamadore* for vibraphone, marimba and synthesizer in 1989; *El Baile de los Gigantes* for harp and electroacoustic sounds on tape in 1990; *Feedback*

series for synthesizer and video camera, between 1992 and 1994; *In a point of the spiral* for electroacoustic sounds on tape in 1992; *Far beyond the rain* for solo sampler in 1993; *UnmundodentrodeunmundO* for processed voice and electroacoustic sounds on tape in 1994; *Oh...Impotencia* for solo synthesizer in 1995; *Crystal Ball* for electroacoustic sounds on tape in 2000; *Uncertainty principle*, also for electroacoustic sounds on tape, in 2001; *Principio de incertidumbre* in 2002, *my dog's birthday party* in 2003; and *if we ever meet again* and *broken time*, both in 2004. He also composed music for films, television and multimedia shows.

Diana Arismendi (born in Caracas, 1962) composed, among other works: *Parábolas* for tape in 1980; *Cientocincuenta Días*, also for tape, in 1981; and *Irreverencias* for oboe and tape.

Alonso Toro (born in Caracas, 1963) composed among other works: *No me perdonan* in 1995.

Carlos Suarez (born in Caracas, 1966) composed *Sagrarios sonoros* for ethnic instruments and tape in 1995; *Revelaciones para el tiempo que transcurre* for prepared piano and tape in 1996; *Sobre la opacidad del mal* for keyboard and tape in 1997; *El templo de los augurios* for indigenous instruments and tape, and *Los arquetipos de la trinidad femenina* for organ and tape, both in 1998; *Manifestaciones extáticas del pensamiento* for solo tape, and *El misterio de los animales brujos* for several ethnic instruments and tape, both in 1999; *El ojo de Juyá* for solo tape in 2001; *Horror vacui* for string quartet and tape in 2002.

Rodrigo Segnini-Sequera (born in Caracas, 1968) studied electronic music, piano and musicology in Venezuela; then he focused on audio digital signal processing (spectral and physical models) at CCRMA, Stanford University, in the United States; and later he moved

to Japan to work at DeOS-Electronic Music Studio, Tokyo National University of Fine Arts and Music, for some years.

Among other pieces he composed: *Maratsade* for tape in 1992; *Pekuek* for synthesizer and electronics in 1994; *Pekuek II* for tape in 1994-1995; *MPCSSCVEV {Imp-loro}*, portable music for computer, synthesizer, sampler, wind controller and live performer based on fantastic situations in Caracas in 1995; *Madriz* for CD-ROM, special concert version for two channel tape, in 1995-1996; *Pamine* for piano and four channel tape in 1996-1997; and *Geidai* for eight channel tape, in 1999-2000.

Segnini wrote in 1994 for his graduation at the Escuela de Artes, Facultad de Humanidades y Educación, Universidad Central de Venezuela (Arts School of the Central University of Venezuela): *Comprender la música electroacústica y su expresión en Venezuela (To understand electroacoustic music and his expression in Venezuela)*.

Musikautomatika, a group of experimental music with **Stefano Gramitto**, **Luis Levin**, **Mirella Lopez** (replaced by **Gabriela Gamboa** around 1989) and **Alvise Sacchi** (born in Bergamo, Italy, 1947), has been working in Venezuela with electroacoustic media for many years. Also **Psyclosonika**, a group derived from Musikautomatika, without Mirella Lopez and Gabriela Gamboa, and with Jacky Schreiber replacing Stefano Gramitto.

Many other Venezuelan composers have been using electroacoustic media in their music. **Beatriz Bilbao** composed *Abbys II* for synthesizer and drum machine, 1988; *Los ojos de Picasso* for voice, flute, double bass and polyphonic synthesizer, 1989; and *Triángulo Mágico* for two synthesizers and symphonic orchestra, collaboration with Ricardo Teruel, 1989. **Roberto Cedeño** composed *Arimka* for clarinet and synthesizer, 1991. **Roberto Chacón** composed *Máscaras* for tape, 1984, and *Polvo de Estrellas* for percussion and electronic processing, 1991. **Juan de Dios López** composed *El Triunfo de las Llamas* for flute, oboe, double bass and electronics, 1989; *Al borde del abismo* for double bass and

electronic sounds, 1990; and *Gravedad Cero* for vibraphone and electronic processing in 1991. **Leonidas D'Santiago** composed *El pájaro de madera*, 1986, and *Pieza para clarinete y cinta*, 1991. **Ricardo Lorenz Abreu** composed *Tres miniaturas* for flute and tape, 1988. **Servio Tulio Marin** composed *Impresiones fugitives*, 1976, and *Retour au silence*, 1985; he was living in the United States for several years and is now in Europe. **Emilio Mendoza** composed *La siesta* for tape, 1983. **Miguel Noya** composed *Bajo la sombra del mundo* for double bass, tape and electronic processing, 1993. **Fidel Rodríguez Legendre** composed *Doble operativo* for vibraphone and video tape, 1995. **Alexander Romero** composed *Día de la Creación* for actress and live electronics, 2005. **Juan Francisco Sans** (born in Caracas, 1960) composed *Lasciate mi morire* for oboe and electronic processing. **Edgar Saume** (born in Caracas) composed *Secuencias Ritmicas* for percussion and tape. **Adrián Suárez Pérez** composed *La piel de Petare* for actress, tape and electronic processing in 1995. **Numa Tortolero** composed *Retorno*, 1983, *Sugestión*, 1984, and *Situación de la Ciudad*, 1986, all three works for tape.

CHAPTER VII

TRENDS IN MUSIC COMPOSITION INVOLVING ELECTROACOUSTIC MEDIA

7.1 Styles¹⁶

This chapter presents a selection of works by several Latin American composers showing a diversity of compositional styles and techniques. Full scores or excerpts are used so as to convey the composers' creative approaches. There is a wide variety among the included musical samples.

The first piece, *Complejo No.2* by Virgilio Tosco, has an open approach using a fully graphic notation score. It is a good example of the experimental style used by composers from Centro de Música Experimental in Cordoba, Argentina, during the mid 60s. That group used to work a lot with unusual instrumentations and improvisation.

Mexican composer Manuel Enriquez also uses graphic notation in his work for violin and tape, *Móvil II* or *Viols*, but accompanied by a detailed description of the symbols he adopted for it. This piece was originally composed in 1969 for a string soloist. Only later was the tape part added, realized in 1972 at the Columbia-Princeton Electronic Music Center in New York. In this piece, like in many other works, the studio (its equipment, and above all, the people working there) had an important influence on the adopted production techniques as well as on the style of the electronic tape part.

¹⁶ In the context of this doctoral thesis, **style** is considered the distinctive or characteristic manner in which the elements of music are treated. In practice, the term may be applied to, for example, composers, media, nations, or form or type of composition (adapted from MENC, The National Association for Music Education (undated) Glossary. Address: http://www.menc.org/publication/books/performance_standards/glossary.html).

Flor de Sancayo for piano and tape, composed by Peruvian Edgar Valcárcel in 1976, has a flexible formal structure allowing a combinatorial approach and offering to the performer ample freedom. The score shows notes in musical staves but arranged in non-traditional ways. It has no written guidelines accompanying it.

Far from improvisation or aleatoric procedures, Venezuelan composer Alfredo del Mónaco's *Alternancias* for violin, viola, cello, piano and electronic sounds on tape asks for a highly synchronized performance between the acoustic instruments themselves and the electronic tape part. The work was realized in 1971 at the Columbia-Princeton Electronic Music Center. The Center, where Argentinean composer Mario Davidovsky was working since the early 60s and was its Director from 1980 to 1994, had a strong influence on several Latin American composers who had the opportunity to study and compose there. Davidovsky, well known by his acclaimed *Synchronisms* mixed series, is a symbol of the Center's style during those years.

Something different, nor fully serial or aleatoric can be perceived in Peruvian César Bolaños pieces from the 60s, when he was composing music for tape, mixed chamber works, and also large and complex multimedia pieces. *Interpolaciones* for electric guitar and four channels tape from 1966, *Alfa-Omega* for two narrators, theatrical mixed choir, electric guitar, double bass, 2 percussionists, two dancers, magnetic tape, projections and lights from 1967, and his computer-assisted composition from 1970, *Canción sin palabras (ESEPCO II)*, for piano with two performers and tape, are examples of his work.

Ecuadorian composer Milton Estevez composed several pieces for orchestra and tape during the mid 80s. In *Apuntes con Refrán* the Ecuadorian composer uses a flexible approach, mixing fully notated parts with controlled improvisation. The electronic sounds on tape were created using FM techniques on a digital synthesizer.

The scores and excerpts in the following section depict both the diversity in terms of compositional trends and the variety of notation styles.

7.2 Score examples

The following scores by composers from different Latin American countries show different approaches in terms of instrumentation, techniques and styles.

- **Complejo No.2 by Virgilio Tosco (Argentina)**

Complejo No.2 for recorders, piano, percussion (including cracking aluminum plates, rubbed bronze discs, wood and metal elements) and electronically generated white noise was composed in 1965 by Virgilio Tosco (born in Achiras, province of Córdoba, 1930; died in Córdoba City, 2000)

Figure 8. Virgilio Tosco's *Complejo No.2* for recorders, piano, percussion and electronically generated white noise, composed in 1965.

The symbols are explained in the lower part of the score: madera = wood; metal; ruido blanco = white noise; platillo frotado = rubbed cymbal; cuerdas piano frotadas = rubbed piano strings; golpe sobre cuerdas piano = knock on piano strings; flauta = flute (in this case: recorder).

The notation is extremely open. Except for a few notes indicated for the flute, there are no pitches. No *tempo* and metrics indications either. Only a basic grid is used to suggest time relationships, and eventually synchronize some events.

The graphics for each instrument are mixed in the score. According to the widow of the composer, who sent me also the copy of the score included above, these are the only indications she was able to find corresponding to this piece:

Cada instrumento tiene su simbología particular. Aunque los instrumentos estén mezclados en la partitura, hay líneas que indican su continuidad. La intensidad está dada por el tamaño de los signos; un poco a la derecha de la mitad se encuentra el climax, donde confluyen todos los instrumentos.

Each instrument has its own symbols. Even if the instruments look mixed in the score, there are lines showing its continuity. Sign's size indicate intensity, a little bit from the center to the right is the climax, where all instruments meet. [RDF free translation]

Formiga de Tosco, L. (2003). *Complejo No. 2* [epigraph]. Email subject: Musica Electroacustica. Argentina.

These kinds of open and experimental works were usual among the composers and performers founders of Centro de Música Experimental created in 1965. Affiliated to the National University of Córdoba, Argentina, the Center's group was integrated by Oscar Bazán (born in Cruz del Eje, 1936), Pedro Echarte, Carlos Ferpozzi (born in Córdoba, 1937), Graciela Castillo (born in Córdoba, 1940), Virgilio Tosco, and, for a certain length of time, Horacio Vaggione (born in Córdoba, 1943).

An excerpt of this score was used for the cover of the book *La Notación de la Música Contemporánea* by Ana María Locatelli de Pérغامo (Buenos Aires: Ricordi, 1975).

Complejo No. 2 was premiered during the Primeras Jornadas de Música Experimental held in Córdoba during 1966.

- **Móvil II / Viols by Manuel Enriquez (Mexico)**

Móvil II, by Mexican composer Manuel Enriquez (born in Ocotlán, Jalisco, 1926; died in Mexico City, 1994) has three different versions according to the score: one for a string instrument only, a second one for amplified violin and optional processing, and another one for violin and tape. The name of the piece changes for *Viols* when is performed in its version for violin and tape.

Móvil II was composed for any string instrument (in fact, for any orchestral bowed string instrument: violin, viola, cello, double bass), and asks for a special tuning on it:

- first string, 3/4 of tone lower
- second string, 1/4 of tone higher
- third string, 1/4 of tone lower
- fourth string, 1 and 1/4 of tone lower

There are no traditionally notated pitches in the score. Musical events appear organized in different segments, sometimes framed by a geometrical figure (rectangle, triangle, circle, etc.). The composer explains:

The space between horizontal lines means the whole register of the instrument, the sounds must be produced under a visual impression; in the circle and triangle segments the sound material is still more indetermined and must be played with the maximum of phantasy. The total organization is “at random” and the whole length between 6 and 8 minutes.

Enriquez, M. (1969-1976). *Móvil II* [score]. Mexico.

s i g n o s

<p>Sonidos prolongados, siempre <i>senza vibrato</i></p> <p>Vibrato muy lento</p> <p>Trémolo</p> <p>Col legno "tratto"</p> <p>"ricochét" siguiendo el diseño</p> <p>Colpear el diapason con los dedos de la mano izquierda, sobre una cuerda suelta y siguiendo la línea punteada</p>		<p>Prolongued sounds, always "<i>senza vibrato</i>"</p> <p>very slow vibrato</p> <p>Trémolo</p> <p>Col legno "<i>tratto</i>"</p> <p>"ricochét" following the design</p> <p>Tap the fingerboard with the left hand fingers, on an open string and following the dotted line</p>
<p>Armónicos artificiales (4a. ó 5a. ad lib.)</p> <p>sul ponticello</p> <p>col legno battuto</p> <p>tocar detrás del puente, "arco"</p> <p>tocar detrás del puente, "pizz"</p> <p>(con las uñas, cuando sea posible)</p> <p>Pizz normale</p>		<p>Artificial flagolettes (4a. or 5a. ad lib.)</p> <p>sul ponticello</p> <p>col legno battuto</p> <p>play behind the bridge, "arco"</p> <p>play behind the bridge, "pizz", with the nails if possible</p> <p>Pizz normale</p>
<p>Pizz con gliss. hacia abajo o hacia arriba, según esté indicado</p> <p>Pizz de mano izquierda</p> <p>Pizz. presionando el diapason y gliss.</p> <p>Gliss. y trillo, siguiendo las líneas</p>		<p>Pizz with gliss. up or down, as it is written</p> <p>left hand pizzicato</p> <p>Pizz. pressing the fingerboard and gliss.</p> <p>Gliss. and trill following the lines</p>
<p>Pequeños cresc. y dim. siguiendo el dibujo</p> <p>Pausa corta</p> <p>Pausa media</p> <p>Pausa larga</p>		<p>Little cresc. and dim. following the design.</p> <p>Short pause</p> <p>Medium pause</p> <p>Long pause</p>
<p>Tocar el instrumento con ambas manos, tocar un pizz. fff sobre las cuatro cuerdas abiertas y moverlo hasta que desaparezca el sonido</p> <p>Colpear la caja del instrumento con la mano</p>		<p>Take the instrument with both hands, play a pizz. fff on the four open strings and shake it till the sound disappear.</p> <p>Tap the instrument with the hand</p>
<p>El espacio entre las líneas horizontales es el registro entero del instrumento, los sonidos deben producirse bajo una impresión visual; en los segmentos del triángulo y del círculo el material es todavía más indeterminado y debe tocarse con el máximo de fantasía. La organización es "al azar" y la duración entre 6 y 8 minutos.</p>		<p>The space between horizontal lines means the whole register of the instrument; the sounds must be produced under a visual impression; in the triangle and circle segments the sound material is still more indetermined and must be played with the maximum of fantasy. The total organization is "at random" and the whole length between 6 and 8 minutes</p>
<p>La pieza puede ser ejecutada en tres versiones distintas:</p> <p>Versión I - "Instrumental", como está escrita originalmente.</p> <p>Versión II - "Instrumental", con un micrófono de contacto y la correspondiente amplificación (y, ó transformación)</p> <p>Versión III Acompañada de la cinta pregrabada y que puede pedirse a la Casa Editorial</p>		<p>This piece can be played in three different versions:</p> <p>Version I - "Instrumental", as it is originally written.</p> <p>Version II - "Instrumental", with a contact microphone and the right amplification (and or transformation)</p> <p>Version III With the accompaniment of the pre-recorded tape, which can be ordered to publishing house</p>
<p>El instrumento debe afinarse de la siguiente manera: 1a. cuerda, 3/4 de tono bajo 2a. cuerda, 1/4 de tono alto 3a. cuerda, 1/4 de tono bajo 4a. cuerda, 1 y 1/4 de tono bajo</p>		<p>The instrument must be tuned in the following way: 1st. string, 3/4 of tone lower 2nd. string, 1/4 of tone higher 3rd. string, 1/4 of tone lower 4rd. string, 1 and 1/4 of tone lower</p>

Figure 9. Manuel Enriquez's *Móvil II* or *Viols* for violin and tape, composed 1969-1972. Explanation of score's symbols.

m ó V i l l I I
para cualquier instrumento de cuerda

manuel enríquez

REV. 1972

COPYRIGHT DEL AUTOR, 1974

Figure 10. Manuel Enriquez's *Móvil II* or *Viols* for violin and tape.
Graphic score.

The original piece for string instrument was composed in 1969. Enriquez completed his a new version for violin and tape in 1972, creating the tape part with electronic sounds at the Columbia-Princeton Electronic Music center in New York.

The score and related materials were provided by Susana Enriquez Alfaro, the composers' widow.

- **Flor de Sancayo by Edgar Valcárcel (Peru)**

Flor de Sancayo (a.k.a. *Retablo I*) for piano and tape, composed in 1976 by Edgar Valcárcel, shows an open style of notation, mixing a traditional approach for pitches with graphical structures that organize different groups of seven sequences in circular, triangular and other geometrical forms.

There are no additional indications for the performance with the tape part. The electronic sounds on tape created at the Electronic Music Studio of McGill University, in Canada, are organized in three cues or parts, to be played with the musical material corresponding to the three different pages of the score. These three electronic parts are 3:15, 2:34 and 2:32 minutes long.

The image shows a page of a musical score titled "RETABLO I 'flor de sancayo' para piano y sonidos electronicos" by Edgar Valcárcel, Montreal - 1976. The score is divided into two main sections. The left section, labeled "a alcides lanza", features a central piano part with a dynamic marking of *mp* and a tempo of *86-J*. This central part is surrounded by seven numbered sequences (1-7) arranged in a circular pattern, with arrows indicating a clockwise flow from one sequence to the next. Each sequence consists of a piano staff with rhythmic markings and some melodic lines. The right section features three electronic tape parts, numbered 1, 2, and 3, arranged in a horizontal row. Below these are four more numbered sequences (4, 5, 6, 7) arranged in a horizontal row. Arrows connect the tape parts to the sequences, indicating their relationship. The notation includes various musical symbols such as notes, rests, and dynamic markings.

Figure 11. Edgar Valcárcel's *Flor de Sancayo* for piano and tape, composed in 1976. Score: page 1.

Figure 12 shows a complex musical score for piano and tape, page 2. The score is arranged in a circular pattern with seven numbered sections (1-7) connected by arrows. Section 2 is at the top, 6 and 7 are in the center, 5 is at the bottom, and 1, 3, and 4 are on the sides. Each section contains musical notation for piano and tape.

Figure 12. Edgar Valcárcel's *Flor de Sancayo* for piano and tape. Score: page 2.

Figure 13 shows a complex musical score for piano and tape, page 3. The score is arranged in a circular pattern with seven numbered sections (1-7) connected by arrows. Section 1 is on the left, 2-4 are in the middle, 5-7 are on the right, and 3 is at the bottom. Each section contains musical notation for piano and tape.

Figure 13. Edgar Valcárcel's *Flor de Sancayo* for piano and tape. Score: page 3.

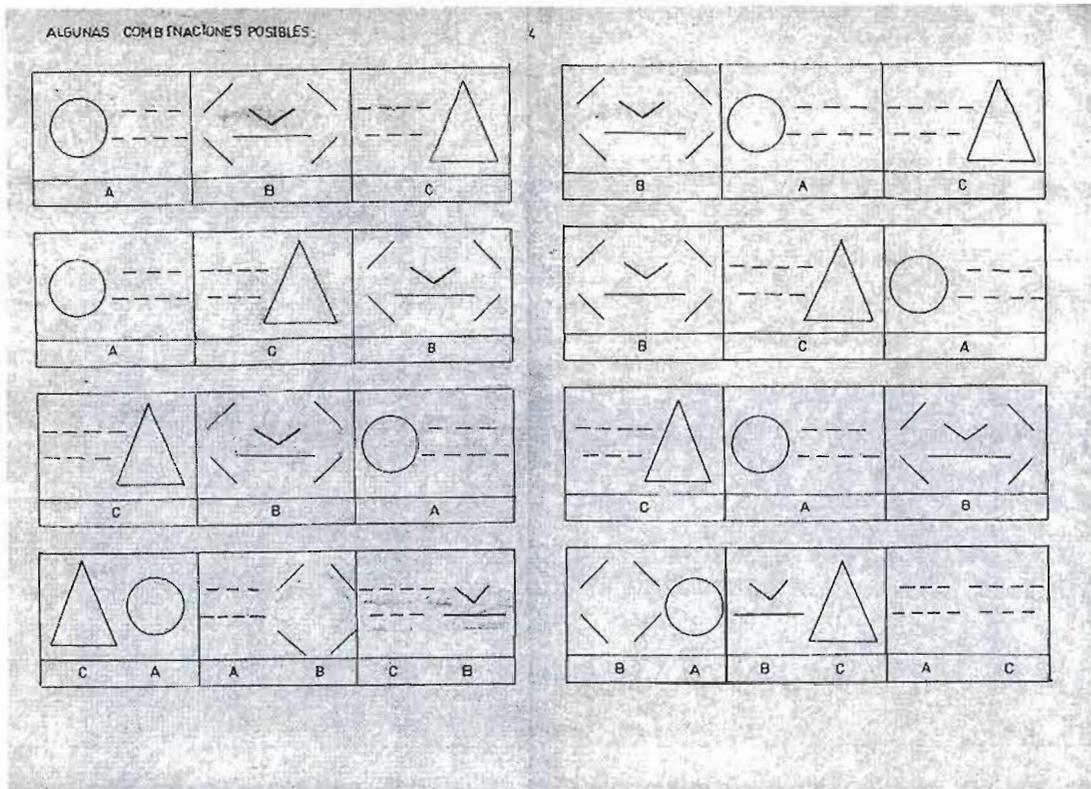


Figure 14. Edgar Valcárcel's *Flor de Sancayo* for piano and tape. Score: page 4.

Page 4 shows possible performance combinations of sections and subsections from A, B, C (corresponding to pages 1, 2 and 3 of the score) resulting in examples like: A-B-C, A-C-B, C-B-A, B-A-C, B-C-A, C-A-B and CA-AB-CB, BA-BC-AC, among other possibilities.

The score was provided by the composer and the recording by Alcides Lanza, Director Emeritus of the Electronic Music Studio of McGill University, with the former's permission.

- ***Alternancias* by Alfredo del Mónaco (Venezuela)**

Alternancias, for violin, viola, cello, piano and electronic sounds on tape was composed by Alfredo del Mónaco in 1971. The tape part was realized at the Columbia-Princeton Electronic Music Center.

In *Alternancias* del Mónaco hasn't asked for special tuning of the bowed string instruments. He uses special signs when quarter tones are needed.

All the score is precisely notated looking for a synchronized performance between the acoustic instruments themselves and the tape part. The *tempo* is indicated using traditional musical notation ($q = 60$) or graphically, using the distance between bars (1 cm = 1 second).

"ALTERNANCIAS" (1971)

Commissioned by the Cuarteto Galzio,
Caracas, Venezuela, for the '34th. Venice
Biennale, 1971.-

Violín, Viola, Cello, Piano y sonidos electrónicos (electronic sounds on tape).

CUERDAS (STRINGS):

-  = Pizzicato. La cuerda golpea contra el 'tastó. (Snap Pizz. allowing the string to strike the fingerboard)
 = Arco (Bow).
 = Vibrato Lento (debe escucharse la fluctuación de 1/4 de tono). (Very Slow Vibrato: 1/4 tones must be heard).
 = Vibrato Rápido. (Fast Vibrato).
 = 1/4 de tono hacia arriba. (1/4 tone higher).
 = 1/4 de tono hacia abajo. (1/4 tone lower).
 = Tocar 'detrás' del Puente, en la cuerda especificada. (Play 'behind' the bridge, on the specified string).
sul ponticello = Arco cerca del puente; usar sonido 'nasal', a veces. (Bow near the bridge; use 'nasal' sound at times).

-  = Cuerdas: Golpear con los nudillos sobre la caja. (Strike the sounding board with finger tips or knuckles).
 = 'Pizzicato' en las cuerdas del piano, con objeto metálico. Usese Pedal. ('Pizz.' on the strings of the piano with a metal object. Use Pedal).
 = Presionar con el dedo la cuerda, cerca del puente, cuando se ejecute la nota. Usese el pedal (sonido cercano a la marimba, reverberado). (Press finger hardy on string near the 'bridge' while the note is played on the keyboard. Use pedal. -Results: sound closer to a 'low-marimba' with reverberation).
 = 'Cluster' sobre teclas blancas solamente; o, sobre teclas blancas y negras. ('Cluster' on white keys only; or, on white & black keys).

El Tempo está indicado: $\text{♩} = 60$; o el espacio entre barras como igual a un segundo. (Tempo is indicated as: $\text{♩} = 60$; or the space between bars as equal to one second).

En los sonidos largos, el cambio de arcos debe ser imperceptible e individual. (During long sustained sounds, change bows imperceptibly and individually).

Las barras sirven de sincronización, solamente. No deben escucharse sincopas ni acentos, salvo indicados. (Bar lines serve only for synchronization; no syncopations nor accents must be heard except indicated).

El grabador debe detenerse sobre las cintas 'guías' al momento indicado. El reinicio debe hacerse sobre la cinta magnética siguiente, al comienzo. Hay dos segundos de pausa antes de la próxima señal. (Tape recorder must be stopped on leading tapes whenever indicated and re-started at the beginning of the next magnetic tape. There is a two seconds pause before next signal is heard). Place loudspeakers near the instruments for a better blend of sounds. Balance both at center of concert hall.

© Alfredo del Monaco

Alfredo del Monaco
El Peñón-G. Andrómeda
Qta. Chapina-CARACAS 108
VENEZUELA

Tape part realized at
Columbia-Princeton Electronic Music Center, N.Y./71

Figure 15. Alfredo del Mónaco's *Alternancias* for violin, viola, cello, piano and electronic sounds on tape, composed in 1971. Explanation of score's symbols.

(1.60)

V₂

Ten. f. (senza rubato) s. parte ad... c. legato... c. legato

C.

Ten. f. (senza rubato) (senza) = c. legato (senza) s. parte (senza)

pp ff pp ff ...

pp f pp ff pp ff ...

START

A

B

3:1 3:1

s. parte ad... (col legno) ... c. legato ...

pp ... fff

pp ... fff

Figure 16. Alfredo del Mónaco's *Alternancias* for violin, viola, cello, piano and electronic sounds on tape. Score's excerpt: page 1.

The image shows a handwritten musical score for the piece "Alternancias" by Alfredo del Mónaco. The score is divided into two systems. The first system (measures 1-15) includes parts for Violin (V), Viola (Va), Cello (C), and Piano (P), along with a "TAPES" section. The second system (measures 16-31) continues the instrumental parts and includes detailed electronic sound instructions such as "flageolet (from mid.)", "amp", and "C.A.". The score is annotated with performance directions like "trist. (from mid.)", "ff", and "p".

Figure 17. Alfredo del Mónaco's *Alternancias* for violin, viola, cello, piano and electronic sounds on tape. Score's excerpt: page 2.

The image shows a handwritten musical score for the piece "Alternancias" by Alfredo del Mónaco. The score is divided into two systems. The first system (measures 1-20) includes parts for Oboe (O.), Violin (V.), Viola (Va.), Cello (C.), and Piano (P.). The second system (measures 20-41) includes parts for Violin (V.), Viola (Va.), Cello (C.), and Piano (P.). The score features complex rhythmic patterns, dynamic markings (ff, p, f), and performance instructions such as "col legno", "Tutti (forn. w. hrt)", and "STOP".

Figure 18. Alfredo del Mónaco's *Alternancias* for violin, viola, cello, piano and electronic sounds on tape. Score's excerpt: page 3.

sound-expressive structure). *Sialocibi* (ESEPCO-I) for piano and one reciter-mime-actor and *Canción sin palabras* (ESEPCO-II), subtitled *Homenaje a las palabras no pronunciadas*, for piano with two performers and tape, are two works representative from this stage.

Honeywell Bull and later Olivetti Argentina were supporting Bolaños and Milchberg experiences carried out in Buenos Aires.

ESEPCO-II "Canción sin palabras" homenaje a las palabras no pronunciadas
(estructuras sonoro expresivas por computación)
para 1 piano (2 ejecutantes), banda magnética y amplificación microfónica.
C. BOLAÑOS - M. MILCHBERG

PIANO
CUERDAS
GOLPES
CUERDAS
GOLPES
PIANO Directo
MOD. D.
Gen. pulsador
CINTA
Sección
T. parcial
T. total

1cm = 4sgds

Figure 20. César Bolaños' *Canción sin palabras* (ESEPCO-II) for piano and tape, collaboration with Mauricio Milchberg, composed in 1970. Score's excerpt: initial minutes.

The score has indications for the performers to play in the keyboard, directly on the strings or even knocking around in different parts of the piano. It has also indications for the magnetic tape part. Not mentioned in the instrumentation, the score also reveals the use of an electronic impulse generator in the piece.

- *Apuntes con Refrán* by Milton Estevez (Ecuador)

Ecuadorian Milton Estevez composed several pieces for orchestra and electronics during the 80s. For *Apuntes con Refrán*, a piece from 1987, he created the electronic part in his home studio using a Yamaha DX7 FM synthesizer, a digital sequencer and a Revox B77 open reel tape recorder. The excerpts from the score included below shows an open style allowing controlled improvisation mixed with fully notated parts.

This is a sketch of a “multiple solo” for acoustical and electroacoustical instruments. It contains some “rough” materials (since they are ideas to evolve in the “multiple solo”) as well as some free exploratory approaches to other composing devices.

Within the first category, a short event plays the role of *refrain*. The individual quality of its solo lines, as they are played simultaneously, is dissolved within a large texture, which becomes characteristic, very bright and is some way aggressive [...]

The *refrain* interventions assume different shapes. Some of them (e.g. the first one) are immediately dissolved and in some way developed through multiple and open repetitive evolution procedures. Others appeal to counterpoint variation devices.

In the *refrain* and the *tutti* interventions, the principal device is the vertical texture and its shape, each time renewed by open construction and performance. In the alternate passages (based on modal materials from Ecuadorean music), on the contrary, line movement becomes conspicuous.

The electroacoustical texture, constructed with the same material of the acoustic texture, uses both structural ways, but color variation is added in order to modify each appearance. The same electronic event of the introduction takes place at several reprises, each time modified through most of the work, alternating also with the solo acoustical interventions. In addition to the acoustical solo lines, except in the introduction, the electroacoustical texture plays a subordinate role in its relationship with the global mixed texture, alternating or superimposing by analogy or contrast.

Estevez, M. (2004). Program Notes. [personal communication].

Móvil II (Viols), *Alternancias* and *Apuntes con Refrán* are available for listening online (Internet) at the Daniel Langlois Foundation for Art, Science, and Technology web site¹⁷.

