

AFTERSOUND: Frequency, Attack, Return

Curated by Melissa Ragona + Margaret Cox
Aug. 21 - Nov. 22, 2015

Featured Artists: Paul DeMarinis, Michael Johnsen, Victoria Keddie,
Caroline Record, Marina Rosenfeld, Jesse Stiles, Sergei Tchernin.

Pioneers of Sound + Archive: Maryanne Amacher, Cathy Berberian,
John Cage, George Crumb, Karlheinz Stockhausen, Iannis Xenakis.

Featured Visual Scores: Roger Beebe, Lin Culbertson, Luca
Forcucci, Kraig Grady, Scott Kiernan, Jonna Kina, Zach Layton,
Golan Levin, Eric Normand, Eric Raynaud, Dmitry Shubin, Matt
Wellins and more in the gallery + online!

MILLER GALLERY AT CARNEGIE MELLON UNIVERSITY

bit.ly/aftersound

Paul De Marinis (Stanford, California)

***Helmholtz (DUO)*, 2015**

glass, motors, sound, flame

So-called “Helmholtz” resonators are named after the great 19th century scientist, Hermann Helmholtz, who rediscovered the unique resonant properties of spherical enclosures that had been used to equalize the sound of ancient Roman theaters. Although originally made out of terracotta, Helmholtz resonators may be made of any rigid material, including plastic, glass, or ceramic, that can be formed into a sphere. For *Helmholtz (DUO)*, the large glass spheres act as resonators for very low frequency sounds. By arranging a number of flames with resonators of different sizes, the flames will respond by vibrating when their pitch is present. Vibrations are visualized as the flames are reflected in the rotating mirrors. In addition to Helmholtz’s invention, Rodolph Koenig’s manometric flame apparatus (1862) plays a major role in this installation. Constructed as a device to visualize the relative prominence of various audio frequencies, or audio spectra, this construction worked by subjecting flame to illumination-gas that was directed by the vibrations of a rubber diaphragm. Based on both the principles of the “sensitive flame” (a gas flame which resonates readily with site specific sounds or air vibrations), and architectural resonant frequencies, *Helmholtz DUO*, combines the rich histories of acoustic psychology with the physics of sound.

Read more here: <http://www.well.com/~demarini>

Michael Johnsen (Pittsburgh)

***Folk-Telharmonium*, 2015**

recycled consumer electronics, sink traps, magnets, beeswax, steel wool, cinnamon, stapler...

This 21st century electronic folk instrument pays its respects to its oldest ancestor, Thaddeus Cahill's telharmonium. Built in 1897, Cahill's invention was the mother of all electronic synthesizers. Though it weighed as much as 200 tons, it was only audible via tiny telephone earpieces. It was intended as a proto-muzak service for subscribers via telephone lines. One of its most renowned clients was Mark Twain. Its sound was generated by weighty rotating toothed generators, making it a kind of musical power plant capable of a 1.5 megawatt output. Just a few years before amplifiers and loudspeakers were invented—innovations that could have saved the telharmonium's future—all efforts to continue its advancement came to a halt. Its legacy is most connected to its ability to reproduce the sounds of orchestral instruments, the Hammond organ adopted some of its basic technology.

Folk-Telharmonium is a fanciful speculation on this earlier technology. It is an attempt to make a kind of kitchen-sink telharmonium, without spending a penny. By taking the spinning drum of the humble VCR as its basic engine, a primitive tone-wheel is constructed out of found objects (including the detritus of other consumer electronics and easily available domestic goods). The latter contain some form of iron which—as they spin (their motion picked up by induction coils)—produce audible sound currents. It includes toggle switches which add or remove component sounds. The knobs control motor speed and, therefore, pitch of sounds.

Read more here: <http://via2014.com/people/michael-johnsen>

Victoria Keddie (New York)

***Aelita*, 2014**

TRT 10:21 min

Sound and video composition involving signal generation, DAC, wavetek, oscillators, T-resonator, surveillance camera, CRT monitor feedback. Composition focuses on synced pattern repetition of sound and video signatures in dialogue with each other. The work comes from a live session balancing video and sound waves at a near point of signal collapse.

***Helios Electro*, 2014**

TRT: 6:28

Sound and video feedback systems with signal generation. Camera halogen with monitor feedback through multi channel mixing console to create a multi layered composition involving pure feedback. Sound recorded from video systems with synced output, as well as magnetic tape recordings that have been recorded continuously and played back through localized transmission.

***Mosquito*, 2014**

TRT 18:04 min

Sound and video composition. Signal generation, feedback, wavetek synthesizer and sweep, oscillators, T- resonator, surveillance camera, CRT monitor feedback. Composition focuses on synced pattern repetition of sound and video signatures in dialogue with each other. Editing technique involves the parsing and rebuilding of these signature patterns to create a multi layered parlay between video and sound waves.

Victoria Keddie (New York)

***Headbanger*, 2015**

stainless steel

Headbanger composition #1 (a boy age 11)

paper, ink, pencil

Headbanger composition #2 (a boy age 13)

paper, ink, pencil

Headbanger composition #3 (a girl age 22)

paper, ink, pencil

The overall work involves a three-part visual composition and fabricated steel sculpture. The concept for the work is based on sleep related rhythmic movement disorder (RMD), commonly called “headbanging.” Headbanging typically involves repetitive lifting of the head and forcibly banging the head against the pillow or mattress; or slamming the back of the head against a headboard or wall. This banging exercise in sleep demonstrates a violent percussion, that through ENG analysis, happens often in sequence and in somewhat “rhythmic” intervals. This work focuses on one complete round of testing involving three anonymous patients. All three cases had (RMD) with atypical headbanging, which takes various forms, such as head slapping, punching and/or banging.

Having worked extensively in video and sound signal generation and signal to signal response, EMG testing methods allowed Keddie the opportunity to investigate the human variable as both generator and conductor of signal.

Read more here: <http://www.victoriakeddie.com>

Marina Rosenfeld (New York)
Turn of My Century: Dub plates and test pressings 1998-2014, 2015

Marina Rosenfeld (New York)
Caroline Record (Pittsburgh)
Archive-Machine, 2015

dub plates, score on paper, digital archiving software with touchscreen, turntables, speakers, stereo microphone, furniture

Marina Rosenfeld's work, comprised of both a 16 year archive of the artist's dub plates and test pressings, and an archive-making digital machine created in collaboration with artist-computer programmer Caroline Record, proposes the exhibition as both duration and site, enacting a daily program of playback and recording over the exhibition's 81 days. With the assistance of daily performers, Rosenfeld's personal archive of dub plates—original 10- and 12-inch acetate records and test pressings, annotated in nail polish and magic marker, and produced as an integral part of the artist's compositional and performance practice since the late 90s—are heard one side at a time, from start to finish, according to a daily score, a format in which the plates have rarely, if ever, been heard. Exposed without manipulation, without “being played” by the artist, the plates deliver their devolving ratio of musical signal-to-noise into the gallery, plumbing the space itself for reflected sound, and revealing the staging effect of the record player to be both photographic and ephemeral, provisional and impervious—an analogic machine subject to magic and erasure. A tandem digital work captures and logs each “long-play,” entering the resulting recording into a temporary aural archive visualized as an infinite tower of spiral lines that visitors to the gallery can navigate and play. Rosenfeld situates her music in the curved path of the needle, a path that tries repeatedly—and sometimes succeeds—to expel the needle that re-traces it.

