

# SMC 2009

6th Sound and Music Computing Conference | 23 - 25 | July

Casa da Música | Porto



# 6th Sound and Music Computing Conference

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## 1 | Introduction

Porto, 23-25 July 2009. The Portuguese summer is as always a memorable affair, especially if it is windy beyond belief and with occasional downpour, as was the case at the beginning of the SMC conference. Nevertheless, the sun finally prevailed revealing its rays that Portugal is famous for, bathing the city's facades in its warm glow from morning to sundown. Porto, built in the usual Latin way with many narrow streets neither parallel nor perpendicular, is an intricate city full of elevation that carries one up hills to beautiful views above the Douro River and Gaia city situated just across from it.

According to sources Portugal got its name from "Portus"- an ancient name of this very city with today's approximate 250.000 habitants and metropolitan area of around 2 million. Revitalized in 2001 alongside with the nomination for "European Capital of Culture", Porto has developed its cultural significance not only nationally but also globally. With an extensive architectural tradition, the city continues to be of architectural significance and still remains an important reference much thanks to the renowned contemporary architect Álvaro Siza Vieira and his way of thinking concerning the urban landscape.

Situated at the end (or beginning) of one of the largest avenues of the city, Avenida da Boavista, you'll find A Casa da Musica, which officially "is the first new building in Portugal to be entirely dedicated to music - to the presentation and public enjoyment of music, to music education and to the creation of music."

A Casa da Música, its opening initially scheduled to coincide with the year of "Cultural Capital of Europe 2001", first opened its doors on April 2005 slightly behind schedule. The buildings extraordinary display of modern architectural triumph joyously hosted the 6th SMC - Sound and Music Computing Conference, after previously being hosted by Paris, Salerno, Marseille, Lefkada and Berlin.

"The SMC Conference is a privileged

forum in Europe for the promotion of international exchanges around Sound and Music Computing, a field that approaches the whole sound and music communication chain from a multidisciplinary point of view.

By combining scientific, technological and artistic methodologies it aims at understanding, modelling and generating sound and music through computational approaches.

Its core academic subjects relate to musicology, physics (acoustics), engineering (including computer science, signal processing and electronics), psychology (including psychoacoustics, experimental psychology and neurosciences) and music composition. The SMC initiative is jointly supervised by the following European associations: AFIM (Association Française d'Informatique Musicale), AIMI (Associazione Italiana di Informatica Musicale), DEGEM (Deutsche Gesellschaft für Elektroakustische Musik), HACI (Hellenic Association of Music Informatics) and IAMT (Iberian Association for Music Technology)."

SMC 2009 was organized by the Institute for Systems and Computer Engineering of Porto (INESC Porto), the Research Center for Science and Technology in Art (CITAR) of the Universidade Católica Portuguesa in Porto, the School of Music and Performing Arts (ESMAE), Porto's Concert Hall: the Casa da Música, and the Department of Electrical and Computer Engineering of the Faculty of Engineering of the University of Porto.

According to the organization, the SMC 2009 hosted two hundred participants from more than 50 countries, ranging from Hamilton, New Zealand to San Francisco, US, while the conference website received 22.500 hits from 110 countries across the world since its inception. Six events of the conference were transmitted via [www.casadamusica.tv](http://www.casadamusica.tv), and was followed online in 35 countries.

While main events were held at Casa da Música, others were designated for the Coliseum at Passos Manuel street; an old cinema turned multi-purpose

venue serving a large community of Porto artists and audiences. A location famous for hosting concerts of a wide range of music with varying aesthetical intentions, a collaboration which proved to be a very rewarding for both parts.

Although Casa de Música, notoriously maze-like with its winding corridors, peculiar elevator-system and many doors, could easily turn into an logistical nightmare for everyone involved, the organizers seemed to have planned the rather intense program to perfection and without any obvious delays they kept the attendees entertained, curious, and interested throughout the entire four days.

## 2 | Tutorials

On the first day of the conference three tutorials were presented. Composer and researcher from Centre for Music and Technology in Helsinki Mika Kuuskankare started off by demonstrating the current status of PWGL, a visual programming language for computer aided composition and sound synthesis, showing some practical examples of which not all performed to Mika's expectation. However, the improvements, and quality of the application became quite evident to most, not just for computer aided composition but also for sound synthesis and music notation, which, coupled with a straightforward graphical design, makes it an open-source application with an increasingly promising future.