Those works as well as *Flor de Sancayo (Retablo I)* and *ESEPCO-II (Canción sin palabras)* are also available for listening at the Centre for Research and Documentation (Intranet) of the same Foundation.

A composer' selection of (17 from 61) pages from *Apuntes con Refrán* as well as full-length scores from Manuel Enriquez's *Móvil II (Viols)*, Alfredo del Mónaco's *Alternancias*, César Bolaños' *Interpolaciones* for electric guitar and tape from 1966, alcides lanza's *interferences III [1983-IV]* for chamber ensemble and computer generated sounds from 1983, Jônatas Manzolli's *Névoas e Cristais* for vibraphone and computer from 1995, and Edson Zampronha's *Mármore* for tuba and electroacoustic sounds from 2001, are also available online at the Foundation's web site¹⁸.

¹⁷ <http://www.fondation-langlois.org/flash/e/index.php?NumPage=556>

¹⁸ <http://www.fondation-langlois.org/flash/e/stage.php?NumPage=556>

CHAPTER VIII

MUSIC-RELATED TECHNOLOGY AND SCIENCE RESEARCH

8.1 Technology innovators. Early developments

An aspect strongly connected to the development of a musical practice using electronic media is that of the available technologies to support it.

During the early years of electroacoustic music creation in Latin America there were not favorable or easy conditions in most countries. Different from today, the access to highly flexible and powerful recording technologies as well as to professional systems for the electronic generation and processing of audio signals was extremely limited or inexistent in most places.

Many composers were working with tape techniques using home tape recorders, recording any kind of acoustic sounds in order to edit those samples later applying the usual techniques: cut and splice, speed change, tape direction, and loops. Electronic generating and modifying equipment was very rare and it was usually available only in electronic music studios, where composers shared those resources, or in radio stations or scientific research labs.

However, there were exceptional cases worth considering and the following paragraphs are focused on some of them.

In 1942, **Juan Blanco** (born in Mariel, 1919) registered the description and design of a new musical instrument at the Patent and Trademark Office in Cuba. He called his creation the

Multiórgano (Multiorgan), and it was based on 12 magnetophonic wire loops running through a playback head (recording on magnetic tape was being used in Germany at that time but not in America yet!) Being a polyphonic instrument, the Multiorgan could be loaded with 12 chromatically recorded voices, musical instruments or other sounds, including any multitimbral combinations and limited only by the allowed number of loops. Each sound signal would be controlled by a keyboard switching its flow to the amplifier. One pedal changed the sound amplitude, and another one modified its frequency/duration, varying loop speeds. The Multiorgan concept predated the Mellotron by several years, but the original instrument invented by Blanco was never built. In 1991, during the *Musical Inventions and Creations: Denial of Utopia*, an International Symposium held in Bourges, France, Blanco presented a blueprint of the original design.

In Chile, during 1957 **Juan Vicente Asuar** (born in Santiago, 1933) proposed to write his civil engineering thesis on *Generación Mecánica y Electrónica del Sonido Musical* (*Mechanic and Electronic Generation of Musical Sounds*). Then, in 1958, he started building the first Electronic Music Studio of Chile at the Catholic University, which was ready in 1959.

Asuar was helping to develop several electronic music studios in different countries during the 60s, including Germany and Venezuela.

Since 1969 he has become interested in the possibilities of using computers in music and he created some works using an IBM360 in 1970 and again in 1972.

In 1978 Asuar started his own computer music studio based on what he called *COMDASUAR* or *Computador Musical Digital Analógico Asuar*. The COMDASUAR was using a microcomputer to generate square waves in real time that later were processed by analog means. The system was able to produce six voices simultaneously. The software he wrote for the system was able to generate basic control signals allowing the composer to produce his own scores (including data interpolation, pitch transposition, etc.) but also providing more

Pavón was the technical director of the first Electronic Music Lab in Mexico, created as part of the Composition Workshop at the National Conservatory of Music. With Héctor Quintanar as its artistic director, the laboratory launched activities in January 1970 with equipment that included Buchla and Moog synthesizers.

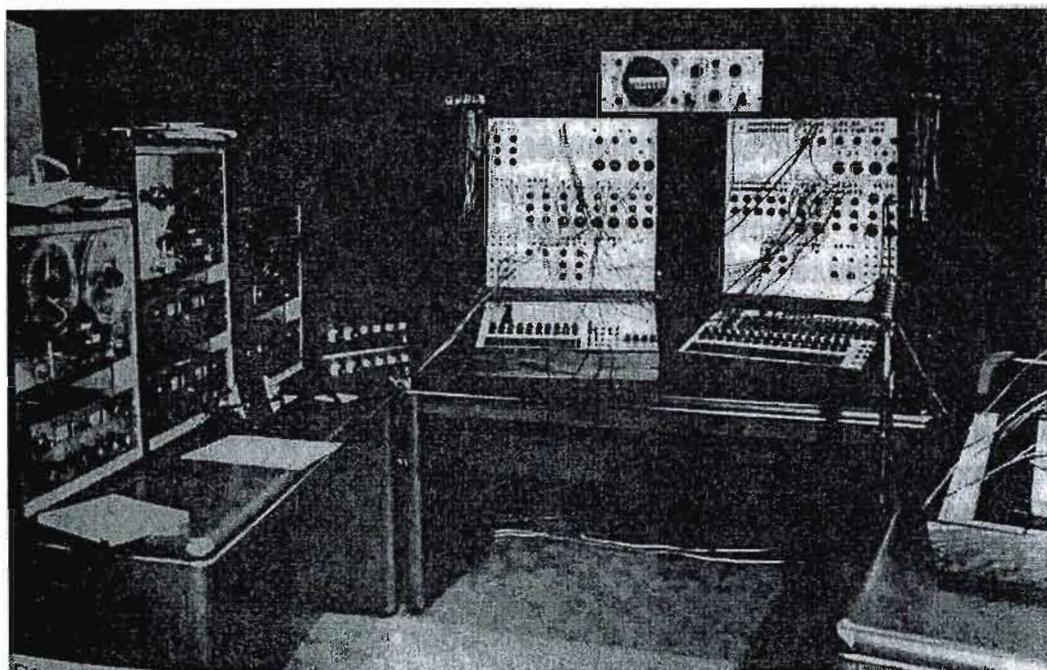


Figure 24. The first electronic music lab in Mexico opened in 1970.

Years later, Pavón wrote one of the first books in Spanish about electronic music: *La Electrónica en la Música ... y en el Arte* (*Electronics in Music...and the Arts*), which was published in 1981 by CENIDIM. In the book, he wrote about the acoustics, history, technology and techniques of electroacoustic music as well as about new media arts.



Figure 25. Cover of the book *La Electrónica en la Música ... y en el Arte* by Raúl Pavón.

Pavón also developed the Icofón, an oscilloscope-based system that derived images from sounds (working with Lissajous figures). He used this system to create several multimedia works.

In Argentina, **Fernando von Reichenbach** (born in Buenos Aires, 1931; died in the same city, 2005) played a major role in technological development during the CLAEM/Di Tella Institute days in the mid 60s.

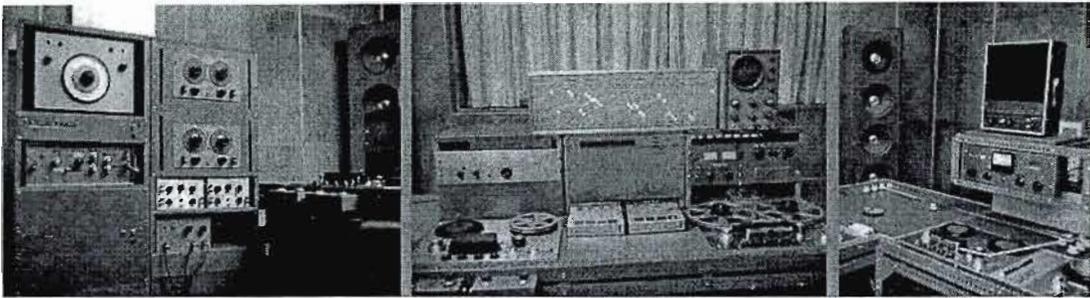


Figure 26. The Electronic Music Lab at CLAEM during the late 60s, after Fernando von Reichenbach redesigned it. Photo by César Bolaños.
2005 © The Daniel Langlois Foundation for Art, Science, and Technology.

He invented the Convertidor Gráfico Analógico (Analog Graphic Converter), also known as Catalina, used to convert graphic scores from a paper roll into electronic control signals adapted for musical uses with analog instruments, capturing the original drawing images with a camera.

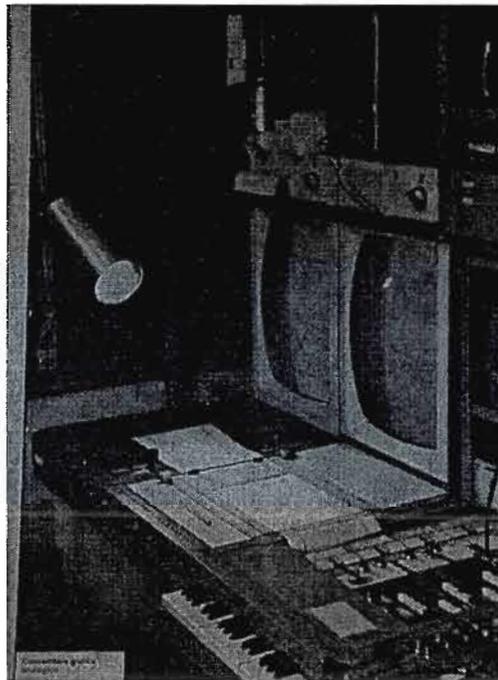


Figure 27. The Analog Graphic Converter developed by von Reichenbach during the 60s.

Reichenbach había construido Catalina, o sea el Convertidor Analógico Gráfico, que era una banda de papel en la que se dibujaba, una cámara de television que leía la banda de papel, y un generador de las tensiones que controlaban a un módulo Moog que era el generador de audio, controlado por la tensión que a su vez era controlada por este aparato de Reichenbach.

Reichenbach had built Catalina, that is to say the Analog Graphic Converter, that was a paper band in which it was drawn, a TV camera that read the paper band, and a generator of the voltages that were controlling a Moog oscillator, which was the audio generator, controlled by the voltage that was as well controlled by Reichenbach's apparatus. [RDF free translation]

Martinez, A. (2003). On the Analog Graphic Converter by Fernando von Reichenbach. [interview by RDF].

The only VCO available at CLAEM to be controlled by the Analog Graphic Converter was a Moog module borrowed from composer Nelly Moretto. It was a multi-waveform monophonic oscillator. Therefore, any polyphonic texture needed to be realized by mixing and remixing each line on analog (usually stereo) tape recorders.

Al no haber computadoras era necesario que de alguna manera se pudiesen dibujar las alturas o las intensidades o ambas cosas al mismo tiempo; teníamos dos canales de dibujo [...]

[A través de los dibujos era posible controlar] ...el oscilador, el modulador y el filtro.

Having no computers, it was necessary to find some way to draw the pitch or the intensity or both at the same time; we had two channels for drawing [...]

[With drawings it was possible to control] ...the oscillator, the modulator, and the filter. [RDF free translation]

von Reichenbach, F. (2003). On the Analog Graphic Converter. [interview by RDF].

The first tape piece created using the Converter was *Analogías Paraboloides* by Pedro Caryevschi, composed in 1970. José Ramón Maranzano and Eduardo Kusnir also composed tape pieces with the Converter that same year.

During those years, von Reichenbach also created devices such as the keyboard-controlled polyphonic third/octave and octave filter, and a special patch-bay that helped solve the complex needs of composers at the lab.

Usually using low-tech he was working behind the scene to solve the technical needs of composers who were experimenting at Di Tella Institute. An example of this is the switch pedal board he developed for *Interpolaciones*, a 1966 piece for guitar and tape by Peruvian composer César Bolaños, to allow the performer a live control of sound distribution around the audience.

Fernando von Reichenbach was also involved with the technical development of several multimedia shows in Buenos Aires. Around 1960, before CLAEM started its activities, he was working to put on one of the first large multimedia shows of Argentina, the Shell Pavilion.

It is worth mentioning the experiences of Peruvian composer **César Bolaños** (born in Lima, 1931) with the mathematician **Mauricio Milchberg** in Buenos Aires during the late 70s, when they were experimenting with computers to organize compositional materials. Those works led to the creation of two pieces: *Sialocibi (ESEPCO I)* for piano and one reciter-mime-actor and *Canción sin palabras (ESEPCO II)* for piano with two performers and tape, both from 1970. Milchberg wrote about those experiences:

Lo que sí es claro, es que sólo traté de ser un complemento del trabajo del compositor, que es quien tomaba las decisiones en última instancia. Usando técnicas de cálculo dentro de lo que se solía llamar, muy exagerada y pomposamente, inteligencia artificial. No se generaban sonidos, sino estructuras - la intención era escribir "partituras" [...] y complementos, como la generación de los textos leídos.

It was clear that I was only trying to be a complement of the composer, who was really taking the decisions. Working with calculus techniques from what used to be called, very overestimated, artificial intelligence. We were not using the computers to generate sounds but structures - the idea was to write "scores" [...] and complements, like the generation of some texts read during the pieces. [RDF free translation]

Milchberg, C. (2005). Email subject: Cinta de César Bolaños. France.

Most of the technology innovators and researchers previously mentioned were also composers. References about their musical production using electroacoustic media can be found in chapters V and VI, searching in their respective countries (e.g. Juan Blanco: Cuba; José Vicente Asuar: Chile; Raúl Pavón: Mexico; César Bolaños: Peru).

8.2 Recent research

After the pioneering years represented in the previous section by Blanco, von Reichenbach, Pavón and a few other researchers and composers, it is hard to find stable technology research related to music until recent years. An exception is the work by **Aluizio Arcela** (born in João Pessoa, Paraíba, 1948) in Brazil.

Arcela's research started in 1975 at the Electrical Engineering Department of the Pontifical Catholic University of Rio de Janeiro. In 1977 he presented his thesis *Dynamic Spectra-Generating System for the Synthesis of Musical Signals* in which he explained a system combining digital and analog technologies for producing frequency spectra within the range of human perception.

In 1983 Arcela was invited to join the University of Brasília where he started a program in computing. In order to accept, he asked the University for a laboratory to do research in computer music. A short time later he founded the Laboratório de Processamento Espectral (Spectral Processing Lab) at that University.

Also at the University of Brasília, in 1989 Arcela created the Master's in Computer Music, the first University-level computer music course in South America.

Arcela developed software for sound synthesis, algorithmic musical composition and computer image generation based on musical intervals. An example is Som-A, his programming language for additive sound synthesis.

Some research papers by Arcela written between 1978 and 2002 are available on Internet¹⁹.

Several Brazilian composers/researchers have devoted part of their energies to create computer music applications, among them: **Rodolfo Caesar** (born in Rio de Janeiro, 1950) and **Gilberto Carvalho** (born in 1952). Caesar developed some MIDI-based software for electroacoustic music composition: Copacabana and Perfil. And Carvalho, in collaboration with Hudson Lacerda, developed MUSAS (Musical Space Analyzer and Synthesizer) a software tool for musical analysis and composition that works with two main approaches: the creation of musical spaces and their analysis by the pitch-class set theory.

During the last decade is noticeable the activity developed in music technology and new media by several Brazilian researchers, all of them born in the 60s. **Fernando Iazzetta**, **Fábio Kon** and **Jônatas Manzolli** have been working mostly in Brazil, and **Eduardo 'Reck' Miranda** and **Marcelo Mortensen Wanderley** out of their mother country.

Most of those researchers have been also active as composers. References about their musical production using electroacoustic media can be found in chapter V, searching in the Brazil section. The same is valid for researchers from other countries also named in this chapter; the information about their musical production should be searched in sections corresponding to their countries of birth (e.g. Emiliano Causa, Argentina; Roberto Morales-Manzanares, Mexico; Juan Reyes, Colombia).

Fernando Iazzetta (born in Sao Paulo, 1966) teaches Electroacoustic Music at the Music Department of the University of Sao Paulo, where he coordinates LAMI - Laboratório de Acústica Musical e Informática (Computer and Musical Acoustics Laboratory) and is a Research Associate at the Graduate Program on Communication and Semiotics at PUC-SP.

¹⁹ <http://www.cic.unb.br/docentes/arcela/lcmm/textos/artigos.html>

His research is directed towards the study of new forms of music technology and music interaction. He developed: GenComp, a graphic environment for creation and representation of music based on genetic algorithms, and with Fabio Kon: MaxAnnealing, a tool for algorithmic composition based on simulated annealing.

Iazzetta is author of the book *Música: Processo e Dinâmica* (Music: Process and Dynamics) published by AnnaBlume in 1993, and a number of articles, papers and technical communications, among others: *Um Novo Músico Chamado Usuário*, published in the proceedings of I Simpósio Internacional de Computação e Música, held in Caxambú, Brazil, 1994; *A Semiotic Approach to Music Interaction* published in the proceedings of International Computer Music Conference - ICMC95, held in Banff, Canada, 1995; *Sons de Silício: Corpos e Máquinas Fazendo Música*, doctorate thesis, program of Semiotics and Communication (Comunicação e Semiótica), PUC-SP; *A Música, o Corpo e as Máquinas* published in Opus IV magazine, 1997; *O Fonógrafo, o Computador e a Música na Universidade Brasileira* published in the proceedings of X Encontro Nacional da ANPPOM, held in Goiânia, Brazil, 1997; *Internet Music: Dream or (virtual) reality*, collaboration with Fabio Kon, published in the proceedings of V Simpósio Brasileiro de Computação e Música, held in Belo Horizonte, Brazil, 1998; *A Música Efêmera da Internet*, collaboration with Fabio Kon, published in the proceedings of XI Encontro Nacional da ANPPOM, held in Campinas, Brazil, 1998; *Material, Forma e Processo na Música Eletroacústica* presented in the VI Simpósio Brasileiro de Computação e Música, held in Rio de Janeiro, Brazil, 1999; *La música en Internet: un sueño o una realidad (virtual)?*, collaboration with Fabio Kon, published in *Música y nuevas tecnologías - Perspectivas para el siglo XXI*, Eduardo R. Miranda (editor), Barcelona, Spain, by L'Angelot Editora, 1999; *Meaning in Music Gesture*, in the ebook (CD-ROM) *Trends in Gestural Control of Music*, Marc Battier and Marcelo Wanderley (editors), Paris-IRCAM - Centre Pompidou.

Iazzetta composed several mixed works as well as tape pieces. In *Gérmén*, an electronic piece from 1996, he applied his software GenComp.

Fábio Kon (born in São Paulo, 1969) has a bachelor degree in Percussion from Sao Paulo State University and a PhD degree in Computer Science from the University of Illinois at Urbana-Champaign, where he studied Algorithmic Composition with Prof. Heinrich Taube. Kon is Professor at the Department of Computer Science at the University of Sao Paulo.

Some of Fábio Kon publications are: *O Som do Futuro - Música, Computadores e Fractais*, published in *Jornal da Tarde*, São Paulo, Brazil, 1992; *Música, Computadores e Fractais II*, Technical Report - IA/UNESP, 1992; *A Detailed Description of MaxAnnealing*, with Fernando Iazzetta, Technical Report, Department of Computer Science - IME/USP, 1995; *Categorical Grammar and Harmonic Analysis*, collaboration with Flavio Silva, published in the proceedings of the Second Brazilian Symposium on Computer Music, held in Canela, Brazil, 1995; *Stylistic Musical Choices Via Fuzzy Preference Rules* collaboration with Flavio Silva, published in the proceedings of the Congress of the International Fuzzy Systems Association, held in São Paulo, Brazil, 1995; *A Música Efêmera da Internet*, collaboration with Fernando Iazzetta, published in the proceedings of the 11th Meeting of the National Association of Research and Graduate Studies in Music (ANPOM'98), held in Campinas, Brazil, 1998; *Internet Music: Dream or (virtual) Reality*, collaboration with Fernando Iazzetta, published in the proceedings of the 5th Brazilian Symposium on Computer Music, held in Belo Horizonte, Brazil, 1998; *La música en Internet: un sueño o una realidad (virtual)?*, collaboration with Fernando Iazzetta, published in *Música y nuevas tecnologías - Perspectivas para el siglo XXI*, Eduardo R. Miranda (editor), Barcelona, Spain, by L'Angelot Editora, 1999; *ACMUS: Design and Simulation of Musical Listening Environments*, collaboration with Fernando Iazzetta and Flavio Silva, published in the proceedings of the 8th Brazilian Symposium on Computer Music, held in Fortaleza, Brazil, 2001; *Downloading Musical Signs*, collaboration with Fernando Iazzetta, *European Journal for Semiotic Studies*, Vol. 13, No. 1-2, Vienna, Austria, 2001.

As it was mentioned before, Fábio Kon developed with Fernando Iazzetta: MaxAnnealing, a tool for algorithmic composition based on simulated annealing. He is currently working on applying the technology of mobile agents, developed in the late 90s, to create distributed environments for music composition and performance through computer networks.

Kon also composed some electroacoustic works, among them: *Momentos I* in 1994, collaboration with Fernando Iazzetta, one result of Kon's research project about *The Use of Fractal Geometry on Music Analysis and Composition*.

Jônatas Manzolli (born in Olimpia, Sao Paulo, 1961), composer and mathematician, has been working on the development of gesture interfaces, using sensors to relate body movements to sound events, since the early 90s. He has been leader of the Computer Music Research Group of NICS, Núcleo Interdisciplinar de Comunicação Sonora (Interdisciplinary Nucleus of Sound Communication) at UNICAMP, since 1994. In 1996 Manzolli created the Gesture Interface Laboratory (LIGA) at NICS "to study relationships between human gestures, machines and sound, and to develop software and hardware for real time composition/performance applications." (Manzolli, 2004)

His research is focused on mathematical model applications of complex systems to music composition and interactive systems. Two of his recent works are: the evolutionary compositional system Vox Populi and the application of neuroinformatic technology in the RoBoser project.

In *Vox Populi: An Interactive Evolutionary System for Algorithmic Music Composition*, paper published in 2000, VOX POPULI is described in this way:

Musical composition can be seen as a framework to express human subjectivity in symbolic and sub-symbolic terms. While recent techniques of digital sound synthesis present a large number of new sounds at the musician's desktop, several artificial intelligence techniques have been applied to algorithmic composition. [...] We introduce Vox Populi, a system based on the Evolutionary Computation for composing music in real time. A population of chords is properly codified according to the MIDI protocol, and evolves by the application of genetic algorithms. Graphic controls (pad and sliders) provide a friendly manipulation of the fitness and of the sound attributes.

Evolutionary Computation is used to stimulate the user's sonic perception and to which he responds. Associating the dynamic behaviour of genetic algorithms with

tools for real time interaction, Vox Populi becomes a musical instrument. Differently from a traditional one, Vox Populi is able to create its own sound raw material (chord population) and to provide a choice-criteria (music fitness) simultaneously.

Moroni, A., Manzolli, J., Von Zuben, F. V., and Gudwin, R. (2000). Vox Populi: An Interactive Evolutionary System for Algorithmic Music Composition. In *Leonardo Music Journal*, v. 10, 49-54. United States: The MIT Press.

Manzolli developed the Roboser project with Dr. Paul Verschure of the Institute of Neuroinformatics in Zurich. The following paragraph gives a basic description of it:

This paper describes Roboser (<http://www.roboser.com>), an autonomous interactive music composition system. The core of the system comprises two components: a program for simulating large-scale neural networks, and an algorithmic composition system. Both components operate in real-time. Data from e.g. cameras, microphones and pressure sensors enter the simulated neural system, which is also used to actively control motor devices such as pan-tilt cameras and robots. The neural system relays data representing its current operational state on to the algorithmic composition system. The composition system in turn generates musical expressions of these neural states within an a priori stylistic framework. The result is a real-time system controlled by a brain-like structure that behaves and interacts within a given environment and expresses its internal states through music.

Wassermann, K. C., Blanchard, M., Bernardet, U., Manzolli, J., Verschure, P. (2000). Roboser - An Autonomous Interactive Musical Composition System. In I. Zannos (Ed.), *Proceedings of the International Computer Music Conference (ICMC)*, 531-534. United States: The International Computer Music Association.

Another recent research by Manzolli, about musical creation on the web, is introduced in this abstract:

Our objective was to build a "Virtual Studio", an environment suited for creating musical compositions, interactively, on the web. Starting from this point, we studied the implementation of new computer based music instruments for distributed performance on the Web, called here as DMIs. We took advantage of the recent Java2 implementation to create a general model for developing interactive musical performance among Internet users. The DMIs were used in interactive performances where a MIDI Server receives several streams of MIDI data from several clients. In this paper, we present and analyse the performance of two DMIs: the first one is called "Rabisco" which allows the user to draw sound trajectories on the Web; the second, called "Cordas", is a fretted-string instrument implemented using class abstractions. In both examples, there is a heavy usage of Java Object Oriented

packages and they run in any browser supporting the current Java Virtual Machine (JVM) across the Web.

Ramos, F. L., Manzolli, J., and Costa, M. O. (2003). Virtual Studio: Distributed Musical Instruments on the Web. In *Anais do XXIII Congresso da Sociedade Brasileira de Computação, IX SBCM (Simpósio Brasileiro de Computação e Música)*. Brazil: UNICAMP.

The RoBoser system was used to compose the soundscape of *Ada: the intelligent space* presented at the World Expo 02 in Neuchatel, Switzerland.

Eduardo ‘Reck’ Miranda (born in Porto Alegre, 1963) is an active researcher and composer. As researcher his main areas of work are: sound-based communication systems (origins of intonation systems in languages; emotion in computer speech; automatic language identification systems; robot communication), formerly developed at SONY Computer Science Lab Paris; music and the brain (non-gestural music control using brainwaves; neurocompatible interfaces; neural networks); music and artificial intelligence (sound design systems; intelligent synthesizers; knowledge representation; symbolic machine learning), formerly conducted at University of Edinburgh; and evolutionary music (granular synthesis; algorithmic composition; origins of music), developed at Edinburgh Parallel Computing Centre, Glasgow University and the SONY Computer Science Lab Paris.

Miranda published several books about music and new technologies²⁰: *Computer Sound Synthesis for the Electronic Musician*, Focal Press, Oxford, United Kingdom, 1998 (with music software on the accompanying CD-ROM); *Musica y nuevas tecnologías: Perspectivas para el siglo XXI*, L'Angelot, Barcelona, Spain, 1999; *Readings in Music and Artificial Intelligence*, Harwood Academic Publishers, Amsterdam, The Netherlands, 2000; *Composing Music with Computers*, Focal Press, 2001 (with music software on the accompanying CD-ROM); and *Computer Sound Design: Synthesis Techniques and Programming*, also by Focal

²⁰ Some research papers by Miranda are available on Internet at: <http://neuromusic.soc.plymouth.ac.uk/>

Press, 2002 (also with music software on the accompanying CD-ROM). He is also co-author with Marcelo Wanderley of a new book: *New Digital Musical Instruments: Control and Interaction beyond the Keyboard* (working title) being published by A/R Editions.

Working at the Edinburgh Parallel Computing Centre (EPCC) Miranda developed Chaosynth, “an innovative granular synthesis software that uses evolutionary computing techniques for generating complex sound spectra” (Miranda, 2004).

Miranda lives at present in the U.K. where he is Head of Computer Music Research and Reader in Artificial Intelligence & Music at the School of Computing, Communications and Electronics of the University of Plymouth.

Marcelo Mortensen Wanderley (born in Curitiba, 1965) holds a degree on electrical engineering from UFPR - Universidade Federal do Paraná, Brazil, a MSc from UFSC - Universidade Federal de Santa Catarina, Brazil, on integrated analog circuit design, and a PhD from the University Pierre et Marie Curie - Paris VI, France, on acoustics, signal processing and computer science applied to music. As part of his PhD, Wanderley spent five years at the Analysis-Synthesis Team at IRCAM (Institut de recherche et coordination acoustique musique) in Paris, where he studied ways of designing new digital musical instruments. His main research interests are directed towards “the development of human-computer interaction (HCI) tools and metaphors in a musical context” focusing on the “analysis of performer-instrument interaction with applications to gestural control of sound synthesis.” (Wanderley, M. 2004).

Wanderley is co-editor, with Marc Battier, of *Trends in Gestural Control of Music*, an ebook published by IRCAM with a collection of essays about different kinds of sensors and their expressive use in devices to control electronic musical instruments.

Some of his publications²¹: *3D Position Signals Acquisition System with Application to Real-Time Processing* published in the proceedings of ICSPAT'96, held in Boston, United States, 1996; *Dance-Music Interface based on Ultrasound Sensors*, published in the proceedings of the III Brazilian Symposium on Computer Music held in Recife, Brazil, also in 1996; *Non-obvious Performer Gestures in Instrumental Music*; in A. Braffort et al. (editors): *Gesture-Based Communication in Human-Computer Interaction*, Springer Verlag, 1999; *Contrôle gestuel de la synthèse sonore*, collaboration with Philippe Depalle, in H. Vinet and F. Delalande (editors): *Interfaces Homme-Machine et Création Musicale*, Hermes Science Publishing, 1999; *Improving Instrumental Sound Synthesis by Modeling the Effect of Performer Gestures*, collaboration with Philippe Depalle and Olivier Warusfel, published in the proceedings of the International Computer Music Conference - ICMC99, held in Beijing, China; *Gestural Control of a Physical Model of a Bowed String Instrument*, collaboration with Stefania Serafin, Richard Dudas and Xavier Rodet, also published in the proceedings of the International Computer Music Conference - ICMC99; *Gesture-Music*, collaboration with Claude Cadoz, in the aforementioned *Trends in Gestural Control of Music - Ircam - Centre Pompidou*, 2000; *Towards a Model for Instrumental Mapping in Expert Musical Interaction*, collaboration with Andy Hunt and Ross Kirk, published in the proceedings of the International Computer Music Conference - ICMC2000, held in Berlin, Germany; *Gestural Control of Music*, published in the proceedings of the International Workshop Human Supervision and Control in Engineering and Music held in Kassel, Germany - September 2001; *Gestural Control at IRCAM*, collaboration with Marie-Hélène Serra, Marc Battier and Xavier Rodet, published in the proceedings of the International Computer Music Conference - ICMC2001, held in Havana, Cuba - September 2001; *The Importance of Parameter Mapping in Electronic Instrument Design*, collaboration with Andy Hunt and Matt Paradis, published in Proceedings of the 2002 International Conference on New Interfaces for Musical Expression (NIME-02), Dublin, Ireland, 2002; *Quantitative Analysis of Non-Obvious Performer Gestures*, in I. Wachsmuth and T. Sowa (editors) *Gesture and Sign Language in Human-Computer Interaction*, Springer Verlag, 2002; *Evaluation of Input Devices for Musical Expression: Borrowing Tools from HCI*, collaboration with Nicola Orio,

²¹ Some research papers by Wanderley are available on Internet at:
<http://recherche.ircam.fr/equipes/analyse-synthese/wanderle/articles.html>

published in *Computer Music Journal*, Vol 26 No. 3, 2002; *Mapping Strategies for Real-time Computer Music*, guest editor, in *Organised Sound* Vol. 7, Number 2, 2002; *Gestural Control of Sound Synthesis*, collaboration with Philippe Depalle, published in *Proceedings of the IEEE*, vol. 92, No. 4, 2004. He is also co-author with Eduardo Miranda of a new book: *New Digital Musical Instruments: Control and Interaction beyond the Keyboard* (working title) being published by A/R Editions.