Read more here: <http://www.marinarosenfeld.com>

Jesse Stiles (Pittsburgh)

Control Voltage (a.k.a. "CV"), 2015

computer, video monitor, analog synthesizer, analog delay line, donkey jaw.
12 minute loop.

note: "Do not touch"

CV, Cv, or cv may refer to:

Cataclysmic variable star, characterized by irregular and large increases in brightness

Coefficient of variation, a measure of dispersion of a probability distribution

Computer vision, methods of extracting information and meaning from images & video

Constant voltage source, electrical description

CV/Gate, a control voltage and gate solution

Cv, the flow coefficient, used to determine the pressure-drop across
an element in fluid flow applications

About the skull - in several countries in Latin America a donkey's jaw
is used as a percussion instrument. In this capacity it is known as a
"quijada."

Read more here: <http://jts3k.com/site2>

Jesse Stiles (Pittsburgh)

***IR Chorus*, 2015**

candles, infrared sensors, digital oscillators, transducers

On the surface of Earth, at far lower temperatures than the surface of the Sun, almost all thermal radiation consists of infrared in various wavelengths. Of these natural thermal radiation processes only lightning and natural fires are hot enough to produce much visible energy, and fires produce far more infrared than visible-light energy.

Herein a set of infrared sensors are positioned above candles, converting the flickering of flame to a varying voltage, which in turn modulates a set of individually tuned digital oscillators. The generated audio is thereby an analog of the fire.

Read more here: <http://jts3k.com/site2>

Sergei Tcherepnin (New York)

Subharmonic Sparks (Five Copper Tongues)

2014

copper, silk, 2 transducers

courtesy of the artist and Murray Guy Gallery (New York)

note: “Viewers may touch and bend the copper tongues, but ONLY GENTLY!”

Subharmonic Sparks is composed of three different short compositions, each around five minutes long. The work plays autonomously as a looping series of tracks, but also invites the viewer to interact with its overall structure. By gently bending the copper tongues, each visitor can elicit a new composition. Transduction is the key strategy here—there are five tongues, but only two of them have transducers. These two are the ones that will filter the sound as you bend them. “Subharmonic” refers to the undertone scale, a descending scale that is the mirror image of the harmonic scale, to which most Western music is tuned. As Cate McQuaid (Boston Globe) describe it: “It’s minor and moody.” Tcherepnin describes this work, that is part of a larger series: “I think of them as Venus Flytraps, they are quiet until you touch the tongue.” Tcherepnin composes sound works that are actualized through sculptural forms, objects that exist simultaneously as speakers and instruments. *Subharmonic Sparks* explores visitors’ capacities to affect and be affected by sound through their bodies as much as their auditory systems. This work premiered at the MIT List Visual Arts Center in 2014.

Read more: <https://listart.mit.edu/exhibitions/list-projects-sergei-tcherepnin>
<https://www.bostonglobe.com/arts/2014/07/12/tcherepnin-creates-works-seen-heard-and-felt-mit/OhBi5YVNwxAyljc1jZYRtO/story.html>

Luca Forcucci (Milan, Italy) ***In a Silent Way*, 2015**

'As this wave from memories flows in, the city soaks it up like a sponge and expands.'

- Italo Calvino, *Invisible Cities* (1972)

Imaginary Listening explores the possibility of imaginary aural perception emerging from the past. Such perception should appear while recombining and crossing the intrinsic memory of a town and one's own memory, which leads to a combination of several realities:

- One that existed, but is not there anymore;
- One that remains;
- One that is imagined;
- One, which combines existed and imagined realities within one's own imagination.

The proposed works invite the audience to a Silent Listening. Image one is a power station (Kraftwerk) architectural structure from Berlin, with the spectrogram from Satch Hoyt's electric flute. Image two is the map of the Russian attack of Berlin in 1945, with the spectrogram from Audrey Chen's voice.

Read more here: <https://lucaforcucci.wordpress.com>

Kraig Grady (US-Australian)
***A Secondary Meta Slendro Relation
as viewed from a Native American
Perspective, 2015***

digital print

This chart shows all the relations of a special triad found within the tuning of my Meta-Slendro ensemble of acoustic instruments. These are instruments using a tuning of Erv Wilson called Meta-Slendro. This uses a twelve tone section of a particular series of harmonics: 9-12-16-21-28-3u7-49-65-86-114-151-200. I have also constructed an ensemble of nine primary instruments, with numerous smaller constructions. This tuning corresponds to a tuning process used on Anaphoria Island (which has influenced all elements of this musical composition). Within this chart, a secondary triadic relation is shown that uses a pattern of $a+e=f$. This sequence produces the same numbers as the simpler series of the tuning. The sky colored tone signals the basic triad. In contrast, the flesh colored tone represents triads that have no tones in common. The red triad highlights the relationship most remote in terms of common tone movement. The second part of the diagram mirrors the first. If one were to compare this work to the conventional twelve tone tuning system —and its basic triads—one would see the difference expressed in structural possibilities.

Note: “The North American Embassy of Anaphoria Island” is a non-profit organization promoting the culture of an imaginary island, founded by Grady. His work is connected to the kind of “visionary geography” he promotes on the island of Anaphoria.

Read more here: <http://www.anaphoria.com>

Jonna Kina (Helsinki, Finland)

***Foley Objects*, 2013**

photography

“A thing which is present can be invisible, hidden by what it shows”

-Rene Magritte

Foley is the reproduction of sound effects, which are added in postproduction to enhance the audio experience in films. In the piece, *Foley Objects*, I show the sound sources themselves as images. The title of each photograph describes the original sound for which the objects were used. The connection of the two—image and title—is both arbitrary and surreal, but also strictly documentary. I collected objects from various Foley artists and sound designers. This collection of images can be “read” as an archive of sounds, as well as a performance that shifts between documentation and absurd playfulness.

Read more here: <http://www.jonnakina.com>

**WHEN YOU HEAR SOUND, YOU MAY
GENTLY TOUCH THE COPPER TONGUES.**

**DO NOT BEND, PULL, OR RESHAPE THE
COPPER. THAT WILL DAMAGE THE WORK.**

Zach Layton (New York)

untitled, 2013

archival ink jet print

One of my first experiments in the darkroom combining sound visualization technologies and photographic processes. This piece was created using an oscilloscope in the color darkroom, utilizing the waveforms displayed on the screen as a light source against photosensitive paper. The prints were then scanned digitally—while moving according to chance procedure—smearing the image.

