

7th Sound and Music Computing Conference

CONFERENCE GUIDE

21-24 July 2010, Barcelona Universitat Pompeu Fabra

smc2010.smcnetwork.org



Organizers



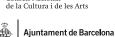




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Benvinguts 2

It is a great pleasure to welcome you all to the 7th edition of the Sound and Music Computing Conference in Barcelona.

The SMC conference is still a young event, but it has been maturing fast over the last few years and it now attracts excellent contributions from the international Sound and Music Computing research community. Last year, the SMC2009 in Porto was a clear turning point in which the conference reached an excellent level of quality, both in terms of the contributions and of the organization. This year we have done our best to follow that excellent trail.

Our original goal in organizing SMC 2010 was to keep the conference to a relatively small size, while continuing the effort in promoting quality research on the interdisciplinary aspects of the SMC field and also continuing the effort in emphasizing the involvement of young researchers. In this booklet you can see the result of all these efforts.

As we did last year, we have organized a Summer School just before the conference. It includes lectures and group projects around the topic of soundscapes, combining both artistic and technological approaches. Complementing the Summer School, a set of tutorials take place the day before the conference and they have been selected to offer hands-on training on relevant software tools for the field.

The many concerts that have been organized during the conference reflect the practice-based research that characterizes our field. We received 60 music submissions from which the appointed curators of the different concerts selected 30 pieces. The curators had also the option to invite composers to present works that could complement the accepted submissions.

The paper and poster sessions continue to be the main venue for presenting the recent research advances in our field. We received 130 submissions, from which the panel of 110 reviewers, coordinated by the Scientific Chairs and under the supervision of the Scientific Committee, selected 75 articles. Of these articles, 30 were chosen to be presented as oral presentations and 45 were chosen to be presented as posters. All the selected articles are being published electronically under a Creative Commons License, distributed as a CD-Rom for the participants and publically available on the Web.

The conference also includes some events that have been organized by the Local committee, such as the keynote talk by Dr. Ricard Solé on the topic of Complex Networks and a panel session on "Tools for Music or Music for Tools?". These events aim to cover key topics of relevance to our community that might promote interesting discussions among the participants.

We are all very conscious that the main goal of an academic conference is the gathering of a research community to promote fruitful personal and group discussions. A conference is successful when the participants return home with the feeling that they have grown both professionally and personally. We hope that the venue we have selected, the Communication Campus of the Universitat Pompeu Fabra, and our organization of the different conference events, will accomplish this goal.

Xavier Serra General Chair SMC 2010 3 Committee

General Chair

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Music Programme Chair Andrés Lewin-Richter (Phonos Foundation, Spain)

Summer School Chair Enric Guaus (ESMUC, Spain)

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Gualtiero Volpe (InfoMus Lab, Genova, Italy)

Stefan Weinzierl (TU Berlin, Germany)

The SMC Summer School takes place right before the SMC Conference and its goal is to give an opportunity to young researchers interested in the field to learn about some of the core interdisciplinary topics and to share their own experiences with other young researchers, through the study of the soundscapes of Barcelona. For that, we will use Freesound.org, a huge collaborative database of sounds, released under the Creative Commons Sampling Plus license.

The program of the Summer School will cover various aesthetic and technical aspects for soundscape analysis and creation with lectures and hand-on practical sessions. The School caters to suit different student backgrounds and interests.

The lectures cover the following topics:

- Soundscape composition: Documentation, listening, and creation using computers: Acoustic ecology and Soundscape composition, by Barry Truax.
- Sound and music content processing: Theory and applications of sound and music description, by Fabien Gouyon.
- Introduction to recording techniques using handheld recorders: Technical concepts for recording and mixing audio in optimal conditions, by Enric Guaus.

The hands-on practical sessions cover the following topics:

- Composition of Realistic and Interactive Soundscape: Analyse, record and annotate a target soundscape of Barcelona, in order to re-compose it, by Mattia Schirosa.
- Augmented Soundscapes: Creation of augmented soundscapes, starting from recordings of real soundscapes, using real-time machine listening and signal processing techniques, by Stefan Kersten.
- SMC Tales: Develop a mobile phone application for collaborative storytelling, by Vincent Akkermans.

Tangible interface for graph based music representation: Building a tangible interface for the music representation used in radio FreeSound, by Gerard Roma.

Summer school chair Enric Guaus (ESMUC)

Faculty
Fabien Gouyon (INESC Porto)
Enric Guaus (ESMUC)
Barry Truax (Simon Fraser University)

Project Tutors

Vincent Akkermans (Universitat Pompeu Fabra) Stefan Kersten (Universitat Pompeu Fabra) Gerard Roma (Universitat Pompeu Fabra) Mattia Schirosa (Universitat Pompeu Fabra)

Students

Sara A. Adhitya, Clarie Bosi, Ivo S. Chichkov, Thiago Duarte, Iain D. Foreman, Steven Gelineck, Alessandro Giovanucci, Bob Jackson, Krunal Kumpavat, Marcella Mandanici, Iñigo Martínez, Davide Andrea Mauro, Noris N. Norowi, Romain Pangaud, Paulo Santiago, Umut Simsekli, Adrien Sirdey, Simone Spagnol, Luca Turchet, Laurens J. van der Wee and Oliver White.

10.00h - 13.00h	Tutorial #1 SuperCollider for Real Time, Interactive Audio	
15.00h - 18.00h	Tutorial #2 (Ab)using MIR to create music: corpus-based synthesis and audio mosaicing	Tutorial #3 Hands-on ReacTable!

10.00h: Tutorial #1 - SuperCollider for Real Time, Interactive Audio Room 54.003

Andrea Valle (CIRMA, Università di Torino)

A crash course for absolute beginners in SuperCollider - an environment and programming language for real-time audio synthesis and algorithmic composition. The workshop will introduce the participants to all the key elements of SuperCollider. The overall basic presentation aims at letting the user move along in learning SuperCollider by her/himself. Architecture, audio server, language basics, GUI, scheduling will be exemplified by creating step-by-step a minimal application that will allow the user to play live while writing on the keyboard.

15.00h: Tutorial #2 - (Ab)using MIR to create music: corpus-based synthesis and audio mosaicing
Room 54.003

Diemo Schwarz (IMTR Team, IRCAM - Centre Pompidou)

The wealth of tools developed in Music Information Retrieval (MIR) for the description, indexation, and retrieval of music and sound can be easily (ab)used for the creation of new musical material and sound design. In this tutorial we will focus on corpus-based concatenative synthesis (CBCS), a generalisation of audio mosaicing, where short snippets of a descriptor-analysed sound corpus are played according to a match with a target, either given in terms of descriptors or by a target sound. This allows to explore a large corpus of sounds interactively, or by composing a path through the descriptor space, and to create novel harmonic, melodic and timbral structures, while keeping the richness and nuances of the original sound material. The workshop will use the free modular CataRT real-time synthesis system (http://imtr.ircam.fr/imtr/CataRT) for Max/MSP with FTM&Co (http://ftm.ircam.fr) that also works as a standalone application. In the workshop we will learn how to use and control CataRT with the mouse, external controllers, and incoming audio, how to adapt its modules to various applications, and how to extend its descriptor analysis and import.

10.00h: Tutorial #3 - Hands-on ReacTable!

Sergi Jordà, Daniel Gallardo and Carles F. Julià (Universitat Pompeu Fabra)

This workshop offers participants hands on experience with real-time music creation using tabletop and tangible interfaces. The workshop structure is divided into three parts, which are:

- An introduction to the ReacTable tabletop music synthesiser, during which participants will have the opportunity to play on the ReacTable.
- A brief tutorial on sound and music programming in PureData, a visual programming language with a signal processing orientation, and an introduction to an in-house generic tabletop display and controller framework to control PureData programs. This will be followed by a more theoretical discussion about the relevance and the adequacy of tangibles, and more specifically tabletops, for music performance.
- The development, in groups, of a musical tangible application written in PD and controlled using a tabletop interface. This will involve developing sound/music PureData patches, designing and discussing the mapping of parameters, testing the application on a tabletop (i.e. the ReacTable hardware) and finally presenting the work in front of the workshop participants.

18.00h	Summer School Concert
19.00h	Reception
19.30h	Opening Concert

18.00h: Summer School Concert

Sala Polivalent

This concert features the pieces done by the students of the SMC Summer School as part of the hands-on projects carried out during the four days of the school.

19.00h: Reception Plaça Gutenberg

19.30h: Opening Concert

Sala Polivalent

Island (2000)

Temple (2002)

The Shaman Ascending (2004-2005)

Chalice Well (2009)

Barry Truax

Barry Truax

Barry Truax

Barry Truax

Island is an 8-track soundscape composition that blends natural acoustic environmental sounds with processed versions of the same sounds. The result is a visit to an imaginary island imbued with magical realism, beginning at the shoreline, proceeding up a rapidly flowing stream, visiting a resonant cistern, climbing to the windy peak of a mountain lake, descending again through a nighttime forest of crickets, and ending at a different shoreline. Original sound recordings by the World Soundscape Project, Robert MacNevin, David Monacchi and the composer.

Temple is a soundscape composition composed of choral voices that takes place in the reverberant cathedral of San Bartolomeo, in Busetto, Italy. However, lacking any specific Christian reference, the work can be heard as a spiritual voyage in an imaginary temple whose acoustic properties not only reverberate the choral voices but reflect them back as ghostly after-images that suggest an inner space of vast dimensions. Original voice recordings by counter-tenor David Garfinkle, alto Sue McGowan, and bass Derrick Christian.

The Shaman Ascending evokes the imagery of a traditional shaman figure chanting in the quest for spiritual ecstasy. However, in this case, the listener is placed inside of a circle of loudspeakers with the vocal utterances swirling around at high rates

of speed and timbral development. The work proceeds in increasing stages of complexity as the shaman ascends towards a higher spiritual state. The work and its title are inspired by a pair of Canadian Inuit sculptures by John Terriak with collectively the same name, as well as Inuit throat singing. All of the vocal material heard in the piece is derived from recording of the Vancouver bass singer Derrick Christian. The Shaman Ascending was commissioned by the ZKM, Karlsruhe, Germany and premiered there in February 2005.

Chalice Well is a holy well situated at the foot of Glastonbury Tor in southwest England, thought to be originally the island of Avalon from Arthurian legend, and the site where Joseph of Arimathea placed the chalice known as the Holy Grail. According to legend, the Tor, a masculine symbol, is hollow underneath and the entrance to the underworld, guarded by the Grail. The well, on the other hand, is a symbol of the feminine aspect of deity, and its waters are believed to possess healing qualities. This work takes the listener on an imaginary journey down into the well, passing through several cavernous chambers on its descent, filled with rushing and trickling water, including the chamber of the feminine spirit. The journey continues to the glass chamber, then to the gates of the underworld, only to be confronted by the image of the Grail, and finally coming to rest in the space where wind and water, the masculine and the feminine are combined.

• Barry Truax. Professor at the School of Communication at Simon Fraser University where he teaches courses in acoustic communication and electroacoustic music. He has worked with the World Soundscape Project, editing its Handbook for Acoustic Ecology, and has published a book Acoustic Communication dealing with all aspects of sound and technology. As a composer, Truax is best known for his work with the PODX computer music system that he has used for tape solo works and those which combine tape with live performers or computer graphics. A selection of these pieces may be heard on the Compact Discs Digital Soundscapes, Pacific Rim, Song of Songs, Inside, Twin Souls, Islands, and Spirit Journies, all on the Cambridge Street Records label, plus the double CD of the opera Powers of Two. In 1991 his work, Riverrun, was awarded the Magisterium at the International Competition of Electroacoustic Music in Bourges, a category open only to electroacoustic composers of 20 or more years experience.

9.00h	Oral Session 1 - Melody and Harmony	
10.30h	Poster Craze 1	
11.00h	Poster Session 1	Coffee Break
12.00h	Oral Session 2 - Timbre and Melody	

9.00h: Oral Session 1 - Melody and Harmony

Auditorium

Chair: Rafael Ramírez

9.00h: [OS1-1] Exploring Common Variations in State of the Art Chord Recognition Systems. Taemin Cho, Ron Weiss and Juan Pablo Bello.

Most automatic chord recognition systems follow a standard approach combining chroma feature extraction, filtering and pattern matching. However, despite much research, there is little understanding about the interaction between these different components, and the optimal parameterization of their variables. In this paper we perform a systematic evaluation including the most common variations in the literature. The goal is to gain insight into the potential and limitations of the standard approach, thus contributing to the identification of areas for future development in automatic chord recognition. In our study we find that filtering has a significant impact on performance, with self-transition penalties being the most important parameter; and that the benefits of using complex models are mostly, but not entirely, offset by an appropriate choice of filtering strategies.

9.20h: [OS1-2] Lyrics-to-Audio Alignment and Phrase-Level Segmentation Using Incomplete Internet-Style Chord Annotations. Matthias Mauch, Hiromasa Fujihara and Masataka Goto.

We propose two novel lyrics-to-audio alignment methods which make use of additional chord information. In the first method we extend an existing hidden Markov model (HMM) for lyrics alignment by adding a chord model based on the chroma features often used in automatic audio chord detection. However, the textual transcriptions found on the Internet usually provide chords only for the first among all verses (or choruses, etc.). The second method we propose is therefore designed to work on these incomplete transcriptions by finding a phrase-level segmentation of the song using the partial chord information available. This segmentation is then used to constrain the lyrics alignment. Both methods are tested against hand-labelled ground truth annotations of word beginnings. We use our first method to show that chords and lyrics complement each other, boosting accuracy from 59.1% (only chroma feature) and 46.0% (only phoneme feature) to 88.0% (0.51 seconds mean absolute displacement). Alignment performance decreases with incomplete chord annotations, but we show that our second method compensates for this informa-

tion loss and achieves an accuracy of 72.7%.

9.40h: [OS1-3] Chord Sequence Patterns in OWL. Jens Wissmann, Tillman Weyde and Darrell Conklin.

Chord symbols and progressions are a common way to describe musical harmony. In this paper we present SEQ, a pattern representation using the Web Ontology Language OWL DL and its application to modelling chord sequences. SEQ provides a logical representation of order information, which is not available directly in OWL DL, together with an intuitive notation. It therefore allows the use of OWL reasoners for tasks such as classification of sequences by patterns and determining subsumption relationships between the patterns. We present and discuss application examples using patterns obtained from data mining.

10.00h: [OS1-4] Performance Rendering for Polyphonic Piano Music with a Combination of Probabilistic Models for Melody and Harmony. Tae Hun Kim, Satoru Fukayama, Takuya Nishimoto and Shiqeki Sagayama.

We present a method to generate human-like performance expression for polyphonic piano music. Probabilistic models and machine learning techniques have been successfully applied to solve the problem of generating human-like expressive performance, given a music score. In case of polyphonic music, however, it was difficult to make models tractable and a huge amount of training data was necessary, because performance contexts and relationships of performance expressions are very complex. To overcome these problems, we propose a method with a combination of probabilistic models for melody and harmony. The experimental results show that the proposed method was able to generate fluctuations of performance expression parameters for polyphonic piano music such like human performers do. The results of the subjective evaluations are also reported which indicate that their sounds were human-like and had certain degree of musicality.

10.30h: Poster Craze 1 Auditorium

[PS1-1] Creation and Exploration of a Perceptual Sonic Textures Space Using a Tangible Interface. Jean-julien Filatriau and Daniel Arfib.

