Contents

Welcome Note

Welcome to Innovation in Music 2015 (InMusic15), an international conference organised by KES International and hosted by Anglia Ruskin University, taking place on the 7th-9th June 2015.

Innovation in Music (InMusic'15) is a European music industry conference building on the success of 2013's conference. InMusic'15 brings together researchers and professionals alike interested in the future of the music industry from the artist through to the consumer.

InMusic'15 will continue to provide an outstanding opportunity for all those interested in the fast-moving changes taking place in the music industry to mix with experts in the field, exchange experiences and learn about the latest trends and innovative developments. Participants can also achieve a publication in the gold-standard online proceedings.

We thank Anglia Ruskin University for hosting the event, also the keynote speakers, reviewers, international programme committee members, authors, sponsors and delegates for their participation.

Robert J. Howlett
Rob Toulson
Conference chairs

Organisation

General Conference Chair

Dr. Rob Toulson
Anglia Ruskin University, UK

KES Executive Chair

Professor Robert J. Howlett
Bournemouth University & KES International

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London College of Music, University of West London, UK

Dr. Rob Toulson
Anglia Ruskin University, UK

Dr. Jay Hodgson
University of Western Ontario, Canada

Russ Hepworth-Sawyer
MOTTOsound & York St John University, UK

Dennis Collopy
University of Hertfordshire, UK

International Programme Committee

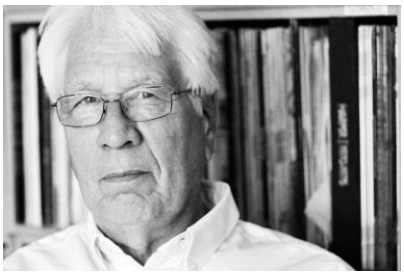
Name	Affiliation
Dr. Chris Barlow	Southampton Solent University, UK
Dr. Nicholas Brown	Anglia Ruskin University, UK
Mr. Dennis Collopy	University of Hertfordshire, UK
Prof. Andrew Dubber	Birmingham City University, UK
Dr. Paul Ferguson	Edinburgh Napier University, UK
Dr. Simon Hall	Birmingham City University, UK
Dr. Tom Hall	CoDE, Anglia Ruskin University, UK
Mr. Russ Hepworth-Sawyer	York St John University & MOTTOsound, UK
Dr. Richard Hoadley	Anglia Ruskin University, UK
Dr. Jay Hodgson	University of Western Ontario, Canada
Mr. Andrew J. Horsburgh	Southampton Solent University, UK
Prof. Bob Howlett	Bournemouth University, UK
Asst. Prof. Brett Leonard	University of Nebraska at Omaha, USA
Dr. Sebastian Lexer	University of West London, UK
Mr. Richard Lightman	University of Kent, Music Producers Guild, UK
Dr. Mariana Lopez	Cultures of the Digital Economy Research Institute (CoDE), Anglia Ruskin University, UK
Dr. Mark Marrington	York St John University, UK
Mr. Bryan Martin	McGill University & Centre For Interdisciplinary Research In Music Media And Technology, Canada
Mr. Justin Paterson	London College of Music, University West London, UK
Dr. Lorenzo Picinali	De Montfort University, UK
Dr. Josh Reiss	Queen Mary University, London, UK
Dr. Robert Sholl	University of West London & Royal Academy of Music, UK
Prof. Darren Sproston	University of Chester, UK
Dr. Nikos Stavropoulos	Leeds Beckett University, UK
Dr. Catherine Tackley	Open University, UK
Dr. Rob Toulson	Anglia Ruskin University, UK

Keynote and Invited Speakers

Peter Jenner

Industry Keynote

Jenner is legendary in the music business. One time manager to Pink Floyd, The Clash, Ian Dury & Billy Bragg amongst many others, he is now at the forefront of the debates surrounding the digital use of music. He was President Emeritus (IMMF), Director (UK MMF) and on the advisory board of FAC. He is also a visiting professor for the University of Hertfordshire and the University of Adger in Norway.



His overriding interest is in securing artists' rights and fair payment. In 2006, he courted controversy with his seminal paper and conference 'Beyond the Soundbytes' in which he proposed an 'Access to Music Charge' which would remunerate musicians appropriately for the use of their works, within a digital environment. Peter is involved with trying to develop a viable digital market in China and he continues to be one of the most sought after and respected speakers in media today. He was also a member of the organising committee of WIPO's 'International Music Registry' project and is currently a Visiting Professor at the University of Hertfordshire and also at the University of Adger in Norway.

Tim Exile

Creative Keynote

Biography: Tim is, by admission, a musician, inventor, composer, developer, producer, speaker, thinker, performer, improviser, Buddhist, lover of the moment, magician of the z-plane, erstwhile violinist, once dj, occasional hermit, still a child.

Abstract: Tim will provide both a talk and performance using modern approaches to music technology.

www.timexile.com

David Wrench

Producer, Recording and Mix Engineer

Production Keynote

Abstract: During this keynote address, David will give a candid Q&A about his pathway into music production, his approach to innovative projects and an insight to some of the varied projects he has worked on. David will also demonstrate mix session examples of his work.