Read more here: <http://www.zachlaytonindustries.com>

Zach Layton (New York)

Sonic X-Ray 2 (mothra), 2014

archival inkjet print

The analysis of acoustic and optical space has become an essential aspect of my practice. Over the past year, I've been working with a system that uses lasers and a highly sensitive electromagnetic measuring device called a galvanometer. This device is constructed using two high-speed motors, which rotate perpendicular reflective mirrors through the voltage produced by a stereo audio signal. The rapidly oscillating reflection of the laser against the mirrors creates a kinetic drawing in light, generating complex calligraphic forms that emerge from the sound of pulse-waves carefully harmonized at the scale of a hundredth of a millisecond. Slight detuning of this system enables a kinetic image to emerge. Additionally, the concept of modulation is extended to optics. In this case, I use a curved glass to modulate and diffract the laser's trajectory.

Read more here: <http://www.zachlaytonindustries.com>

Zach Layton (New York)

***Wave Fossil Shadow 1*, 2014**

Silver Gelatin Photogram

This photogram was created using a sound modulated laser beam, which leaves behind a trace of vibratory topography. Introducing sonic vibration into the photographic darkroom reveals an indexical, rather than a symbolic representation of sound. What occurs on the surface of the photosensitive paper is the shadow of a sound object. I consider these photograms to constitute the archeology of an instant, revealing the metastable physicality of vibration that exists between sight and sound.

Read more here: <http://www.zachlaytonindustries.com>

Éric Normand (Québec, Canada) ***sur la glace / on ice***, 2010

graphic score for improvisation with an orchestra

Normand describes how his work evolved during the time he was experimenting with his Québec-based ensemble, *Girrl*: “At once, we realized that what we love to do the most is face the unknown. We wanted to create compositions that have no fixed timeline, we wanted improvisers’ decisions influencing the structure of the piece. That’s why we have worked more and more, on the one hand, with games, and on the other, with conductions. And I was really into literature at that time: Calvino, Queneau, Perec... You know OULIPO? *Ouvroir de Littérature Potentielle*... the combination of art, mathematics and playfulness. That was a big inspiration at the very beginning. And then we realized these kinds of games create great musical situations, moving like a living composition, with the main elements never occurring at the same time, but bringing forms and making sense anyway.”

Read more here: http://www.actuellecd.com/en/bio/normand_er/critiques
<http://ernormand.bandcamp.com/track/sur-la-glace>

Eric Raynaud (Paris, France) ***Entropia “Spatial Score,”*** 2015

Spatial Score is taken from the piece *Entropia*, an immersive audio visual performance initiated by Fraction’s work on 3D ambisonic experimental music that explores aesthetic representation of an entropic system. It’s based on an audio reactive geodesic lead-filled sphere that maintains constant interaction with immersive visual projection. The image is synchronized to the sphere’s sound.

The work is structured in specific scenes, each with its own 3D sound spatial score, made using the software, lannix. In addressing the dynamic form of geometry, the software allows the 3D sound dimension of a work to connect with spatial dimensions (in an architectural sense). The scores, like this one, consist of sets of parametric curves, one for each sound source. These curves set the trajectories of sound sources in the 3D space and take part in the narration of the work. Along these trajectories, the composer controls the sources’ motion and velocity. Raynaud transforms these curves in *real time*, and modulates their transformation, which inevitably accentuates the stochastic aspect of the work. The latter also informs the work’s spatialization. This score represents an enhanced snapshot of the produced sound during its real time processing.

Read more here: <http://www.fractionmusic.com>

Dmitry Shubin (St. Petersburg, Russia)

***Deviations*, 2014**

For any instruments

Deviations' score is intended for free interpretation by each performer. Nevertheless, there is an important limitation. Exact value should be assigned to any sign or group of signs. Once you have assigned this value, the performer must strictly adhere to it in all other areas of the score, where the character or group of characters is found. For example, the performer may decide that some sign means some tone, or crackling, or anything else; then, any appearance of this sign should be interpreted in the same way.

Read more here: <http://www.dmitryshubin.ru>

Matt Wellins (New York)

Quotidian Review, 2013 (rev. 2015)

endless video with endless stereo sound

This piece came from a desire to apply aspects of object theater (specifically the work of Stuart Sherman) to software. The sounds, collected from the royalty-free Hanna-Barbera Sound Effects Library, result from the rigorous misuse of household objects. That squawking hullabaloo is then unceremoniously reapplied to mundane virtual objects, which encounter their own form of simulated turbulence.

Instructions for use:

Sounds are attached to the models. Moving an object left and right will pan, up and down; will attenuate, forwards and backwards; and, will alter the playback speed and direction. Some objects will resist coercion.

Read more here: <http://mattwellins.com>

Lin Culbertson (New York)

***Black Shred*, 2012**

discarded paper and other detritus

Black Shred is the second in a series of compositions that uses discarded paper and other detritus as the sonic building blocks for compositions created using unconventional materials and methods. Discarded black shredded paper was shaped into a graphic score that was then photographed and transmuted into audio using a computer program. The score itself was played like an instrument, amplified with pickups and pedals, with the result being that the black score is paradoxically transformed into white noise. The word “black” has many connotations, and *Black Shred* alludes to some of these: Black Magic, Black Heart, Black Metal, Black Death. The transcendent nature of sound is used to communicate—in a visceral way—what “black” might sound like. No other elements other than those generated by the Black Shred score were used in the making of this composition.

Read more here: <http://www.linculbertson.net>

Lin Culbertson (New York)

***White Shred*, 2009**

shredded documents containing sensitive personal information

White Shred is a composition that uses shredded documents containing sensitive personal information as its sole source material. The shredded pieces, derived from financial and health documents, were incorporated in myriad ways and forms. Paper fragments were assembled into a three dimensional score which was played like an instrument, photographed and translated into sound by a computer program, and finally vocalized by a reading of the text fragments contained within. *White Shred* is the product of bringing together information that was once critical, then discarded, then mutilated, and ultimately recycled into a reconstituted sound form: *garbage as music*.

Read more here: <http://www.linculbertson.net>

Maryanne Amacher (1938- 2009, Kingston, New York)

***City-Links*, 1967-1981**

pdf documentation of several performances of *City-Links*' performances produced by Ludlow 38 Künstlerhaus Stuttgart Goethe Institut New York for the exhibition, *Maryanne Amacher: City-Links* at Ludlow 38 in New York (2010)

Courtesy of Ludlow 38 Künstlerhaus Stuttgart Goethe Institut New York
Special thanks to Axel Wieder, director, Index- The Swedish Contemporary Art Foundation, Stockholm and co-curator of *Maryanne Amacher: City-Links*. Between 1967 and 1981 at the Ludlow 38 Künstlerhaus Stuttgart Goethe Institut New York (2010)

Amacher was a student of Karlheinz Stockhausen in the 1960s, collaborator of John Cage and Merce Cunningham in the 1970s and 1980s and teacher at Bard College until her death in October 2009. Amacher went on to receive major commissions throughout the world for her work. As a seminal figure in acoustics, architectural installation and the physiological phenomenon called "otoacoustic emission," her contributions to the field were recognized in awards and grants from the Guggenheim Foundation, National Endowment for the Arts, New York Foundation for the Arts, Pew Memorial Trust and the Foundation for Contemporary Performance Arts, Inc. among others. In 2005 she was awarded the Prix Ars Electronica.

