

# The Development of Electroacoustic Music in Colombia, 1965–1999: An Introduction

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**I**n a broad sense, the history of Colombian electroacoustic music can be divided into two major periods: the formative years and the microcomputer-generated music years. This history is a fragmented one due to an 11-year hiatus in electroacoustic production and promotion caused by lack of interest by composers, musicians, musical institutions, governmental institutions and radio stations dedicated to promoting erudite music in the country. The composers of the formative era did not have a direct influence on the following generation of composers interested in electroacoustic music. The early years are represented by a handful of isolated composers working with no intention of pursuing careers as electroacoustic composers (with the exception of Jacqueline Nova Sondag). On the other hand, composers of the microcomputer era have been working as a network with the goal of establishing a respected field in the country.

## THE FORMATIVE YEARS (1965–1975)

Colombian electroacoustic music began in 1965 with *Ensayo electrónico* by Fabio González-Zuleta, who was born in Bogotá in 1920. He studied at the Los Angeles School of Music (1929) and at the Conservatorio Nacional de Música in Bogotá (1932). Invited by the German government, he took part in courses given by Karlheinz Stockhausen in Cologne (1966). Although González-Zuleta's output is traditional and acoustic with the exception of *Ensayo Electrónico*, he was the first Colombian to realize an electroacoustic work in Colombia. The production of this work took place in the Studios of the National Radio of Colombia in Bogotá. Guillermo Díaz was the sound engineer who assisted technically in production.

*Ensayo Electrónico* reflects González-Zuleta's traditional tendencies; the work is a transcription of a chorale to electronic sound using a procedure based on a series of numerical relations between harmonic structures and frequencies [1]. In this sense, the piece includes algorithmic elements and shows the influence of the Cologne School [2]. In *Ensayo Electrónico*, there are recognizable sections of rhythmic patterns and melodic contours derived from the folk music of the central part of Colombia (*Bambuco* and *Pasillo*). These rhythmic-melodic sections intermingle with sections in which change of frequency and amplitude evolve at a slow pace. The work uses sinusoidal oscillators as the main sound source, and its duration is 14:17.

The next Colombian composer to create an electroacoustic work was Blas Emilio Atehortua. He was born in Medellín in

1932 and began studies at the Conservatorio de Bellas Artes de Medellín. He continued his studies at the Conservatorio Nacional de Música in Bogotá, where he became the secretary of Centro de Estudios Folklóricos y Músicas. At the conservatory, he studied harmony with Antonio María Benavides and counterpoint with González-Zuleta. In 1963, he won a scholarship to study at El Centro Latinoamericano de Altos Estudios Musicales del Instituto Torcuato Di Tella in Buenos Aires, Argentina. There he studied with Alberto Ginastera, Aaron Copland and Olivier Messiaen, among others. Although more interested in writing for acoustic instruments, he composed two electroacoustic works while studying at the Instituto Torcuato Di Tella: *Syrygma I* (1966) and *Himnos de Amor y Vida* (1967). These works are the product of Atehortua's formative years as a composer [3]. His music embraces the elements of contemporary music (dodecaphonism, serialism and expressionism) without neglecting his post-romantic and at times nationalistic style. Today, he is considered the father of academic music in Colombia [4].

In *Syrygma I* (Greek word meaning "harmonic"), Atehortua uses as sound sources sinusoid, square and sawtooth waves, white noise and piano samples that had been transformed with filters and ring modulators. Time distortion techniques are applied toward the end of the work using "varispeed"—accomplished with a four-track reel-to-reel recorder with the motor and brake off. This technique allows the manipulation of various parameters such as speed and playback. This short (4:36) piece premiered at the Fifth International Festival of Contemporary Music, organized by the Instituto Torcuato Di Tella. It is the first electroacoustic work by Atehortua and was written while he was studying with José Vicente Asuar and engineer Fernando Von Reichenbach [5].

