

INNOVATION IN MUSIC 2022



CONFERENCE PROGRAMME

Innovation in Music 2022

17-19 June



Gold Sponsor

Innovation in Music 2022

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FRIDAY 2022-06-17

*Welcome to Innovation in music
2022! - 15:30 1C103 - Lilla salen*

Conference Committee: Anna Maria Koziomtzis, Bo Westman, Per-Henrik Holgersson, Russ Hepworth-Sawyer, Justin Paterson, Rob Toulson & J-O Gullö

**Keynote 1: Armen Shaomian -
15:45 - 1C103 - Lilla salen**



We are very pleased to present this year's first keynote speaker, Armen Shaomian from University of South Carolina, USA. He grew up in Vaxholm, close to Stockholm, and is a former student at KMH. Armen Shaomian has extensive background in performing arts, higher education, and project management consulting. He is an active concert pianist specializing in contemporary classical music. He has premiered several works of notable composers and performed numerous concerts at venues in Europe and the United States. Other entertainment work includes several voice-overs for Disney and Warner Bros. feature animations. Armen Shaomian currently serves as the president of the Music and Entertainment Industry Educators Association (MEIEA).

Armen Shaomian will present experiences from how the American music industry has been affected and coped with the pandemic era and what characterizes the restart of music activities that have been down.

**Panel 1: Entrepreneurship,
Copyright, & Innovation in
Music: Linda Portnoff,
Christian Råsmark, Thomas
Arctaedijs & Örjan Strandberg
15:30 - 1C103 - Lilla salen**

Chair: J-O Gullö

Linda Portnoff, CEO and founder of *Tangy Markets*. She is also a board member of KMH's board and has previously been head of Music Sweden, an organization for the Swedish music industry. In her research, Linda Portnoff has focused on music-related areas related to entrepreneurship and copyright.

Christian Råsmark is the Chief Product Officer at Session Studio, the app that enables music creators to co-write songs and ensure that all the correct credit information is attached from song idea through to release. Session was founded by Björn Ulvaeus, Max Martin and Niclas Molinder to ensure that every music creator gets the fair credits and rewards they deserve.

Thomas Arctaedijs is a professor of entrepreneurship at KMH. He is also an entrepreneur with a solid background in developing sustainable IT companies. Thomas Arctaedijs is also very active in SSES - Stockholm School of Entrepreneurship, which is a collaboration between universities in Stockholm with the purpose is to develop conditions for sustainable entrepreneurship and development.

Örjan Strandberg is musician and creator who has worked in the music industry throughout his adult life. He has been a board member of most collecting societies and other interest organizations in Sweden with a relevance to the music industry and to media production, including Swedish Sound Engineers Society – SSES. He is skilled in music licensing, sound, music business consulting, composition and music production and likes to debate issues related to copyright and innovation in music.

Seminar with online presenters 17:30 - Lilla salen

Chair: J-O Gullö

Paul Novotny: How to Put Together a Premium DIY Dolby Atmos 'Tiny Studio' on a Budget

On May 17, 2021, Apple Music announced that it will bring Spatial Audio with Dolby Atmos and Lossless Audio to its entire catalogue at no additional cost to consumers. In addition, Apple will reportedly be bringing Spatial Audio and “immersive music-authoring tools” to its digital audio workstation (DAW) Logic-Pro in late 2021, giving do-it-yourself (DIY) music producers the software tools needed to publish music in these new formats.

The primary challenge for music makers worldwide is to effectively and cost-effectively implement the necessary associated infrastructure that supports “spatial” and “lossless” mix and master for delivery to aggregates. The aspects for consideration are: architectural constraints, mechanical and audio engineering solutions, hardware/software choices, economic implications, immersive audio aesthetics, and production-delivery perspectives. Myriad choices must be carefully weighed, then curated to solve small-room challenges efficiently while providing a professional level of redundancy and long-term repair-ability—all combining to create a control room environment that encourages smooth, unimpeded workflow, on a lower budget.

The term “tiny studio” comes from the globally popular “tiny home” concept—a form of architecture inspired by the huts and tents built by indigenous peoples such as the Sioux, Inuit, and Samoans, made all the more necessary in the present pandemic era, prompting people around the world to work in a relatively small, home space. This author’s home-based “tiny studio” (control room) is just 8’ x 13’ or approximately 105 square feet. So far, the limitations of this space have created challenges and opportunities bringing about unexpected and exciting solutions to form a premium 3D digital/analog hybrid mix/master installation.

This Atmos installation expands an existing and professionally functioning 5.1 “tiny studio,” with completion scheduled for October 2021. At this time the hypothesis speculates that expansion will work, while the intention of this case study is to stimulate discussion about the ability of music producers of all stripes to create a vital, viable, and budget-sensitive immersive 3D audio “tiny studio” control room environment.

Discussion includes contextual, theoretical, and methodical details about room size, baffling, cabling and connectivity, speaker selection and ceiling mounting, hardware/software selection, room alignment, headphones, binaural monitoring, and workflow. The DIY music maker—student, pro-amateur, and professional—are encouraged to work towards creating their own Dolby Atmos “tiny studio” with a better understanding of the inherent challenges and possible solutions. To date this project benefits from generous advisement of Warren Beck and Dave Dysart; YSL Pro Audio-Toronto; Adrian Novotny, Mechanical Engineer; Paul Barton, Chief Designer PSB/Lenbrook Group of Companies; and Rich Walborn, Chief Technical Officer, Audio Design Labs (ADL); and Blue Sky Professional Audio Monitoring Systems. This professional advisory panel is expanding as the project evolves.

Link to video: https://youtu.be/TKnW_9B--k

Anders Lind: Music for the mobile phone orchestra, string orchestra and analog synthesizers: An evaluation of a concert hall performance including 15-year-old non musicians as performers

This presentation focuses on a Mobile Phone Orchestra (MPO) performance platform, developed for non-musician participation, and to facilitate a diverse and rewarding artistic expression. In particular, a performance of Voltage Controlled String Orchestra, composed for MPO (15-year-old non musicians), String Orchestra and Soloist (Analog Synthesizer) will be discussed. Mobilephoneorchestra.com is a Web Audio API, developed to enable large-scale concert hall performances of fixed polyphonic contemporary art music. It is a kind of philharmonic orchestra for electronic sounds that embraces non musicians as performers and uses smart phones as instruments.

The platform contains audio trigger instruments, developed for the smart phone interface. Moreover, dedicated animated music notation in multiple individual parts, for both performance instructions and to conduct a MPO performance is included. This presentation will show the artistic possibilities and limitations with the MPO platform, from a composer perspective. Furthermore, an evaluation based on the experiences of the participating MPO performers at the Voltage Controlled String Orchestra performance, will be presented. [Voltage Controlled String Orchestra recording of live performance (Spotifylink):https://open.spotify.com/album/6c3baC67yHdn3kEULXIwFq?si=RaPynqE5QeO61SMmytzcw&dl_branch=1 Video-ink Mobile Phone Orchestra: https://youtu.be/Zfc_2eYDFmk].

Link to video: https://youtu.be/SUe_jyGrGZ8

Pedro Miguel Ferreira: Road(ies) To Nowhere? A Portuguese live music perspective

Concerning the topic - Music production: past, present and future – I was immediately transported to my investigation, which is about the (in)visibility of the backstage. And that concerns live music production in Portugal: past, present and future. How about – in a near future – we can all compare notes, and build an international dossier about sociological perspectives behind the scenes?

What is (or was) like to be a roadie, a sound or light technician at the present, in the future or even in the past? That reminds me the lyrics of Road to Nowhere, by Talking Heads, when they say: «Well, we know where we're goin' / But we don't know where we've been / And we know what we're knowin' / But we can't say what we've seen».

In Portugal, after a right-wing dictatorship (1933 – 1974), a greater openness in society and some social stability had contributed to the growth of leisure. Social improvement of the Portuguese democracy; some social stability; leisure and hedonistic time became bigger and better. A phenomenon called “boom do rock português” (Portuguese rock’s big bang) in 1980 was a result of an urban audience that has arrived, consequential from the growth in the supply and demand for free time. However, the music industry wanted to grow, but Portugal, as a country with a new democracy, didn’t have infrastructures, specialized staff or a sustainable cultural policy.

In the 90’s, the technology expanded even more, the recording industry had prospered, summer festivals and stadium concerts definitely emerged and it was necessary to hire (and train) more technicians. If in the 80’s there was a big bang with Portuguese (main rock) bands, in the 90’s there was a big bang Portuguese tech.

Concerning the support technicians, some were already essential services, like sound technicians and stage assemblers (stage hands, loaders, riggers, forklift conductors). With the evolution of the sector, band roadies and light technicians became also important (they weren’t in Portugal back in the 80’s). In order to understand how and when the technical aspect in the musical world (Krueger, 2020) became vital, it’s fundamental to understand the origin (Becker, 2011), evolution (Taylor, 2021) successive sociological (Hebdige, 2018) and historical (Byrne, 2013) transformations in the field of art.

In the light of the tertiarization of the cultural sector, mapping the backstage as an area with its own areas and functions, but which are related in a network. The main expected conclusions are to understand what these workers do, what they represent and how they position themselves hierarchically.

It’s my conviction that the human touch will always be part of the live music, and the online will

be only a tool, not the substitute of the roadies, sound and light technicians or stagehands. Could I be wrong? Let’s talk about that and use popular music one more time with the Talking Heads: «Would you like to come along? / You could help me sing this song / And it's all right, baby it's all right».

Link to video: <https://youtu.be/6AjZW09x65c>

Eirik Askerøi: Sonic Markers in Popular Music: Innovation - Trend - Tradition

Throughout recording history, the use of different technologies and instruments has left lasting impressions on recordings, suggesting an almost intrinsic relationship between sound and period. With an increasing momentum from the early 2000s and onwards, producers, engineers and mixers, especially within the realm of popular music, have taken compositional advantage of this relationship, constructing what I label sonic markers: Musical codes that have been historically grounded through a specific context, and that, through their appropriation, serve a range of narrative purposes in recorded music. In the proposed paper I will explore this concept as a careful navigation between the two following positions: 1. Sonic markers as narrative strategies—how sonic markers can be used as a means of constructing musical identities in pop production. 2. Sonic markers as constructions—how sonic markers themselves are constructed through different narrative strategies.

Presented against a backdrop of various musical examples, I will argue that sonic markers constitute an inroad for interpreting the expressive dimensions of musical sound in recorded music for practitioners as well as academics. Exploring the potential effects of musical codes in recorded music requires close readings of musical texts against a contextual backdrop of journalistic and scholarly writings (articles, interviews, blogs, books), biographies, documentaries, semi-biographical movies (biopics), music videos and social media. The overall aim of this paper, then, is to demonstrate how sonic markers operate within different discursive formations and supply “sonic evidence” for identity formations in popular music.

Link: <https://www.inmusicconference.com/>

Ola Buan Øien: The Dialogue of Mr. Question Mark and Sylvia Massy: Challenging norms at the intersection of crafts and creativity in music recording contexts

This single case study investigates music recording techniques in light of producer, engineer, mixer and author Sylvia Massy’s practice. Massy is an American award-winning and meritorious music

producer known for creative and unconventional experimental approaches and production techniques. Data generation is performed mainly through transcripts and reflection logs based on five YouTube videos by exploring the following research question: "Dear Sylvia: How do you facilitate the concept of adventurous recording techniques?" The materials are analyzed based on arts-based meaning interpretation and the study's findings are disseminated exclusively in the form of dialogue between the research subject Massy and Mr. Question Mark. In this way, the methodological approach is operationalized through a backwards interview where the questions are created in meeting the data material. The aim of the study is to develop understandings about music recording by exploring techniques that fall outside the norm through dialogue between the author's avatar (Mr. Question Mark) and Massy.