During the 1970s, Maryanne Amacher was a fellow at the MIT Center for Advanced Visual Studies (CAVS). CAVS founder György Kepes is credited as one of her primary influences. While at MIT, she worked on her noted *City-Links*, a series of installations using real-time "telelinks" that transmitted sounds from remote locations. The project was presented at Minneapolis' Walker Art Center and Chicago's Museum of Contemporary Art in 1974 and was reinstalled at New York City's Ludlow 38 Künstlerhaus Stuttgart Goethe Institut New York. Amacher produced 22 *City-Links* projects in total, connecting distant microphones to installations and performances using dedicated FM-quality analog phone lines. Areas of downtown Buffalo, MIT, Boston Harbor, the Mississippi River, the New York harbor, studios in various locations, and other sites in the USA and abroad were transported, sometimes integrating performers near the microphones (such as John Cage and George Lewis for *City-Links* #18 performed at The Kitchen in 1979).

Maryanne Amacher wrote about her *City-Links* series: *In my first sound works I developed the idea of sonic telepresence, introducing the use of telecommunication in sound installations. In the telelink installations "CITY-LINKS" #1-22 (1967-) the sounds from one or more remote environment (in a city, or in several cities) are transmitted "live" to the exhibition space, as an ongoing sonic environment. I produce the "CITY-LINKS" installations using real-time telelinks to transmit the sound from microphones I place in the selected environments, spatializing these works with many different sonic environments: harbors, steel mills, stone towers, flour mills, factories, silos, airports, rivers, open fields, utility companies, and with musicians "on location." The adventure is in receiving live sonic spaces from more than one location at the same time - the tower, the ocean, the abandoned mill. Remote sound environments enter our local spaces and become part of our rooms.*

Adapted from: <http://www.artandeducation.net/announcement/mit-presents-a-tribute-to-pioneering-sound-artist-maryanne-amacher/>
<http://ludlow38.org/archive/index.php?/stuttgart/maryanne-amacher-city-links>

Read more: Maryanne Amacher Archive: http://maryanneamacher.org/memorial/Maryanne_Amacher/Amacher_Archive_Project/Amacher_Archive_Project.html

Cathy Berberian (1925—1983, US/Milan, Italy)

***Stripsody*, 1966**

visual score for solo voice

source: Berberian, Cathy. *Stripsody*, (New York: C.F. Peters, 1966), pp 8-9.
courtesy of the Hunt Library (Carnegie Mellon University)

Cathy Berberian is one of the most important innovators of vocal art in the twentieth century. She collaborated with many prominent composers, such as Luciano Berio (to whom she was married to for over a decade) and John Cage. She also interpreted numerous eclectic works from Claude Debussy to Igor Stravinsky to John Lennon. In 1959, Cage initially wrote, “Aria” specifically for Berberian (a mezzo soprano) to sing. Aria premiered at the Accademia Filarmonica in Rome with a simultaneous performance of *Fontana Mix* (one of the central works featured in *AFTERSOUND*). Cage wrote both pieces while he was in residence with Berio—inspired by both Berio’s own compositional practices, as well as Berberian’s unique interpretive works. Berberian describes how the audience responded after her performance of Cage’s work in Rome:

“...the big explosion was—the end of ‘58, the beginning of ‘59 when Cage wrote *Aria for Mezzo Soprano*...for me. That really shook [up] the ideas that people had about vocal possibilities. I remember the first time I did it in Rome...and [there] were the usual little old ladies you know and [were] obviously quite shaken up by this thing and there was a question and answer period afterwards with John Cage answering questions [and] one of these little ladies got up very primly you know with very tight little lips and said: ‘Mr. Cage, how could you let that lady’—that was me, ‘that lady’... how could you let that lady do such obscene things?”

Berberian made her compositional debut with *Stripsody*, for solo voice, in 1966. *Stripsody* is an exploration of the onomatopoeic sounds of comic strips illustrated by Roberto Zamarin. The work represented a radically new paradigm of new musical composition during the 1960’s. Berberian’s compositional directions for *Stripsody* implore each performer to “wherever possible [make] gestures and body movements...simultaneous with vocal gestures.” In this way, a kind of alienated effect is produced in which vocal events are— at once—inscribed score, and corporeal performance.

Read more: <http://cathyberberian.com>
<http://www.theguardian.com/music/gallery/2013/oct/04/graphic-music-scores-in-pictures>

Cathy Berberian: Pioneer of Contemporary Vocality by Placanica, Francesca, Verstraets, Pieter, Sivuoja-Kauppalaa, Anne, Karantonis, Pamela, (London: Ashgate Publishing, 2014)

John Cage (1912-1992, New York)

***Fontana Mix (Light Grey)*, 1981**

screenprint on arches paper, with three celluloid (mylar) templates printed in black ink
edition of 97, 76/97

courtesy of Solway Gallery (Cincinnati, Ohio)

John Cage's *Fontana Mix*, composed in 1958, premiered in Rome in 1959 with his vocal composition, *Aria* (composed using the process of *Fontana Mix*). The two works were presented simultaneously, with Cathy Berberian, one of the featured artists in this exhibition, performing *Aria* (see our "Pioneers of Sound" section). However, this particular screenprint of *Fontana Mix* is not the original score which actually came in a kind of "treatment manual" that consisted of ten transparencies with points; ten drawings having six differentiated curved lines; a transparency of a 100x20 graph; and a transparency of a straight line. In concert with a specific system for use, intersecting points of the graph would shift, producing corresponding lines and measurements made on several different sheets that were freely assigned to musical occurrences such as volume, tone color, and pitch. This print, in terms of its continually shifting "chance" positions as it is shipped around, or settles in its frame within a gallery or museum, repeats Cage's initial impulse to create a "score" that was truly indeterminate. When the Miller Gallery received this print, we did not recognize it from the image we first viewed on Solway's gallery site. It was precisely this shifting, unpredictable form that interested Cage across notation and performance. In our Pioneer of Sound section, we have a smaller, sample-sized version of *Fontana Mix* (1965), that acts as a mini facsimile of the original score. In contrast, *Fontana Mix (Light Grey)* (1981), is part of a series of prints that Cage executed in the late 1970s and 1980s, showing his passion for and versatility with works on paper. Almost all his prints during this period were produced with chance operations—both performed on the prints (as in the case of his watercolors), and, in this case, built into the very structure of the work.

Note: Cage used the original *Fontana Mix* (1958) to compose six different works: As mentioned above, *Aria* (for voice) (1958), *Fontana Mix* (for magentic tape) (1959), *Water Walk* (1959), *Sounds of Venice* (1959), *Theatre Piece* (1960), and *WBAI* (1960).