In the second tutorial Olivier Lartillot from University of Jyväskylä, Finland ventured on a thorough overview of the MIRtoolbox and emphasised some key aspects which aren't yet properly documented. Following, Bob Sturm presented some interesting results from his on-going research on dictionary-based methods (DBM's) of sound analysis a method that he described to be for granular synthesis what Fourier analysis is for additive synthesis. After expounding some of the main concepts, an example of atomic decomposition processes was presented - the same

topic of last year's "best paper" at the International Conference on Computer Music which Bob co-authored.

### 3 | Keynotes

Atau Tanaka - From Mainframes to DIY Culture - Continuous Evolution in Computer Music

As the first keynote of the conference, Atau Tanaka stood for the more laid back but yet articulate presentation that consisted of his own experience/ observations in the field contrasted against the subject's history. The presentation's key points reminded us about the ambiguousness of the roles of the instrument-builder/composer, producer/performer or consumer/participant, which aren't as easily defined and categorized as they used to be.

When it came to his own work, real-time networked interaction through the extensive use of sensors and miniaturized mobile devices, analogue combined with digital, open-source software use and development, and the do-it-yourself (DIY) culture all play a major role - just as in the computer music research field in general. In his Net\_Dérive project (with its obvious situationist undertones) the audience were presented with a first-hand experience of Tanaka's take on interactive composition: which often implies strategies and procedures commonly found in Computer Supported Cooperative Work (CSCW), by designing multi-user instruments which may be played in concert-like situations / appreciated in an installation or any other network performance environments.

When it comes to central issues surrounding Tanaka's own work, both as a researcher and as an artist, the dynamics of democratized digital forms and how they permanently change and evolve, seems to be most significant. He emphasized that his concerns are well beyond mere technology, trying to understand greater concerns which all may enrich our musical approaches.

José C. Principe - Perception as Self-Organization in Space Time

The Director and Founder of the Computational Neuro-Engineering Laboratory (CNEL) of the University of Florida, was responsible for what could be considered one of the more inspiring talks of the conference by "critically reviewing the tools used in audio engineering and how one can design new self-organized systems to quantify the world around us." Professor Principe who is involved in biomedical signal processing, Brain Machine Interfaces in particular, and the modelling and applications of cognitive systems, briefly reviewed the science of sound which he categorized into three epochs: from Physics to Psycho-Acoustic theories to finally arrive at today's Computer Auditory Scene Analysis (CASA).

Professor Principe discussed the differences between the auto-correlation and the auto-correntropy function, concluding with what he said to be his main point: " - going beyond auto-correlation function is something that needs to be done", to continue on Self-Organizing Networks and Self-Organizing Maps (SOM) where he stressed the importance of letting the data design the system (data providing the coefficient directly), which he also related to the necessity of reducing redundancy (Which is the opposite of entropy, he reminded us).

As a final note Professor Principe presented some computational neuroscience related questions such as "How does the brain perform computation associated with perception?" and "How do we enjoy music?" where he concluded that computation is emerging as the fundamental principle to the self-organizing function of the brain.

Bruce Pennycook - Who will turn the knobs when I die.

In his keynote, composer, new media developer, and media technol-

ogy specialist Bruce Pennycook went through the aesthetics of interactive music and concerns regarding archival issues, longevity of the music of the genre, and general transient issues concerning sound and music today. As major trends in the evolution of music have gone from patch cords and knobs to computers, it undoubtedly changes the way we play, perform and ultimately even think. Bruce was voicing his concerns about the longevity of many of his own pieces and the music of the genre as a whole, as they aren't performed in the same way as traditionally scored pieces, some only be performed by a trained operator. On top of that, he questioned music-education's reluctance to pick up many pieces transferring them to students, and how this affects Computer Music, not only anchoring the genre in history, but also grounds it in contemporary society, making it an active, shaping force of music culture.