Another contributor to electroacoustic music in Colombia in the early years was David Feberbaum. He studied theory and counterpoint with Luis María Díaz in Bogotá. In 1966, he traveled to London, where he continued his musical education at the London School of Music and later at Trinity Col-

## ABSTRACT

The author presents a general view of the development of electroacoustic music in Colombia from its beginnings up to the recent present. The article covers major protagonists and events that have contributed to the development of this new field of music. The author also focuses on several key works in the development of this media and their creators.

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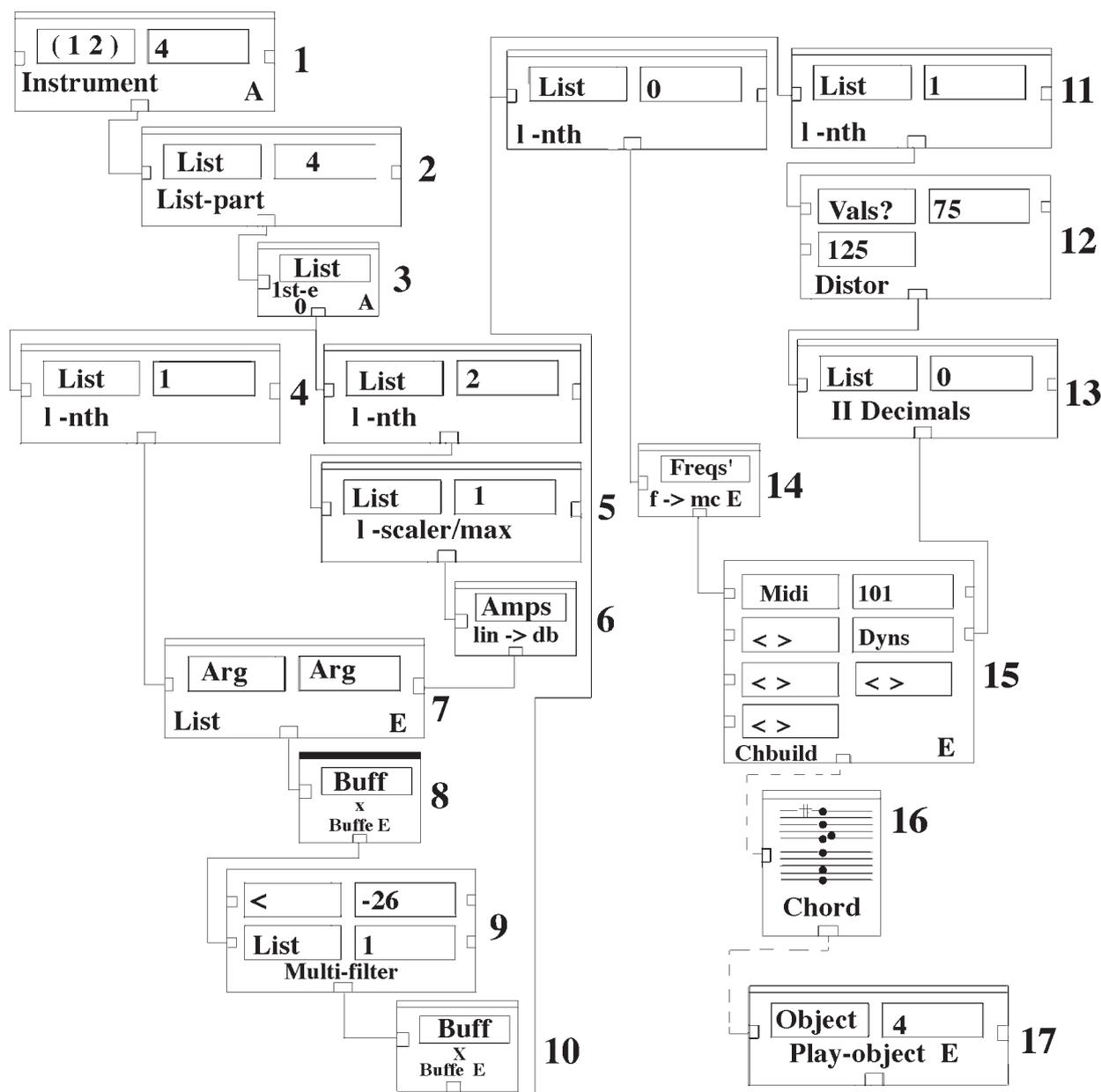