This study takes place in the framework of an ongoing research dealing with the analysis, synthesis and gestural control of sonic textures. In this paper, we describe two recent contributions related to this field: the first one aimed at providing a sonic textures space based on human perception. For that purpose, we conducted a psychoacoustic experiment, relying on the tangible interface, where subjects were asked to evaluate similarity between sonic textures by gathering them in several groups. The second part of this study aimed at experimenting the control of sonic textures synthesis using a tangible interactive table. We also designed a musical tabletop application inspired by the metaphor of a sonic space exploration. This gave very promising insights on the possibilities offered by such interfaces for the real-

time processing of sonic textures.

[PS1-2] AV Clash - Online Tool for Mixing and Visualizing Audio Retrieved from Freesound.org Database. Nuno N Correia.

In this paper, the project AV Clash will be presented. AV Clash is a Web-based tool for integrated audiovisual expression, created by Video Jack (Nuno N. Correia and Andre Carrilho, with the assistance of Gokce Taskan). In AV Clash, users can manipulate seven objects that represent sounds, incorporating audio reactive animations and graphical user interface elements to control animation and sound. The sounds are retrieved from online sound database Freesound.org, while the animations are internal to the project. AV Clash addresses the following research question: how to create a tool for integrated audiovisual expression, with customizable content, which is flexible, playful to use and engaging to observe? After an introduction to the project, a contextualization with similar works is presented, followed by a presentation of the motivations behind the project, and past work by Video Jack. Then the project and its functionalities are described. Finally, conclusions are presented, assessing the achievement of the initial aims, and addressing the limitations of the project, while outlining paths for future developments.

[PS1-3] PHOXES - Modular Electronic Music Instruments Based on Physical Modeling Sound Synthesis. Steven Gelineck and Stefania Serafin.

This paper describes the development of a set of electronic music instruments (PHOXES), which are based on physical modelling sound synthesis. The instruments are modular, meaning that they can be combined with each other in various ways in order to create richer systems, challenging both the control and perception, and thereby also the sonic potential of the models. A method for evaluating the PHOXES has been explored in the form of a pre-test where a test subject borrowed the instrument for a period of 10 days. The longer test period makes way for a more nuanced qualitative evaluation of how such instruments might be integrated into workflows of real world users

[PS1-4] Interlude - A Framework for Augmented Music Scores. Dominique Fober, Christophe Daudin, Yann Orlarey and Stéphane Letz.

An Augmented Music Score is a graphic space providing the representation, composition and manipulation of heterogeneous music objects (music scores but also images, text, signals...), both in the graphic and time domains. In addition, it supports the representation of the music performance, considered as a specific sound or gestural instance of the score. This paper presents the theoretical foundation of the augmented music score as well as an application - an augmented score viewer - that implements the proposed solutions.

[PS1-5] Quantifying Masking In Multi-Track Recordings. Sebastian Vega and Jordi Janer.

It is known that one of the most important tasks in music post-production is equa-

lization. Equalization can be applied in several ways, but one of the main purposes it serves is masking minimization. This is done so that the listener can appreciate the timbral qualities of all instruments within a musical mix. However, the study of masking between the different instruments of a multi-track mix has not received a lot of attention, and a quantitative measure based on perceptual studies has not yet been proposed. This paper presents such a measure, along with a study of masking between several common instruments. The measure proposed (cross-adaptive signal-to-masker ratio) is intended to serve as an analysis tool to be used by audio engineers when trying to combat masking using their preferred equalization techniques.

[PS1-6] Mixtract: An Environment for Designing Musical Phrase Expression. Mitsuyo Hashida, Shunji Tanaka, Takashi Baba and Haruhiro Katayose.

Music performance is processing to embody musical ideas in concrete sound, giving expression to tempo and dynamics and articulation to each note. Human competence in music performance rendering is enhanced and fostered by supplementing a lack of performance skill and musical knowledge using computers. This paper introduces a performance design environment called Mix-tract, which assists users in designing phrasing, and a performance design guideline called the Hoshina-Mixtract method executable on Mixtract. Mixtract provides its users with a function for assisting in the analysis of phrase structure and a function to show the degree of importance of each note in a phrase group. We verified that the proposed system and method help seven children to externalize their musical thought and help them transform their subjective musical thoughts into objective ones.

[PS1-7] On the Traceability of the Compositional Process. Hanns Holger Rutz, Eduardo Miranda and Gerhard Eckel.

Composition is viewed as a process that has its own temporal dimension. This process can sometimes be highly non-linear, sometimes is carried out in real-time during a performance. A model is proposed that unifies the creational and the performance time and that traces the history of the creation of a piece. This model is based on a transformation that enhances data structures to become persistent. Confluent persistence allows navigation to any previous version of a piece, to create version branches at any point, and to combine different versions with each other. This concept is tuned to integrate two important aspects, retroactivity and multiplicities. Three representative problems are posed: How to define dependencies on entities that change over time, how to introduce changes ex-post that affects future versions, and how to continue working on parallel versions of a piece. Solutions based on our test implementation in the Scala language are presented. Our approach opens new possibilities in the area of music analysis and can conflate disparate notions of composition such as tape composition, interactive sound installation, and live improvisation. They can be represented by the same data structure and both offline and real-time manipulations happen within the same transactional model.

[PS1-8] Tidal - Pattern Language for Live Coding of Music. Alex McLean and Geraint Wiggins.

Computer language for the description of pattern has been employed for both analysis and composition of music.In this paper we investigate the latter, with particular interest in pattern language for use in live coding performance.Towards this end we introduce Tidal, a pattern language designed for music improvisation, and embedded in the Haskell programming language. Tidal represents polyphonic patterns as a time varying function, providing an extensible range of pattern generators and combinators for composing patterns out of hierarchies of sub-patterns. Open Sound Control (OSC) messages are used to trigger sound events, where each OSC parameter may be expressed as a pattern.Tidal is designed to allow patterns to be created and modified during a live coded performance, aided by terse, expressive syntax and integration with an emerging time synchronisation standard.

[PS1-9] In a Concrete Space: Reconstructing the Spatialization of Iannis Xenakis' Concret PH on a Multichannel Setup. Andrea Valle, Kees Tazelaar and Vincenzo Lombardo.

Even if lasting less than three minutes, lannis Xenakis' Concret PH is one of the most influential worksin the electroacoustic domain. It was originally created to be diffused in the Philips Pavilion, designed by the same Xenakis for the 1958 World Fair in Brussels. As the Pavilion was dismantled in 1959, the original spatialization design devised from the Pavilion has been lost. The paper presents new findings about the spatialization of Concret PH. It discusses them in the light of Xenakis' aesthetics, and consequently proposes a plausible reconstruction of the spatialization design. Finally, it proposes a real-time, interactive implementation of the reconstructed spatialization, rendered on a 8-channel setup using a VBAP technique.

[PS1-10] A Lyrics-Matching QBH System with Applications in Real-time Accompaniment. Panagiotis Papiotis and Hendrik Purwins.

Query-by-Humming (QBH) is an increasingly popular technology that allows users to browse through a song database by singing/humming a part of the song they wish to retrieve. Besides these cases, QBH can also be used in applications such as Score Alignment and Real-Time Accompaniment. In this paper we present an online QBH algorithm for audio recordings of singing voice, which uses a Multi-Similarity measurement approach to pinpoint the location of a query within a musical piece taking into account the pitch trajectory, phonetic content and RMS energy envelope. Experiments show that our approach can achieve 75% Top-1 accuracy in locating an exact melody from the whole song, and 58% Top-1 accuracy in locating an exact melody from the whole song, and 58% Top-1 accuracy in locating the phrase which contains the exact lyrics an improvement of 170% over the basic pitch trajectory method. Average query duration is 6 seconds while average runtime is 1.1 times the duration of the query.

[PS1-11] Analyzing Left Hand Fingering in Quitar Playing. Enric Guaus and Josep Lluís Arcos.

In this paper, we present our research on left hand gesture acquisition and analysis in guitar performances. The main goal of our research is the study of expressiveness. Here, we focus on a detection model for the left hand fingering based on gesture information. We use capacitive sensors to capture fingering positions and we look for a prototypical description of the most common fingering positions in guitar playing. We report the performed experiments and study the obtained results proposing the use of classification techniques to automatically determine the finger positions.

[PS1-12] Voice Conversion: a Critical Survey. Anderson F Machado and Marcelo Queiroz.

Voice conversion is an emergent problem in voice and speech processing with increasing commercial interest due to applications such as Speech-to-Speech Translation (SST) and personalized Text-To-Speech (TTS) systems. A Voice Conversion system should allow the mapping of acoustical features of sentences pronounced by a source speaker to values corresponding to the voice of a target speaker, in such a way that the processed output is perceived as a sentence uttered by the target. In the last two decades the number of scientific contributions to the voice conversion problem has grown considerably, and a solid overview of the historical process as well as of the proposed techniques is indispensable for those willing to contribute to the field. The goal of this text is to provide a critical survey that combines historical presentation to technical discussion while pointing out advantages and drawbacks of each technique, and to bring a discussion of future directions, specially referring to the development of a perceptual benchmarking process in voice conversion systems.

[PS1-13] Automatic Song Composition from the Lyrics Exploiting Prosody of Japanese Language. Satoru Fukayama, Kei Nakatsuma, Shinji Sako, Takuya Nishimoto and Shiqeki Saqayama.

Automatic composition techniques are important in sense of upgrading musical applications for amateur musicians such as composition support systems. In this paper, we present an algorithm that can automatically generate songs from Japanese lyrics. The algorithm is designed by considering composition as an optimal solution search problem under constraints given by the prosody of the lyrics.

To verify the algorithm, we launched "Orpheus" which composes with the visitor's lyrics on the web-site, and 56,000 songs were produced within a year. Evaluation results on generated songs are also reported, indicating that "Orpheus" can help users to compose their original Japanese songs.

[PS1-14] Mimicry of Tone Production: Results from a Pilot Experiment. Tommaso Bianco.

In this paper we present the description and the first results of a pilot experiment in which participants were requested to mimic the production of sonic elements trough different control modalities. Results show different degrees of dependence of the control temporal profiles with the dynamic level and temporal ordering of the stimuli. The protocol and methodology here advanced may turn useful for ameliorating existing mapping strategies for gesture based interactive media, with particular emphasis to adaptive control of physics-based models for sound synthesis.

[PS1-15] Hubs and Orphans - an Explorative Approach. Martin Gasser, Arthur Flexer and Dominik Schnitzer.

In audio based music similarity, a well known effect is the existence of hubs, i.e. songs which appear similar to many other songs without showing any meaningful perceptual similarity. We show that this effect depends on the homogeneity of the samples under consideration. We compare three small sound collections (consisting of poly- phonic music, environmental sounds, and samples of individual musical instruments) with regard to their hubness. We find that the collection consisting of cleanly recorded musical instruments produces the smallest hubs, whereas hubness increases with in homogeneity of the audio signals. We also conjecture that hubness may have an impact on the performance of dimensionality reduction algorithms like Multidimensional Scaling.

11.00h: Poster Session 1 Auditorium Hall (Exhibition of Poster Craze 1) 11.00h: Coffee Break Cafeteria

12.00h: Oral Session 2 - Timbre and Melody

Auditorium

Chair: Perfecto Herrera

12.00h: [OS2-1] The Influence of Reed Making on the Performance and Sound Quality of the Oboe. Carolina Blasco-Yepes and Blas Payri.

An essential part of the oboe technique is the reed-making process, where the raw material is carved and shaped. Different oboe schools define different types of shapes, and argue about their adequacy for a better sound and performance. This paper focuses on the perceptual influence of 3 reed-making types. We chose 6 reeds representing 3 pairs of each style (French, German, American) and recorded 116 sound samples with two oboists in controlled conditions. N=63 sound stimuli were selected: 9 diminuendo long tones, 18 eight-note phrases from which 18 lowpitched and 18 high-pitched tones were extracted. Tones were normalized in pitch and intensity to help listeners to focus on timbre. 40 participants (20 non-oboist musicians and 20 professional oboists) completed a free-categorization task on each of the 4 stimuli sets, grouping sounds by global similarity. Results show that the most salient production parameters are the attack type and the oboist-oboe. The reed-making shows no significant influence on isolated tones and a marginal influence on complex phrases, and interreed differences are more important than inter-reed-making differences. Reed-making is important in performance technique but has no influence on the perceived timbre. Future research will deal with

performer proprioception of the reed making.

12.20h: [OS2-2] Kettle: A Real-Time Model for Orchestral Timpani. Panagiotis Papiotis and Georgios Papaioannou.

The orchestral timpani are a key component in western classical music, although their weight, size, and fragility make their transportation very difficult. Current commercial software synthesizers for the Orchestral Timpani are primarily sample-based and work with a MIDI keyboard, giving the user control over the note amplitude and pitch. This approach implements a virtual five-piece set of orchestral timpani, which is controlled using a pressure-sensitive graphics tablet. A brief analysis of the mechanics and playing techniques of the Timpani is presented, followed by their approximation by this models control scheme and sound engine. Thereon, the details of the models implementation are explained, and finally the results of the model are presented along with conclusions on the subject.

12.40h: [OS2-3] Timbre Remapping through a Regression-Tree Technique. Dan Stowell and Mark D. Plumbley.

We consider the task of inferring associations between two differently-distributed and unlabelled sets of timbre data. This arises in applications such as concatenative synthesis/ audio mosaicing in which one audio recording is used to control sound synthesis through concatenating fragments of an unrelated source recording. Timbre is a multidimensional attribute with interactions between dimensions, so it is non-trivial to design a search process which makes best use of the timbral variety available in the source recording. We must be able to map from control signals whose timbre features have different distributions from the source material, yet labelling large collections of timbral sounds is often impractical, so we seek an unsupervised technique which can infer relationships between distributions. We present a regression tree technique which learns associations between two unlabelled multidimensional distributions, and apply the technique to a simple timbral concatenative synthesis system. We demonstrate numerically that the mapping makes better use of the source material than a nearest-neighbour search.

13.00h: [OS2-4] Melodic Memory and its Dependence on Familiarity and Difficulty. Mariana E. Benassi-Werke, Marcelo Queiroz, Nayana G. Germano and Maria Gabriela M. Oliveira.

In this paper, three state of the art non-stationary sinusoidal analysis methods based on Fourier transform (FT) are compared - the derivative method, reassignment and generalized reassignment. The derivative method and reassignment were designed to analyze linear log-AM/linear FM sinusoids. Generalized reassignment can analyze sinusoids containing arbitrary order modulations, however the discussion will be limited to linear log-AM/linear FM in order to compare it objectively to reassignment and the derivative method. In this paper, the equivalence of reassignment and the derivative method is shown to hold for arbitrary order modulation estimation and theoretical comparison with generalized reassignment is presented. The

results of tests conducted on two different frequency ranges, full range (frequencies up to Nyquist) and reduced range (frequencies up to 3/4 Nyquist) frequency range, are compared to the Cramer-Rao bounds (CRBs).