### | Oral Session 1

First off was the hot topic of Sonic Interaction Design and a group from IRCAM, McGill and Zürcher Hochschule der Künste in Zurich with the Flops glass - a glass-container embedded with tilt sensors which produces impact sounds when tilted, emulating falling objects out of the glass. A device specifically designed to study emotional reactions arising from sonic interactions. Based on three factors: "valence, arousal and dominance" and by changing sharpness, tonality and naturalness of a sound exposed to a test group, the team tried to find out what reaction can be anticipated out of which character of sound. By juxtaposing their study to similar studies of airplane sounds they found natural sounds to be more pleasant and induced a greater sense of control in its subjects compared to synthetic sounds. However, natural sounds were not experienced as calming, where especially tonality didn't seem to affect the types of emotional reactions measured, which contradicts earlier

studies in the area.

Next up was Eoin Brazil and Mikael Fernström from University of Limerick, Ireland whom after a moment of technical issues (which on a whole were spared from the conference), presented research concerning empirically based auditory display design. What at first could have been seen as quite an undertaking to consider everyday sounds and their descriptions/understanding/synthesis/modelling to come out with a somewhat watertight SID design process, later proves quite convincing. By extending existing SID methodologies from emphasis on mere sound creation to highlight the empirical investigation of the sound artefact created and how it is perceived by an audience, they hope to provide a way to “bridge the semantic gap between low level perceptual studies and high-level semantically meaningful concepts”. This, by among other things, incorporating wider socio-cultural considerations when working within the proposed framework which they find lacking in current SID models.

### **| Oral Session 2**

“Soundscapes” was the topic starting off the next oral session, or more specifically their analysis and re-synthesis. From CIRMA and the University of Torino came the next presenters whom, based on the notion of a lack of models/applications which re-synthesizes a soundscape (through the analysis on an existing one) proposed a method based on the premise that soundscapes are made up of “sound zones” which spatially group together types of sound objects. Re-synthesis is then delivered through Supercollider and GeoGraph, the latter a graph-based system to describe musical structures.

The next presentation concerned integrating an interface to navigate a map of environmental sounds using the IEEE 1599, XML-based standard of multi layer representation of music information. Inspired by the “Sons de Barcelona” and “Freesound.org” and its likes, the team proves that the

XML standard may transcend strictly musical content by applying it in a city pedestrian soundscape project conducted during the SMC 2008 in Genoa.

### **| Oral Session 3**

Session 3 concerned Interactive performance systems and started off with the augmented African thumb piano named the “Hyper Kalimba”. Through various sensors and Max/MSP, pitch bend, tremolo, extended range and delay broadens the sound possibilities of the Kalimba without interfering with any of its original features to allow seasoned practitioners to build upon existing knowledge when exploring the hyper-instrument’s emerging sound possibilities. Max/MSP was also used in the DTW gesture recognition tool presented by the next speaker Frederic Bettens from Mons in Belgium. Aiming to give instrumental music performers extended control over the sound of their instrument by extending the “instrument body” onto the whole performer and what traditionally would be considered non-musical gestures, the team proves a surprisingly rewarding experience through viola player Dominica Eyckmans and her “Dancing Viola” project.

Instrument/body was again the topic with Motion-Enabled live electronics (MELE) at a workshop part of Impuls 2009 in Graz, Austria. In an attempt to provide performers with more than traditional pedals and switches to shape their sound in a more intuitively manner, the team from University of Music and Performing Arts employed state-of-the-art 3D motion tracking to inform the sound processing and projection. Additional to the emancipation experienced with bodily-attached controllers the performers sensed an increased attention from the audience on their actions on the stage, resulting not only in a change of awareness of their performance, but resorting many participants to ask for choreographic support.

### **| Oral Session 4**

First up under the computational musicology topic, the research team from Aristotle University of Thessaloniki presented a technical proposal in order to solve the problem of inefficiency of the Voice Integration/ Segregation Algorithm (VISA) [ Karydis et al. ] when dealing with cases where the number of streams/voices change during the course of a musical work. Incorporating the principles of both temporal and pitch proximity and the Synchronous Note Principle, they developed a new version of the algorithm, to include an improved mechanism for context-dependent breaking of chords and for keeping streams homogeneous. The new algorithm proved to generate improved results when dealing with a larger and more diverse dataset (non-homorhythmic homophonic accompanimental textures or even homophonic and polyphonic combined) than the one selected by Karydis’s group (where the number of voices remained steady throughout the musical work) without, however, compromising its efficiency with this older dataset.