Fig. 1. PatchWork description of each box: 1. Read analysis data from instrument. 2. Separate data by columns. 3. Change format of data into structured list. 4. Separate the frequency and the amplitude lists. 5. Normalize amplitude data into between 0 and 1. 6. Convert amplitudes to dB. 7. Rejoin amplitude and frequency lists. 8. Store results temporarily. 9. Filter out all low-amplitude elements. 10. Store results temporarily. 11. Separate the frequency and the amplitude lists. 12. Scale amplitudes into the MIDI range between *p* and *ff*. 13. Round off amplitude data into integer values. 14. Convert frequency data into MIDI values. 15. Build chords with the frequencies and dynamics. 16. Display and edit chord. 17. Play chord via MIDI for testing.

lege, where he studied harmony and analysis with James Petten. Between 1969 and 1970, he was a member of the work group of the Centre for Electronic Music at the Royal College of Music. He attended summer courses with Michel Decoust and Peter Maxwell Davies from 1966 to 1970. At his arrival in Colombia, he was appointed lecturer in twentieth-century music, electroacoustic music and musical analysis, and taught musical forms and acoustics at the National University (music department, arts faculty)

in Bogotá. He founded his own Center for Electronic Music in collaboration with Guillermo Díaz. Feberbaum also has worked in organizations devoted to promoting contemporary music. He founded the Centro de Documentación Musical de Colcultura (Music Resource Center of the Colombian Institute of Culture) in 1976 with Hjalmar de Greiff.

One of Feberbaum's major recorded works is the third movement of a piece titled *Electronic Study in Three Movements* (1971). The work was produced with the

technical assistance of Guillermo Díaz at the composer's private studio. The structure of the work is traditional, according to the composer, and it was conceived on an analog synthesizer developed in London in 1970 by a group under Peter Zinovieff's technological leadership and Tristan Cary's musical direction. The latter was the director of the Centre for Electronic Music at the Royal College of Music at the time. The work is technologically related to specific resources and functions of the analog synthesizer

and is the result of endless takes, montages and manual editing. As an expression, *Electronic Study in Three Movements* is the result of the composer's experience of coming back to his native country. The composer felt isolated due to the lack of groups with which to share his work. In a new socio-cultural environment, the composer felt compelled to abandon the search for extreme avant-garde expression. Therefore, the structure of *Electronic Study in Three Movements* is in three parts and is conceived as "electronic tonal music," yet it lacks traditional harmonic construction [6]. The third movement uses melodic fragments superimposed with disjointed sounds that are random in direction and randomly placed in time. Glissandi are a common trait in the movement, which in certain places presents interesting placement of sound in space. The production of the movement used frequency modulation and amplitude modulation sound synthesis techniques.