Biography: David Wrench has become one of the most celebrated and sought-after mix engineers, not least because two of his 2014 projects were nominated for the Mercury Music Prize - those being two of the most contemporary albums of the year FKA Twigs' LP1 and Jungle's self-titled debut. David is a multi-talented Producer, Recording Engineer and Mix Engineer and an exceptionally well regarded musician and multi-instrumentalist. His credits for mixing and engineering include Bat For Lashes, Everything Everything, Caribou, Guillemots, Philip Selway and Glass Animals.

"Mix engineer David Wrench has the rare ability to bring discipline to experimental projects, without losing their leftfield qualities." (Sound on Sound, January 2015)

Martin Walsh

Vice President, Research & Development, DTS

Technical Industry Keynote - Innovation in Music Recording and Reproduction, Past Present and Future

Abstract: This presentation will highlight some of the most interesting innovations that have occurred in music recording and reproduction, from Edouard-Leon Scott's first recordings over 150 years ago to the present reality of digitally mastered, cloud-based and on-demand all-you-can-eat content. The presenter also delves beyond today's rapidly changing listening habits and into the worlds of listener interactivity, headphone mixing and the possibilities of music creation and consumption using upcoming technologies such as virtual and augmented reality.

Biography: Martin Walsh received a PhD in spatial audio from Trinity College Dublin in 1996. From there he joined Aureal Semiconductor in California, where he co-developed the first industry standard positional 3D audio gaming API know as A3D. Dr. Walsh also led the development of new positional audio rendering technologies in Creative Labs. In 2008 Dr. Walsh joined DTS where he now holds the position of Vice President for Research & Development. His duties to date include the development of all spatial audio associated with the DTS Headphone:X program.

www.dts.com

Special Sessions

Innovation Panel

InMusic '15 will feature an panel of keynotes and invited speakers discussing innovation chaired by Paul Crick, Music Industry Lead for IBM Europe

Biography: Paul is an experienced, commercially savvy management consultant with a passion for marketing, music and personal development. He says he also has a soft spot for all things Apple. Paul is currently the Music Industry Lead for IBM Global Business Services, Europe. Paul aids clients within the ecosystem of the global music industry cutting through the noise and helps them learn how to harness data-driven marketing tools & techniques ethically and effectively to drive revenue growth.

Paul is a keen musician and therapist aiding musicians in their performance careers and is also a board member or trustee for a number of musical related organisations nationally.

Focal Press Mixing and Mastering Panel Session

InMusic '15 will feature an panel of mixing and mastering engineers discussing current issues and trends

Chaired by Focal Press author and mastering engineer Russ Hepworth-Sawyer, and joined by Simon Gogerly (Grammy award winning mix engineer) Grammy award winning mastering engineers, Mandy Parnell and Bryan Martin, the panel will explore issues of delivery systems, innovation in the market place, online automated mastering and lots more.

Theremin Bollards Updated

InMusic'15 will host a special session as David Young, York St John University, updates delegates on the tremendous progress made by the Theremin Bollards project.

This includes an update on the technology and business around Theremin Bollards, including discussion of recent commissions for the Natural History Museum, Yorkshire Sculpture Park and the Science Museum.

Biography: David is an innovator, entrepreneur and part time music production lecturer at York St John University.

The iPod Generation — Can the Consumer Download Good Sound?

After a brief introduction to the psychoacoustic principles exploited by lossy audio compression formats, and the capabilities and limitations imposed by various encoders, Dr. Ian Corbett will display the common artifacts produced by various encoders as audio, RTA, and waveform graph examples. This is proof that what you're listening to is not the same as the engineer intended! Once you learn to identify these specific artifacts, you can't not notice them! After exploring these issues, the presentation will discuss the validity of those lossy codecs, and some current higher quality alternatives available to those who download their musical entertainment.

A 40 minute discussion exploring the artifacts that lossy encoding produces will include discussion on why lossy codecs were necessary, whether they are still necessary, and alternatives that are available.

Biography: Dr. Ian Corbett is the Coordinator of the Audio Engineering Program, and Professor of Music Technology and Audio Recording at Kansas City Kansas Community College. He also owns and operates "off-beat-open-hats - recording and sound reinforcement", specializing in servicing the needs of classical and jazz ensembles in the Kansas City area. Since 2004 he has been a member of the Audio Engineering Society's Education Committee, and has mentored, presented, and served on panels at local, regional, national, and international AES events. Ian authors articles on audio recording related subjects for Sound On Sound ("The Worlds Best Recording Technology Magazine"), and “Mic It!”, a book on mics, mic techniques, and their impact on the mix process was published by Focal Press in 2014. Ian holds a Doctor of Musical Arts degree in composition from the University of Missouri-Kansas City.