Music recording techniques that are examined through this study's dialogue include concepts such as: (1) "fearless recording", "from the rule book of recording to really stretching out", "out of restricted thinking", and "adventure recording" (these principles highlights that there are no rules or norms for what can be done associated with recording and that there are no limits in terms of potential scopes for producers), and (2) "build a telephone mic", "the garden hose", and "use the potato as an audio filter", to name a few (these examples of concrete technological experiments and innovations may challenge established understandings of the recording producer). Massy thus acts as an initiating creative impulse who further offers fruitful perspectives and tips for sonic exploration and development of insights about music recording techniques both in a creative and craft perspective.

In this way, this study helps to offer understandings about music recording techniques through the philosophical reflections that follow from the dialogue between Mr. Question Mark and Silvia Massy.

Link to video: https://youtu.be/YNadTNL_7oM

produced the music to be played in Dolby Atmos. Henry Mikkonen's Composition Case Study No. 3 is included in the project: *Lost in Space: Three Case Studies in Music Production Using Immersive Audio*. Martin Åberg's composition *Metaphor - S: A: M: Suite* is part of the project: *Spatial sound sculpture: Music production and creative mixing in Dolby Atmos*.

Seminar with online presenters 09:00 - Lilla salen

Chair: J-O Gullö

Yuxiang Cai, Rui Liu and Xuefeng Zhou: An investigation of piano timbre preference based on employing equalizer to adjust the harmonic loudness

In order to improve piano timbre by controlling inconsistent harmonic loudness, many piano manufacturers selected hammering positions at the string length of 1/7, 1/8, 1/9, etc. in the pitch of mid-low range of the piano according to Young's Law. This kind of approach – such as hammering positions at the cord length of 1/8 – control the 7th and 9th discord harmonics while lose the loudness of the 8th concord harmonic. However, the contemporary recording techniques (equalizers) of timbre adjustment can be well used without sacrificing harmonic loudness (J. Rämö & V. Välimäki, 2014). Under this circumstance, can ordinary listeners – they getting used to listening to natural piano timbre – perceive the change in timbre processed by the equalizers?

This study aims to explore the effect which the general audience perceive the sound of weakening the loudness of the 7th and 9th harmonics while enhancing the loudness of the 8th harmonics.

A survey investigated 98 people was carried out after sample work (processing audio materials). The audio material is selected in the sound zone where the hammering position is 1/8 of the string length, and the equalizer is used to adjust the harmonic intensity of a specific number of individual pitches in the audio material. Respondents of the survey chose from five different audios according to their preferences that use the equalizer to adjust the 7th, 9th and 8th harmonics of the short and long tones in the audio material – a melody written for this purpose. The survey devised the melody of "non-processing" natural sound as the baseline. Besides, there are two adjustment schemes - scheme 1 is to enhance the 8th harmonic by 15db while the 7th and 9th harmonics are reduced by 15db; Scheme 2 is processed in the opposite way. Then audio A

SATURDAY 2022-06-18

**Welcome with music: Henry
Mikkonen & Martin Åberg
08:45 - Lilla salen**

Welcome to music composed and produced by Henry Mikkonen & Martin Åberg, KMH. Both have

(scheme 1 for both short and long tones), B (no processing), C (scheme 1 for short tones, scheme 2 for long tones), D (scheme 2 for short tones, and long tones adopt scheme 1) and E (short tones and long tones both adopt scheme 2) were exposed to interviewees. The interviewees choose their preferences one after listening.

The investigation confirmed that the listener's preference for piano timbre would increase when the use of equalizers to weaken the loudness of the 7th and 9th harmonics while increase the loudness of the 8th harmonics in the bass range of the piano. This result can be extended to recording engineering and AI music production.

Link to video: <https://youtu.be/o2wq8apVUOM>

Martin Koszolkó: Connecting across borders: communication tools, group structures and practices of remote music collaborators

The remote music collaboration software (RMCS) offers a democratic working environment where amateurs and professionals can connect, collaborate, communicate, and learn from each other. The global Covid-19 pandemic in 2020 has also highlighted that RMCS offer a safe way of working for music makers when faced with travel restrictions.

Innovations within RMCS led to the creation and continuous expansion of various platforms that offer collaborative solutions for music making within thriving and ever-growing online communities. RMCS platforms cater to multiple approaches to cloud-based music creation. They are also valuable learning environments. The use of RMCS in formal school settings has exploded during the current global pandemic, but even long before Covid-19, these online platforms provided an excellent opportunity to learn the craft of music making and technical aspects of software from various communities of practice.

The innovative design and disruptive potential of RMCS are evidenced in the availability of new forms of crowdsourcing of musical talent and access to advanced music production technologies utilising the cloud. Access is often provided on a free or freemium basis, which leads to a further increase in user engagement resulting in millions of musicians using a broad range of collaborative software solutions.

Based on my decade long, practice-led research in this field, I examine how various communication technologies in RMCS facilitate connections between collaborating musicians. I reflect on the behaviour and structure of RMCS groups and analyse the engagement of my collaborators in crowdsourced projects. I analyse the phases and types of communication as well as importance of communication tools used in the process of

negotiating creative outcomes and facilitating connections between collaborating musicians.

Reflecting on my collaborative experiences, I trace the availability and improvement of the communication tools that allow for optimisation of achievable creative results and enhance the collaborative process. I also define various modes of collaborative work as well as the structures, behaviours and characteristics of successful music production groups operating in the context of RMCS. I conclude by asserting that to fully benefit from the possibilities offered by RMCS, musicians need to implement a set of strategies that increase user engagement and enhance musical outcomes of the collaboration.

Link to video: <https://youtu.be/QRyhhOaaIMw>

Hussein Boon: Two Production Strategies for Music Synchronisation As Speculative Entrepreneurship

This presentation of ongoing research explores two production strategies for music creators interested in developing their work in the area of music synchronisation. Music synchronisation can prove to be a viable source of income revenue (TV & Radio global publishing EUR 3.29 billion - IMPF 2020: 13), for the right song. Popular song use in TV came to prominence during the 'second golden age of television' circa 1981 (Thompson 1996). 'Grey's Anatomy' (1,947 songs, 380 episodes) and 'The O.C.' (697 songs, 92 episodes), have done much to cement the role of songs underpinning televisual narrative drama, building upon earlier examples such as 'Miami Vice' (611 songs, 112 episodes).

These production strategies are grouped under an overall heading of speculative entrepreneurship. Speculative due to the volatility of a highly competitive marketplace, identified as 'risky business' (Hesmondhalgh 2018: 31), where risk could be reduced by 'producing goods that can be easily categorised' (Jones 2012: 24). Entrepreneurship relies upon three ideas. First, music creatives are also audience members. They 'consume' visual media, and that this 'consumption in context', takes the form of reflexive action, paramount to developing production practices. Secondly, music creators must have an understanding of problems encountered by music supervisors, and tackle these at an earlier stage of the production process, ideally leading to intriguing and novel solutions of arrangement style and production approach. Lastly, that audio tracks can be edited to generate a number of supporting underbed tracks, created from individual parts, themes and stems, packaged to create a coherently themed music library.

This research makes a contribution to Hesmondhalgh and Baker's research problem 'to what extent is it possible to do good work in the

cultural industries?' (2010), underpinned by Jones's formulation that musicians 'must somehow make their own efforts complement rather than conflict' (Jones 2012: 59). The research output enhances existing approaches and is applicable to any music style, from any location in the world, and, more importantly, by practitioners at any level of competence. For music production creatives understanding music use with the moving image, coupled with an understanding of the narrative and cultural underpinning music provides, is of vital importance. Ideally, this understanding should lead to more of a 360 degree approach to Music Synchronisation production activities, requiring novel solutions informed by reflexive responses, and sector practices in making symbolic goods.

Link to video: <https://youtu.be/budL5gBxYAc>

Yngvar Kjus, Ragnhild Brøvig-Hanssen & Solveig Wang:

Encountering new technology: A study of how female creators explore DAWs

The topic of this paper is the encounter with new technology and the exploration of its potential in creative work. More specifically, it looks at experiences with digital audio workstations (DAWs), such as Ableton and Logic, which during a few decades have been established as almost indispensable for composing songs, shaping sounds and refining expressions, among other things. We ask what characterizes the early and potentially formative encounters with DAWs, probing how beginners relate to opportunities and obstacles for their creative ambitions. Our study focuses on female creators, who often are underrepresented in music production. The study will shed light on the conditions of and potential barriers for women to take part in contemporary music production, thereby also illuminating the pathway for others who begin to use DAWs in their music making.

There exists considerable research on the development of new music technology and on the creative processes of production, including how the use of DAWs entail innovations in musical expression (e.g. Bennett and Bates 2018, Brøvig-Hanssen and Danielsen 2016, Kjus 2017, Zagorski-Thomas 2012). There are few studies, however, on how creators encounter technology which is new to them. This can be seen as an explorative sense-making process that music makers go through when they discover the tools and techniques they want to use. Insights from research on perceptual processes can contribute to our understanding of how individuals chart possibilities and limitations in their environment, over time developing awareness of nuances and variations in the musical affordances of tools and technologies (e.g. Clarke 2005). We are interested in how beginners explore the architecture of DAW programs and how they develop

competency in the use of different functionalities and effects. Moreover, we are interested in the significance of DAWs for creative processes, whether they are used to continue existing workflows or to develop musical materials, effects and structures in new ways. We are thereby interested in how the use of DAWs stimulates (or obstructs) different kinds of creativity, and will thereby lean on literature on creative processes (e.g. McIntyre 2011, Csikszentmihalyi 1996). One aspect of creativity is the ability to identify problems as well as solutions, which for music makers involves various issues regarding the construction and articulation of sounding expressions. One of the things we will explore is the extent to which the problems/solutions of music making is being entwined with the problems/solutions of using DAWs.

The primary method of the study is qualitative interviews with female musicians, probing various aspects of their experience with using DAWs with specific attention to their accounts of creative gratification as well as to technology-induced frustrations. Our informants (n=8–10) will partly be recruited from DAW introduction courses, where we also aim to carry out field observation as well as interviews with experienced instructors as part of our ambition to identify patterns in the appropriation and utilization of DAWs.

Link to video: <https://youtu.be/BhBTsgPxCiU>

Scott Stickland, Nathan Scott & Rukshan Athauda: The DAW Collaboration Framework: Improving Creative Opportunities and Authenticity in Collaborative Online Audio Mixing

Successful collaboration is core to the realisation of creative projects. For instance, professional studio-based mixing of recorded audio material is an innately collaborative process characterised by interpersonal transactions crucial to the ultimate mix outcome. While the in-studio environment remains the gold standard, remote collaboration modes and practices for audio mixing are highly desirable. However, the increased reliance on online collaboration platforms has required stakeholders to adapt to a virtual studio environment at the risk of relinquishing some of the intrinsic characteristics that face-to-face in-studio interactions provide. When the online environment and context lack these characteristics, and despite the additional effort and negotiation from contributors, the process can result in a compromised audio mixing outcome.