15.00h	Oral Session 3 - Multimodality	
16.30h	Poster Session 1	Coffee Break
17.30h	Oral Session 4 - Sound Modeling and Processing	

15.00h: Oral Session 3 - Multimodality

Auditorium

Chair: Federico Avanzini

15.00h: [OS3-1] Analysing Gesture and Sound Similarities with a HMM-based Divergence Measure. Baptiste Caramiaux, Frédéric Bevilacqua and Norbert Schnell. In this paper we propose a divergence measure which is applied to the analysis of the relationships between gesture and sound. Technically, the divergence measure is defined based on a Hidden Markov Model (HMM) that is used to model the time profile of sound descriptors. We show that the divergence has the following properties: non-negativity, global minimum and non-symmetry. Particularly, we used this divergence to analyze the results of experiments where participants were asked to perform physical gestures while listening to specific sounds. We found that the proposed divergence is able to measure global and local differences in either time alignment or amplitude between gesture and sound descriptors.

15.20h: [OS3-2] Limitations in the Recognition of Sound Trajectories as Musical Patterns. Blas Payri.

Spatial movement has been used by composers as a musical parameter (intention), and this paper focus on the reception by the audience of spatial patterns. We present the results of a series of perception experiments where a total of N=118 listeners had to recognize simple rhythm patterns based on the left-right movements of 7 different sound types. The stimuli varied in harmonicity (HNR), temporal intensity variation, spectral distribution, movement continuity and tempo. Listening conditions included stereo loudspeaker open field listening and headphone listening. Results show that globally the recognition is low, considering the simplicity of the pattern recognition task. The factor that most perturbed recognition is the intensity variation, with completely unvarying sounds yielding better results, and this was more important than the listening condition. We conclude that spatial sound movement is not suitable as a composition element for normally complex music, but it can be recognized by untrained listeners using stable sounds and simple patterns.

15.40h: [OS3-3] Examining the Role of Context in the Recognition of Walking Sounds. Stefania Serafin, Luca Turchet and Rolf Nordahl.

In this paper, we present an experiment whose goal was to recognize the role of contextual information in the recognition of environmental sounds. 43 subjects participated to a between-subjects experiment where they were asked to walk on a limited area in a laboratory, while the illusion of walking on different surfaces was

simulated, with and without an accompanying soundscape. Results show that, in some conditions, adding a soundscape significantly improves surfaces' recognition.

16.00h: [OS3-4] An Audiovisual Workspace for Physical Models. Benjamin Schroeder, Marc Ainger and Richard Parent.

We present an experimental environment for working with physically based sound models. We situate physical models in an interactive multi-modal space. Users may interact with the models through touch, using tangible controllers, or by setting up procedurally animated physical machines. The system responds with both real-time sound and graphics. A built-in strongly-timed scripting language allows for a different kind of exploration. The scripting language may be used to play the models with precise timing, to change their relation, and to create new behaviours. This environment gives direct, concrete ways for users to learn about how physical models work and begin to explore new musical ideas.

16.30h: Poster Session 1Auditorium Hall
(Exhibition of Poster Craze 1)

16.30h: Coffee Break

Cafeteria

17.30h: Oral Session 4 - Sound Modeling and Processing

Auditorium

Chair: Giovanni de Poli

17.30h: [OS4-1] Comparison of Non-Stationary Sinusoid Estimation Methods using Reassignment and Derivatives. Sašo Muševič and Jordi Bonada.

In this paper, three state of the art non-stationary sinusoidal analysis methods based on Fourier transform (FT) are compared - the derivative method, reassignment and generalized reassignment. The derivative method and reassignment were designed to analyze linear log-AM/linear FM sinusoids. Generalized reassignment can analyze sinusoids containing arbitrary order modulations, however the discussion will be limited to linear log-AM/linear FM in order to compare it objectively to reassignment and the derivative method. In this paper, the equivalence of reassignment and the derivative method is shown to hold for arbitrary order modulation estimation and theoretical comparison with generalized reassignment is presented. The results of tests conducted on two different frequency ranges, full range (frequencies up to Nyquist) and reduced range (frequencies up to 3/4 Nyquist) frequency range, are compared to the Cramer-Rao bounds (CRBs).

17.50h: [OS4-2] Phaseshaping Oscillator Algorithms for Musical Sound Synthesis. Jari Kleimola, Victor Lazzarini, Joseph Timoney and Vesa Välimäki.

This paper focuses on phaseshaping techniques and their relation to classical abstract synthesis methods. Elementary polynomial and geometric phaseshapers, such as those based on the modulo operation and linear transformations, are investigated. They are then applied to the generation of classic and novel oscillator effects by using nested phaseshaping compositions. New oscillator algorithms introduced in this paper include single-oscillator hard sync, triangle modulation, efficient su-

persaw simulation, and sinusoidal waveshape modulation effects. The digital waveforms produced with phaseshaping techniques are generally discontinuous, which leads to aliasing artefacts. Aliasing can be effectively reduced by modifying samples around each discontinuity using the previously proposed polynomial band limited step function (polyBLEP) method.

18.10h: [OS4-3] Sparse Regression in Time-Frequency Representations of Complex Audio, Monika Dörfler, Arthur Flexer, Gino Velasco and Volkmar Klien.

Time-frequency representations are commonly used tools for the representation of audio and in particular music signals. From a theoretical point of view, these representations are linked to Gabor frames. Frame theory yields a convenient reconstruction method making post-processing unnecessary. Furthermore, using dual or tight frames in the reconstruction, we may resynthesize localized components from so-called sparse representation coefficients. Sparsity of coefficients is directly reinforced by the application of a penalization term on the coefficients. We introduce an iterative algorithm leading to sparse coefficients and demonstrate the effect of using these coefficients in several examples. In particular, we are interested in the ability of a sparsity promoting approach to the task of separating components with overlapping analysis coefficients in the time-frequency domain. We also apply our approach to the problem of auditory scene description, i.e. source identification in a complex audio mixture.

19.30h	Instrumental-Electronic Concert I
22.00h	Concert around Freesound

19.30h: Instrumental-Electronic Concert I

Sala Polivalent

TRPTS (laptop solo)

Detti del Tuono

Detti del Tuono

Daniel Domínguez Teruel

Andrea Valle, Offelie Derieux

Impulsus I (video) Lina Bautista Live Audio Cues Koray Tahiroglu

Baroque Basso Continuo for Cello, Stephen Barrass & Diane Whitmer,

Heart (ECG) and Mind (EEG) Sasha Agranov

Curator: Eduard Resina

TRPTS_DAMB. For laptop and live-electronics, 6 channels. Consists of sounds that are produced using the laptop. These are recorded, processed and played back, in real-time. Amongst others inspired of the idea of the Musique Concrète Instrumentale from Lachenmann, the aim is not to generate sounds synthetically, but in fact to conceive the computer as an analog soundsource to use it at the same time as an digital music instrument.

• Daniel Dominguez Teruel (1984) studied Music Technology and Musicology at the HfM Karlsruhe and ESMUC Barcelona. A member of the ESMUC Laptop Orchestra. His works were performed at ZKM, Musica Viva Festival Lisbon, Phonos Barcelona, SMC 2009, ton:art Karlsruhe and ICMC 2010. The piece 5 Klangaktionen was selected by IMEB in 2009.

Detti del tuono is inspired by T.S. Eliot's Wasteland, in particular by the section "What the thunder said" (the Italian title means "Tales of the thunder"). The flute part has been written by analyzing a recorded reading of the poem.The same excerpts from the Wasteland are used to generate four percussion layers through the Rumentarium (from rumenta: Northern Italian for "rubbish, junk"), a 24 handmade electro-mechanical percussion set using DC motors, controlled by the computer. In the presented version, the Rumentarium's output is recorded onto 4 tracks, spatialized in real-time according to the flute's sound.

 Andrea Valle studied composition with Alessandro Ruo Rui, Azio Corghi, Mauro Bonifacio, Trevor Wishart and Marco Stroppa. An electric bass player interested in experimental rock and in free jazz, he is a member of AMP2, a collective devoted to free improvisation. He is researcher at the School of Fine Arts, Music and Performative Arts of the University of Torino, and a founding member of CIRMA (Interdepartmental Centre for Multimedia and Audiovisual). He has participated to the EU-funded project VEP, that has reconstructed in Virtual Reality the Philips Pavilion.

• Ophélie Derieux (Tours, 1981) Flute Prize at Tours Conservatory (1998), at Paris (2001) and Aix-en-Provence Music School (2002). Further studies at ESMUC with Viçens Prats. Member of the French Flute Orchestra (OFF) (2002/4) – conducted by P.-Y. Artaud and P.-A. Biget- participating in a recording with Georges Mousstaki, and the Zagreb Music Festival (2003). In 2005 recording of the sound track for "No és un joc" by Antonio Rosa (music Luis Codera Puzo). In 2006 works with the percussion group "Drumming" at the Nous Sons Festival, soloist at the Percusión Festival Barcelona 2007. In 2008 member of the Pulsar Ensemble. In 2009 created her own performance "Ethos&co creant l'escena" at the Auditórium, Barcelona, participated at "Novelum", Toulouse, "XXXX Encontre Internacional de Compositors", Mallorca, music performances at the Barcelona Picasso Museum and the Barcelona Percusión Festival 2010.

Impulsus I is an experimental work of animation and sound design based on lights using an abstract language in the video and sounds created and transformed. The sound design was made with the intention to translate the textures produced in the video to sounds and sound textures as well, bridging the images.

• Lina Bautista (1985, Bogotá) studied music at the "Academia Superior de Artes de Bogotá" and Sound Creation at the conservatory of the "Universidad Nacional de Colombia". Has obtained a several awards, first prize at the ASAB composition contest in 2008 and has made sound designs for many performances and animations. Actually she studies the Postgraduate Program in Musical Composition and Contemporary Technologies at the Universitat Pompeu Fabra.

Live Audio Cues. Improvising interactively turns human musical interaction into continuous activity, exploring new formations of sounds and listening consciously. In Live Audio Cues performances, conscious awareness results in investigating the unexpected through voluntary actions, which evolve into a source for creating a musical dialog with the interactive performance system. Live Audio Cues is an audiovisual real-time improvisation for live electronics and gesture controlled musical instruments interfaced with torch and duck. Interactive performance system acts together with the performer's control gestures and responds to the current state changes of the system components. Hannah Drayson created the abstract visual layers of this piece.

• Koray Tahiroglu. A performer of live electronic music, an improviser, researcher and lecturer who grew up in Istanbul. Currently he lives in Helsinki and works as a postdoctoral researcher at the Department of Media, Aalto University School of Art and Design. Since 2004, he has been teaching workshops and courses introducing artistic strategies and methodologies for creating computational art works

focusing on open source applications and hardware as developing environments. Tahiroglu has performed experimental music in collaboration with sound artists and performers as well as with solo performances at various sound art events and festivals in Europe and North America.

Baroque EEG for Cello, Heart (ECG) and Mind (EEG). The Cellist's brain signals and pulse figure against the Baroque Basso Continuo that they are playing. The Cellist wears the state of the art Enobio system which wirelessly transmits EEG, ECG and EOG from brain activity, pulse, and eye movements to a laptop computer. These signals are mapped into sound in real-time with specially designed sonification algorithms. The concert piece is composed by a live mixing of the music of the Cello with the sonification of the spontaneous signals of musician's brain and body. The authors would like to thank both Simon Smith of BCN Sound (http://www.bcnsound.com/) and Iván Cester from Starlab for collaborating on the demo DVD for this piece.

- Stephen Barrass. A sonification researcher, sound artist and academic in the Faculty of Arts and Design at the University of Canberra in Australia. He holds a B.E. in Electrical Engineering from the University of New South Wales (1986) and a Ph.D. titled Auditory Information Design from the Australian National University (1997). He was a Post-Doctoral Fellow at the Fraunhofer Institute for Media Kommunication in Bonn (1998) and Guest Researcher in Sound Design and Perception at IRCAM in Paris (2009). He organised the International Conference on Auditory Display and the Listening to the Mind Listening concert at the Sydney Opera House in 2004. He is currently a participant in the European COST initiative on Sonic Interaction Design.
- Diane Whitmer. A Neuroscientist at Starlab in Barcelona and an amateur musician with training in classical violin and piano. She earned a B.A. in Cognitive Science from Dartmouth College in 1997 and a Ph.D. in Computational Neurobiology from UC San Diego in 2008. In between, she worked in software user-centered design in the San Francisco Bay Area. For her PhD dissertation, she investigated oscillations in the rat vibrissa system and also sensorimotor processing in neurology patients using advanced signal processing techniques. At Starlab, she now develops tools for non-invasive brain stimulation and brain-computer interfaces.
- Sasha Agranov (Saint Petersburg,1977) moved to Israel in 1979. Studied violoncello with Hilel Zori at the Music Academy of Tel Aviv. 1999-2005 studies at the Royal Conservatory in The Hague, baroque violoncello with Jaap Ter Linden. Played in the Early Music Festival of Brezice and the Music Festival of San Sebastian. Member of Company Circus Delirium the pop groupe amanda jayne, Freak Folk Groupe picola Orchestra Gagarin, Baroque Ensemble Rubato Appassionato and Selva de Mar, a music ensemble that performs "aquatic" music, "a tapestry of timeless, almost utopian atmospheres that bewitch the imagination, constructed over an acoustic base (cello and hang), superimposed with a variety of different objects and ethereal use of electronic processes."

22.00h: Concert around Freesound

Sala Polivalent

Concert in the Concert Bram de Jong and Gerard Roma

Coming Together Arne Eigenfeldt

Agua (cero) 2 Hanns Holger Rutz & Nayari Castillo

Grainstone Antonio Scarcia Alarm – Signal Diemo Schwarz

Swish & Break (Geschlagene-Natur) Maurizio Goina, Pietro Polotti & Sarah Taylor

Curators: Bram de Jong and Gerard Roma

Concert in the Concert. Concert in the Concert is a homage to the collaborative, distributed nature of Freesound. It is based on the "Shower in the Shower" experiment carried on by the Freesound community in 2006 as a geographically distributed version of Alvin Lucier's "I'm sitting in a room". Concert in the Concert consists of recordings of the Concert itself that are uploaded and downloaded to/from Freesound during the Concert by the audience.

- Bram de Jong obtained his bachelor degree in computer science engineering at Ghent University. He has worked as a senior R&D engineer at MTG-UPF and as a senior developer at Barcelona Music and Audio Technologies (BMAT). He was CTO of Splice Music, one of the first web-based music creation platforms, and is curretly co-owner of SampleSumo. Bram is the "main man" behind Freesound, both as a developer and as a forum moderator.
- Gerard Roma studied Philosophy at Universitat Autònoma de Barcelona and Information and Communication Technologies at Universitat Pompeu Fabra. Currently a Phd candidate at MTG-UPF, where he works on computational models and applications for collaborative music creation. He is suspect of performing and releasing electronic music under different pseudonyms.

Coming Together. An autonomous soundscape composition created by four autonomous artificial agents - the composer's role in performance is to simply adjust levels. Agents choose sounds from a pre-analyzed database of soundscape recordings (from Freesound.org), based upon their spectral content. Agents analyze, in real-time, other agent's audio, and attempt to avoid dominant spectral areas of other agents, selecting sounds that do not mask one another. As the composition progresses, this is facilitated by lowering the bandwidth of the agent's resonant filters, projecting an artificial harmonic field upon the recordings that are derived from the spectral content of the recordings themselves. Finally, each agent adds granulated instrumental tones at the resonant frequencies, thereby completing the "coming together".