Marcelo Wanderley lives in Montreal, Canada. He is Assistant Professor and Music Technology Area Chair at the Faculty of Music, McGill University.

Some other Brazilian researchers working in the computer music field are: Ignacio de Campos, José Homero F. Cavalcanti, Regis Rossi Alves Faria, José Eduardo Fornari, Anselmo Guerra de Almeida, Victor Lazzarini, Maurício Alves Loureiro, Mikhail Malt, Artemis Moroni, Márcio da Costa Pereira Brandão, Geber Ramalho and Rosa Maria Vicari.

The Brazilian Symposium on Computer Music (SBCM) has become an important international event during the last decade. The first symposium was held in Caxambu, 1994, the second one in Canela, 1995, the third one in Recife, 1996, the fourth one in Brasília, 1997, the fifth one in Belo Horizonte, 1998, the sixth one in Rio de Janeiro, 1999, the seventh one in Curitiba, 2000, the eighth one in Fortaleza, 2001, the ninth one in Campinas, 2003, and the tenth one again in Belo Horizonte, 2005. Scientific research as well as technological innovations related to computer music in Brazil can be tracked through the papers and related works presented in each edition.

Argentina is one of the most prolific places for electroacoustic music composition in Latin America. However, research activities focused on the development of applied technology for music have been, generally speaking, sporadic and without much institutional support until the recent years. Of course, there have been exceptions, like the aforementioned works by Fernando von Reichenbach.

Eleazar Garzón (born in Pozo del Molle, Córdoba, 1948), composer and researcher, developed several computer applications for music. Some of them are: Sinapsis, introduced in 1995 during the II Brazilian Symposium on Computer Music held in Canela and described by his author as “a self-generating system of musical discourses”, and Mus-ario, introduced in 2001 during the VII Brazilian on Computer Music held in Fortaleza and described as a “simulator of musical discourses based on artificial life”.

Among the younger generation of technology researchers and composers born in Argentina we find **Pablo Cetta**, **Luis María Rojas**, **Damián Keller**, **Emiliano Causa** and **Francisco Colasanto**.

Pablo Cetta (born in Buenos Aires, 1960) started his activities as researcher in 1987 with the project *Digital Control of analog synthesizers* at Centro de Investigación Musical of the University of Buenos Aires (UBA). Subsequently he worked on the project *Estudios sobre la utilización del Espacio en Música partiendo de un hardware especialmente diseñado para tal fin* (*Studies on the use of Space in Music applying specially designed hardware*), which resulted in the composition of his piece *Bosco: jardín al compás del deseo*. As part of his work for the Centro de Estudios Electroacústicos at FACM-UCA he developed a series of applications for computer assisted composition using pitch class sets, combinatorial arrays and instrumental re-synthesis of sound synthesis techniques. He also developed digital signal processing and educational software. During 1992 he was working on an automatic musical performance software, applying musical graphics and MIDI control in real time. In 1996 he worked on the project *Estudio y desarrollo de una interfaz gráfica a aplicar en programas de síntesis digital* (*Study and development of a graphic interface to apply to digital synthesis programs*). During the last years he was working on a research project focused on building *Un modelo para la simulación del Espacio en Música* (*A model for simulation of Space in*

Music), which involved the development of sound spatial localization applications using the HRTF technique applied to the composition of chamber music with electronic sounds.

Dr. Cetta composed several pieces for tape as well as mixed works.

Luis María Rojas (born in Bolivar, 1960) is researcher, musical software developer and composer. He received a prize in the Computer Assisted Work category from the International Institute of Electroacoustic Music of Bourges, France, for his Texture 3.0 software. Rojas says about his development: “Texture generates musical information by stochastic means in two different ways: the first one to be interpreted by a MIDI device, and the other one to be interpreted by TRender, a software synthesizer included with the package.” (Rojas, L. M. 2003. Personal communication).

Rojas also developed SMSrt during 2001, a Xavier Serra’s SMS based software.

He is teaching Electroacoustic Media at the Musical Conservatory of Bahia Blanca, Argentina.

Damián Keller (born in Buenos Aires, 1966) has been developing an interdisciplinary research work on instrumental timbre and formal structures using tools extracted from psychology of perception, signal processing and musical analysis.

Some of Keller’s published articles and reports are: *Theoretical outline of a hybrid musical system*, with C. Silva, published in the Proceedings of the Second Brazilian Symposium on Computer Music held in Canela, Brazil, in 1995; *Anitoo: some analysis tools*, published in the Proceedings of the International Computer Music Conference held in Hong Kong, in 1996; *Ecologically-based granular synthesis*, with B. Truax, published in the Proceedings of the International Computer Music Conference held in Ann Arbor, United States, in 1998; *touch'n'go: Ecological Models in Composition*, Master of Fine Arts Thesis, Simon Fraser

University, Burnaby, Canada, 1999; *Social and perceptual dynamics in ecologically-based composition*, published in Proceedings of the VII Brazilian Symposium of Computer Music held in Curitiba, Brazil, in 2000; *Introduction to the ecological approach*, included in the accompanying CD-ROM coming with R. Bianchini and A. Cipriani (editors) *Virtual Sound*, Contempo Edizioni, Rome, Italy, 2000; *Social and perceptual processes in the installation The Trade*, with A. Capasso, published in Organised Sound Vol. 5 No. 2, 2000; *Social and perceptual dynamics in ecologically-based composition*, published in Electronic Musicological Review, Vol. 6, 2001; *Accumulation and interaction in an urban landscape: Urban Corridor*, with A. Capasso, and S.R. Wilson, published in the Proceedings of the VIII Brazilian Symposium of Computer Music held in Fortaleza, Brazil, 2001; *Everyday sounds: synthesis parameters and perceptual correlates*, with J. Berger, published in the Proceedings of the VIII Brazilian Symposium of Computer Music held in Fortaleza, Brazil, 2001.

In collaboration with C. Rolfe, Keller developed MacPOD, a real-time granular synthesis software.

Emiliano Causa (born in La Plata, 1970) studied graphic art, composition, sax and information systems' engineering. He is Researcher and Professor at the Multimedia Production career of the Fine Arts Faculty, University of La Plata.

Causa has been developing software applications for music, digital audio signal processing and multimedia: a tool for assisted composition based on Schillinger techniques, a time expander, a neural network based pitch recognition system, sound morphing software, and some sound-image-movement developments, among others.

In 2002 Causa founded the group Proyecto Biopus (with Christian Silva, Tarsicio Pirota and Julián Isacch) to work on interactive artworks and web-art developments, bringing together multimedia and artificial intelligence concepts.

He has been active in electroacoustic music, video and web art.

Francisco Colasanto (born in Buenos Aires, 1971) is researcher at IIESMUMD, Instituto de Investigación Experimental en Sonido y Música por Medios Digitales de la Facultad de Informática de la Universidad de Morón (Digital Sound and Music Experimental Research Institute at University of Morón) and LIPM. His research is mainly focused in interactive musical performances involving acoustic instruments and electronics.

Today, several public and private universities in Argentina are supporting some technology research activities related to electroacoustic music creation and performance.

Research activities in terms of music technology applications and related new media developments have been increasing since the mid 80s. Most researchers have been developing, at least part of their work, out of their native country, looking for an adequate support. Juan Reyes and Camilo Rueda from Colombia, Roberto Morales-Manzanares from Mexico, and Rajmil Fischman from Peru, are some of those researchers.

Juan Reyes (born in Barranquilla, 1962), composer and researcher, obtained degrees in Mathematics and Music Composition from the University of Tampa, in the United States. He also studied computer music at Center for Computer Research in Music and Acoustics (CCRMA) in Stanford University.

Reyes has been focusing his research on: artificial intelligence and music, 1995; spectral and physical models of musical instruments, 1996; wavelets, 1997; chaos and attractors, 2000; dynamic systems and scan synthesis, 2001; algorithmic composition, 2003; among other topics.

Some musical outputs of Reyes research projects can be heard in his pieces: *Straw-Berry*, composed in 1997 at MOX - Advanced Computing Center of Los Andes University in Bogota, where he was using physical modeling of blown and plucked musical instruments; *SygFrydo*, composed in 1998 at MOX, using physical, spectral and expression modeling; and *Chryseis*, composed in 2002 at CCRMA - Stanford University in California, using scanned synthesis.

Camilo Rueda was helping to develop PatchWork, the visual music composition language created at IRCAM, France, during the early 90s. Among other papers, he published: *A visual Programming Environment for Constraint Based Musical Composition* in the proceedings of the I Brazilian Symposium on Computer Music, 1994.

Roberto Morales-Manzanares (born in Mexico City, 1958) is an active composer, performer and researcher. He developed Escamol, “an algorithmic tool for composition which uses non-deterministic automaton controlled by rules” (Morales, E and Morales, R. 1995 *Learning Musical Rules*). Escamol can “generate more than 20 simultaneous voices and its predicates include counterpoint modal rules, algorithms that simulate Alberti’s bass, traditional harmonic progressions, contemporary composition rules and generative grammars” (Morales, E and Morales, R. 1997. *Music, Composition, Improvisation and Performance through Body Movements*).

Some of Morales published research papers are: *Learning Musical Rules*, collaboration with E. Morales, 1995; *Non Deterministic Automaton for Composition*, in 1994 International Computer Music Conference Proceedings, International Computer Music Association; *Análisis de forma y estilo musicales por inducción utilizando lógica de primer orden*, collaboration with E. Morales, in Revista de la Sociedad Matemática Mexicana vol. 14, 1994; *Learning Counterpoint rules for analysis and Generation*, collaboration with E. Morales, in First Brazilian Symposium on Computer Music, 1994; *SICIB (Sistema Interactivo de Composición e Improvisación para Bailarines)*, collaboration with E. Morales, in Revista de

la Sociedad Matemática Mexicana vol. 16, 1996; *Music, Composition, Improvisation and Performance through Body Movements*, in KANSEI The technology of Emotion, 1997 Proceedings, AIMI International Workshop; *Integrating Bayesian Networks with Logic Programs for Music*, collaboration with E. Morales and E. Sucar, in 2000 International Computer Music Conference Proceedings, International Computer Music Association.

Morales composed a large number of tape and mixed pieces using electroacoustic media, many of them involving live electronics.

Rajmil Fischman (born in Lima, 1956) studied composition and electrical engineering, and has been working with computer media since the mid 80s. He has been composing both tape and mixed works. He is Professor at Keele University, in Staffordshire, U.K.

Some of his published papers are: *Music for the Masses*, published in 1994 by Journal of New Music Research (Swets & Zeitlinger, Netherlands); *A Systematic Approach to the Analysis of Music for Tape*, published in 1995 on the Proceedings of the International Computer music Conference at Banff, Canada; followed by *Analysis of Crosstalk, a work by Michael Vaughan* and *The Phase Vocoder: Theory and Practice*, both published in 1997 by Organised Sound (Cambridge University Press, UK); *Global Village - Local Universe*, published in 1999 by Leonardo Music Journal (The MIT Press, USA); *Derivation of Organic Musical Structure and Materials from the Solution of Differential Equations* (MRI Press, USA) and *Application of Mathematical Models to the Generation of Organic Musical Structure and Discourse in Composition: Research Summary*, published in 2002 on the Proceedings of the International Computer music Conference at Göteborg, Sweden. He also contributed with two chapters, *A Tutorial Survey of 'Classic' Synthesis Techniques* and *Multiband Processing with Time-varying Filters* to *The Csound Book* and accompanying CD-ROM edited by Richard Boulanger and published in 2000 (The MIT Press, USA).

Fischman also has been developing some software applications, including: CDPDESK1, CDP - Composers' Desktop Project and GRAPHLIB - CDP Graphics Library and manual in

1987; MAESTRO1 - *SoundMaestro* for CD production. Version 1 in 1988; KEELEDESK, a compositional environment for the manipulation and processing of soundfiles in 1991 (this project includes and integrates the research and development carried out by Digital Music Technology students at Keele University); AL, Algorithmic Composition Graphics Environment, and ERWIN-COM plug-in for granular synthesis using the statistical distributions obtained from Schrödinger's quantum mechanics equation for a potential with spherical symmetry, in 2001. Since 1987 he has been also developing miscellaneous programs for musical signal processing, distributed by the Composers' Desktop Project.

Throughout this chapter a first approach to the music-related technology and science research developed in different Latin American countries is proposed. It was very difficult to find traces of the pioneering music-related technology innovations developed by José Vicente Asuar, Juan Blanco, Raúl Pavón, Fernando von Reichenbach, and Mauricio Milchberg with César Bolaños. For example, it was impossible to find Pavón in Mexico, even asking many of his colleagues, they have no references about where he could be living today. Once again, I need to say here that part of our recent history in terms of art and new technologies is being lost, and we need to do much more before it is too late.

While Brazilian researchers have been developing important activities, both in their own country and abroad for the last three decades, Argentinian, Colombian and Mexican researchers have been increasing their music-related technology and scientific studies during the last few years.

CHAPTER IX

CONCLUSIONS

9.1 Conclusions

The results of my research show a sustained development in several Latin American countries in terms of musical creation involving electroacoustic media.

Argentina, Brazil and Cuba have been showing uninterrupted activities around the studied field since the 50s or 60s. On the other hand, countries like Chile, Mexico, Uruguay and Venezuela showed pioneering activities during the 50s or 60s but then an irregular production, in some cases until the late 80s or 90s, when strong activities in the field restarted.

Composers from Bolivia, Colombia, Ecuador and Peru using electroacoustic media in their music during the 60s and 70s were mainly working at studios in Europe, the United States or in other Latin American countries (e.g. Argentina).

In a few countries of the studied region, like Costa Rica or El Salvador, we can track sustained activities in the electroacoustic music field only since the 80s, the 90s, or even just a very few years ago.

There are also some exceptional situations, like the one in Guatemala or the Dominican Republic, where just a few composers have been integrating electroacoustic techniques and technologies in their music. In spite of that, in Guatemala Joaquín Orellana started to incorporate electroacoustic media in his music during the early 60s. In the Dominican

Republic the first activities were found around the late 70s.

To my initial main research question: How has the tradition of musical creation using electroacoustic media developed in Latin America? I am proposing this thesis together with the collection of recordings archived at the Daniel Langlois Foundation as an answer. With them I am aiming to unfold part of the Latin American electroacoustic music history, helping to keep the memory of this tradition developed through the work of many artists and technology innovators. This empirical research has allowed me to work with pioneers of the electroacoustic music field and to produce concrete actions to preserve some of their endangered works.

The few major initiatives supporting electroacoustic music creation during the early years of its development in Latin America, like the CLAEM at Instituto Di Tella in Buenos Aires during the 60s, did not produce any actions related to the preservation and documentation of their vast production.

The region's economic and social conditions were not good and are not much better today. In some cases, they are even worse now than during the 50s or 60s, but the affordability and availability of sophisticated electronic technologies to produce and transform musical sounds is a different reality today from that of the pioneering years.

The experimental approach of many composers, together with innovative solutions coming from technology makers, resulted in a vast and rich production developed during several decades, beginning just a few years later than in the places where electroacoustic music was born.

The history of Latin America as a region has many points in common. When electroacoustic music activities started in the different countries there were many similarities in their context. The political, social and economic situation have been difficult in most countries for many years, and that has not changed much lately.

The access to the technology needed to create electroacoustic music was prohibitive for individuals until not so many years ago. The costs of buying equipment were very high and the technical maintenance also costly and usually extremely complex to resolve.

Composers were traveling to Europe and the United States to be able to learn about the new technologies and, most of all, to be able to use them in their own creations. Local institutional support was scarce in Latin America, and with a few exceptions, no organizations were able to survive for a long period. Talented composers and creative technology innovators were “making the change”, most of them without important institutional support. They have been the real basis for this incredible musical production that has not been very well known in most of the main northwestern centers of electroacoustic music or even in Latin America itself.

The lack of preservation actions and documentation about electroacoustic music in Latin America led to the urgent need to do something about it, before it was too late, and this text together with its accompanying recordings archive are the results of this regional-focused initiative.

9.2 Future steps

Hopefully, the work I have been presenting throughout this text will invite the reader to explore more about the wonderful and largely unknown sonic world created by hundreds of Latin American composers over the past several decades.

Future steps could follow multiple paths, as for example: (a) further research work on the recordings already available at the Daniel Langlois Foundation for Art, Science and Technology, (b) further regional or local field-research with composers and/or organizations that still have musical recordings and information of pioneering works.

The basic information I have included in the database accompanying the recordings of the collection I have developed at the DLF could be widely expanded. The compositional techniques used in some works, as well as the technology developed for them are two aspects that could be considered to extend this study, but also, in a deep contextual analysis, the history and socio-economic characteristics of the different countries of the region could be looked into. In fact, I consider this work is a part of an unfolding process where we could find a new world of sounds and music but it is also a process of basic knowledge about different cultural contexts with varied artistic developments.

At the moment of this writing, 2005, there are several major European institutions joining efforts to find possible solutions for the electroacoustic music preservation problem.

Today a more energetic action is needed in order to build initiatives that will open preservation and access to our electroacoustic heritage. Two major dangers threaten the electroacoustic memory:

- The decaying of all media, mainly analog but also early digital media
- The fact that many actors and historical centres are disappearing, carrying with them knowledge and know-how about collections, technology and history.

Concern is growing in the electroacoustic community as well as in the academic domain for developing initiatives that may improve this situation and progressively build a common, wide, non-aesthetic oriented preservation action.

The approach of the network is completely open-minded. There are no aesthetic or technological restrictions; the main concern is that there is *media that needs to be preserved*. Priority is given to endangered media, mainly analog media and early digital media. The urgency is to preserve music for which media is the only carrier, and may disappear if the media decays. Our focus is on music composed with technological devices.

Many questions remain open: what documentation systems and protocols are needed; what do we do with essential documents such as scores and diagrams; what future is there for old software, hardware, machines and devices used for musical creation; what essential information should be preserved so as to guarantee a future performance of a work? Within the project's scope there are no limitations, the entire electroacoustic domain is concerned and no limits should be put to it. The only limitations are practical; what can be done, and what are the priorities in relation with the danger of losing our heritage?

Teruggi, D. (2005). *Electroacoustic Music Preservation: a memorandum*. Email subject: Electroacoustic Preservation Meeting, France.

This text and the accompanying recordings archive are positive steps towards what the European initiative is mentioning. However, many more actions must be taken soon to preserve an important part of the Latin American heritage concerning its recent artistic production involving electronic technologies.

I hope this work will be useful and will help others to learn something from it.

LATIN AMERICAN ELECTROACOUSTIC MUSIC COLLECTION

Argentina

Table 12. Musical compositions created by Argentinian composers available for listening in the *Latin American Electroacoustic Music Collection*.

Composition	Date of creation	Composer	Date of birth	
<i>Dos Estudios en Oposición</i>	1959	Dianda, Hilda	1925	
<i>A-7</i>	1964	Dianda, Hilda	1925	
<i>Contrastes</i>	1964	Krieger, Armando	1940	
<i>Diálogos I</i>	1964	1965	Kröpfl, Francisco	1931
<i>Electronic Study No.3</i>	1964	1965	Davidovsky, Mario	1934
<i>Concreción 65</i>	1965	Castillo, Graciela	1940	
<i>Diálogos II</i>	1965	Kröpfl, Francisco	1931	
<i>exercise I (1965-V)</i>	1965	lanza, alcides	1929	
<i>Forma sonora de Ondina : Homenaje a Aloysius Bertrand</i>	1965	Arandia Navarro, Jorge	1929	
<i>Composición 9b</i>	1966	Moretto, Nelly	1925	
<i>interferences I (1966-II)</i>	1966	lanza, alcides	1929	
<i>interferences I (1966-II) [tape part only]</i>	1966	lanza, alcides	1929	
<i>kromoplasticos</i>	1966	lanza, alcides	1929	
<i>plectros II (1966-I)</i>	1966	lanza, alcides	1929	
<i>plectros II (1966-I) [tape part only]</i>	1966	lanza, alcides	1929	
<i>interferences II (1967-I)</i>	1967	lanza, alcides	1929	
<i>interferences II (1967-I) [tape part only]</i>	1967	lanza, alcides	1929	

<i>strobo I (1967-V)</i>	1967		lanza, alcides	1929
<i>strobo I (1967-V) [tape part only]</i>	1967		lanza, alcides	1929
<i>two times too</i>	1967		lanza, alcides	1929
<i>Ejercicio I</i>	1968		Grela, Dante	1941
<i>ekphonesis I (1968-II) [tape part only]</i>	1968		lanza, alcides	1929
<i>ekphonesis II (1968-III)</i>	1968		lanza, alcides	1929
<i>ekphonesis II (1968-III) [tape part only]</i>	1968		lanza, alcides	1929
<i>Estudio Electrónico No. 1</i>	1968		Tejeda, Eduardo	1923
<i>Médisances</i>	1968		Ferreyra, Beatriz	1937
<i>penetrations I (1968-IV)</i>	1968		lanza, alcides	1929
<i>ekphonesis III (1969-II)</i>	1969		lanza, alcides	1929
<i>ekphonesis III (1969-II) [tape part only]</i>	1969		lanza, alcides	1929
<i>Four electronic statements (1969-IIIbis)</i>	1969		lanza, alcides	1929
<i>Invocation</i>	1969		Serra, Luis Maria	1942
<i>Ludwig van [tape part only]</i>	1969		Kagel, Mauricio	1931
<i>penetrations II (1969-IV) [version 1]</i>	1969		lanza, alcides	1929
<i>penetrations II (1969-IV) [version 2]</i>	1969		lanza, alcides	1929
<i>penetrations II (1969-IV) [tape part only]</i>	1969		lanza, alcides	1929
<i>The Cement Jungle Suite (1969-III)</i>	1969		lanza, alcides	1929
<i>Tres movimientos para cinta magnetofónica</i>	1969		Tosco, Virgilio F. H.	1930
<i>Analogías Paraboloides</i>	1970		Caryevschi, Pedro	
<i>Dynamus</i>	1970		Bértola, Eduardo	1939
<i>La Panadería</i>	1970		Kusnir, Eduardo	1939
<i>L'Orvietan</i>	1970		Ferreyra, Beatriz	1937

<i>Mnémon</i>	1970		Maranzano, José	1940
<i>Música para sintetizador</i>	1970		Kröpfl, Francisco	1931
<i>Penetraciones</i>	1970	1972	Bértola, Eduardo	1939
<i>penetrations V (1970-IV)</i>	1970		lanza, alcides	1929
<i>penetrations V (1970-IV) [tape part only]</i>	1970		lanza, alcides	1929
<i>acúfenos II (1971-IV)</i>	1971		lanza, alcides	1929
<i>acúfenos II (1971-IV) [tape part only]</i>	1971		lanza, alcides	1929
<i>Atmósferas II</i>	1971		Tosco, Virgilio F. H.	1930
<i>Dividido dos</i>	1971		Etkin, Mariano	1943
<i>eidesis III (1971-II)</i>	1971		lanza, alcides	1929
<i>eidesis III (1971-II) [tape part only]</i>	1971		lanza, alcides	1929
<i>ekphonesis IV (1971-III) [tape part only]</i>	1971		lanza, alcides	1929
<i>Música en-cinta</i>	1971		Alvarez, Calixto	1938
<i>Penetraciones II</i>	1971		Bértola, Eduardo	1939
<i>plectros III (1971-I)</i>	1971		lanza, alcides	1929
<i>plectros III (1971-I) [tape part only]</i>	1971		lanza, alcides	1929
<i>Skolyon</i>	1971		Viera, Julio Martín	1943
<i>Estudio</i>	1972		Grela, Dante	1941
<i>penetrations VII (1972-III)</i>	1972		lanza, alcides	1929
<i>penetrations VII (1972-III) [tape part only]</i>	1972		lanza, alcides	1929
<i>Siesta Blanca</i>	1972		Ferreyra, Beatriz	1937
<i>Absolum</i>	1973		Luengo, María Teresa	1940
<i>Estudio I</i>	1973		Rapp, Jorge	1946
<i>hip'nos I (1973-I)</i>	1973		lanza, alcides	1929
<i>Canto del Loco</i>	1974		Ferreyra, Beatriz	1937
<i>Parca</i>	1974		Bazán, Oscar	1936

<i>plectros IV (1974-I)</i>	1974		lanza, alcides	1929
<i>plectros IV (1974-I) [tape part only]</i>	1974		lanza, alcides	1929
<i>... Después el silencio ...</i>	1975	1976	Dianda, Hilda	1925
<i>Bah, le dije al tiempo</i>	1975		Moretto, Nelly	1925
<i>huauqui</i>	1975		Paraskevaidis, Graciela	1940
<i>kron'ikelz75 [1975-I]</i>	1975		lanza, alcides	1929
<i>Los números</i>	1975		Bazán, Oscar	1936
<i>Memento</i>	1975		Maranzano, José	1940
<i>Senzar</i>	1975		Tejeda, Eduardo	1923
<i>Tramos</i>	1975		Bértola, Eduardo	1939
<i>Un tiempo, un lugar ...</i>	1975		Rapp, Jorge	1946
<i>Visiones</i>	1976		Serra, Luis Maria	1942
<i>acúfenos III (1977-I)</i>	1977		lanza, alcides	1929
<i>acúfenos III (1977-I) [tape part only]</i>	1977		lanza, alcides	1929
<i>eidesis IV (1977-II)</i>	1977		lanza, alcides	1929
<i>eidesis IV (1977-II) [tape part only]</i>	1977		lanza, alcides	1929
<i>Scherzo</i>	1977		Kröpfl, Francisco	1931
<i>...out of... (1978-I)</i>	1978		lanza, alcides	1929
<i>Cotidiana</i>	1978		Rapp, Jorge	1946
<i>Echos</i>	1978		Ferreya, Beatriz	1937
<i>ekphonesis V (1979-I)</i>	1979		lanza, alcides	1929
<i>ekphonesis V (1979-I) [tape part only]</i>	1979		lanza, alcides	1929
<i>El cuaderno del alquimista</i>	1979		Mandolini, Ricardo	1950
<i>Glaciación</i>	1979		Grela, Dante	1941
<i>Una Orquesta Imaginaria</i>	1979		Viñao, Alejandro	1951
<i>Voces II</i>	1979	1982	Terzián, Alicia	1934
<i>acúfenos V (1980-II)</i>	1980		lanza, alcides	1929
<i>acúfenos V (1980-II) [tape part only]</i>	1980		lanza, alcides	1929
<i>Canción de Madera y Agua</i>	1981		Mandolini, Ricardo	1950

<i>Go</i>	1981		Viñao, Alejandro	1951
<i>Configuraciones Espaciales</i>	1982		Grela, Dante	1941
<i>Estudio sobre Ritmo y Espacio</i>	1982		Dal Farra, Ricardo	1957
<i>Estudio sobre un ataque de timbal</i>	1982		Dal Farra, Ricardo	1957
<i>Hinterland</i>	1982		Roqué Alsina, Carlos	1941
<i>módulos II (1982-I)</i>	1982		lanza, alcides	1929
<i>módulos II (1982-I) [tape part only]</i>	1982		lanza, alcides	1929
<i>Montparnasse la nuit</i>	1982		Teruggi, Daniel	1952
<i>Octuor</i>	1982		Vaggione, Horacio	1943
<i>Tres Piezas para Flauta y Sonidos Electrónicos</i>	1982		Palazzo, Ricardo	1955
<i>Y así era</i>	1982		Castillo, Graciela	1940
<i>Audiciones</i>	1983		Dal Farra, Ricardo	1957
<i>Civilizaciones</i>	1983	v.2003	Dal Farra, Ricardo	1957
<i>De mi huían los pájaros</i>	1983		Mandolini, Ricardo	1950
<i>Estudio elíptico</i>	1983		Dal Farra, Ricardo	1957
<i>interferences III (1983-IV) [version 1]</i>	1983		lanza, alcides	1929
<i>interferences III (1983-IV) [version 2]</i>	1983		lanza, alcides	1929
<i>interferences III (1983-IV) [tape part only]</i>	1983		lanza, alcides	1929
<i>módulos III (1983-III)</i>	1983		lanza, alcides	1929
<i>módulos III (1983-III) [tape part only]</i>	1983		lanza, alcides	1929
<i>Poema reiterado</i>	1983		Mandolini, Ricardo	1950
<i>sensors IV (1983-V)</i>	1983		lanza, alcides	1929
<i>sensors IV [tape part only]</i>	1983		lanza, alcides	1929
<i>Aquí, allá y en todas partes ...</i>	1984		Rapp, Jorge	1946
<i>Ceremonia Secreta</i>	1984		Mandolini, Ricardo	1950
<i>Gags Kags</i>	1984		Kusnir, Eduardo	1939
<i>Klavierstück VI (Hommage à Bach)</i>	1984		Roqué Alsina, Carlos	1941

<i>Música para Hall</i>	1984		Dal Farra, Ricardo Costa, Carlos	1957
<i>Mutación II</i>	1984	1985	Kröpfl, Francisco	1931
<i>Overstrung</i>	1984	1985	Valverde, Gabriel	1957
<i>Sphæra : Eteera</i>	1984	1993	Teruggi, Daniel	1952
<i>Una música, un rumor, un símbolo</i>	1984		Valverde, Gabriel	1957
<i>¿Es ese el baile de Delia Ble?</i>	1985		Edelstein, Oscar	1953
<i>Cómo es Lily?</i>	1985		Kusnir, Eduardo	1939
<i>Ek-stasis</i>	1985	1986	Valverde, Gabriel	1957
<i>ektenes I (1985-III)</i>	1985		lanza, alcides	1929
<i>Estudio Electronico II</i>	1985		Rapp, Jorge	1946
<i>Incertidumbre</i>	1985		Mendelievich, Eudardo	1958
<i>Petit Poucet Magazine</i>	1985		Ferreya, Beatriz	1937
<i>Primer Instante [tape 1]</i>	1985		Dal Farra, Ricardo	1957
<i>Primer Instante [tape 2]</i>	1985		Dal Farra, Ricardo	1957
<i>Son Entero</i>	1985	1988	Viñao, Alejandro	1951
<i>Thema</i>	1985		Vaggione, Horacio	1943
<i>Acusmático</i>	1986		Dal Farra, Ricardo	1957
<i>Al menor ruido los pájaros se callan</i>	1986		Tauriello, Antonio	1931
<i>Ancestros</i>	1986		Dal Farra, Ricardo	1957
<i>Canto a mi misma</i>	1986	1987	Terzián, Alicia	1934
<i>Clones</i>	1986		Dal Farra, Ricardo Gervasoni, Arturo	1957 1962
<i>Contradicciones</i>	1986		Simkin, Carlos	1944
<i>Dos niños amenazados por un ruiseñor</i>	1986		Tauriello, Antonio	1931
<i>Double</i>	1986		Dal Farra, Ricardo Gervasoni, Arturo	1957 1962
<i>Intangibles universos</i>	1986		Grela, Dante	1941
<i>Integrados</i>	1986		Dal Farra, Ricardo	1957