Read more here:

http://johncage.org/pp/John-Cage-Work-Detail.cfm?work_ID=79

<https://newamericanpaintings.wordpress.com/2012/02/28/controlled-chaos-john-cage-at-crown-point-press/>

<http://www.solwaygallery.com/>

John Cage (1912-1992, New York)

***Fontana Mix*, 1965**

[facsimile of original score]

12 transparent sheets (10 with points, one with a graph, one with a straight line) and 10 drawings with 6 differentiated curved lines. Reproduced from holograph. Includes instructions for creating piece.

Courtesy of Arts Library, Carnegie Mellon University Libraries
(with a very special thanks to Mo Dawley, Art and Drama Librarian)

Mini facsimile of the original score, *Fontana Mix* (1958) which was constructed as a kind of “treatment manual” that consisted of ten transparencies with points; ten drawings having six differentiated curved lines; a transparency of a 100x20 graph; and a transparency of a straight line. In concert with a specific system for use, intersecting points of the graph would shift, producing corresponding lines and measurements made on several different sheets that were freely assigned to musical occurrences such as volume, tone color, and pitch.

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John Cage (1912-1992, New York)

***Concert for Piano and Orchestra*, 1957-8**

solo for piano

Cage, John. *Concert for Piano and Orchestra*, (New York: Edition Peters 1960), pp 20.

Dedicated to the Abstract Expressionist painter, Elaine deKooning, *Concert for Piano and Orchestra* is the work that set the stage for the radical turn Cage took with *Fontana Mix* (also featured in this exhibition) and *Aria*, as well as many other open-ended scores to come. By using ambiguous notations, as well as many different ways of fulfilling the “instructions” for performers (at least fifty different options exist in the work), Cage began to forge a compositional approach that would largely be shaped by indeterminate and chance strategies. *Concert for Piano and Orchestra* was comprised of “63 pages to be played, in whole or in part, in any sequence, involving 84 ‘types’ of composition —to be performed, in whole or in part, in any duration, with any number of performers, as a solo, chamber ensemble, symphony, concert for piano and orchestra, aria, etc.” Performers were also encouraged to use any combination of piano, flute, clarinet, bassoon, trumpet, trombone, tuba, violins, violas, cello, double bass, with or without a conductor. In the same way that Cage’s *4’33”* (1952) was influenced by Robert Rauschenberg’s *White Painting* (1951), *Concert for Piano and Orchestra* was deeply influenced by the critical exchanges he had with Abstract Expressionist painters, among them Willem and Elaine deKooning, during his stints at Black Mountain College in the late 1940s and early fifties. Indeed, this inspired him to be sensitive to the materials with which he was working, i.e. even the imperfections in the paper used for this score, directed its shape and texture. This work was also used as music for a choreographed work by his partner, Merce Cunningham, entitled *Antic Meet* (1958), with stage decors and costume design by Robert Rauschenberg. It was also performed either solo or in combination with many other Cage works, including, *Fontana Mix*.

Read more here:

http://johncage.org/pp/John-Cage-Work-Detail.cfm?work_ID=48

Sofia Gubaidulina (Moscow, Russia and Hamburg, Germany)

***Detto I*, 1978**

sonata for organ and percussion

source: Gubaïdulina, Sofïa Asgatovna. *Detto I*, (Hamburg: H. Sikorski, 1991), pp 16-17.

Sofia Gubaidulina is a Russian composer whose works were viewed with skepticism by the leadership of the Soviet Union during the 1970s. Her “alternative tunings” threatened more traditional compositional practice. Her works often combined unusual pairings of instruments (bongos and cymbals; tam-tams and güiros) i.e. for *Detto I*, organ and percussion were employed. Gubaidulina is most known for her resistance to conventional tonal centers and traditional triadic structures, instead she favors pitch clusters and intervallic designs. The latter often arise from contrapuntal interactions between melodic sequences. In *Detto I* she uses sonorous glissando clusters on the organ and tremolo bell clusters as a contrast to vertical chord formations. This work, in particular, demonstrates the kinds of contrasts she often utilized in her work: linear against chordal against glissando.

Read more here:

<http://www.theguardian.com/music/2013/oct/31/sofia-gubaidulina-unchained-melodies>

Jennifer Higdon (New York)

rapid-fire, 1992

Higdon, Jennifer. *rapid-fire*, (United States: J, Higdon, 1992), pp 6.

Jennifer Higdon has written works in a wide variety of instrumentations, from unaccompanied solo pieces to concerti, chamber, and large-scale symphonic compositions. She has also written both programmatic (works that use an extra-musical narrative) and absolute music (works that exist independently—in and of themselves— from any reference to the outside, representational world). Although, her programmatic works heavily outnumber the absolute pieces. Her titles, such as *running the edge*, *rapid•fire*, and *DASH* use letters similar to how she thinks of musical notation. She often plays on words and their capitalization, font, and placement—in an effort to evoke the expected mood or structure of a particular work. For example, *rapid•fire* is a frantic six-minute piece for solo flute in which the flute depicts the violence of an inner-city battle scene, imitating gunshots and cries of the wounded innocent. Like many of Higdon's compositions, this work includes in its score an explanation of the title, program notes and explicit instructions for the performer. Higdon describes *rapidfire* as a musical representation of the “violence of the cities; more specifically, the innocent young who are cut down in their homes and on the streets. It is an expression of rage, of pain, and of disbelief.” She charges that the work for solo flute in *rapid•fire* is “supposed to be brutal and raucous.” The score includes thirty-nine detailed instructions that direct the solo flutist to use a variety of extended techniques including pitch bending, harmonics, alternate fingerings, overblowing, and triple tonguing, at corresponding points in the score. The final instruction tells the flutist to throw a small firecracker upon reaching the last note of the piece, an explosive punctuation to the violence found throughout the work.

Read more here:

“Jennifer Higdon's Oboe Concerto: The Composition, Transformation, and a Performer's Analysis,” Janice Elizabeth Crews, unpublished dissertation, School of Music, Louisiana State University, 2010.