Our research has confronted this problem by developing a novel application and infrastructure that interfaces with an existing professional digital audio workstation (DAW) platform that addresses several critical audio mixing and music production characteristics. Interviews with professional audio

engineers revealed that the “ideal” remote collaboration setting needs to deliver an experience similar to an in-studio environment. Therefore, we identified the following critical requirements to enhance user interoperability and presence through a focus on (a) real-time communication and interactions; (b) access to high-resolution audio material and monitoring; (c) equitable localised access to and control of a DAW project; and (d) the ability to scale to many remote participants. No current-to-market DAW software platform facilitates and integrates all of these criteria.

By transferring and accessing locally-stored DAW project and audio files, our DAW Collaboration Framework (DCF) provides synchronous mixing operation of multiple DAW instantiations through the transmission and reception of MIDI control data, facilitating real-time high-resolution monitoring in each user environment. The DCF circumvents the latency and quality issues associated with network audio streaming, facilitates scalability to multiple users with no degradation of service, allows the control of project elements in real-time, and provides real-time communication and interaction through videoconferencing and text-based chat features.

Deployment of the DCF in real-world audio mixing contexts with professional mixing engineers demonstrated successful operation in one-on-one and group environments and an acceptance of and satisfaction with the DCF’s novel mode of operation and audio mixing practice. The participants expressed enthusiasm for the framework’s potential to present new business opportunities for studio-based mixing engineers in broadening their reach beyond their physical location. While it has proven well-suited to recorded audio mixing, the DCF exhibits the capacity to control software parameters in broader media-based applications and offers dynamic instructor/student interactivity in online audio education contexts. Ultimately, the DCF recognises the necessity of preserving interpersonal transactions in creative online collaborative endeavours.

Link: <https://www.inmusicconference.com/>

Samuel Lynch & Helen English, Jon Drummond, Nathan Scott: Exploring Dynamic Music Methods to Extend Compositional Outcomes

Music compositions are traditionally presented as fixed, temporally linear articles. Challenging this is the emergence of music that can change, react, and adapt in a medium that is non-linear, ever changing, and dynamic. Referred to as interactive or adaptive music, dynamic music provides new opportunities for music to be created, expressed, utilised and experienced.

Limited research is currently available about the development and implementation of dynamic music on compositional processes and outcomes. The first section of this research presents examples of music that could be considered dynamic that have emerged from the eighteenth century to more modern instances as present in interactive media. The research identifies that dynamic music has a somewhat limited implementation and only emerges as a solution to inherent problems arising from interactivity. With the exception of video game music most current dynamic music practices, such as those found in interactive music albums or reactive music apps, incorporate limited dynamic methods and techniques. Even within video games, a lack of developed skills about dynamic music creation can lead it to be perceived as either too difficult to effectively incorporate or too expensive to consider in commercial applications. Algorithmic and computer-generated approaches towards dynamic music promise a high level of dynamic control and variability, however, current computational methods can limit music fidelity and creative approachability, while severely limiting stylistic variety.

The second section of this research identifies the unique characteristics of dynamic music and considers opportunities for effective implementation and extension beyond the current scope of use. It explores how creating music as a collection of smaller musical cells that may be dynamically sequenced together offers a unique opportunity for music to be crafted in new multi-dimensional ways. It presents the potential for dynamically-produced music in broader human-user contexts including generating curated musical experiences, influencing methods of music therapy through personalised interactive music experiences, and offer a means for audiences to craft their own arrangements out of the provided music. Furthermore, this research posits the potential for dynamic music to be further developed as an art form to lead to the democratisation of music composition - composing music that it may be presented as a constructable set of parts that can be arranged or explored by the music consumer.

This preliminary work engenders a need to better understand the fundamental affordances of dynamic music and to consider its suitability in new contexts. It necessitates a deeper investigation of the compositional and production methods used in its creation and supports a review of contextual integration and control methods. Furthering knowledge in these areas aims to aid the evolution of dynamic music, encourage new innovation in digital music making, support more avenues for creative expression, and improve the quality of, and access to, the music we consume.

Link to video: <https://youtu.be/iuEB1aRCIPc>

Session 1 A 10:20-12.00 - 1C103 *(Lilla salen)*

Chair: Justin Paterson

Ingvild Koksvik: Staging Notions of Space: Developing a Practice-Based Model for Realizing Compositional Intention in 3D and Stereo Record Production

To date, scholars have examined the listener's perception of space in recorded popular music, where literal and metaphorical interpretations of sonic space are aligned to recording and production techniques. More recently, as binaural listening to 3D formats like Dolby Atmos has become accessible for listeners on streaming platforms, new premises for interpretations of space in recordings have emerged. Yet, there are many things going on in the recording process that are not possible to identify in the final recording. From a creative perspective, thinking of space involves more sides of recording and mixing than the creation of sonic space itself. Notions of space might also be part of the compositional intention, to be realized through aesthetic, performative, compositional, and technological aspects of record production.

This paper addresses an ongoing practice-based study of the creative process of producing my third solo album as a recording artist and songmaker (Koksvik, forthcoming 2022), mixed for playback in stereo and Dolby Atmos. In collaboration with recording engineer Jaran Gustavson and mixer Christer-André Cederberg at Cederberg Studios in Kristiansand, Norway, I have recorded an album of eight original songs in which notions of space influence the compositional design in various ways. Through continuous dialogue on the aesthetic and performative considerations undertaken in the recording and mixing process, I reveal aspects of the process from idea to finalized recording. In this paper, I aim to theorize the relations between the compositional intention, the materialization process, and the aesthetic outcome and thereby propose a practice-based model for staging notions of space. Moreover, I seek to demonstrate how mixing in Dolby Atmos can afford new ways of utilizing space as an aesthetic element from a recording artist and songmaker's perspective.

Henrik Langemyr: Music(al) Production: To Compose and Produce Musical for Recorded Medium: Based on the Perspective of Music, and Media Production

The way in which we experience musical theatre has shifted in the last few years. Rather than being performed live, musicals lean more often towards being within a produced and recorded format. As music producer and musical composer, I am intrigued by this change, and the possibilities it entails. Within this master's project I explore the possibilities in composing and producing musical for the recorded medium, out of the perspective of music, and media production, and explore artistic possibilities when considering the production aspects during the entire process in creating a musical film. Reflecting on how musicals are being made right now, and how modern technology and producing techniques can affect how musicals could be made in the future, I discuss different production concepts I gather from my own experience working with this project, and previously existing production methods and theoretical ideas, such as the use of a click track while producing, musical metaphors, and media transformation. I discuss the benefits of, as music producer, having insight in every step of the process, and state that by considering production aspects of the project during the entire process, new artistic possibilities are created for musical narrative and further storytelling when creating musical

Marc Estibeiro: An interactive chamber work for two classical guitars and electronics which uses the natural sound of the acoustic instruments as both source material for electronic processing and as a means of controlling the electronic part

This paper presents a chamber composition for two classical guitars and electronics which utilises a bespoke software environment created in SuperCollider (SuperCollider, 2021). The software environment is a development of previous work by the author on using pitch tracking algorithms to control the electronic part in such a way that electronic cues can be triggered without the need for external sensors or controllers. Instead, the system makes use of the existing skillsets of the performers and the natural sounds of the instruments (Estibeiro & Cotter, in press) (Estibeiro M. , 2019) (Estibeiro M. , 2017). Various issues which were present in earlier versions of the environment, such as false triggers caused by harmonics, unwanted bleed, incorrectly calibrated dynamic thresholds etc., are addressed and discussed. A variety of strategies to better calibrate the pitch tracking algorithm are

presented, together with effective ways of choosing and notating appropriate trigger notes.

The environment works well in a variety of contexts, from various levels of controlled improvisation to more structured compositions. However, each circumstance presents a unique set of challenges requiring an individually tailored approach to best exploit the affordances of the system. Strategies for choosing appropriate mappings for the electronic part, together with effective ways to pre-programme the system quickly and effectively for live performance are discussed and presented. Issues relating to interface design, the use of non-standard and standard notation, the use of extended techniques, and approaches to performance more generally are also discussed.

Using the sound of the guitars as both the means of controlling the electronic part and the source material for the electronic processing results in a fascinating interplay of causal and mimetic relationships. The environment is most effective when the performers are focused on the often subtle connections between their actions, the resulting acoustic and electronic sounds, and the ways in which these feedback and inform new gestures. The result is a contemporary chamber music experience which explores and extends the intimacy and natural beauty of the classical guitar.

Stephen Bruel: Remastering Elton John's Goodbye Yellow Brick Road

The emergence of digital audio production technologies, enhanced signal processing techniques and commercial demand has contributed to older analogue recordings being remastered and rereleased. In the process, this has transformed the traditional technical role of mastering and/or remastering to a more creative one. As the final stage in the music production process, the decisions the remastering engineer makes and the processes they follow have a significant impact on the final audio and musical outcome. Additionally, remastering practice raises questions surrounding perceptions of cultural heritage and authenticity as digitally manipulated copies are marketed as replacements of the original musical artefact and/or embraced by society as a potentially superior and more authentic product to the original recording.

In this paper, I describe remastering practice as applied to Elton John's iconic double album Goodbye Yellow Brick Road. Originally released in 1973 on vinyl, and with subsequent remasters released in various digital formats since, this recording has been Elton John's most commercially successful release. I begin with a comprehensive portrayal of the original recording, mixing and mastering processes used through interviews with recording and mixing engineers David Hentschel and Peter Kelsey and mastering engineer Ray Staff,

in combination with secondary research accounts. From there I explore remastering practice applied to the 1995 CD release through a detailed interview with remastering engineer Tony Cousins as well as the 2014 CD release through secondary research. I then explore notions of cultural heritage and authenticity as well as sonic differences perceived between the different releases through interviews with all production personnel previously mentioned. Finally, I compare the perceived sonic differences highlighted using digital audio analysis including peak meter readings, RMS and LUFS measurements, dynamic range values and frequency spectrum graphs to present a greater understanding of remastering practice outputs.

Session 1 B 10:20-12:00 (1D221)

Chair: Russ Hepworth-Sawyer

Claus Sohn Andersen: The space is the place - Interplay and interaction in an extreme location

The proposed paper investigates if and how an extreme location (acoustically and otherwise) affects musical practices in terms of interplay and interaction during improvisation, compared to how the same musicians play together under more ordinary circumstances (i.e., rehearsal space and recording studio).

July 2017, my two bandmates and I, joined by our engineer, booked a recording session at Emanuel Vigeland's Mausoleum in Oslo, also known as Tomba Emmanuelle. The session was completely improvised and followed a weekend of relatively traditional musical practice in a conventional recording studio.

The mausoleum is a dimly lit stone vault, with all of its 800m² of wall and ceiling decorated with Vigeland's magnum opus, the fresco Vita. There is no natural light, and the hard, reflective surfaces all around result in a room more reverberant than any cathedral (reverberation times in the mausoleum range from approx. 8 seconds in the upper frequencies, rising to nearly 20 seconds at 125Hz). In this paper, I will explore if and how the framing provided by such an extreme location affected both our musical practices and output therefrom – in Christopher Small's terms, whether our musicking changed.

While my primary interest is in the acoustic conditions, it is neither possible nor desirable to negate other aspects of the space and their impact on the performers. These include, among other features, the cathedral-like shape of the space, its role as a final resting place and the nature of the omnipresent artwork. Therefore, the analysis deals with how the

entire experience of being inside Tomba Emmanuelle shaped our interplay, interaction, and improvisation compared to the choices we make in other settings, such as the rehearsal space or the recording studio. Findings suggest that the most affected musical parameters were dynamics and temporal density.

