creation and technology: the contemporary opera

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Il international conference

electroacousticwinds

eaw2017 synchresis

AUDIO VISION TALES

The International Conference *Electroacousticwinds 2017*:

SYNCHRESIS – Audio Vision Tales is organized by the Center of Electroacoustic Research (CIME), the Institute for Ethnomusicology – Research Center for Music and Dance (INET-MD), Research Institute in Design, Media and Culture (ID+) and DigiMedia – Digital Media and Interaction (CIC.Digital).

This conference seeks to establish bridges between Music Creation, Design & Soundscapes and New Media.

The *eaw2017 SYNCHRESIS – Audio Vision Tales* conference will focus on the relationship between sound and image, two different languages within the multimedia art form. The technological tools to improve this relationship are the main focus of the proposed symposium; dialogical perspectives will be given center stage relevance and participants will be confronted with both technical-linguistic and aesthetic points of view, but also discussions on how technology is enabling these two mediums to merge, creating tools for manipulating and enhancing not only the artist's creativity but also the audience's immersion.

This audio-vision relationship has become a research focus for different authors in recent decades. However, in this field, as in others within the digital humanities realm, new assumptions and theories are created every time technology overcomes its constraints and presents a new paradigm. Design and soundscapes aims to discuss and mirror interactions between and features of design, sound, silence and the potential to perceive space, place and time. Intending to enlarge the scope of the debate, Design and Soundscapes invites researchers, practitioners and performers to present theoretical frameworks and/or empirical studies that address these topics.

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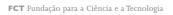














Monday, 13th November

8h00 Registration

OPENING SESSION CCCI Auditorium

Prof. Dr. Manuel Assunção, Rector of University of Aveiro

Prof. Dr. Rui Raposo, Head of Department

Communication and Art

Prof. Dr. Isabel Soveral, Research Unit INET-MD,

University of Aveiro

Prof. Dr. Fátima Pombo, Research Unit ID+, University of

10h00 **Coffee Break**

SESSION I CCCI Auditorium

INTERACTIVE SOUND I VIRTUAL REALITY / AUGMENTED REALITY

10h30 Keynote

Guilherme Campos, University of Aveiro

Give Us Some Space

11h30 Rui Penha, INESC TEC - University of Porto

The unique expressivity of interactivity

Henrique Portovedo and Paulo Ferreira-Lopes CITAR -12h00

Portuguese Catholic University of Porto

HASGS: Hybridaugmented system of Gestural Symbiosis Generating Visual Information

12h30 Lunch

SESSION II CCCI Auditorium

SOUND & STORYTELLING

14h00 Keynote

Nuno Fonseca, Polytechnic Institute of Leira

Sound Particles

António Sousa Dias, University of Lisboa 15h00

Cinema e sonoplastia: O caso de Domingo à Tarde (1966)

de António de Macedo

15h30 António Costa Valente, University of Aveiro

O CONTO DO VENTO: o jogo da narração

16h00 Mat Dalgleish and Niel Reading, United Kingdom

Seeing with One's Own Ears: Soundtrack as Interface for

17h00 Coffee Break

CONCERT CCCI Auditorium

SYNCHRESIS

Works by Composers and Designers from University of

WORKSHOPS

10h00-13h00 - AV Studio

W1: Sound Particles

Nuno Fonseca, Polytechnic Institute of Leiria

15h00-18h00 - AV Studio

W2: Sing and Speak 4 Kids

David Sonnenschein, University of Southern California

15h30-18h00 - CCCI Auditorium

W3: Musidesign: patterns in live performance

Lori Freedman, University of Concordia

Pierre Hebert, filmmaker, performer and visual artist

Tuesday, 14th November

SESSION III CCCL Auditorium

DESIGNING ATMOSPHERES

9h30 Keynote_Jaime Munarriz Ortiz, Complutense University

Sonic landscapes, visual environments. Interaction and

synchronicity in composition and live performance.

10h30 Coffee Break

11h00 Lecture

Anna Marie Fisker, University of Aalborg

Teatro Olimpico by Andrea Palladio - an iconic opera scenario - and the diffused lightning system - enhancing the aura of mystery in the Wagnerian universe by Mariano

11h30 Niels Peter Skou, University of Southern Denmark

Soundscapes of the experience museum

Nadine Leles, Joel Preto Paulo and Carlos Carvalho, 12h00

Engineering Institute of Lisboa

Sensa Sound

12h30 Lunch

SESSION IV CCCI Auditorium

SOUND AND VISION IN EDUCATION

14h00 Kevnote

> David Sonnenschein, University of California SanDiego Film Dialogue and Lyrics as Catalyst for Speech

Production

15h00 Rita Nicolau and Joana Quental, University of Aveiro

Design as a tool for education in Dyslexia: the importance

of musical feedback

15h30 Marcelo Batista and Rui Costa, University of Aveiro

Visual Representation in Musical Education

Carlos Alberto Augusto, composer and sound designer 16h00

Soundscape studies in Portugal

17h00 Coffee Break

CONCERT DeCA Auditorium

Bridging 18h00

Lori Freedman and Pierre Hebert

WORKSHOPS

9h30-12h30 - Room 21.2.1 / 14h30-17h30 - Room 21.2.1

W4: Audio Post-Production for Cinema

Nikola Medic, MA in Sound Design at National Film and

Television School

Wednesday, 15th November

SESSION V DeCA Auditorium

VISUAL STORYTELLING AND MUSIC

9h30 **Omar Hamido** (online), University of California Irvine *Abstract Rhythm Model*

10h00 **Tânia Barros and Helena Barbosa**, University of Aveiro From static to dynamic: representing images through

music

10h30 Coffee Break

11h15 **Joana Sá**. University of Aveiro

Beyond dualities and subjectivity – The performing body

and the virtual
11h45 **Nuno Dias**. Un

Nuno Dias, University of Aveiro

Music versus Design – the possibility of a sound and vision

co-creation culture in DeCA

12h30 Lunch

SESSION VI DeCA Auditorium

INTERIOR DESIGN HISTORY AND MUSIC

14h30 **Keynote_Renja Suominen-Kokkonen**, University of

Helsinki

Music and Soundscape in Alvar Aalto's Architecture

15h30 **Liliana Neves and Fátima Pombo**, University of Aveiro *The quality of the Music Room in the domesticity of the*

Casa dos Patudos. Raul Lino project of 1905

Rita Cruz and Fátima Pombo, University of Aveiro

16h00 **Rita Cruz and Fátima Pombo**, University of Aveiro Sound in space as a design feature in workplace interiors

16h30 Lecture

Paulo Jorge Ferreira, CEO of Avantools

17h00 Coffee Break

CONCERT CCCI Auditorium

18h00 Itinerário do Sal - multimedia opera

Miguel Azguime, Miso Ensemble

WORKSHOPS

9h30-12h30 - Room 21.2.1

W4: Audio Post-Production for Cinema

Nikola Medic, MA in Sound Design at National Film and Television School

9h30-12h30 - Room 40.3.16

W5: Observation of the Environment and Construction of the Landscape (theoretical session and debate)
Carles Ameller and M. Dolors Tapias, University of

Barcelona

Thursday, 16th November

SESSION VII DeCA Auditorium

INTERTWINING - SOUND GRAPHIC NOTATION

9h30 **Keynote_Per Anders Nilsson**, University of Gothenburg Symbols—Signs—Sounds

10h30 Coffee Break

11h00 **Pedro Louzeiro**. University of Évora

Synchronizing to Visual Cues in a Networked, Real-Time

Notation Environment – Comprovisador
11h30 Eunice Artur and Graca Magalhães. Un

Eunice Artur and Graça Magalhães, University of Aveiro Sound as a medium, the performer as a médium

SESSION VIII - DeCA Auditorium

INTERACTIVE SOUND II: Performance

12h00 Belquior Marques and Pedro Rodrigues, University of

Aveiro

Perceive to Perform: Temporal Indeterminacy in Music for

instrument and Live Electronics

12h30 **Helena Marinho and Joaquim Branco**, University of

Aveiro

New music for old instruments: The expanded fortepiano

13h00 Lunch

SESSION IX DeCA Auditorium

CREATION AND TECHNOLOGY: THE

CONTEMPORARY OPERA

14h30 **Keynote_Sharon Kanach,** University of Rouen, Centre lannis Xenakis

15h30 Eduardo Patriarca and Isabel Soveral, University of

Aveiro Magdala

16h00 **António Chagas Rosa**, University of Aveiro

Melodias Estranhas

16h30 **Miguel Azguime,** Director of Portuguese Music

Information Center

Two New Op-Era examples and their technological

creation network

17h00 Coffee Break

MOVIE CCCI Auditorium

18h00 Through this looking glass

Joana Sá, University of Aveiro

WORKSHOPS

9h00-13h30 - Room 40.3.16 / 14h30-19h00 - Room 40.3.16

W5: Observation of the Environment and Construction of the Landscape (field work)

Carles Ameller and M. Dolors Tapias, University of Barcelona

14h30-17h30 – Sound Studio

W6: The Bucket System - a computer mediated improvisation system by Palle Dahlstedt, Per Anders Nilsson, and Gino Robair

Per Anders Nilsson, Performer Ensemble, University of Gothenburg

Friday, 17th November

ROUND TABLE AND GROUP DISCUSSIONS CCCI Auditorium

Ph30 Audio-Vision relationships – new research perspectives

SESSION I INTERACTIVE SOUND I: VIRTUAL REALITY / AUGMENTED REALITY

Give us some space

Guilherme Campos University of Aveiro

Keywords: Room acoustics, spatial hearing, auralisation, 3D spatialisation, audio virtual reality.

This talk explores different notions of 'space' in connection to human sound perception and the development of audio and VR technology.

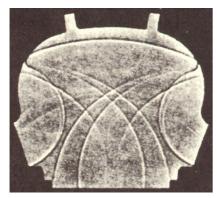
Eardrum stimuli are determined not only by the sound sources themselves but also by their location within the surrounding space and the acoustic behaviour defined by its physical characteristics (size, shape and materials). Recognised and studied for millenia, this observation is especially important in spaces built for speech and/or music. Multiple links can be found between music and architecture. The inter-influence between musical styles and the design of performance spaces is a fascinating topic. Sabine established the field of Room (or Architectural) Acoustics on modern scientific grounds about a century ago. It is now quite clear how to achieve good acoustics for both speech and music. Still, room acoustic design is too often neglected.

From the eardrum stimuli, the internal auditory system is able to extract data on the location of the source and the physical characteristics of the space. This spatial hearing ability is vitally important, as evidenced by the pervasive evolutionary traits specifically supporting it, like pinnae and multiple, spaced-apart ears. Directional information is imprinted on sound waves due to their interaction with head and torso. The main azimuth cues are inter-aural level and arrival-time differences (ILD and ITD); pinnae are key to adding elevation-dependent spectral colouring. All the cues for a given direction can be captured by measuring the corresponding binaural head-related impulse response (HRIR).