<http://jenniferhigdon.com/biography.html>

<http://jenniferhigdon.com/nonorchestralreviews.html>

Author Unknown

Medieval Fragment

(score for the 2nd Sunday of Advent), Italy, ca. 1525

vellum leaf; black, green, red, blue, and orange pigment; illuminated initial, "I" (J) in gold leaf

Courtesy of Special Collections, Carnegie Mellon University Libraries, donated by Dorothy Smith Sterling from the library of Homer E. Sterling, Professor of Graphic Design (had special interest in art book design), Carnegie Institute of Technology (ca. 1940s - 1970s)

(with a very special thanks to Mary Catharine Johnsen, Senior Librarian, Special Collections Librarian for Fine & Rare Book Room, Liaison Librarian to the School of Design; and Kristin Heath, Music and Catalog Librarian, Liaison Librarian to the School of Music)

Used in the Roman Mass for the 2nd Sunday of Advent, this particular fragment, was taken from what was known as the "Jerusalem Surge" or the communion section of the liturgy. The first words on the fragment are from the offertory: "tuam, et Salutare tuum da nobis" or, "grant us thy salvation." The illuminated "I" or "J" in gold leaf and orange-pink and green pigment refers to the word, Jerusalem, sung in this phrase in the main part of the choral work: "Arise, O Jerusalem, and stand on high; and behold the joy that will come to thee from thy God." Note: capital "I" and capital "J" are written the same during this particular manuscript era. The development of square notation in medieval music may be seen as the result of changes in both the conception and the function of chant notation. Stroke notation organized into a series of discrete squares linked by thin lines suggests that "chant" was thought of more in terms of individual pitches than of lines and phrases. The latter might have resulted because of a chant's role as static tenor beneath more mobile upper parts in polyphony. Because of the easier visibility of individual notes, it facilitated singing from a codex by a group of singers (the increasing size of manuscripts also reflects the trend towards singing from a book instead of from memory, at least in some regions). This particular "score page" is from a book that was not for private use. The latter was placed upon a pedestal for group viewing, monks or nuns gathered around to sing from it.

Read more here: Google e-book version of *The Liturgical Year, Advent*, 2d. ed. by the Very Rev. Dom Prosper Guéranger, Abbott of Solesme. Dublin, James Duffy, 1870. p. 174

The Oxford Dictionary of Music::

http://www.oxfordmusiconline.com/subscriber/article/grove/music/20114pg4?q=square+notation&search=quick&pos=46&_start=26#firsthit

<http://www.oxfordmusiconline.com/subscriber/article/grove/music/20114pg4?q=square+notation&search=quick&pos=46&_start=26#firsthit>

Listen to a contemporary version here:

<https://www.youtube.com/watch?v=ZjV-SElwduA>

György Ligeti (Romania, 1923—Vienna, 2006)

***Volumina*, 1973**

for organ

Ligeti, György. *Volumina for Organ*, (Frankfurt; New York: H. Litolff's Verlag/C.F. Peters, 1973), pp 4-5, 10-11, 18-19.

György Ligeti is known for his complex micropolyphonies (simultaneity of different lines, rhythms, and timbres). His 1961 orchestral work, *Atmosphères* made him known to an international audience—a piece in which a seemingly static structure of single voices is in constant flux through minute rhythmic, intervallic, and dynamic adjustments. Other works like *Requiem* (1963-65) and the choral work, *Lux aeterna* (1966) were featured in Stanley Kubrick's soundtrack for *2001, A Space Odyssey*. Influenced by Pierre Boulez's version of serialism, John Cage's theories of chance, and Iannis Xenakis's stochasticism, Ligeti invented a way of thinking about composition that merged these ideas into the notion of permeability, a way of approaching “groups, structures, and textures” in music—replacing melodic lines, motifs, and harmonies for the notion of slowly, emerging, sustained sounds. Like *Atmosphères*, *Volumina*, transfers the lessons from Darmstadt and Cologne—in which electronic works were central—so that one hears the modulations of a recorded work (timbre) represented in ever-so-slightly changing acoustic textures. By using a “cluster technique,” in *Volumina* (and other works of this period), Ligeti would use the same chord, but the form changed and grew throughout the course of the piece through always-changing registration and a mounting crescendo. The scoring for *Volumina* is different than all of his other music, it is Ligeti's only example of graphic notation, composed at a time when he was rebelling against serialism.

Read more here: “Sourcing Gesture and Meaning from a Music Score: Communicating Music Technique in Music Teaching,” Dr. Andres Blackburn, Faculty of Music, Sultan Idris Education University Tanjong Malim Perak, Malaysia: http://www.academia.edu/4390774/Gesture_and_meaning_derived_from_the_score_communicating_technique_in_music_teaching

“A Guide to György Ligeti's Music,” Tom Service, The Guardian (August, 2012): <http://www.theguardian.com/music/tomserviceblog/2012/aug/27/gyorgy-ligeti-contemporary-music-guide>

Listen here: <https://www.youtube.com/watch?v=wbLcl9-JsOU>

Karlheinz Stockhausen (1928-2007, Kürten, Germany)

***Tierkreis*, 1974-75**

(12 Melodien der Sternzeichen/ 12 Melodies for the Zodiac)

Stockhausen, Karlheinz. *Tierkreis*, (Kürten, Germany: Stockhausen Verlag, 1975/1993), title page.

Influenced profoundly by the work of Olivier Messiaen (with whom he also studied), Karlheinz Stockhausen composed 376 individually performable works. He was one of the primary theoreticians of electronic and serial music—serving as the artistic director for one of the most important electronic music studios in history, the West German Broadcasting (Westdeutscher Rundfunk) in Cologne, Germany from 1963 to 1977. His early work, *Studie I* (1953; “Study”) was the first musical piece composed from sine-wave sounds, while *Studie II* (1954) was the first work of electronic music to be notated. Stockhausen’s studies at the University of Bonn (1954-56) in phonetics, acoustics, and information theory informed much of his subsequent composition work. Besides WDR, his early exposure to musique concrète and the studios of Pierre Schaeffer at the Radiodiffusion-Télévision Française (RTF), set the stage for later explorations into sound synthesis and spatial projections, as explored in his works, *Kontakte* and *CARRÉ* (both premiered in 1960).

Tierkreis (1974-75), developed out of a playful music-theater piece that Stockhausen had composed for his own children, entitled, *Musik im Bauch* (music in the belly) (a joke he had with his youngest daughter was that her growling belly was making music). *Musik im Bauch* features a scene where a performer reaches into the belly of a life-size puppet and pulls out twelve music boxes. Stockhausen’s task of actually composing something these music boxes could play yielded twelve melodies, one named after each constellation of the zodiac, thus, *Tierkreis* came into being. Each of the 12 melodies is meant to be played on a music box—the original twelve music boxes were produced in 1974 in collaboration with technicians at the Reuge music box factory in Ste. Croix, Switzerland.

Karlheinz Stockhausen (1928-2007, Kürten, Germany)

***Carré (Square)*, 1959-60**

(für 4 Orchester und Chöre/for 4 orchestras and 4 choirs)

Stockhausen, Karlheinz. *Carré*. (London: Universal Edition 1971), pp 58-59.

As mentioned in the description of *Tierkreis*, *Carré* was composed during the same span of time that he was working on *Kontakte* (1958-60)—a period in which Stockhausen was deeply involved in exploring the spatialization of sound (both in terms of psychoacoustics, as well as spatial distribution in terms of pitch, rhythm, timbre, dynamics, register, and density within composition). Thus, he used a large orchestra of eighty players and then divided them into four orchestral units, each given approximately the same scoring, and each given their own conductor. A mixed choir of between 12 and 16 singers were attached to each orchestra. These groups were then distributed into four corners of, preferably, a perfectly square performance space. (similarly, *Kontakte* is composed in four channels, with loudspeakers placed at the corners of a square surrounding the audience). Unlike his previous works up to this point, which were concerned with frequency ratios of complex timbres, in *Carré*, a simpler attention was given to individual sounds or combinations that organized interior rhythms. He was also interested in temporality and velocity, a focus that came to him, he argues, while on tour, flying from one city to the next, in the US:

“I was flying every day for two or three hours over America from one city to the next over a period of six weeks, and my whole time feeling was reversed about two weeks. I had the feeling that I was visiting the earth and living in the plane. There were just very tiny changes of bluish color and always this harmonic spectrum of the engine noise...it changed all the time because I was listening to all the partials within the spectrum...I made sketches for *Carré* during that time.”