Modeling Schoenberg’s Theory of Harmony was the next topic on the agenda with “A Computational Model that Generalises Schoenberg’s Guidelines for Favourable Chord Progressions” by Torsten Anders and Eduardo Miranda from ICCMR in Plymouth. They presented a formal model that they proclaimed is capable of working at the level of abstraction presented in Schoenberg’s theory text, with one possible caveat; that the capability owns to the fact that the object to model was the explanation of these harmonic rules and not the rules themselves. The main features of the system rest on the computer generation of four-voice homophonic chord progressions or the creation of other harmonic dependent textures, even if the flexibility of the proposed model permits applications beyond a four-voice setting. (Even in a microtonal music context.) Results achieved allow the

implementation of a group of exercises, although the less complex ones suggested by Schoenberg's treatise, which all may be found in the proposed paper. Examples may be found at <http://strasheela.sourceforge.net> provided with full source code.

The final presentation concerning computational musicology proposed a method for modelling musical dissonance. Expressing dissonances in a sequential form as, "the dissonance phenomena in music can be seen as an ordered sequence of processes" which, according to the authors Salim Perchy and Gerardo M. Sarria makes the Real-Time Concurrent Constraint Calculus (rtcc) the preferred choice. For it permits a process to react to the environment after receiving a stimulus from it, during a certain time interval. As this reactive system efficiently manages asynchronous behaviour, it seems to be appropriate to model dissonances as a non-deterministic process over time.

#### | Oral Session 5

The first presentation of day two concerned album and artist effects and music information retrieval. Through using two different methods, a timbre based Mel Frequency Cepstrum Coefficients and Single Gaussian (G1) and Fluctuation Patterns (FPs) on very large datasets (like that of the World Wide Web), the authors Arthur Flexer and Dominik Schnitzer from Austria tried to answer if there's a proved album and artist effect in very large databases, which of them is larger than the other and how the size of database correlate to test results. They found that there is a clear album and artist effect in very large databases for both methods, although the effect might be overestimated when smaller datasets are being use. Furthermore, the FP being interestingly enough also less sensitive to production and mastering effects of albums.

Xavier Serra from MTG at Universitat Pompeu Fabra in Barcelona was next talking about the challenges in improving the freesound.org site, not

only the concept as a whole but particularly the improvement of its social tagging mechanisms which underlie much of the sites user experience. Polysemy, synonymy and data scarcity concerns, which all are common issues in social tagging, are without exception relevant for freesound.org. To fight any incongruencies, a content-based audio similarity method of extending tags - so called "autotagging" - was proposed, which through human assessment showed "strong agreement" in 77% of tags enhanced by the auto-recommendation. Showing that the site is on the right path in helping people find sounds by minimizing human margin of error when it comes to folksonomies. Projecting the past against the future, Xavier Serra shared his thoughts on attempts to attract young people to the site by the "Sons de Barcelona" project and attempts to incentivize collaborative practices through a "Free Sound Radio".

#### | Oral Session 6

Next on the agenda was Chris Raphael from Indiana University who presented his musical accompaniment system (software that serves as musical partners for live musicians). Their proposed system models the traditional "classical" concerto setting in which the computer's task is to perform a pre-composed musical part in a way that follows a live soloist. Their system which goes under the name "Music Plus One" (name inspired by the "Music Minus One" accompaniment records) uses a hidden Markov model of score following as of the grounding it gives to navigate the "accuracy-latency trade-off", which tries to minimize that chance that a score follower reports events before they actually have occurred. As the MPO model primarily deals with the synchronization issues beyond common practice music for soloist and orchestra, they see their research applicable way beyond and into other domains where ways of going about synchronization issues similar to theirs may prove very useful.

As a final presentation, Bernard Niedemayer from Linz in Austria shared his take on audio to score alignment through a "matrix factorization based feature" where combined with dynamic time warping, it proves to be an viable alternative to the more traditional chroma-vectors.