			Gervasoni, Arturo	1962
<i>Karma [stereo version]</i>	1986		Dal Farra, Ricardo	1957
<i>Karma [4 tracks]</i>	1986		Dal Farra, Ricardo	1957
<i>PH</i>	1986		Dal Farra, Ricardo Gervasoni, Arturo	1957 1962
<i>Procesos</i>	1986		Dal Farra, Ricardo	1957
<i>Sonambula</i>	1986	1987	Nilini, Ricardo	1960
<i>Sphæra : Aquatica</i>	1986	1993	Teruggi, Daniel	1952
<i>The U.F.O. forest</i>	1986		Ferreya, Beatriz	1937
<i>Toccata del Mago</i>	1986	1987	Viñao, Alejandro	1951
<i>"La Noche de las Noches" seven Zenga</i>	1987	1989	Viñao, Ezequiel	1960
<i>arghanum III (1987-II)</i>	1987		lanza, alcides	1929
<i>arghanum IV (1987-III)</i>	1987		lanza, alcides	1929
<i>Búsqueda</i>	1987		López Lezcano, Fernando	1956
<i>Cúmulos</i>	1987	1988	Valverde, Gabriel	1957
<i>Divertimento II : El Reloj</i>	1987		Viera, Julio Martín	1943
<i>G</i>	1987		Dal Farra, Ricardo Gervasoni, Arturo	1957 1962
<i>Hambulata Hic Armatus Homo</i>	1987		Piantino, Eduardo	1943
<i>L'autre ... ou le chant des marécages</i>	1987	2004	Ferreya, Beatriz	1937
<i>Para Todos Ellos</i>	1987		Dal Farra, Ricardo	1957
<i>Planos Imaginarios</i>	1987		Perales, Stella	1944
<i>Souffle d'un petit Dieu distrait</i>	1987	1997	Ferreya, Beatriz	1937
<i>Viril Occidente</i>	1987		Edelstein, Oscar	1953
<i>... due giorni dopo [stereo version]</i>	1988		Dal Farra, Ricardo	1957
<i>... due giorni dopo [4 tracks]</i>	1988		Dal Farra, Ricardo	1957
<i>...there is a way to sing it... (1988-III)</i>	1988		lanza, alcides	1929
<i>Argos</i>	1988		Fumarola, Martín	1966

<i>Canticum</i>	1988		Franchisena, César	1923
<i>ekphonesis VI (1988-II)</i>	1988		lanza, alcides	1929
<i>ekphonesis VI (1988-II) [tape part only]</i>	1988		lanza, alcides	1929
<i>Entropogel</i>	1988		Nillni, Ricardo	1960
<i>København</i>	1988		Luna, Fabián	1963
<i>Orillas</i>	1988		Kröpfl, Francisco	1931
<i>Sçir</i>	1988		Vaggione, Horacio	1943
<i>Uhuru</i>	1988		Dal Farra, Ricardo Gervasoni, Arturo	1957 1962
<i>Vértex</i>	1988		Pérez Miró, Ricardo	1952
<i>A bylo to tak...</i>	1989		Fiore, Héctor	1953
<i>Danzas</i>	1989		Gerardi, Enrique	1926
<i>De los mundos paralelos</i>	1989		Grela, Dante	1941
<i>Doble Mensaje</i>	1989		Mary, Mario Marcelo	1961
<i>EGT</i>	1989		Dal Farra, Ricardo	1957
<i>El Grito</i>	1989		Lopez Blanco, Esteban	
<i>El Valle de las Profecías</i>	1989		Bazán, Oscar	1936
<i>Estatismo</i>	1989		Fumarola, Martín	1966
<i>Homenaje a Pierre Schaeffer</i>	1989		Belloc, Enrique	1936
<i>Japi-Nd</i>	1989		Dal Farra, Ricardo	1957
<i>lacrimosa a salvador dali</i>	1989		Schmilovich, Sergio	1959
<i>Los Giros del Alma del Toro</i>	1989		Sad, Jorge L.	1959
<i>Melólogo I (Chroniques de l'abolition de l'esclavage)</i>	1989		Serra, Luis Maria	1942
<i>Nio Aeln</i>	1989		Grätzer, Carlos	1956
<i>Sikxo</i>	1989		Justel, Elsa	1944
<i>SP4</i>	1989		Dal Farra, Ricardo	1957
<i>Sphæra : Focolaria</i>	1989	1993	Teruggi, Daniel	1952

<i>Sphaera : Terra</i>	1989	1993	Teruggi, Daniel	1952
<i>Synergy</i>	1989		Furman, Pablo	1955
<i>Synergy [tape part only]</i>	1989		Furman, Pablo	1955
<i>un mundo imaginario (1989-II)</i>	1989		lanza, alcides	1929
<i>un mundo imaginario (1989-II) [tape part only]</i>	1989		lanza, alcides	1929
<i>Xastock</i>	1989		Dal Farra, Ricardo	1957
<i>Anaconda</i>	1990		Rosas Cobian, Michael	1953
<i>arghanum V (1990-I) pet</i>	1990		lanza, alcides	1929
<i>arghanum V (1990-I) pet [tape part only]</i>	1990		lanza, alcides	1929
<i>arghanum V (1990-I) pi</i>	1990		lanza, alcides	1929
<i>arghanum V (1990-I) pi [tape part only]</i>	1990		lanza, alcides	1929
<i>Ash</i>	1990		Vaggione, Horacio	1943
<i>Batimenti</i>	1990		Cerana, Carlos	1958
<i>Ciao bambina</i>	1990		Fiore, Héctor	1953
<i>Ecos</i>	1990		Schachter, Daniel	1953
<i>El adiós</i>	1990		Pozzati, Guillermo	1958
<i>Endorfina</i>	1990		Mary, Mario Marcelo	1961
<i>Escenas para un film - I</i>	1990		Gerardi, Enrique	1926
<i>Escenas para un film - II</i>	1990		Gerardi, Enrique	1926
<i>Failles fluorescentes</i>	1990		Grätzer, Carlos	1956
<i>Gaps</i>	1990		Nillni, Ricardo	1960
<i>Gaps [tape part only]</i>	1990		Nillni, Ricardo	1960
<i>Kai generated</i>	1990		Fiore, Héctor	1953
<i>La Confesión</i>	1990		Schmilovich, Sergio	1959
<i>Las vaquitas son ajenas</i>	1990		Fiore, Héctor	1953
<i>Lejanía</i>	1990		Gerardi, Enrique	1926

<i>Melólogo II (A Jacques Coeur, Argentier du Roi)</i>	1990		Serra, Luis Maria	1942
<i>Persecución</i>	1990		Keller, Damián	1966
<i>Strata</i>	1990		Furman, Pablo	1955
<i>Tecnota</i>	1990		Fiore, Héctor	1953
<i>the freedom of silence (1990-II)</i>	1990		lanza, alcides	1929
<i>the freedom of silence (1990-II) [tape part only]</i>	1990		lanza, alcides	1929
<i>Tonal / Nagual</i>	1990		Sad, Jorge L.	1959
<i>Tu casa o este océano</i>	1990		Dirie, Gerardo	1958
<i>A.M a deux (Divertimento)</i>	1991		Serra, Luis Maria	1942
<i>Ashram</i>	1991		Dal Farra, Ricardo	1957
<i>Ashram [tape part only]</i>	1991		Dal Farra, Ricardo	1957
<i>Buenos días fue un buen día</i>	1991		Kusnir, Eduardo	1939
<i>Cohesión</i>	1991		Mary, Mario Marcelo	1961
<i>Composición</i>	1991		Grela, Dante	1941
<i>Dos estudios preliminares</i>	1991	1992	Valverde, Gabriel	1957
<i>El Simurgh -Book I- "The Conference of the Birds"</i>	1991		Viñao, Ezequiel	1960
<i>Estudio Sobre Una Configuración Fractal</i>	1991		Zimbaldo, Daniel	1955
<i>Expansión</i>	1991		San Martín, Patricia	
<i>Furioso</i>	1991		Dal Farra, Ricardo Biriotti, León	1957 1929
<i>Fy Mor</i>	1991		Justel, Elsa	1944
<i>Hálito</i>	1991		Schachter, Daniel	1953
<i>Hot'n cold</i>	1991		López Lezcano, Fernando	1956
<i>Huellas digitales</i>	1991		Cerana, Carlos	1958

<i>India vieja, sincretismo #1</i>	1991		Halac, José	1962
<i>Mano a Mano</i>	1991		Teruggi, Daniel Schwarz, Jean	1952
<i>Memorias II</i>	1991	1992	Castillo, Graciela	1940
<i>Mnèse</i>	1991	1992	Nillni, Ricardo	1960
<i>Sinfonía Concertante</i>	1991		Belloc, Enrique	1936
<i>Solo Saxo Baritono</i>	1991		Alsuyet, Claudio	1957
<i>son glosas, claro... (1991-I)</i>	1991		lanza, alcides	1929
<i>Soplando Almas</i>	1991		Naón, Luis	1961
<i>Three Winters</i>	1991		Calzón, Miguel	1956
<i>Till</i>	1991		Vaggione, Horacio	1943
<i>Tintas</i>	1991		Candía, Cecilia	1959
<i>Urbis #2</i>	1991		Rosas Cobian, Michael	1953
<i>Vestigios</i>	1991		Lluán, Claudio	1957
<i>Womb (etudes)</i>	1991		Rosas Cobian, Michael	1953
<i>... para el trato con el desierto</i>	1992		Budón, Osvaldo	1965
<i>... que me hiciste mal...</i>	1992		Cetta, Pablo	1960
<i>A 1</i>	1992		Schachter, Daniel	1953
<i>ALL +</i>	1992	1993	Justel, Elsa	1944
<i>Bakxai</i>	1992		Rosas Cobian, Michael	1953
<i>Borges y el Espejo</i>	1992		Viñao, Alejandro	1951
<i>Break up</i>	1992		Rapp, Jorge	1946
<i>Chant d'Ailleurs</i>	1992		Viñao, Alejandro	1951
<i>Danzas</i>	1992		Schmilovich, Sergio	1959
<i>Desde la Torre</i>	1992		Figueiras, Juan Carlos	1957
<i>Divertimento III</i>	1992		Viera, Julio Martín	1943
<i>D'un souffle retrouvé</i>	1992	1993	Grätzer, Carlos	1956
<i>El Simurgh (Book II)</i>	1992		Viñao, Ezequiel	1960
<i>Homotecia [III]</i>	1992	1994	Dal Farra, Ricardo	1957

<i>Homotecia [IX]</i>	1992	2004	Dal Farra, Ricardo	1957
<i>Homotecia [tape part only]</i>	1992		Dal Farra, Ricardo	1957
<i>Homotecia [Va]</i>	1992	1995	Dal Farra, Ricardo	1957
<i>Homotecia [Vb]</i>	1992	1995	Dal Farra, Ricardo	1957
<i>Homotecia [VI]</i>	1992	2001	Dal Farra, Ricardo	1957
<i>Homotecia [VII]</i>	1992	2002	Dal Farra, Ricardo	1957
<i>In-movile</i>	1992	1993	Fumarola, Martín	1966
<i>KITAB</i>	1992		Vaggione, Horacio	1943
<i>Latido Estival</i>	1992		Justel, Elsa	1944
<i>Maturity, sincretismo #3</i>	1992		Halac, José	1962
<i>Memorias</i>	1992		Dal Farra, Ricardo	1957
<i>Memorias del Poeta</i>	1992		Schmilovich, Sergio	1959
<i>Minimax</i>	1992		Cerana, Carlos	1958
<i>Mirada Roja</i>	1992		Chab, Gustavo	1964
<i>Stanford (a mi padre)</i>	1992		Pozzati, Guillermo	1958
<i>Syracus</i>	1992		Teruggi, Daniel	1952
<i>Uitotos, sincretismo #2</i>	1992		Halac, José	1962
<i>Urbis #3</i>	1992		Rosas Cobian, Michael	1953
<i>Veladuras</i>	1992		Nillni, Ricardo	1960
<i>vôo (1992-I)</i>	1992		lanza, alcides	1929
<i>vôo [tape part only]</i>	1992		lanza, alcides	1929
<i>Alma de las orquestas</i>	1993		Di Liscia, Pablo	1955
<i>Ball, sincretismo #4</i>	1993		Halac, José	1962
<i>Brasil[espaço]ia</i>	1993	1994	Keller, Damián	1966
<i>Carmeloirimba : Un saludo a Carmelo Saitta</i>	1993		Belloc, Enrique	1936
<i>Del otro lado del silencio</i>	1993		Mary, Mario Marcelo	1961
<i>Desencuentros</i>	1993		Pensado, Andrea	1965
<i>El libro de los seres imaginarios</i>	1993		Sad, Jorge L.	1959

<i>Espresso Machine II</i>	1993	1995	López Lezcano, Fernando	1956
<i>Fall</i>	1993		Cerana, Carlos	1958
<i>Gritos y gritarras</i>	1993		Cromberg, Teodoro	1955
<i>Instants d'hiver</i>	1993		Teruggi, Daniel	1952
<i>Kölnisch Wasser</i>	1993	1994	Bellusci, Miguel	1958
<i>La esfera y la piedra</i>	1993	1994	Naón, Luis	1961
<i>La ira de Fassbinder</i>	1993		Mihovilcevic, Luis	1958
<i>La vida perdurable</i>	1993		Calzón, Miguel	1956
<i>Las obsesiones de Pierre Delval : Ira. obsesión</i>	1993		Mihovilcevic, Luis	1958
<i>Leph</i>	1993		Vaggione, Horacio	1943
<i>Lucero</i>	1993		Rosas Cobian, Michael	1953
<i>Macristalhias</i>	1993		Naón, Luis	1961
<i>Mare Nostrum III</i>	1993		Schmilovich, Sergio	1959
<i>Mestizaje</i>	1993	1994	Biffarella, Gonzalo	1961
<i>Monedas de Hierro</i>	1993		Matalon, Martín	1958
<i>Para Bla : un saludo a Barbara Belloc</i>	1993		Belloc, Enrique	1936
<i>pizz.</i>	1993		Garavaglia, Javier	1960
<i>Remansos</i>	1993		Goldberg, Silvia	
<i>Seine sans e</i>	1993		Schachter, Daniel	1953
<i>Sureña</i>	1993		Furman, Pablo	1955
<i>Sureña [tape part only]</i>	1993		Furman, Pablo	1955
<i>Three Dreams</i>	1993		López Lezcano, Fernando	1956
<i>Tiempo quebrado (Sin Tiempo I)</i>	1993		Schachter, Daniel	1953
<i>Un hombre</i>	1993		Schmilovich, Sergio	1959
<i>Un tiro de dados</i>	1993		Losa, Diego Willey, Robert	

<i>Vino nuevo en odres viejos</i>	1993		Martinez, Edgardo	1958
<i>Wind Again</i>	1993		Budón, Osvaldo	1965
<i>3 Cascadas en Transición</i>	1994		Luna, Fabián	1963
<i>Acousmaclip 2 : Las Relaciones Peligrosas</i>	1994		Belloc, Enrique	1936
<i>Ancestros</i>	1994		Garzón, Eleazar	1948
<i>Apocalypse was postponed due to lack of interest</i>	1994		Pampin, Juan	1967
<i>Biósfera I</i>	1994		Rapp, Jorge	1946
<i>Cuarteto</i>	1994		Dal Farra, Ricardo	1957
<i>El pesar de los Pájaros: homenaje a Jackes Prevert</i>	1994		Calmens, Claudio	1962
<i>Entre vents et marées</i>	1994		Roqué Alsina, Carlos	1941
<i>Espejos de tiempo</i>	1994	2002	Martinez, Patricia	1973
<i>Espejos virtuales</i>	1994	1996	Schachter, Daniel	1953
<i>Espejos, certeza, cereza</i>	1994		Calmens, Claudio	1962
<i>Gato's Raid</i>	1994		Rosas Cobian, Michael	1953
<i>Gegensätze (gegenseitig)</i>	1994		Garavaglia, Javier	1960
<i>Gestes de l'écrit</i>	1994		Teruggi, Daniel	1952
<i>Gramatica Vitae</i>	1994		Belloc, Enrique	1936
<i>Hildegard's Dream</i>	1994		Viñao, Alejandro	1951
<i>ID2</i>	1994	1995	Compañía de Música Imaginaria	
<i>ID3</i>	1994	1995	Compañía de Música Imaginaria	
<i>IL1</i>	1994	1995	Compañía de Música Imaginaria	
<i>in ...visible (1994-I)</i>	1994		lanza, alcides	1929
<i>in ...visible (1994-I) [tape part only]</i>	1994		lanza, alcides	1929

<i>IncurSIONes en el AREM [version for sampled instruments]</i>	1994		Kröpfl, Francisco	1931
<i>IncurSIONes en el AREM [version for electronic sounds]</i>	1994		Kröpfl, Francisco	1931
<i>Köchenseq</i>	1994	1995	Compañía de Música Imaginaria	
<i>La Melodía Perdida</i>	1994		Villar, Jorge	1937
<i>Las últimas luces</i>	1994		Druetta, Hugo	
<i>Mel18</i>	1994		Dal Farra, Ricardo	1957
<i>Microtematismo</i>	1994		Pozzati, Guillermo	1958
<i>Mininga</i>	1994	1995	Compañía de Música Imaginaria	
<i>Movimiento urbanos</i>	1994		Martinez, Edgardo	1958
<i>Otros lugares</i>	1994		Pérez Miró, Ricardo	1952
<i>Pieza 1 - 1993</i>	1994	1995	Compañía de Música Imaginaria	
<i>poPierre</i>	1994	1997	Belloc, Enrique	1936
<i>Ráfagas de tiempo</i>	1994		Grätzer, Carlos	1956
<i>Renacer</i>	1994		Carranza, Ofelia	1953
<i>Restos de nada</i>	1994	1999	Martinez, Patricia	1973
<i>Rumbos</i>	1994		Rosas Cobian, Michael	1953
<i>Schall</i>	1994		Vaggione, Horacio	1943
<i>Set-in</i>	1994		Fumarola, Martín	1966
<i>Síntesis, en cuatro sueños</i>	1994		Mihovilcevic, Luis	1958
<i>Timbres partiels</i>	1994		Mary, Mario Marcelo	1961
<i>Trío</i>	1994	1995	Compañía de Música Imaginaria	
<i>Urbis #4</i>	1994		Rosas Cobian, Michael	1953
<i>AL Rumga!</i>	1995		Pensado, Andrea	1965

<i>Arcano 72</i>	1995		Mihovilcevic, Luis	1958
<i>Arcano 82</i>	1995		Mihovilcevic, Luis	1958
<i>Arte Poética (I)</i>	1995		Garavaglia, Javier	1960
<i>Arte Poética (II Stanza)</i>	1995		Garavaglia, Javier	1960
<i>Autour des Tores</i>	1995		Nillni, Ricardo	1960
<i>Del ser o la nada y esa desesperada búsqueda</i>	1995		Polonuer, Fernando	1964
<i>ektenes III (1995-I)</i>	1995		lanza, alcides	1929
<i>ektenes III (1995-I) [tape part only]</i>	1995		lanza, alcides	1929
<i>El pájaro</i>	1995		Kröpfl, Francisco	1931
<i>El Peregrinar de la Araña</i>	1995		Fumarola, Martín	1966
<i>Electrocañas</i>	1995		Cerana, Carlos Losa, Diego	1958
<i>Feuillage de silence</i>	1995		Justel, Elsa	1944
<i>Figuras Flamencas</i>	1995		Verandi, Mario	1960
<i>Homenaje a E.C.</i>	1995	1996	Biffarella, Gonzalo	1961
<i>Intramuros II</i>	1995		Schachter, Daniel	1953
<i>La legende des clones</i>	1995		Mandolini, Ricardo	1950
<i>La rue de la Cage Verte</i>	1995		Biffarella, Gonzalo	1961
<i>Music for Alto Saxophone & Electronics</i>	1995		Furman, Pablo	1955
<i>Música entre Músicas / 2</i>	1995		Gerardi, Enrique	1926
<i>Orígenes</i>	1995	1996	Biffarella, Gonzalo	1961
<i>Plegaria</i>	1995		Biffarella, Gonzalo	1961
<i>Rugosidades del inconsciente colectivo</i>	1995		Belloc, Enrique	1936
<i>Tap-Tap-Tap</i>	1995		Kusnir, Eduardo	1939
<i>Tríptico</i>	1995	1997	Haro, Jorge	1963
<i>Voces del recuerdo</i>	1995	1996	Minsburg, Raúl	1965
<i>Web composition</i>	1995		Verandi, Mario	1960

<i>A tear on the desert</i>	1996		Verandi, Mario	1960
<i>Angelus</i>	1996		Iglesias-Rossi, Alejandro	1960
<i>Arte Poética (Stanzas III to VII)</i>	1996		Garavaglia, Javier	1960
<i>Auto-rre-trato</i>	1996	1999	Martinez, Patricia	1973
<i>AWB</i>	1996	1997	Mihovilcevic, Luis	1958
<i>Ça, c'est Bourges : hommage à Schaeffer</i>	1996		Biffarella, Gonzalo	1961
<i>Callejuelas</i>	1996		Fumarola, Martín	1966
<i>Chi-pa-boo</i>	1996		Justel, Elsa	1944
<i>Ciclópeo</i>	1996		Moliterni, Antonio	1963
<i>Claustrum</i>	1996		Naón, Luis	1961
<i>Claxis</i>	1996		Mihovilcevic, Luis	1958
<i>Contraries (Resonances)</i>	1996		Garavaglia, Javier	1960
<i>Dancescape</i>	1996		Verandi, Mario	1960
<i>Del Big Bang a la Torre de Babel</i>	1996		Candia, Cecilia	1959
<i>Dos piezas</i>	1996		Loudet, Pablo	1969
<i>Du libe tu?</i>	1996		Justel, Elsa	1944
<i>Estudio para tres</i>	1996		Loudet, Pablo	1969
<i>Faces and Intensities</i>	1996		Verandi, Mario	1960
<i>Fuga tras un objeto oculto</i>	1996		Schachter, Daniel	1953
<i>Fuyante</i>	1996		Budón, Osvaldo	1965
<i>Fuyante [tape part only]</i>	1996		Budón, Osvaldo	1965
<i>Haricots</i>	1996		Justel, Elsa	1944
<i>Hasta que el tiempo se quiebre</i>	1996	1999	Martinez, Patricia	1973
<i>Heartbreaker</i>	1996		Verandi, Mario	1960
<i>Klang/Clan</i>	1996	1997	Colectivo de Creación Sonora	
<i>Las siete vidas de un gato</i>	1996		Matalon, Martín	1958

<i>Los Enemigos del Hombre de Conocimiento [version 1]</i>	1996		Mandolini, Ricardo	1950
<i>Los Enemigos del Hombre de Conocimiento [version 2]</i>	1996		Mandolini, Ricardo	1950
<i>Los Pliegues del Cielo</i>	1996		Poblete, Sergio	1959
<i>Madres en el desierto</i>	1996		Rojas, Luis	1960
<i>Marimabágenes</i>	1996		Cromberg, Teodoro	1955
<i>Metal Hurlant</i>	1996		Pampin, Juan	1967
<i>Mont Jüic</i>	1996		Lafuret Pereyra, Raúl	
<i>Narziss</i>	1996		Lafuret Pereyra, Raúl	
<i>Objetos animados : homenaje a Pierre Schaeffer.</i>	1996		Rapp, Jorge	1946
<i>Rastros</i>	1996		Biffarella, Gonzalo	1961
<i>Spectral Colours</i>	1996		Garavaglia, Javier	1960
<i>Summer Band</i>	1996		Teruggi, Daniel	1952
<i>Terrero</i>	1996	1997	Varchausky, Nicolás	1973
<i>Territorios</i>	1996		Budón, Osvaldo	1965
<i>The Big Dipper (1996-II)</i>	1996		lanza, alcides	1929
<i>The Big Dipper (1996-II) [tape part only]</i>	1996		lanza, alcides	1929
<i>Tierra y Sol</i>	1996		Dal Farra, Ricardo	1957
<i>Vidrios</i>	1996		Alcaráz, Gustavo	
<i>Vientos</i>	1996		Kröpfl, Francisco	1931
<i>Ya nunca me veras como me vieras</i>	1996		Mataloni, José	1965
<i>... raíces lejanas, tal vez ...</i>	1997		Schachter, Daniel	1953
<i>...se desprende y cae...</i>	1997	1998	Martinez, Patricia	1973
<i>Al sur</i>	1997		Kröpfl, Francisco	1931
<i>Alba Sud</i>	1997	1998	Justel, Elsa	1944
<i>Antaitl</i>	1997		Rojas, Luis	1960

<i>Añoranza de lo dionisiaco</i>	1997		Cromberg, Teodoro	1955
<i>Ausbruch</i>	1997		Grätzer, Carlos	1956
<i>Blue Diamond</i>	1997		Villar, Jorge	1937
<i>Círculo de Piedra</i>	1997		Candia, Cecilia Foutel, Ana	1959
<i>crystal mirages</i>	1997		Teruggi, Daniel	1952
<i>D'un geste apprivoisé</i>	1997		Campana, José Luis	1949
<i>El radar de Tasmania (a Tarkovski)</i>	1997		Mihovilcevic, Luis	1958
<i>Fréquences de Barcelone</i>	1997		Verandi, Mario	1960
<i>fugitives voix</i>	1997		Teruggi, Daniel	1952
<i>Geofonía</i>	1997		Belloc, Enrique	1936
<i>Gritos</i>	1997		Garzón, Eleazar	1948
<i>Haiku</i>	1997		Vázquez, Osvaldo	1956
<i>La estructura</i>	1997		Loudet, Pablo	1969
<i>Las formas del silencio</i>	1997		Minsburg, Raúl	1965
<i>Metamorfosis</i>	1997		Miraglia, Daniel	1958
<i>Noche y Fuego</i>	1997		Ochoa, Pedro	1968
<i>Objetos Reencontrados</i>	1997		Belloc, Enrique	1936
<i>Overture (in memoriam T.A.T.)</i>	1997		Garavaglia, Javier	1960
<i>Portraits témoins</i>	1997		Mary, Mario Marcelo	1961
<i>sin título : obertura para Omobramu</i>	1997		Rojas, Luis	1960
<i>Sons</i>	1997		Vázquez, Osvaldo	1956
<i>Tangata vocale</i>	1997		Campana, José Luis	1949
<i>The shining space</i>	1997		Teruggi, Daniel	1952
<i>Tiempos virtuales</i>	1997		Rapp, Jorge	1946
<i>Toco Madera</i>	1997		Pampin, Juan	1967
<i>Tus palabras cercanas</i>	1997		Polonuer, Fernando	1964
<i>Un romance en tiempo de candombe</i>	1997		Fiore, Héctor	1953
<i>Una esquina de la eternidad</i>	1997		Mihovilcevic, Luis	1958

<i>Words through the Worlds</i>	1997		Dal Farra, Ricardo	1957
<i>... soretes de punta</i>	1998		Keller, Damián	1966
<i>Agon</i>	1998		Vaggione, Horacio	1943
<i>Apenas insinuado</i>	1998		Villar, Jorge	1937
<i>Ascension : Las Tierras Nuevas</i>	1998		Iglesias-Rossi, Alejandro	1960
<i>Atomización de Tangos</i>	1998		Calmens, Claudio	1962
<i>Au-delà du miroir</i>	1998		Zimbaldo, Daniel	1955
<i>Blanco de Zinc</i>	1998		Varchausky, Nicolás	1973
<i>Breve reseña sobre los sueños, el vacío y la enfermedad</i>	1998		Polonuer, Fernando	1964
<i>Cómeme, bebeme</i>	1998		Loudet, Pablo	1969
<i>Días Después...</i>	1998		Minsburg, Raúl	1965
<i>Dos visiones apresuradas de la misma cosa</i>	1998		Rojas, Luis	1960
<i>El Cementerio Marino</i>	1998		Szewach, Julieta	1971
<i>El Doble</i>	1998		Colectivo de Creación Sonora	
<i>El rancho</i>	1998		Fiore, Héctor	1953
<i>Emulaciones</i>	1998		Luna, Fabián	1963
<i>Esculturas para tocar</i>	1998		Fiore, Héctor	1953
<i>Estudio para cinta y guitarra eléctrica</i>	1998		Loudet, Pablo	1969
<i>Etoiles Liquides</i>	1998		Gervasoni, Arturo	1962
<i>Etoiles Liquides [tape part only]</i>	1998		Gervasoni, Arturo	1962
<i>Everlast</i>	1998		Alarcón, César	1972
<i>gl</i>	1998		Solare, Juan María	1966
<i>Hilo de Marfil</i>	1998		Candia, Cecilia	1959
<i>images symphoniques</i>	1998		Teruggi, Daniel	1952
<i>La cacerola</i>	1998		Rojas, Luis	1960

<i>Malkut</i>	1998		Martinez, Federico	1968
<i>Marina (de un tiempo de verano)</i>	1998		Serra, Luis Maria	1942
<i>Monalisa Overdrive II</i>	1998		Miraglia, Daniel	1958
<i>Nubwaora</i>	1998		Garzón, Eleazar	1948
<i>Objets croisés II</i>	1998		Mary, Mario Marcelo	1961
<i>Oktubre</i>	1998		Schmilovich, Sergio	1959
<i>On the liquid edge [fragment]</i>	1998		Dal Farra, Ricardo	1957
<i>Refugio y temblor</i>	1998		Fernandez, Mariano	1974
<i>Río de los pájaros</i>	1998	1999	Ferreyra, Beatriz	1937
<i>Rugosidades en los pliegues de Oniria</i>	1998	1999	Garzón, Eleazar	1948
<i>Shaguir</i>	1998		Fumarola, Martín	1966
<i>T.A.T. (A Man's life)</i>	1998		Garavaglia, Javier	1960
<i>Tan go zando</i>	1998		Fiore, Héctor	1953
<i>Tani, Tani, La balada del sagrado demandante</i>	1998		Mihovilcevic, Luis	1958
<i>Verano del 98</i>	1998		Villar, Jorge	1937
<i>Viendo</i>	1998		Galperín, Miguel	1972
<i>A Ana-Sequenzia para cinta y melódica</i>	1999		Mihovilcevic, Luis	1958
<i>Actions</i>	1999		Poblete, Sergio	1959
<i>Assurancetourix</i>	1999		Solare, Juan María	1966
<i>Blanco de Titanio</i>	1999		Varchausky, Nicolás	1973
<i>Carcajadas Ajadas III</i>	1999		Pensado, Andrea	1965
<i>Cientos de voces</i>	1999		Minsburg, Raúl	1965
<i>Como una luna en el agua</i>	1999		Fernandez, Mariano	1974
<i>continentalia</i>	1999		Mataloni, José	1965
<i>Czekam na odpowiedz</i>	1999		Fiore, Héctor	1953
<i>De objetos y desvíos</i>	1999		Castillo, Graciela	1940
<i>Desnudo de mujer sobre sofá azul</i>	1999		Ventura, Ricardo	1955
<i>Eili I</i>	1999		Calmens, Claudio	1962