Fusing Semantic and Audio Technologies for Intelligent Audio Production and Consumption project (FAST)

A panel session to facilitate and stimulate discussion around the themes and issues arising from the Fusing Semantic and Audio Technologies for Intelligent Audio Production and Consumption project (FAST), a 5 year academic research project funded by the EPSRC, which aims to tackle the following questions:

“How can next generation web technologies (Ontologies, Linked Data and Metadata) combined with music content analysis (particularly derived at source) bring new value and functionality to producers, creators, consumers and intermediaries of music content? How will both ends of this value chain benefit from more engaging interactions (enhanced productivity, increased enjoyment and immersion) while creating or consuming music, and can intermediaries add value with semantically enhanced services? What can other areas of science and ICT learn from end-to-end digitisation and next generation technologies adapted in the music industry?”

FAST background: The advent of recording in the 19th Century made it possible to enjoy music at a time, and in a place, different from the performance. Compression, broadband and the ever increasing capacity to aggregate large collections mean that the issues confronting music consumers have totally changed in nature: equally so for professionals, such as broadcasters (playlists for radio, music for documentaries, etc.) and those at the creative heart of the process: musicians, sound engineers and producers. The recorded music industry has grappled unsuccessfully with digital technology and the rate of adoption of new technologies has been slow, ironically, mostly in fear of piracy and loss of revenue. Given the social and economic importance of music, it is vital that the industry's crisis is averted and its decline reversed. Simple semantics and metadata are already helping (for example in recommendation and sharing services) but this is just the beginning. The next generation semantic technologies that are the focus of the FAST project have the power to exact the turnaround that music (and other content industries) needs but this should be established via a fundamental and principled exploration of how semantic technologies underpin music throughout the value chain.

FAST Vision: The FAST project addresses 3 premises: (i) that Semantic Web technologies should be deployed throughout the content value chain from producer to consumer; (ii) that advanced signal processing should be employed in the content production phases to extract "pure" features of perceptual significance and represent these in standard vocabularies; (iii) that this combination of semantic technologies and content-derived metadata leads to advantages (and new products and services) at many points in the value chain, from recording studio to end-user (listener) devices and applications.

Panel Members include:
Matt White – Director of User Experience, Omnifone
Jon Eades – Project Manager, Abbey Road Studios
Gyorgy Fazekas – Lecturer and Researcher in Semantic Audio, Centre for Digital Music, Queen Mary University of London
Peter Tolmie – Senior Researcher, Ethnography and Human Computer Interaction, The Mixed Reality Lab, University of Nottingham
Gary Bromham – composer, recording / mix engineer, producer and lecturer, who has worked with Bjork, George Michael, Sheryl Crowe and U2 amongst many others

Panel chair: Adrian Hazzard, Research Associate, The Mixed Reality Lab, University of Nottingham

LOLA Network Demonstration

Many of us use networked audio in our facilities and DAWs are moving us nearer to cloud-based workflows. However, real-time collaboration between cities and countries still eludes us and we lack that sometimes vital eye contact. The LoLa (low-Latency) audio and video system shows us what is possible using high-speed National Research and Education Networks. Dr. Paul Ferguson from Edinburgh Napier University will provide an update on his current research projects using LoLa between Edinburgh, Prague, Italy and Chicago. Paul will show a performance of realtime audio and video between musicians playing together, but sited in both Edinburgh and Cambridge.

Timetable

Sunday 7th June 2015

4:00 – 5:00 pm	**Registration and coffee (room LAB027)**
5:00 - 5:20 pm	**Conference opening (Mumford Theatre)**
5:20 – 7:00 pm	**Tim Exile - Creative Keynote** **Tim Exile – Performance** **(Mumford Theatre)**
7:00 – 8:00 pm	**Wine reception (room LAB027)**

Monday 8th June 2015

<table>
<tr><td>8:30 am</td><td colspan="3">Registration opens</td></tr>
<tr><td>9:00 – 10:30 am</td><td colspan="3">David Wrench – Music Production Keynote and Interview (LAB002)</td></tr>
<tr><td>10:30 – 11:00 am</td><td colspan="3">Coffee break (LAB005)</td></tr>
<tr><td>11:00 am – 1:00 pm</td><td>Paper Session 1A (LAB002)</td><td>Paper Session 1B (LAB006)</td><td rowspan="4">Theremin Bollards Installation (Foyer at LAB005)</td></tr>
<tr><td>1:00 – 1:40 pm</td><td colspan="2">Lunch (LAB005)</td></tr>
<tr><td>1:40 – 3:20 pm</td><td>Paper Session 2A (LAB002)</td><td>Paper Session 2B (LAB006)</td></tr>
<tr><td>3:20 – 3:40 pm</td><td colspan="2">Coffee break (LAB005)</td></tr>
<tr><td>3:40 – 5:00 pm</td><td colspan="3">Martin Walsh – Music Technology Keynote (LAB002)</td></tr>
<tr><td>5:00 – 6:00 pm</td><td colspan="3">Mixing and Mastering Panel Session (LAB002) Mandy Parnell, Simon Gogerly, Bryan Martyn (LAB002)</td></tr>
<tr><td>6:00 – 7:30 pm</td><td colspan="3">Break</td></tr>
<tr><td>7:30 – 10:30 pm</td><td colspan="3">Conference dinner (Newnham College)</td></tr>
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Note: Conference paper presentations will last 15 minutes with an additional 5 minutes allocated for questions