#### | Oral Session 7

Continuing on a similar subject, Andy M. Sarroff and Juan P. Bello from NYU presented findings associated with predicting the perceived spaciousness of stereophonic music recordings, and from it derived objective signal attributes. To achieve this, the music had to be parameterized by three discrete dimensions of perception, namely width of the source ensemble, the extent of reverberation, and extent of immersion. Their predictive algorithms demonstrated to perform well on all dimensions and proved that it's actually possible to map perceived spaciousness through mere attributes of an audio signal.

Next up was Giovanni De Poli, Antonio Roda (Padova University) and Luca Mion (TasLab, Trento) from Italy, who investigated the more emotional and effective content of music, at the same time widening the application of math within music by extending beyond sound relation, structure, production and propagation and into the domain of emotions. They did this by exploring the possible association between musical expressiveness and basic physical phenomena described by integro-differential operators.

#### | Oral Session 8

For session eight, the topic was "Computer environments for sound/music processing/composition". Started off by Chris Chafe from Stanford talking about tools and methods to assess and tune network parameters for remote sessions of network performances. One such tool proposed enables performers to tune the parameters of their connection through what could be considered an "auditory display" which in turn is connected to a multi-client

avoid spending time adjusting ones connection to prevent disruptive and many times unavoidable delay/jitter problems rather than playing music. The implementation is part of the JackTrip application, software for low-latency, high quality and multi-channel audio streaming over TCP/IP Wide Area Networks (WAN).

The next paper dealt with a programming language for real-time signal processing and synthesis presented by Yann Orlarey, Dominique Fober and Stephane Letzwich from Grame (Centre National de Création Musicale) in France. "Faust" is a language which is designed from scratch to serve as a compiled language, which allows it to be complementary to existing audio languages and provide a alternative to C/C++ when developing signal processing applications, libraries or audio plug-ins. Two new compilation schemes for "Faust" together enable data to be computed in parallel, which produces interesting improvements in performance.

All the way from Universidade de Brasilia, Brazil came the next presenters Bruno F. Lourenço, José C.L. Ralha, Márcio C.P. Brandão who used a Lindenmayer system (L-system) to create interesting musical scores. Most commonly used to model the growth processes of plant development, or in the more familiar form of graphical fractal-art, their research show that by introducing genetic operators to create new sets of production rules of the L-systems instead of using increasingly sophisticated L-systems (which doesn't generate interesting enough art, neither graphically nor musically according to the authors), they ensure variability in the output to such degree as to create interesting scores.

Next authors, Leandro Ferrari Thomaz and Marcelo Queiroz from São Paulo, Brazil proposed a framework relating to the emerging area of musical multi-agent system technology. By introducing a taxonomy and implement a computational framework which encapsulates previous work and addresses problems like real-time

synchronization, sound communication and spatial agent mobility, the authors hope to provide a way for users to develop a musical multi-agent system which is directly tailored to his needs, the framework also freeing him from worrying too much about technicalities. To verify the usefulness of this framework, two scenarios were put forward where musical multi-agent systems issues, like MIDI and audio communication, artificial life constructs, spatial trajectories, and acoustical simulation were discussed and scrutinized.

### **| Oral Session 9**

Third day initially concerned musical pattern recognition, a paper authored by the three Americans Jon Gillick from Wesleyan University, Kevin Tang from Cornell and Robert M. Keller from Harvey Mudd College, dealt with the automated learning of jazz grammars from a corpus of performance through a combination of clustering and Markov chains. Research shows the success in generating novel and individually distinct solos which do not deviate unfavourably from the overall "sound" of performers analyzed, nor stray too far from the characterization of jazz.

The second paper presented by Dough Van Nort, Jonas Braasch and Pauline Oliveiros from Rensselaer Polytechnic Institute in New York dealt with exploring the "language" between performers or performers and audience in musical improvisation where sound recognition and evolutionary algorithms may provide a helpful framework to guide the improvisation.

### **| Oral Session 10**

Matija Marolt from University of Ljubljana, Slovenia started off session ten which dealt with Sound/Music signal processing algorithms by presenting an approach of transcription of recordings of Slovenian bell chiming performances and its various implications, not only as an attempt of salvaging cultural heritage from external forces but also in making tra-

ditional, but less known forms of musical expression more accessible to mainstream music research.