Conventional stereophony, in which two loudspeakers control the ILD cues determining the perceived source

position on the L-R axis, was the initial step towards integrating the spatial dimension of sound in audio. It can be extended to 3D through the use of loudspeaker arrays. With 3D recording technology (soundfield microphones, Ambisonics equipment) increasingly mature and accessible, there is no technical impediment to 3D musical performance, exploration and creation. However, with surround-sound systems largely restricted to cinema theatres, few rooms are appropriately equipped and accessible for that purpose.

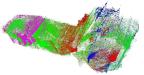
Reproduction is the true challenge for high-fidelity 3D sound spatialisation. The effectiveness of loudspeakerarray delivery is restricted to a relatively small listening area ('sweet spot') and far-field source simulations. These limitations are potentially solved by binaural delivery, with spatialisation through HRIR filtering – at the expense of real-time acoustic modelling with headtracking for each listener and the need to wear headphones (or earphones). Numerous interesting application niches can be mentioned. Externalisation and localisation accuracy with non-individualised HRIR sets can be improved through learning. The research project 'Virtual headphones' aims at dispensing with actual headphones by using directional ultra-sound beams to carry the audio signals to the listener's ears. VR technology is traditionally vision-oriented; the trend to full 360o systems accentuates the hemispheric range limitation of vision and the need to integrate the audio component. Sound is important in its own right but also crucial to support multimodal perception mechanisms. For example, the VR distance compression effect, especially notorious with HMD devices, can be addressed by manipulating audiovisual congruence.



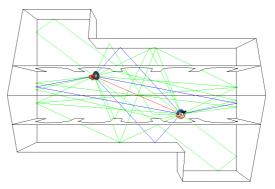
Scale-model photographic investigation of sound-wave propagation in a New York theatre, by Wallace C. Sabine.







3D Reconstruction and Auralisation of the 'Painted Dolmen' of Antelas



AcousticAVE demo: HRIR-based headphone auralisation with real-time head-tracking in a virtual space

Sabine, W (1922) Collected papers on acoustics. Cambridge, Harvard University Press.

Campos G, Dias P, Vieira J, Santos J, Mendonça C, Lamas JP, Silva N and Lopes S (2014) AcousticAVE: Auralisation Models and Applications in Virtual Reality Environments. 8th Iberian Congress of Acoustics (TECNIACUSTICA 2014), Murcia, Spain, October 29-31.

Mendonça C, Campos G, Dias P, Vieira J, Ferreira J, Santos J (2012) On the Improvement of Auditory Accuracy with Non-Individualized HRTF-based Sounds. J. Audio Eng. Soc. 60(10), pp. 821-830, October.

Blard G (2013) Auscultadores Virtuais. MEng dissertation, University of Aveiro, December.

Finnegan D, O'Neill E, Proulx M (2016) Compensating for Distance Compression in Audiovisual Virtual Environments Using Incongruence. Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems, pp. 200-212, San Jose, California, USA, May 7-12.

The unique expressivity of interactivity

Rui PenhaINESC TEC – University of Porto

Keywords: interactivity; expressivity; gesture; interactive music; sound design

Interactivity has become a mainstream buzzword, one that is used to denote a particularly large spectrum of

processes, from the dependable reaction of a screen pointer to a given human input all the way to engaging behaviours probably best expressed in the German word zusammenspiel — from zusammen (together) and spiel (play). Interactive musical systems have long been a research interest for various authors, with notable early definitions by Robert Rowe (1993), Joel Chadabe (1997), Todd Winkler (1998) and Bert Bongers (2000). Of particular interest for this talk will be the three metaphors proposed by Joel Chadabe on a public talk in 2005 (as cited in Drummond, 2009) as a way to describe different paradigms of interactive musical systems: "(1) Sailing a boat on a windy day and through stormy seas; (2) The net complexity or the conversational model; (3) The powerful gesture expander."

The conventional way of producing sound with mechanical musical instruments or sonic devices (such as the ones used by foley artists) implies some degree of interaction between the human agent and the artefact, present in the struggle to control the forces and reactions in action based on an embodied knowledge of its particular resonances and idiosyncrasies. The duality of gesture-as-movement and gesture-as-intention is therefore present in the process that transforms the physical performance gesture into the conveyed musical or sonic gesture. But what happens when the interactive capabilities of the system increase and the performer can no longer reasonably expect to fully control the outcome of his or her actions? Is the expressivity of the system compromised or are we facing a new kind of expressive potential? Who are the agents behind that expression? How can interactive musical systems expand our current notions of musical expressivity and musical agency? What does that bring for the composer, the sound designer, the performer, the gamer or the audience? These are some of the questions that will be addressed in this talk, based on the implications that different concepts of interactivity have in our understanding of interactive music and sound design.

Bongers, B. 2000. Physical Interfaces in the Electronic Arts – Interaction Theory and Interfacing Techniques for Real-Time Performance. In M. M. Wanderley and M. Battier (eds.) *Trends in Gestural Control of Music.* Paris: IRCAM–Centre Pompidou.

Drummond, J. 2009. Understanding Interactive Systems. *Organised Sound* 14(2): 124–133.

Chadabe, J. 1997. Electric Sound: The Past and Promise of Electronic Music. Upper Saddle River, NJ: Prentice Hall.

Rowe, R. 1993. Interactive Music Systems: Machine Listening and Composing. Cambridge, MA: The MIT Press.

Winkler, T. 1998. Composing Interactive Music: Techniques and Ideas Using Max. Cambridge, MA: The MIT Press.

HASGS: Hybrid augmented system of Gestural Symbiosis Generating Visual Information.

Henrique Portovedo and Paulo Ferreira Lopes

CITAR – Portuguese Catholic University of Porto

Keywords: Saxophone, Augmented Instrument, Gestural Interaction, Live Electronics, Generative Visuals

This paper discusses a two-layer augmentation strategy applied to a saxophone. Augmented instruments are defined as "acoustic (sometimes electric) musical instruments extended by the addition of several sensors, providing performers the ability to control extra sound or musical parameters". The first layer of augmentation is attached to the instrument, controlling sound events, and its based on several sensors (ribbon, trigger, pressure, accelerometer, gyroscope and keypad). The second layer is associated to the generation of visuals. This second layer was devised initially to capture gestural data, as performer gestures are perceived by the audience at the same time as they characterise and distinguish each performer particularities. This paper also explores how this system can serve for the adaptation of existing pieces using electronics, that in common, have the use of external devices. Finally, we discuss how notation and composition can be affected by this type of instrument in a symbiotic relation with visual augmentation.

This augmented system for saxophone was motivated by the need to perform pieces with a common aesthetic that have been written using electronic environments. These pieces share the need for control external devices in order to be performed. The repertoire for saxophone and electronics is growing in a huge scale, from pieces using stomp boxes or control pedals for different triggering or fading, to pieces requiring the manipulation of knobs. These controllers, by their nature, devices that separate sound production (synthesis) and performer gesture (control), have subsequently generated an increased interest in the study of compositional mapping strategies for computer music. From our experience, we conclude that the act of controlling external devices while performing an instrument is changing completely traditional performance practice, contributing to new performative gestures and virtuosity. The system presented here, was intended,

in first instance, to solve problems on the performance of existing pieces when trying to reduce external activity from the process of manipulating and playing the saxophone. This should allow to focus all activity of performing a piece on the instrument, as much as in a classical music performance situation, relating directly to tradicional performance practice. One aspect that we like to highlight is that this system of augmentation, can be applied to any saxophone, the conception of this prototype, allows this augmentation kit to be placed in the sopranino or in the baritone saxophone. If this project started with the idea of problem solving regarding to existing repertoire, new repertoire and improvisational performance situations led to the development of an hybrid system, as a sensor of gestures, giving musical signification translated into visual generative artwork.





Cadoz, C., and M. M. Wanderley. "Gesture - Music." In Trends in Gestural Control of Music, edited by M. M. Wanderley and M. Batier. Ircam - Centre Pompidou, 2000.

Hunt, A., and R. Kirk. "Mapping Strategies for Musical Control " In Trends in Gestural Control of Music edited by M. Wanderley and M. Battier Ircam, Centre Pompidou 2000.

Miranda, E. R., and M. M. Wanderley. New Digital Instruments: Control and Interaction Beyond the Keyboard. Middleton, Wisconsin A-R Editions 2006.

Palacio-Quintin, Cléo. "Eight Years of Practice on the Hyper-Flute: Technology and Musical Perspectives" In New Interfaces for Musica Expression Genova, Italy 2008.

SensaSound

Nadine Leles & Joel Preto Paulo & Carlos Carvalho

Engineering Institute of Lisboa

Keywords: Designing Atmosphere, Soundscapes, Directional Sound, Interactive Music, Sensors

The concept of 3D sound listening, or surround sound, has gained great popularity in recent years. It intends to equip itself with a garden or covered space with an

area where the people can enjoy a sonorous experience for hearing of parts prepared for reproduction in 3D sound. The system can be controlled through a mobile application where visitors can select the desired music program, where, with the use of sensors of various types, Movement, sound, video camera, etc., can be created sound aesthetics framed in the movement of the Garden. The audience, in addition to having a contemplative role in the installation, also indirectly interacts with it, since their movements and random movements are used to create all the interactive effect and the final sound composition. The sound composition follows the morphing algorithms for generative music.

This technologic interactive installation that creates a music/sound atmosphere is based on a structure with different sensors. This system actuates as a controller for an electroacoustic system with a number of speakers including ultra-directional sound sources such as audiobeam devices, developed at Audio and Acoustics Laboratory of ISEL. There are two types of sensors being used. Firstly, an ultrasonic sensor, with the role of measuring distances. Secondly, a force sensing resistor, sensing the force or pressure applied to it.

The control of the movement of the audiobeam devices is based on the Moving-Head-Intelligent-Lights equipment. Regarding the concepts of the "moving heads/moving lights", these "robots" are used not only for light but also for sound radiation. This is new in the aim of an artistic sound approach. Placing the directional speakers produces the perception of the different sound directions in the space. This will be performed because the column works by emitting modulated high frequency ultrasonic beams. Due to the fact that the pitch is too high for humans to listen, a person can hear the waves colliding with the object that the beam is pointed at (the reflection).

The production of the sound will be implemented in software with the help of an API-MIDI. The control of the Moving-Head-Intelligent-Lights equipment is made by using the DMX protocol, for command of lighting systems.

The innovation of this project consists of the fact of illuminating a statue in an art museum, to get the attention of the visitor and create ludic and entertaining environments.

Nowadays, advertisement is the key to a successful business. Directional audio is used to catch the person's concentration by picking audio in a specific position, making them stop and turn their head to the wanted direction. Therefore, this project comes up also with the idea of getting costumers attention, not just as a spectator, but also as intervenients, as sensors will shape the perception of the costumer towards the product.

The hardware used in this project involves the Arduino, in order to process the information coming from the sensors. The main software is implemented in a personal computer, using the Python programming language and a set of libraries concerning music generation.