Tuesday 9th June 2015

9:00 am	**Registration opens**	
9:20 – 11:00 am	**Paper Session 3A (LAB002)**	**Paper Session 3B (LAB006)**
11:00 – 11:20 am	**Coffee break (LAB005)**	
11:20 am – 12:00 pm	**Tutorial Session – Ian Corbett: The iPod Generation: can the consumer download good sound? (LAB002)**	
12:00 – 1:00 pm	**Panel Session - Fusing Semantic and Audio Technologies for Intelligent Audio Production and Consumption (FAST) (LAB002)**	
1:00 – 1:40 pm	**Lunch (LAB005)**	
1:40 – 2:00 pm	**LOLA Network Demonstration (LAB002)**	
2:00 – 3:00 pm	**Peter Jenner – Music Business Keynote (LAB002)**	
3:00 – 3:20 pm	**Coffee break (LAB005)**	
3:20 – 4:20 pm	**Chaired by Paul Crick (IBM) – Music Business Panel Discussion (LAB002)**	
4:20 – 4:40 pm	**Plenary and close (LAB002)**	

Note: Conference paper presentations will last 15 minutes with an additional 5 minutes allocated for questions.

Presentation Schedule

Session 1A - Monday 11:00 am – 1:00 pm Room LAB002

Timothy Cooper *Integrating the spatiality of live performers within the imaginary spatial image of a pre-recorded electroacoustic part in performance as a compositional premise*
Niels Adelman-larsen *New acoustic technology for indoor live music events*
Esthir Lemi, Reed Esslinger, Collin McRae *Loompianola: A Contemporary Hybrid Instrument*
Malachy Ronan, Robert Sazdov and Nicholas Ward *Exploring the sound quality dimensions of hypercompression*
Tim Canfer *A System of Reactive Backing for Live Popular Music*

Session 1B - Monday 11:00 am – 1:00 pm Room LAB006

Mathew Flynn *From Shifting Units to the Main-Stream: A reordering of the commercial and cultural value of the recording*
Kenneth Alewine *3 Pieces for Melancholia: Mood Performance and Visual Music*
Chang Seok Choi *Formless Form as Forma Efformans*
Josh Booth *POLY-16: Towards a Compositional Theory of Activation*
Matt Shelvock *Gestalt Mixing*

Session 2A - Monday 1:20 – 3:20 pm Room LAB002

Paul Rhys *Smart Interfaces for Granular Synthesis of Sound by Fractal Organisation*
Justin Paterson and Rob Toulson *Interactive Digital Music: enhancing listener engagement with commercial music*
Edward Averell and Don Knox *Interactive Algorithmic Composition*
Mark Marrington *Paradigms of music software interface design and musical creativity*

Session 3B - Monday 1:20 – 3:20 pm Room LAB002

Peter Self *What Price Music*
Carola Boehm *Triple Helix Partnerships for the Music Sector: MusicIndustry, Academia and the Public*
Johny Lamb and Philip Reeder *Still Every Year They Went*
Scott Hewitt and Adam Jansch *The Locative Album System – The Early Experiments*

Session 3A - Tuesday 9:20 – 11:00 am Room LAB002

Brecht De Man and Joshua Reiss *Crowd-sourced learning of music production practices through large-scale perceptual evaluation of mixes*
Jay Hodgson and Russ Hepworth-Sawyer *An Artist Roundtable On The Overlooked Art of Preproduction*
Bryan Martin *Mixing Popular Music in Three Dimensions*
Paul Ferguson *Realtime music collaboration using the Internet*

Session 3B - Tuesday 9:20 – 11:00 am Room LAB006

Darrell Mann, Marcelo Gimenes and Rodrigo Schramm *PanGenics: Objective Assessment Of The Chops, Feel & Creativity Capabilities Of A Musician*
Andrew Horsburgh *Spatial Mixing: Surrounding the Listener*
Vincent Nwilo *Contemporary African Tunes; rejuvenating world music*
Andrew Bourbon *Multi-Bus Diffusion System*

Paper Titles and Abstracts

Session 1A

Integrating the spatiality of live performers within the imaginary spatial image of a pre-recorded electroacoustic part in performance as a compositional premise
Timothy Cooper
This paper discusses compositional approaches to multi-channel space in a mixed-media electroacoustic music context, live presentation of mixed-media music and theories surrounding the above.