Continuing the topic, Vincent Akkermans from Utrecht school of the arts and Joan Serra and Perfecto Herrera from MTG in Barcelona spoke concerning the presentation and evaluation of a music descriptor useful in MIR, namely the "shape-based spectral contrast descriptor" which is said to yield significant increase in accuracy, robustness and applicability over OBSC, the more common octave based descriptor used in content-based MIR when classifying a songs music genre for instance, based on the audio signal.

### **| Oral Session 11**

Last of the oral sessions concerned Musical Performance Modelling. The INTUNE software starts of at the premise that we're not that great at estimating ourselves objectively, but can learn to do so if providing the "proper external perspective" as the authors put it. INTUNE is a program to help musicians hear and improve their intonation and tries to overcome the obvious deficiencies of the much-accepted electronic tuner as an aid to perfect ones intonation through the use of not only aural, but also visual feedback. Session eleven proved to be an entertaining and insightful presentation by Christopher Raphael of a paper co-authored by Kyung Ae Lim, both from Indiana University.

Following was again more Austrians, Sebastian Flossman, Maarten Grachten and Gerhard Widmer from Johannes Kepler University in Linz. By using the dataset of human piano performances of 13 complete Mozart sonatas and the complete set of works for solo piano by Chopin, the project tried to algorithmically render and model expressive performance. Their presentations not only highlighted the advancements of their proposed network to model dependencies between score and performance, but also highlighted issues concerning human aesthetic evaluation within successful research in music model-

ling and rendering. Concluding that although they've taken great strides towards a machine-generated performance to sound "musical" to humans, there still needs to be features in their model which are capable of explaining data with a higher degree of interpretational freedom.

#### 4 | Inspirational Sessions

Inspirational sessions were held throughout the whole conference where informal discussions between panel and audience could take place in relation to short presentations.

At the first inspirational session we witnessed some good examples of what Sonic Interaction Design is or how it may be employed in everything from "wise bathrooms" to personal acoustic shields in form of umbrellas, all delivered with both serious intent or with poignant irony to shine light of key issues concerning our relationship with technology.

The second session concerned Algorithmic Composition and Interactive Music, a topic which has gotten a fair amount of attention lately due to its relevance to computer games and other music software applications like Noatikl and Nodal. A 10 minute presentations by each panel members like Bruce Pennycook, Robert Rowe spanned all topics to assess the state of the art and discussing future developments of highly relevant topics in the field.

"Current challenges within SMC" was the topic of the third inspirational session, moderated by Xavier Serra from MTG in Barcelona, a discussion about opportunities and challenges facing the SMC in the present and future. First on the agenda was Giovanni de Poli and Antonio Camurri who shared some thoughts on SMC education/curriculum issues concerning skills needed in the job market, why to get educated in SMC and which topics are of central importance in a SMC degree, also bringing up the need to assess any founding literature and define the current and future literature base, which SMC is to rest on.

Following was Matthias Mauch who

advocated for a central concept of music modelling and evaluation, questioning limits of accuracy of current approaches and urged for larger focus upon interactive aspects of features of these models, which he found be do well with a more holistic approach. He also expressed the need to increase the evaluation strategies of music to improve feature extraction and broaden the field.

Next on the agenda was Marcelo Wanderlay who spoke about evaluating input devices for musical expression, which device for which context, qualitative vs. quantitative considerations, also the importance of a more granular definition of the musical "task" in various research contexts.

Anssi Klapuri questioned the importance of multimodality and examples from our living environment; for instance, applying theories on how babies orient themselves through multimodal interaction when trying to make machines understand sound. Chris Chafe from Stanford "Network concerts, virtues and challenges" went over the obvious virtues but also the less obvious challenges of networked concerts such as levels, mixes, sound staging, moving mikes, basically all that which makes the performance enjoyable and doable not only for involved performers but also for an audience. Areas, which Chris reminded us all, could benefit from more research and not forgetting to mention that much of the research in networked music is "Green", introducing ecological concerns into the SMC research field.