The mode of investigation applied is best described as a narrative, arts-based inquiry, situated in the area between autoethnography, narrative inquiry and artistic research. It is informed and inspired by the writings of, among others, Svend Brinkmann, Catherine K. Riessmann and Jeong-Hee Kim. The departure point of this research is the author's personal experience, supported by audio and video recordings. These recordings will serve to exemplify and illuminate the findings.

Matthew Lovett: Artificial creativity and tools for understanding: music, creative labour and AI

In March 2016, in an already historic match, DeepMind's AlphaGo - an artificial intelligence (AI) programme using machine learning (ML) - beat the global Go champion Lee Sedol. AlphaGo's victory marked a step-change in terms of human-machine engagement, but at the same time raised questions about the nature of intelligence itself.

More recently, in July 2021, the musician Holly Herndon released *Holly+*, a collaboration between Herndon, the musician and technologist Mat Dryhurst, and the ML musical instrument and audio tools developers, Never Before Heard Sounds. Using a Voice Model of Herndon's voice ('a deep neural network that can generate raw audio of an individual voice (Herndon, 2021)), the *Holly+* project transforms up to 5 minutes of original audio into an audio file that is 'sung back in [Herndon's] distinctive processed voice' (Herndon, 2021).

If, following the economist Jacques Attali, music is a 'tool of understanding' (Attali, 1985), then what do the music-making practices of *Holly+* teach us about creativity in the context of AI? In addition, beyond integrating ML into the production of music, *Holly+* brings to light new questions about authorship, ownership, and the relationship that we humans have with our own voices; offering challenging perspectives on the nature of human creativity.

This paper draws on three narratives in AI and ML development to consider current and potential impacts on music production and creativity: 1) The development of AI as a tool for catalysing creativity, as is currently being explored via the *Holly+* project. 2) The development of AI as a labour device. The economist Daniel Susskind (2020) suggests that the history of technology's impact on the workplace has been characterised by its capacity to create new roles for human workers at the same time as it has made

us redundant in established roles. By framing this process as 'task encroachment' - whereby he focuses on the way that technology replaces humans carrying out tasks within a job, rather than in job roles as a whole - Susskind concludes that the paradigm shift initiated by AlphaGo will have significant consequences across human society. 3) According to its founder, Demis Hassabis, DeepMind's 'mission is to 'fundamentally understand intelligence, and recreate it artificially' (Hassabis, 2020). For the philosopher Reza Negarestani, 'contemplating the possibility of artificial general intelligence [...] is an expression of our arrival at a new phase of critical self-consciousness' (Negarestani, 2018), which suggests that developments in AI have already brought us to a new understanding of our own relationship with intelligence.

Whilst implementations of AI are offering a range of solutions to support, stimulate and improve music creativity and production, the quest to establish what intelligence is, is generating a number of compelling perspectives and implications. By looking to current developments in AI and beyond, the paper concludes by evaluating not only the consequences for musicians as creative labourers, but also developing a holistic and system-based view of music and intelligence in terms of what could be called artificial creativity.

Tony Dupé: Self Production as a Creative Practice

As a music artist, producer and lecturer I have encountered many songwriters and composers who feel they are outside of the music production conversation yet they have a great capacity for discussing and exploring sound, music, language and culture.

The contemporary music artist has a different skillset and a different mindset to bring to production. Self production as a subset of music production brings new opportunities where the technical options are narrowed (what I need to make my music). Without having to be across all technology or all types of music, the self producer has a manageable corner to work from away from the eyes and ears of a gendered, often intimidating music production industry.

In this paper I would like to propose a creative methodology for the self producer, where composition and production exist in an ongoing dialogue. This approach draws on sound studies, art pedagogy and praxis, performance, amateurism, community and identity. I also explore the importance of play, experimentation, positivity, limitations, regime and how the making of a record can be a rich and fulfilling experience.

Self production can be challenging in so many ways and contains multiple roles and modes of engagement. If you can make the experience as

enjoyable as possible you will hear the work positively through that experience and want to make more memories and music. In my long engagement with music production I have always felt like an outsider as I narrowed my technical engagement and focussed elsewhere. I made records outside of recording studios in houses, churches and halls in beautiful countryside, immersed in the environment, the music, the artist and the players. A community formed around this practice and many records including my own were made that reflected where, when and who we were at that time.

Music artists come to music with their own unique way of playing, singing and making language come alive in a meaningful way. Most will see themselves as not a “proper” singer/player etc but they have a way which works and that communicates to the listener for whom there is only that which they can hear and feel, it is encoded in the sound. I believe this approach can extend to self production if the methodology inspires confidence and an invitation to play and be creative.

My hope is to open this conversation to both recommend production to the music artist and to recommend the music artist to production.

Leigh Shields: Exploring the history of distortion in Drum and Bass

Non-Linear Distortion has been used as a production tool in Drum and Bass for much of its history and first started to make an appearance in productions around 1995. Before computing became more powerful and at the same time cheaper and more accessible, the application of effects could only be used through hardware set ups (mixing desks, sequencers and effects processors). Initial research and discussions with prominent producers of the time suggests that this was created by driving the input gain on analogue desks and creating clip distortion, before moving on to using guitar pedals. This created a new sound and texture to Drum and Bass and was the catalyst for diverging Drum and Bass into new sub genres such as Tech Step and Neurofunk. This paper not only explores the technology used in the beginnings of the application of distortion in Drum and Bass but also explores the societal influences that may have been responsible for the heavy, dark and distorted themes found within.

During the evolution of Jungle and Drum and Bass in the mid 90's, inner-city London (as well as much of the UK) was experiencing difficult social conditions as a result of recession and economic downturn. The disused factories and warehouses were being used as venues to stage Drum and Bass events and the music being played was reflective of the dark spaces it was played in; producers then created aggressive and industrial sonic characteristics with the use of distortion which

echoed the underground conditions from which it came. During our exploration we attempt to make links between these socio-cultural junctures and the technology that was adopted in order to manifest and articulate the feelings of a distorted society.

Session 1 C 10:20-12.00 (1E207)

Chair: Rob Toulson

Matthias Jung & Vegard Kummen: Hacking the concert experience - exploring co-creative audience interaction at a chiptune live performance

With this pilot study we explore new ways of interaction between audience members and musical artists at a chiptune live concert. The central question is how the audience experiences the performance when actively participating in the show using their personal smartphones.

The concert experiment is conducted with the chiptune group "Kubbi" that consists of Vegard Kummen on bass and synths and Tobias Øymo Solbakk on drums. Chiptune is a musical aesthetic and culture that celebrates the sounds of archaic computers and video game consoles in electronic music production with both obsolete and modern media. Hacking within this culture refers to creative programming and deep exploration of technology for knowledge creation and developing new ways of artistic expression. Inspired by this paradigm we invite audience members to become part of the live performance by interacting with the music technology that is used by the performing artists. These devices are connected to a publicly projected visual which gives access to audience members to change musical parameters during the concert. We are specifically interested in how audience members and music performers experience this novel type of interaction, what the limitations of this co-creative concert setting are, and what happens to the aesthetic experience given such a scenario.

We collect music-related data from the interaction experiment and conduct a survey with the audience after the performance. We also collect data from interviews with the music performers which, we hope, will contribute to a better understanding of the interaction processes between performing musicians and audience members when using participatory music technologies.

Haoran Jiang: A History of Taiwan's Recording Industry: Production and Promotion Strategies of Campus Song Records by Synco Corporation (52)

During the 1970s, the students of Taiwanese universities spontaneously started a folk song movement and composed a group of student songs in the campuses. The record companies quickly noticed the business opportunities of these songs. By organizing music competitions, they attracted many campus students to enter the recording industry and launched the genre of “campus song” in the market. Facing this new popular music genre, how did these record companies design their products and open up their market? whether they would adopt special promotion methods different than other popular music genres? Although campus song has been explored many times by the existing research, to the best of our knowledge, most of these works focus on the social history of folk song movement or the lyrics of campus songs, and there has been no in-depth study on this genre from the angle of recording industry history. The study takes Synco Corporation as the case, which is the most influential record company to campus song. Using the information obtained from newspaper reports, oral history, sound files, covers of LP records, this study reconstructs the recording industry history of campus song by Synco Corporation and speculates on the strategies behind production and promotion. It discovers that the practitioners of Synco Corporation had a relatively clear “product image” about campus song—a type of new popular music, that is fresh, clean, delicate and embodies Chinese flavors. During the whole process of production, whether the selection of singers, the collection of songs, the design of music style and record covers, all these steps were committed to creating the established product image. On the other hand, the promotion of campus song records indeed distinguished from other popular music records. Since these student singers were unknown to audiences and TV stations had no interests in them, Synco Corporation chose campus concert tours to exploit market and promote records, supplemented with radio programs and print media. Also, the combination between campus songs and TV dramas became a characteristic promotion method to Synco Corporation. Drawing from the theories of Bruno Latour and Gilles Deleuze, this study concludes that despite the challenges of new product development, through making heterogeneous connections with various human and unhuman social-material beings (people, media, texts, technologies, etc.), campus song shaped a musical assemblage like “actor-network”, thereby finding its “lines of flight”. Stephen Cottrell has defined “phonomusicology” as “the study of recorded music, including its contexts of production and patterns of consumption”. It is hoped that this

study could contribute to the historical survey about Taiwan’s recording industry as well as the knowledge of phonomusicology.

Mat Dalglish: Unconventional Inputs: The Modular Synthesizer as One-Handed Instrument

As the last millennium drew to a close, few could have imagined there would be a significant modular synthesizer revival. The introduction in 1997 of Doepfer’s (2015) A-100 system and Eurorack format initially appeared an isolated development: for three years Doepfer remained the format’s only exponent. Nevertheless, other manufacturers eventually adopted its standards, the number of makers and users grew, and today there exists a sizable Eurorack scene internationally (Bates, 2021a). Academic interest in modular synthesizers has followed (e.g. Erbe, 2015; White, 2019), but while researchers have discussed interface aspects (Bates, 2021b), there has been little consideration of modular synthesizers in relation to disabled users. The chapter starts by introducing medical and social models of disability (Shakespeare, 2016), then positions the modular synthesizer within a HCI interaction loop (Bongers, 2000). Drawing on concepts of affordances (Norman, 1999; Hartson, 2003) and Cognitive Dimensions of Notations (Green, 1999; Bellingham et al., 2014) interface issues around one-handedness, manual dexterity and posture are discussed in relation to modular synthesizer use.

Drawing on the author’s eleven years of experiences as (concurrently): a modular synthesizer user with complex orthopaedic disability; a practitioner-researcher specialising in musical interface design, accessible technologies, and procedural audio, the main contribution of the chapter is to develop a model of interaction compatible with one-handed use. This model conceives of musical processes and sub-processes as constructions distributed across player and synthesizer, and also across three distinct temporalities of interaction; realtime, near realtime, and non-realtime. Examples from the author are used to illustrate different aspects of the model. Wider applicability and possibilities for future work are discussed.

Shib Shankar Chowdhury: Autoethnography and composition for Innovative music creation about Pandemic with reference to "I Am Virus"

The paper explores what an integrated concept of autoethnography and composition for Innovative music creation about Pandemic with reference to my

song “I Am Virus” composed in E flat major and the track was produced by Steve Robin at The Barn Recording Studios, Brisbane.