• Arne Eigenfeldt. Composer of live electroacoustic music, and researcher in the field of metacreation - endowing computers with creative behaviour. His music has been performed around the world, and his collaborations range from Persian Tar masters to contemporary dance companies to musical robots. His research has been presented at conferences such as ICMC 04, 05, 06, 07, 08, 09,10, NIME 08, SEAMUS 05, 07, ISMIR 08, 09), the Electronic Music Studies Network (EMS 07, 09, 10), SMC 06, Generative Art (GA 09), and Computational Creativity (ICC-X). He is an associate professor of music and technology at Simon Fraser University, Canada, and an associate director of the Metacreation Research Group (metacreation.net).

Agua (Cero) 2 (2010) was first performed in Maracaibo, one of the hottest places in Venezuela. The title is a pun as it both denotes the lack of water, but also that it is raining cats and dogs. The piece is based around a live-improvisation with "Wolkenpumpe", a custom developed software, and black & white video projection. This time the sound materials, all related to water, are taken from the FreeSound archive during the performance. Nayari Castillo's video works often have a photographic still quality, focused on the amazement of slow changes, the tension between stasis and movement

- Hanns Holger Rutz (aka Sciss) (1977, Germany) studied computer music and audio engineering at the Technical University Berlin, and from 2004–2009 worked as artistic assistant at the Studio for electroacoustic Music (SeaM) Weimar. His compositions include tape music, works with video, as well as collaborative works with theatre and dance. His recent focus is on sound installation, and electronic live improvisation. In his creations, the development and research on software and algorithms plays an important role. In 2009, he moved to Plymouth where is currently conducting a PhD at the Interdisciplinary Centre for Computer Music Research (ICCMR)
- Nayarí Castillo (Venezuela/USA) is Molecular Biologist and Artist. MFA in Contemporary Representational Visual Systems. University of the Arts, Caracas, Venezuela. MFA Public Art and New Artistic Strategies, Bauhaus University, Weimar, Germany. Has participated in numerous collective and solo exhibits in cities like Brussels, Salzburg, Belgrade, Budapest, Tenerife, Miami, Buenos Aires, Mombasa, among others. In the Venezuelan context she took part in several exhibitions obtaining the first prices of the 62th National Contest Arturo Michelena and the VIII CANTV Youth with FIA Contest. Publications include: 21 Venezuelan Women Photographers / M.T. Boulton, Photography in Venezuela 1960-2000 / J.C. Palenzuela and Open Maps: Latinoamerican Photography 1991-2002 / Alejandro Castellote. At present she resides in Plymouth, UK.

Grainstone. The work has been realized in form of studio with manipulation of samples (from Freesound.org) through sessions in Supercollider environment. The genesis of work reflects a classical "tape studio" approach: lists processing and real-

time controls have been used to produce several audio layers in a hierarchical form, and then digitally edited.

• Antonio Scarcia. Graduated in Electronic Engineering (University of Padua) and Electronic Music ("Discipline Musicali" degree, at Bari Conservatory). His works have been included in important programmes as ICMC 2007 (Copenhagen), North Carolina Computer Music Festival 2008 (Raleygh), SMC 2009 (Porto) and Mantis Festival 2010 (Manchester).

Alarm-Signal. Alarm sounds and signals are usually lying in wait all around us to alert our attention, warn us of danger, wake us up. This piece finally gives them a chance to express themselves freely; just what the freesound project was intended for."Alarm" and "signal" are the search terms used in freesound to find the sounds out of which this piece is exclusively constructed. Despite the startling nature of most of these sounds, the use of corpus-based concatenative synthesis techniques in the CataRT system makes it possible to compose smooth evolutions and soothing combinations of timbres, thereby reflecting on the inner qualities of these sounds that are richer than their everyday use.

• Diemo Schwarz. A researcher at IRCAM, musician on drums and laptop. His compositions and live performances---with his solo project Mean Time Between Failure, in the duo the concatenator with Etienne Brunet, or improvising with musicians such as George Lewis, Evan Parker, Frédéric Blondy, Victoria Johnson, Luka Juhart, Pierre-Alexander Tremblay---explore the possibilities of corpus-based concatenative synthesis to re-contextualise any sound source by rearranging sound units into a new musical framework using interactive navigation through a sound space. Collaborates with Philippe Manoury, Dai Fujikura, Stefano Gervasoni, Pierre Jodlowski, Aaron Einbond, Sam Britton. PhD in computer science applied to music.

Swish & Break (*Geschlagene-Natur*). The work is based on the EGGS project - Elementary Gestalts for Gesture Sonification. In EGGS, sound is conceived as a representation of basic gesture elements - http://visualsonic.eu/ . The sound is meant as an effect of the choreographic gesture and its expressiveness. The system becomes a sort of "choreophone".

The sounds employed in this performance were retrieved from the Freesound project by means of specific keywords: Swish, Nature and Break.

- Maurizio Goina viola player and an audio-visual composer based in Trieste, Italy. Currently working as researcher on a Gesture Sonification project at the School of Music and New Technologies, Conservatory "G. Tartini" of Trieste.
- *Pietro Polotti* teaches Electronic Music at the Conservatory "G. Tartini" of Trieste, Italy. He also collaborateswith the University of Verona as researcher in sonic interaction design. He is part of the Gamelunch group www.soundobject.org/Ba-

sicSID. In 2008, he started with Maurizio Goina the EGGS project – www.visualsonic.

• Sarah Taylor - Trained at the Australian Ballet School (Degree in Dance). Collaborations in the field of choreography and dance assistance include, Gelabert /Azzopardi - Barcelona (16 productions), Paolo Grassi School - Milan, Komische Oper - Berlin, World Madness Festival - Münster, Charles Atlas - Videodance production, Deutsche Oper - Berlin.

9.00h	Keynote - Evolution of Complex Networks: From Cells to Language and Technology	
10.30h	Poster Craze 2	
11.00h	Poster Session 2	Coffee Break
12.00h	Oral Session 5 - Music Classification and Annotation	

9.00h: Keynote - Evolution of Complex Networks: From Cells to Language and Technology

Auditorium

Ricard Solé (Universitat Pompeu Fabra)

Complex systems pervade our real world, from social systems to genome dynamics. All these systems are characterized by the presence of emergent phenomena: New properties emerge from the interactions of simpler units and are not reducible to the properties of the latter. The natural description of complex systems involves a network view, where each system is represented by means of a web. Such graphs have been shown to share surprisingly universal patterns of organization, indicating that fundamental laws of organization also pervade complexity at multiple scales.

• Ricard Solé is an ICREA research professor (the Catalan Institute for research and Advanced Studies), working at Universitat Pompeu Fabra, where he leads the Complex Systems Lab. He is also also External Professor of the Santa Fe Institute and member of the Council of the European Complex Systems Society. Dr. Solé completed a five-year degree in Physics and another 5-year degree in Biology at the University of Barcelona and received his PhD in Physics in the Universitat Politecnica de Catalunya. His main research interests is understanding the possible presence of universal patterns of organization in complex systems, from prebiotic replicators to evolved artificial objects. Key questions are how robust structures develop, how information is incorporated into these structures and how computation emerges. He is also interested in how to determine what are the contributions of selection, chance and self-organization to the evolution of complexity. Part of these studies are funded by a James McDonnell Foundation Award.

10.30h: Poster Craze 2 Auditorium

Auditorium

[PS2-1] Restoration of Audio Documents with Low SNR: a NMF Parameter Estimation and Perceptually Motivated Bayesian Suppression Rule. Giuseppe Cabras, Sergio Canazza, Pier Luca Montessoro and Roberto Rinaldo.

In the field of audio restoration, the most popular method is the Short Time Spectral Attenuation (STSA). Although this method reduces the noise and improves the SNR, it mostly tends to introduce signal distortion and a residual noise called musical noi-

se (a tonal, random, isolated, time-varying noise). This work presents a new audio restoration algorithm based on Non-negative Matrix Factorization (NMF) with a noise suppression rule that introduce the masking phenomenon of the human hearing to calculate a noise masking threshold from the estimated target source. Extensive test with PESQ measure at low SNR (i.e. < 10dB) shows that the method do not introduce musical noise and permits to control the trade-off between undesired component suppression and source attenuation. In particular, we show that NMF is a suitable technique to extract the clean audio signal from undesired non stationary noise in a monaural recording of ethnic music. Moreover, we carry out a listening test in order to compare NMF with the state of the art audio restoration framework using the EBU MUSHRA test method. The encouraging results obtained with this methodology in the presented case study support their applicability in several fields of audio restoration.

[PS2-2] Constant-Q Transform Toolbox for Music Processing. Christian Schärkhuber and Anssi Klapuri.

This paper proposes a computationally efficient method for computing the constant-Q transform (CQT) of a time-domain signal. CQT refers to a time-frequency representation where the frequency bins are geometrically spaced and the Q-factors (ratios of the center frequencies to bandwidths) of all bins are equal. An inverse transform is proposed which enables a reasonable-quality (around 55dB signal-tonoise ratio) reconstruction of the original signal from its CQT coefficients. Here CQTs with high Q-factors, equivalent to 1296 bins per octave, are of particular interest. The proposed method is flexible with regard to the number of bins per octave, the applied window function, and the Q-factor, and is particularly suitable for the analysis of music signals. A reference implementation of the proposed methods is published as a Matlab toolbox. The toolbox includes user-interface tools that facilitate spectral data visualization and the indexing and working with the data structure produced by the CQT.

[PS2-3] Automatic Music Composition Based on Counterpoint and Imitation Using Stochastic Models. Tsubasa Tanaka, Takuya Nishimoto, Nobutaka Ono and Shigeki Sagayama.

In this paper, we propose a computational method of automatic music composition which generates pieces based on counterpoint and imitation. Counterpoint is a compositional technique to make several independent melodies which sound harmonious when they are played simultaneously. Imitation is another compositional technique which repeats a theme in each voice and associates the voices. Our computational method consists of the stochastic model of counterpoint and that of imitation. Both stochastic models are simple Markov models whose unit of state is a beat. We formulate the problem as the problem to find the piece which maximizes the product of probabilities that correspond to both stochastic models. Dynamic programming can be used to find the solution because the models are simple Markov models. Experimental results show that our method can generate

pieces which satisfy the requirements of counterpoint within two successive beats, and can realize imitations of the theme with flexible transformations.

[PS2-4] Exploring Timbre Spaces With Two Multiparametric Controllers. Chris Kiefer.

This paper describes the development so far of a system that uses multiparametric controllers along with an interactive high-level search process to navigate timbre spaces. Either of two previously developed interfaces are used as input devices; a hand tracking system and a malleable foam controller. Both interfaces share the property of streaming continuous multiparametric co-dependent data. When these data streams are mapped to synthesis parameters, the controllers can be used to explore the parameter space in an embodied manner; with the hand tracker, moving or changing the shape of the hand changes the sound, and with the foam, deforming its shape changes the sound. The controllers become too sensitive with larger parameter spaces, so a navigation system was developed to enable high level control over the subset of the parameter space in which the controllers are working. By moving and refining the working range, a timbre space can be progressively explored to find a desired sound. The search process was developed by focusing on three scenarios, the control of four, ten and forty dimensional timbre spaces. Using the system is an interactive process, while one hand is used for detailed search with one of the input devices, the other hand controls high level search parameters with MIDI and the computer keyboard. Initial reactions from two musicians indicate the development so far to be successful, the next stage in this project is to carry out formal user studies

[PS2-5] Dependent Vector Types for Multirate Faust. Pierre Jouvelot and Yann Orlarey.

Faust is a functional programming language dedicated to the specification of executable mono-rate synchronous musical applications. To extend Faust capabilities to domains such as spectral processing, we introduce here a multi-rate extension of the core Faust language. The key idea is to link rate changes to data structure manipulation operations: creating a vector-valued output signal divides the rate of input signals by the vector size, while serializing vectors multiplies rates accordingly. This interplay between vectors and rates is made possible in the language static semantics by the introduction of dependent types. We present a typing semantics, a denotational semantics and a correctness theorem that show that this extension preserves the language synchronous characteristics. This new design is under current implementation in the Faust compiler.

[PS2-6] The "Stanza Logo-Motoria": An Interactive Environment for Learning and Communication. Antonio Camurri,Sergio Canazza,Corrado Canepa,Antonio Rodà,Gualtiero Volpe, Serena Zanolla and Gian Luca Foresti.

The Stanza Logo-Motoria is a multimodal interactive system for learning and communication developed by means of the EyesWeb XMI platform. It is permanently

installed in a Primary School where it is used as an alternative or/and additional tool to traditional ways of teaching. The Stanza Logo-Motoria is used by all school children, from first to fifth class, including children with disabilities. This paper describes the system and a first assessment of the teaching activities carried out with it.

[PS2-7] Sound Texture Synthesis with Hidden Markov Tree Models in the Wavelet Domain. Stefan Kersten and Hendrik Purwins.

In this paper we describe a new parametric model for synthesis of environmental sound textures, like running water, rain and fire. Sound texture analysis is cast in the framework of wavelet decomposition and hierarchical statistical, generative models, that have previously found application in image texture analysis and synthesis. By stochastic sampling from the model and reconstructing the sampled wavelet coefficients to a time-domain signal, we can synthesize distinct versions of a sound, that bear perceptually convincing similarity to the source sound. The resulting model is shown to perform favourably in comparison to previous approaches to sound texture synthesis while the resulting models provide a parametric description of sound textures.

[PS2-8] Head in Space: A Head-tracking Based Binaural Spatialization System. Luca Andrea Ludovico, Davide Andrea Mauro and Dario Pizzamiglio.

This paper discusses a system capable of detecting the position of the listener through a head-tracking system and rendering a 3D audio environment by binaural spatialization. Head tracking is performed through face recognition algorithms which use a standard webcam, and the result is presented over headphones, like in other typical binaural applications. With this system users can choose an audio file to play, provide a virtual position for the source in an Euclidean space, and then listen to the sound as if it is coming from that position. If they move their head, the signal provided by the system changes accordingly in real-time, thus providing a realistic effect.

[PS2-9] A Look into the Past: Analysis of Trends and Topics in the Sound and Music Computing Conference. Pratyush, Martí Umbert and Xavier Serra.

In this paper we analyze the proceedings of all the past six editions of the Sound & Music Computing Conference. The proceedings are analyzed using knowledge based-keywords to text-mapping to discover the overall conference evolution trends. The analysis is done on a basis of number of papers and distinct authors, participation ratio for each relevant topic, the interdependence of topics in terms of shared keywords and the overall popularity of keywords. The analysis was done for each conference year as well as for the overall collection of proceedings till date. The objective of the discussed work is to provide an insight of the progress made over the past six years in the SMC community that was envisioned in the roadmap.

[PS2-10] MusicGalaxy - An Adaptive User-Interface for Exploratory Music Retrieval. Sebastian Stober and Andreas Nuernberger.

Sometimes users of a music retrieval system are not able to explicitly state what they are looking for. They rather want to browse a collection in order to get an overview and to discover interesting content. A common approach for browsing a collection relies on a similarity-preserving projection of objects (tracks, albums or artists) onto the (typically two-dimensional) display space. Inevitably, this implicates the use of dimension reduction techniques that cannot always preserve neighbourhood and thus introduce distortions of the similarity space. This paper describes ongoing work on MusicGalaxy -- an interactive user-interface based on an adaptive non-linear multi-focus zoom lens that alleviates the impact of projection distortions. Furthermore, the interface allows manipulation of the neighbourhoods as well as the projection by weighting different facets of music similarity. This way the visualization can be adapted to the user's way of exploring the collection. Apart from the current interface prototype, findings from early evaluations are presented.