<i>Eili 2</i>	1999		Calmens, Claudio	1962
<i>Eili 3</i>	1999		Calmens, Claudio	1962
<i>El Escrache</i>	1999		Keller, Damián	1966
<i>El nombre</i>	1999		Martinez, Federico	1968
<i>Eleas</i>	1999		Garzón, Eleazar	1948
<i>Entre la noche y el océano</i>	1999		Pérez Miró, Ricardo	1952
<i>Estudios Sinfónicos I</i>	1999		Miraglia, Daniel	1958
<i>Hambre Hombre</i>	1999		Causa, Emiliano	1970
<i>Hulasa</i>	1999		Fiore, Héctor	1953
<i>Karawane</i>	1999		Alarcón, César	1972
<i>La Espera</i>	1999		Loudet, Pablo	1969
<i>La ida hacia abajo de la tierra de la tarde</i>	1999		Colectivo de Creación Sonora	
<i>La Varsovia</i>	1999		Varchausky, Nicolás	1973
<i>Las gárgolas invisibles</i>	1999		Fernandez, Mariano	1974
<i>Llanuras</i>	1999		Loudet, Pablo	1969
<i>LuzazuL</i>	1999		Schachter, Daniel	1953
<i>On Swings and Folds</i>	1999		Nillni, Ricardo	1960
<i>ontem (1999-I)</i>	1999		lanza, alcides	1929
<i>ontem [tape part only]</i>	1999		lanza, alcides	1929
<i>Organismos Sonoros</i>	1999		Causa, Emiliano	1970
<i>Palabras I</i>	1999		Keller, Damián	1966
<i>Péripéties pour pardessus de viole et charango</i>	1999		Fiore, Héctor	1953
<i>Poppekstive</i>	1999		Garavaglia, Javier	1960
<i>Pour le piano (fin de siglo)</i>	1999		Mihovilcevic, Luis	1958
<i>Río de los pájaros azules</i>	1999	2000	Ferreya, Beatriz	1937
<i>Río de los pájaros escondidos</i>	1999	2000	Ferreya, Beatriz	1937
<i>SC</i>	1999	2000	Fumarola, Martín	1966

<i>Scatt</i>	1999		Mihovilcevic, Luis	1958
<i>Solidità della Nebbia</i>	1999	2000	Solare, Juan María	1966
<i>Syrinx según Eleazar</i>	1999		Garzón, Eleazar	1948
<i>The Breaking of the Scream</i>	1999		Halac, José	1962
<i>Tiempos imaginarios</i>	1999		Minsburg, Raúl	1965
<i>Tres momentos</i>	1999	2000	Rapp, Jorge	1946
<i>Tunes</i>	1999		Fiore, Héctor	1953
<i>Variaciones negras</i>	1999		Rojas, Luis	1960
<i>Viejo océano</i>	1999		Schmilovich, Sergio	1959
<i>Wiersze na flet</i>	1999		Fiore, Héctor	1953
<i>¿Qué haré cuando esto termine? : ¿...?</i>	2000		Alcaráz, Gustavo	
<i>Aarhus</i>	2000		Mary, Mario Marcelo	1961
<i>Alma mía</i>	2000		Castillo, Graciela	1940
<i>alma mula</i>	2000		Colectivo de Creación Sonora	
<i>Ambiance 2</i>	2000		Vázquez, Osvaldo	1956
<i>Argumentum ex cracoviensi</i>	2000		Fiore, Héctor	1953
<i>Así ...</i>	2000		Campana, José Luis	1949
<i>Bestiario*</i>	2000		Alarcón, César	1972
<i>de áncoras : algo sobre Julio Cortazar</i>	2000		Alcaráz, Gustavo	
<i>Diabolus Urbanus</i>	2000	2001	Naón, Luis	1961
<i>Dinámicas Expansivas</i>	2000		Luna, Fabián	1963
<i>Disritmia</i>	2000		Villar, Jorge	1937
<i>Ecos del Proceso Sonoro de K</i>	2000		Candia, Cecilia	1959
<i>El caminante</i>	2000		Ochoa, Pedro	1968
<i>El regreso</i>	2000		Kröpfl, Francisco	1931
<i>El vuelo</i>	2000		Kröpfl, Francisco	1931
<i>Elefante</i>	2000		Rojas, Luis	1960
<i>En el comienzo fue la Palabra</i>	2000		Miraglia, Daniel	1958

<i>Entre 2 mundos</i>	2000		Biffarella, Gonzalo	1961
<i>Estacionarias</i>	2000		Romeo, Ernesto	1968
<i>Estoy así ...</i>	2000		Causa, Emiliano	1970
<i>Evil Fruit</i>	2000		Verandi, Mario	1960
<i>Fragmentación e Interferencia</i>	2000		Causa, Emiliano	1970
<i>Germinal</i>	2000	2001	Loudet, Pablo	1969
<i>Granular Song</i>	2000		Garavaglia, Javier	1960
<i>Improvisación</i>	2000		Colectivo de Creación Sonora	
<i>La Bonaerense / La Federal</i>	2000		Varchausky, Nicolás	1973
<i>Las criaturas de orlEGm</i>	2000		Garzón, Eleazar	1948
<i>Líneas y puntos de otro tiempo</i>	2000		Schachter, Daniel	1953
<i>Manchas</i>	2000		Allende, Eduardo	
<i>Mayo</i>	2000		Mihovilcevic, Luis	1958
<i>Pequeños Diseños Sonoros</i>	2000		De Armas, Ricardo	1957
<i>piazzollage</i>	2000		Mataloni, José	1965
<i>Pieza electroacústica N* 1 (Síntesis)</i>	2000		Catalano, Julio César	
<i>Plastic Water</i>	2000		Verandi, Mario	1960
<i>Presencias Reales</i>	2000		Miraglia, Daniel	1958
<i>primera carta</i>	2000		Mataloni, José	1965
<i>tiempo dos</i>	2000		Mataloni, José	1965
<i>Tres Epistolas: del secreto de las alas ocultas a la luz del sol de medianoche</i>	2000		Iglesias-Rossi, Alejandro	1960
<i>Tríptico de Bahía Blanca</i>	2000		Belloc, Enrique	1936
<i>24 variations</i>	2001		Vaggione, Horacio	1943
<i>Acecho, Persecución y Muerte</i>	2001		Causa, Emiliano	1970
<i>Adivinanza</i>	2001		Mataloni, José	1965
<i>Angelus I</i>	2001		Gervasoni, Arturo	1962
<i>Angelus II</i>	2001		Gervasoni, Arturo	1962

<i>Angelus III</i>	2001		Gervasoni, Arturo	1962
<i>Calvario</i>	2001	2003	Alarcón, César	1972
<i>Circus</i>	2001		Gervasoni, Arturo	1962
<i>desiertos</i>	2001		Alcaráz, Gustavo	
<i>Dos Discursos</i>	2001		Causa, Emiliano	1970
<i>Efecto Tango</i>	2001	2002	Schachter, Daniel	1953
<i>Eili 4</i>	2001		Calmens, Claudio	1962
<i>Entre sueños</i>	2001		Minsburg, Raúl	1965
<i>Estudios Sinfónicos II</i>	2001		Miraglia, Daniel	1958
<i>evolución</i>	2001		Schmilovich, Sergio	1959
<i>FlaX</i>	2001	2002	Schachter, Daniel	1953
<i>Ghosts</i>	2001		Villar, Jorge	1937
<i>Interieur</i>	2001		Gervasoni, Arturo	1962
<i>Jazz't for Miles</i>	2001		Ferreyra, Beatriz	1937
<i>La ba-balle du chien-chien à la mé- mère</i>	2001		Ferreyra, Beatriz	1937
<i>La Noche en que los Peces Flotaron</i>	2001		Mandolini, Ricardo	1950
<i>Magma</i>	2001		Mataloni, José	1965
<i>Música desilusionada</i>	2001		Rojas, Luis	1960
<i>Música para muestras N* 1</i>	2001		Catalano, Julio César	
<i>Ofrenda</i>	2001		Castillo, Graciela	1940
<i>Panther</i>	2001		Solare, Juan María	1966
<i>Patio</i>	2001		Yaya, Gabriela	1975
<i>Pequeño Poema</i>	2001		Villar, Jorge	1937
<i>Pieza electroacústica N* 2</i>	2001		Catalano, Julio César	
<i>Plainte</i>	2001		Gervasoni, Arturo	1962
<i>puerta : primera parte del cosmos</i>	2001		Alcaráz, Gustavo	
<i>quien me diese alas como de paloma</i>	2001		Martinez, Patricia	1973
<i>recuerda : el cello también puede hacer</i>	2001		Alcaráz, Gustavo	

<i>bellas melodías</i>				
<i>Sortilegios</i>	2001		Ferpozzi, Carlos A.	1937
<i>SSSSCHCHS</i>	2001		Gervasoni, Arturo	1962
<i>Vivencias</i>	2001		Ferreya, Beatriz	1937
<i>Voi ch'intrate</i>	2001		Solare, Juan María	1966
<i>Was a saW</i>	2001		Solare, Juan María	1966
<i>...como rocas al sol (2002-V) [tape part only]</i>	2002		lanza, alcides	1929
<i>011220</i>	2002		De Armas, Ricardo	1957
<i>Accessus</i>	2002		Luna, Fabián	1963
<i>Analogías Nro. 1</i>	2002		Uslenghi, Federico	
<i>aXions (2002-II)</i>	2002		lanza, alcides	1929
<i>aXions (2002-II) [tape part only]</i>	2002		lanza, alcides	1929
<i>Back to the guitar</i>	2002		Alarcón, César	1972
<i>Cantos de antes</i>	2002		Ferreya, Beatriz	1937
<i>Correspondencias</i>	2002		Poblete, Sergio	1959
<i>Dale que va!</i>	2002		Pensado, Andrea	1965
<i>Die Arcana (Tarot I)</i>	2002		Mataloni, José	1965
<i>El otro lado</i>	2002		Garzón, Eleazar	1948
<i>El Sueño del Gallo</i>	2002		Mataloni, José	1965
<i>Equinoccio</i>	2002		Garzón, Eleazar	1948
<i>escrarcha : segunda parte del cosmos</i>	2002		Alcaráz, Gustavo	
<i>expanção (2002-III)</i>	2002		lanza, alcides	1929
<i>expanção (2002-III) [tape part only]</i>	2002		lanza, alcides	1929
<i>Invierno de Plata</i>	2002		Serra, Luis Maria	1942
<i>La edad de la luz</i>	2002		Maglia, Fernando	1954
<i>Les chemins du vent des glaces</i>	2002	2004	Ferreya, Beatriz	1937
<i>L'ombre du souffle</i>	2002		Gervasoni, Arturo	1962
<i>Mixturas</i>	2002		Grela, Dante	1941

<i>Monstruo Mecánico</i>	2002		Mataloni, José	1965
<i>Música para muestras N* 2</i>	2002		Catalano, Julio César	
<i>Navidad del Agua</i>	2002		Mataloni, José	1965
<i>Ninth (Music for viola and computer)</i>	2002		Garavaglia, Javier	1960
<i>Ombres Portees</i>	2002		Nillni, Ricardo	1960
<i>Pieza electroacústica N* 3 (Mezcla)</i>	2002		Catalano, Julio César	
<i>Primpilipansa</i>	2002		Justel, Elsa	1944
<i>Retorno al fuego</i>	2002		Castillo, Graciela	1940
<i>Sin título</i>	2002		De Armas, Ricardo	1957
<i>aXents (2003-I)</i>	2003		lanza, alcides	1929
<i>aXents (2003-I) [tape part only]</i>	2003		lanza, alcides	1929
<i>c3seg</i>	2003		Rojas, Luis	1960
<i>Ceremonia de sangre y piedra</i>	2003		Fernandez, Mariano	1974
<i>Circundantes en Eco</i>	2003		Gervasoni, Arturo	1962
<i>crescente (evocativa)</i>	2003		Abadi, Sami	1965
<i>crescente (invocativa)</i>	2003		Abadi, Sami	1965
<i>drum phase</i>	2003		Abadi, Sami	1965
<i>El Club de la Calle 42</i>	2003		Villar, Jorge	1937
<i>fantasía 2003</i>	2003		Schmilovich, Sergio	1959
<i>Interruptores</i>	2003		Alarcón, César	1972
<i>kiki</i>	2003		Abadi, Sami	1965
<i>La puerta</i>	2003		De Armas, Ricardo	1957
<i>Le Solfegiste solfegé</i>	2003		Ferreya, Beatriz	1937
<i>Mi sol menor</i>	2003		Yaya, Gabriela	1975
<i>Moebius</i>	2003		Garzón, Eleazar	1948
<i>Murmureln</i>	2003		Ferreya, Beatriz	1937
<i>nascente</i>	2003		Abadi, Sami	1965
<i>Next Bach</i>	2003		Gervasoni, Arturo	1962
<i>Pieza electroacústica N* 4 (Mixta)</i>	2003		Catalano, Julio César	

<i>Pobrecita si me muero</i>	2003		Alcaráz, Gustavo	
<i>Signes émergents</i>	2003		Mary, Mario Marcelo	1961
<i>Strauss, clonazepam and young thieves</i>	2003		De Armas, Ricardo	1957
<i>Tierra viva</i>	2003		Ochoa, Pedro	1968
<i>tlön</i>	2003		Abadi, Sami	1965
<i>toshío</i>	2003		Abadi, Sami	1965
<i>vance</i>	2003		Abadi, Sami	1965
<i>voids</i>	2003		Abadi, Sami	1965
<i>Ya ... una versión</i>	2003		Espinosa, Susana	
<i>7777222448822337778</i>	2004		De Armas, Ricardo	1957
<i>Caños 34</i>	2004		De Armas, Ricardo	1957
<i>Gotas caen</i>	2004		Martinez, Patricia	1973
<i>Las estrategias fatales</i>	2004		De Armas, Ricardo	1957
<i>Los relojes de Dalí</i>	2004		De Armas, Ricardo	1957
<i>TOC (trastorno obsesivo compulsivo)</i>	2004		De Armas, Ricardo	1957
<i>Transvolución</i>	2004		Mataloni, José	1965
<i>1ºdemulticarr</i>	undated		Pensado, Andrea	1965
<i>2ffts+RM</i>	undated		Pensado, Andrea	1965
<i>Alerta, peligro... planeta azul</i>	undated		Buiani, Elena	1956
<i>Eili Eili</i>	undated		Calmens, Claudio	1962
<i>Etnográficas I</i>	undated		Cozzi, Daniel	1949
<i>EVENT 1</i>	undated		Pensado, Andrea	1965
<i>Futura</i>	undated		Chab, Gustavo	1964
<i>Impresiones No. 1</i>	undated		Gonzalez, Marcelo	
<i>Impresiones No. 1 [tape part only]</i>	undated		Gonzalez, Marcelo	
<i>Inflexiones</i>	undated		Ferrari, Andrés	1971
<i>La ida</i>	undated		Sad, Jorge L.	1959
<i>La llave de cristal</i>	undated		Zimbaldo, Daniel	1955

<i>Le cri etouffé</i>	undated	Zimbaldo, Daniel	1955
<i>NASALc/banquetes</i>	undated	Pensado, Andrea	1965
<i>O tempo - A condena</i>	undated	Edelstein, Oscar	1953
<i>Paisaje nocturno</i>	undated	Cutaia, Carlos	1941
<i>Ritual of the Rose</i>	undated	Zimbaldo, Daniel	1955

Bolivia

Table 13. Musical compositions created by Bolivian composers available for listening in the *Latin American Electroacoustic Music Collection*.

Composition	Date of creation		Composer	Date of birth
<i>CM-OP1</i>	1968		Pozadas, Florencio	1940
<i>Bolivianos...!</i>	1973		Villalpando, Alberto	1942
<i>Awasqa</i>	1986		Prudencio, Cergio	1955
<i>Soundfences</i>	1989		Alandía Canipa, Edgar	1950
<i>Desde el jardín de Morador</i>	1990		Villalpando, Alberto	1942
<i>Silent Towers</i>	1990		Fernandez, Agustin	1958
<i>Undfen</i>	1990		Alandía Canipa, Edgar	1950
<i>De los Elementos</i>	1991		Villalpando, Alberto	1942
<i>Sexta Mayor</i>	1992		Suárez, Nicolás	1953
<i>Paisaje Sonoro Nocturno I</i>	1993		Ibañez, Jorge	1960
<i>Paisaje Sonoro Nocturno II</i>	1993		Ibañez, Jorge	1960
<i>Es Zas</i>	1993		Claros Brasil, Sergio	1963
			García, Oscar	1960
<i>Chica Aruma</i>	1994		Suárez, Nicolás	1953
<i>Intiyana</i>	1994		Parrado, Javier	1964
<i>...sottili canti invisibili</i>	1995		Alandía Canipa, Edgar	1950
<i>Estudio Ocarino</i>	1998		Ibañez, Jorge	1960
<i>Irupampa</i>	2002		García, Oscar	1960
<i>Pu Choroy Piré</i>	undated		Namuncurá, Juan	1962

Brazil

Table 14. Musical compositions created by Brazilian composers available for listening in the *Latin American Electroacoustic Music Collection*.

Composition	Date of creation		Composer	Date of birth
Sibemol	1956		Carvalho, Reginaldo	1932
Pequena Peça para Mi bequadro e Harmônicos	1961		Antunes, Jorge	1942
Valsa Sideral	1962		Antunes, Jorge	1942
Música para Varreduras de Frequências	1963		Antunes, Jorge	1942
Fluxo Luminoso para Sons Brancos I	1964		Antunes, Jorge	1942
Contrapunctus contra Contrapunctus	1965		Antunes, Jorge	1942
Três Estudos Cromofônicos	1966		Antunes, Jorge	1942
Três Estudos Cromofônicos	1966		Antunes, Jorge	1942
Três Estudos Cromofônicos	1966		Antunes, Jorge	1942
Canto Selvagem	1967		Antunes, Jorge	1942
Intermitências II	1967		Santoro, Claudio	1919
Canto do Pedreiro	1968		Antunes, Jorge	1942
Movimiento Browniano	1968		Antunes, Jorge	1942
Auto-Retrato sobre Paisaje Porteño	1969	1970	Antunes, Jorge	1942
Cinta Cita	1969		Antunes, Jorge	1942
Historia de un Pueblo por Nacer	1970		Antunes, Jorge	1942
Mutationen III	1970		Santoro, Claudio	1919
Para nascer aqui	1971		Antunes, Jorge	1942
Un-X-2	1971		Neves, José Maria	1943
FlautatualF	1972		Antunes, Jorge	1942
Source	1974		Antunes, Jorge	1942
Vivaldia MCMLXXV	1975		Antunes, Jorge	1942

Suite Eletrônica	1979		Richter, Frederico	1932
AI YUJIN	1980		Richter, Frederico	1932
Ecco Study	1980		Richter, Frederico	1932
Introdução e Elegia por um Herói Moribundo	1980		Richter, Frederico	1932
Sonhos e Fantasia	1980		Richter, Frederico	1932
Study Spectrum Shaper	1980		Richter, Frederico	1932
Electroacoustic Music	1981		Richter, Frederico	1932
Electronic Study	1981		Richter, Frederico	1932
Mean Time Far Away	1981		Richter, Frederico	1932
Metamorfoses	1981		Richter, Frederico	1932
Di-Stances	1982		Dantas Leite, Vânia	1945
Sound	1982		Csekö, Luis Carlos	1945
Cyclone	1983		Mannis, José Augusto	1958
Chroma	1986		Coelho de Souza, Rodolfo	1952
PAN: Laceramento della Parola (Ommagio a Trotskij)	1986	1988	Menezes, Flo	1962
Words in Transgress	1986	1995	Menezes, Flo	1962
Cinco Canções Japonesas	1987		Coelho de Souza, Rodolfo	1952
Sounds from the sacrifice of Iphigenia	1987		de Oliveira, Jocy	1936
Synergie	1987		Mannis, José Augusto	1958
Contextures I (Hommage à Berio)	1988	1989	Menezes, Flo	1962
Profils écartelés	1988		Menezes, Flo	1962
Duorganum II	1989		Mannis, José Augusto	1958
Voice Solo	1989		Sukorski, Wilson	1956
Berocan	1990	1996	Manzolli, Jônatas	1961
Contesture III - Tempi Reali, Tempo	1990		Menezes, Flo	1962

Virtuale				
Contesture IV - Monteverdi Altrimenti	1990	1993	Menezes, Flo	1962
Electroacoustic Samba I	1990	1991	Miranda, Eduardo Reck	1963
Metropolis	1990		Coelho de Souza, Rodolfo	1952
Ponto, Linha e Plano	1990		Rescala, Luiz Augusto (Tim)	1961
3 Fragmentos	1991		Mannis, José Augusto	1958
Reflexos	1991		Mannis, José Augusto	1958
Reflexos [tape part only]	1991		Mannis, José Augusto	1958
Chuva Oblíqua	1992		Coelho de Souza, Rodolfo	1952
Electroacoustic Samba II	1992		Miranda, Eduardo Reck	1963
Noises	1992		Miranda, Eduardo Reck	1963
O Demiurgo	1992		Mannis, José Augusto	1958
Turbulências	1992		Manzolli, Jônatas	1961
A Dialética da Praia	1993		Menezes, Flo	1962
Agenda pour un petit futur	1993		Antunes, Jorge	1942
Deep Resonance	1993		Miranda, Eduardo Reck	1963
Interlude No.1 pour Olga	1993		Antunes, Jorge	1942
Multiple Reeds	1993	1994	Cicchelli Velloso, Rodrigo	1966
Planos	1993	1994	Pinheiro, Luis Roberto	1960
Technicki I	1993		Sukorski, Wilson	1956
Technicki II	1993		Sukorski, Wilson	1956
Trem-Pássaro	1993		Garcia, Denise	1955
Um dia feito d'água	1993		Garcia, Denise	1955
Vozes da Cidade	1993		Garcia, Denise	1955
Campos de Pássaros - Messiaen	1994		Menezes, Flo	1962

Revisitado			Ferraz, Silvio	1959
For Cello	1994		de Oliveira, Jocy	1936
Ida	1994		de Oliveira, Jocy	1936
Ida	1994		de Oliveira, Jocy	1936
La loba	1994		de Oliveira, Jocy	1936
Milk of love	1994		de Oliveira, Jocy	1936
Mythical chants	1994		de Oliveira, Jocy	1936
Nemietoia	1994		Caesar, Rodolfo	1950
Olivine Trees	1994		Miranda, Eduardo Reck	1963
Parcours de l'entité	1994		Menezes, Flo	1962
Sforzatto/Piano	1994		Dantas Leite, Vânia	1945
Textórias	1994		Kampela, Arthur	1960
The woman with the golden hair	1994		de Oliveira, Jocy	1936
Triflauto Solilóquio	1994		Lintz Maues, Igor	1955
Women dreams	1994		de Oliveira, Jocy	1936
/cartas/rs95.car	1995		Arcela, Aluizio	1948
Ballade Dure	1995		Antunes, Jorge	1942
Electroacoustic Samba X	1995		Miranda, Eduardo Reck	1963
Fuzuê	1995		Pinheiro, Luis Roberto	1960
Goma Arábica	1995		Miranda, Eduardo Reck	1963
La beauté indiscrete d'une note violette	1995		Antunes, Jorge	1942
La Prosa dell'uomo	1995	1996	Gorodski, Fábio	1971
Materialma	1995		Pantaleão, Aquiles	1965
Materialma	1995		Pantaleão, Aquiles	1965
Modelagem V	1995	1996	Zampronha, Edson S.	1963
Momento Angular	1995		Caminhoto, Guto	1967
Névoas e Cristais	1995		Manzolli, Jônatas	1961
Noite	1995		Lazzarini, Victor	1969
Piece of Mind	1995		Aguiar, Celso	1957

Vitraux MCMXCV	1995		Antunes, Jorge	1942
Amazing Amazon	1996		Sukorski, Wilson	1956
Atlas Folisipelis	1996	1997	Menezes, Flo	1962
InterAto	1996		Iazzetta, Fernando	1966
Nuages	1996	1997	Cintra, Celso	1969
Refulgere Urbem	1996	1997	Garcez, Luciano	1972
A caminho da scola / Jardim de Infância / Escola Normal			Tragtenberg, Livio	1961
	1997		Sukorski, Wilson	1956
A cidade desperta	1997		Tragtenberg, Livio	1961
			Sukorski, Wilson	1956
Acqua Viva	1997	1998	Manzoli, Jônatas	1961
Aquele que ficou sozinho	1997		Guigue, Didier	1954
Árvore (after Walter Smetak)	1997		Sukorski, Wilson	1956
Butantan / No trabalho, na sorte	1997		Tragtenberg, Livio	1961
			Sukorski, Wilson	1956
Círculos ceifados	1997		Caesar, Rodolfo	1950
Concreta	1997		Pantaleão, Aquiles	1965
Crowd	1997		Iazzetta, Fernando	1966
Entrevalos	1997		Kafejian, Sérgio	1967
EXPASSVM	1997		de Campos, Ignacio	1966
O que acontece embaixo da cama enquanto Janis está dormindo?			Coelho de Souza, Rodolfo	1952
	1997			
Olhos de Vampa	1997		Sukorski, Wilson	1956
PerCurso	1997		Iazzetta, Fernando	1966
PerCurso	1997		Iazzetta, Fernando	1966
Sinfonias	1997	1998	Menezes, Flo	1962
TransFormantes III	1997		Menezes, Flo	1962
Vox Victimae	1997		Guigue, Didier	1954
Cognitive Dissidents	1998		Sukorski, Wilson	1956

Colorless Green Ideas Sleep Furiously	1998	Coelho de Souza, Rodolfo	1952
CriaTerra	1998	Sukorski, Wilson	1956
Dru	1998	Iazzetta, Fernando	1966
Hombres tristes y sin título rodeados de pájaros en noche amarilla, violeta y naranja	1998	Antunes, Jorge	1942
Mecânica Popular	1998	Sukorski, Wilson	1956
Naked Diva	1998	de Oliveira, Jocy	1936
Three Inconspicuous Settings	1998	Pantaleão, Aquiles	1965
Clariagua	1999	Coelho de Souza, Rodolfo	1952
Corde e Cabaça	1999	Iazzetta, Fernando	1966
Fragmentacion	1999	Zamprona, Edson S.	1963
Grain Streams	1999	Miranda, Eduardo Reck	1963
Improviso em forma de pássaro preto	1999	Coelho de Souza, Rodolfo	1952
in respect of ordinary things	1999	Pantaleão, Aquiles	1965
Infobodies	1999	Garcia, Denise	1955
Modelagem XI	1999	Zamprona, Edson S.	1963
When I drift into my thoughts	1999	Corrêa, Jaime	
A - Telefone + Beat leve + J - Janela	2000	Tragtenberg, Livio Sukorski, Wilson	1961 1956
Caribal	2000	Mannis, José Augusto	1958
Concerto para Computador e Orquestra	2000	Coelho de Souza, Rodolfo	1952
Etnias	2000	Manzoli, Jônatas	1961
Harmonia das Esferas	2000	Menezes, Flo	1962
Longas noite II + Tensao II	2000	Tragtenberg, Livio	1961

			Sukorski, Wilson	1956
Q1	2000		Mannis, José Augusto	1958
Sala / quarto / Raí	2000		Tragtenberg, Livio Sukorski, Wilson	1961 1956
Tanque / fim	2000		Tragtenberg, Livio Sukorski, Wilson	1961 1956
Trama Nudo Flujo	2000		Zampronha, Edson S.	1963
Vachagotta's waiting	2000		Pantaleão, Aquiles	1965
Mármore	2001		Zampronha, Edson S.	1963
Objetos Afetos	2001		Manzolli, Jônatas	1961
Par Lui 2	2001		Garcia, Denise	1955
Caminhantes	2002		Manzolli, Jônatas	1961
Danças & Intermezzi	2002		Corrêa, Jaime	
O jardim dos caminhos que se bifurcam	2002		Corrêa, Jaime	
Olhos d'água	2002	2003	Manzolli, Jônatas	1961
Tangerina	2002		Iazzetta, Fernando	1966
Mural	2003		Manzolli, Jônatas do Valle, Raúl	1961 1936
Non Sequitur	2003		Manzolli, Jônatas do Valle, Raúl	1961 1936
Fanfarra fúnebre	undated		de Oliveira, Jocy	1936
O Acorrentamento de Prometeu	undated		Guerra de Almeida, Anselmo	1959
Technicki III	undated		Sukorski, Wilson	1956
Technicki IV	undated		Sukorski, Wilson	1956
The Book of Sounds III: Cuica	undated		Coelho de Souza, Rodolfo	1952

Chile

Table 15. Musical compositions created by Chilean composers available for listening in the *Latin American Electroacoustic Music Collection*.