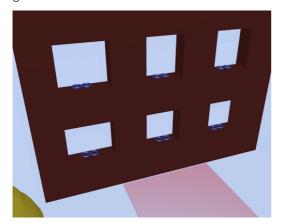


Figure 1. Structure of sensors (ultrasonic and pressure)

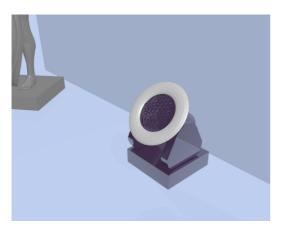


Figure 2. Lighting robot device with an audiobeam device attached to for controlling the position of radiated sound beam



Figure 3. A perspective of the interactive installation proposed. Musical soundscape generated by an electroacoustic sound system and a number of sculptures, used as reflectors of sound waves generated by audiobeam devices, controlled by different sensors actuated by the visitors.

T. Winkler. Composing Interactive Music: Techniques and Ideas Using Max. The MIT Press, 2001.

Lerdahl, F., and Jackendoff, R. A Generative Theory of Tonal Music. Cambridge, Massachusetts: MIT Press, 1983.

Arduino Music and Audio Projects, Authors: Cook, Mike Desktop Audio Technology Digital audio and MIDI principles Introduction to DMX, PHILIPS

Fast communication with the DMX protocol. Application Note DK9222-0311-0029-Light. BECKHOFF New Automation Technology

SESSION II SOUND & STORYTELLING

Sound Particles

Nuno Fonseca Polytechnic Institute of Leiria

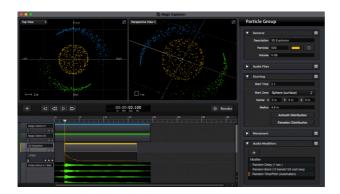
Keywords: Sound design, immersive sound, 3D sound, audio post production, cinema

"Epic scenes need highly complex sound design content, which is not easy to create with current audio tools. For instance, a battlefield with thousands of warriors, should eventually have thousands of sounds playing at the same time. Unfortunately, current audio solutions require professionals to manually handle each sound individually, limiting soundscapes to a few dozen sounds playing at the same time.

Sound Particles is a 3D CGI-like software for audio post production, which can use particle systems to generate thousands of sounds over a 3D space, currently being used but all major Hollywood studios, mainly for epic movies like "Batman v Superman", "Cars 3", "Spider Man: Homecoming", "Guardians of the Galaxy 2", "The Great Wall" and many others. Particle Systems are a common tool used in computer graphics and VFX to create fuzzy/shapeless objects like fire, rain, dust or smoke. Instead of animating all individual points (water drops, grains of dust or smoke), the user creates a particle system, an entity that is responsible for the creation and management of

thousands of small objects. Sound Particles uses the same concept, but for audio: each particle represents a sound source (instead of a 3D object) and a virtual microphone captures the virtual sound of the particles

(instead of the virtual CGI camera)."



Nuno Fonseca Introdução à Engenharia de Som, , FCA, 2007... 2013. Nuno Fonseca, Catarina Reis, Catarina Silva, Luis Marcelino, Vitor Carreira Desenvolvimento em iOS , FCA, 2012...2013.

Nuno Fonseca "The Future of Audio Post-Production using Virtual 3D Scenes". In SMPTE Motion Imaging Journal, Volume: 125, Issue: 9, Nov.-Dec. 2016.

Bouillot, N., Cohen, E., Cooperstock, J. R., Floros, A., Fonseca, N., Foss, R., Goodman, M., Grant, J., Gross, K., Harris, S., Harshbarger, B., Heyraud, J., Jonsson, L., Narus, J., Page, M., Snook, T., Tanaka, A., Trieger, J., Zanghieri, U., Best Practices in Network Audio", Journal of Audio Engineering Society, Volume 57 Issue 9 pp.; September 2009

Nuno Fonseca "Particle Systems for Creating Highly Complex Sound Design Content" in 137th Audio Engineering Society (AES) Convention; Los Angeles, USA, October 2014.

Cinema e sonoplastia: o caso de Domingo à Tarde (1966) de António de Macedo

António Sousa Dias University of Lisboa

Palavras chave: Cinema; Cinema Novo Portugês; Sonoplastia; Design Sonoro; António de Macedo.

António de Macedo (1931-2017) realizador, dramaturgo, escritor, investigador, é um dos realizadores revelados pelo Cinema Novo em Portugal e um dos poucos que abordou de forma consistente na sua obra cinematográfica e literária a "ficção especulativa" e o fantástico. A importância que sempre acordou ao som enquanto elemento essencial na estruturação cinematográfica verifica-se em toda sua prolífica obra. Nesta comunicação, iremos focar a nossa atenção sobre o filme Domingo à Tarde (1966), a partir de um romance de Fernando Namora. Neste filme, Macedo para além de realizador, argumentista, montador, apresenta-se como sonoplasta o que evidenciando o seu interesse no som, implica uma concepção sonora respondendo à questão que se colocava a si mesmo, a saber, que possibilidades sonoras se abriam ao fazer um filme sem música de fundo.

MACEDO, António (1959, 1960) A Evolução Estética do Cinema. Lisboa, Clube Bibliográfico Editex.

MATOS CRUZ, José (2000). António de Macedo — Cinema, a viragem de uma época. Lisboa, Dom Quixote.

MOZOS, Manuel (org.) (2012). O Cinema de António de Macedo, Lisboa, Cinemateca Portuguesa-Museu do Cinema.

"Conto do Vento" / "Tale of the Wind": The Game of Narration

António Costa Valente University of Aveiro

Keywords: animation, cinematographic sound, wind, narrative, immateriality

Twelve minutes of moving digital images, built on a gaming platform that in almost all senses seems to be obviously virtual. Without any physical anchorages, the depth allows endless sets of approach and distance, allowing the film to make use of a full use of the "z" axis, exploring a space hypothetically nonexistent.

A story that is told in a single point of view, capturing or showing images without the perception of any interval, but where time jumps and helps to perceive the plot.

Among all the characters, there is one that no image shows. We see the result of her presence, we perceive her strength, but she seems to be in the sound that lies the materiality of her existence.

Seeking to establish connections, which further evidence boundaries, the characters echo in the film in dimensions that seem to establish times where sound seems to be the only element that can carry continuity.

A film that flirts among population clusters, isolated in the present and referenced in the past, traditions and guilt in the time of two characters (plus one), to whom the sound allows to endure a perennial and in some cases immaterial existence.

A cinematographic sound that has been permanently crossed in a production process initiated in the also immaterial space of ideas. A process of experimental construction between the world of the actors (of their noises and sonorities), and of the spatial prediction blocks that gain the urgency of constant intersections. A process where these crosses are always heard.

This will be a communication about the many times that sound seems to allow in the context of an animated film.

"Tale of the Wind" is the most ever awarded short film, entirely produced in Portugal.

____.2017."Conto do vento" Accessed June 1. http://contodovento.blogspot.pt/

Boissson, Noelle. 2005. Monteuse de film. Paris. L'oeil neuf éditions. Gandolfi, Alain. 2002. techniques audio appliquées au mixage cinéma. Paris. Dunod.

Nieto, José. 2003. Música para la imagen. La influencia secreta. Madrid. Iberautor.

Seeing with One's Own Ears: Soundtrack as Interface for Theatre

Mat Dalgleish and Neil Reading United Kingdom

Keywords: soundtrack, interface, Chion, theatre, blindness and visual impairment

From primarily vocal-centric origins, Bratton (2014) argues that the 19th century saw the expansion and increased importance of visual language in theatre, as the spectacular gradually took over from the spoken word. Today, theatre is similar to numerous other art forms in that it is heavily reliant on visual information, for instance to convey narrative, scene and context. However, this reliance on visual information can present significant access challenges for blind and visually impaired people. Audio description for theatre attempts to increase the accessibility of performances by translating the visual elements of a performance into a spoken commentary that fits between on-stage dialogue. It is now relatively well established in the United Kingdom and beyond, but has been little tested empirically, and raises a number of human and technological issues (Fryer, 2013).

In this paper we describe our exploration of an ambiently diffused soundtrack as an alternative to audio description for theatre. Secondary aims of the project include developing and sharing practices that encourage more socially inclusive theatre audiences locally and further afield, and expanding understanding of the diversity of musical interfaces and their applications.

Drawing on the theoretical basis provided by Chion (1994) and Deutsch (2007), the soundtrack is considered as an artificial assemblage of literal (informative) and non-literal (emotive) sounds that the audience accepts as a cohesive, immersive experience, and cumulatively acts as a kind of 'interface' to the performance (i.e. a way in). Similar to audio description, the soundtrack attempts to supplement or replace 'lost' visual information. However, it does not present or imply a rigid

interpretation, and meaning is left open to the individual. The soundtrack also provides the same auditory information to all and thus offers a far more unified audience experience: it does not require some audience members to adopt specialized, sometimes cumbersome, and potentially othering personal equipment. By making use the house's existing PA/sound reinforcement system, costs and setup time are also reduced.

Using Bert, a play by Dave Pitt, as a testbed for the soundtrack model, we describe the initial findings and audience feedback from two March 2017 performances. These took place at the Arena Theatre, Wolverhampton, UK, for an audience of 25 blind and visually impaired people and their companions. Informed by these findings and our experiences as composer-producer and director-theatre manager respectively, we discuss some possible implications of the soundtrack model. These include increased social inclusion and enhanced audience experience. Finally, we outline some possibilities for future work that include more widely accessible staging, and integration of the soundtrack into props and set.



Bratton, J. (2014). *Theatre in the 19th century*. Available from: https://www.bl.uk/romantics-and-victorians/articles/19th-century-theatre. [Accessed 20 September 2017].

Chion, M. (1994). Audio-vision: Sound on Screen (translated Gorbman, C.). New York: Columbia University Press.

Deutsch, S. (2007). The Soundtrack: Putting Music in its Place. *The Soundtrack*. 1(1), 3-11.

Fryer, L. (2013) New voices: An ecological approach to audio description. *The Psychologist*, Vol.26 (June 2013), 458-461.

SESSION III DESIGNING ATMOSPHERES

Sonic landscapes, visual environments. Interaction and synchronicity in composition and live performance.

Jaime Munárriz Ortiz Complutense University of Madrid

Keywords: Sync, Audiovisual Performance, Synchronicity, Live, Composition

AV sync: concept

Audiovisual sync has been a concern since the early beginnings of technological art. The work in two separate realms, the visual space and the sonic world, can coexist in different formats and proposals. This coexistence establishes technical difficulties, but mainly opens questions on meaning, narrative, semiotic and linguistic phenomena and pragmatic problems on the mechanics of performance and interface.

The simultaneity of visual and sound elements establishes always a relationship between both media contents, even if it's an undesired one, as the theories on cinema montage have established. Sounds around an image modify it's content, and images over sound or music alter it's meaning as well.

AV performance: aesthetics

This relationship between visual and sonic layers can emerge from contrast, affinity, formal similarities, cause-effect relationship or any other connection between it's elements. In audiovisual performance artists tend to establish associative dialogues, subtle plays between both media, constructing a whole from different sets of materials.