The reference of the song that has been considered for the work is “I Am Virus” composed in E Flat major. In this paper, the unified notion of autoethnography has been presented in association with the song. In addition to that the presentation has been on the song composition in respect to “Innovative music creation about the pandemic Covid - 19”. The production took place at Brisbane in the Barn recording studio by Steve Robin. The following is the link of the song to understand this abstract:

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

The self-narration took place in the song in the context of the society through the adopted method of autoethnography. The focus in this methodology can be found in the description of the cultural members who contribute in bringing out insights on the different cultures. The revelation that takes place through the technique includes “personal investment”, “own interpretations” and finally the “analysis”.

The composition took place with the self - experience in the pandemic. The observation of the sufferings, the changes in the environment, the economic restrictions, the fearful emotions, finding out treatment solutions all have been the elements that the virus has been connected to. The innovative part of the composition is the use of the first person as the virus and the referring or the connecting party has been human beings. In other words, the presentation of the situations and actions has been from the perspectives of the virus. In this song harm caused by pandemic has been illustrated but all it has been done from a positive perspective. Steve had tried to keep the mood and production of the song positive. He tried to let my message of the song be the most important thing by giving it a rhythm with a forward momentum, to help us to remember, as we deal with the crisis to keep pushing and striving. For all of the negative impacts the pandemic has caused, Steve has found it important to look for a different and positive way of doing things.

The exploration of the tone has revealed a soothing and positive point of view amidst the sufferings and deaths. The effect on social life has been presented as both destructive and submission to new aspects of living. The end of the song has revealed that it is all about hope and that the situation can be overcome gradually.

Therefore, it can be said that the method has been helpful in understanding the process of the composition that has taken place by Steve. All the elements of autoethnography can be found in this innovative music such as situational observation like deaths, description of the restrictions being faced and portrayal of the other directions that can be brought out of the pandemic.

Keynote 2: Susanne Rosenberg **13:00-13:50 - 1C103 (Lilla salen)**

Susanne Rosenberg, professor of folk singing and for many years head of the Department of Folk Music at KMH, will in this keynote present results and experiences from her various innovative research projects. Susanne Rosenberg is now leading a major research project, Folk Song Lab, founded by the Swedish Research Council grant (VR) within the field Artistic Research.



The purpose of the Folk Song Lab project is to develop and explore new models for collective improvisation in traditional folk singing. The starting point is the ethnological performance-perspective, meaning that a folk song takes form only in the performance, viewing the song as a cognitive frame. In this explorative study, this perspective is researched using features of traditional folk song in new contexts, based on new models for collective improvisation in sessions. The project is unique from the perspective of genre, gender, and instrument. The project also aims at observing how the design of models for improvisation affects the participant experience of psychological flow, both on individual and on group level. The goal of the project is to establish new artistic expressions for folk song, thus revitalizing and renewing folk singing of today by means of collective improvisation and to shed light on how flow and artistic expression in a collective context are interrelated.

Session 2 A 14:00-15:40 - 1C103 (Lilla salen)

Chair: J-O Gullö

Håkan Lindberg: Innovation solving problems with vocal recordings

It is well known that recording of voices with small distance to the microphone often causes unwanted bumps and distortion when pronouncing letters like P and B that is called plosives. This problem is solved with a pop screen. However, the quality of such pop screens vary widely. The most common problem is that the pop sound is not eliminated effectively, Secondly the frequency curve is affected in a negative way, so much that it is easily audible. The pop screen is normally very close to the mouth and there are problems with the hygiene. Most pop screens are not possible to clean from spit, virus, and bacteria. The new P110 pop screen solves these problems, it is specifically designed to effectively prevent plosives pops. At the same time, to eliminate the audible colouration that other pop filters often display.

It is extremely effective in killing pops without compromising the frequency response and character of the microphone. The foam used in the P110 is carefully researched to maximise pop protection and minimise colouration. The specially selected foam is "hydrophobic" – this means that it will not absorb water. So, moisture from the breath will not be absorbed by the foam and therefore does not stay on the filter to distort and colour the sound. The foam disk is easily washed in ordinary detergent for improved hygiene and because it is hydrophobic, dries very quickly. In addition, the wire holder for the foam is invisible to audio and does not have diffraction effects that could occur with a large supporting frame.

Spare foam filter pads are available, so every user can have their own personal one for improved hygiene. Most pop filters are known to colour the sound measurements made have proved that there is no audible coloration with P110.

Emil Kraugerud: Closeness beyond closeness: The technological facilitation of acousmatic hyperintimacy

The sense of intimacy one experiences when listening to certain recordings is often the result of specific production and performance techniques, and as such, this acousmatic intimacy is inherently technological. The proposed paper addresses the technology and techniques that have made acousmatic intimacy possible, including the technology of recording, mixing, and playback. It

will confront three main issues: how various technologies have facilitated the production of acousmatic intimacy, how the perception of intimacy in recorded music has changed with the advent of new ways of affording intimacy, and how the boundaries for this perception are often pushed in ways that transcend physical presence.

Certain technologies, such as the electrical microphone, magnetic tape recording, dynamic range compression, multitracking, and digital reverb, have enabled the production of intimate-sounding recordings. Equally important are the ways in which recordists have used these tools to trigger an acousmatic experience of intimacy and even pushed them to represent soundscapes that transcend the type of intimacy we know from everyday extramusical settings. For example, the way in which singers and recordists started to make use of the electrical microphone enabled a form of intimacy that has continued to change the sound of recorded music even today. In this paper, I will look into the specifics of how the electrical microphone and other technologies have influenced the production of acousmatic intimacy.

The paper will further engage with the ways in which acousmatic intimacy is continuously developing, and especially the ways in which new production techniques that afford experiences of intimacy often work at the margins of what is perceived and experienced as an actual live performance (as opposed to a performance that has been manipulated to such an extent that the manipulation itself becomes the focus of attention). Whereas the microphone and multitrack tape recording enable the mediation of performances as intimate in the recorded domain, other technologies have provided tools for recordists to further exaggerate characteristics of a recorded performance that may trigger a feeling of intimacy in the listener. These issues will be discussed through music analyses focusing on record production processes and their impact on listener interpretation.

Bjørnar Sandvik: Sample, Slice, and Stretch! Four Innovative Moments in the History of Waveform Representation

How has the transition to the era of digital reproduction and so-called "new media" influenced how musicians and producers conceptualize and interact with recorded sound? This paper will consider how the design and use of software and digital instruments have forged persistent links between aesthetic expression and media technologies. In particular, I am interested in exploring past and present interfaces and protocols that rely on visual waveform representation of sound. Software designed to afford creative interaction with pre-recorded sound as "content"

represented on screens as discrete segments of music, have, together with an increasing abundance of hardware peripherals and controllers become dominant elements in the sites of music composition and production. The way that these digital interfaces are used to trigger, edit, and sequence already recorded sounds or samples exemplify how, as Sterne puts it, “the possibility of sound reproduction reorients the practices of sound production” (Sterne, 2003, p. 221). With the pervasiveness of multimodal media, interacting with sound represented as waveforms on screens has become almost as habitual as hearing the actual sounds itself. In the context of music production, editing and sequencing waveforms on a screen have, alongside the programming of MIDI notes, become synonymous with composing, arranging and interacting with musical sound in software across a range of styles and genres. Drawing on perspectives and techniques from media theory, design, and music analysis, I will describe how the concept of visual-spatial sound on screens have been received and used at four different moments of media change. First, I will revisit the prehistory and early introduction of waveform representations on computer screens. Second, I will consider the evolution of the concept of “loop slicing,” as popularized by Propellerhead’s software Recycle (1994), affording the alteration of the tempo of a music loop without changing its pitch or otherwise altering its sound. Today, sophisticated audio slicing and time-stretching features have become standardized features in most DAWs, and audio waveforms are typically considered “elastic,” “flexible” and “warpable.” Here, I am interested in the rhetoric and protocols that surrounded the early introduction and development of these techniques. Third, I will consider how, in the early 2000s, new hardware controllers increasingly implemented waveform displays, in part (somewhat ironically) as the result of an ideal to move away from the computer screen. I will ask whether we are currently stuck in a feedback-loop in user interface design, searching back and forth between past and present user-interfaces, mediums, and practices. Lastly, and following this idea, I will discuss how interacting with sound through multitouch interfaces such as mobile phones and iPads is often considered to be an even more immediate way to interact with sound as waveforms. Through offering the possibility to “touch” the sound itself, iPad apps such as Marcos Alonso’s Samplr and Novation’s Blocs is being among the most immediate and intuitive ways to interact with sound, exemplifying how the capacities of visual-spatial representation of sound offers have become crystallized into mechanisms.

Antti Sakari Saario: “Yesterday’s Charm, Today’s Precision”: Martin B. Kantola and the design of a new ‘classic’ microphone (Nordic Audio Labs NU-100K)

This paper investigates innovation in transducer design by the sound engineer, inventor and developer of high-end audio equipment, Martin B. Kantola, who, in the words of the late Bruce Swedien, is ‘the microphone guru of life’ and ‘knows more about microphones than any one single guy I have ever met’ (Swedien, 2018, 2009).

Kantola’s boutique microphone manufacturing business ‘Nordic Audio Labs’ (NAL) is based in the village of Karperö in the Swedish-speaking parts of the West-coast of Finland where all the microphones are hand-built in-house by Kantola and his team of family members.

Notably, the NAL microphones are favoured by artists and engineers in various production, genre and stylistic contexts, ranging from orchestral recording to contemporary pop production, and the A-list users and owners include Björk, Bruce Swedien, James Hetfield, Al Schmitt, Michael Jackson, and the super-hitmaker Max Martin.

Due to the fundamental role of transducers in recorded sound production practice, the affordances and constraints associated with specific models shape the recorded sound with an immediate and direct effect, thus affecting and shaping the whole production process. More so than with loudspeakers, microphone choices tend to be wedded to ‘classic’ models and their contemporary reinterpretations or ‘clones’. Whilst NAL are known for their high-end versions of the venerable Neumann U-47 (NU-47, SWE#1, NU-47V, NU47-PQV), the company has refocused its business model around a single new microphone model – the NU-100K – which is marketed as ‘nothing short of revolutionary’ (Nordic Audio Labs, 2021) with the design goal of the microphone becoming “a new classic” (Kantola, Nordic Audio Labs, 2020).

Principal research questions are: What produces innovation in microphone design? What produces a (new) classic studio microphone? What informs Kantola’s designs and where and how innovation takes place in his work? How does innovation in microphone design feedforward to the audio production ‘chain’ (e.g., artist-microphone interaction, recording technique, changes in workflow)? What are the hallmarks of quality in microphones, according to Kantola?

The paper draws primarily from new interviews with Kantola and earlier conversations from my 2012 site visit to NAL. The investigation is supported by secondary research into related historical and studio production contexts, studio tests and comparisons of select NAL microphones models (NU-47V, NU-880F and NU-100K), available

microphone reviews, user and designer comments, and other existing materials relating to Kantola's work (incl. documentary footage).

The paper provides a value proposition for the work of Kantola and his 30+ year design 'quest' to produce a 'new classic' (NU-100K) and situates the associated innovation into a wider production context, presenting a theoretical framing and discussion of the approaches to microphones and transducer design and music technology innovation. According to Kantola there is no such thing as perfect sound, but it is, nevertheless, an eternal quest (Luukkanen, 2011), and he has made the strategic decision to compete in the global microphone market solely on the basis of a notion of 'quality' (Haavisto, 2017). Driven by this 'quality', Kantola's career is a testament to what Swedien calls his "dedication to excellence" (Grönholm, 2010).