New acoustic technology for indoor live music events
Niels Adelman-larsen
Research shows that too much low frequency reverberation is the primary source for an unpleasant sonic experience as perceived by musicians as well as audiences at amplified music concerts. The author has researched which acoustics are suitable in halls for amplified music, from medium sized venues to the biggest arenas. These results show that it is essential to provide means for additional low frequency absorption in most venues. Typical temporary solutions involves installation of several layers of fabric material at various distances from reflecting surfaces. However, this method provides a relatively modest absorption coefficient in the important 63 and 125 Hz octave bands, while damping well the high frequencies, which are already absorbed substantially by the audience. A new mobile, patented technology of inflated, ultra thin plastic membranes seems to solve this challenge of low-frequency control and is suitable for halls and arenas that occasionally present amplified music and need to be treated for single events. The same technology, permanently installed, applies to multipurpose halls that need to adjust their acoustics, to accommodate various musical styles, at the push of a button. This paper presents the authors? research as well as the technology showing applications in differently sized venues, including before and after measurements of reverberation time versus frequency.

Loompianola: A Contemporary Hybrid Instrument
Esthir Lemi, Reed Esslinger, Collin McRae
"Loompianola" is an instrument emerging out of the combination of two distinct objects: a Cranbrook rug loom and a 100 year old Grinnell Brothers piano. The goal of this hand-made interactive collaboration between Esthir Lemi, Reed Esslinger and Collin McRae was to construct a haptic sound object utilizing the natural forms of percussion and strings endemic to both. The result was exhibited for 5 days at the Duderstadt Gallery at the University of Michigan. The installation's experimental performances resulted in further research of technology (jacquard punch cards, player piano scrolls, sensor technologies etc), the poetic connection of music and visual art, as well as each object's connection to regional history. The path of two significant Michigan industries, Grinnell Brothers Piano Company and Cranbrook looms, intertwined in unexpectedly fruitful ways. This paper is a short description of parallel worlds re-connecting the gaps of loss and finding ways to reconstruct a vision of a possible future.

Exploring the sound quality dimensions of hyper-compression

Malachy Ronan, Robert Sazdov and Nicholas Ward

'STUDENT PAPER'. This study explores the sound quality attributes and dimensions of hyper-compression. Four expert listeners took part in an elicitation experiment drawing on descriptive analysis methods for data elicitation and content analysis for data analysis. Participants were presented with unprocessed and hyper-compressed stimuli in an A-B comparison test and required to record any differences perceived. Axial coding of this text data resulted in a total of forty-three sound quality attributes. These attributes were abducted into four established sound quality dimensions: (1) Clearness/distinctness, (2) Feeling of space, (3) Fullness vs thinness and (4) Brightness vs darkness. New dimensions comprised: (1) Energy and (2) Instrument level change while ?no difference? was also perceived. This study represents a first step towards uncovering the sound quality attributes and representative sound quality dimensions associated with hyper-compression.

A System of Reactive Backing for Live Popular Music

Tim Canfer

This paper presents a new type of system of Reactive Backing for live popular music, specifically for a Singer/Songwriter. A set of devices is presented to adjust the tempo, dynamics and transport of a sequencer (Ableton Live) so that both syncing to a click track is unnecessary and that the separate instruments of the backing track react in real time in the manner of live musicians.

Foot tapping as the main driving function for the tempo device is used here. This approach is discussed, and future testing and development of an audio driven device to test against is examined.

A demonstration of the current system is proposed in the form of a solo singer songwriter, using a guitar, microphone and laptop to play music demonstrating the system’s capabilities

Session 1B

From Shifting Units to the Main-Stream: A reordering of the commercial and cultural value of the recording

Mathew Flynn

Spotify has endured scrutiny and criticism from artists and industry commentators as to the fairness, viability and sustainability of its economic and royalty distribution model. The model circumvents conventional unit capitalism, employing a pari-mutual system of royalty distribution that economically values each artist by comparing their total plays to that of all the other artists on the platform. Meaning, as a proportional share of the platforms total monthly subscription and advertising revenue, the royalty distribution value of 100,000 plays for one act is relative to the total number of plays on the platform. The 'Longtail' business model that drives Spotify's pari-mutual approach is at odds with the 'winner takes all' unit model that has been the mainstay of the record business since its inception. Whilst affording record companies an unprecedented opportunity to perpetually monetise their entire catalogues, at the same time, music steaming services offer the labels superstar artists far less in immediate royalty returns than the old unit model. The innovation of the pari-mutual system favours labels, but disadvantages their current superstar artists. The new approach could be conceived of as a 'winner takes less' business model. Despite the very public concerns of artists and their labels, music users are increasingly adopting free and subscription based streaming as a way of listening to music. Industry practitioners and commentators broadly agree that streaming is the future of digital music consumption, what is contested is the business model it should operate on. This paper explores the tensions caused by the inherent contradictions for record labels and streaming services in the pari-mutual royalty system as the record industry business model shifts from selling units to selling use

3 Pieces for Melancholia: Mood Performance and Visual Music

Kenneth Alewine

The long history of melancholia and the depressions has always connected the philosophy of mind to the unseen and the very small, from mysterious dark fluids coursing through the body to electrical energies pulsing along the nerves. The prescribed remedies for melancholia and depression, discovered long ago in psychoactive herbs and recently among the neurotransmitters, also have a recurring synergy with music. The philosopher-poet Novalis once wrote, "Every disease is a musical problem; every cure is a musical solution." Musical configurations related to melancholia and its cures abound in the history of medicine. Thus the objective of this presentation is to suggest that musical data related to mental illness can be realized in therapeutic ways using electronic music accompanied by video microscopies, thus bridging the gaps between medicine and music technology. My ongoing research project, Digital Melancholia, examines these gaps using three modes of musical expression that process the historical representations of melancholia as electro-acoustic phenomena. These three types are: generative music (automata), granular synthesis (temporal), and acousmatic voice recordings (spatial).