As VJ works mainly tries to enrich the music with fancy visuals, Live Cinema and Audiovisual Performance create poetical worlds, intertwining images and sound in a complex sensorial experience. From the fields of New Media Art emerges an exploration on the essence of digital data, with transcoding practices that create

visual and sonic layers as a direct translation of raw data. Artists work on associative narrative, derivative immersive assemblages or digital artifacts as strategies for dealing with this confrontation of visuals and sound.

History

We can trace this subject into the idea of total art work, the first visual organs, the Bauhaus and other avantgarde experiments, the liquid light projections of the psychedelic era, total art and environments in the 70s, to get to digital technology and the invention of the digital projector.

The digital projector allows for the projection of content that can be modified in real time, according to the development of the piece on stage. The artist/performer can interact with the system to play and alter the images in real time. Generative software is the perfect companion for this kind of sets, giving birth to the new autonomous practices of Audiovisual Performance.

Notation - Visual scores

Visual scores have played a big role in the 20th century, establishing connections between the visual and the audible. The possibility of direct representation of sound and musical form represents a mythical goal for contemporary creations. Different tendencies have evolved around this problem, from direct coded systems to free strategies for open improvisation.

Technical direct representations are possible, as image sonifications, but artists have been trying to establish other kinds of dual form languages that allows them to compose and perform works that combine both media.

From a composer point of view, the challenge is in the methods and rules needed for this double field composition. Algorithmic systems may soften the burden on the composer, sometimes taking too much control on the final work.

Technology

Sync between audio and visual requires special software and communication protocols. Most artists use separate programs for each medium, so a network is needed for sending messages between both domains. Protocols can be established with personalized messages, establishing a basic form of communication between the audio elements and the visual system.

My sets

In my work since 2000, I've been exploring this field, building systems and composing different sets for live performance. Some of this works will be analyzed and dissected, searching for it's motivations, technical solutions employed, problems and findings, and it's aesthetic output.







COOKE, Grayson. LIVENESS AND THE MACHINE. Improvisation in Live Audio-Visual performance. Screen Sound n2, 2011.

DIXON, Steve. Digital performance. A history of new media in theater, dance, performance art, and installation. MIT Press, 2007.

KWASTEK, Katja. Aesthetics of Interaction in Digital Art. MIT Press, 2015. MALONEY, Kathleen. Sounding Images and Imaging Sounds -

Audiovisual Interactivity in *performance*. Sight Lines Thesis Projects, 2005.

WOOLMAN, Matt . Sonic Graphics: Seeing Sound. Thames & Hudson, 2000-

Teatro Olimpico by Andrea Palladio – an iconic stage scenario; and the diffused lightning system by Mariano Fortuny – enhancing the aura of mystery in the Wagnerian universe

Anna Marie Fisker University of Aalborg

Keywords: Iconic Theatres, Light design, Architecture, Andrea Palladio, Mariano Fortuny

My paper deals with the origins of stage design experienced through architecture – pointing out that the term scenography includes all of the elements that contribute to establishing an atmosphere and mood for a theatrical presentation: lighting, sound, set and costume design.

Historically scenography has evolved from roots in the classical antiquity and notably connections to the architects of the Renaissance era - largely due to the theatrical activity in Eastern Europe in the twentieth century creating a historical interrelation between architecture and scenography. However, the separation of stage design from architecture is a modern notion deriving less specialization and cross-pollination of design disciplines.

My approach considers this relationship between scenography and architecture, firstly taking Andrea Palladio, one of the most famous architects of the sixteenth century, into a holistic exploration. Palladio designed the Teatro Olimpicoin Vicenza and its infrequent permanent sets at the end of his illustrious career. It is still a unique example to learn from. Palladio said, "A room has to be for the eye, as music is for the ear". I put up the question why the relationship between scenography and architecture by time becameforged.

The annotation is interesting: scale drawings of a plan, section and elevations, and scale models; historically architecture has been expressed this way, but could the essential difference be that the stage is a fictional universe, a neutral space for imagined places. Yet the modern theatre owes much to its historical and traditional connections with architecture- and lighting and sound design have been tossed into the mix because technology has made it possible to control and reproduce them, along with set and costume design.

My paper takes the term *scenography*f urther into debate. Focusing on this historical interrelation between architecture and scenography; I introduceMariano Fortuny (y Madrazo) whowas the rarest of theatre designers: he created both scenic, costume, and unique lighting designs in his Lab that he establish in 1912 in the Palazzo Pesaro degli Orfei in Venice. Fortuny worked untiringly in this marvelous laboratory; shutting himself away from the world, he dedicated himself to diverse and ambitious projects. His innovations in developing electrical lighting instruments and electrical installation protocol revolutionized how theatres attacked the technical limitations of this newly developed technology. One cannot help being aroused by his contemporary innovations in textile design, dyeing techniques, and clothing designs.

Fortuny was greatly influenced by Richard Wagner in his theatrical settings, who, in turn, had a very intense relationship with the city of Venice. Fortuny went on to do much work in the theater, specifically related to lighting and set design.

My paper deals through these two designers of historical iconic theatre scenarioswith scenic design as a holistic exploration of Opera Set Designs.



Project for light application. Model. 1903. Mariano Fortuny at Palazzo Fortuny Venice. Photo: Mark Pimlott

Soundscapes of the experience museum

Niels Peter Skou University of Southern Denmark

Keywords: Soundscapes, experience design, museum studies, presence, atmosphere

The concept of experience is gaining pace simultaneously in the fields of culture and economy changing the way cultural institutions as well as shops works and are designed. There is a common movement away from the alleged supremacy of the visual towards the multisensorial character of experience design. In this context of designing experiences and environments sound design plays a central but often overlooked role.

This presentation will take a look at the use of designed soundscapes at two museums in the Danish City of Aarhus, the Green Houses at the Botanical Garden and the Archeological Museum of Moesgaard, which both in recent years have been rebuild in order to facilitate a transformation from scientifically based educational museums towards experience museums that combines spectacular architecture with interactive technology and involves the visitor as participants in a staging of their subjects. The presentation will investigate two interconnected questions related to this transformation, namely how the soundscapes contributes to shape the experience of the exhibition space and how this experience in turn shapes the conceptualization of the subjects of the museum exhibitions.

Both Museums can be dated back to the late 19th Century, are part of Aarhus University and were totally or partially rebuild in 2014 in order to orient them towards the general public. They can thus be seen as representatives of a new way to present and communicate knowledge. In their traditional forms they could be said to combine distance, authenticity and concentration. The traditional Botanical Garden present specimens of the global flora condensed in a microcosm but also in a way that is markedly exotic and distanced from the local surroundings. Similarly it is imperative for the archeological museum that the exhibitioned objects are authentic but the traditional museum display creates a visual and spatial distance which also maintains the historical distance. The use of soundscapes, however, creates an immersive context in which the visitors experience themselves as participants supposedly transgressing the boundaries of geography and history. The separation of authenticity and fictionality thus becomes blurred and sound becomes involved in a new form of production of presence and distance.

The starting point of the analysis is phenomenological following the conception by Gernot Böhme that sound and space is connected in the way sound contributes to the shaping of the space of bodily presence as well as its 'atmosphere'. (Böhme 2004) It will thus be based on phenomenological spatial analysis combined with interviews with sound designers. Moreover the cases may be related to the general question of the differences between and possible transformation from a 'visual' to an 'auditive' culture. (Welsch 1997)

Böhme, Gernot (2004): "Atmospheres: The Connection between Music and Architecture beyond Physics", *Metamorph. 9, International Architecture Exhibition, Focus*, Venice 2004, pp. 110-114
Gumbrecht, Hans Ulrich (2003): *Production of Presence*, Stanford:

Stanford University Press

Don Ihde (1974): "The auditory dimension" in *Listening and Voice: A Phenomenology of Sound*, Athens: Ohio University Press, pp. 49-55
 R. Murray Schafer (1994): The Soundscape: Our Sonic Environment and the Tuning of the World, Vermont: Destiny Books

Wolfgang Welsch (1997): "On the Way to an Auditive Culture?" in *Undoing Aesthetics*, London: SAGE Publications

SESSION IV SOUND AND VISION IN EDUCATION

Film dialogue and lyrics as catalysts for speech production

David Sonnenschein University of Columbia, San Diego

Keywords: dialogue, lyrics, speech, language, neuroscience

Although dialogue and song lyrics in film and digital media often help the audience to understand the mental, emotional and physical experiences of the onscreen characters (*receptive language*), the speech production of the viewer (*expressive language*) can also be stimulated in various ways. Film sound theory, neuropsychology and practical significance of this less familiar use of soundtracks to catalyze speech and singing in the audience will be discussed.

Examples given include feature films with famous movie quotes and popular sing-alongs (e.g. Rocky Horror Picture Show), language training programs utilizing film and television scenes, spontaneous language learning from Disney animation films (in "Life, Animated"), and an interactive audiovisual speech program for children with autism known as Sing and Speak 4 Kids that is being developed by the author.

Theories and protocols presented that substantiate this process of language learning include cinematic listening modes, mirror neurons, memes, neurocinematics, instructional design, OPERA hypothesis for enhancing neural encoding of speech with music, and neurologic music therapy Developmental Speech-Language Training through Music.

With an invitation to put theory into practice, the author encourages further exploration and application of the material presented herein for research, teaching, artistic and therapeutic purposes. Academics and educators can investigate further links between the fields of film sound, music, learning, speech-language

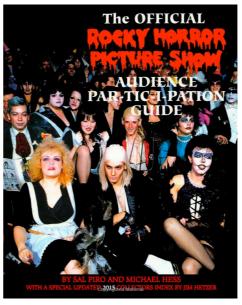
and neuroscience, supporting the design of effective communication tools. Filmmakers, sound designers, music/song composers, and game developers may adapt this analysis for increasing engagement with their audience. Therapists can augment their understanding and practical tool set that can offer their clients greater fluency in expressive language. Language teachers can access the power of film to support their students' acquisition of both receptive and expressive second language.



"Sing and Speak 4 Kids", interactive language learning program developed by David Sonnenschein



"Life, Animated" documentary film and book, describing learning to speak from Disney animation films



"Rocky Horror Picture Show", prime example of audience participation and sing-along

Badt, Karen, *Mirror Neurons and Why We Love Cinema: A Conversation with Vittorio Gallese and Michele Guerra in Parma*, 05/10/2013, http://www.huffingtonpost.com/karin-badt/mirror-neurons-and-whywe_b_3239534.html

Lim, Hayoung, Developmental Speech-Language Training Through Music for Children with Autism Spectrum Disorders: Theory and Clinical Application, 2011, Jessica Kingsley Publishers

Patel, Aniruddh, Why would Musical Training Benefit the Neural Encoding of Speech? The OPERA Hypothesis, 2011 Jun 29, Front Psychol. 2011: 2: 142.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3128244/

Sonnenschein, David, *Sound Design: The Expressive Power of Music, Voice and Sound Effects in Cinema*, 2001, Michael Weise Productions
Suskind, Ron, *Life, Animated*, 2014, Kingswell Press

Design as a tool for Education in Dyslexia: the Importance of Musical Feedback

Rita Nicolau and Joana Quental University of Aveiro

Keywords: Education, Interaction design, Digital Games, Animation, Illustration

Technology has created a great deal of new possibilities for education and educational tools, that are open for exploration and that have already started to shape new ways of learning for the younger generations. In cases where students face specific obstacles such as the ones brought by dyslexia, the new media can be the answer to motivate and help students engage with school and hopefully overcome their difficulties.