Session 2 B 14:00-15:40 (1D221)

Chair: David Thyren

Florian Hollerweger: Audio beyond Demand: Creative Reinventions of the Broadcast Listening Experience

In a recent paper presented at the Audio Mostly Conference [Hollerweger, Florian (2021): Streaaam: A Fully Automated Experimental Audio Streaming Server], we presented the "Streaaam" project, a fully automated experimental audio streaming server collaboratively developed by students and faculty at Columbia College Chicago, using Raspberry Pi single-board computers and Free/Libre Open Source Software. In that paper, we discussed the server's software backend and some of its main features. They include an automatic speech-synthesized moderator that weaves real-time data retrieved from public web APIs into its narration, as well as automated loading and playback of generative music pieces programmed in Pd, SuperCollider, and Csound. In the project's first stage, we creatively combined these features into prototypical audio programs, such as an automated robot comedy show. Over the fall 2022 semester, students in a sonic arts class then used the server's infrastructure to further explore the aesthetic idiosyncracies of what we refer to as the "broadcast listening experience". Characterized by the listener's limited ability to control playback, such an experience in return facilitates 'chance discoveries' of favorable sonic constellations. While broadcast listening has arguably lost ground to the conveniences of on-demand listening in recent years, we consider it an important vehicle for listeners to discover new information and music - to sonically nourish their soul, in other words - beyond the constraints of their

everyday filter bubbles. We encouraged our students to creatively reinterpret the broadcast listening experience through modern music technologies not generally used in this context, but available on our server. In the present paper, we present the outcomes of this collaborative creative process and discuss some case studies of new innovative broadcast programs created by students for our public stream at <https://streaaam.colum.edu>. We also refer interested readers to a 10-minute presentation video at <https://streaaam.colum.edu/streaaam.mp4>, which discusses the technology behind "Streaaam". Our public code repository at <https://gitlab.com/floholl/streaaam> provides step-by-step instructions for re-implementing our server from scratch.

Sven Ubik, Jakub Halak, Martin Kolbe & Jiri Melnikov: *Comfortable playing together over distance*

The communication between musicians across Europe is very important for sharing different views and enriching experience. Some musical academies are known for their expertise in particular areas. We created technology that allows musicians to play together comfortably across distance between cities and countries. The end-to-end delay for both audio and HDTV video is several milliseconds. Several unique cross-border concerts have been arranged with musicians and audiences connected between countries. The technology now enables new possibilities of cultural exchange and helps to promote the heritage of European classical music in a way particularly attractive for younger audiences. New experiences are possible that have already been proven, such as the playing multiple organs together. The solution allows distance learning, distance auditions among musical academies, using historical instruments to play together with other musicians and other innovative activities and events promoting European musical heritage. In 2020, the solution and its use to promote collaboration in music across Europe has been awarded the Creative Europe / Europa Nostra Award. We will present example events that were organised in several European countries as well as some behind-the-scenes technology details.

Mattias Petersson: A new morphology – Strategies for innovation in live electronics performance

On a macro-level, a live electronics ensemble could be thought of as a modular system of interconnected human and non-human agents. By zooming in to a meso-level, each performer reveals their own ensemble of agents, configured and setup as unique musical instruments. By applying a perspective on a

live electronics ensemble as being a scaleable modular system, a different analytical approach is enabled, through which the affordances of the meso-level constellations, and their respective interactions within the system, can be better understood.

The purpose of this study is to gain a deeper understanding of the adaptation process required by musicians taking part in a live electronics ensemble. By analyzing the results of a survey taken by former students of the live electronics ensemble course at The Royal College of Music in Stockholm (KMH), taking both the aesthetic, ideological and pedagogic foundations of the course into account, these results will be correlated with other ensemble's approaches as well as strategies and pieces developed within the KMH course since its founding in 2006. In order to situate the practice of the ensemble, the results are cross-compared and related to documentation of activities in similar ensembles, in particular with regard to a collaboration between the KMH ensemble and the Dirty Electronics ensemble at De Montfort University, UK. Hereby, the paper connects the innovation perspectives in the ensemble with an international outlook in the same field.

By considering how the ontology of live electronic instruments affect the ensemble situation, a brief account of philosophical organology lays the ground for a discussion of how an effective instrument might look and thereby, how inclusive musicking might be facilitated. Questions regarding shared and distributed instrumentality and when the actual becoming of an instrument happens are central perspectives in this discussion. Drawing from the fields of cybernetics as well as actor network theory, ultimately, this paper will propose an alternate, and possibly more idiomatic, morphology for live electronics performance.

Zachary Diaz: Signifyin(g) Producers: The Roland SP-404 and The Evolution of Live Instrumental Hip-Hop Performance

The performance of beats by DJs or producers have existed for as long as hip-hop has existed, and since the rise of DJs in hip-hop scenes in the New York City Area in the 1970s, the performance of a looped "breakbeat" has been crucial to hip-hop's evolution. In hip-hop's early stages of development, the DJ was considered to be the centre of any hip-hop event, as they provided the music as well as their own interpretations of said music on turntables, as has been described by a number of hip-hop scholars and historians (Jeff Chang, Joseph Schloss, et al). The role and definition of a DJ also became more complex, as the role of a producer became more of a significant influence in the sound and accompaniment of many MCs. Because of the evolution of music technology over the past five decades, the ways in which DJs and producers

perform (either through sampled or original material) in live spaces have expanded beyond two turntables and can vary wildly in terms of what electronic equipment is being used. No matter what the equipment, however, the act of Signifyin(g) upon the listener or audience using various performance techniques have been a consistent and common phenomenon. Just as rappers Signify using wordplay, producers Signify using musical snippets, mashups, and various forms of sound manipulation using various electronic instruments and devices. One piece of equipment, originally released by Roland in 2005, is the SP-404 (SP as an abbreviation for "signal processor") and has become a staple for many producers from variety of popular music genres, from hip-hop beat-makers like Ras G and Flying Lotus to electronic and rock groups like Animal Collective and Beck. This presentation will look at the device's growth in popularity with producers over the past decade (based on research done by popular music writers such as Primus Luta and Mark Katz), as well as observe and analyse a video of a "beat set" performance by Los Angeles-based instrumental hip-hop artist Dibia\$, highlighting the ways in which the techniques used by Dibia\$ allows him to Signify upon the listener (as per Henry Louis Gates' and Gena Caponi's concept of Signifyin(g) in African diasporic expressive culture). Finally, I will end the presentation with an SP-404 performance of my own, further exploring techniques commonly used by myself as well as other SP-404 performers.

Session 2 C 14:00-15:40 (1E207)

Chair: Per-Henrik Holgersson

Kirsten Hermes: Levelling up chiptune: nostalgic retro games console sounds for the ROLI Seaboard

In the seventies and eighties, special chips were built that could transform electrical impulses from a computer into analogue sound waves. Musicians and programmers transformed early games consoles, arcade machines and personal computers into musical instruments through computer code. From the technological restriction of these old devices emerged "chiptune", a lo-fi style of electronic music. The genre's unique sound continues to inspire modern musicians (McAlpine, 2018) who use tracker software, hardware hacking (Farrell, 2020) and software emulations, often fusing chip sounds with modern pop and EDM.

In juxtaposition to the technological restriction of this old hardware, modern electronic music instruments are becoming ever more complex, offering fine control over sonic parameters both live

and in the studio. MIDI polyphonic expression (MPE) expands the expressive power of traditional MIDI controllers by allowing individual modulation data to be sent for each musical note in a chord (Official Midi Specifications, 2021). This includes musical performance parameters such as note-on velocity, pitch bend, channel pressure (aftertouch), and note-off velocity. MPE controllers such as the ROLI Seaboard, the Haken Continuum Fingerboard or the TouchKeys are more similar to real, acoustic instruments, which tend to be highly responsive to small movements (Hermes, 2022).

This paper explores the question as to whether the nostalgia of chiptune can be translated to MPE performance instruments, given the fact the hardware aspects of chiptune music and the importance of authenticity play an important role in the identity of the genre (Tomczak, 2008). Can a genre that thrives on technological and creative restriction be performed on complex and multidimensional electronic music instruments?

The research underlying this paper combines a literature review with a practice-led case study where the author reflects on her preset pack “Chiptune Bubblegum” for the “Equator 2” MPE software synthesizer, which was published by ROLI in 2021. Through methods such as sampling, granular synthesis, pitch modulation (e.g. arpeggios with shifting speeds) and distortion, the author replicates the sound of old games consoles within the synthesizer, while implementing expressive performance control. Sliding, gliding and pressing motions on the ROLI Seaboard controller are mapped to sonic changes in the synthesizer’s intricate modulation matrix. Nostalgic timbres are placed in a new context, morphing and shifting into one another, and moving around on a virtual stage, all depending on performance parameters. The author draws on feedback from the ROLI team and prosumers exploring the sound pack to answer the research question.

Ambrose Field & Ling Ding: Innovation and music business: a new approach for international partnership in music

This paper sets out how innovation can be identified in the development of business relationships between Western and Chinese organisations specifically concerned with Music Production and Education. It does so through an approach which foregrounds intercultural understanding, and re-evaluates the business impacts of cultural practices such as *guanxi* from the perspective of creating sustainable international partnerships (Ding, 2021). These have become necessary as organisations pursue increasingly global objectives in developing research programmes, practical alliance and cultural exchange, as national economic concerns have

resulted in a current climate where international business has become vital (Enders, 2004; Teichler, 2004; Chan, 2004).

The authors show how arts-based partnerships can be driven by values that are not necessarily associated with traditional, Westernized views of corporate or industrial relationship formation, but at the same time, can offer new and unique opportunities for collaboration and cultural exchange. From information gained through documentary evidence and individual interview, a new approach to understanding the value of *guanxi* in assisting the setup and maintenance of international relationships is proposed. These ideas have existing parallels found between the philosophical approaches of Foucault (Foucault, 1977; Fairlough, 1992; Wodak, and Meyer, 2015; Johnstone, 2017) and traditional ideas from Confucius (Yang 1994), through their re-interpretation in contemporary society. The paper sets out the hierarchical nature of exchange in *guanxi*, analysing the impact of interpersonal relationships (Xin and Pearce, 1996; Tsang, 1998; Lee, Butt, Shah, and Sheikh, 2020; Abosag, Yen, Barnes, and Gadalla, 2020), kinship, and business strategy (Luo, Huang and Wang, 2012; Chen and Chen 2004, and Su, Mitchell, and Sirgy, 2007) showing that a modern understanding of these processes is beneficial to the success of international collaboration.

The paper shows how the metrics-led indicators of international relationship construction can result in practice that sustains the past and instead advocates for the adoption of networked value systems where equitable cultural contributions to relationship construction can be made. Outcomes from case-study work in music organisations will be presented with a view to understanding the importance of modern *guanxi*.

The paper challenges the view that international relationships constructed on the basis of goods-logic in terms of transactional trade are sustainable in the long term especially through times of crisis, such as political uncertainty and global pandemic. Adopting a *guanxi* strategy can protect and improve the sustainability of relationships, and importantly, this can be achieved in an open and mutually understood manner.

Egor Poliakov & Martin Pfeiderer and Christon-Ragavan Nadar: Analyze! Development and integration of software-based tools for musicological and music theoretical needs

While computers and various music software are already an essential part in context of music performance and production, there is still a

noticeable gap in adoption of software tools to various fields of musicology and music theory. Especially the accessibility of currently available software tools for audio and sheet music analysis as well as the lack of well-established methodical concepts for integration of computer aided research methods in current music university educational programs is concerning.