[PS2-12] Interpretation and Computer Assistance in John Cage's Concert for Piano and Orchestra (1957-58). Benny Sluchin and Mikhail Malt.

Conceptual musical works that lead to a multitude of realizations are of special interest. One cannot talk about a performance without taking into account the rules that lead to the existence of that particular presentation. After dealing with similar works of open form by lannis Xenakis and Karlheinz Stockhausen, the interest in John Cage's music is evident. His works are so free that one can play any part of the material; even a void set is welcomed. The freedom is maximal and still there are decisions to consider in order to perform the piece. The present article focus on the Concert for Piano and Orchestra of 1957-58, and it is part of the Cagener project, intended to develop a set of conceptual and software tools, which generates a representation of the pieces, intended to assist the performers in their task. The computer serves as a partner in making choices of multiple possibilities, mix together sounds of different sources and of various kinds and following compositional ideas clearly stated.

[PS2-13] Adaptive Spatialization and Scripting Capabilities in the Spatial Trajectory Editor Holo-Edit. Charles Bascou.

This paper presents recent works on controlling and editing sound spatialization on multiple speakers based on sound descriptors. It has been implemented as an extension of Holo-Edit, an OpenSoundControl compliant multitrack spatial trajectory editor developed at GMEM. An SDIF interface has been implemented allowing importing and visualizing sound descriptors generated by third party's software. A set of scripting tools is proposed to process and map these time-tagged data to sound trajectory generation.

[PS2-14] OnArchitecture and Formalisms for Computer-Assisted Improvisation. Fivos Maniatakos, Gerard Assayag, Frederic Bevilacqua and Carlos Agon.

Modelling of musical style and stylistic re-injection strategies based on the recombination of learned material has already been elaborated in music machine im-

provisation systems. Case studies have shown that content-dependant regeneration strategies have great potential for a broad and innovative sound rendering. We are interested in the study of the principles under which stylistic reinjection could be sufficiently controlled, in other words, a framework that would permit the person behind the computer to guide the machine improvisation process under certain logic. In this paper we analyze this three party interaction scheme among the instrument player, the computer and the computer user. We propose a modular architecture for Computer Assisted Improvisation (CAO). We express stylistic reinjection and music sequence scheduling concepts under a formalism based on graph theory. With the help of these formalisms we then study a number problems concerning temporal and qualitative control of pattern generation by stylistic reinjection. Finally we discuss the integration of these concepts into a real-time environment for computer improvisation, under the name GrAIPE.

11.00h: Poster Session 211.00h: Coffee BreakAuditorium HallCafeteria(Exhibition of Poster Craze 2)

12.00h: Oral Session 5 - Music Classification and Annotation

Auditorium

Chair: Bryan Pardo

12.00h: [OS5-1] MusicJSON: A Representation for the Computer Music Cloud. Jesus L. Alvaro and Beatriz Barros.

New cloud computing ways open a new paradigm for music composition. Our music composing system is now distributed on the Web shaping what we call as Computer Music Cloud (CMC). This approach benefits from the technological advantages involved in distributed computing and the possibility of implementing specialized and independent music services which may in turn be part of multiple CMCs. The music representation used in a CMC plays a key role in successful integration. This paper analyses the requirements for efficient music representation for CMC composition: high music representativity, database storage, and textual form. Finally, it focuses on its textual shape, presenting MusicJSON, a format for music information interchange among the different services composing a CMC. MusicJSON and database-shaped representation, both based on an experienced sound and complete music representation, offer an innovative proposal for music cloud representation.

12.20h: [OS5-2] Strategies towards the Automatic Annotation of Classical Piano Music. Bernhard Niedermayer and Gerhard Widmer.

Analysis and description of musical expression is a large field within musicology. However, the manual annotation of large corpora of music, which is a prerequisite in order to describe and compare different artists' styles, is very labour intensive. Therefore, computer systems are needed, which can annotate recordings of different performances automatically, requiring only minimal corrections by the

user. In this paper, we apply Dynamic Time Warping for audio-to-score alignment in order to extract the onset times of all individual notes within an audio recording and compare two strategies for improving the accuracy. The first strategy is based on increasing the temporal resolution of the features used. To cope with arising constraints in terms of computational costs, we apply a divide and conquer pattern. The second strategy is the introduction of a post-processing step, in which the onset time of each individual note is revised. The advantage of this method is, that in contrast to default algorithms, arpeggios and asynchronies can be resolved as well.

12.40h: [OS5-3] Automatic Music Tag Classification based on Block-Level Features. Klaus Seyerlehner, Gerhard Widmer, Markus Schedl and Peter Knees.

In this paper we propose to use a set of block-level audio features for automatic tag prediction. As the proposed feature set is extremely high-dimensional we will investigate the Principal Component Analysis (PCA) as compression method to make the tag classification computationally tractable. We will then compare this block-level feature set to a standard feature set that is used in a state-of-the-art tag prediction approach. To compare the two feature sets we report on the tag classification results obtained for two publicly available tag classification datasets using the same classification approach for both feature sets. We will show that the proposed features set outperform the standard feature set, thus contributing to the state-of-the-art in automatic tag prediction.

13.00h: [OS5-4] Additional Evidence that Common Low-Level Features of Individual Audio Frames are not Representative of Music Genres. Gonçalo Marques, Miguel Lopes, Mohamed Sordo, Thibault Langlois and Fabien Gouyon.

The Bag-of-Frames (BoF) approach has been widely used in music genre classification. In this approach, music genres are represented by statistical models of low-level features computed on short frames (e.g. in the tenth of ms) of audio signal. In the design of such models, a common procedure in BoF approaches is to represent each music genre by sets of instances (i.e. frame-based feature vectors) inferred from training data. The common underlying assumption is that the majority of such instances do capture somehow the (musical) specificities of each genre, and that obtaining good classification performance is a matter of size of the training dataset, and fine-tuning feature extraction and learning algorithm parameters.

We report on extensive tests on two music databases that contradict this assumption. We show that there is little or no benefit in seeking a thorough representation of the feature vectors for each class. In particular, we show that genre classification performances are similar when representing music pieces from a number of different genres with the same set of symbols derived from a single genre or from all the genres. We conclude that our experiments provide additional evidence to the hypothesis that common low-level features of isolated audio frames are not representative of music genres.

15.00h	Panel - Tools for Music or Music for Tools?	
16.30h	Poster Session 2	Coffee Break
17.30h	Oral Session 6 - Interaction	

15.00h: Panel - Tools for Music or Music for Tools?

Auditorium Chair: Cyril Laurier

New technologies offer a world of almost infinite possibilities that artists explore to create new music. However, in this world of all possibles, how new tools and instruments are designed? Is the technological progress always good for music? Must a modern musician be technical? Is there a technological temptation for the artist that can be a break on creativity?

Participants:

- Arne Eigenfeldt (Simon Fraser University)
- Cristian Vogel (No future)
- Norbert Schnell (IRCAM)
- Pietro Polotti (University of Verona)
- Sergi Jordà (Universitat Pompeu Fabra)

Each participant will present his own experience and ideas about the topic and a discussion with the audience will follow.

- Arne Eigenfeldt is a Canadian composer and creator of interactive and generative music systems based in Vancouver. Both his music and his research into intelligent systems have been presented internationally. He is currently a professor of music at Simon Fraser University.[1] He also produces electronica under the pseudonym Raemus. Eigenfeldt has composed extensively for contemporary dance, especially in collaboration with choreographer Serge Bennathan. His electroacoustic music is predominantly live, predominantly generated or performed in software he has written in Max/MSP. His recent research focuses on encoding knowledge into intelligent performance systems.
- Cristian Vogel is a composer, performer, producer and sound designer born in Chile and raised in the UK. He now lives and works in Barcelona. Cristian has released a number of influential electronic music albums as well as being the resident composer for Gilles Jobin's dance company in Geneva. He has toured globally and consistently since 1992, both as solo artist and in the groups Super_Collider and Night of the Brain. He has collaborated with artists such as Pieter-Jan Ginckels, as well as creating sound and visual installation art of his own. He is also an alpha tester

for Symbolic Sound Kyma X music and sound design system, and organised the first International Kyma Users Symposium in Barcelona (October 2009).

- Norbert Schnell is born in Hamburg (in 1967) where early he gets engaged in music composition and arrangement for theatre. He moves to Graz/Austria to study Telecommunications and Music. Among his music theory teachers are Georg-Friedrich Haas, Bernhard Lang and Gerd Kühr. He becomes studio assistant at the Institut für Elektronische Musik (IEM) and gets involved in contemporary music projects with composers such as Beat Furrer and Robin Minard as developer and adviser. From 2002 to the end of 2007 he coordinates the Real-Time Applications and Real-Time Musical Interactions team at IRCAM. Besides the engagement into artistic productions at and around IRCAM with composers such as Pierre Boulez, Philippe Manoury, Emmanuel Nunes and Marco Stroppa, he participates in international research projects and collaborate with industry partners in the domains of music technology, education and simulation. Since 2008 he focuses on his PhD thesis on real-time interactive music media based on recorded sounds. In parallel he collaborates with several artists on interactive sound installations.
- Pietro Polotti received a musical education, studying piano, composition and electronic music. He also got a degree in physics. In 2002, he obtained a Ph.D. in communication systems from the Ecole Polytechnique Federale de Lausanne, Switzerland. Presently, he teaches Electronic Music at the Conservatory "G. Tartini" of Trieste, Italy. He also collaborates with the University of Verona as sound designer within various European research projects. During the last years, his interests moved from digital sound processing towards sonic interaction design and interactive arts focused on sound. He is part of the Gamelunch group www.soundobject. org/BasicSID/Gamelunch. In 2008, he started with Maurizio Goina the EGGS project (Elementary Gestalts for Gesture Sonification www.visualsonic.eu).
- Sergi Jordà (Madrid, 1961) holds a B.S. in Fundamental Physics and a Ph.D. in Computer Science and Digital Communication. He is a researcher in the Music Technology Group of Universitat Pompeu Fabra in Barcelona, and a lecturer in the same university, where he teaches computer music, HCl, and interactive media arts. He has written many articles, books, given workshops and lectured though Europe, Asia and America, always trying to bridge HCl, music performance and interactive media arts. He has received several international awards, including the prestigious Ars Electronica's Golden Nica in 2008. He is currently best known as one of the inventors of the Reactable, a tabletop musical instrument that accomplished mass popularity after being integrated in Icelandic artist Bjork's last world tour, and he is one of the founding partners of the spin-off company Reactable Systems.

16.30h: Poster Session 2Auditorium Hall
(Exhibition of Poster Craze 2)

16.30h: Coffee Break Cafeteria

17.30h: Oral Session 6 - Interaction

Auditorium

Chair: Dominique Fober

17.30h: [OS6-1] Dynamic Cues for Network Music Interactions. Alain Renaud. This paper provides an overview of a cueing system, the Master Cue Generator (MCG) used to trigger performers (humans or computers) over a network. The performers are scattered in several locations and receive cues to help them interact musically over the network. The paper proposes a classification of cues that dynamically evolve and reshape as the performance takes place. This begets the exploration of various issues such as how to represent and port a hierarchy of control over a networked music performance and also takes into account parameters inherent to a network such as latency and distance. This approach is based on several years of practice led research in the field of network music performance (NMP), a discipline that is gaining grounds within the music technology community both as a practice and through the development of tools and strategies for interacting over disparate locations.

17.50h: [OS6-2] Issues and Techniques for Collaborative Music Making on Multi-Touch Surfaces.Robin Laney, Chris Dobbyn, Anna Xambó, Mattia Schirosa, Dorothy Miell, Karen Littleton and Sheep Dalton.

A range of systems exist for collaborative music making on multi-touch surfaces. Some of them have been highly successful, but currently there is no systematic way of designing them, to maximize collaboration for a particular user group. We are particularly interested in systems that will engage novices and experts. We designed a simple application in an initial attempt to clearly analyze some of the issues. Our application allows groups of users to express themselves in collaborative music making using pre-composed materials. User studies were video recorded and analyzed using two techniques derived from Grounded Theory and Content Analysis. A questionnaire was also conducted and evaluated. Findings suggest that the application affords engaging interaction. Enhancements for collaborative music making on multi-touch surfaces are discussed. Finally, future work on the prototype is proposed to maximize engagement.

18.10h: [OS6-3] Towards A Practical Approach to Music Theory on the Reactable. Andrea Franceschini.

This paper builds upon the existing Reactable musical platform and aims at extending and improving its approach to music theory. Sections 1 and 2.2 explain the motivations that led to the development of this proposal from a musical point of view while also giving a music education perspective. In section 2 we'll see a brief survey on tabletop and tangible multi-user systems for audiovisual performance and we'll also brie?y introduce the process of implicit learning, we'll formulate a hypothesis about music as a natural language, and describe how the work hereafter presented can help music education. In section 3 we'll describe the current state of the art

about music theory on the Reactable, followed by an original proposal about a way to extend and improve it. Finally we'll see how people who had a chance to test the system found it interesting and playful, while also giving important feedback that can be used to improve many practical aspects of the implementation.

18.30h: [OS6-4] Towards Adaptive Music Generation by Reinforcement Learning of Musical Tension. Sylvain Le Groux and Paul Verschure.

Although music is often defined as the language of emotion, the exact nature of the relationship between musical parameters and the emotional response of the listener re- mains an open question. Whereas traditional psychological research usually focuses on an analytical approach, involving the rating of static sounds or pre-existing musical pieces, we propose a synthetic approach based on a novel adaptive interactive music system controlled by an autonomous reinforcement learning agent. Preliminary results suggest an autonomous mapping from musical parameters (such as rhythmic density, articulation and sound level) to the perception of tension is possible. This paves the way for interesting applications in music therapy, inter- active gaming, and physiologically-based musical instruments.

19.00h	Instrumental-Electronic Concert II	
20.30h	Banquet	
23.00h	Concert Around reacTable	

19.00h: Instrumental-Electronic Concert II

Sala Polivalent

Signos Exteriores Joan Bages

The Cake Laurens van der Wee and Oriol Codina Sucarrats

Happy Miso 25! Carlos Guedes

New York Counterpoint Steve Reich and Simón Ibañez Ginés

Kakusei Yota Kobayashi
Cut up YT (laptop video) Seiichiro Matsumura

Curator: Ramon Humet

Signos Exteriores. It's the will and the inability to go out of oneself to be projected towards the outside world, towards the otherness. The body and the human mind can be facilitating elements for communication but if these elements don't work as they should the communication will be disrupted.

Joan Bagés - My work includes instrumental compositions, electroacoustic music, acousmatic music and sound installations. I've studied in Barcelona and Paris.
 I've received some scholarships from Phonos, Generalitat de Catalunya, Denités93.
 Nowadays I'm finishing my PhD at Paris VIII University.

The Cake is a sonic improvisation system, built to perform with a musician. An analysis algorithm will reduce two incoming sound streams to one single stream, cut this up and classify the segments. This library is then used to drive the synthesis. The Cake likes to be judged on its musical output.