Jacqueline Nova Sondag was the most prolific and most active composer in Colombian electroacoustic music during the early years. She was born in Ghent, Belgium, on 6 January 1936. She studied at the Facultad de Artes de la Universidad Nacional de Colombia in Bogotá under Gonzáles-Zuleta and Luis A. Escobar. In 1967, she won a scholarship to study advanced composition at the Instituto Torcuato Di Tella under A. Ginastera, L. Nono, Francisco Kroepfl, V. Ussachevsky, R. Haubenstock-Ramati, F. Von Reichenbach and G. Gandini. She took part in many international music festivals and organized courses of electronic music that were broadcast over the radio in 1969. She did conference concerts in 1970 and worked under the direction of Kroepfl at the Laboratorio de Acústica Estudio de Fonología Musical. Nova formed the Agrupación Nueva Música in Bogotá and organized its first concert in 1971. She received many awards, including first prize in chamber music at the Third Festival of Music in Caracas, Venezuela, 1966; in Colombia, she won first prize at the Fifth National Theater Festival in 1969 and the national composition prize in 1971. As an electroacoustic composer, Nova developed much more sophisticated techniques and fluidity for this medium than any other Colombian composer of her generation due to her constant involvement in the medium and her contact with other composers of electroacoustic music throughout the world.

Nova's electroacoustic works can be classified in three broad categories, as follows:

- Tape music: *Oposición-fusión* (electronic sounds, 1968); *Signo de Interrogación* (electronic experience, 1969); *K Z K* (radio experience, 1969); *Cantos de la Creación de la Tierra* (processed voice on tape, 1972); and *Camilo* (tape for film, 1974).
- Tape and Instruments: *H-K-70* (piano, percussion and taped voices); *Julius Cesar* (voices and electronic instruments, 1969); *Hiroshima* (voices, electronic sound and orchestra, 1974); *Homaggio a Catullo* (voices, strings, percussion and electronic sound, 1972); *L.M.A. 11* (voices, strings, percussion and electronic sound, 1969); *Pitecanthropus* (voices, electronic sound and orchestra, 1971); *Resonancias I* (piano and electronic sound, 1969); *Sinkronizacion* (voice, piano, harp, percussion and electronic sound, 1969); *14-35* (processed voices on tape and orchestra).
- Multimedia Works: *Síntesis* (voices, strings, mime and electronic sound, 1969); *Ballet* (tape and voice, 1972); *Proyecciones* (projector and orchestra, 1968); *Música para las Esculturas de F. Bursztyn* (tape, 1974) [7].
- Discography: *Cantos de la Creación de la Tierra*, included in *Tres Composiciones electroacústicas* from the series *Música nueva latinoamericana 2* (Tacubá, Uruguay 1976); and in *33 Años de música electroacústica colombiana* (Comunidad Electroacústica Colombiana in Colombia, 1998); *Moviles*, included in *Clasicos colombianos siglo XX*, Vol. 2 (Colcultura: Comisión V Centenario, 1993).

*Cantos de la Creación de la Tierra* (processed voice on tape, 1972) is one of the most celebrated works by Nova. It was produced at the acoustics lab of the Universidad Nacional de Buenos Aires under the direction of Francisco Kroepfl. The sonic material for this work is a chant in *Tunebo*, an aboriginal text from Indian tribes of the central state of Boyaca-Colombia. The text is a story in "Paleotegría," the Chibcha tribe's defunct language, which Chibcha priests used in their magic chants. This work has been performed in Argentina, Colombia, Uruguay and the United States and was featured at the Contemporary Music Festival of Bourges, France [8]. In *Cantos de la Creación de la Tierra*, text and

voice are at first unrecognizable. The piece slowly evolves so that gradually voice and later text become recognizable. The macrostructure of the work is cyclical, since the sound synthesis process just described repeats itself twice. The repetition of this process is recognizable in the middle and at the end of the piece, where the chant is presented in its original form. The sound synthesis is achieved by cutting, splicing, looping, changing speed and changing the direction of the recorded chant and also by the use of filters. The microstructure of the work presents additive and subtractive processes of juxtaposition of a diversity of sounds in a collage, creating larger sections in which rich spectral textures build and disintegrate. These sections begin with lower-register long sounds and develop into many rhythmic active sonic worlds. *Cantos de la Creación de la Tierra* is an excellent example of speech transformation in an analog medium. In my opinion this piece, at 18:35, does not present a boring moment.