Composition	Date of creation	Composer	Date of birth
<i>Los Peces</i>	1957	Amenabar, Juan	1922
<i>Variaciones Espectrales</i>	1959	Asuar, José Vicente	1933
<i>Juegos</i>	1966	Becerra-Schmidt, Gustavo	1925
<i>Divertimento</i>	1967	Asuar, José Vicente	1933
<i>Volveremos a las montañas</i>	1967	Brncic, Gabriel	1942
<i>Guararia Repano</i>	1968	Asuar, José Vicente	1933
<i>Klesis</i>	1968	Amenabar, Juan	1922
<i>Batucada</i>	1969	Brncic, Gabriel	1942
<i>Sueño de un niño</i>	1970	Amenabar, Juan	1922
<i>Amacata</i>	1972	Amenabar, Juan	1922
<i>Ludus Vocalis</i>	1973	Amenabar, Juan	1922
<i>Affaires des Oiseaux</i>	1976	Asuar, José Vicente	1933
<i>Chile fértil provincia</i>	1976	Brncic, Gabriel	1942
<i>Contratempo-Sensatempo</i>	1976	Amenabar, Juan	1922
<i>Juegos</i>	1976	Amenabar, Juan	1922
<i>Amanecer</i>	1977	Asuar, José Vicente	1933
<i>Cirrus</i>	1978	Vera-Rivera, Santiago	1950
<i>Elegía</i>	1982	Asuar, José Vicente	1933
<i>Polifonia de Barcelona</i>	1983	Brncic, Gabriel	1942
<i>Diálogos</i>	1985	Asuar, José Vicente	1933
<i>Clarinen Tres (a Bárbara Brncic Monsegur)</i>	1986	Brncic, Gabriel	1942
<i>Des' être (a Oscar Masotta)</i>	1986	Brncic, Gabriel	1942

<i>En el jardín</i>	1986		Asuar, José Vicente	1933
<i>En el infinito</i>	1987		Asuar, José Vicente	1933
<i>Interior</i>	1987		Becerra-Schmidt, Gustavo	1925
<i>Astillas de bambú</i>	1989	1994	Martinez Ulloa, Jorge	1953
<i>Composición de 1989 (a Eduardo Polonio)</i>	1989		Brcic, Gabriel	1942
<i>Fiesta</i>	1989		Cori Traverso, Rolando	1954
<i>La otra concertación</i>	1989		Cáceres, Eduardo	1955
<i>A</i>	1990	1992	Ancarola, Francesca	1968
<i>Vade Retro (a Luigi Nono)</i>	1990		Brcic, Gabriel	1942
<i>Cygnus</i>	1994		Morales Ossio, Cristián	1967
<i>Lovecraft</i>	1994		Cantón Aguirre, Edgardo	1963
<i>Metalmambo</i>	1994		Cáceres, Eduardo	1955
<i>NILNOVISUBSOLE</i>	1994		Carrasco Pantoja, Fernando	1953
<i>NUD</i>	1994		Mora, Mario	1967
<i>OIREB-A</i>	1994		Holman Grossi, Ernesto	1950
<i>...Que no Desorganitza Cap Murmuri. (a Joan Brossa)</i>	1995		Brcic, Gabriel	1942
<i>Dos Esbozos Para Antiguos Instrumentos Electrónicos</i>	1995		Brcic, Gabriel	1942
<i>Golpe de luz</i>	1995		Vergara Solar, Juan Carlos	1969
<i>Sax</i>	1995		Mora, Mario	1967
<i>Las huellas del pequeño venado</i>	1996	1997	Candela, Jose Miguel	1968
<i>Preludio des éléments</i>	1996		Cantón Aguirre, Edgardo	1963
<i>Saint Michel en carretera nocturna</i>	1996		Cantón Aguirre, Edgardo	1963
<i>RisRas</i>	1997		Morales Ossio, Cristián	1967
<i>Búsqueda y Retorno</i>	1998		Arenas Navarrete, Mario	1953
<i>Jojo</i>	1998		Otondo , Felipe	1972

<i>La Casa del Viento</i>	1998		Brncic, Gabriel	1942
<i>Apolo - 23</i>	1999		Lazo, Paola	1969
<i>Attract</i>	1999		Fernández, José Miguel	1973
<i>Attract II</i>	1999		Fernández, José Miguel	1973
<i>Bailecitos con la novia</i>	1999		Cori Traverso, Rolando	1954
<i>Birds in a Cage full of silence</i>	1999		Otondo , Felipe	1972
<i>Clarinet-Concert</i>	1999		Brncic, Gabriel	1942
<i>Coréutica</i>	1999		Brncic, Gabriel	1942
<i>La Música del Cuerpo</i>	1999		Schumacher, Federico	1963
<i>Memoria de los Andes</i>	1999	2000	Cantón Aguirre, Edgardo	1963
<i>Palabras del Sur</i>	1999		Schumacher, Federico	1963
<i>ajar.cl</i>	2000		Carrasco Pantoja, Fernando	1953
<i>Bajan Gritando Ellos</i>	2000		Candela, Jose Miguel	1968
<i>Gato en el Agua</i>	2000		Schumacher, Federico	1963
<i>Guitar ex Machina</i>	2000		Otondo , Felipe	1972
<i>La violación de Lucrecia</i>	2000		García-Gracia, Cecilia	1968
<i>Leruleru...lá</i>	2000		Cáceres, Eduardo	1955
<i>Nuevamente</i>	2000		Carvalho, Antonio	1972
<i>Shu-Shu</i>	2000		Alvarado, Boris	1962
<i>TD reciclados</i>	2000		Vergara Solar, Juan Carlos	1969
<i>100 Flores</i>	2001	2002	Schumacher, Federico	1963
<i>Dj2</i>	2001		Candela, Jose Miguel	1968
<i>Dj3</i>	2001		Candela, Jose Miguel	1968
<i>Impermanences I</i>	2001		Otondo , Felipe	1972
<i>Los Sueños de Attar</i>	2001		Cantón Aguirre, Edgardo	1963
<i>On the radio, oh, oh, oh</i>	2001		Schumacher, Federico	1963
<i>9dn.13</i>	2002		Fernández, José Miguel	1973
<i>Delta</i>	2002		Candela, Jose Miguel	1968

<i>Dual</i>	2002		Fernández, José Miguel	1973
<i>Exzummo</i>	2002	2004	Lazo, Félix	1957
<i>La Sombra del Sonido</i>	2002		Kaplan, Adolfo	
<i>TOTTO</i>	2002		Lazo, Paola	1969
<i>TTK : I</i>	2002		Candela, Jose Miguel	1968
<i>TTK : LII</i>	2002		Candela, Jose Miguel	1968
<i>TTK : XLIX</i>	2002		Candela, Jose Miguel	1968
<i>TTK : XLVII</i>	2002		Candela, Jose Miguel	1968
<i>TTK : XXII</i>	2002		Candela, Jose Miguel	1968
<i>Constelaciones 1</i>	2003		Otondo , Felipe	1972
<i>Estrellas Compactas</i>	2003		Schumacher, Federico	1963
<i>Improv. video/music</i>	2003		Lazo, Félix	1957
<i>Les filles du Mara</i>	2003	2004	Lazo, Félix	1957
<i>Objetos Encontrados</i>	2003		Otondo , Felipe	1972
<i>Wérika</i>	2003		García-Gracia, Cecilia	1968
<i>Medusa II [tape part only]</i>	2004		Lazo, Paola	1969
<i>MingaSola I</i>	2004		Schumacher, Federico	1963
<i>Pi</i>	2004		Otondo , Felipe	1972
<i>Zapping Zappa : Homenaje a Frank Zappa</i>	2004		Otondo , Felipe	1972
<i>Estudio Nocturno</i>	undated		Rivas, Roque	1975
<i>Ñanco</i>	undated		García-Gracia, Cecilia	1968
<i>Proteo</i>	undated		Martinez Ulloa, Jorge	1953
<i>Tinku</i>	undated		Martinez Ulloa, Jorge	1953
<i>Una flauta en el camino</i>	undated		Asuar, José Vicente	1933

Colombia

Table 16. Musical compositions created by Colombian composers
available for listening in the *Latin American Electroacoustic Music Collection*.

Composition	Date of creation		Composer	Date of birth
<i>Ensayo Electrónico</i>	1965		González Zuleta, Fabio	1920
<i>Syigma I</i>	1966		Atehortúa, Blas Emilio	1933
<i>Oposición-Fusión</i>	1968		Nova, Jacqueline	1935
<i>Estudio Electrónico</i>	1971		Ferberbaum, David	
<i>Creación de la Tierra</i>	1972		Nova, Jacqueline	1935
<i>Omaggio a Catullus</i>	1972	1974	Nova, Jacqueline	1935
<i>El Paseo Bolívar : Música por computador para el oyente desprevenido</i>	1988		Reyes, Juan	1962
<i>Catenaria</i>	1989	1990	Posada, Andrés	1954
<i>Las Meninas</i>	1991		Reyes, Juan	1962
<i>Requiem sobre una muerte imaginaria</i>	1991	1999	Peralta, Catalina	1963
<i>Trípode</i>	1992		Carbo, Guillermo	1963
<i>Rocas</i>	1993		Reyes, Juan	1962
<i>Boca de Barra : An Infraacoustical Landscape</i>	1994		Reyes, Juan	1962
<i>Esquicios</i>	1994	1998	Bejarano, Mauricio	1955
<i>Suite Logique</i>	1994		Triana, Alba Fernanda Henao, Luis Fernando	
<i>A Armero</i>	1995		Cuellar, Lucio Edilberto	1954
<i>Recitativo IIb</i>	1995	1997	Peralta, Catalina	1963
<i>Suspensión I</i>	1995	1997	Acosta, Rodolfo	1970

<i>Choi Hung</i>	1996		Reyes, Juan	1962
<i>Choi-Hung</i>	1996		Reyes, Juan	1962
<i>Equus & Resonancias</i>	1996		Reyes, Juan	1962
<i>Estudio de ruidos y campanas</i>	1996		Toro, Germán	1964
<i>Ficciones</i>	1996	1997	Toro, Germán	1964
<i>... del imperativo ...</i>	1997	1998	García Piedrahíta, Roberto	1958
<i>Aire</i>	1997	1998	Toro, Germán	1964
<i>D'or et de lumière</i>	1997	2000	Parra, Arturo Bejarano, Mauricio	1958 1955
<i>Espacios de tiempo</i>	1997		Romano, Ana María	1971
<i>Recitativo elettronico II</i>	1997		Peralta, Catalina	1963
<i>Soliloquio del retorno</i>	1997	1999	Peralta, Catalina	1963
<i>Straw-berri</i>	1997		Reyes, Juan	1962
<i>Androide</i>	1998		Cuellar, Lucio Edilberto	1954
<i>La basilique fantôme</i>	1998	2000	Parra, Arturo Roy, Stéphane	1958
<i>L'envers du temps</i>	1998	2000	Parra, Arturo Gobeil, Gilles	1958
<i>Sol y sombra,... L'espace des espectres</i>	1998	2000	Parra, Arturo Dhomont, Francis	1958
<i>Soledad</i>	1998	2000	Parra, Arturo Gobeil, Gilles	1958
<i>Suite para flauta, trompeta, dos percusionistas, violoncello, piano y tape</i>	1998		Cuellar, Lucio Edilberto	1954
<i>Sygfrydo</i>	1998		Reyes, Juan	1962
<i>Inventario I</i>	1999	2003	Toro, Germán	1964

<i>Inventario III</i>	1999		Toro, Germán	1964
<i>ppP</i>	1999	2000	Reyes, Juan	1962
<i>Rothko II : Segundo homenaje a Mark Rothko</i>	1999	2000	Toro, Germán	1964
<i>Carrera 7a.</i>	2000		Bejarano, Mauricio	1955
<i>De Igitur o la locura de Elbehnon: Estudio Antiguo - (Introducción)</i>	2000	2001	Peralta, Catalina	1963
<i>Domingo</i>	2000		Bejarano, Mauricio	1955
<i>Fluidos</i>	2000		Bejarano, Mauricio	1955
<i>Hora 0:00</i>	2000		Bejarano, Mauricio	1955
<i>La Estación</i>	2000		Bejarano, Mauricio	1955
<i>Parque de Usaquén</i>	2000		Bejarano, Mauricio	1955
<i>Plaza de Bolívar</i>	2000		Bejarano, Mauricio	1955
<i>Reloj final</i>	2000		Bejarano, Mauricio	1955
<i>Rutas del agua</i>	2000		Bejarano, Mauricio	1955
<i>Silencio No.1 ... BLANCO</i>	2000		Bejarano, Mauricio	1955
<i>Silencio No.2 ... AZUL</i>	2000		Bejarano, Mauricio	1955
<i>Silencio No.3 ... NEGRO</i>	2000		Bejarano, Mauricio	1955
<i>Silencio No.4 ... VIOLETA</i>	2000		Bejarano, Mauricio	1955
<i>Silencio No.5 ... PLATEADO</i>	2000		Bejarano, Mauricio	1955
<i>Tiempo de agua</i>	2000		Bejarano, Mauricio	1955
<i>Tren de paso</i>	2000		Bejarano, Mauricio	1955
<i>Viernes Santo</i>	2000		Bejarano, Mauricio	1955
<i>Oranged (lima-limón)</i>	2001		Reyes, Juan	1962
<i>Wadi Musa (or the Monteria Hat)</i>	2001		Reyes, Juan	1962
<i>Chryseis</i>	2002		Reyes, Juan	1962
<i>Efervessencia</i>	2002		Muñoz, Ramiro	1977
<i>Signature work : Variación en cinco objetos sonoros</i>	2003		Cuellar, Lucio Edilberto	1954

<i>Tierra Vieja, Tierra Nueva</i>	2003	Cuellar, Lucio Edilberto	1954
<i>Abierto</i>	2004	Romano, Ana María	1971
<i>Amarilla al sol</i>	2004	Carreño, Juan Pablo	1978
<i>Cambuche</i>	2004	Zea, Daniel	1976
<i>Needle Battle</i>	2004	Cárdenas, Alexandra	1976
<i>Pieza electroacústica No. 2</i>	2004	García, Jorge	1975
<i>Responsorio</i>	2004	Lozano, Santiago	1976
<i>Todas las noches, el cielo arde sobre Bogotá.</i>	2004	Acosta, Rodolfo	1970
<i>Variaciones en seis objetos sonoros</i>	2004	Cuellar, Lucio Edilberto	1954
<i>Vivo</i>	2004	Leguizamón, Daniel	1979

Costa Rica

Table 17. Musical compositions created by Costa Rican composers available for listening in the *Latin American Electroacoustic Music Collection*.

Composition	Date of creation	Composer	Date of birth
<i>Fotos 1</i>	1997	Castro, Otto	1972
<i>Espirales</i>	1999	Castro, Otto	1972
<i>TV 1</i>	1999	Castro, Otto	1972
<i>Jardín Tóxico</i>	2000	Castro, Otto	1972
<i>Mala Fe</i>	2000	Castro, Otto	1972
<i>Encuentros Televisivos</i>	2001	Castro, Otto	1972
<i>BSTRFeDóN</i>	2002	Autoperro (Arce - Ordoñez)	
<i>HuMDL</i>	2002	Autoperro (Arce - Ordoñez)	
<i>Olimpia</i>	2002	Herra, Luis Diego	1952
<i>TXaLPART</i>	2002	Autoperro (Arce - Ordoñez)	
<i>ZaRGZS</i>	2002	Autoperro (Arce - Ordoñez)	
<i>El pescador y la muerte</i>	2003	Herra, Luis Diego	1952
<i>Señales</i>	2003	Herra, Luis Diego	1952
<i>Arquetipos Marinos (Tejiendo lenguajes ancestrales)</i>	2004	Castro, Otto	1972
<i>Rinocerontes</i>	2004	Herra, Luis Diego	1952
<i>Zurquí</i>	2004	Herra, Luis Diego	1952

Cuba

Table 18. Musical compositions created by Cuban composers available for listening in the *Latin American Electroacoustic Music Collection*.

Composition	Date of creation		Composer	Date of birth
<i>Ensamble VI</i>	1963		Blanco, Juan	1919
<i>Estructuras</i>	1963		Blanco, Juan	1919
<i>Interludio con Máquinas</i>	1963		Blanco, Juan	1919
<i>Interpolation</i>	1965		de la Vega, Aurelio	1925
<i>La Partida Viviente</i>	1967		Blanco, Juan	1919
<i>Concierto for two pianos, percussion, tape and audience</i>	1968		Barroso, Sergio	1946
<i>Contrapunto Espacial No. 3</i>	1969		Blanco, Juan	1919
<i>Tangents</i>	1973		de la Vega, Aurelio	1925
<i>Para-Tangents</i>	1973		de la Vega, Aurelio	1925
<i>Olep ed Arudamot</i>	1974		de la Vega, Aurelio	1925
<i>Chile Vencerá</i>	1975		Blanco, Juan	1919
<i>Galaxia M-50</i>	1975		Blanco, Juan	1919
<i>Yantra VI</i>	1976	1979	Barroso, Sergio	1946
<i>Inflorescencia</i>	1976		de la Vega, Aurelio	1925
<i>Contrapunto Espacial No. 6</i>	1976		Blanco, Juan	1919
<i>Yantra IX</i>	1979		Barroso, Sergio	1946
<i>Extrapolation</i>	1981		de la Vega, Aurelio	1925
<i>Picassianas I: Homenaje al Centenario de Picasso</i>	1981		Ortega, Jesús	1935
<i>La tierra que nos vio nacer</i>	1981		Rodríguez, Fernando	1958
<i>En un abrazo de luz</i>	1981		Rodríguez, Fernando	1958
<i>Yantra X</i>	1982		Barroso, Sergio	1946

<i>Les Barricades Mystérieuses : Variations on a Rondo by Couperin</i>	1982	1985	Barroso, Sergio	1946
<i>Pirandelliana</i>	1983		Piñera, Juan	1949
<i>El otro huevo de la serpiente</i>	1983		Rodríguez, Fernando	1958
<i>Aguas Territoriales</i>	1983		Fariñas, Carlos	1934
<i>Primer Día de Mayo</i>	1984		Fariñas, Carlos	1934
<i>Tres de Dos</i>	1984		Piñera, Juan Alejandro, Edesio	1949 1958
<i>Halley 86</i>	1984		Roloff, Julio	1951
<i>Ritual</i>	1984		Blanco, Juan Marcos	1953
<i>Cirkus Toccata</i>	1984		Blanco, Juan	1919
<i>Cirkus Toccata</i>	1984		Blanco, Juan	1919
<i>Ireme</i>	1985	1979	Barroso, Sergio	1946
<i>Caballos</i>	1985		Blanco, Juan Marcos	1953
<i>Asonante</i>	1985		de la Vega, Aurelio	1925
<i>Invocación (Por la Paz Mundial) : a Leo Brower</i>	1985		Ortega, Jesús	1935
<i>Picassianas III : a Juan Blanco</i>	1985		Ortega, Jesús	1935
<i>Tañidos</i>	1985		Blanco, Juan	1919
<i>Pámpano y Cascabel</i>	1985		Piñera, Juan	1949
<i>Pámpano y Cascabel [tape part only]</i>	1985		Piñera, Juan	1949
<i>Fanfarría de Primavera</i>	1986		Ortega, Jesús	1935
<i>Espacios V</i>	1986		Blanco, Juan	1919
<i>Suite erótica</i>	1986		Blanco, Juan	1919
<i>Del espectro nocturno [tape part only]</i>	1986		Piñera, Juan	1949
<i>Encuentro</i>	1986		Rodríguez, Fernando	1958
<i>Espacios II</i>	1986		Blanco, Juan	1919
<i>En Febrero Mueren las Flores</i>	1987		Barroso, Sergio	1946
<i>Soledad</i>	1987	1988	Barroso, Sergio	1946

<i>Ella (Pastorale)</i>	1987		Blanco, Juan	1919
<i>Germinal</i>	1987		Piñera, Juan	1949
<i>Canzona</i>	1988		Barroso, Sergio	1946
<i>Son Mac Plus</i>	1988		Ortega, Jesús	1935
<i>Espacios VI</i>	1988		Blanco, Juan	1919
<i>Music for Different Timbres</i>	1989		Rodríguez, Armando	1951
<i>Texturas Americanas I</i>	1989		Blanco, Juan	1919
<i>Retratos I (photographs I)</i>	1989		Garcia, Orlando J.	1954
<i>La Fiesta</i>	1989		Barroso, Sergio	1946
<i>1789-1989 : Homenaje al Bicentenario de la Revolucion Francesa</i>	1989		Blanco, Juan	1919
<i>Variaciones Americanas</i>	1989		Blanco, Juan	1919
<i>Tema con Variaciones</i>	1989		Blanco, Juan	1919
<i>Espacio Cerrado</i>	1990		Pedroso, Pedro Pablo	
<i>Improvisation with Metallic Materials</i>	1990		Garcia, Orlando J.	1954
<i>Sitio sin nombre</i>	1990		Garcia, Orlando J.	1954
<i>Spatial Projection</i>	1990		Rodríguez, Armando	1951
<i>Linear</i>	1990		Rodríguez, Armando	1951
<i>Triangular</i>	1990		Rodríguez, Armando	1951
<i>Progression</i>	1990		Rodríguez, Armando	1951
<i>Occupied Space</i>	1990		Rodríguez, Armando	1951
<i>Piece No. 2 from Three Pieces for Double Bass and Tape</i>	1990		Garcia, Orlando J.	1954
<i>Tablao</i>	1990		Barroso, Sergio	1946
<i>Music for Nada [tape part only]</i>	1990		Garcia, Orlando J.	1954
<i>Improvisation with Metallic Materials [tape part only]</i>	1990		Garcia, Orlando J.	1954
<i>Piece No. 1 from Three Pieces for Double Bass and Tape</i>	1990		Garcia, Orlando J.	1954

<i>Piece No. 3 from Three Pieces for Double Bass and Tape</i>	1990		Garcia, Orlando J.	1954
<i>Metallic images</i>	1991		Garcia, Orlando J.	1954
<i>Cuando el aura es áurea o la muy triste historia de los ocho minutos con treinta y ocho segundos</i>	1991		Piñera, Juan	1949
<i>Palmas</i>	1992		Valera, Roberto	1938
<i>From Darkness to Light</i>	1992		Rodríguez, Armando	1951
<i>Crónicas de Ultrasueño</i>	1992		Barroso, Sergio	1946
<i>Sonatada</i>	1992		Barroso, Sergio	1946
<i>Cinco Epitafios : para un narcotraficante</i>	1992		Blanco, Juan	1919
<i>Cinco Epitafios : para un niño</i>	1992		Blanco, Juan	1919
<i>Cinco Epitafios : para un terrorista</i>	1992		Blanco, Juan	1919
<i>Cinco Epitafios : para un perro</i>	1992		Blanco, Juan	1919
<i>Cinco Epitafios : para un tirano</i>	1992		Blanco, Juan	1919
<i>Paisaje</i>	1992		Blanco, Juan	1919
<i>Treno por las Víctimas del Estrecho de la Florida</i>	1992		Blanco, Juan	1919
<i>Nexos II: Escenas de Vida</i>	1993		Pedroso, Pedro Pablo	
<i>Orbitas Elípticas</i>	1993		Fariñas, Carlos	1934
<i>Período Espacial</i>	1993		Valera, Roberto	1938
<i>A Quiet World</i>	1993		Rodríguez, Armando	1951
<i>Charangas Delirantes</i>	1993		Barroso, Sergio	1946
<i>Viejas Voces</i>	1993		Barroso, Sergio	1946
<i>Loops</i>	1993		Blanco, Juan	1919
<i>Contrastes II</i>	1993		Blanco, Juan	1919
<i>16 repeticiones sobre un temas de J. S. Bach</i>	1993		Rodríguez, Fernando	1958

<i>Paisaje 1994: Música para las demoliciones</i>	1994		Pedroso, Pedro Pablo	
<i>Piedras</i>	1994		Pérez Velazquez, Ileana	1964
<i>Yoruba</i>	1994		Pérez Velazquez, Ileana	1964
<i>Celia</i>	1994		Pérez Velazquez, Ileana	1964
<i>That Day</i>	1994		Rodríguez, Armando	1951
<i>Para Enterrar la Esperanza</i>	1994		Blanco, Juan	1919
<i>S.O.S. 13 de marzo</i>	1994	1995	Blanco, Juan	1919
<i>Variantes II</i>	1994		Blanco, Juan	1919
<i>Conversations</i>	1995		Pérez Velazquez, Ileana	1964
<i>Un ser con unas alas enormes</i>	1995		Pérez Velazquez, Ileana	1964
<i>A storm was coming over the quiet pond</i>	1995		Rodríguez, Armando	1951
<i>De dos para uno</i>	1997		Perón, Alain	1969
<i>Opus 18 o de la gota de agua</i>	1997		Piñera, Juan	1949
<i>Moniobra</i>	1998		O'Reilly, Mónica	1975
<i>Canción</i>	1998		Blanco, Juan	1919
<i>Loa del Camino</i>	1999		Valera, Roberto	1938
<i>La primavera del ángel</i>	1999		Escalante, Irina	1977
<i>Como un coro de clarinetes celestiales</i>	1999		García, Orlando J.	1954
<i>Imágenes (Sonidos) Sonoros Congelados</i>	1999		García, Orlando J.	1954
<i>Ajuandéjuan</i>	2000		Piñera, Juan	1949
<i>D...efectos</i>	2000		Piñera, Juan	1949
<i>Divertimento</i>	2000		Núñez, Teresa	1966
<i>El segundo de un compay eterno</i>	2000		O'Reilly, Mónica	1975

<i>Mundo Interior</i>	2000		Escalante, Irina O'Reilly, Mónica	1977 1975
<i>Plegarias</i>	2000?		Rodríguez, Fernando	1958
<i>Psss</i>	2000		O'Reilly, Mónica	1975
<i>Separación</i>	2000	2001	García, Orlando J.	1954
<i>Sira Arisu Ira</i>	2000		Escalante, Irina	1977
<i>Bbpino</i>	2001		O'Reilly, Mónica	1975
<i>Canción C: Jesús, amigo, yo siempre estoy contigo</i>	2001		Blanco, Juan	1919
<i>Congas</i>	2001		Escalante, Irina	1977
<i>Liturgias</i>	2001		Escalante, Irina	1977
<i>Momentum</i>	2001		Escalante, Irina	1977
<i>Un besito a papito</i>	2001		O'Reilly, Mónica	1975
<i>Tres little escenas de Mr. Pérez</i>	2002		O'Reilly, Mónica	1975

Dominican Republic

Table 19. Musical compositions created by Dominican composers available for listening in the *Latin American Electroacoustic Music Collection*.

Composition	Date of creation		Composer	Date of birth
<i>Tangentes</i>	1988		José, Alejandro	1955
<i>Cuatro Estudios para Wind Controller</i>	1989		José, Alejandro	1955
<i>Pulsar: El Caribe</i>	1991		José, Alejandro	1955
<i>Ecofonía</i>	1992		José, Alejandro	1955
<i>Beyond the Stars</i>	1994		Luna, Ana Margarita	
<i>Todo Es Uno</i>	1995		José, Alejandro	1955
<i>Millenium Hope</i>	199?		Cucurullo, Dante	1957
<i>Toccatta de mente</i>	1999		José, Alejandro	1955
<i>El Encantador de Aguas</i>	2000		Cucurullo, Dante	1957
<i>Con el Pulso de una Estrella</i>	2002	2003	José, Alejandro	1955

Ecuador

Table 20: Musical compositions created by Ecuadorian composers available for listening in the *Latin American Electroacoustic Music Collection*.

Composition	Date of creation		Composer	Date of birth
<i>Dort wo wir leben</i>	1967		Maiguashca, Mesías	1938
<i>Hör-zu</i>	1969		Maiguashca, Mesías	1938
<i>Ayayayayay</i>	1971		Maiguashca, Mesías	1938
<i>Übungen</i>	1972	1973	Maiguashca, Mesías	1938
<i>Lindgren</i>	1976		Maiguashca, Mesías	1938
<i>... y ahora vamos por aqui ...</i>	1977		Maiguashca, Mesías	1938
<i>Intensidad y Altura</i>	1979		Maiguashca, Mesías	1938
<i>Fermez les yeux S.V.P.</i>	1983	2001	Rodas, Arturo	1954
<i>FMelodies II</i>	1983	1984	Maiguashca, Mesías	1938
<i>Los Ojos de mis Sueños</i>	1984		Luzuriaga, Diego	1955
<i>Patch 13</i>	1984		Estevez, Milton	1947
<i>Apabatapabata</i>	1986		Luzuriaga, Diego	1955
<i>Brasilia</i>	1986		Luzuriaga, Diego	1955
<i>Ludus Spectralis</i>	1986		Luzuriaga, Diego	1955
<i>Apuntes con Refrán</i>	1987		Estevez, Milton	1947
<i>Pythagoras</i>	1987		Luzuriaga, Diego	1955
<i>Sarapangas como vos</i>	1987		Luzuriaga, Diego	1955
<i>moments musicaux</i>	1989		Maiguashca, Mesías	1938
<i>The Wings of Perception II</i>	1989	1992	Maiguashca, Mesías	1938
<i>Zeluob 3</i>	1990		Freire, Pablo	1961
<i>El Oro</i>	1992		Maiguashca, Mesías	1938
<i>Flauta y Viento</i>	1992		Luzuriaga, Diego	1955
<i>Sacateca's Dance</i>	1992		Maiguashca, Mesías	1938

<i>Los Amantes</i>	1993		Flores Abad, Eduardo	1960
<i>The Nagual</i>	1993		Maiguashca, Mesías	1938
<i>The Spirit Catcher</i>	1993		Maiguashca, Mesías	1938
<i>The Tonal</i>	1993		Maiguashca, Mesías	1938
<i>Yaravi</i>	1993		Campos, Jorge	1960
<i>Ritmo en el ritmo</i>	1994		Flores Abad, Eduardo	1960
<i>Viento en el Viento</i>	1994		Luzuriaga, Diego	1955
<i>Taleas</i>	1995	1996	Flores Abad, Eduardo	1960
<i>Cantos vivos y cantos rodados</i>	1996		Estevez, Milton	1947
<i>Kon-Tiki</i>	1996		Campos, Jorge	1960
<i>Tiefen</i>	1998		Maiguashca, Mesías	1938
<i>A ras del cuero #3</i>	2001		Flores Abad, Eduardo	1960
<i>Bailecito</i>	2001		Rodas, Arturo	1954
<i>El llanto del disco duro</i>	2001		Rodas, Arturo	1954
<i>El Aire ... Como ... Pan</i>	2002		Pontón, Julián	1961
<i>Electroacoustic Piece I: from The Book of the Orchestra: BESTIARIO</i>	2002	2003	Rodas, Arturo	1954
<i>Electroacoustic Piece II: from The Book of the Orchestra: BESTIARIO</i>	2002	2003	Rodas, Arturo	1954
<i>Electroacoustic Piece III: from The Book of the Orchestra: BESTIARIO</i>	2002	2003	Rodas, Arturo	1954
<i>Electroacoustic Piece IV: from The Book of the Orchestra: BESTIARIO</i>	2002	2003	Rodas, Arturo	1954
<i>Electroacoustic Piece V: from The Book of the Orchestra: BESTIARIO</i>	2002	2003	Rodas, Arturo	1954
<i>Electroacoustic Piece VI: from The Book of the Orchestra: BESTIARIO</i>	2002	2003	Rodas, Arturo	1954
<i>Electroacoustic Piece VII: from The Book of the Orchestra: BESTIARIO</i>	2002	2003	Rodas, Arturo	1954

<i>Electroacoustic Piece VIII: from The Book of the Orchestra: BESTIARIO</i>	2002	2003	Rodas, Arturo	1954
<i>Finale: from The Book of the Orchestra: BESTIARIO</i>	2002	2003	Rodas, Arturo	1954
<i>Líneas flotantes</i>	2002		Flores Abad, Eduardo	1960
<i>Piece of Cake: Suite</i>	2003		Rodas, Arturo	1954
<i>Tutti Frutti : from The Book of the Orchestra: BESTIARIO</i>	2003		Rodas, Arturo	1954

El Salvador

Table 21. Musical compositions created by Salvadoran composers available for listening in the *Latin American Electroacoustic Music Collection*.

Composition	Date of creation		Composer	Date of birth
<i>Estudio 3</i>	2003		Huguet, Francisco	1976
<i>Tiento 2</i>	2003		Huguet, Francisco	1976

Guatemala

Table 22. Musical compositions created by Guatemalan composers available for listening in the *Latin American Electroacoustic Music Collection*.