This project aims to explore the use of alternative methods to teach young students how to correctly spell, considering that spelling is one of the most common difficulties in dyslexic children and that there are very little tools that have been created to help with this problem, especially within the Portuguese language.

By combining animation, illustration and music the solution takes shape as a digital game for children ages six to nine years old, where the user is asked to complete the words considered "tricky" or similar to each other. The user is then presented with an animated illustration that creates a visual memory aid to help remember how the word is correctly written as a future reference. This concept origins from the fact that multisensorial stimuli have better results than the traditional ones in students with learning difficulties. This way, sound becomes a very crucial part of the game and one of the most complex elements to design. Because of this, a collaboration with music students from the university of Aveiro was established which resulted in the composition and recording of the interaction feedbacks, music and voices. As a consequence, the creation process aimed to answer the following questions: How can we design sound to create a positive and motivating atmosphere, making sure that the learning process is a pleasant and exciting experience? Considering the different levels of difficulty that are present in the game, how can we identify them using music? How can we bring animations to life and transform them into memorable events using sound? By answering these guestions, the sound work for the game was developed, according to the necessities of the user and the educational context, thus becoming an active part of the solution and not just a decorative element. Concluding, therefore, that sound represents a new ally in designing digital educational tools and in including all kinds of students that may need



Pic 1. "disletra" Game title

alternative ways of learning.



Pic 2.. Example of the challenges presented during the game. Contrast between two similar words

Denis, G., & Jouvelot, P. (2005). Motivation-driven educational game design. Proceedings of the 2005 ACM SIGCHI International Conference on Advances in Computer Entertainment Technology -ACE '05, (April), 462-465. https://doi.org/10.1145/1178477.1178581

Lopes, C. (2005). Design de ludicidade: do domínio da emoção no desejo, à racionalidade do desígnio, ao continuum equifinal do desenho e à confiança que a interacção social lúdica gera. SOPCOM: Associação Portuguesa de Ciências Da Comunicação, 0(0), 459-466.

Mihelj, M., Novak, D., Milavec, M., Ziherl, J., Olenšek, A., & Munih, M. (2012). Virtual Rehabilitation Environment Using Principles of Intrinsic Motivation and Game Design. Presence: Teleoperators and Virtual Environments, 21(1), 1-15.

Pelletier, C. (2009). Games and Learning: What's the Connection? International Journal of Learning and Media, 1(1), 83-101.

Visual representation in Musical education: technology and sound-image

Marcelo Baptista and Rui Costa University of Aveiro

Keywords: Graphic notation; Musical education; Interaction Design; Graphic Design; Workshop.

Since the first graphic representations of music, apparently vague but also suitable when it is used verbally and memorised, from Guido d'Arezzo – and his contribution for staff notation and the relationship between pitches – till 20th century graphic notation – like John Cage and Cornelius Cardew –, music has always had something visual that we can relate, as well as to watch or to teach.

This is part of my – *work in progress* – master design project. So, this paper shows the importance of technology to develop new ways of teaching and understanding musical concepts in a ludic context of musical education. The main goal is to build something that can help non-musicians to understand how musical concepts such as pitch, rhythm, expression, form and timbre work by using methods of drawing as a tool. Also, to understand how they

recognise an image – like a painting or an illustration – as a graphic notation, so then they can relate to the sound. To get all this information, the teaching method based on workshops for young kids will help them to experience different sounds by drawing and using manual and digital ways. Therefore, it will force them to explore, to learn, to play and to improvise in a ludic way.

There are two workshops on the way: one for Casa da Música, leaded by Dra. Helena Caspurro and based on composing music in the classroom by relating draws and sound to the augmented reality and programming; and an experimental workshop where people/kids have to draw something on the computer in two different ways: firstly, they must try to relate the draw they did to musical concepts without listening to anything; thereafter, they have to do the same thing, but listening at the same time while they do it.

In conclusion, using the technology as a tool to build

educational programmes will help people to understand the relationship between sound and image in a ludic, natural and interactive way. Thus, they can explore on their own not only the music, but also to build imagery scenarios and programming.

STRAYER, Hope R. (2013) "From Neumes to Notes: The Evolution of Music Notation, "Musical Offerings: Vol. 4: No. 1, Article 1., DOI: 10.15385/jmo.2013.4.1.1

Available at:

http://digitalcommons.cedarville.edu/musicalofferings/vol4/iss1/1
TIMIN, Alissa. (2008). "Picturing Music: The Return of Graphic Notation".
Retrieved from http://www.newmusicbox.org/articles/Picturing-Music-The-Return-of-Graphic-Notation/

Casa da Música - Compor na Sala de Aula. (2016), from http://www.casadamusica.com/pt/agenda/2016/11/26-novembro-2016-compor-na-sala-de-aula/46584/?lang=pt#tab=0/

BYRD, Donald (2009) "Studying Music is Difficult and Important: Challenges of Music Knowledge Representation". in *Proceedings of Dagstuhl Seminar on Knowledge Representation for Intelligent Music Processing*, Leibniz-Center for Informatics, Wadern, Germany.

SINGER, Elly (2015) "Play and playfulness in early childhood education and care", in *Psychology in Russia: State of the Art*, Volume 8, Issue 2, 2015. University Ultretch, The Netherlands. ISSN: 2307-2202 (Online) Portuguese soundscape say if we care to listen? Three elements, Music, Noise and Silence, were used in the book "Sounds and Silences of the Portuguese Soundscape" to attempt an answer to these questions. In a historical and technical perspective the contribution of each of these elements is analysed. Several cases of an harmonious relationship with the acoustic environment were also described. An attempt based on all these elements was made to briefly sketch the Portuguese soundscape. The book pretends to help gain a deeper insight of the Portuguese identity based on these elements.

studies which is of interest to the discipline in general and to all interested in the importance of sound. Soundscape studies started in Portugal in the mid 70s. Work was carried on by individuals, without support or institutional integration. Nevertheless, interest remained high and that prompted the emergence of a new wave of researchers and artists, renewing ties, giving the field a new depth and leading it into news areas of study. This, in turn, creates a renewed and ever stronger interest into soundscape studies.

This is but a modest contribution to soundscape

The relative but undoubted success of the book "Sounds and Silences of the Portuguese Soundscape" since its publishing in 2014, demonstrates the importance of the field and the role it can have, both at the academic and popular level. It also gives extra weight to the need to pursue these studies in Portugal at a higher level.

Augusto, C. A (2014). Sons e Silêncios da Paisagem Sonora Portuguesa. Lisboa: Fundação Francisco Manuel dos Santos

Soundscape studies in Portugal

Carlos Alberto Augusto composer and sound designer

Keywords: soundscape studies, acoustic environment, music, noise, silence

Does a country sound like a musical instrument? Can one infer by its inner workings the meaning of its sounds? How does Portugal sound? What does the

SESSION V VISUAL STORYTELLING AND MUSIC

Abstract Rhythm Model

Omar Costa Hamido University of California Irvine

Keywords: music, painting, compositional process

The Abstract Rhythm Model results from a research whose main objective was to identify and understand the relations between music and painting, regarding their material means and their compositional processes. In this paper I briefly present a schematic conceptual representation of these relations as well as a technique capable of operationalizing this scheme. I discuss the possibility of deconstructing the material means of musical and pictorial creation, striving to identify correspondences and divergences between them, in order to reach what might be called (following Adorno) "an immanent principle in a pure sense." Drawing on a two-dimensional perspective of the material means, I suggest that the process I named "colapsagem", an 'interaction' of one of the dimensions on /against / with the other dimension (for each of the material means) can accurately portrait the deconstruction process, allowing us to come close to "essential" common /transversal elements of the creative/ compositional endeavour, both in music and in painting. These elements (shape and duration) occupy a central role in the explanation of the Abstract Rhythm Model.

The Abstract Rhythm Model can be used as a multi-artistic compositional model, a single model for emerging parallel composition processes, in different artistic expressions, having a common initial phase. To illustrate some of the model's features I present some examples of what I called "universal score". I will use some extracts from "qup", which is a piece I composed for alto saxophone with resonator tube and drums, and a piece that was also object of exploration and pictorial performance / interpretation by an invited plastic artist.

Adorno, T. W. (Spring 1995). On Some Relationships between Music and Painting (Gillespie, S., Trans.). *The Musical Quarterly*,LXXIX(1), pp. 66-79.

Hamido, O. C. (2014). < | > - Estudo sobre as relações entre Música e Pintura e processos composicionais.Porto: IPP-ESMAE [Dissertação de Mestrado]

Kandinsky, W. (1946). *On the Spiritual in Art.* (H. Rebay, Ed.) New York City: The Solomon R. Guggenheim Foundation.

From static to dynamic representing images through music

Tânia Barros and Helena Barbosa University of Aveiro

Keywords Comunication design, music, motion, interaction, experience

Image representation and music are two concepts that, although they are different forms of human perception, vision and hearing, both present themselves as transmitters of messages, which arouse different emotions and reactions in individuals. Although the two concepts can live individually, the human being is able to perceive and apprehend both at the same time and as such, had a will to unite them, developing techniques that provide the transmission of contents, as well as pleasurable experiences and delight. This project aims to test the relationship between moving images and a music associated with it. This is an old relationship, which in the first forms of representation of moving images also had associated music for attracting the attention of the viewer, but also for a better understanding of the animation exhibited. The project was developed based on the issue of the representation of moving images, and besides some exercises of deconstruction of the dynamic image, for physical supports, it was also considered important to investigate and approach the relationship between the representation of the image and a musical production related to it. Following this, a fictitious festival of opening titles was developed called "Entreaberto", considering that this is the environment that brings together all the conditions to demonstrate and relate these two concepts. The project aims to tackle the detachment that exists between graphic production attached to the artefacts that coexist with a film with other in a static form. For this event, in addition to the communication composed by the physical objects that incite the movement, the festival's own opening title was developed in partnership with the students of

Music of the University of Aveiro, with the purpose of

creating a unique theme song.

This exercise is distinguished by its multidisciplinary nature, rejecting the idea of "ordering" the song, but including the role of music in the planning and representation of dynamic images. This partnership allowed us to understand how musicians, non-designers, interpret the proposed storyline in a non-visual way. The intention was to understand how music interprets and represents the image intangibly. Music has a powerful, though often unnoticed, effect and sometimes may even be overpowered by the image. In this way, it can be said that sound strengthens the image and the image strengthens the sound, in a relationship of balance and harmony to which it is due to the synergies generated, in this case between designers and musicians.



Fig. 1 - Music students in the presentation concert



Fig. 2 – Clips from the oppening title "Entreaberto".

Arnheim, R. (1979). Arte y percepcion visual: Psicología del arte creador Nueva version. Madrid: Alianza Editorial, S.A., 1979. ISBN 84-206-7003-0.