Formless Form as Forma Efformans

Chang Seok Choi

‘Formless Form’ is the concept of a form in a micro level which converts to a different form in a macro level, not only transforming itself constantly according to its surroundings, but also influencing them.

POLY-16: Towards a Compositional Theory of Activation

Josh Booth

The abstract proposes a paper that will describe a multimedia sound/video compositional system that minimally constrains input data or material (e.g. pitches, rhythmic values, colors, shapes, etc.), while automating the temporalization of this material to create musical/visual output or content (e.g. sound patterns, animation, etc.).

Gestalt Mixing

Matt Shelvock

This paper uses Gestalt theory as a ecological perceptual model to discuss the practice of contemporary mixing. While Gestalt design principles have been naturalized into the study of other design based arts including music theory, visual arts, GUI design, and sound design for non-musical applications such as operating systems, I offer that Gestalt theorization is equally applicable to the discussion of mixing practice. The Gestalt principles of totality and of psychophysical isomorphism in particular characterize the perceptual impact of an album as a perceptual whole. That is to say, the psychophysiological impact of an album is the result of a system of dynamic sound relationships. In recording practice, mixing provides the dominant method for structuring these dynamic sound relationships. Gestalt perception centers around the concept of prägnanz, or the tendency of the mind to organize objects into simple and meaningful constructions. The law of prägnanz accounts for the variety of ways Gestalt perception is formed within an individual, and its accordant sub-laws of proximity, similarity, closure, symmetry, common fate, and continuity are particularly instructive as design principles within the sound ecology of a mix. This paper will explain how prägnanz functions within a mix composite with specific reference to prominent mixing techniques.

Session 2A

Smart Interfaces for Granular Synthesis of Sound by Fractal Organisation

Paul Rhys

This paper presents software for granular synthesis of sound, which features a graphical interface that enables easy creation and modification of sound clouds by deterministic fractal organisation. Output sound clouds exist in multidimensional parameter-time space, and are constructed as a micropolyphony of statements of a single input melody or note-group. The approach described here is a powerful alternative to statistical methods, creating sounds with greater vitality and interest over a range of time scales. The interface constitutes a powerful tool for intuitive control and reorganisation of large amounts of data.

Interactive Digital Music: enhancing listener engagement with commercial music

Justin Paterson and Rob Toulson

Historically, interactivity with recorded commercial music could take a number of forms. Listeners have long been inspired to interact with music and create new representations of popular releases. Vinyl offered many opportunities to reappropriate chart music, from scratching and tempo manipulation to mixing multiple songs together. More recently, artists could engage their audience to interact with their music by offering mix-stems online for experimentation and sharing. With the extended processing power of mobile devices, the opportunities for interactive music are dramatically increasing. Embedding music in a bespoke app allows the listener to manipulate musical or technical aspects of the playback, and algorithmic playback systems enable a song to be subtly (or substantially) different on each listen.

This paper presents research that demonstrates a novel approach to interactive digital music, as funded by the UK Arts and Humanities Research Council. The research looks at the emergent format of the album app - as explored by artists such as Bjork, Peter Gabriel and Francois and the Atlas Mountains - and extends the existing paradigms of interactive music playback. The novel album app designed in this research presents a new opportunity for listeners to engage with recorded content by allowing them to explore alternative takes, renditions of a given song in multiple genres, and by allowing direct interaction with embedded mix-stems. Throughout the real-time interaction, the resultant audio remains true to the artist and producer's studio vision; it is user-influenced, but machine-controlled. Further, the app is used to collect first-hand quantitative data of how the audience responds to the interactivity and the greater album app format itself, allowing the artist to tailor and refine their subsequent outputs in response. The project is conducted in collaboration with artist Daisy and The Dark.

Interactive Algorithmic Composition

Edward Averell and Don Knox

The paper documents the creation of a software tool which uses knowledge gathered from the field of music cognition to create an algorithmic composition system. The compositional algorithm follows models of melodic expectation to react and adapt to musical input, creating melodic accompaniment in real-time.