Composition	Date of creation	Composer	Date of birth
<i>Humanofonia</i>	1971	Orellana, Joaquín	1937
<i>Sanctus</i>	1975	Lehnhoff, Dieter	1955
<i>Imposible a la X</i>	1980	Orellana, Joaquín	1937
<i>Híbrido a presión</i>	1982	Orellana, Joaquín	1937
<i>Trans-tres</i>	1985	de Gandarias, David	1952
<i>Conquista 2</i>	1988	de Gandarias, Igor	1953
<i>Cuarteto No.3</i>	1990	Alvarado, Paulo	1960
<i>Dialogante</i>	1995	de Gandarias, Igor	1953
<i>Feria Fantástica</i>	1995	de Gandarias, Igor	1953
<i>Anonyme</i>	1997	Maselli, Renato	1964
<i>Invisibles, pero presentes</i>	1997	Alvarado, Paulo	1960
<i>Percursos de Hormigo, Senderos de Silicio</i>	1997	de Gandarias, David	1952
<i>5.50BG</i>	1998	Alvarado, Paulo	1960
<i>Los Matachines (El Enfrentamiento)</i>	1999	Alvarado, Paulo	1960
<i>Memorias de un día remoto</i>	1999	Lehnhoff, Dieter	1955
<i>Rituales nocturnos</i>	1999	Lehnhoff, Dieter	1955
<i>Gracias</i>	2002	Maselli, Renato	1964
<i>Atlas en el Diván</i>	2003	Alvarado, Paulo	1960

Mexico

Table 23. Musical compositions created by Mexican composers available for listening in the *Latin American Electroacoustic Music Collection*.

Composition	Date of creation		Composer	Date of birth
<i>El paraíso de los ahogados</i>	1960		Jiménez Mabarak, Carlos	1916
<i>Viols</i>	1969	1972	Enriquez, Manuel	1926
<i>Opus 1</i>	1970		Quintanar, Héctor	1936
<i>Parámetros I</i>	1971		de Elías, Manuel	1939
<i>Suite Electrónica</i>	1971		Quintanar, Héctor	1936
<i>Contrapunto</i>	1972		Lavista, Mario	1943
<i>Voz</i>	1972		Quintanar, Héctor	1936
<i>Non nova sed novo</i>	1974		de Elías, Manuel	1939
<i>Diálogos</i>	1975		Quintanar, Héctor	1936
<i>Conjuro</i>	1976	1977	Enriquez, Manuel	1926
<i>Conjuro [tape part only]</i>	1976	1977	Enriquez, Manuel	1926
<i>Atmósferas</i>	1977		Russek, Antonio	1954
<i>Miniaturas</i>	1977	1992	Russek, Antonio	1954
<i>Estudio Electrónico I</i>	1979		Russek, Antonio	1954
<i>Cinco Piezas Breves</i>	1980		Russek, Antonio	1954
<i>Estudio Electrónico II</i>	1980		Russek, Antonio	1954
<i>eua'on</i>	1980		Estrada, Julio	1943
<i>Vulcán</i>	1980	1983	Rojo, Vicente	1960
<i>Continuidades y Distancias</i>	1981		Russek, Antonio	1954
<i>Intrspecciones</i>	1981		Russek, Antonio	1954
<i>Para espacios abiertos</i>	1981		Russek, Antonio	1954
<i>Reincidencias</i>	1981		Russek, Antonio	1954
<i>Summermood</i>	1981		Russek, Antonio	1954

<i>Fantasia cósmica</i>	1982		Pavón, Raúl	1930
<i>Agua Derramada</i>	1983		Morales-Manzanares, Roberto	1958
<i>Discursos</i>	1984		Russek, Antonio	1954
<i>Paisaje Circular</i>	1984		Russek, Antonio	1954
<i>Radio I</i>	1984		Russek, Antonio	1954
<i>Temazcal</i>	1984		Alvarez, Javier	1956
<i>Edge Dance</i>	1985		Alvarez, Javier	1956
<i>Los Archivos de Panamá</i>	1985		Alvarez, Javier	1956
<i>Master Pez</i>	1985		Marquez, Arturo	1950
<i>Erótica 2</i>	1986		Rojo, Vicente	1960
<i>Mexihco</i>	1986		Soto Millán, Eduardo	1956
<i>Alternativas sobre un cuadro de Rodolfo Nieto</i>	1987		Córdoba, Jorge	1953
<i>On Going On</i>	1987		Alvarez, Javier	1956
<i>Papalotl</i>	1987		Alvarez, Javier	1956
<i>A Toute Vitesse</i>	1988		Russek, Antonio Rojo, Vicente	1954 1960
<i>ASA/ISO 100 21°</i>	1988		Russek, Antonio	1954
<i>Así el Acero</i>	1988		Alvarez, Javier	1956
<i>De vez en vez</i>	1988		Russek, Antonio	1954
<i>Luz de Invierno</i>	1988		Russek, Antonio	1954
<i>Luz de Invierno [tape part only]</i>	1988		Russek, Antonio	1954
<i>Masclétá y fuga</i>	1988		Marquez, Arturo	1950
<i>Poesía de la voz</i>	1988		Marquez, Arturo	1950
<i>Sin título</i>	1988		Marquez, Arturo	1950
<i>Acuerdos por Diferencia</i>	1989		Alvarez, Javier	1956
<i>Estudio Antimatérico</i>	1989		Rocha Iturbide, Manuel	1963
<i>Hamlet</i>	1989		Russek, Antonio	1954

<i>Punto y Aparte</i>	1989	Russek, Antonio	1954
<i>Diálogo de sordos</i>	1989?	MASOS	
<i>Encuentro</i>	1989?	MASOS	
<i>Inicio</i>	1989?	MASOS	
<i>Marcha</i>	1989?	MASOS	
<i>Reposo</i>	1989?	MASOS	
<i>Rito</i>	1989?	MASOS	
<i>Atl</i>	1990	Rocha Iturbide, Manuel	1963
<i>Cempaxuchitl</i>	1990	Morales-Manzanares, Roberto	1958
<i>Extinción</i>	1990	Menaceri, Samir	1956
<i>Marina</i>	1990	Medina, Roberto	1955
<i>Ohtzalan</i>	1990	Russek, Antonio	1954
<i>Frost clear energy saver</i>	1991	Rocha Iturbide, Manuel	1963
<i>Homenaje</i>	1991	Sandoval, Carlos	1956
<i>Lumil</i>	1991	Salinas, Arturo	1955
<i>Mambo à la Bracque</i>	1991	Alvarez, Javier	1956
<i>Servicio a Domicilio</i>	1991	Morales-Manzanares, Roberto	1958
<i>Zanfonieta</i>	1991	Russek, Antonio	1954
<i>Doloritas</i>	1992	Estrada, Julio	1943
<i>Five Micro Études for tape</i>	1992	Ortiz, Gabriela	1964
<i>Mannam</i>	1992	Alvarez, Javier	1956
<i>Concretando</i>	1993	Russek, Antonio	1954
<i>Life is nothing but a dream</i>	1993	de Mendía, Guillermo	1955
<i>Mineral de Cata</i>	1993	Morales-Manzanares, Roberto	1958
<i>Nextalgia</i>	1993	Russek, Antonio	1954
<i>Nueva</i>	1994	Morales-Manzanares,	1958

			Roberto	
<i>Reflejos</i>	1994		Rodriguez, Salvador	1960
<i>SL-9</i>	1994		Rocha Iturbide, Manuel	1963
<i>Transiciones de Fase</i>	1994		Rocha Iturbide, Manuel	1963
<i>eua'on'ome</i>	1995		Estrada, Julio	1943
<i>Móin Móir</i>	1995		Rocha Iturbide, Manuel	1963
<i>(pequeño estudio sin título)</i>	1997		Salinas, Arturo	1955
<i>(T) our Time</i>	1997		Galindo, Guillermo	1960
<i>El Firmamento</i>	1997		Sigal, Rodrigo	1971
<i>Nocturno v. 3.0</i>	1997		Silva, Pablo	1964
<i>Orquídea Eterna</i>	1997		Galindo, Guillermo	1960
<i>Time is Money</i>	1997		Russek, Antonio	1954
<i>Viernes Santo</i>	1997		Russek, Antonio	1954
<i>Babel</i>	1998		Sigal, Rodrigo	1971
<i>Babel de Nuevo I</i>	1998		Russek, Antonio	1954
<i>Dolor en Mi</i>	1998		Sigal, Rodrigo	1971
<i>Fe</i>	1998		Sigal, Rodrigo	1971
<i>Lagarto</i>	1998		Sigal, Rodrigo	1971
<i>Murmullo a voces</i>	1998		Morales-Manzanares, Roberto	1958
<i>Agnioétiomix</i>	1999		Chargueron, Carole	1966
<i>Cycles [Sigal, 1]</i>	1999		Sigal, Rodrigo	1971
<i>Cycles [Sigal, 2]</i>	1999		Sigal, Rodrigo	1971
<i>Detachment</i>	1999		Galindo, Guillermo	1960
<i>Haiku-2000</i>	1999	2000	Galindo, Guillermo	1960
<i>Siete Laberintos de Cristal</i>	1999		Russek, Antonio	1954
<i>Babel de Nuevo II</i>	2000		Russek, Antonio	1954
<i>Cisma 2000</i>	2000		Galindo, Guillermo	1960
<i>De silentii natura, de corporum natura</i>	2000		Silva, Pablo	1964

<i>Nitiicasi</i>	2000		Odgers, Alejandra	1967
<i>Offrande</i>	2000		Alvarez, Javier	1956
<i>El Santo Cuántico</i>	2001		Machintosco	
<i>Fluide</i>	2001		Chargueron, Carole	1966
<i>La Torre</i>	2001		Russek, Antonio	1954
<i>LU</i>	2001		Russek, Antonio	1954
<i>Octum</i>	2001		Escuer, Alejandro	1963
<i>Semi No Koe</i>	2001		Rocha Iturbide, Manuel	1963
<i>Twilight</i>	2001		Sigal, Rodrigo	1971
<i>AcusmaticAcuatica</i>	2002		Sigal, Rodrigo	1971
<i>Cactus Geometries</i>	2002		Alvarez, Javier	1956
<i>Delirio en gris (smog y sol)</i>	2002		Argil, Andrés Saqui, Alejandro	1972
<i>Divertimento I</i>	2002		Russek, Antonio	1954
<i>Dormitando en el tren</i>	2002		Argil, Andrés Saqui, Alejandro	1972
<i>El fantasma del aislamiento urbano</i>	2002		Argil, Andrés Saqui, Alejandro	1972
<i>Friction of things in other places</i>	2002		Sigal, Rodrigo	1971
<i>Gastando el calzado</i>	2002		Argil, Andrés Saqui, Alejandro	1972 1974
<i>La abducción del guitarrista</i>	2002		Argil, Andrés Saqui, Alejandro Russek, Antonio	1972 1974 1954
<i>La lección de japones</i>	2002		Argil, Andrés Saqui, Alejandro Russek, Antonio	1972 1974 1954
<i>Mientras la ciuda duerme II</i>	2002		Argil, Andrés Saqui, Alejandro	1972 1974

<i>Mientras la ciudad duerme I</i>	2002		Argil, Andrés Saqui, Alejandro	1972 1974
<i>Noticias del desayuno</i>	2002		Argil, Andrés Saqui, Alejandro Russek, Antonio	1972 1974 1954
<i>Periferia de lujo</i>	2002		Argil, Andrés Saqui, Alejandro	1972 1974
<i>Postales de Fe</i>	2002		Sigal, Rodrigo	1971
<i>Rezago en la estación</i>	2002		Argil, Andrés Saqui, Alejandro	1972 1974
<i>Rimbarimba</i>	2002		Sigal, Rodrigo	1971
<i>Telúrico</i>	2002		Russek, Antonio	1954
<i>Tolerance</i>	2002		Sigal, Rodrigo	1971
<i>Transmission Temazcal</i>	2002		Galindo, Guillermo Brown, Chris	1960
<i>Transmission Tenderloin</i>	2002		Galindo, Guillermo Brown, Chris	1960
<i>... EVEN ...</i>	2003		Rocha Iturbide, Manuel	1963
<i>Avaricia</i>	2003		Sigal, Rodrigo	1971
<i>Blood Stream</i>	2003		Sigal, Rodrigo	1971
<i>Convexo</i>	2003		Russek, Antonio	1954
<i>En Círculos I</i>	2003		Russek, Antonio	1954
<i>En Círculos II</i>	2003		Russek, Antonio	1954
<i>Envidia</i>	2003		Sigal, Rodrigo	1971
<i>Liquid Fear</i>	2003		Sigal, Rodrigo	1971
<i>Boredom of familiarity</i>	2004		Sigal, Rodrigo	1971
<i>De Cuerpo Entero</i>	2004		Russek, Antonio	1954
<i>EEE</i>	2004		MU	
<i>El Ángel</i>	2004		Russek, Antonio	1954

<i>Hammermusik primary structures</i>	2004		Rendón, Ricardo	
<i>Mielina</i>	2004		MU	
<i>Mu 03</i>	2004		MU	
<i>Orfeo</i>	2004		Russek, Antonio	1954
<i>Power nap</i>	2004		Sigal, Rodrigo	1971
<i>Sin Título</i>	2004		Russek, Antonio	1954
<i>Sobre el Agua</i>	2004		Silva, Pablo	1964
<i>Sonic farfalla</i>	2004		Sigal, Rodrigo	1971
<i>Storm</i>	2004		Russek, Antonio	1954
<i>Unplugged</i>	2004		Russek, Antonio	1954
<i>Mu 09</i>	2005		MU	
<i>Duelo</i>	undated		Fernández Ros, Antonio	1961
<i>in_dog</i>	undated		Galindo, Guillermo	1960
<i>On the Other Shore</i>	undated		Villarreal, Sergio	

Panama

Table 24. Musical compositions created by Panamanian composers available for listening in the *Latin American Electroacoustic Music Collection*.

Composition	Date of creation		Composer	Date of birth
	1986	1995		
<i>Línea</i>			Soley, David	1962

Paraguay

Table 25. Musical compositions created by Paraguayan composers available for listening in the *Latin American Electroacoustic Music Collection*.

Composition	Date of creation		Composer	Date of birth
	1991	1993		
<i>Dimensiones</i>			Luzko, Daniel	1966
<i>Desolación</i>			Luzko, Daniel	1966
<i>Estudio</i>			Luzko, Daniel	1966
<i>Ombyka</i>			Ayala, René	1957
<i>Adriana</i>			Luzko, Daniel	1966
<i>El Duende</i>			Villagra Boa, Hugo Guillermo	1982
<i>La Guerra</i>			Villagra Boa, Hugo Guillermo	1982
<i>Desconcierto para chapa y percusión</i>	undated		Ayala, René	1957
<i>Las Sirenas</i>	undated		Ayala, René	1957

Peru

Table 26. Musical compositions created by Peruvian composers available for listening in the *Latin American Electroacoustic Music Collection*.

Composition	Date of creation		Composer	Date of birth
<i>Intensidad y Altura</i>	1964		Bolaños, César	1931
<i>Interpolaciones</i>	1966		Bolaños, César	1931
<i>Prisma</i>	1967		Pinilla, Enrique	1927
<i>Invención</i>	1967		Valcárcel, Edgar	1932
<i>Alfa-Omega</i>	1967		Bolaños, César	1931
<i>Canto Coral a Túpac Amaru [tape part only]</i>	1968		Valcárcel, Edgar	1932
<i>Zampoña Sónica [tape part only]</i>	1968	1976	Valcárcel, Edgar	1932
<i>I-10-AIFG/Rbt1</i>	1968		Bolaños, César	1931
<i>Flexum</i>	1969		Bolaños, César	1931
<i>Gravitación Humana</i>	1970		Núñez Allauca, Alejandro	1943
<i>Canción sin Palabras</i>	1970		Bolaños, César Milchberg, César	1931
<i>Sialocibi</i>	1970		Bolaños, César Milchberg, César	1931
<i>Flor de Sancayo [tape part only]</i>	1976		Valcárcel, Edgar	1932
<i>Flor de Sancayo</i>	1976		Valcárcel, Edgar	1932
<i>Lago de totoras (Composiciones Nativas)</i>	1978		Ruiz del Pozo, Arturo	1949
<i>Selvinas (Composiciones Nativas)</i>	1978		Ruiz del Pozo, Arturo	1949
<i>Estudio para clarinete cajamarqueno (Composiciones Nativas)</i>	1978		Ruiz del Pozo, Arturo	1949

<i>Una tarka en Brujas</i> (Composiciones Nativas)	1978		Ruiz del Pozo, Arturo	1949
<i>Estudio para quena</i> (Composiciones Nativas)	1978		Ruiz del Pozo, Arturo	1949
<i>Despegue</i> (Composiciones Nativas)	1978		Ruiz del Pozo, Arturo	1949
<i>Parantara</i> (Composiciones Nativas)	1978		Ruiz del Pozo, Arturo	1949
<i>Los Dados Eternos</i>	1991		Fischman, Rajmil	1956
<i>Dreams of Being</i>	1991		Fischman, Rajmil	1956
<i>Piedra del Q'osqo</i>	1991		Junchaya, Rafael Leonardo	1965
<i>Ccoyllurcha</i>	1993		Junchaya, Rafael Leonardo	1965
<i>Deformaciones</i>	1993		Mercier, Gilles	1963
<i>Cold Fire</i>	1994		Fischman, Rajmil	1956
<i>Sin Los Cuatro</i>	1994		Fischman, Rajmil	1956
<i>Glissando 5</i>	1995		Velarde Chong, Nilo	1964
<i>Alma Latina</i>	1996	1997	Fischman, Rajmil	1956
<i>If Stones Could Have a Brief Word...</i>	1996		Fischman, Rajmil	1956
<i>Interacciones Iniciales</i>	1996		Mercier, Gilles	1963
<i>Barren Lands</i>	1997		Fischman, Rajmil	1956
<i>Ramblings on a Volcano</i>	1997		Fischman, Rajmil	1956
<i>Mutaciones Tímbricas "A" y "B"</i>	1997		Mercier, Gilles	1963
<i>Kol HaTorr</i>	1998		Fischman, Rajmil	1956
<i>Presidio</i>	1998		Mercier, Gilles	1963
<i>Evo 3214</i>	1998		Mercier, Gilles	1963
<i>Mulchmus</i>	1998		Mercier, Gilles	1963
<i>Dimensiones Suspendidas</i>	1998		Mercier, Gilles	1963
<i>No me quedo ... (plantado en este verso)</i>	2000		Fischman, Rajmil	1956
<i>Ejercicio</i>	2000		Sosaya, José	1956
<i>In-vita</i>	2000		Junchaya, Rafael Leonardo	1965

<i>Ejercicio</i>	2000		Sosaya, José	1956
<i>Erwin's Playground</i>	2001		Fischman, Rajmil	1956
<i>And I Think to Myself ...</i>	2001		Fischman, Rajmil	1956
<i>Místico</i>	2001		Velarde Chong, Nilo	1964
<i>Silbadores</i>	2001		Oliver, Jaime	
<i>A Short Tale</i>	2002		Fischman, Rajmil	1956
<i>Madrigal</i>	2002		Junchaya, Rafael Leonardo	1965
<i>Die Erscheinung</i>	2003		Junchaya, Rafael Leonardo	1965
<i>axones</i>	2003		Filinich Orozco, Renzo	1978
<i>clasifonía 1</i>	2003		Filinich Orozco, Renzo	1978
<i>anisotropía</i>	2003		Filinich Orozco, Renzo	1978
<i>12 minutos exactos</i>	2003		Filinich Orozco, Renzo	1978
<i>poema sonoro "vida"</i>	2003		Filinich Orozco, Renzo	1978
<i>axones (live)</i>	2003		Filinich Orozco, Renzo	1978
<i>improvización</i>	2003		Filinich Orozco, Renzo	1978
<i>Esperalba</i>	2003		Mercier, Gilles	1963
<i>Intubici</i>	2003		Mercier, Gilles	1963
<i>Estructuras: Parte 1 - Parte 2</i>	2004		Filinich Orozco, Renzo	1978
<i>Imágenes sonoras sobre la carretera (Efecto Doppler)</i>	2004		Filinich Orozco, Renzo	1978
<i>Sensaciones</i>	2004		Filinich Orozco, Renzo	1978
<i>Altiplano</i>	2004		Filinich Orozco, Renzo	1978
<i>Vida Artificial</i>	2004		Filinich Orozco, Renzo	1978
<i>Psicodelia Vocal</i>	2004		Filinich Orozco, Renzo	1978
<i>Sequenza X</i>	2004		Filinich Orozco, Renzo	1978
<i>Noise, What Is Noise?</i>	2004		Filinich Orozco, Renzo	1978

Puerto Rico

Table 27. Musical compositions created by Puerto Rican composers available for listening in the *Latin American Electroacoustic Music Collection*.

Composition	Date of creation	Composer	Date of birth
<i>Cuidese de los ángeles que caen</i>	1974	Aponte Ledée, Rafael	1938
<i>Elvira Gimenez (o al otro lado de Tica...)</i>	1974	Aponte Ledée, Rafael	1938
<i>Los Huevos de Pandora</i>	1974	Aponte Ledée, Rafael	1938
<i>Composición Electrónica</i>	1978	Ortiz Alvarado, William	
<i>Enchanted Islands</i>	1984	Torres Santos, Raymond	1958
<i>Otoao</i>	1985	Torres Santos, Raymond	1958
<i>Mágicas Antillas</i>	1991	Vázquez, Carlos	1952
<i>El Encanto de la Noche Tropical I: El Yunque</i>	1993	Vázquez, Carlos	1952
<i>Los Ciclos de Luisa</i>	1994	Vázquez, Carlos	1952
<i>Aires Granadinos</i>	1995	Schwartz, Francis	1940
<i>Saxofonía</i>	1996	Vázquez, Carlos	1952
<i>Lenguas</i>	1998	Schwartz, Francis	1940
<i>Mascarada</i>	1999	Vázquez, Carlos	1952
<i>Un Boricua en Madrid</i>	1999	Vázquez, Carlos	1952
<i>Esa medalla me quema el pecho</i>	2000	Vázquez, Carlos	1952
<i>Aquel album ...</i>	2003	Vázquez, Carlos	1952
<i>Lux Aeterna</i>	undated	Torres Santos, Raymond	1958

Uruguay

Table 28. Musical compositions created by Uruguayan composers available for listening in the *Latin American Electroacoustic Music Collection*.

Composition	Date of creation		Composer	Date of birth
<i>Música para aluminios</i>	1967		Aharonián, Coriún	1940
<i>Que</i>	1969		Aharonián, Coriún	1940
<i>Oulom I</i>	1970		Cervetti, Sergio	1940
<i>Oulom II</i>	1970		Cervetti, Sergio	1940
<i>El Glotón de Pepperland</i>	1970		Martinez, Ariel	1940
<i>Cabotaje IIIa : En medio</i>	1971		Martinez, Ariel	1940
<i>Cabotaje IIIc : En medio</i>	1971	1976	Martinez, Ariel	1940
<i>Tromboffolón I</i>	1971		Martinez, Ariel	1940
<i>Tromboffolón I [tape part only]</i>	1971		Martinez, Ariel	1940
<i>Raga</i>	1971		Cervetti, Sergio	1940
<i>Homenaje a la flecha clavada en el pecho de Don Juan Díaz de Solís</i>	1974		Aharonián, Coriún	1940
<i>Gran tiempo</i>	1974		Aharonián, Coriún	1940
<i>Equus</i>	1976		Silva, Conrado	1940
<i>¡Salvad los niños!</i>	1976		Aharonián, Coriún	1940
<i>la batalla desesperada</i>	1976	2003	Paz Carlson, Eduardo	1958
<i>Así nomás</i>	1977		Da Silveira, Carlos	1950
<i>le dije que aguarde</i>	1977	2003	Paz Carlson, Eduardo	1958
<i>los pies del sol I</i>	1977	2003	Paz Carlson, Eduardo	1958
<i>plaza de comidas</i>	1977	2003	Paz Carlson, Eduardo	1958
<i>mont du métal</i>	1977	2003	Paz Carlson, Eduardo	1958
<i>congelados</i>	1977	2003	Paz Carlson, Eduardo	1958
<i>maría se desnuda para la mente</i>	1977	2003	Paz Carlson, Eduardo	1958

<i>detergentes 1</i>	1977	2003	Paz Carlson, Eduardo	1958
<i>infinidad de productos</i>	1977	2003	Paz Carlson, Eduardo	1958
<i>eva</i>	1977	2001	Paz Carlson, Eduardo	1958
<i>in crematorium</i>	1977	2001	Paz Carlson, Eduardo	1958
<i>parte 9 : Ton Corps Ballet</i>	1977	2003	Paz Carlson, Eduardo	1958
<i>oratio secreta : parte 7</i>	1977	2001	Paz Carlson, Eduardo	1958
<i>Natal del-Rei</i>	1978	1980	Silva, Conrado	1940
<i>Esos silencios</i>	1978	1981	Aharonián, Coriún	1940
<i>benedictus de la Misa Electroacústica 2</i>	1978	2002	Paz Carlson, Eduardo	1958
<i>hotel de paso</i>	1978	2002	Paz Carlson, Eduardo	1958
<i>La Construcción</i>	1979		Maslíah, Leo	1954
<i>Stella Vindemiatrix</i>	1979		Cervetti, Sergio	1940
<i>Llanto</i>	1980		Maslíah, Leo	1954
<i>el fonoglifo</i>	1980		Paz Carlson, Eduardo	1958
<i>vitres de son</i>	1980	2003	Paz Carlson, Eduardo	1958
<i>Suiana Wanka</i>	1981	1982	Condon, Fernando	1955
<i>esos laberintos, tan nuestros</i>	1981		Maggiolo, Daniel	1956
<i>Apruebo el sol</i>	1984		Aharonián, Coriún	1940
<i>Impresiones de Toledo</i>	1986	1988	Rivero, Marino	
<i>The Hay Wain</i>	1987		Cervetti, Sergio	1940
<i>Transatlantic Light</i>	1987		Cervetti, Sergio	1940
<i>En Familia</i>	1988		Condon, Fernando	1955
<i>Takanimba (A night in Soweto)</i>	1988		Jure, Luis	1960
<i>y en eso te vi, tan perdida</i>	1989		Maggiolo, Daniel	1956
<i>adormecida por el aire del atlántico [... se van, no vuelven más...]</i>	1989	1995	Maggiolo, Daniel	1956
<i>Eyeless in Gaza</i>	1989	1992	Jure, Luis	1960
<i>Beauté magique</i>	1989		Pietrafesa, Renée	
<i>Pericón</i>	1989		Silva, Conrado	1940

<i>en el hecho mismo de la pasión</i>	1991	1992	Maggiolo, Daniel	1956
<i>afuera el aire es tan solo otra ilusión</i>	1991	1998	Maggiolo, Daniel	1956
<i>Furioso</i>	1991		Biriotti, León Dal Farra, Ricardo	1929 1957
<i>spiritu sanctus in corde 2</i>	1991	2002	Paz Carlson, Eduardo	1958
<i>12 de samsara ballet</i>	1991	2002	Paz Carlson, Eduardo	1958
<i>17 de samsara ballet</i>	1991	2002	Paz Carlson, Eduardo	1958
<i>visión 2</i>	1991	1996	Paz Carlson, Eduardo	1958
<i>Radio Huesca</i>	1992		Maslíah, Leo	1954
<i>Tiruriru</i>	1992	1993	Maslíah, Leo	1954
<i>Africa tuya</i>	1993		Maslíah, Leo	1954
<i>Espaços Habitados</i>	1994		Silva, Conrado	1940
<i>Self-Portrait</i>	1994		Biriotti, León	1929
<i>Rigor Vitae, Curriculum Mortis</i>	1995		Maslíah, Leo	1954
<i>Eccétera</i>	1995		Maslíah, Leo	1954
<i>Secas las pilas de todos los timbres</i>	1995		Aharonián, Coriún	1940
<i>saturnina</i>	1995	2003	Paz Carlson, Eduardo	1958
<i>3 meditaciones</i>	1996		Sotuyo, Pablo	1963
<i>Bereshit 1.1</i>	1997		Sotuyo, Pablo	1963
<i>Bereshit 1.2</i>	1997		Sotuyo, Pablo	1963
<i>de los vientres, de las más</i>	1997		Maggiolo, Daniel	1956
<i>a pesar de todos los naufragios</i>	1999		Maggiolo, Daniel	1956

Venezuela

Table 29. Musical compositions created by Venezuelan composers available for listening in the *Latin American Electroacoustic Music Collection*.