Read more here:

http://www.karlheinzstockhausen.org/carre_english.htm

Other Planets: *The Music of Karlheinz Stockhausen* by Robin Maconie (New York: Scarecrow Press, 2005)

Listen here:

https://www.youtube.com/watch?v=tnaL_KyjQxA

Iannis Xenakis (Romania, 1922—Paris, 2001)

Psappha (Sappho), 1975

for solo percussion

Xenakis, Iannis. *Psappha*, (Paris : Editions Salabert, 1976), pp 4-5.

Iannis Xenakis is probably one of the most diversely trained composers in this exhibition. Born in Romania and educated in Greece, he illegally emigrated to Paris in 1947—fleeing the violence caused by the Axis occupation of Greece. In Paris, he met the architect, Le Corbusier and landed a job in his architectural studios. First, simply working as an engineering assistant, he soon became one of the most important figures in Le Corbusier's projects, eventually co-authoring and directing many of the architect's most innovative ventures. While working for Corbusier, Xenakis studied harmony, counterpoint, and composition. And, his architectural and musical interests began to merge. At Le Corbusier's request, Xenakis organized a "spatialized concert" on the roof of the housing unit in Marseille for the CIAM (Congrès international d'architecture moderne). Three different types of music were played from three different points on the terrace (musique concrète, traditional music from India and Japan, and jazz).

His now, well known architectural-sound spatialization projects include a monastery at La Tourette near Eveux-sur-l'Arbresle in France (1957) and the *Philips Pavilion* (1958). The former was designed while he was working on his composition, *Metastasis*, whose textures and glissandi are based on ruled parabola and graphically conceived. This compositional approach directly influenced the triple rows of his famous "undulating glass panes" on the west facade of the monastery, as well as the parabolic shape and sound design of the Philips Pavilion (lined, as it was, with 450 speakers). Xenakis, in his stochastic compositions, was interested in characterizing physical reality in a non-deterministic way, by giving probabilities of occurrences--and thus rethinking notational time in terms of a statistical mean of events and movements. Stochastic means conjecture, chance, probability, but also translates from the Greek as TARGET and REFLECT--the twin systems of indexical and phenomenological investigations. Xenakis's scores, influenced by his earlier training as an architect under Le Corbusier, were visual models which he animated by manipulating different components of sounds into a complex audio template--mirroring the aggregate movement of particles, whether they be gas molecules, cicadas buzzing in different pulses, a swarm of bees droning in flight, or clouds scurrying across the sky. With the help of Messiaen, he was accepted as a member of Pierre Schaeffer's Groupe de Recherches de Musique Concrete from 1955-62, in which he created his iconic work, *Concret PH* (1956) used in the Philips Pavilion. Nevertheless, he was considered an outsider to Schaeffer's group because of his interest in works that needed to be realized, not just with tape recorders, but with massive live string-oriented orchestras.

"*Psappha*, which pays homage to Sappho's incantatory rhythms, is scored for six groups of instruments, the choice of materials being left largely to the player. Schick used woodblocks, bongos, a tom-tom, congas, a bass drum, steel pipes, a frying pan, and two Xenakis specialties: *simantra*, resonant wooden bars modelled on Byzantine church instruments; and *sixxen*, or bars of metal. The music proceeds from gently purring, interlocking patterns to an apocalyptic episode of bass-drum thwacks interspersed with silences, then rises to a shimmering, accelerating finale. The score presents various riddles, not least a multilayered passage that apparently requires the player to grow a third arm. Xenakis often inserted such "impossible" moments: the piano piece *Evryali* notoriously includes a C-sharp that is a half step higher than the highest note on the instrument."

—Alex Ross, "Xenakis in New York" (The New Yorker, March 1, 2000)

Read more here:

<http://www.therestisnoise.com/2010/03/xenakis-.html>

<http://www.iannis-xenakis.org/xen/bio/biography.html>

"Paul Sharits: A Cinematics of Sound," by Melissa Ragona in *Lowering the Boom: Critical Studies in Film Sound*, eds. Jay Beck, Tony Grajeda (Chicago: University of Illinois Press, 2008) [special section on Iannis Xenakis and his influence on the filmmaker, Paul Sharits]

Iannis Xenakis

Metastasis (Dialectical Transformations)

1953-54

score for orchestra

Xenakis, Iannis. *Metastasis*, (London; Boosey & Hawkes Music Publishers Ltd., 1967), pp 4-5.

His first major work, *Metastasis* was written in 1953-54 after his studies with Olivier Messiaen whose focus on non-retrogradable (palindromic) rhythms and indefinite harmonic sequences —approaches that would inspire Xenakis to think of ways of stretching time and fooling pitch. *Metastasis* was written for 61 orchestral players (46 strings), with each playing a different part. Uses multiple glissandi (straight lines) in the music for string and horn parts. The latter are indicators for the player to begin at a certain pitch and slide through all the frequencies on the way to a different pitch (could be higher or lower). Xenakis realizes that drawing the glissandi in the score can create a special surface of straight lines, called a ruled surface. This was the inspiration for his design of the *Philips Pavilion*. He thought of the glissandi as graphs of straight lines (time on the horizontal axis, pitch on the vertical), where different slopes correspond to different “sound spaces.”

Read more here:

“Aspects of compositional realization in Xenakis’s pre-stochastic and early stochastic music,” Ron Squibbs, Proceedings of the Xenakis International Symposium Southbank Centre, London, 1-3 April 2011. www.gold.ac.uk/ccmc/xenakis-international-symposium

<http://www.theguardian.com/music/tomserviceblog/2013/apr/23/contemporary-music-guide-xenakis>

Listen here:

<https://www.google.com/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=xenakis%20metastasis>

Roger Beebe

TB TX DANCE (Two-Projector Version)
2007

[N.B., the single-channel version was made in 2006, but this version was created for my 2007 tour]
HD video transfer from 16mm film original, 2:26

The background of the image is made of patterns of dots directly laser printed on clear leader. That background also doubles as an optical soundtrack/score with different pitches created by the different density of dots. The dots were inspired by the stockings Toni Basil (“Antonia Christina Basilotta”) wore in Bruce Conner’s “Breakaway” in 1966, which also serves as the source footage for the dancer in the film.