"More of the same" was the topic of the subsequent presentation. Composer, sound/media artist Hannes Raffaseder pleaded for new artistic concepts and aesthetic approaches in computer music. Raffaseder reminded the audience of the abundance of innovations within the field, but also questioned the homogenous aesthetics of the creative output. Even if most performances, one could agree, had their virtue more in the demonstration of art-supplies than artistic output, an increased awareness

for whom and why we make music could be in place. Also utilitarian aspects of music were brought up by Christopher Raphael at the end of the session with his thought on music for computer games.

The last inspirational session set out to present original, forward-thinking ways to visualize music which all had the potential to fuel interesting and controversial discussions, and to transcend the common appearance of many current visualizations of music. Contributors got the chance to present and demo their prototypes for 15 minutes, which was followed by an open discussion. Everything from visual augmentation of large-scale music libraries to interesting audiovisual mappings based on various kinds of stimuli were presented, which proved to be an intense and exciting experience as we were moving closer to the end of the conference.

#### 5 | Concerts

Several concerts appeared throughout the conference, having received 258 submissions; the selection covered 44 pieces distributed all across the 3 days. The concerts were divided between Casa da Música and the Passos Manuel street's Coliseum, the latter also hosting some of the inspirational sessions as an attempt to not only share some of the logistics, but also to open the SMC event to the wider community. The concert programme was selected with the help of music chairs Pedro Rebelo (Sonic Arts Research Centre, Queen's University Belfast) and Carlos Guedes (Escola Superior de Música e Artes do Espetáculo-IPP, Porto) while compiled by four invited curators: Evan Parker (UK), the renowned improviser/saxophonist, Robert Rowe (New York University, US) composer/academic, Pauline Oliveros (Rensselaer Polytechnic Institute, US) composer/improviser and academic and hardware hacker/improviser/academic Nicolas Collins (School of the Art Institute of Chicago, US). All four very well known individuals designated to the difficult task of accepting only 44

out of 258 works.

Out of the concerts, the first and the last could be said to have stood out of the crowd. The first one was very special number named "Curator's Concert" which represented works from Robert Rowe, Quartetto Telematico, Nicolas Collins, Pedro Rebelo and the Networked Duo (Evan Parker, Frank Perry). Through a group of acoustic instruments articulated with a few electronic interventions they managed to create a wide palette of pieces that made up an impressive concert. Out of the set, the last, namely the duo with Parker and Perry was particularly extraordinary at Casa da Musica this evening, a completely acoustic performance if it wasn't for the medium, the Internet. Parker decided to play sax (to everyone's delight), while Perry played Tibetan Singing Bowls in Bournemouth, England. Both seemed to gallantly manage and overcome any inevitable limitations inflicted (such as latency) when communicating sonorously even through a generous bandwidth, which can only be attributed to the tact and sensibility of great musicians, adjusting to the latency on the fly.

The global piece of the same concert on the other hand, played by Pedro Rebelo (piano), Franziska Schroeder (saxophones), António Augusto de Aguiar (double bass), Evan Parker (sax) and Frank Perry, did not reach by far the elegance and simplicity which we found in the duo. Last but not least on that same concert, it was a delight to witness the pioneer of Deep Listening, Pauline Oliveros, on accordion and iPhone (from Dartington, UK) trying to match Jonas Braasch on soprano saxophone (from Troy, NY), Chris Chafe on daxophones and Doug Van Nort on Greis and electronics (both present at Casa da Música).

The following seven concerts reflected a large variety of sonic and aesthetical styles, ranging from

live laptop to tape pieces crossing all possible instrumental styles with intermittently augmented by the sound processing, either pre-recorded or not - some being less obvious than others.

The last concert of SMC 2009 was made up of a dazzling variety of instrumentation, technical approaches and styles of student submissions curated by Robert Rowe, which stood out of the crowd because of its great width, and displaying the obvious creativity bustling in the SMC community.