Composition	Date of creation		Composer	Date of birth
<i>Metagrama</i>	1969	1970	del Mónaco, Alfredo	1938
<i>Electronic Study II</i>	1970		del Mónaco, Alfredo	1938
<i>Alternancias</i>	1971		del Mónaco, Alfredo	1938
<i>Dualismos</i>	1971		del Mónaco, Alfredo	1938
<i>Syntagma (A)</i>	1972		del Mónaco, Alfredo	1938
<i>Trópicos</i>	1972	1973	del Mónaco, Alfredo	1938
<i>Electronic Study III</i>	1974		del Mónaco, Alfredo	1938
<i>Nuestra Cultura Vegeta</i>	1976		Teruel, Ricardo	1956
<i>Thingsphonia</i>	1978		Rugeles, Alfredo	1949
<i>A ver si nos entendemos</i>	1983		Teruel, Ricardo	1956
<i>Glooskap y Lindú</i>	1984		Teruel, Ricardo	1956
<i>um-um-é-hum-ah</i>	1984		Teruel, Ricardo	1956
<i>Un minuto de silencio ¡Por favor! (o ni en sueños)</i>	1984		Teruel, Ricardo	1956
<i>Sin ti por el alma adentro</i>	1987		D'Escrivan, Julio	1960
<i>Tarde con Chicharras</i>	1987		Freitez Gassán, Fernando	1958
<i>Truly Yours</i>	1987		Matamoros, Gustavo	1957
<i>Truly Yours [tape part only]</i>	1987		Matamoros, Gustavo	1957
<i>El Maromero</i>	1988		Freitez Gassán, Fernando	1958
<i>Hace veinte años : Homenaje a Los Beatles</i>	1988		Rugeles, Alfredo	1949
<i>La Pieza</i>	1988		Matamoros, Gustavo	1957
<i>Mambo del Gallinero</i>	1988		Freitez Gassán, Fernando	1958
<i>Persistencia de la Memoria : A</i>	1988		Freitez Gassán, Fernando	1958

<i>Salvador Dalí</i>				
<i>Seis por Izquierdo</i>	1988		Freitez Gassán, Fernando	1958
<i>Sombras Móviles</i>	1988		Freitez Gassán, Fernando	1958
<i>Vojm</i>	1988		Izarra, Adina	1959
<i>El duende de las cuevas</i>	1989		Freitez Gassán, Fernando	1958
<i>In Memory of Gentle Giant [tape part only]</i>	1989	1991	Matamoros, Gustavo	1957
<i>In Memory of Gentle Giant II</i>	1989	1991	Matamoros, Gustavo	1957
<i>La Caja de Sorpresas</i>	1989		Freitez Gassán, Fernando	1958
<i>Oración para clamar por los oprimidos</i>	1989		Rugeles, Alfredo	1949
<i>Salto mortal</i>	1989		D'Escrivan, Julio	1960
<i>Omaggio</i>	1990		Sánchez Bor, Domingo	
<i>Retrato: Bob Gregory</i>	1990		Matamoros, Gustavo	1957
<i>Retratos: Luis Gómez-Imbert</i>	1990		Matamoros, Gustavo	1957
<i>Bajo la Sombra del Mundo</i>	1993		Noya, Miguel	
<i>La muerte del delfín</i>	1994		Benedetti, Josefina	
<i>UnmundodentrodeunmundO</i>	1994		Schreiber, Jacky	1961
<i>Agua [y basura] por todas partes</i>	1995		Matamoros, Gustavo	1957
<i>Dispositivo rítmico en homenaje a Theodor Adorno</i>	1995		Rodríguez Legendre, Fidel	
<i>MPCSSCVEV (Imp-loro)</i>	1995		Segnini-Sequera, Rodrigo	1968
<i>Microtonal I</i>	1996		Teruel, Ricardo	1956
<i>Pamine</i>	1996	1997	Segnini-Sequera, Rodrigo	1968
<i>Tropical Bird</i>	1996		Teruel, Ricardo	1956
<i>Chaos Metamorphosis</i>	1997		Castillo Olivari, Arcángel	1959

<i>Pierrot</i>	1997	Castillo Olivari, Arcángel	1959
<i>Eufonía</i>	1999	Teruel, Ricardo	1956
<i>Seis dúos para dos generadores de dos generaciones: Dúo 1</i>	1999	Teruel, Ricardo	1956
<i>Seis dúos para dos generadores de dos generaciones: Dúo 2</i>	1999	Teruel, Ricardo	1956
<i>Seis dúos para dos generadores de dos generaciones: Dúo 3</i>	1999	Teruel, Ricardo	1956
<i>Seis dúos para dos generadores de dos generaciones: Dúo 4</i>	1999	Teruel, Ricardo	1956
<i>Seis dúos para dos generadores de dos generaciones: Dúo 5</i>	1999	Teruel, Ricardo	1956
<i>Seis dúos para dos generadores de dos generaciones: Dúo 6</i>	1999	Teruel, Ricardo	1956
<i>Save Twilight: IfIAmToLive</i>	2000	Castillo Olivari, Arcángel	1959
<i>Save Twilight: Moths</i>	2000	Castillo Olivari, Arcángel	1959
<i>Save Twilight: Speak, YouHaveThreeMinutes</i>	2000	Castillo Olivari, Arcángel	1959
<i>Save Twilight: TheFuture</i>	2000	Castillo Olivari, Arcángel	1959
<i>Save Twilight: ToBeReadInTheInterrogative</i>	2000	Castillo Olivari, Arcángel	1959
<i>Grabados : Grabado 01</i>	2001	Teruel, Ricardo	1956
<i>Grabados : Grabado 02</i>	2001	Teruel, Ricardo	1956
<i>Grabados : Grabado 03</i>	2001	Teruel, Ricardo	1956
<i>Prótesis</i>	2001	Galán, Agapito	
<i>Heavy-Dream</i>	2002	Galán, Agapito	

<i>Las Troyanas</i>	2003		Galán, Agapito	
<i>Preludio de Robert de Visée</i>	2003		Izarra, Adina	1959
<i>Prozac</i>	undated		Castillo Olivari, Arcángel	1959

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APPENDIX A

LIST OF INTERVIEWS

Recordings freely available for consultation as part of the *Latin American Electroacoustic Music Collection* created by Ricardo Dal Farra and hosted by the Daniel Langlois Foundation in Montreal.

Interview with: Rafael Aponte Ledée (born in Puerto Rico). Recorded in 2003.

Interview with: César Bolaños (born in Peru). Recorded in 2004.

Interview with: Graciela Castillo (born in Argentina). Recorded in 2003.

Interview with: Rolando Cori and Jorge Martinez (both born in Chile). Recorded in 2004.

Interview with: Manuel de Elías (born in Mexico). Recorded in 2003.

Interview with: Alfredo del Mónaco (born in Venezuela). Recorded in 2003.

Interview with: Manuel Enriquez (born in Mexico). Recorded in 1992.

Interview with: Carlos Ferpozzi (born in Argentina). Recorded in 2004.

Interview with: Enrique Gerardi (born in Argentina). Recorded in 2003.

Interview with: alcides lanza (born in Argentina). Recorded in 2003.

Interview with: Ariel Martinez (born in Uruguay). Recorded in 2003.

Interview with: Alejandra Odgers (born in Mexico). Recorded in 2003.

Interview with: Héctor Quintanar (born in Mexico). Recorded in 2005.

Interview with: Conrado Silva (born in Uruguay). Recorded in 2004.

Interview with: Wilson Sukorski (born in Brazil). Recorded in 2004.

Interview with: Horacio Vaggione (born in Argentina). Recorded in 2003.

Interview with: Edgar Valcárcel (born in Peru). Recorded in 2003.

Interview with: Carlos Vázquez (born in Puerto Rico). Recorded in 2003.

Interview with: Alberto Villalpando (born in Bolivia). Recorded in 1994.

Interview with: Fernando von Reichenbach (born in Argentina). Recorded in 2003.

APPENDIX B

ECONOMY OVERVIEW

The following paragraphs complements the economic information mentioned in Chapter III, section 3.2 Economy overview, about Latin America and some northwestern countries where pioneering electroacoustic music activities started.

All the information was gathered from the *The World Factbook 2004* prepared by the Central Intelligence Agency of the United States.

Latin America

Argentina benefits from rich natural resources, a highly literate population, an export-oriented agricultural sector, and a diversified industrial base.

Bolivia long one of the poorest and least developed Latin American countries, made considerable progress in the 1990s toward the development of a market-oriented economy.

Possessing large and well-developed agricultural, mining, manufacturing, and service sectors, **Brazil's** economy outweighs that of all other South American countries and is expanding its presence in world markets.

Chile has a market-oriented economy characterized by a high level of foreign trade.

Colombia's economy suffers from weak domestic and foreign demand, austere government budgets, and serious internal armed conflict, but seems poised for recovery.

Costa Rica's basically stable economy depends on tourism, agriculture, and electronics exports.

Cuba's government continues to balance the need for economic loosening against a desire for firm political control. It has undertaken limited reforms to increase enterprise efficiency and alleviate serious shortages of food, consumer goods, and services.

The **Dominican Republic** suffers from marked income inequality; the poorest half of the population receives less than one-fifth of GNP, while the richest 10% enjoys nearly 40% of national income (Gross national product or GNP is the value of all final goods and services produced within a nation in a given year, plus income earned by its citizens abroad, minus income earned by foreigners from domestic production)

Ecuador has substantial petroleum resources, which have accounted for 40% of the country's export earnings and one-fourth of public sector revenues in recent years.

With the adoption of the US dollar as its currency, **El Salvador** has lost control over monetary policy and must concentrate on maintaining a disciplined fiscal policy. GDP per capita is roughly only half that of Brazil, Argentina, and Chile, and the distribution of income is highly unequal.

Guatemala is the largest and most populous of the Central American countries. The agricultural sector accounts for about one-fourth of GDP, two-thirds of exports, and half of the labor force. Coffee, sugar, and bananas are the main products.

Mexico has a free market economy with a mixture of modern and outmoded industry and agriculture, increasingly dominated by the private sector. Per capita income is one-fourth that of the US; income distribution remains highly unequal.

Panama's dollarised economy rests primarily on a well-developed services sector that

accounts for three-fourths of GDP. Services include operating the Panama Canal, banking, the Colon Free Zone, insurance, container ports, flagship registry, and tourism.

Paraguay has a market economy marked by a large informal sector. The informal sector features both reexport of imported consumer goods to neighboring countries as well as the activities of thousands of microenterprises and urban street vendors. A large percentage of the population derives their living from agricultural activity, often on a subsistence basis.

Peru's economy reflects its varied geography. Abundant mineral resources are found in the mountainous areas, and Peru's coastal waters provide excellent fishing grounds.

Puerto Rico has one of the most dynamic economies in the Caribbean region. A diverse industrial sector has far surpassed agriculture as the primary locus of economic activity and income. Encouraged by duty-free access to the US and by tax incentives, US firms have invested heavily in Puerto Rico since the 1950s. US minimum wage laws apply.

Uruguay's well-to-do economy is characterized by an export-oriented agricultural sector, a well-educated workforce, and high levels of social spending.

Venezuela continues to be highly dependent on the petroleum sector, which accounts for roughly one-third of GDP, around 80% of export earnings, and more than half of government operating revenues.

Europe and North America

As an affluent, high-tech industrial society, **Canada** today closely resembles the US in its market-oriented economic system, pattern of production, and high living standards. Since World War II, the impressive growth of the manufacturing, mining, and service sectors has transformed the nation from a largely rural economy into one primarily industrial and urban.

France is in the midst of transition, from a well-to-do modern economy that has featured extensive government ownership and intervention to one that relies more on market mechanisms. France's leaders remain committed to a capitalism in which they maintain social equity by means of laws, tax policies, and social spending that reduce income disparity and the impact of free markets on public health and welfare.

Germany's affluent and technologically powerful economy- the fifth largest national economy in the world - has become one of the slowest growing economies in the entire euro zone, and a quick turnaround is not in the offing in the foreseeable future.

Italy has a diversified industrial economy with roughly the same total and per capita output as France and the UK. This capitalistic economy remains divided into a developed industrial north, dominated by private companies, and a less developed, welfare-dependent agricultural south, with 20% unemployment. Most raw materials needed by industry and more than 75% of energy requirements are imported.

Aided by peace and neutrality for the whole 20th century, **Sweden** has achieved an enviable standard of living under a mixed system of high-tech capitalism and extensive welfare benefits. It has a modern distribution system, excellent internal and external communications, and a skilled labor force.

The **United Kingdom**, a leading trading power and financial center, is one of the quartet of trillion dollar economies of Western Europe. Agriculture is intensive, highly mechanized, and efficient by European standards, producing about 60% of food needs with only 1% of the labor force. The UK has large coal, natural gas, and oil reserves; primary energy production accounts for 10% of GDP. Services, particularly banking, insurance, and business services, account by far for the largest proportion of GDP while industry continues to decline in importance.

The **United States** has the largest and most technologically powerful economy in the world, with a per capita GDP of \$37,800. In this market-oriented economy, private individuals and

business firms make most of the decisions, and the federal and state governments buy needed goods and services predominantly in the private marketplace. US firms are at or near the forefront in technological advances, especially in computers and in medical, aerospace, and military equipment.

APPENDIX C

GLOSSARY

Acousmatic music

[...] The term Electroacoustic Music has expanded to such a degree that it has become a meaningless catch-all", wrote Michel Chion in 1982. Today, this expression reveals little of what we may expect to hear, and its use is analogous to applying the term acoustic music to define the entire instrumental repertoire. For these reasons, a group of composers, descendants of the school of musique concrète, found it necessary to find a term that clearly designates the genre in which they work, and which calls for a particular reflection, a methodology, a craft, a syntax, and specific tools.

This term is acousmatic. It refers to a theoretical and practical compositional approach, to particular listening and realization conditions, and to sound projection strategies. Its origin is attributed to Pythagoras (6th C. BC) who, rumour has it, taught his classes –only verbally – from behind a partition, in order to force his students to focus all their attention on his message. In 1955, during the early stages of musique concrète, the writer Jérôme Peignot used the adjective acousmatic to define a sound which is heard and whose source is hidden. By shrouding ‘behind’ the speaker (a modern Pythagorean partition) any visual elements (such as instrumental performers on stage) that could be linked to perceived sound events, acousmatic art presents sound on its own, devoid of causal identity, thereby generating a flow of images in the psyche of the listener.

In order to avoid any confusion with performance-oriented electroacoustic music, or music using new instruments (Ondes Martenot, electric guitars, synthesizers, real-time digital audio processors, etc), François Bayle introduced the term acousmatic music in 1974.

Dhomont, F. (2002). *Acousmatic Update*. Sonic Arts Network. [online] Address: http://www.wordiq.com/definition/Reel-to-reel_audio_tape_recording

The acousmatic listening experience is independent of the visual domain and thus frees the mental images and creative forms of our imagination.

Musiques & recherches (undated). *About acousmatic?* [online] Address: <http://www.musiques-recherches.be/acousmatic.php?lng=en>

Electroacoustics

The branch of electronics that deals with the conversion of electricity into acoustical energy and vice versa.

AllWords.com (2002). *Electroacoustics* [online]. Address: <http://www.allwords.com/glossaryPage.php?CAT=ELO&letter=E%25>

Electroacoustic music

The term electroacoustic music used throughout this text refers to: musical creations that involve electronically modified or generated sounds, which may or may not be accompanied by live voices or acoustic instruments, and that use a language close to the experimental and/or academic world (adapted from a definition by Otto Luening in *The Odyssey of an American Composer*, New York: Charles Scribner's Sons, 1980).

There are many other approaches and definitions to electroacoustic music, like this one by Kevin Austin (with an acknowledgement to M. Century):

The use of electricity for the conception, ideation, creation, storage, production, interpretation, distribution, reproduction, perception, cognition, visualization, analysis, comprehension and/or conceptualization of sound.

Ears: ElectroAcoustic Resource Site. Music, Technology and Innovation Research Group at De Montfort University (2003). *Electroacoustic Music* [online]. Address: <http://www.mti.dmu.ac.uk/EARS/Data/node82.html>

To have an idea of how vast the electroacoustic music world and its relationships could be, the following are some of the Genres and Categories of Electroacoustic Music as it appears on the ElectroAcoustic Resource Site (EARS) of the Music, Technology and Innovation Research Group of De Montfort University: Acousmatic; Adaptive Music; Algorithmic Music; Ambient Music; Analogue Electroacoustic Music; Collage; Computer Music; Digital Music; Electroacoustic Music; Electronic Music; Electronica; Experimental Music; Granular Music; Immersive Environment; Interactivity; Interdisciplinary Artistic Work (Audio-vision - Multimedia/Intermedia - Sound Design - Text-sound Composition); Internet Music; Live Electronics; Lowercase Sound; Mixed Work; *Musique concrète*; Phonography (Anecdotal

Composition); Plunderphonics; Radio Art/Radiophonics/Hörspiel; Sonic Art; Sound Art (Sound Installation); Soundscape Composition; Stochastic Music; Tape Music.

This somewhat elusive term has evolved since the late 1950s, and attempts to define it have provoked much-heated debate amongst academics and practitioners. The term has a specific meaning in audio engineering (see 2 below), and a rather-too-simplistic explanation is that it was adopted as an inclusive and umbrella term as the activities of *musique concrète*, tape music, and electronic music composers saw almost immediate cross-fertilization, which continued through the 1960s and 70s.

The term saw early usage in the United Kingdom and Canada, and during the 1970s tended (amongst other terms) to be used in the French language (*électroacoustique*) in place of *musique concrète*. The term was never in wide usage in the United States, where Electronic Music, Tape Music and Computer Music predominated, but recent years have seen an increased usage here too. The term is currently widely used in several European/South American languages, including Spanish and Portuguese.

More recently, some, particularly in Canada, have adopted the term *Electroacoustics*, which includes *Electroacoustic Music Studies* in its sense, and has the advantage of emphasising the interdisciplinary nature of the field in the nuance of its meaning.

Some argue that the term is so elusive as to be unhelpful, and should therefore be abandoned. Others opt for the most general possible use of the word as an umbrella term (see 1 below). The English language has seen increased recent usage of the terms *Sonic Art* and *Electroacoustics* in place of *Electroacoustic Music*. The French language has several nuanced alternatives, including *l'Art de Sons Fixés* (Michel Chion) and *Musique Acousmatique* (proposed by François Bayle in the early 1970s as a replacement for *Musique Concrète*, and a means of delineating his aesthetic concerns within the broader field of *Electroacoustic Music*).

In an attempt to illustrate nuance, the following four established definitions are offered below.

1. Electroacoustic music refers to any music in which electricity has had some involvement in sound registration and/or production other than that of simple microphone recording or amplification. (Source - L. Landy - *Reviewing the Musicology of Electroacoustic Music, Organised Sound* 4/1)

2. An adjective describing any process involving the transfer of a signal from acoustic to electrical form, or vice versa. Most commonly transducers, such as the microphone or loudspeaker are examples of this process.

Although the term most precisely refers to a signal transfer from electrical to acoustic form or vice versa, it also is often used more loosely to refer to any process for the electronic generation and/or manipulation of sound signals, including techniques of sound synthesis for the electronic or digital generation of such signals. When the

purpose of such manipulation is artistic, the result is commonly called electroacoustic music. (Source: Barry Truax - Handbook for Acoustic Ecology CD-ROM Edition. Cambridge Street Publishing, 1999 - CSR-CDR 9901)

3. Music in which electronic technology, now primarily computer-based, is used to access, generate, explore and configure sound materials, and in which loudspeakers are the prime medium of transmission. There are two main genres. Acousmatic music is intended for loudspeaker listening and exists only in recorded tape form (tape, compact disk, computer storage). In live electronic music the technology is used to generate, transform or trigger sounds (or a combination of these) in the act of performance; this may include generating sound with voices and traditional instruments, electroacoustic instruments, or other devices and controls linked to computer-based systems. Both genres depend on loudspeaker transmission, and an electroacoustic work can combine acousmatic and live elements. (Source - Simon Emmerson, Denis Smalley, *The New Grove Dictionary of Music and Musicians*. Second Edition, 2001, ed. Stanley Sadie)

Ears: ElectroAcoustic Resource Site. Music, Technology and Innovation Research Group at De Montfort University (2003). *Electroacoustic Music* [online]. Address: <http://www.mti.dmu.ac.uk/EARS/Data/node82.html>

Electronic Music

Originally, music in which the sound material is not pre-recorded, but instead uniquely generated electronically, historically through oscillators and noise generators, currently digitally. There are some, particularly in the United States, who use this term today as a synonym for electroacoustic music. The German equivalent, Elektronische Musik has more precise historical connotations, referring to electronically generated post-serial composition that commenced in the early 1950s in the broadcast studios in Cologne.

Ears: ElectroAcoustic Resource Site. Music, Technology and Innovation Research Group at De Montfort University (2003). *Electronic Music* [online]. Address: <http://www.mti.dmu.ac.uk/EARS/Data/node83.html>

Experimental Music

1. Synonymous with avant-gardism (Paul Griffiths, Robert Fink and Herbert Eimert)
2. Music made in a laboratory (Lejaren Hiller, Pierre Schaeffer)

3. The performance of music of which the outcome cannot be foreseen (John Cage, Michael Nyman, Wim Mertens and Joaquim M. Benitez)

4. Music in which the innovative component (not in the sense of newness found in any artistic work, but instead substantial innovation as clearly intended by a composer and/or performer) of any given aspect of a given piece or performance takes priority above the more general technical craftsmanship expected of any art work

(Source - Leigh Landy, "What's the Matter with Today's Experimental Music?", Chur, Harwood Academic Publishers, pp. 3-7)

Ears: ElectroAcoustic Resource Site. Music, Technology and Innovation Research Group at De Montfort University (2003). *Experimental Music* [online]. Address: <http://www.mti.dmu.ac.uk/EARS/Data/node85.html>

Interactive Instruments

The means and manner by which a human may interact with a machine for the purpose of music making has proven an area of immense research and activity since the days of early electronic instruments. This term is used without any great consistency, in part due to the immense scale of current research and activity in the field.

Any conceivable means of inputting data into a system to elicit some form of musically meaningful response may be considered to be a controller. In the broadest possible sense, a controller, via some form of communication between component parts (e.g. MIDI, converters, computer software) in conjunction with some means of producing or modifying sound may be termed an Interactive Instrument. Frequently, such controllers exist in homologous relationships with sensors (e.g. of movement). Thus gloves, conductors batons, toys, amongst countless other examples, may be constructed or modified to function as musical instruments.

An existing form of musical instrument may be modified through the addition of sensors, enabling control of additional electronically mediated sound generation or modification (including the instrumental sound itself) in addition to the conventional control the musician exerts over the production of the acoustic sound. Such examples are also sometimes referred to as Extended Instruments.

Ears: ElectroAcoustic Resource Site. Music, Technology and Innovation Research Group at De Montfort University (2003). *Interactive Instruments* [online]. Address: http://www.mti.dmu.ac.uk/EARS/Data/node207.html#Interactive_Instruments

Interactivity

“Interactivity refers broadly to human-computer musical interaction, or human-human musical interaction that is mediated through a computer, or possibly a series of networked computers that are also interacting with each other. Often, an interactive performance, composition or improvisation will involve the creation or programming of software that will respond to pre-determined aspects of a live performance. The software will then determine other aspects of the music, either generating synthesised sound, or modifying in some way all or some of the ‘live’ sound.

The behavior of the computer may be highly determined or indeterminate as defined by the musicians, and may be modified from performance to performance. The exact musical role of the computer may even be modified in real-time during the course of a performance.

Interactive music-making introduces and often utilises notions of virtual instrument, virtual performer, virtual composer, and even virtual listener.

Interactive music-making frequently blurs the conventional distinction between compositional and improvisational activity. Key issues in interactive music making are socialisation, collective authorship, geographical and temporal synchronicity/asynchronicity, and ‘distributed activity’.”

Ears: ElectroAcoustic Resource Site. Music, Technology and Innovation Research Group at De Montfort University (2003). *Interactivity* [online]. Address: <http://www.mti.dmu.ac.uk/EARS/Data/node47.html#Interactivity>

Interface

Software or hardware-based device or protocol which serves as an intermediary between a computer and a peripheral device or between two different systems which permits the exchange of information between them.

Ears: ElectroAcoustic Resource Site. Music, Technology and Innovation Research Group at De Montfort University (2003). *Interface* [online]. Address: <http://www.mti.dmu.ac.uk/EARS/Data/node248.html>

Latin America

The term **Latin America** is used loosely to refer to all the American countries south of the United States: used this way, it covers the whole of South America, Central America, Mexico, and the Caribbean. In this text it is used in a strict sense to refer solely to the nations in those geographical regions where the Spanish and Portuguese languages predominate; this narrower definition excludes the countries and territories where English and other languages are spoken (Jamaica, Belize, Guyana, Suriname, Haiti, etc.)” [...] The Latin American countries, taking the term in its strict sense, are:

- Argentina
- Bolivia
- Brazil
- Chile
- Colombia
- Costa Rica
- Cuba
- Dominican Republic
- Ecuador
- El Salvador
- Guatemala
- Honduras
- Mexico
- Nicaragua
- Panama
- Paraguay
- Peru
- Uruguay
- Venezuela and
- the Commonwealth of Puerto Rico (USA)

Free-Definition (undated). *Latin America - definition, meaning, explanation & information* [online]. Address: <http://www.free-definition.com/Latin-America.html>

Live electronics

A term dating from the analogue age of electroacoustic music that describes performance involving electronic instruments which can be performed in real-time. The term is more commonly expressed today as music involving interactive instruments.

Ears: ElectroAcoustic Resource Site. Music, Technology and Innovation Research Group at De Montfort University (2003). *Live Electronics* [online]. Address: <http://www.mti.dmu.ac.uk/EARS/Data/node97.html>

MIDI

MIDI is an abbreviation for Musical Instrument Digital Interface, which designates the standard protocol for communication between electronic instruments and equipment with MIDI implementation. This has proven to be of particular interest within electroacoustic music in the areas of sequencing, triggering and controlling. MIDI devices allow for the sending and receiving of MIDI protocol messages. MIDI interfaces enable MIDI instrument connection to a computer, which allows for computer control of other MIDI equipment.

Ears: ElectroAcoustic Resource Site. Music, Technology and Innovation Research Group at De Montfort University (2003). *MIDI* [online]. Address: <http://www.mti.dmu.ac.uk/EARS/Data/node211.html#MIDI>

Musique concrète

When in 1948 Pierre Schaeffer gave the name *concrète* to the music which he invented, he wanted to demonstrate that this new music started from the *concrete sound material*, from heard sound, and then sought to abstract musical values from it. This is the opposite of classical music, which starts from an abstract conception and notation leading to a concrete performance. Schaeffer wanted to react against the "excess of abstraction" of the period but he did not shy away from "reconquering" this musical abstract. A reconquering which for him had necessarily to go through a *return to the concrete*. (Source - Michel Chion, *Guide des Objets Sonores*. Eds. Buchet/Chastel, Paris, 1983, 1995 - translation by John Dack/Christine North)

Ears: ElectroAcoustic Resource Site. Music, Technology and Innovation Research Group at De Montfort University (2003). *Musique Concrète* [online]. Address: <http://www.mti.dmu.ac.uk/EARS/Data/node100.html>

Open reel tape recorders

Reel-to-reel or open reel tape recording refers to the form of magnetic tape audio recording in which the recording medium is held on a reel, rather than being securely contained within a cassette [...] The reel-to-reel format was used in the very earliest tape recorders, including the pioneering German Magnetophons of the 1930s. Originally, this format had no name, since all forms of magnetic tape recorders used it. The name arose only with the need to distinguish it from the several kinds of tape cartridges or cassettes which were introduced in the early 1960s.

wordIQ (2004). *Reel-to-reel audio tape recording* [online]. Address: http://www.wordiq.com/definition/Reel-to-reel_audio_tape_recording

Early tape recorders were first developed in Germany. On Christmas day 1932 the British Broadcasting Corporation first used a tape recorder for their broadcasts.

Magnetic tape recording as we know it today was developed in Germany during the late 1930s by the C. Lorenz company [...] The typical professional tape recorder of the early 1950s used 1/4" wide tape on 10 1/2" reels, with a capacity of 2400 feet (731.5 metres). Typical speeds were initially 15 in/s (380 mm/s) yielding 30 minutes' recording time on a 2400 ft (730 m) reel. 30 in/s (720 mm/s) was used for the highest quality work.

Standard tape speeds varied by factors of two: 15 and 30 in/s were used for professional audio recording; 7 1/2 in/s (190 mm/s) for home audiophile prerecorded tapes; 7 1/2 and 3 3/4 in/s (190 and 95 mm/s) for audiophile and consumer recordings (typically on 7 in or 18 cm reels). 17/8; in/s (42 mm/s) and occasionally even 15/16 in/s (21 mm/s) were used for voice, dictation, and applications where very long recording times were needed, such as logging police and fire department calls [...] A tape allows multiple tracks in parallel to each other. Because they are carried on the same medium, they stay in perfect synchronization. This allowed for stereo sound (2 tracks), and quadrophonic sound (4 tracks). In a professional setting today, such as a studio, audio engineers may use 24 tracks or more for their recordings, one (or more) tracks for every instrument played.

Magnetic audio tape can be easily and inaudibly spliced. The combination of the ability to edit via splicing, and the ability to record multiple tracks, revolutionized studio recording. It became common studio recording practice to record on multiple tracks, and mix down afterwards. The convenience of tape editing and multitrack recording led to the rapid adoption of magnetic tape as the primary technology for commercial musical recordings [...] Analog magnetic tape recording introduces noise, usually called "hiss", caused by the finite size of the magnetic particles in the tape. There is a direct tradeoff between noise and economics. Signal-to-noise ratio is reduced at higher speeds and with wider tracks, increased at lower speeds and with narrower tracks [...] Prior to 1963, when Philips introduced the Compact audio cassette, almost all tape recording had used the reel-to-reel (also called "open reel") format. Previous attempts package the tape in a convenient cassette that required no threading met with limited success; the most successful was 8-Track cartridge used primarily in automobiles for playback only. The Philips Compact audio cassette added much needed convenience to the tape recording format and quickly came to dominate the consumer market, although it was lower in quality than open reel formats.

wordIQ (2004). *Sound recording* [online]. Address: http://www.wordiq.com/definition/Sound_recording

Recording

Many forms of electroacoustic music making are founded on the use of sound recording at some stage of their creation. Historically, those forms of electroacoustic music descended from the musique concrète comprise of studio-based investigation into recorded sound objects. The processes of sound recording and composing are frequently impossible to conceive of as entirely independent; recording is part of the musical creation rather than a documentation of the performance of an existing music or improvisation.

Ears: ElectroAcoustic Resource Site. Music, Technology and Innovation Research Group at De Montfort University (2003). *Recording* [online]. Address: <http://www.mti.dmu.ac.uk/EARS/Data/node262.html>

Sampling

A technique used to capture continuous phenomena, whereby periodic snapshots are taken. If the sampling rate is fast enough, the human sensory organs cannot discern the gaps between each snapshot when they are played back. This is the principle behind motion pictures.

Sampling is the key technique used to digitize analog information. For example, music CDs are produced by sampling live sound at frequent intervals and then digitizing each sample. The term sampling is also used to describe a similar process in digital photography.

Forschungsprojekt "AURIS - Multimedia" (2002). *Glossary* [online]. Address: <http://arge.tuwien.ac.at/arge/acro.html>

Sound art

This term has been used inconsistently throughout the years. Currently it is generally used to designate sound installations (associated with art galleries and museums), public sonic art and site-specific sonic art events.

Ears: ElectroAcoustic Resource Site. Music, Technology and Innovation Research Group at De Montfort University (2003). *Sound Art* [online]. Address: <http://www.mti.dmu.ac.uk/EARS/Data/node109.html>

Sound source

This term is generally associated with "classical" electroacoustic composition that privileges the notion of "material", which is investigated and developed during the compositional process in the studio. In this context Sound Source simply refers to the physical provenance of such material, for example a vibrating body recorded in the studio, an environmental recording, or a synthesizer output. It can also refer to the basic structuring units in a given compositional conception or strategy, for example sonic grains or vowels and consonants extracted from speech.

Ears: ElectroAcoustic Resource Site. Music, Technology and Innovation Research Group at De Montfort University (2003). *Sound Source* [online]. Address: <http://www.mti.dmu.ac.uk/EARS/Data/node309.html>

Synthesizer

An electronic instrument for the production and control of sound that can be used for the making of music.

Thomson Learning (undated). *Glossary of Humanities Terms* [online]. Address: <http://lms.thomsonlearning.com/hbcp/glossary/glossary.taf?gid=24&start=s>

Any grouping of electronic equipment intended for sound synthesis.

Ears: ElectroAcoustic Resource Site. Music, Technology and Innovation Research Group at De Montfort University (2003). *Synthesizer* [online]. Address: <http://www.mti.dmu.ac.uk/EARS/Data/node259.html>

A synthesizer is an electronic musical instrument designed to produce artificially generated sound [...] Synthesizers create sounds through direct manipulation of electrical currents (as in analog synthesizers), mathematical manipulation of discrete values using computers (as in software synthesizers), or by a combination of both methods.

Free-Definition (undated). *Synthesizer - definition, meaning, explanation & information in free-definition.com* [online]. Address: <http://www.free-definition.com/Synthesizer.html>