Paradigms of music software interface design and musical creativity

Mark Marrington

Building on previous studies I have undertaken in the educational context, my presentation will offer observations arising from my ongoing research into attitudes and approaches towards music creation engendered by digital tools. The primary focus is on evaluating paradigms of software interface design (with a particular focus on the Digital Audio Workstation and attendant third party plugins), ranging from the 'virtual environment' scenario in which hardware tools are painstakingly modeled to imitate the real world of studio production, to interfaces which are rather more abstract in their visual structures, often encouraging the musician to think in terms low level computer process. The user's capacity to negotiate the constraints of the tool and assimilate its particular language is of importance in either case, whether engaging with visual metaphors for familiar technologies in terms of their real-world practical application or learning system-specific languages which constitute the building blocks of musical processes that are highly determined. The question concerning the extent of the software interface's propensity to shape aspects of musical detail, structure and style is at the heart of this discussion and is considered with reference to established theories of creativity (especially Csikszentmihalyi's 'systems' theory). It is intended that this paper will be delivered in a form of presentation and re-worked as a full article for the conference proceedings.

Session 3B

What Price Music
Peter Self
A presentation introducing a Canterbury Christ Church University five year research project looking into the issues surrounding the valuing and accessing of recorded music using an ethnological/narrative approach.

Triple Helix Partnerships for the Music Sector: MusicIndustry, Academia and the Public
Carola Boehm
This paper represents an exploration of a partnership model - the triple helix - that is specifically designed to drive innovation. Applying this to the music sector, it will provide case studies relevant for innovations in music technology.

Still Every Year They Went
Johny Lamb and Philip Reeder
An abstract for a collaborative paper about the project 'Still Every Year They Went' by Dr Johny Lamb and Dr Philip Reeder.

The Locative Album System – The Early Experiments
Scott Hewitt and Adam Jansch
The Locative Album System - The Early Experiments the ongoing adventures of presenting music for private listening on your location aware device in the context of chosen locations.

Session 3A

Crowd-sourced learning of music production practices through large-scale perceptual evaluation of mixes

Brecht De Man and Joshua Reiss

Mixing music is a highly complex and important part of the music production process, with a variety of creative and technical challenges, few of which have established solutions. Consequently, several approaches are viable for each given recording, and evaluation of differences in music production practices is therefore highly subjective. However, the study of perception of music production processes reveals that there is some degree of consensus on which mixes or specific parameter settings are preferred over others.

In this work, we consider a dataset consisting of a number of songs, each mixed by at least eight different mixing engineers, with extensive perceptual evaluation in the form of both rating values and free-form comments. In contrast with most previous work in the area, the music production data we collected provides insight into realistic mixes as opposed to considering a specific process in isolation, which disregards the cross-adaptive nature of the mixing process. Furthermore, detailed perceptual evaluation of each mix allows to distinguish if the complete song or specific components thereof received a treatment that was perceived as positive or negative. Finally, having access to the original, raw audio as well as the exact parameter settings used on each processor, thorough analysis of the mix in conjunction with the rich subjective assessment is possible.

We propose a methodology to derive the bounds of what are considered ‘preferred’ or ‘acceptable’ ranges of values of processing parameters and mix properties, from subjective evaluation of different mixes of identical and/or different songs. As such, we systematically learn from mixes of arbitrary quality to zone in on production practices that are perceived as good, obviating the need for exemplary productions to study the mixing process. On the contrary, a limited spread of parameter settings and mix features would impede a sufficiently accurate estimation of the lower and upper bounds of acceptable parameter ranges. As we learn how the bounds of these processing parameters or extracted audio features vary between different songs or genres, we identify zones wherein these values should lie in a majority of productions according to general perception. A proof of concept of an intelligent metering system for music processing informed by such perceptual evaluation of mixes is presented, and directions for future research and applications in music technology are outlined.

An Artist Roundtable On The Overlooked Art of Preproduction

Jay Hodgson and Russ Hepworth-Sawyer

Preproduction is the most mysterious procedure in record production. It is an intrinsically amorphous procedure which follows only the most abstract of imperatives: prepare a track, or tracks, for production. But what it means to "prepare a track for production" varies greatly from genre to genre, producer to producer, and artist to artist (even from track to track). Preproduction in laptop genres, for instance, might look like basic tracking to a rock producer, while some forms of classical preproduction look more like simple “studio prep” from the multitrack pop producer’s point-of-view. Recordists can be such talented songwriters that little, if any, input from producers is required to prepare their songs for recording, while other artists will need their producers to make compositional sense out of their songwriting sketches. Meanwhile, producer-composers like Brian Eno will often combine preproduction and tracking into a single process, making the possibility of establishing a definitive distinction between the two procedures a matter for academics to debate.

Preproduction may be a mysterious process, but it is certainly knowable. As Mick Glossop (Van Morrison, Frank Zappa) told us, though “every band and project is different, the principles [of preproduction] can be the same.” Indeed, though it is highly individuated, and though it must remain flexible enough to adapt to meet the needs of each individual band, their specific songs, and the particular gear complement (and budget!) they have to work with, broad patterns recur constantly in preproduction. To concretize these overlapping patterns — and, thus, to begin the process of demystifying preproduction as a musical technique — we asked a number of highly successful producers to explain their understandings of, and experiences with, the preproduction process. We then organized their comments into a virtual “round table,” as it were. We then assembled their comments into a short summary film, which we intend to screen after some brief contextualizing commentary. In sum, this round table includes commentary from, among others: Sir George Martin, Bob Ezrin, Mick Glossop, Jack Richardson, and Alastair Sims. The “round table” we organized elucidates a structure for preproduction, with some very well-defined features. It is our ultimate goal, at this early stage in our research into preproduction’s musical ramifications, to simply mark that structure as it emerged in the comments of our round table panelists.