Although the concerts overall may have generated a lot of food for thought concerning Sound and Music Computing, one couldn't deny that they were a bit disappointing in the way of not facilitating the great sum total of what each individual part on stage could create under "normal" circumstances. However, it takes a lot of courage and perseverance to work under the conditions that a busy scheduled conference provides which should be commended, one also has to keep in mind that these were concerts in the context of a SMC conference, which has its fair share of distracted and maybe benignly uneducated audience, musically. Furthermore, if it was not for the SMC logo on the pamphlets in people's hands, the concert could easily be interpreted as a jazz concert, and the line-up being what you find in a contemporary jazz festival. Although an exception could be made for Salvage, the Nicolas Collins piece where seven performers attempted to re-animate deceased and discarded electronic circuitry where six of the players used test probes to make connections between a simple circuit and the electronic corpse and the seventh performer "conducting" the performance by periodically signalling the players to freeze the individual sound texture by holding their probes as still as possible.

Overall, everything imaginable was presented at the SMC concerts much like Pauline Oliveros notes concerning the introductory concert, which

deserves to be quoted at full length: "the variety of music presented for selection for SMC was fascinating. More and more the computer disappears into the music. Transparency is enhancing the music that couldn't be made without the computer yet the music wants to be free of the medium. More and more the computer is an instrument of choice. The most pressing problem is the musical interface. How is it possible to gain the most expressive access to the enormous power of the computer? The future of music is indicated in the development of this access and in the pieces selected for performance this year."

Common sentiments were to be found in Nicolas Collins notes: "In selecting music for two concert programs at the Casa da Música and Passos Manuel I reviewed some 60 submissions. I was pleasantly surprised by the diversity I encountered: the music covered a wide range of styles -- from familiar "academic" computer music genres, through interactive improvisation-based work and multimedia projects, to experimental pop -- and its practitioners hail from all over the globe. Just as the electronic music tools of the post-war European avant-garde were incorporated into the Pop sound palette by the end of the 1960s, so the computer has become an ubiquitous tool for music of all sorts - not just the piano for the new millennium, but also our tape recorder, manuscript paper, accompanist, collaborator, record label, radio station, business manager and record store. Moreover, since the late 1990s the speed and memory capacity of affordable computers have made the manipulation and storage of video as practical as working with sound, and a large percentage of the SMC submissions demonstrate so strong and well-integrated a visual component as to make them indistinguishable from "video art." As a result, I'm happy to admit, I no longer have any idea what the term "computer music" might mean."

Robert Rowe, highlighted that: "the student submissions for the 2009



Sound & Music Computing conference revealed a rich and dazzling variety of instrumentation, technical approaches, and styles. (...) from several countries, traditions, and aesthetic points of view.(...) Altogether, a tour de force by the next generation of electro-acoustic composers.”

Finally, and to my great satisfaction, Evan Parker introduced improvisation to the program at the Passos Manuel venue, which it had as its core where “Laptop music, remixing of live sounds, instrument and electronics dialogues and custom instrument makes this concert a showcase of current improvisation work using technology.”

Before closing the difficult task of giving a fair summation of the SMC 2009 concerts where a general feel and salient features has taken precedence over reporting each submission in detail, I was glad to see the great John Bischoff listed among the long line of proposals. Selected by Nicolas Collins for the third concert, Bischoff played his 2008 piece: “Audio Combine, a solo electro-acoustic work which analyzes the impulse sounds initiated by a performer using sonic objects and builds a multi-layered collage structure in response. As the objects are activated one at a time, the resulting sounds are amplified, colorized, and recycled in fragmented form based on the timing patterns of their initial occurrence. As more sounds are made, more layers of fragmentation are generated on top of one another. One can think of the piece as the real-time construction of a sonic collage whose details are always different because the performer’s timing is always different.”

I think many would agree that a better experience that night than Bischoff’s performance for the specific audience, is hard to come by. An exemplary performance of a great concert concerning electronics, that together with the Evan Parker and Frank Perry duo, was one of the conference’s absolute highlights.

For great many reasons it makes perfect sense to have John Bischoff at

the SMC conference, although some would argue that a man of his extensive practice in network cooperative music deserves better circumstances than what the SMC seemingly could provide. Watching him cramped up on stage with less experienced performers was extremely disheartening at times. With a ten-minute time limit, which can seem like a long time, one can only do so much when sharing the stage. All in all, his lack of exposure during the conference was unfortunate, especially for great fans. However, apart from this maybe subjective disappointment, the SMC 2009 in Porto was a great and rewarding experience, and the SMC as a research field appears to be in good shape, making us all look forward with great anticipation to the next year’s conference in Barcelona.