In the proposed talk we want to share our experience based on an one-year scientific and educational project at University of Music Franz Liszt Weimar, with the goal to develop, test and evaluate several flexibly applicable teaching modules for various music analysis issues based entirely on free and open-source software. The project also led to the development of new software tools, to the building a big (over 4800 entries) online sheet music database in musicXML format as well as to the creation of a wiki-resource with text and video-based tutorials. The following musicological issues stand in the main focus of the project: 1) computer aided annotation and visualization of sheet music, 2) statistical analysis of sheet music 3) software based search of rhythmical and melodic pattern

The development of tools for solving these problems was mainly based on the customization of various python-based libraries (music21) and of jupyter notebooks as an user-friendly front-end solution. Furthermore, a lot of python libraries used in data analysis (Pandas) were adopted to be used for analyzing sheet music data. The practical testing of these resources took place during lectures in spring/summer 2021 and was successfully tested with different student groups, lecturers and professors within the musicology and music theory departments.

The ongoing evaluation of the project include online surveys and interviews to investigate both the user interaction with the software and the overall experience of using computers for music analysis. With our paper we want to encourage a general discussion about strategies of integration of software-based learning methods into various fields of music education.

Christos Moralis: The 'Performable Recordings' model: Bridging the gap between the 'Human' and 'Non-Human' in Live Electronic Music Performance

The emerging phenomenon of new types of bands, or individual performers, in popular electronic music, who try to bring the studio sound on stage created a gap between 'human' and 'non-human' that requires them to work with technology in new ways. The 'Performable Recordings' model is, 'a type of music production, that enables the artist(s) to perform a musical piece live, using, in real-time, the

mixing and post-production processes that create the aesthetics of a studio produced version'.

This research builds upon Moore's tripartition of authenticities and more specifically the two forms of authenticity that are most salient in this process of 'musicking'. These are the 1st and the 3rd person as described in Moore's (2002) model. The 1st person authenticity relates to the extent to which the participants feel that the performers engage in authentic human expression through their performance. The 3rd person authenticity relates to the participants' assessment of what constitutes an authentic sonic example of a musical tradition or genre – in this case EDM. In addition to what it should sound like, 3rd person authenticity is also concerned with what are the appropriate 'tools' that should be used and factors such as the coherence between aural and visual, employment of skill, performativity and the constant awareness of a 'standard of achievement'.

The key is the combination of fixed and varied elements, such as timing, pitch, dynamics and timbre, based on machine accuracy and some aspects of human expressive performance. The originality lies in the specific way in which existing technologies for a real-time process have been combined, such as real-time timing and dynamics quantization, and the interactive and collaborative process that led to this configuration. The negotiation between the research participants, the aesthetics of electronic music and the technical aspect of this model revealed that parameters such as the cognitive process, cultural differences, perception and creativity play a significant role in designing new production and performance practices resulting also into new methods of notation and score reading for technologies and audio processes, while the design itself cannot be a linear process but a cycle of design and feedback. This has also a backward effect, suggesting that these technologies can help the studio-based audio productions to introduce the live element in a controlled environment, benefiting from more expressive performances.

Session 3 A 16:00-17:15 (1C103 *Lilla salen*)

Chair: J-O Gullö

Scott L. Miller & Carla Rees: Telematic Performance and Recording of Interactive Electroacoustic Chamber Music

Our ongoing collaborative work involves the use of real-time interactive electronics in chamber music settings with classically trained performers of

acoustic instruments. Like other practitioners, the events of Spring 2020 presented a new technical challenge - how to implement multiple audio-processing networks over the internet using home-quality internet connections, prosumer hardware, and the diverse quality of performing and recording spaces available in each unique home. An implicit creative challenge also faced us; in the absence of near-zero latency, what musical style or approach to music performance and recording would be effective, let alone satisfying?

In this paper we will outline our approach to telematic performance and recording, beginning with connecting solo flute in Windsor, UK with real-time electronics (Kyma) and recording in Minnesota, USA. Our experiments focus on home-based systems; ISP connections were slightly above average (200 down/10 up in the US; 70 down/17 up in the UK) but far from the Internet2 speeds and consistency available at research institutions. Navigating through meeting-focussed communications systems (Zoom, Skype and Facetime) to low-latency software that was being renewed, more widely disseminated, or newly built in response to the sudden demand created by the pandemic lockdowns (JackTrip, SoundJack, QuackTrip, Sonobus), we worked with a range of tools in order to continue our collaboration and develop our creative practice. We found the greatest quality and reliability with QuackTrip, a patch by Miller Puckette that runs on the Pure Data (Pd) application. QuackTrip creates a peer-to-peer connection, and by running multiple instances, we could successfully establish low-latency networks of three musicians with discrete two-channel connections of uncompressed audio. Eventually, we settled on Puckette's Netty-McNetface to network as many as 12 different musicians.

Our experience of these tools and systems led us to consider how specific contrasting musical elements behave and sound in that environment. In addition to the compromises that were necessary to make relating to audio quality and accuracy, the latency that is an inescapable part of transmitting sound globally precludes music that is rhythmically intricate or precise at a certain threshold. It was therefore important to us to create music that is well-suited to the idiosyncrasies of the tools being used. The solution has been to work with graphic scores; the first collection of scores focused on particular aspects of sound, indicated by the titles, leaving other dimensions open, such as instrumentation, timbre, tempo, and pitch.

In this paper we will discuss both the production aspects of this work – for example how the clicks and pops caused by buffer under runs and network issues influence our aesthetic and timbral approach – as well as the ongoing impact of this work on our creative practice both in person and online theatre.

Session 3 B 16:00-17:15 (1D221)

Chair: David Thyren

Phil Harding: Transforming A Pop Song: The Journey of the Extended Club Remix

Extended club remixes are generally the result of an intensive period of group creativity (Sawyer, 2003). This analysis will focus upon the musical and vocal elements required to achieve an extended club remix that excites and satisfies the commissioning client. The framework and process of this study follows the principles of Moylan's Recording Analysis: How the Record Shapes the Song (Focal Press/Routledge, 2020). Dance and club remixes are usually a re-recording process where the remix team manipulates and re-arranges the originally recorded material (often keeping just the vocals). New instrument and vocal recordings, plus computer music programming, often transform the track into an artifact suitable for an entirely different music genre and marketplace. I will utilize the Moylan (2020) recording analysis system to discover if an extended club mix can transform a pop song. For this purpose, the Taz Vegas record 'Am I Dreaming' (2019) is a good example to evaluate the recorded and programmed elements produced by my PJS Productions team members.

I have been a specialist in extended club remixing since the 1980s (Harding, 2010) and will offer a perspective from my role as the team leader during this remix using data gathered from my interviews with the project's agents and with the systematic approach applied in the 'Service Model' of pop music production (Thompson and Harding, 2017; Harding and Thompson 2019; Harding, 2020).

I will explore the aesthetics of the remix process and how a team immersing themselves in the domain (Csikszentmihalyi, 1997) can internalize the reference track elements disseminated by the team leader during pre-production. This achieves a free-flowing agency for the team members to perform their roles in the field (Csikszentmihalyi, 1997; Fulton & Paton in McIntyre, 2016; Thompson 2019) and to shape the context and character of the remix via the pre-cognitive abilities assimilated the team leader.

M. Nyssim Lefford & Gary Bromham and David Moffat: From Intelligent Digital Assistant to Intelligent Digital Collaborator

Intelligent Digital Mixing Assistants (IMAs) such as those found in products by Izotope, Synchro Arts and Sound Radix are being used with increasing

frequency in music mixing. These are mixing tools that “take care of the technical aspects and physical constraints of music production” (De Man, Stables & Reiss, 2019). Utilising various signal analysis techniques, IMAs can detect, manage or help resolve a variety of sound engineering related issues. They are especially popular in genres that value strict adherence to genre conventions, for example, K-pop and J-pop. Using IMAs while mixing means reducing the amount of focus needed to address technical concerns; therefore allowing more attention to be dedicated to aesthetic matters. Nevertheless, while taking advantage of intelligent functionality, creative users must communicate with IMAs about technical aspects of a mix to select from different types of assistance and auto-corrections offered. This communication may be extended to directly facilitate and scaffold the aesthetic aspects as well. Developments in human-automation interaction (HAI) in other domains have shown that user-tool communications can be rich and dynamic when the tool encourages the reciprocation of knowledge, when user and tool are able to learn from and adapt to the other, and co-interrogate— in this case— creative possibilities and actions.

HAI in music production is an emerging field, and some early assumptions, while understandable, do not necessarily best serve the creative process of mixing, for example, the assumption that these tools play an assistive role. Simply the term assistant, like “wizard” or “tool”, has set up “asymmetry” (Reeves & Nass, 1996, p.160) in mixer-tool interactions. According to Naikar, “models of human–automation interaction that focus on ‘who should do what’ or on ‘who should be responsible for what’ fail to appreciate how complex cognitive work is carried out” (Naikar, 2018, p. 62). Music mixing involves not only integrating varied perspectives and types of technical and aesthetic knowledge, but also prioritising technical versus aesthetic information as situations demand. Mixers also render genre conventions, exude personal styles and technique, and take decisions that guide the evolution of a mix over time. Current IMAs provide little assistance in this work.

This paper draws insight from literature in cognitive systems engineering and cognition of creativity to identify how intelligent mixing systems can function as musical collaborators, proposing solutions for structuring user-tool communications to encourage co-creation and “interdependence” (Reeves & Nass, 1996). With the aim of better aligning HAI with the actual cognitive work of mixing, this study investigates the communication requirements for an intelligently assisted co-creative environment. Findings point to a set of design goals, interaction parameters and constraints for an intelligent digital collaborator.

Brendan Williams: Creative Potentials for Dolby Atmos: Presenting the self-balancing acoustic ensemble

Dolby Atmos is now firmly established as an accessible consumer format for music consumption. The adoption of the object-based system by Apple Music, Tidal and Amazon has been met with a scramble by artists and record labels to exploit the new technology. In the world of classical music there is an existing large body of research around surround audio capture and presentation, which has primarily sought to establish microphone techniques which most accurately convey a sense of spatially consistent realism to the listener. This paper presentation however investigates practice-based research which explores the creative potentials for spatial ‘storytelling’ in a contemporary classical context.

Having previously produced records which contain extreme variations in spatial treatments (with GoGo Penguin, Robin Richards etc) the author will present examples of how these techniques can function within Atmos in a classical music context. Drawing on Blesser and Salter’s Functional Model for Auditory Awareness as a framework the research considers how listeners interpret the presentation of spatial information in a musical setting. Records are not made in a vacuum; we present mixes layered with references to genre specific aesthetics and historic technologies which are rich in meaning to both the artistic collaborators and their assumed listeners.

Audiences for classical music are changing; ensembles such as Manchester Collective seek to break away from established paradigms of acoustic music presentation, embracing the language of popular and electronic music forms in order to aesthetically support a composer or artistic director’s sonic vision for a piece or its programmatic context. The accessibility of Atmos, particularly its ability to ‘fold down’ for headphone listening, presents unique opportunities for sonic creativity and a break from established conventions. The paper looks towards large scale collaborations between Manchester Collective and the author planned for 2023, focussing on a number of ‘proof of concept’ recording sessions.