- Laurens van der Wee (1982) is a sonic designer currently enrolled in a Master of Music program at the Music Technology department of the Utrecht School of the Arts. Projects include Tilemaster (SMC & ICMC 2009), VOID (electronics for modern dance), No Sine Cure (oscilloscope performance, ICMC 2008) and Anthèmes 2 (software).
- Oriol Codina Sucarrats (1988) at present studuies at Conservatoire National de Nice with Michel Lethiec. Started clarinet at the age of nine at Escola de Música de Vic with Natalia Arroyo. Later with Isaac Rodriguez at Liceu Conservatory finishing with honors. Has played with Orquestra del Vallès, Orquestra de Cambra de Vic,

Orquestra de Joves Intèrprets dels països Catalans and Jove Orquestra Nacional the Catalunya, played as soloist with Jove Orquestra de la Comarca de Osona and the Orquestra del Conservatori del Liceu. First prize at Concurs de Cambra de Catellterçol and second prize at Concurs de Cambra l'Arjau for his interpretation of Mozart and Weber clarinet quintets, and he won the AIE 2008 scolarship for Conservatori del Liceu Students.

Happy Miso 25! is a short piece to celebrate Miso Music's 25th Anniversary. This is a "concept piece" in which 25 bell sounds collected from Freesound.org, each one representing a year of Miso Music activity, are played in succession in random order and positioned in unique spatial position (chosen randomly). After each bell is played its spectrum gets frozen, and after the 25 bells are played one listens to a complex spectrum created by the spectral freezing of all of the 25 bells. The complex spectrum that emerges after all bells are played symbolizes all the multiple aesthetics this organization has promoted. The piece is realized by running a Max patch that automatically selects the sounds, their spatial position and operates the spectral freezing and shaking. In this concert, I will premiere the 8-channel version of this piece.

• Carlos Guedes (PhD NYU, 2005) is currently Associate Professor at the Faculty of Engineering, Porto, where he teaches in the UT Austin I Portugal Digital Media graduate programs (Masters and PhD). As a researcher, he co-founded the Sound and Music Computing Group at INESC Porto (Telecommunications and Multimedia Unit) with Fabien Gouyon, developing projects in interactive music systems and procedural music. He also co-chaired SMC 2009. As a composer and media artist, he develops an activity interactive dance, music for film, and interactive installations. Recently presented "Sweet Drama" for big band and "Echo Locations" with Kirk Woolford SXSW Austin, Texas.

New York Counterpoint was commissioned by The Fromm Music Foundation for clarinetist Richard Stolzman. It was composed during the summer of 1985. The duration is about 11 minutes. The piece is a continuation of the ideas found in Vermont Counterpoint (1982), where as soloist plays against a pre-recorded tape of him or herself. In New York Counterpoint the soloist pre-records ten clarinet and bass clarinet parts and then plays a final 11th part live against the tape. New York Counterpoint is in three movements: fast, slow, fast, played one after the other without pause. The change of tempo is abrupt and in the simple relation of 1:2. The piece is in the meter 3/2 = 6/4 (=12/8). As is often the case when I write in this meter, there is an ambiguity between whether one hears measures of 3 groups of 4 eight notes, or 4 groups of 3 eight notes. In the last movement of New York Counterpoint the bass clarinets function to accent first one and then the other of these possibilities while the upper clarinets essentially do not change. The effect, by change of accent, is to vary the perception of that which in fact is not changing.

- Steve Reich was recently called "our greatest living composer" (The New York Times), "America's greatest living composer." (The Village VOICE), "...the most original musical thinker of our time" (The New Yorker) and "...among the great composers of the century" (The New York Times).. From his early taped speech pieces It's Gonna Rain (1965) and Come Out (1966) to his and video artist Beryl Korot's digital video opera Three Tales (2002), Mr. Reich's path has embraced not only aspects of Western Classical music, but the structures, harmonies, and rhythms of non-Western and American vernacular music, particularly jazz. "There's just a handful of living composers who can legitimately claim to have altered the direction of musical history and Steve Reich is one of them," states The Guardian (London). In April 2009 Steve Reich was awarded the Pulitzer Prize in Music for his composition 'Double Sextet'.
- Simón Ibañez Ginés (1986). Studies clarinet at Vall d'Uxó Conservatory with J.E. Romero and David Martinez. In 2005 starts clarinet studies at Liceo Conservatory in Barcelona with Isaac Rodriguez and chamber music Emili Brugalla and Manolo Gonzalez. Has been playing with ensembles Liceu XXI, IJove Orquestra de la Vall de Uxó, Sinfònica Gérminans, Orquestra Sinfònica del Conservatori Superior de Música del Liceu. Has attended master classes with Roy Jowit, François Benda, Romain Guyot and Arno Piters. At present teaches at Gymusic, Barcelona and is a member of the Orquestra Sinfònica de Sant Cugat and FusionART.

Kakusei (Japanese for "Awakening") is an acousmatic rendering of a dream, and the self-realizations that follow from the act of awakening. The dream world consists of two primary settings: the first is associated with aspects of ritual, with recurring horn-calls announcing new, fragmented states; the second setting is subaquatic, with traces of the ritual horns now submerged and distorted. At this point there is a noticeable reduction of event density, and the events themselves become viscous, moving with dream-like slowness. Through this darkness emerge the beginnings of self-realization, which gradually strengthen by way of an extended crescendo that finally culminates with a sudden snap back to consciousness — or perhaps it is merely another hallway to yet another dream....

• Yota Kobayashi (1980, Japan) writes music that explores imaginary soundscapes. Studied composition at Simon Fraser University with Barry Truax and Owen Underhil. Currently based in Vancouver, Canada, where he teaches electronic music and sound design courses at Langara College and works actively with film, dance, and theater productions. His works have been presented at numerous festivals and conferences like Bourges, ICMC, SMC, New York City Electroacoustic Music Festival, and The Noise of Snow Festival. Among his awards Musica Nova (1st prizes in 2008 and 2009, Czech Republic), Concorso Internazionale Luigi Russolo (1st prize in 2010, Italy/France), Prix Jeux du Temps (2nd prize 2009 and 3rd prize 2006, Canada).

Cut up YT consists of Youtube movies and their sound tracks searched by specific

keywords. 'Cut Up Machine', the original application, makes it possible to manipulate starting points and durations of 4 movie tracks' playback. The aim of this piece is to try to make up 'Music' by active use of 'tiny' regions of nondescriptive, unedited movie

• Sei Matsumura - A composer, sound designer and interaction designer. Matsumura also bridges media art and experimental music field. Studied at the Institute of Sonology of the Royal Conservatory The Hague, finished his Ph.D. at Tokyo University. Now, he is Associate Professor of School of Design at Tokyo University of Technology.

20.30h: Banquet

Restaurant "La Oca Mar"

23.00h: Concert Around reacTable

Sala Polivalent

Voyager Iván Sánchez

Windswept Marc Aigner and Ann Stimson

KVS Walk Juan Parra Cancino

Mimar Mikel Chamizo and Sax-sons Quartet

Coordinator: Sergi Jordà

Voyager is created starting with a selection of sounds captured by instruments installed in the satellites Voyager, Galileo, Cassini and Jupiter Flyby, and is related to the principle of the entropy, which establishes that the Universe constantly becomes disorderly in search for balance, for greater stability, for greater possible dispersion and probability. Chance, destiny, luck and chaos are the main elements that the entropy studies, so that the application of game systems seemed to be the best resource for the execution of the piece.

• Iván Sanchez has prepared himself inside and outside his country and develops his work in different sorts of musical styles: from rock and classical, to academic electroacoustic, experimental electronic music and free improvisation. As a composer, has created works for concert and sound art, sound design for theater, dance, video art and film. Has enjoyed collaborations with artists and producers like Jorge Reyes, Michael Sembello, Alberto Castro Leñero, Laura Aris and German Jauregui among others. At present he directs the Laboratorio de Arte Sonoro of the Centro de Arte y Nuevas Tecnologías in San Luis Potosí, México.

Windswept for reacTable and extended flute explores the ideas of breath and touch; their extensions; and the way they inform each other. The resultant sound exists in a virtual, imaginative world where we may wander through a landscape of

silence, color, and time

- Marc Ainger A composer and sound designer who has written for a variety of media, including works for orchestra, chamber music, computer music, film and video, and dance. Significant commissions and performances include the Aspen Music Festival, Gageego New Music Ensemble, the American Film Institute, the Klangarts Festival, Guangdong Modern Dance, the Royal Danish Ballet, the New Circus, Streb, and Late Night with David Letterman. Awards include the Boulez Composition Fellowship, the Irino International Chamber Music Competition, Musica Nova, Meet the Composer, the Esperia Foundation, and the Ohio Arts Council. As a sound designer, Ainger has worked with institutions, including the Los Angeles Philharmonic, Tempo Reale, IRCAM, the Olympic Arts Festival, and Pacific Coast Soundworks. He is currently head of theory and composition at the Ohio State University (US).
- Ann Stimson As a flutist and a theorist, Ann Stimson has long been as advocate for new music. She made her professional debut at the age of 18 as a member of the Los Angeles Debut Orchestra, and since then has gone on to concertize throughout the world (U.S., Italy, Hong Kong, Denmark, Spain, Northern Ireland, France, etc.) specializing in new music, especially in music that utilizes computers and electronics. Her work explores the extension of traditional instruments and modes of performance into new, imaginative realms of action and interaction. She currently teaches flute at Kenyon College and music theory at the Ohio State University (US).

KVSwalk_SOLO researches the possibilities and limitations of physicality and embodied musicality in computer music performance. Its structure is centered around the metaphoric imaginary, as well as sonic derivatives of the Karman Vortex Street phenomena. Commisioned by the ORCiM research Centre in Music.

• Juan Parra Cancino - Chilean composer, computer performer and guitarist based in Holland. His music has been performed worldwide and has been awarded several prizes. He performs with Electronic Hammer and WireGriot, among other long-term collaborations. A PhD candidate at the U. of Leiden, appointed as researcher at the Orpheus Research Centre in Music (ORCIM).

Mimar. In the Nordic mythology the Mimar well, at its bottom is resting Odin's Eye, a source of wisdom for anybody that drinks its water, he will be able to see images of the future. In *Mimar*, four saxophone players will drink the infinite possibilities of the reacTable, a futuristic instrument where they access to sounds never thought before

• Mikel Chamizo - (Tolosa, 1980) After finishing his musical studies at Musikene with Ramón Lazkano and Gabriel Erkoreka, has been working in the audiovisual field mainly the sound design section of video-art projects, performances and films mainly using electronic music

• Sax-Sons Quartet - Established in 2005 at the Escola Superior de Música de Catalunya (ESMUC) and is formed by Tere Gómez Ramírez, Gemma Torralbo Salmón, Pau Sanchís Ferrandis and Bru Maymó Tomás. Sax-Sons Quartet has been involved in performing different musical styles, like classical music, and even tango and jazz. Has performed at the Barcelona Auditorium (2007) and at the Sitges International Music Festival (2009). Finalists of the ComRàdio *Tutto Prices* (2008). The members of the quartet perform with local orchestras like OBC, OJC, BCN 216, JONC, JOSC, OJIPC and EYWO.

10.00h	Oral Session 7 – Rhythm and Percussion	
11.30h	Poster Craze 3	
12.00h	Poster Session 3	Coffee Break
12.30h	Music made with Vocaloid and LoopMash	

10.00h: Oral Session 7 - Rhythm and Percussion

Auditorium

Chair: Fabien Gouyon

10.00h: [OS7-1] Õdaiko - A Real Time Score Generator Based on Rhythm. Filipe Cunha Monteiro Lopes.

The interaction between composers and performers has recently acquired new challenges with the advent of scores in real time. Such systems potentiate new approaches to composition and performance by imposing new possibilities and constraints. ODAIKO is a real-time graphical score generator and features a composer playing live electronic music, an assistant to the composer generating the scores and finally the performer(s). In this paper, I present ODAIKO, focusing on its implementations and the related composer-assistant-performer interactions as a basis for development.

10.20h: [OS7-2] Style Emulation of Drum Patterns by Means of Evolutionary Methods and Statistical Analysis. Gilberto Bernardes, Carlos Guedes and Bruce Pennycook. In this paper we present an evolutionary algorithm for real-time generation of polyphonic rhythmic patterns in a certain style implemented as a Pure Data patch. Population of rhythms is derived from analysis of MIDI loops, which profile each style for subsequent automatic generation of rhythmic patterns that evolve over time through genetic algorithm operators and user input data.

10.40h: [OS7-3] Simple Tempo Models for Real-time Music Tracking. Andreas Arzt and Gerhard Widmer.

The paper describes a simple but effective method for incorporating automatically learned tempo models into real-time music tracking systems. In particular, instead of training our system with `rehearsal data' by a particular performer, we provide it with many different interpretations of a given piece, possibly by many different performers. During the tracking process the system continuously recombines this information to come up with an accurate tempo hypothesis. We present this approach in the context of a real-time tracking system that is robust to almost arbitrary deviations from the score (e.g. omissions, forward and backward jumps, unexpected repetitions or re-starts) by the live performer.

11.00h: [OS7-4] Dance Pattern Recognition using Dynamic Time Warping. Henning Pohl and Aristotelis Hadjakos.

In this paper we describe a method to detect patterns in dance movements.

Such patterns can be used in the context of interactive dance systems to allow dancers to influence computational systems with their body movements. For the detection of motion patterns, dynamic time warping is used to compute the distance between two given movements. A custom threshold clustering algorithm is used for subsequent unsupervised classification of movements. For the evaluation of the presented method, a wearable sensor system was built. To quantify the accuracy of the classification, a custom label space mapping was designed to allow comparison of sequences with disparate label sets.

11.30h: Poster Craze 3

Auditorium

[PS3-1] A Perceptual Study on Dynamical Form in Music. Jens Hjortkjær and Frederik Nielbo.

The concept of dynamical form is presented as a dimension of music perception. Dynamical form refers to the subjective perception of temporal events in music (explosive, fading out, rising etc.). In a behavioral experiment listeners were asked to categorize musical excerpts varying in musical period, tonality, instrumentation, and acoustic features while attending to their dynamical form. Data indicates that subjects are sensitive to dynamical forms, but were particularly sensitive to a specific one (suspense). We also discuss a method of categorizing dynamical forms in terms of force dynamics.

[PS3-2] Structural Modeling of Pinna-Related Transfer Functions. Simone Spagnol, Michele Geronazzo and Federico Avanzini.

This paper faces the general problem of modelling pinna-related transfer functions (PRTFs) for 3-D sound rendering. Following a structural modus operandi, we exploit an algorithm for the decomposition of PRTFs into ear resonances and frequency notches due to reflections over pinna cavities in order to deliver a method to extract the frequencies of the most important spectral notches. Ray-tracing analysis reveals a convincing correspondence between extracted frequencies and pinna cavities of a bunch of subjects. We then propose a model for PRTF synthesis which allows controlling separately the evolution of resonances and spectral notches through the design of two distinct filter blocks. The resulting model is suitable for future integration into a structural head-related transfer function model and for parameterization over anthropometrical measurements of a wide range of subjects.

[PS3-3] Connecting Graphical Scores to Sound Synthesis in PWGL. Mika Kuuskankare and Mikael Laurson.

In this paper we describe how graphical scores can be coupled with synthesis algorithms in the visual programming language PWGL. The present approach is based

on an extensible music notation and a direct connection to a flexible sound synthesis engine. We implement, as an exercise, a simple working model that makes it possible create graphical scores out of user defined graphical objects and connect the graphical objects to specific synthesis methods.

[PS3-4] Crowdsourcing a Real-World On-Line Query by Humming System. Arefin Huq, Mark Cartwright and Bryan Pardo.