Sculptor Feliza Bursztyn (b. 1933, Bogotá; d. 1983, Paris) created the first sound sculpture piece in Colombia. The work is titled *Las Históricas* and was displayed at an art exhibition in 1968 in Bogotá. *Las Históricas* is an iron sculpture in which the predominant shape is a twisted, hooklike strip floating free in space. With the help of a visible engine, the sculpture vibrates and sounds constantly due to the friction of the various twisted iron sheets. Bursztyn favored anarchy in shape and concept. Her goal was to create ephemeral antiaesthetic works instead of beautiful perdurable ones. She was the first Colombian sculptor interested in movement in sculpture. She used as a medium of expression everyday pieces of tools, nuts and salvage metal [9].

These formative years came to a close with a piece by Francisco Zumaqué, entitled *Pikkigui*. The piece was realized in 1975 while the composer was studying at the Ecole Americaine des Arts in Paris. *Pikkigui* is based on a song by the Rossigaro tribe of the Amazon region. It is the only known work in this medium by Zumaqué, who is more interested in writing for acoustic instruments. Zumaqué was born in Cereté, Colombia, in 1945 and grew up in a family of professional musicians. He studied at the National Conservatory of Bogotá, where he excelled as a student and was awarded a scholarship, "Best Student of Fine Arts," to do his postgraduate studies in France, where he studied with Nadia Boulanger

and Olivier Messiaen. Zumaqué is perhaps the most celebrated living composer of Colombia. He learned to express his cultural identity in the precise language of serious contemporary music. His work excels not only in erudite music but also in popular music. He recorded with Eddie Palmieri and Gloria Estefan during the same period that he performed concerts of contemporary music with Lucas Foss. He has worked professionally in Colombia, France, Mexico and the United States [10].

### THE MICROCOMPUTER-GENERATED MUSIC YEARS

After an 11-year period of no activity in electroacoustic music (1975–1986), a new generation of electroacoustic musicians emerged in Colombia. An ensemble called Sol Sonoro, formed by Roberto García, Luis Boyra and Ricardo Arias, broke the silence in 1986. Among this generation of electroacoustic musicians are composers Mauricio Bejarano, Roberto García, Andrés Posada, Juan Reyes, Catalina Peralta, Gustavo Parra, performer-artist Ricardo Arias and guitarist Arturo Parra.

From the generation emerging from the 1980s, Andrés Posada has taught at and directed the Laboratorio Colombiano de Música Electrónica Jacqueline Nova in Manizales, outside Bogotá. He is also the director of the Notas y Partituras computer music center in Medellín and teaches music at the Universidad de Antioquia and the Instituto Musical Diego Echeverría. Born in Medellín, Colombia, Posada studied composition at the Mannes College of Music in New York with Leo Edwards and Peter P. Stearns. His pieces have been performed in Venezuela, Chile, Australia, Cuba, Mexico, Puerto Rico, Italy, Uruguay, the United States, Ecuador, Argentina and Colombia. Among his compositions are *Presagio Lírico* for string quartet (1983); *Sonata Estival* for cello, trumpet, percussion and double woodwind quintet (1985); *Overtura para Concierto*, for orchestra (1987); *Los Colores* for orchestra (1988); *Catenaria* for tape (1989–1990); *Canonac* for viola, guitar and harpsichord (1992); and *Benkos*, an electroacoustic piece for dance (1992).

*Catenaria*, a work included in the *Leonardo Music Journal 4* CD, was produced at Laboratorio Colombiano de Música Electrónica Jacqueline Nova. It was produced from three types of FM sounds created on a Yamaha DX: (1)

plucked sounds, which have similar color to that of a harpsichord. The plucked sound has two variations of color in the attack, depending on the amplitude of the sound—if the amplitude is high, a strong percussive sound is the result. If the amplitude is low, the result is a tender sound; (2) bell-like tones that sound as if they were bowed; and (3) panpipe sounds. These FM sounds contain percussive and expansive effects that expand the piece's sampled piano to create a single amalgamated instrument. The structure of *Catenaria* is based on a matrix of seven sounds that form the major seventh, major sixth, diminished fifth, perfect fourth, major third and major second intervals. The intervals produce the numeric progression 7-6-5-4-3-2. This progression first follows a descending order and then a retrograde order, creating the form and structure of *Catenaria* [11].