This film was commissioned at Cinematexas in 2005 (over a meal of pulled pork and peach cobbler) and is also known as “32.37” (the price of that meal). From the *Lunchfilm* series: curator Mike Plante has lunch with a filmmaker and then gets a film for the cost of the lunch in trade. Some rules are written on a napkin. The rules for this commission: Reference dance. Reference Texas. Have an autograph in it. Mention Toni Basil.

Scott Kiernan

Devils Triangles Reprise, 2006

26 min. video installation with sound, custom built harp, steel

A song to conjure to transport of the Bermuda Triangle to the American Midwest, derived from a graphic score composed through the triangulation of U.S. domestic flight paths.

The visual score was then sent to a harpmaker in the Appalachian mountains, whose geographic coordinates in relation to my own, paralleled the original flight triangulation map. He built a harp from this score, on which he performed and shot video which was later included in the final piece.

Golan Levin et al.

***Dialtones (A Telesymphony)*, 2001-2002**

Live performance with interactive software and audience mobile phones, 35 minutes

Dialtones (A Telesymphony) is a large-scale concert performance whose sounds are wholly produced through the carefully choreographed ringing of the audience's own mobile phones. Before the concert, participants register their mobile phone numbers at a series of web terminals; in exchange, new ringtone melodies are automatically transmitted to their phones, and their seating assignment tickets are generated. During the concert, the audience's phones are dialed up by live performers, using custom software which permits as many as 60 phones to ring simultaneously. Because the exact location and tone of each participant's mobile phone is known in advance, the *Dialtones* concert is able to present a diverse range of unprecedented sonic phenomena and musically interesting structures, such as waves of polyphony which cascade across the audience. *Dialtones* was presented at the Ars Electronica Festival in September 2001, and at the Swiss National Exposition in May and June of 2002.

George Crumb (1929, Charleston, West Virginia) ***Ancient Voices of Children*, 1970**

settings of texts by Federico García Lorca

song cycles scored for soprano, boy soprano, oboe, mandolin, harp,
amplified and toy pianos, percussion

Crumb, George. *Ancient Voices of Children*. (New York: C.F. Peters Corporation, 1970), pp 4-5.

George Crumb is probably one of the most accessible composers of post-serial work. Influenced profoundly by Anton Webern, his work features unusual timbres, alternative forms of notation, and extended instrumental and vocal techniques. He often juxtaposes contrasting musical styles, i.e. Western and non-Western musics, classical and experimental, hymns and folk music. Much of Crumb's work, like Jennifer Higdon's, also featured in this exhibition, utilizes programmatic, symbolic, mystical and theatrical elements. Thus, his work is overwhelmingly visual, supplemented by his passion for visual scores. *Ancient Voices of Children* is famous for its bizarre and often eerie vocal effects. Perhaps the most original of these is produced by the soprano singing a kind of fantastic vocalise (based on purely phonetic sounds) into an amplified piano. The singer's voice echoes as the piano strings reverberate sympathetically with the singer. The layout of Crumb's score in the third section of the work, suggests the movement's circular, repetitive form, but it is also symbolic of the meaning of the entire work, which uses Lorca's poetry to create a cycle of birth, death, and rebirth.

Crumb describes his method in this particular work:

"In *Ancient Voices of Children*, as in my earlier Lorca settings, I have sought musical images that enhance and reinforce the powerful, yet strangely haunting imagery of Lorca's poetry. I feel that the essential meaning of this poetry is concerned with the most primary things: life, death, love, the smell of the earth, the sounds of the wind and the sea. These "*ur-concepts*" are embodied in a language which is primitive and stark, but which is capable of infinitely subtle nuance."

Read more here:

<https://www.bostonconservatory.edu/percdb/crumb-ancient-voices-children>

<http://www.georgecrumb.net/>

Listen here:

<https://www.youtube.com/watch?v=x2R6RzkYNwc>

George Crumb

Black Angels: Thirteen Images from the Dark Land 1971

for electric string quartet

Crumb, George. *Black Angels*. (New York: C.F. Peters Corporation, 1971), pp 5-6.

The score to *Black Angels* is inscribed: “finished on Friday the Thirteenth, March 1970 (in tempore belli)” The date of the piece, 1970, was the height of the Vietnam war. For Crumb, this piece is essentially about good versus evil through continual allusion. He conceived the work “as a kind of parable on our troubled contemporary world.” Beginning with the title of the piece, *Black Angels: Thirteen Images from the Dark Land*, Crumb states that “the image of the ‘black angel’ was a conventional device used by early painters to symbolize the fallen angel.” The black angel, in other words is the devil or evil in the good versus evil polarity. The titles of the movements continue the good versus polarity: the fourth movement being, *‘Devil-music’* and the tenth movement, *‘God-music.’* Crumb states “the numerous quasi-programmatic allusions in the work are therefore symbolic although the essential polarity - God versus Devil - implies more than a purely metaphysical reality.” The overall structure of the piece is held together through a numerological construct of which the numbers 7 and 13 are the deciding factors. The numbers 7 and 13 representing good versus evil to Crumb and make up the palindromic design of the piece. *Black Angels: Thirteen Images from the Dark Land* uses the extremes of the electronic instruments’ registers as well as extended techniques such as bowing on the fingerboard above the fingers and tapping the strings with thimbles. At certain points in the music, the players are even required to make sounds with their mouths and to speak. The use of electronic amplification with its distortion is significant to Crumb’s notion of reaching out to the world beyond. Crumb’s score includes a diagram that places the four musicians in a box-like formation. Electric Violin II and Electric Cello are located near upstage right and upstage left, respectively, with their tam-tams between them. Electric Violin I and Electric Viola are near downstage right and downstage left, respectively, but are slightly farther apart than the other two musicians in order to allow full sight of the quartet. *Black Angels* was performed by our very own, Carnegie Mellon Philharmonic in 2011.

Adapted from:

<http://www.humanities.mcmaster.ca/~mus701/melissa/essay.htm>

Read more here: “Between Romanticism and Modernism and Postmodernism: George Crumb’s *Black Angels*,” Blair Johnston, *Society for Music Theory* (Volume 18, No. 2, June, 2012):

<http://www.mtosmt.org/issues/mto.12.18.2/mto.12.18.2.johnston.html>

Listen here (Performed by Carnegie Mellon Philharmonic, 2011):

https://www.youtube.com/watch?v=YGIW_6TN82g

James P. Brommer

Sound Visualization Project, 2005

Rhythm: Time, Motion, and Communication, Professor Dan Boyarski

1 minute

Poetry is an excerpt from “Lecture On Nothing,” by John Cage given at the Artist’s Club, New York, 1950.

Music “Amores I,” by John Cage, 1943. Performed by Cikada Duo, 2002.

Heebok Lee

Sound Visualization Project, 2003

Rhythm: Time, Motion, and Communication, Professor Dan Boyarski

2 minutes

Music “Vox Balaenae (Voice of the Whale),” by George Crumb, 1971.

Courtesy of Arts Library, Carnegie Mellon University Libraries
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Special Collections Librarian for Fine & Rare Book Room, Liaison
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Art and Drama Librarian).

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