Systems able to find a song based on a sung, hummed, or whistled melody are called Query-By-Humming (QBH) systems. Tunebot is an online QBH web service and iPhone app that connects users to the desired re-cording on Amazon.com or iTunes. Tunebot's searchable database is composed of thousands of user-contributed melodies. Melodies are collected from user queries, sung contributions and through contributions from on-line play of an associated iPhone Karaoke game: Karaoke Callout. In this paper we describe the architecture and workings of the paired systems, as well as issues involved in building a real-world, working music search engine from user-contributed data.

[PS3-5] Concurrent Constraints Conditional-Branching Timed Interactive Scores. Mauricio Toro-Bermudez and Myriam Desainte-Catherine.

Multimedia scenarios have multimedia content and interactive events associated with computer programs. Interactive Scores (IS) is a formalism to represent such scenarios by temporal objects, temporal relations (TRs) and interactive events. IS describe TRs, but IS cannot represent TRs together with conditional branching. We propose a model for conditional branching timed IS in the Non-deterministic Timed Concurrent Constraint (ntcc) calculus. We ran a prototype of our model in Ntccrt (a real-time capable interpreter for ntcc) and the response time was acceptable for real-time interaction. An advantage of ntcc over Max/MSP or Petri Nets is that conditions and global constraints are represented declaratively.

[PS3-6] D-Jogger: Syncing Music with Walking. Bart Moens, Leon Van Noorden and Marc Leman

We present D-Jogger, a music interface that makes use of body movement to dynamically select music and adapt its tempo to the user's pace. D-Jogger consists of several independent modules, such as a step detection algorithm and tempoaware playlists, to achieve this goal. The research done with D-Jogger has focused on entrainment: the synchronization of two rhythmical processes, in this case music and walking. We present several ways of visualizing entrainment data, including synchronization plots and phase histograms. A pilot experiment was performed using D-Jogger with 33 participants. Preliminary data suggest that, when the music's tempo and the user's pace are close enough to each other, most users synchronize their walking to the music - taking a step with each beat. A user survey indicated that participants experience this effect as stimulating and motivating. Several other application domains for D-Jogger are possible: personal training devices for joggers, rehabilitation therapy for Parkinson patients or simply as a nice-to-have

application for your mobile phone.

[PS3-7] Legato and Glissando Identification in Classical Guitar. Tan Ozaslan and Josep Lluís Arcos.

Understanding the gap between a musical score and a real performance of that score is still a challenging problem. To tackle this broad problem, researchers focus on specific instruments and/or musical styles. Hence, our research is focused on the study of classical guitar and aims at de- signing a system able to model the use of the expressive resources of that instrument. Thus, one of the first goals of our research is to provide a tool able to automatically identify expressive resources in the context of real recordings. In this paper we present some preliminary results on the identification of two classical guitar articulations from a collection of chromatic exercises recorded by a professional guitarist. Specifically, our system combines several state of the art analysis algorithms to distinguish among two similar guitarists' left hand articulations such as legato and glissando. We report some experiments and analyze the results achieved with our approach.

[PS3-8] Tonal Signatures. Gilbert Nouno and Malik Mezzadri.

We present in this paper an original approach of the use of tonality for composition and improvisation, developed by the composer, improviser and musician [hidden for blind reviewing]. The main concept is to consider a minimal group of notes which acts as a signature of a given scale in the major-minor tonal system. We define first within the tonal system context the notion of tonal signature and expose its principle. Among the possible way to solve this problem and find all the tonal signatures, we define some constraints and we use a constraint solver implemented in the composition aided computer music environment Open Music. We provide some examples of compositions written by the composer with improvisation playing based on the tonal signature concept. [hidden for blind reviewing]'s music counts already a rich discography with players from the international jazz scene. We will provide excerpts of the recorded and published music.

[PS3-9] Acoustic Rehabilitation of a Little Church in Vinaros (Spain). Jaume Segura Garcia, Alvaro Romero and Enrique A Navarro Camba.

Nowadays some churches are not used for worship, but they are used for cultural or leisure performances. The acoustic conditions of the original buildings are not the optimum for these new uses. For this reason it is necessary an acoustical rehabilitation. This paper describes the work done in order to improve the acoustic of a church in Vinar's and it is presented the refurbishment of this room as a multiple-use room. To make this improvement a ray tracing tool has been used. The improvement has been evaluated with virtual acoustics and according to Beranek's parameters. The main aims of this study were to evaluate the actual acoustic conditions and to present a proposal for later acoustic refurbishment.

[PS3-10] Unsupervised Generation of Percussion Sound Sequences from a Sound

Example. Marco Marchini and Hendrik Purwins.

In this paper we present a system that learns rhythmic patterns from drum audio recording and synthesizes music variations from the learnt sequence. The procedure described is completely unsupervised and embodies the transcription of a percussion sequence into a fuzzy multilevel representation. Moreover, a tempo estimation procedure identifying the most regular subsequence is used to guarantee that the metrical structure is preserved in the generated sequence. The final synthesis is performed, recombining the audio material derived from the sample itself. Some examples of generations along with a descriptive evaluation are provided.

[PS3-11] Efficient Finite Difference-based Sound Synthesis using GPUs. Marc Sosnick and William Hsu.

Finite Difference (FD) methods can be the basis for physics-based music instrument models that generate realistic audio output. However, such methods are compute-intensive; large simulations cannot run in real time on current CPUs. Many current systems now include powerful Graphics Processing Units (GPUs), which are a good fit for FD methods. We describe an implementation of an FD-based simulation of a two-dimensional membrane that runs efficiently on mid-range GPUs; this will form a framework for constructing a variety of realistic software percussion instruments. For selected problem sizes, real-time sound generation was demonstrated on a mid-range test system, with speedups of up to 2.9 over pure CPU execution.

[PS3-12] Short Time Pitch Memory in Western vs Other Equal Temperament Tuning Systems. Areti Andreopoulou and Morwaread Farbood.

This study investigates the use of short-term memory for pitch recognition in a Western (12-tone) vs. a 10-tone equal temperament context. 10 subjects with at least one year of formal music and theory training participated in an experiment that consisted of two identical music listening tests (one per tuning system) in which they were trained to recall a reference tone and count the number of times it recurred in various short monophonic melodies. In the parts of the experiment where subjects used their short-term memory to execute one-to-one comparisons between the given reference tone and the melody tones, the results were equivalent for both tuning modes. On the other hand, when subjects tried to recall the reference tone directly from long-term memory, the results were noticeably better for the Western tuning context.

[PS3-13] Audio-based Music Visualization for Music Structure Analysis. Ho-Hsiang Wu and Juan Bello.

We propose an approach to audio-based data-driven music visualization and an experimental design to study if the music visualization can aid listeners in identifying the structure of music. A three stage system is presented including feature extraction, the generation of a recurrence plot and the creation of an arc diagram to visualize the repetitions within a piece. Then subjects are asked to categorize simple forms of classical music with and without audio and visual cues provided.

The accuracy and speed are measured. The results show that the visualization can reinforce the identification of musical forms.

[PS3-14] A Comparison of Probabilistic Models for Online Pitch Tracking. Umut Simsekli andAli Taylan Cemgil.

In this study, we propose and compare two probabilistic models for online pitch tracking: Hidden Markov Model and Change Point Model. In our models each note has a certain characteristic spectral shape which we call spectral templates. Hence the system's goal is to find the note whose template is active given the audio data. The main focus on this work is the trade off between latency and accuracy of the pitch tracking system. We present the probabilistic models and the inference schemes in detail. Encouraging results are obtained from the experiments that are done on low-pitched monophonic audio.

[PS3-15] Descriptor-Based Sound Texture Sampling. Diemo Schwarz and Norbert Schnell.

Existing methods for sound texture synthesis are often concerned with the extension of a given recording, while keeping its overall properties and avoiding artefacts. However, they generally lack controllability of the resulting sound texture. After a review and classification of existing approaches, we propose two methods of statistical modeling of the audio descriptors of texture recordings using histograms and Gaussian mixture models. The models can be interpolated to steer the evolution of the sound texture between different target recordings (e.g. from light to heavy rain). Target descriptor values are stochastically drawn from the statistic models by inverse transform sampling to control corpus-based concatenative synthesis for the final sound generation, which can also be controlled interactively by navigation through the descriptor space. To better cover the target descriptor space, we expand the corpus by automatically generating variants of the source sounds with transformations applied, and storing only the resulting descriptors and the transformation parameters in the corpus.

[PS2-11] First Steps in (Relaxed) Real-Time Typo-Morphological Audio Analysis/Synthesis. Norbert Schnell, Marco Antonio Suarez Cifuentes and Jean-Philippe Lambert. This paper describes a real-time audio analysis/resynthesis system that we developed for a music piece for ensemble and electronics. The system combines real-time audio analysis and concatenative synthesis based on the segmentation of sound streams into constituting segments and the description of segments by an efficient set of descriptors adapted to the given musical context. The system has been implemented in Max/MSP using the FTM & Co and MuBu libraries and successfully employed in the production and performance of the piece. As more and more research in the domain of music information retrieval, we use the term of typo-morphology to designate the description of sounds by morphologic criteria including the temporal evolution of sound features that also can provide pertinent means for the classification of sounds. Although, the article mainly insists on the technical aspects

of the work, it occasionally contextualizes the different technical choices regarding particular musical aspects.

12.00h: Poster Session 3

Auditorium Hall

Cafeteria

(Exhibition of Poster Craze 3)

12.30h: Music made with Vocaloid and LoopMash Auditorium

Songs made with Vocaloid by various authors and demo of LoopMash with a performance by Maarten de Boer and Fokke de Jong.

Note by Xavier Serra

During an informal discussion after a concert at SMC 2009 the idea came out that there should be a space at SMC 2010 for music that, using technology from our community, is outside the Art music tradition. We realized that most of the music heard in our conferences is very much in the Art music tradition, being quite experimental both aesthetically and technologically. But clearly the technology resulting from the Sound and Music Computing research has a big impact in types of music that, despite not being so experimental, deserve a place in our conferences. We took the challenge and the local committee of the SMC 2010 decided to put together this musical event around two technologies, Vocaloid and LoopMash, in the development of which the MTG-UPF has been involved and that are being used for making music that is definitely outside the Art music tradition.

Vocaloid is a singing voice synthesis software of Yamaha that was developed in collaboration with the MTG-UPF. It was first released in 2004 with a few English and Japanese voices, and in 2007 Vocaloid 2 was released with usability and synthesis quality improvements and with the voice of "Hatsune Miku". Since then, Hatsune Miku and Vocaloid have been part of a big social/cultural phenomenon in Japan that we want to present here through the songs/videos that several authors have made. LoopMash is a music creation tool that originated from a joint research project between MTG-UPF and Yamaha. It was released in 2009 by Steinberg as a VST Instrument within Cubase 5. LoopMash is based on audio mosaicing, where sound snippets are automatically extracted from existing music and recombined based on analysis data and under interactive control of the musician. The demo will include a live performance by the two main developers of LoopMash, Maarten de Boer and Fokke de Jong.

15.00h	Oral Session 8 - Voice and	l Singing
16.30h	Poster Session 3	Coffee Break

15.00h: Oral Session 8 - Voice and Singing

Auditorium

Chair: Stefania Serafin

15.00h: [OS8-1] Analysis and Automatic Annotation of Singer's Postures during Concert and Rehearsal. Maarten Grachten, Michiel Demey, Dirk Moelants and Marc Leman.

Bodily movement of music performers is widely acknowledged to be a means of communication with the audience. For singers, where the necessity of movement for sound production is limited, postures, i.e. static positions of the body, may be relevant in addition to actual movements. In this study, we present the results of an analysis of a singer's postures, focusing on differences in postures between a dress rehearsal without audience and a concert with audience. We provide an analysis based on manual annotation of postures and propose and evaluate methods for automatic annotation of postures based on motion capture data, showing that automatic annotation is a viable alternative to manual annotation. Results furthermore suggest that the presence of an audience leads the singer to use more "open" postures, and differentiate more between different postures. Also, speed differences of transitions from one posture to another are more pronounced in concert than during rehearsal.

15.20h: [OS8-2] Emotions in the Voice: Humanising a Robotic Voice. Tristan Bowles and Sandra Pauletto.

The focus of this project is the manipulation of a robotic voice signal for the purpose of adding emotional expression. In particular, the main aim was to design the emotion expressed by a robotic voice by manipulating specific acoustic parameters such as pitch, amplitude and tempo of the speech. The three basic emotions considered were: anger, happiness and sadness. Knowledge based on the analysis of emotional sentences recorded by actors was used to develop a program in Max/MSP to emotionally manipulate neutral sentences produced by a Text-To-Speech (TTS) synthesizer. A listening test was created to verify the program success in simulating different emotions. We found that test subjects could separate the sad sentences from the others, while the discrimination between angry and happy sentences was not as clear.

15.40h: [OS8-3] Real-Time Estimation of the Vocal Tract Shape for Musical Control. Adam Kestian and Tamara Smyth.

Voiced vowel production in human speech depends both on oscillation of the vo-

cal folds and on the vocal tract shape, the latter contributing to the appearance of formants in the spectrum of the speech signal. Many speech synthesis models use a feed-forward source-filter model, where the magnitude frequency response of the vocal tract is approximated with sufficient accuracy by the spectral envelope of the speech signal. In this research, a method is presented for real-time estimation of the vocal tract area function from the recorded voice by matching spectral formants to those in the output spectra of a piecewise cylindrical waveguide model having various configurations of cross-sectional area. When a match is found, the formants are placed into streams so their movement may be tracked over time and unintended action such as dropped formants or the wavering of an untrained voice may be accounted for. A parameter is made available to adjust the algorithms sensitivity to change in the produced sound: sensitivity can be reduced for novice users and later increased for estimation of more subtle nuances.

16.30h: Poster Session 3Auditorium Hall
(Exhibition of Poster Craze 3)

16.30h: Coffee Break

Cafeteria

19.30h	Instrumental-Electronic Concert III
22.00h	ESMUC Laptop Orchestra concert

19.30h: Instrumental-Electronic Concert III

Sala Polivalent

Elevations Interrompues Blas Payri

Invisible Links Miyuki Ito and Víctor Béjar

Haiku Rohan de Livera

True Story Phivos-Angelos Kollias & Pedro Bittencourt

Un lugar inhabitado DDSlash Roland

Aiael's Gold Juraj Kojs and Víctor Béjar

Curator: Albert Llanas

Elevations interrompues. A study on the transformation of sound (pitch, grain, mass, harmonic timbre...): the work is structured in such a way that abrupt changes in the sound features interrupt the periods where the sound features evolve continuously towards an elevation and thinning of the sound.

• Blas Payri studied electro-acoustic composition in Lyon (ENMV), Montréal (UdM) and Paris-Nanterre, audiovisual music in Madrid (ECAM). Obtained a PhD in computer science applied to sound perception at Université Paris-Orsay and is currently member of the audiovisual communication department of the Universidad Politécnica de Valencia, Spain. His works reflect an interest on the specific possibilities of the electroacoustic music language, including abstract pieces that force the écoute réduite, and narrative works that often are applied to the image.

Invisible Links (Alto saxophone with electronics & video). This piece was inspired by a magnificent view in Chiricahua National Monument in Arizona. After a continuing desert towards the horizon, large expanses of volcanic rocks eroded into dramatic pinnacles 27,000,000 years ago appeared in front of me. It is called "sky island of the desert". Myself who was seeing the view as a part of the earth and has been connected with invisible links. We must exist with some kind of balance in this world. When I produced a sound by clapping in the extremely quiet place there, it was reflected from those complicated rocky objects as if it were back further in the past.