Computer programmer and software designer Camilo Rueda is another key figure in the recent development of electroacoustic music in Colombia. He co-founded, with Posada, the first electroacoustic lab in Colombia in 1990, Laboratorio Colombiano de Música Electrónica Jacqueline Nova, located in the city of Manizales [12]. Rueda is part of the team of designers of the PatchWork software for algorithmic composition. The program links boxes on the screen where each box represents a Lisp function. The program collects data from a spectrum analysis of a sound to generate harmonies for traditional composition [13] (Fig. 1).

From the generation emerging from the 1980s, there are three composers working in Bogotá: Roberto García Piedrahita, Juan Reyes and Mauricio Bejarano (Fig. 2). García was born in Bogotá, where he studied piano and mu-

sic pedagogy. In 1981, he moved to Barcelona to study electroacoustic music at the Phonos Foundation with Gabriel Brncic. Piedrahita also attended workshops with Nono and Kroepl. He has participated in many international festivals, including the International Music Festival of Barcelona and the Festival International de Musique Experimentale Synthèse in Bourges, France. Since 1986, he has organized and participated in many events promoting electroacoustic music in Bogotá and Cali, and has worked with live electronics with R. Acosta and “Tangram,” a group formed by students of the National University's music department. He has taught courses on electroacoustic music in Barcelona and at the National University in Bogotá. Among his works are *Palabra Major*; *Ambiguo*, a dance and theater video; *Emoc Agutroc Emoc*; and *Del Imperativo* for tape (1998). *Del Imperativo* was recorded for a CD entitled *33 Años de Música Electroacústica en Colombia* (1998). According to the composer, *Del Imperativo* is the most variable of these, expressing existence, action and sense [14].

*Del Imperativo* has four sections. The first section contains very short percussive sounds intermingled with longer ones. Every short percussive sound in the section is placed at a different point in space. The second section has a much slower pace than the first one due to the long duration of its sounds, and so is more quiet and introspective. The third section picks up the pace a little by using longer sounds that move through a wide range of frequencies. The fourth section is very similar to the first section. It presents the same materials; however, they are organized differently. Interesting sound localization occurs in this section also. Filtered white noise is the predominant sound synthesis technique used in *Del Imperativo*.

**Fig. 2. (left to right) Juan Reyes, Mauricio Bejarano and Roberto García at the auditorium Olav Roots of the Universidad Nacional de Colombia, Bogotá, performing the cycle *La primera Oreja*, 1997.**



Born in Barranquilla in 1962, Juan Reyes is one of the pioneer composers of the 1980s generation. He studied piano and composition at Berklee School of music in Boston, and obtained a degree as a music and mathematics at the University of Tampa. He has been awarded several grants for post-graduate works at the Center for Computer Research in Music and Acoustics (CCRMA) at Stanford University, where he studied with John Chowning among others. He has participated at several electroacoustic music conferences in the United States, Europe and Asia. Currently he teaches at the Advanced Computer Center of Los Andes University in Bogotá. Among other works, he has composed incidental music for Albert Camus's *Caligula* (1988); *Computer Music for the Unexpected Listener*, a set of variations based on popular Colombian themes; a musical essay based on *Las Meninas* (Spanish painter Velásquez's masterpiece) (1991); *Choi-Hung* (1996) for tape; *Straw-berry* (1997) for tape; and *Joselito* (1998) for tape.