Donald, N. (2004). *Emotional Design: Why We Love (or Hate) Everyday Things. The Journal of American Culture* (Vol. 27). https://doi.org/10.1111/j.1537-4726.2004.133_10.x

Neumeyer, D. P.(2015). Meaning and Interpretation of Music in Cinema. Bloomington: Indiana University Press. Retrieved October 4, 2017, from Project MUSE database.

Beyond dualities and subjectivity – The performing body and the virtual

Joana Sá University of Aveiro

Keywords: reality of the virtual; virtual reality; performing body; intensity; musical performance;

Although conceived in very disparate ways through times, different virtuosity ideals show that there is an ontological and almost stable conception of the performing body as a mediator between dualities (outside/inside; form/matter). The anthropological machine incises the performing body, shaping it according to the ideals in vogue of the making human subject, through different times. The performing body is then erased and shaped as a kind of channel for another reality, a realm from the outside, that can be an ideal of sublime in the Romantic, or the objective 'musical work' in the structuralist approaches of the 20th century. The new field of Performance Studies brings new ideas that try to contradict the strict dualities, bringing new concepts of 'musical work' and acknowledging Performance as a place for creation of meaning, instead of assigning it the usual role of reproduction of meaning. However, these new formulations, which try to go against the claimed 'objectivity' of the werktreue ideals, oppose them within the same logics of duality, calling for the subjectivity of the performer - the intentional, the emotional, the personal narrative, the all too human (Assis) subject.

The formalist and structuralist conceptions left (and still leave) energetic forces, impulses and processuality behind, focusing on a rigid and immutable structure that should be imposed upon the performing body, whereas subjectivity approaches of Performance studies, focusing on the will and intention, tend to bypass the pre-human, post-human, the non signifying and non-organized body. As composer/performer my research has been focusing on finding directions for opening new ways of thinking musical creation and musical performance beyond usual semiotics and beyond the organized and emotional narrative. My paper will focus different perspectives of a virtual dimension of the body, a dimension that can open new insights for thinking musical creation and performance. For this, I will make a short introduction to some complex concepts by different authors: on the one hand, I will present ideas of Jean Luc Nancy and Peter Szendy and on the other, ideas of Brian Massumi, Gilbert Simondon, Paulo de Assis and Lucia D'Errico.

Barthes, Roland (1985) trad. Farrar, Straus and Giroux, Inc. "Music's Body - Listening/ MusicaPratica/ The Grain of the Voice/ Music, Voice, Language/ The Romantic Song/ Loving Schumann/ Rasch" in *The Responsability of Forms – Critical Essays on Music, Art and Representation*. Berkeley and Los Angeles, California: University of California Press

Massumi, Brian (2002) "The Autonomy of Affect" in *Parables for the Virtual – Movement, Affect, Sensation*. USA: Duke University Press.

Nancy, Jean Luc (2014) trad. Fernanda Bernardo, *À escuta*. Belo Horizonte: EdiçõesChão da Feira.

Nancy, Jean Luc (2000) trad. Tomás Maia, *Corpus*. Lisboa: Vega, Lda – Passagens.

Szendy, Peter (2002) *Membresfantômes des corps musiciens*. Paris: Éditions de Minuit.

Music *versus* Design – the possibility of a sound and vision co-criation culture in DeCA

Nuno Dias University of Aveiro

Keywords: music, design, co-criation

The Department of Communication and Art (DeCA) was established more than 20 years ago at the University of Aveiro, in a campus where "hard sciences" prevailed. Currently hosts bachelors in music, new communication technologies and design. Within this environment, it would be expected that those areas, namely design and music, were naturally found in a participating co-creation culture. However, a bit surprisingly, the gathering of co-creation has been remarkably sporadic. Over the years there have been only a few collaborative projects that brought together expertise of music and design in a cocreation mode. One can see, nevertheless, a few works that reveal the possibility and potential of cocreation involving music, design, and technology. In this academic year, an exercise specifically involving teachers from music was held in Design Project (Design Bachelor). The process and the results of this encounter allowed us to glimpse the potential of cocreation between designers and musicians, compelling on the necessity to develop a specific mode of teaching for this purpose. Furthermore, in Music Bachelor was developed a set of composing works involving projects of design students. This event brought to musical composition and performance the problem of visuality.

Traditionally design focuses on visuality. In the most part of design projects, music appears only to fill up the "voids" of silence in project presentations. However, given the growing importance of sound and music in contemporary (multi)media, namely in interactive media, we can question if we are not taking too many risks when we specialize design students within a radical visual mode that is deft to conceptual and critical thinking on sound. There isn't an important conceptual and semantic dimension in sound to be explored within design thinking? What kind of theoretical ground will be necessary for both music

and design students? What particular questions should designers ask musicians (and vice versa) on a co-creation mode? What new words and concepts students and professors need to learn?

We will summarize some initiatives and projects hold in DeCA that have integrated design and music students, collecting testimonies and ideas from its protagonists. Furthermore, we interview other stockholders interested on the development a stronger co-creation culture. As a result, and taking in account the specificities of DeCA, we propose a basic framework for future projects involving musicians and designers, as well as the define some project typologies in order to enhance co-creation between designers and musicians.

SESSION VI INTERIOR DESIGN HISTORY AND MUSIC

Music and Soundscape in Alvar Aalto's architecture

Renja Suominen-Kokkonen University of Helsinki

Keywords: Alvar Aalto/ Finlandia Hall/ acoustics/ Viipuri Library/ Villa Kokkonen

Finlandia Hall in Helsinki is Alvar Aalto's best-known building with regard to music and its acoustic problems in particular. It was designed as a concert and congress facility in one of Helsinki's main parks between 1962 and 1967. The building was completed in 1971.

Alvar Aalto's architectural output, however, reveals from an early stage themes in which he considered sound and acoustic as principles of design. The examples that I cite address these ideas and their realisation starting from the beginning of Aalto's career. I present views on why and how Aalto worked on this problematic in his other designs apart from Finlandia Hall. The analysis considers both public buildings and smaller, more private, commissions.

Alvar Aalto Library in Vyborg. Saving a Modern Masterpiece. Edited by Eric Adlercreutz et al. Helsinki: Rakennustieto Publishing, 2009.
 Berger, Laura, The Building that Disappeared. The Viipuri Library. A Gellian Reading. Dissertation Manuscript 2017, Aalto University.
 Göran Schildt, Alvar Aalto, His Life. Jyväskylä: Alvar Aalto Museum, 2007.
 Sipilä, Teemu, Finlandia-talosta Musiikkitaloon. Konserttiakustiikka sinfoniaorkesterin äänituotannossa. Master's thesis in Musicology. University of Helsinki 2017.

Suominen-Kokkonen, Renja, *Aino and Alvar Aalto – A Shared Journey. Interpretations of an Everyday Modernism.* Aalto Studies 1. Helsinki: Alvar Aalto Foundation & Alvar Aalto Museum, 2007.

The quality of the Music Room in the domesticity of the Casa dos Patudos. Raul Lino project of 1905

Liliana Neves and Fátima Pombo University of Aveiro **Keywords:** Casa dos Patudos, music rooms, musical instruments, domestic interiors

This text addresses the particular role that music played in a very iconic project of the Portuguese architect Raul Lino (1879-1974), known for his studies and projects around the concept of Casa Portuguesa (The Portuguese House). A Casa dos Patudos property of the Portuguese Republican politician José Relvas (1858-1929) went through an extension process leaded by Raul Lino in close dialogue with the owner. The construction's work unfolded during 1905-1909 and the exterior façades ended up as showed in figure1.

If the house should shelter with care and detail the valuable art collection of painting, sculpture, furniture and decorative artefacts, also music asked for a very special approach. The music room was a space generally to find at the time in the rich family homes but in the Casa dos Patudos, music and the music room were much more than a tradition's statement. Based upon the historical archive of the nowadays house-museum Casa dos Patudos, upon literature review and the authors visit to the house, it is to argue that from the beginning of the project, the music room, took a relevant place on the domestic space. In effect, not just one music room but finally three spaces inspired by music were to find in Casa dos Patudos during the lifelong of José Relvas.

After the first intervention of Raul Lino in Casa dos Patudos the music room was the heart of the house, and was known as Salão da Renascença, because of its inspiration in the renaissance style. That room was chosen to receive guests and to give home concerts to entertain them, namely by José Relvas an amateur violinist, and his son, who was a professional pianist, or by other invited musicians. The music room was also displaying valuable works of art. In this space each detail was carefully considered: the design of the fireplace, the style of the ceiling, the choice of the furniture and other decorative artefacts and not to forget the acoustic qualities in which Lino had a preponderant role (Fig. 2). The second room for music, known as Sala das Colunas, had considerable smaller dimensions, an intimate, cosy quality and was meant to be a private space to enjoy music by the family. During six years, due to a family tragedy, the silence took over that home. Only in 1926, a third music room found its place at home. The old Sala Corredor was reappropriated to a new function and redecorated in order to hosting a self-playing piano (also known as

pianola). It also received several and remarkable works of art inspired by music as the master piece ordered by Relvas to the Portugueses sculptor Bordallo Pinheiro, the Beethoven's Vase (Fig. 3).

Relvas and Lino shared the passion for classic music. Lino argued that there are many similarities between music and architecture by the metric, rhythm, melody, color – timbre, proportion, harmony. This paper aims to stress the association between music, architectural quality and identity by interpreting the character of Casa dos Patudos music rooms.



Figure 1. Casa dos Patudos, nowadays. Source: https://www.casadospatudos.com/casa-dos-patudos/, retrieved in April 15, 2017



Figure 2. Carlos Relvas piano with his portrait nearby. Source: by author on a guide visit in June 3, 2016.



Figure 3. Music room with Beethoven's Vase. Source: https://www.casadospatudos.com/coleccao/, retrieved in April 15, 2017

Abreu, E. A. de. (2014). 'Imaginando a evidência: apontamentos para a revelação da música no pensar, no viver e no habitar de Raul Lino.' In *Colóquio Nacional Raul Lino Em Sintra*: Actas Do II Ciclo de Conferências, 163–180.

Bastos, J. T. da S. (1906). 'A Casa dos Patudos.' In *Illustração Portugueza*, 2ª Série, n.º 22, 698–704.

Gomes, N. (2012). Para Um Roteiro da Casa dos Patudos – Museu de Alpiarça (Trabalho de Projecto para obtenção do grau de Mestre em Museologia). Universidade Nova de Lisboa, Lisboa.

Lino, R. (1947). *Quatro Palavras sobre Arquitectura e Música*. Lisboa: Valentim de Carvalho.

Município de Alpiarça. (2017). Arquivo Histórico da Casa dos Patudos. Retrieved March 27, 2017, from http://bma-catalogo.alpiarca.pt/docbwebText

Sound in space as a design feature in workplace interiors.