Mixing Popular Music in Three Dimensions

Bryan Martin

3D sound is being implemented in cinema, automobiles, codecs, and in new domestic listening specifications, but there is little investigation into the tools and methods needed to create music mixes in three dimensions. This paper discusses evolving methodologies, strategies, and 3D mix architectures being developed for 22.2 multi-channel surround sound systems by McGill University’s Sound Recording Program. The scalability of these techniques between 22.2 multi-channel systems and smaller loudspeaker configurations will also be discussed.

Realtime music collaboration using the Internet

Paul Ferguson

Three years of research with the LoLa (Low Latency) audio and video system in Europe and America shows us that real-time performance across Europe (and further) is unquestionably possible. The question that now arises is ‘how do we make the collaboration result worthwhile?’ For example, how do factors such as audio latency and the visual representation of the remote artist affect the performers and therefore the quality of their musical performance?

Session 3B

PanGenics: Objective Assessment Of The Chops, Feel & Creativity Capabilities Of A Musician

Darrell Mann, Marcelo Gimenes and Rodrigo Schramm

Arguments over the relative merits of one musician over another have long been the subject of many a heated debate amongst music fans. Much of the heat comes from the highly subjective nature of the subject. The paper reports the results of a comprehensive programme of research to bring a critical mass of objectivity to the discussion. Not so much to help settle arguments, but more as a means of assessing the capabilities of a musician with a view to then working with them to design an education curriculum that will enable them to improve their capabilities. The basis of the objective capability measurement capability has first of all segmented the measurement into the three orthogonal axes that we believe distinguish the core elements of capability: firstly the technical ability ('chops') that a musician possesses; secondly the emotional expression ('feel') with which they're able to bring to a piece of music; and thirdly the creativity that they are able to bring to the manner in which they communicate and convey their intentions to a listening audience. Having determined these three axes, the next measurement challenge becomes defining means of objectively measuring each of them. Given the desire to be able to make these measurements as automatically and autonomously as possible, we began the process by looking to extract the appropriate measurement information from audio files, and analysing the contents using Artificial Neural Networks and Genetic Algorithms. The paper describes how the latter were 'trained' using the results of a survey of well-known musicians by a broad-ranging spectrum of other musicians, music reviewers and music fans. It also describes how the initial audio-file analysis was later complemented through a narrative-based analysis of lyrical content and emotional context of given pieces of music and different versions thereof. The paper presents three-dimensional capability plots of different well-known musicians, grouped against different instruments – guitar, bass, keyboards, drums, vocals – to present what we believe to be, for the first time anywhere, an objective comparison of one popular musician against another. Is Jimi Hendrix a 'better' guitarist than, say, Eric Clapton or Joe Satriani? We answer that question and many others, before ending the paper with a description of how we plan to make a 'Best Musician' capability assessment tool available for amateur musicians and music teachers to upload examples of their playing in order to rank themselves against the chops, feel and creativity dimensions; to define where they would like to take their capability level in the future, and to then receive personalised education advice as to how they might best embark on the capability-building journey.

Spatial Mixing: Surrounding the Listener

Andrew Horsburgh

The objective of this paper is to provide a detailed explanation into the philosophies and technical abilities currently available to sound engineers wishing to move beyond stereophony. It is the author's view that moving beyond 2,0 is not simply achieved by adding channels but requires careful engineering to achieve the maximal spatial quality using the given material. In this paper a description behind the thinking, critical assessment of the production approach, and reproduction considerations are given and demonstrated with audio examples.

Contemporary African Tunes; rejuvenating world music

Vincent Nwilo

The African continent is beaming daily. With the availability of YouTube and the almost friendly mobile telecommunication systems, young people across Africa are accessing music production training online and they are creating exceptional dance tunes that the world is listening to. The days of purposeless wars and dis-community due to constant disbelieve in the African-ness and acceptability of the African brand is gradually fading. The hate system dissolves gradually once any of the contemporary African beats come on the radio. And employment is fundamental too but is the contemporary afro-beat the uniting factor for Africa? What does it owe the world music scene?

Using practical examples of acts like Wizkid, Don Jazzy and Sarz who left the streets, abandoned degrees and prestigious white collar jobs to chase music, this paper is aiming at reviewing the new technical tool for rejuvenating of world music, accepting the African contribution, not just the stealing of sound from local xylophones in a coastal town of Ikot Epkene in the South-South of Nigeria but electronic beats that have changed what afro-beat means and has coloured the future of the African youths as entrepreneurs.

Multi-Bus Diffusion System

Andrew Bourbon

This abstract proposes to explore the integration of a contemporary multi bus mixing system in multichannel performance, fusing contemporary record production with diffusion practice.

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