Prominent among Reyes's recordings is *Straw-berry*, an algorithmic computer-controlled work. It was produced in Common Music and Common Lisp Music. Some samples were taken from the sounds produced by strawberry plants. The work also relates the sweetness of the fruit to the flute. The sounds used were achieved through a synthesis of physical models and digital signal processing. Sound groups were sorted through functions in Common Music; the main function utilized in the generation of this composition is "defun straw-berri (frec dur)." This composition explores the issue of computer-controlled expression where control is achieved with an algorithmic process and a matrix structure. This work was produced at MOX (Advanced Computing Center) at Los Andes University [15].

Mauricio Bejarano, along with Reyes and Piedrahita, stands out among the composers of the 1980s generation. Bejarano was born in Bogotá in 1955. He has explored several fields of creativity, such as sculpture, painting, poetry, essays and acousmatic arts. He has taught acousmatic arts at the National University of Colombia in Bogotá and has attended several workshops on electroacoustic composition run by Michel Zbar (Second International Contemporary Music Festival of Bogotá [FIMC], 1991); Daniel Teruggi (Third FIMC, Bogotá,

1993, and Institut National Audiovisual, Groupe de Recherches Musicales [INA-GRM], Paris, 1994); Francis Dhomont, Stephane Roy and John Chowning (Fourth FIMC, Bogotá, 1995); and Francois Bayle, Daniel Teruggi, Jean-Claude Risset, Serge de Laubier and Yann Geslin (INA-GRM, Paris, 1997). Bejarano's artworks and music have been exhibited and performed nationally and internationally. He has created radiophonic artworks, has written several essays on electroacoustic music and has presented lectures on the topic. The Colombian Ministry of Culture has awarded him a grant to develop a project on Bogotá's soundscape, based on environmental sounds.

*Esquisios* (1994–1998) is a series of strokes. It is also a set of short "cinematophonies" on gesture and the body, passages of acousmatic writings relating to the interior of the body, from corporeality itself to the outward expression of desire. *Esquisios* contains six sections titled and timed as follows:

1. *Escintillante* (Spitting and Shining: first division of the body, flash of the first stroke, 0:20).

2. *Endógeno* (Endogenous: Stroke from the inside, intimate space of corporeality, 1:12).

3. *Estiramiento* (Stretching: Tracing a mechanical gesture that expands and contracts, 1:36).

4. *Estuario* (Estuary: endogenous waters, water jaws . . . on the threshold, 2:52).

5. *Ensoñación* (Reverie: Oneiric trace effects of reverie, 2:12).

6. *Delirio* (Delirium: Exterior gesture, disquieting passion, 2:08).

*Esquisios* (Sketches) was composed and produced at INA-GRM in Paris with the support of Syter System and in the composer's private studio in Bogotá [16].

In the 1990s, a new generation of electroacoustic composers emerged who are not only interested in working with electronic media, but also in working with mixed media. Among them one finds Alba Fernanda Triana, Alejandro Gómez, Germán Toro, Guillermo Garbó, Mauricio Romero and Ricardo Escallón. Rodolfo Acosta has worked in Colombia and Bourges, France, and has created a few outstanding electroacoustic works. Carlos Barreiro has realized important work in the field of criticism and documentation. He has curated concerts for many years and has educated the public through his writing and lectures [17].

## CONCLUSION

In general, Colombian electroacoustic music has presented all the major aesthetic trends and techniques of the times. One aspect that makes it unique is the use of sonic material from Colombia's musical heritage and culture as primary material in the generation of a work. The main contributing factors to the development of electroacoustic music in Colombia are: comparatively easy access to personal computers (still a luxury for many in Latin America); new technology for information access (the Internet); the establishment of the Electroacoustic Community of Colombia (ECO), which organizes periodic cycles of festivals and concerts; and the creation of new music festivals and cycles such as the International Festival of Contemporary Music, organized by pianist Cecilia Casas, and the Young Composer's cycles organized by the American Institute Colombo-Americano with the assistance of Carlos Barreiro. The 1980s generation of composers set a solid foundation upon which the following generations of electroacoustic music practitioners continue to build.