Rita Cruz and Fátima Pombo University of Aveiro

Keywords: Sound, Workplace, Experience, Office furniture, Interior Design

The digital age came into our lives and settled with determination, thereby changing in a few decades daily life and social behaviour, and forcing the world to rethink daily experience, including spaces and objects. Thereafter, workplaces have become invaded by sounds of printers, keyboards and computers, mobile phone calls, videoconferencing, all blended with other background noises that affect concentration at work. Yet, the quality of space and the optimization of acoustics still remain essential for shaping a positive, focused and productive work environment. As our world is getting noisier, it is harder and far more challenging for designers and architects to establish quiet and peaceful workspaces. From architecture to furniture and objects, every element influences the repercussion of sound in space, which in turn has an impact on how one feels and experiences this space. In response to the expansion of open space concept and the consequent need of acoustics improvement, Robert Propst together with the designer George Nelson, created in the United States the Office II (1968), an office furniture line (Fig. 1). The system gained a complete success and influenced the design and the office work back in the 1970s (Pile & Gura, 2000: 410-412).

Nowadays, the availability of the digital devices enables the workplace to be anywhere: on travel, in the hotel, at home, at the cafe or in the office. The development of new materials with soundproofing

features, the ways of minimizing noise and improving audibility (ambient music, video projection, etc.) have evolved not only the sense of responding to acoustic requirements, but also the design of space and furniture in order to support these new forms of work. In addition to floors, ceilings, walls and partitions with acoustic absorption, the feature is also applied in, among others, screens, panels for decorative wall applications, cabinets, sofas, armchairs. The advanced pieces of furniture adapt to flexible spaces supporting a diversity of environments required during the working day: team project work, spontaneous collaboration or mobile working. A workplace opened to innovation and creativity (Fig.2).

The present text is supported by the thoughts of authors such as Steen Eiler Rasmussen and Peter Zumthor, among others, and by the analyses of office furniture design as paradigmatic cases for this study. The analysis explores Action Office II (1968), the Stockholm Furniture Fair organised in February 2016 and focused on noise reduction in Scandinavian interiors, and Orgatec 2016 in Cologne, the most important trade fair in the world dedicated to the workplace, which trends demonstrated the suitability of spaces for new forms of work, taking into account the acoustics (Fig. 3). This article aims to reflect on the importance of sound in space as a structuring condition of interior design and creation of atmospheres, namely in the experience associated with work environments.



Figure 1. Action Office II (1968) – Herman Miller, USA. This system is peculiar for the flexible organization and the improvement of office environment acoustics. It consists of autonomous modules, partitions and removable screens that allow reducing noises, by establishing individual or group work areas in open spaces. Source: available in http://www.hermanmiller.com/products/workspaces/individual-workstations/action-office-system.html., accessed on April 7,



Figure 2. Workplace with office furniture by GUIALMI, Portugal. This flexible workplace is outfitted with acoustic-absorbing office furniture that creates and organizes the space in several work zones. The cabinets with perforated steel plate doors, lined inside with a canvas render the space soundproofing. The screens covered with cardboard and fabric create barriers to sound and noise. Last but not least, the Marea sofa, with high but flexible arms and backs, lined with noise-minimizing foam and fabric, promotes informal or quiet work meetings. Source: available in http://www.guialmi.pt/produtos.php, accessed on April 9, 2017.

Pile, J., & Gura, J. (2000). A History of Interior Design. New York, United States of America: John Wiley & Sons.

Rasmussen, S. E. (1959). Experiencing Architecture. Cambridge, Massachusetts: MIT Press paperback edition.

Sheridan, T., & Van Lengen, K. (2003). Hearing Architecture Exploring and Designing the Aural Environment. Journal of Architectural Education, ACSA, 37-44.

Zumthor, P. (2006a). Atmospheres: Architectural Environments. Surronding Objects. Basel: Birkhäuser.

Zumthor, P. (2006). Pensar la arquitectura. Barcelona: Editorial Gustavo Gili

SESSION VII INTERTWINING – SOUND GRAPHIC NOTATION

Symbols - Signs - Sounds

Per Anders Nilsson University of Gothenburg

Keywords: Signs, symbols, scores, interpretation, improvisation

In this talk Per Anders Nilsson will address questions about the relation between images, signs, and sounds. Interleaved with the talk examples of works and experiments in the area are showed and discussed.

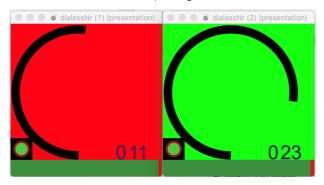
The music in *Re-Created Memory* (Jim Berggren, Per Anders Nilsson) is based on an acousmatic piece that was commissioned the author by GRM in the late 90s. Years later Berggren and Nilsson was asked to create a music/video piece meant to be screened outdoors in a public square. In many cases, the composer is obliged to make music to ready-made images, however, in this case the order of creation was reversed that the music came first.

Philosopher Ludwig Wittgenstein once wrote: "All that a symbol CAN express, it MAY express" meaning that, e.g. that the standard musical notation symbols is mereley a convention. Is is symbols that might be interpreted in many ways. Is there an obvious relation between symbols and signs on the one hand, and sounds on the other? I don't think so. However, we humans tend to interpret higher up on the image equals higher pitch, and that bigger means louder. Cornelius Cardew's seminal piece Treatise (1965-67) takes Wittgenstein's remark as a as point of departure. The score consists of 196 pages of abstract graphics, and at the outset he gave no instructions or even clues of how to interpret and play the piece.

One composer that is bounded to the invention of graphical scores is John Cage. One example is his Imaginary Landscapes no 5, were performers are asked to bring a number of favorite jazz records as sound sources. The score contains of a timeline with "channels" for each individual player, were presence of a thick line means "play", whereas the absence means "be silent". As Cage's score was outlined on a

paper, it allowed participant players to prepare upcoming actions in advance. What happens if we replace the score (on paper) with a real time video score that controls sounds and silences in the same manner, with the difference that information on next "open play window" is hidden.

The Bucket System is an open structure of simple optical signs in the form of LEDs that either light, blink or are black. It is up to the participating musicians to make up rules what the given signs means in each particular performance. In this system, a player receives a new instruction where (s)he is forced to halt or change whatever going on, and since the participant musicians are interrupted all the time, no one will be able to develop things as usual.



1.Screen dump from Nilsson's software Imaginary Imitation

Cardew, C. *Treatise*. Edition Peters (1967)
Monk, R. *Ludwig Wittgenstein The Duty of Genius*. Jonathan Cape Ltd. (1990)

Smalley, D. Spectromorphology. *Organised Sound 2* p. 107 - 26 (1997) Thoresen, L. Spectromorphological analysis of sound objects: an adaptation of Pierre Schaeffer's typomorphology. *Organised Sound*, volume 12, Issue 2 (2007)

Wolff, C. For 1, 2, or 3 People. Edition Peters (1964)

Synchronizing to Visual Cues in a Networked, Real-Time Notation Environment – Comprovisador

Pedro Louzeiro University of Évora

Keywords: Dynamic Musical Notation, Visual Synchronization, Real-Time Algorithmic Composition, Network Musical Performance, Graphical Interface.

Comprovisador is a system designed to enable mediated soloist-ensemble interaction using machine listening, algorithmic compositional procedures and dynamic notation. In real-time, as a soloist improvises, Comprovisador's algorithms produce a score that is immediately sight-read by an ensemble of musicians,

creating a coordinated response to the improvisation. This interaction is mediated by a performance director who does so by manipulating algorithmic parameters. Implementation of this system requires a network of computers in order to display notation (separate parts) to each of the musicians playing in the ensemble. More so, wireless connectivity enables computers – and, therefore, musicians – to be far apart from each other.

Both paradigms in use – networked music performance and real-time notation – face synchronization problems for different reasons. The former must cope with network latency, acoustic delay, lack of eye contact, etc., and the latter must deal with the inherent difficulties of sight-reading. However, this synchronization problem can also be viewed as an opportunity for further development – which this paper hopes to address.

Software for this system is being developed in Max 7, with extensive use of Bach library for its notation features, computer-assisted composition tools and Max integration. The system consists of two applications: one running on a host computer and another instantiated on each of the client computers.

The host application is responsible for receiving and analyzing the input from the soloist(s), calculating compositional procedures and responding to commands from the performance director.

The client application is in charge of rendering the generated score and displaying it to musicians. It features a visual synchronization strategy consisting of a bouncing ball. Three different implementation approaches were used, each of them assessed by musicians during rehearsals and performances. Poor graphics performance on slower machines was noticed to have a negative impact on synchronization where, by using a technology that takes advantage of hardware acceleration (OpenGL), we were then able to reverse those impacts, while enhancing other aspects of the interface regarding information detectability and legibility.

Apart from assessments made by performers, an experiment was laid out so the effectiveness of the synchronization strategy could be measured: events were recorded simultaneously in various steps of the chain and timing was evaluated through waveform analysis. Results will be discussed herein.

Agostini, A., & Ghisi, D. (2010). *Bach: Automated composer's helper*. Retrieved from http://www.bachproject.net (last accessed 2017/04/01)

Dodge, C., & Jerse, T. (1997). Computer music: Synthesis, composition, and performance. New York: Schirmer Books. Retrieved from https://books.google.pt/books?id=eY BQgAACAAJ

Freeman, J. (2008). Extreme sight-reading, mediated expression, and audience participation: Real-time music notation in live performance. *Computer Music Journal*, 32 (3), 25-41. Retrieved from http://www.jstor.org/ stable/40072645

Hajdu, G., & Didkovsky, N. (2009). On the evolution of music notation in network music environments. *Contemporary Music Review, 28*(4-5), 395-407. Retrieved from

http://dx.doi.org/10.1080/07494460903422313 doi: 10.1080/07494460903422313

Louzeiro, P. (2017). Real-time compositional procedures for mediated soloist-ensemble interaction: the Comprovisador. *6th International Conference on Mathematics and Computation in Music.* Mexico City.



Figure 1. Comprovisador.client notation interface: detail of bouncing sphere.

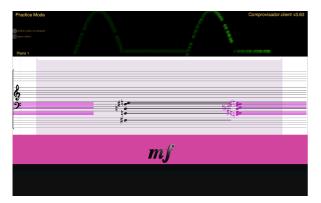


Figure 2. Comprovisador.client notation interface: single instrument layout (proportional notation mode).



Figure 3. Comprovisador.client notation interface: dual-instrument layout (standard notation mode).

Sound as a medium, the performer as a medium

Eunice Artur and Graça Magalhães University of Aveiro

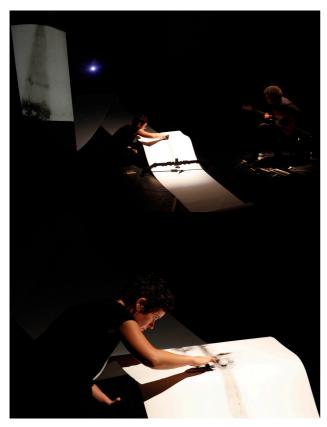
Keywords: graphical notation, sound, performance, wandering

This article intends to cross the vast and fascinating panorama of the graphic notation. The evolution of electronic music requires a new system of notation where, among other things, we seek to understand the new phenomena, such as the relationship between sonority and plastic manipulation in performance; the unpredictability and the error as ways of generating non-linear readings and/or new graphical forms of notation.