• Miyuki Ito received her B.A. from Aichi Prefectural University of Fine Arts and Music, M.A. from the Manhattan School of Music, and D.M.A. from Columbia University (NY). She pursued research at IRCAM with an artist grant from the Agency for Cultural

Affairs, Japan. Her recent awards include the Nagoya Cultural Promotion Agency Prize, Japan Symphony Foundation Prize and Concorso di Composizione Franco Evangelisti. She has been a fellow at the Djerassi Artist Residency and at CMMAS (Mexico). She currently teaches at the Nagoya University of Arts in Japan. The Sands of Time was released on ALCD80.

• Victor Béjar started guitar at the age of five with his father, violin at 6 and several other instruments and having been guitar and music teacher himself at the age of 14 decided to change over to the saxophone. Started classes at the Barcelona Municipal Conservatory where he is now a saxophone teacher. Has received several awards and played as a soloist performing pieces of different styles. Has participated in the recording of many CDs.

Haiku takes as a primary sound source, a recitation of the epic Japanese poem Oku no Hosomichi (The narrow road to the interior) by Matsuo Basho (1644 – 1694). The work was penned as he made an epic journey of around 1200 miles on foot through feudal Japan. My goal was to capture the essence of Basho's journey as related by him in haiku form, and juxtapose on this journey the momentum of modern Japan. Basho's poem winds its way through a forest of soundscapes which encompass both Japan's cutting edge modernism and it's firm grounding in a traditional past.

• Rohan De Livera composes music for a variety of genres and for diverse instrumentation as well as music for short film, theater and television. His music has been performed at venues such as the FILE Hipersonica Exhibition in Sao Paulo, the International Computer Music Conference in Glasgow, the Third Practice Festival in Richmond. Short films with electronic music scores have been screened at the SI-GGRAPH conference in Dallas, the New England Fine Art Institute, in Boston, the Eurographics Conference in Interlaken, and the Imagina Conference in Monte Carlo. Rohan received a Masters degree in composition from the University of Michigan, and a Bachelors Degree in Music Theory and Composition from the Ohio State University.

True Story. The work is inspired by the dipoles of existence-inexistence and orderchaos. The work is the result of the interaction between the oppositional elements of each dipole, a kind of oscillation between the two poles. Notably, the work was conceived and developed in the context of the interdisciplinary scientific field of Systemics. In this approach, the electronic material derives from a self-organised system, a music organism. The organism emerges from a complex network of delay lines, where each element can be influenced by the organism according to its interactions with the environment. Dedicated to Charles Mingus.

• Phivos-Angelos Kollias - In his music the human element is of central significance. His works are influenced by different art forms and the sciences. As a PhD researcher, he is exploring the connection of music and systems thinking – a number

of interdisciplinary scientific theories – while he is applying it to his music. Phivos-Angelos Kollias was born in 1982, in Rhodes, Greece, and he studied in England (APU, Cambridge & City, London) and France (Université de Paris VIII). His works have been performed in many different countries and have received several international awards (for instance: Verdi Conservatoire de Musique – Milan, 2009; G.E.R.M.I. – Rome, 2009; InNova Musica – Andorre, 2009).

• Pedro Bittencourt - (1975, Brazil) Assitant saxophone professor at UFRJ (Universidade Federal do Rio de Janeiro). Ph.D. music candidate on Aesthetics, Sciences and Technologies of Arts at CICM/Université Paris 8, under Horacio Vaggione. His thesis is entitled "The mediation in articulating mixed music composition: the case of the saxophone". Guest artist in ZKM Karlsruhe, President-founder of SAXOPHONEME. Studied saxophone and contemporary chamber music with M-B.Charrier at Conservatoire Bordeaux (2001- 2004). Graduated in Radio-Communication at UFRJ, 2000. His main areas of interest include organizing concerts, teaching music, researching on electronic interaction with saxophones, performing on chamber music and improvising.

Un Lugar Inhabitado: triple torrid convergences (TTC). The question "why, inhabitado?" is trivial when compared to "how inhabitado?" ...a place where no one lives or a place where no one could live? ... a place of sculpted and punctuated silence? This electroacoustic work was conceived, designed and physically composed within six months, using a PC, employing the CDP software suite and SOUNDLOOM, the latter designed by Trevor Wishart.

• d.d.slash / Harry-Ed Roland is a freelance artist who has composed electroacoustic music since 1986. His compositions have been performed in 9 european, 2 north-american and 1 south-american countries, in concert and on radio. Several of his compositions were commissioned and others composed by invitation, as guest composer. Two have been released on commercial-CD compilations, one shortlisted in a renown international competition, three premiered at International Computer Music Conferences, and one at Sound and Music Computing Conference.

Aiael's Gold invites sonorities from the outside environment to the performance space. Two microphones transfer the street sounds to the concert hall, where they are processed and recorded. The complete recording of the sounds from the previous exterior is then used in the following performance, thus transporting sonic memories of particular spaces to new locations. Aiael's Gold takes three notorious common-practice period compositions and fills their rhythmic values with the tenor saxophone timbres and the sounds of the present and past exteriors.

• Juraj Kojs is a Slovakian performer, composer, producer, and educator residing in the US. He is a Postdoctoral Associate in Music Technology and Multimedia Art at Yale's Department of Music. Kojs also manages music and multimedia programs at Harold Golen Gallery in Miami, FL, which include the monthly 12 Nights of Electronic Music and Art concert series. Kojs' compositions were recently featured at festivals and conferences in Europe, Asia, and the Americas. Kojs' works received awards at Eastman Electroacoustic Composition and Performance Competition and the Digital Art Award. His articles appeared in journals such as Organized Sound, Digital Creativity, Leonardo Music Journal, and Journal of New Music Research.

• Víctor Béjar started guitar at the age of five with his father, violin at 6 and several other instruments and having been guitar and music teacher himself at the age of 14 decided to change over to the saxophone. Started classes at the Barcelona Municipal Conservatory where he is now a saxophone teacher. Has received several awards and played as a soloist performing pieces of different styles. Has participated in the recording of many CDs.

22.00h: ESMUC Laptop Orchestra concert

Sala Polivalent

Coordinator: Josep M. Comajuncosas

Performers: Josep M Comajuncosas, Angel Cataño, Daniel Domínguez, Regina Domingo, Aleix Fabra, Quim Llimona, Àlex Rodríguez, Marcelo Enrique Rodríguez López and Luís Vélez

Rimandi Ivano Morrone Gogyo Yota Morimoto

Clear Live ESMUC Laptop Orchestra

Rimandi. A work based on relationships between the noises that, picked up by piezoelectrics placed on four laptops chassis, come from the same laptops and from the gestures of the performers. The sources, modulated by a custom built software for sound processing in real time, change their sound behaviour passing through different fields of timbre

• Ivano Morrone - has composed acoustic and electroacoustic works for soloists, chamber groups, theatre, children, video art, digital formats, sound/visual installations. Has developed custom built software for live electronics. Serves on the editorial staff of the review "Le arti del suono". Teaches at the Conservatory of Music of Cosenza.

Gogyo. The ancient Chinese created a mnemonic device whose element construct a network of interrelated elements [gogyō: five phases]. The system was largely used in seemingly disparate fields such as geomancy, astrology, medicine and music, and is still used in some forms of complementary and alternative medicine. The piece draws from the notion of gogyō, and connects its topological dynamics to create a work with the orchestra.

• Yota Morimoto (*1981) - A Japanese composer born in Sao Paulo, Brazil, currently undertaking a research at the Institute of Sonology in The Netherlands. His works explore unconventional approaches to generating and transmitting sound, implementing models of noise, turbulence and abstract machines. He has performed in festivals and conferences such as TodaysArtFestival, NWEAMO,Transmediale and ICMC.

Clear Live. A revisited real-time version of Paul Lansky's Table's Clear classic for electronic tape, performed by a set of networked laptops.

• Orquestra de Portàtils de l'Esmuc - The laptop ensemble of the Department of Sonology of Escola Superior de Música de Catalunya, established two years ago performed for the first time in June 2008. Has been playing around the Barcelona area and at SMC 2009 Porto. The ensemble is a meeting point of researchers, digital instrumentalists, performers and composers, concentrating in the development of new control interfaces and new musical paradigms, where laptops have the main role. The ensemble is directed by Josep M Comajuncosas.

The **SMC Conference** and the **SMC Summer School** will take place at the Communication Campus of the Universitat Pompeu Fabra in Barcelona.

UPF has several campus and buildings in different places of Barcelona. SMC 2010 will take place at the new Communication-Poblenou Campus, in the heart of new 22@ district, the whole south-eastern quadrant of the city, where the most innovative companies co-exist with research, training and tech transfer centers.

UNIVERSITAT POMPEU FABRA Communication campus - Poblenou Roc Boronat, 138 08018 Barcelona Spain

How to arrive at Communication-Poblenou campus

Subway: L1 - Glòries Bus: 7, 92, 192, N7 Tram: T4 - Ca l'Aranyó

From the airport to the city centre

The best alternative to get to the city centre is the AEROBUS. You can take the AEROBUS in front of the Terminal A, Terminal B and Terminal C. Travel with AEROBUS until the last stop in Plaça de Catalunya, and take the subway L1 to Glòries.

Practical info 60

• Do you need an assistance certificate? Contact us: info@smc2010-info@llista.upf.edu

• If you need to leave your belongings in a locker room, ask for it at the Registration Desk. Universitat Pompeu Fabra is not responsible for any items lost, damaged or stolen.

Music Installation

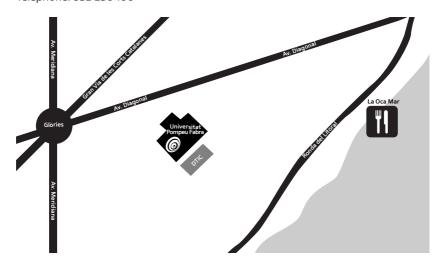
During the 4 days of the SMC Conference there will be a Music Installation called **Psicofonías Urbanas** (by *Danio Catanuto*). This is a sound installation which correlates the city's sound to its citizens. Some punctual radio diffusions and a free distribution of CDs containing the dramatized treatment of some field recordings are the witness of human's transit sound in some urban sites. Just go to the site and tune any FM radio on the right frequency or go off with a CD to hear your city's ghosts at home

Banquet

The SMC2010 Banquet will be held at restaurant La Oca Mar.

La Oca Mar Platja Nova Mar Bella S/N Espigó de Bac de Roda (between Mar Bella and Nova Mar Bella beaches) 08019 Barcelona Spain

Telephone: 932 250 100



Food places nearby the Communication Campus:

Restaurants

Aliaga - Llaguna 154, 08018 Barcelona Arce - Pere IV 178, 08005 Barcelona Baccus - Llacuna 118, 08018 Barcelona Broqueta - Rambla del Poblenou 101, 08018 Barcelona Cal Joan - Llacuna 104, 08018 Barcelona Casa Pepe - Ciutat de Granada 128, 08018 Barcelona El refugio - Pere IV, 08005 Barcelona Fresc Co - Llacuna 140, 08018 Barcelona InRed - Rambla del Poblenou 123, 08018 Barcelona Jennifer - Almogàvers 211, 08018 Barcelona Julián bar - Llacuna 92, 08018 Barcelona La Uni - Llacuna 128, 08018 Barcelona L'aldilà - Llacuna 106-108, 08018 Barcelona Los Cármenes - Sant Joan de Malta 119, 08018 Barcelona Opri – Sancho d'Àvila 167, 08018 Barcelona Panoramus - Rambla del Poblenou 117, 08018 Barcelona

Quina barra - Ciutat de Granada 130, 08018 Barcelona Tampa - Llacuna 120, 08018 Barcelona

Cafeteria UPF – Roc Boronat 138, 08018 Barcelona

Commercial centre: restaurants, bars, shops, cinema, ... Centre comercial Glóries – Av. Diagonal 208, 08018 Barcelona

Office material

Carlin - C/Llacuna, 124, 08018 Barcelona

Printing facilities

CopiServei - C/Llacuna, 132, 08018 Barcelona

Contacts

Conference organisation: 935 422 872 / 935 421 939 Information desk at Communication Campus: 935 422 000 General Information: 010 (forwarded to any telephone number)

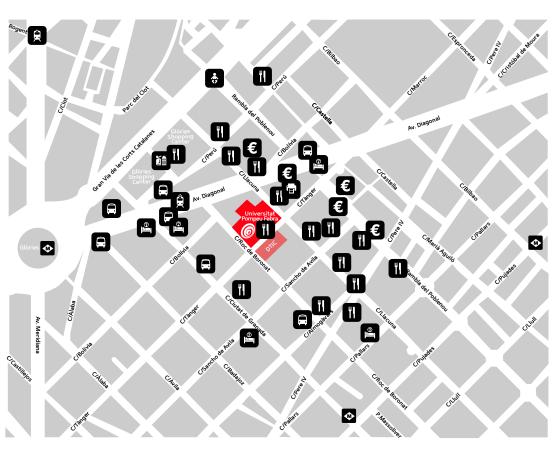
Ambulances: 061 Emergencies: 112

American Express: 900 994 426

MasterCard: 300 371 231 Visa: 900 991 124

Taxis Barcelona: 935 192 570 Catalunya Taxi: 935 197 263

RadioTaxiBCN: 932 250 000



Key to Symbols



Detailed information: smc2010.smcnetwork.org

9:00 Registration opening 10:00 Tutorial #1 SuperCollider for Real Time / 11:00 Tutorial #3 Hands-on ReacTable! 13:00 BREAK 15:00 Tutorial #2 (Ab)using MIR to create music / 16:30 Tutorial #3 Hands-on ReacTable! 18:00 Summer School Concert 19:00 Reception

19:30 Opening Concert

	Friday 23rd of July
8:30	Registration Opening
9:00	Keynote Speech
10:30	PS2-Poster Craze 2
11:00	PS2-Poster Session 2 / Coffee Break
12:00	OS5-Music Class. & Annot.
13:30	BREAK
15:00	Panel
16:30	PS2-Poster Session 2 / Coffee Break
17:30	OS6-Interaction
19:00	Instrum. Electr. Concert II
20:30	Banquet
23:00	Concert around the reacTable

Thursday 22nd of July 8:30 Registration Opening 9:00 OS1-Melody and Harmony 10:30 PS1-Poster Craze 1 11:00 PS1-Poster Session 1/ Coffee Break 12:00 OS2-Timbre and Melody 13:30 BREAK 15:00 OS3-Multimodality 16:30 PS1-Poster Session 1/ Coffee Break 17:30 OS4-Sound Mod. & Proc. 19:30 Instrum. Electr. Concert I 21:00 BREAK 22:00 Concert around Freesound

Sa	turday 24th of July
10:00	OS7-Rhythm & Percussion
11:30	PS3-Poster Craze 3
12:00	PS3-Poster Session 3 / Coffee Break
12:30	Music made with Vocaloid and LoopMash
13:30	BREAK
15:00	OS8-Voice and Singing
16:30	PS3-Poster Session 3 / Coffee Break
19:30	Instrum. Electr. Concert III
21:00	BREAK
22:00	ESMUC Laptop Orchestra concert