## References

1. Mauricio Bejarano, Juan Reyes and Roberto García Piedrahita, jacket notes to *33 Años de Música Electroacústica en Colombia*, compact disc (1998) pp. 1–2.
2. Jon H. Appleton, "Electro-Acoustic Music," Don Randel, ed., *The New Harvard Dictionary of Music* (Cambridge, MA: Belknap Press, 1986) pp. 280–282.
3. Ricardo Arias, "From the Margins of the Periphery," *Leonardo Music Journal* 8 (1998) p. 51.
4. William Atehortua Amanya, "Blas Emilio Atehortua," Gran Enciclopedia de Colombia <<http://www.banrep.gov.co:80/blaavirtual/letra-b/biogcircu/atheblas.htm>> (Bogotá, Colombia: Biblioteca Virtual Luis Angel Arango, 1980).
5. Bejarano et al. [1] pp. 3–4.
6. Bejarano et al. [1] pp. 5–6.
7. Aaron I. Cohen, "Nova Sondag, Jacqueline," *International Encyclopedia of Women Composers* (Westport, CT: Greenwood Press, 1984) p. 512.
8. Bejarano et al. [1] p. 6.
9. Germán Rubiano Caballero, "Feliza Bursztyn," Gran Enciclopedia de Colombia <<http://www.banrep.gov.co:80/blaavirtual/letra-b/biogcircu/bursfeli.htm>> (Bogotá, Colombia: Biblioteca Virtual Luis Angel Arango, 1980).
10. "Francisco Zumaque" <[http://syli34.physik.uni-bonn.de/public\\_html/hz/fzcv.html](http://syli34.physik.uni-bonn.de/public_html/hz/fzcv.html)> (2000).
11. Ricardo Dal Farra, "Some Comments about Electroacoustic Music and Life in Latin America," *Leonardo Music Journal* 4 (1994) p. 96.
12. Juan Reyes, "The Choice of Electroacoustic Music in Colombia," *Mitteilungen, Deutsche Gesellschaft für Elektroakustische Musik* 14, electronic journal <<http://www.kgw.fu-berlin.de/DegeM/Seiten/degem-media-frame.html>> (2 September 1999).

13. Curtis Roads, *The Computer Music Tutorial* (Cambridge, MA: MIT Press, 1996) pp. 850–851.
14. Bejarano et al. [1] pp. 7–8.
15. Bejarano et al. [1] p. 9.
16. Bejarano et al. [1] pp. 10–11.
17. Arias [3] pp. 51–52.

### Bibliography

Dodge, Charles, and Jerse, Thomas A. *Computer Music: Synthesis, Composition, and Performance* (New York: Macmillan Press, Schirmer Books, 1985).

### Discography

*Clasicos Colombianos Siglo XX Vol. II*, Colcultura Comisión V Centenario CD (1993).

*Equus y Resonancias*, Comunidad Electroacústica Colombiana CD (1996).

*Musica Electrónica by Compositores Latinoamericanos: Leonardo Music Journal CD Series 4* (1994).

*Onda Electroacustica*, ACME-Colombia CD, producers: Carlos Barreiro, BLAA Biblioteca Luis Angel Arango (1998).

*33 Años de Música Electroacústica Colombiana*, Comunidad Electroacústica Colombiana (1998).

### LPs

*Tres Composiciones electroacusticas* from the series *Música nueva latinoamericana 2* (Tacuabé, 1976).

*Lucio Edilberto Cuellar Camargo began his musical studies in Bogotá, Colombia, where he was born. He moved to the United States in 1979, where he has continued his studies and has participated in many festivals of new music and electroacoustic music. He has promoted electroacoustic Latin-American music by establishing an annual concert by Latin-American composers at the University of North Texas. He is a member of the Society of Electro-Acoustic Music in the United States and the International Computer Music Association.*

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