In this article we intend to discuss the possibility of experiences' systematization and concepts of ephemeral time, as well as freedom in the improvisation methodology and in real time composition, which has revolutionized the traditional system of musical graphic register.

Usually, graphic notation as a musical representation aims to be interpreted by the musician/performer, whose reading can be linear or non-linear, even when is a result of concrete composition techniques. Otherwise, graphical notation arises as a result of the fusion between sound and graphic matter during the performance; a fusion that creates a close object - the score - that even so remains open, to the possibility of a new interpretation (possibly by another performer). Methodologically, we will analyze the contemporary artistic object from the performative practice, considering the reflexive approach of understanding sound as a material providing services to the performer himself and, simultaneously, the performer as a medium fused with the drawing - an object that creates crosses between form, body and duration.

We propose the analysis of a case study, where the artistic object is assumed as a score, i.e., as a result of the sound register and the drawing as a visual entity, as an object of change, a game that provides new sound readings.





Barreto, J. L. (1995). *Música & Mass Media*. Lisboa: Hugin Editores Bergson, H. (1999). Ensaio sobre a relação do corpo com o espírito. São Paulo: Martins Fontes Deleuze, G. (2000). *Diferença e repetição*. Lisboa: Relógio D'Água Editores

SESSION VIII INTERACTIVE SOUND II: PERFORMANCE

Perceive to perform: Temporal indeterminacy in music for instrument and live electronics

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Keywords: Music for instrument and Live Electronics; Musical perception; Musical Performance; Interaction in Music; Indetermination in Music

The paper consists in the presentation of a study case on two works for guitar and live electronics: Mutazione (2008) by Rael Gimenes and Have the days made you so unwise? (2015) de Welington Alves. This approach provides discussions on how the technological means can interact in order to condition and indeterminate the performance in relation to the time in the musical discourse. As Manoury (1998) and Pierangeli (2011) point out, in the context of mixed electroacoustic music, time is probably the most usual factor in the distinction, generally dualistic, between the repertoire for Tape and for live electronics (Real and deferred time). According to McNutt (2003) and Pestova (2008), the performance of music for instrument and live electronics provides less difficulties in the interaction with computer systems, in relation to the synchronization of sound events, due to the temporal flexibility, as opposed to the rigidity imposed by the Tape, which this platform provides. In this work, I investigate how this attributed flexibility - and sometimes conditional to live electronics - can implicate in the indetermination of the sound events proposed in the score and how perception works in this context. Robert Rowe (1992) attributes three dimensions to interactive musical systems, and the third is the most important for the discussion proposed here, in which the author subdivides the behavior of systems into two paradigms: instrument and player. In the first, the musical system behaves as the extension of the musical instrument and in the second, the

musical system has greater autonomy during the performance, generating more complexity in the interaction with the musician and a less evident relationship between cause and effect. Through the case study I identify the presence of these two paradigms proposed by Rowe in the adressed works, and I try to understand how some sound events written in the score, when played, interact with the systems and how this interaction can influence the time of the musical discourse.

Manoury, P. (1998). La note et le son: écrits et entretiens (1981-1998). Editions L'Harmattan.

McNutt, E. (2003). Performing electroacoustic music: a wider view of interactivity. Organised Sound, 8(03), 297-304.

Pestova, X. (2008). Models of interaction in works for piano and live electronics (Doctoral dissertation, McGill University).

Pierangeli, C. T (2011). Live Electronics: Historias, Técnicas e Estéticas. Universidade Estadual de Maringá.

Rowe, R. (1992). Interactive music systems: machine listening and composing. MIT press.

New music for old instruments: The expanded fortepiano

Helena Marinho and Joaquim Branco University of Aveiro

Keywords: fortepiano; instrumentality; experimentation; sound synthesis; electronic interfaces

Current uses of historical instruments, namely instruments associated with pre-Romantic periods, normally focus on canonic repertoires and musicological-based approaches. Nevertheless, these instrumentscan encompassvaried affordances, and several contemporary composers have explored their specific characteristics; the harpsichord, in particular, is featured in a significant number of solo and chamber contemporary works. Departing from these contemporary approaches, which explore compositional techniques and acoustic possibilities, this research hasfocused on a specific historical keyboard instrument, the fortepiano, in order to expand its historic features through the use of contemporary techniques of sound design. The manufacture of fortepiano copies, nowadays, nearly always omits an important feature of these instruments, namely the added devices, known as Veränderungen or stops, which were used to alter the sound normally produced by the hammers. The sustaining pedal, for example, is one of the devices (along with the unacorda pedal) that has survived subsequent

alterations of the instrument's design. Devices were usually operated through hand-stops or pedals, and produced percussive or timbre-altering effects (Cole 1998, Latcham2008).

This proposal addresses two research questions, departing from the concept of instrumentality (Bovermann et al. 2017) and post-experimentalism (Gilmore 2014): is it possible to digitally re-create devices that are no longer available in modern copies of fortepianos and propose alternative and experimental versions of period keyboard repertoire? Do the ensuing alterations modify instrumental perception and can contribute to the creation of alternative performing solutions, namely in association with improvisatory practices and sound synthesis? In order to address these questions, this research pursued the following interconnected and chronologically orderedlines of investigation: 1) review of organological studies in order to mapcurrent knowledge and characterization of the devices associated with fortepiano building (18th and early 19th century); 2) using microphones, piezoelectric sensors, cameras and other electronic devices, to undertake sound and motion caption in orderto testtechniques of sound synthesis, sound triggering and algorithmic composition with the programming environment Max/MSP/Jitter; 3) studio work, undertaken in order to apply the applications created in the previous task; 4) creative work, involving historical repertoire, composition, and free improvisation techniques; 5) final characterization and description of the developed applications, along with the recording of artistic outputs.

The research has exposed the limitations of the digital production of effects if merely considering historical criteria. It has highlighted, however, a set of techniques and procedures that potentially can contribute to the deconstruction of the standard perception of historical keyboard instruments, and to create new experimental paths for performing and improvising on the fortepiano through the mediation of electronic interfaces and digital sound objects.

Bovermann, Till, Alberto de Campo, Sarah-IndriyatiHardjowirogo, and Stefan Weinzierl, eds. 2017. *Musical Instruments in the 21st Century: Identities, Configurations, Practices.* Singapore: Springer. Cole, Michael. 1998. *The Pianoforte in the Classical Era.* Oxford: Clarendon Press.

Gilmore, Bob. 2014. "Five maps of the experimental world." In Artistic Experimentation in Music: An Anthology, edited by Darla Crispin and Bob Gilmore, 23-29. Leuven:Leuven University Press.

Latcham, Michael. 2008. "Pianos and Harpsichords for Their Majesties." Early Music 36 (3): 359-96. http://www.jstor.org/stable/27655208.

SESSION IX CREATION AND TECHNOLOGY: THE CONTEMPORARY OPERA

Why Xenakis never wrote an opera

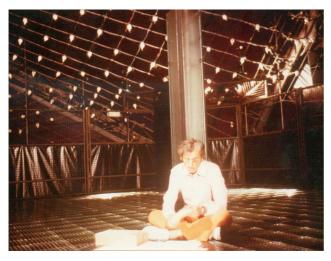
Sharon Kanach University of Rouen, Centre lannis Xenakis

Keywords: Iannis Xenakis, Ancient Greek Theatre, Polytopes, Contemporary Opera, Immersive Art

The only thing contemporary about opera today is the word 'contemporary.' There may be creation, but there is no novelty." These condemning words from lannis Xenakis (1922-2001) in 1989 are a retroflection following first his early works involving Ancient Greek theatre and later his five groundbreaking polytopes. This talk seeks to unveil why one of the most important composers of the second half of the XXth century (and some of his peers) deliberately transgressed specific media, such as opera, in order to create environments and increasingly participatory and immersive processes combining time, space and sound thanks, in particular, to new technologies.



Xenakis, Diatope @ Bruno Rastoin/CIX



Xenakis, Diatope @ Bruno Rastoin/CIX

Revaultd'Allonnes, Olivier. *Xenakis: Polytopes*, Paris, Balland, 1975. Salter, Chris. *Entangled: Technology and the Transformation of Performance*, MIT Press, 2010.

Segalini, Sergio, "Xenakis à Lille. Regards sur l'opéra" in *Opéra International*, November 1989, p 8-9.

Touloumi, Olga, "Contentious Electronic/Radical Blips" in Choi,Esther and Trotter, Marrikka (eds.), *Architecture Is All Over*,New York, NY, Columbia Books on Architecture and the City, 2017, 161-175.

Xenakis, Iannis. Music and Architecture, translated, compiled and presented by Sharon Kanach, Hillsdale, New York, Pendragon Press, 2008.

Magdala, on the threshold of sensations

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Keywords: Opera, Sound Scenography, Sound Story, Soundscape, Set design, Live Electronics

The contemporary opera renews in the format, for necessity of survival and development of the dramatic thought. Thus, the adaptation of the multimedia and cinematographic formats invade the scenic and sonorous space of the recent operatic production. The developments of digital manipulation have allowed us to open different paths to the concept of sound story, or tell a story through the senses.

In Magdala are applied concepts that are mixed between visual and sound scenography, applying different layers of perception to the effect. The scenario is supported in the video exploration added to the sonorization of the environment, as a complement to the narrative, simultaneously with the operative discourse. In essence, the song is distributed through manipulations of effects, environmental and structural sound creations, in

images that involve distinct plans of assimilation by the auditor.

This presentation intends to demonstrate how the various elements are essential for the development of the work, as well as the relations between them, as a sensorial context.

Eco, Umberto (2011) *A definição da obra de arte.* Lisboa: Edições 70 Eco, Umberto (2016) *Obra aberta.* Lisboa: Relógio d'Água Hurel, Philippe (1991) "Le phénomène sonore, um modele pour la composition". In J.-

B. Barrière (ed.) Le timbre, métaphore pour la composition, (p.261 – 271). Paris: Ircam Manoury, Philippe (1998) La note et le son. Paris; L'Harmattan

Saariaho, Kaija (1991) "Timbre et harmonie". In J.-B. Barrière (ed.) *Le timbre, métaphore pour la composition*, (p.412 – 453). Paris: Ircam Searle, John (2015) *Mente, cérebro e ciência*. Lisboa: Edições 70 Manoury. Philippe (1998) *La note et le son*. Paris: L'Harmattan

Two New Op-Era examples and their technological creation network

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Keywords: Hybridation; Intertextuality; Network; Opera; Technology

In the last 10 years I have created several stage works involving a network of technological means as well as a network of artistic disciplines.

I call this type of work a New Op-Era, indeed born from the current electronic culture and being the expression of hybrid intertextuality.

I'll take as examples my works "Salt Itinerary" (2006) and "A Laugh to Cry" (2013) where we'll find within the creative process a network of multiple "inputs" and "outputs", and where representation and operability are integrated in a new kind of creative transversality of textuality.