Session 3 C 16:00-17:15 (1E207)

Chair: Per-Henrik Holgersson

Henrique Portovedo & Ângelo Martingo: Transforming Performance with HASGS: research-led artistic practice in augmented instruments

Drawing on the development and technical possibilities of Hybrid Augmented Saxophone of Gestural Symbioses (HASGS) as a case study, this paper aims at discussing the optimization of augmented instruments and the role of research on the transformation of performance. In recent decades, the compositional exploration of instrumental writing has generated a plethora of resources by means of which the possibilities of performance were greatly enhanced, both regarding the development of innovative musical instruments and the integration of external technological devices including digital technology, electronic materials and sonic repositories in traditional performance practice. Considering the proliferation of resources used in augmented instruments performance, HASGS was developed as an academic project aimed at optimising performance by electronically controlling parameters in mixed music performed in the mechanical instrument, thus reducing the recourse to external control devices for electronic purposes. The HASGS system was initially developed according to a "do it yourself" (DiY) logic, emerging as a response to some of the repertoire written for it, namely, works for saxophone and electronics. The same approach was adopted at the initial phase of prototypes construction. The actual system is constituted by an ESP32 card, providing Bluetooth and wifi connectivity, while based on a digital fabrication solution that can be directly integrated into the instrument's body, thus making of the saxophone a hybrid instrument – both an acoustic instrument and an electronic controller. The remaining components of HASGS include a ribbon sensor, a four button keypad, a trigger button, two pressure sensors, up and down selectors, and an accelerometer. In order to depict HASGS' expressive and technical potential and to promote new repertoire based on it, a table of the system's suggested mappings was presented to composers, outlining the possibilities of communication between its sensors and softwares. In the context of a performance practice in which the interpreter is required to be a creative agent within a multidimensional context of sonic manipulation, improvisation and expressive extension and augmentation, HASGS is shown both as a contribute to the optimisation of this new virtuosity and as a result of the changing role of academic research in the transformation of artistic practice.

Ambrose Field: Rethinking the relationships between space, performance and composition in notated acoustic composition: Quantaform Series

Composers have been writing music for particular spaces for centuries. This paper aims to show how that relationship can be extended and reimagined through the use of novel software to help predict the acoustic response of a space directly within the workflow of constructing a notated score (rather than through audio realisation or the application of an audio effect to a recording). The paper introduces Quantaform Series, a cycle of 20 traditionally notated pieces for solo flute, where each piece is precisely matched in notated score (both spectrally and in the time-domain) to a particular acoustic. This is achieved through tools which simulate and present the harmonic and temporal effects of a specific notated gesture to the composer in musical notation, enabling intuitive non-electronic/recorded media composition to be accomplished in a spatially informed manner.

The key benefit of this approach is that the performance space can take on the role of a performer in its own right, rather than being a sonic after-effect. However, such a situation of predicting the acoustic of the space at composition time changes the responsibilities of the performer to the space in live realisation. The paper documents this new relationship in a critical context and challenges normative views of the connections between space and musical articulation from documentary accounts of the performance, alongside detailing the core technologies developed for acoustically informed composition (with examples given in IRCAM OpenMusic and PureData). The spaces used in Quantaform Series are not concert halls or "regular" music venues -- rather, they are community spaces, bars, climbing walls, football stadia, rooftops and mundane domestic settings. Clips will be shown from the short film "Quantaform" made in collaboration with Screen Yorkshire UK and funded by the Arts Council of Great Britain highlighting this computationally informed, notated acoustic approach to spatial composition.

Hans Lindetorp: Gesture-controlled synths with WebAudioXML

Aiming at making web audio development accessible for artists and creators with little or no programming experience, we have created WebAudioXML (waxml). It is an XML syntax for configuring web audio components and mapping data from touch events, sensors, OSC, MIDI and external data to control audio parameters. In this presentation, I show the key concepts and give a few examples on how a machine learning library for

gesture recognition can be used to map gestures to audio parameter using waxml.

Panel 2: How to get published? And Book releases

Chair: Rob Toulson

In this panel we meet **Hannah Rowe** - Editor at Routledge Taylor & Francis Group and, **Kirsten Hermes, Russ Hepworth-Sawyer and Paul Thompson**, authors of recently published books highly relevant to Innovation in music.

Keynote 3: Sven Ahlbäck, Christian Råsmark & Rob Toulson

With a solid background in both academia and the music world, **Sven Ahlbäck, Christian Råsmark & Rob Toulson** have each developed innovative digital systems and software for musicians and creators. Sven Ahlbäck will present the ScoreCloud Songwriter app (<https://scorecloud.com/songwriter/>) Christian Råsmark will present Session (<https://www.session.id/>) and Rob Toulson Songzap (<https://songzap.app>). During the seminar, we will get to know new innovative software that can meet important needs of us who are active in the world of music.

Dolby Atmos. Henry Mikkonen's Composition *Case Study No. 3* is included in the project: *Lost in Space: Three Case Studies in Music Production Using Immersive*.

Panel 3: Exploring Dolby Atmos: Past Present and Future

Chair: Daniel Pratt

The recent push for Dolby Atmos to become an industry standard in spatialised audio has been super-charged by the implementation of Dolby Atmos into the Apple ecosystem. Atmos integration into both the iTunes platform and the Logic DAW signifies an inescapable paradigm shift that partners with manufacturers and content providers. This panel functions as a critical discussion of how Atmos operates as a creative tool that recognises past, present, and future musical creation. The panel members consist of songwriter and artist Bruce Woolley (Video Killed the Radio Star, Slave to the Rhythm), Andy Visser (artist, record producer, PhD researcher and senior lecturer at the University of West London), Dr Daniel Pratt (record producer and course leader at the University of West London) and Dr Andrew Bourbon (mix engineer and subject area leader in computer science, Huddersfield).

The panel will premiere the first Atmos mix of a Radio Science Orchestra track *Robots From Mars*, written by Andy Visser and Bruce Woolley. This performance will be contrasted with the stereo mix of the track, and it will serve as a springboard for the creative discussions that arise as we take this recording, mixing, and writing team forward in developing a more holistic approach to writing, recording, and mixing primarily for the Atmos platform.

Session 4 A 10:20-12:00 - 1C103 (Lilla salen)

Chair: Justin Paterson

SUNDAY 2022-06-19

Welcome with music: Henry Mikkonen & Martin Åberg - 08:45 Lilla salen

Welcome to music composed and produced by Henry Mikkonen & Martin Åberg, KMH. Both have produced the music to be played in Dolby Atmos. Audio Martin Åberg's composition *Metaphor - S: A: M: Suite* is part of the project: *Spatial sound sculpture: Music production and creative mixing in*

Enric Gaus & Alex Barrachina, Gabriel Saber, Victor Sanahuja, Josep Comajuncosas: Exploring a network setup for music experimentation

In recent years, there has been increasing interest in performing music over the Internet. Festivals and conferences including talks and performances in an experimental music context have emerged. But the

COVID-19 pandemic forces the music community to use digital tools for playing online connected through their home internet connections. In this scenario, the biggest challenge to deal with is latency, that is, the time delay between the sound emitted by the player and it is received by the listener. In general terms, latency is too high for a good synchronisation between them and it is not possible to minimize it unless participants are connected to the network under certain conditions. Nevertheless, the latency introduced by domestic internet connections opens a big room for exploration. Beyond the recreation of traditional musical setups, new musical paradigms may appear. This work presents the results of the research carried out by the Barcelona Network Orchestra collective in these last two years.

Most of the widely used solutions to perform online are based on a client-server configuration to transmit music from one player to another. In some cases, latency is modified (adding an extra delay) for music synchronisation between musicians according to a given tempo. Moreover, some peer to peer (P2P) based solutions are also available, in which users share music directly without a central server. Both configurations have pros and cons. Specifically, P2P based configurations allow the creation of complex networks in which players can add their own stuff to the musical work as well as modifying the existing sounds from other players. Then, the final result is not the addition of individual sounds (like in a traditional orchestra) but a mix of sounds and instruments created and modified by all the performers. Assuming all the nodes in a network will sound different (each musician can modify the original audio sent by another musician), it can be debated which one is the node to be considered the output to be recorded or sent to the audience.

This work presents an example of a decentralised audio setup in which musicians share audio signals injected and/or modified sequentially in a loop configuration. The performer is not the owner of their sound and the time spent for the audio to complete the whole loop is determined by the latency introduced by each internet connection. As explained above, the audio at each node is unique, so it is impossible to have an overall perception of the musical piece. This new paradigm is ideal for experimental improvisation using both acoustic instruments and digital effects.

Paul Thompson, McNally Kirk & Toby Seay: Multiple Takes: Multitrack Audio as a Musical, Cultural, and Historical Resource

Multitrack audio recordings are a critical component of nearly every recorded musical work but are often overlooked as archaeological materials with musical, cultural and historical value beyond their

economic potential. Multitrack materials have also historically been difficult to acquire because of the commercially sensitive nature of many of these recordings. However, there are now a number of emergent archives and collections that allow researchers to peer into the record company vaults. One example is the EMI Music Canada Archive at the University of Calgary in Canada, which includes demo tapes, song lyrics, concert planning documents, promotional material, cover art, correspondence between artists, management, producers and executives in addition to the multitrack tapes of the recordings.

The following paper draws upon one specific example within the archive, that of Canadian Rock band 'Grapes of Wrath' and their album *These Days* (1991) produced by British Record Producer John Leckie. A range of different disciplinary perspectives are implemented such as document analysis, musical analysis, sociology and psychology in order to trace the emergence of this record and the participants involved. This multifaceted approach helps to illuminate often hidden or overlooked processes, practices and people involved in making (or breaking) a record and, importantly, shows how multitrack materials can be used as a rich cultural and historical resource to research the broad area of commercial record production.

Jo Lord & Michail Exarchos: Dynamic meta-spatialisation: Narrative and recontextualisation implications of spatial stage stacking

The two authors are combining forces and formats toward an interactive presentation that will explore the notion of spatial recontextualisation through a series of creative practice stages. The applied context involves four phases: 0. music creation / 1. spatial mixing/ 2. sample-based creation / 3. (re)spatialisation—that provide the practice-based data for investigating: - the cyclical relationship of context and content in spatial staging; - the delineation of performance vs. production contexts and their influence on spatial mixing; - the effect of spatial sonic objects on sample-based musicking; - and the narrative implications of intentional dimensionality in creative music production.

The examination deploys a multi-method, phenomenological, practice-based paradigm to illuminate creative phenomena in the making, mixing and recontextualisation of sonic objects. The bricolage approach of the research design brings together critical theory and autoethnographic strategies to draw out reflexive findings from the creative journey, which involves performance, composition, improvisation, beat-making, and era-informed tracking and mixing practices. Vintage sonic signatures are consciously infused at every part

of the content-creation, acting as contextual signifiers. The iterative, developmental outputs result in exponential staging phenomena ('sonic worlds'), which are dynamically shaped and manipulated in consecutive phases. The objectives of the project are to demonstrate: the metamorphosis of performance into production music; the ways in which production music affords surrealist staging practice; the function and affordances of spatial sonic objects within sample-based music making; and the (re)spatialisation of recontextualised compositional outcomes. To achieve a democratic approach to spatial music production and consumption both the means of creation and delivery need to be accessible to everybody. Attendees are encouraged to bring their own mobile and headphones devices to connect to the presenters' interactive demonstration of process and artefacts, via QR codes provided during the presentation.

Stefan Östersjö, Thanh Thuy Nguyen & Matthew Wright: Yellow music in diaspora: Re-inventing the sound of pre-1975 record production in Sài Gòn

This presentation combines the content of an academic paper with new use of 'post-DJ' technologies in performance, also exploring the dynamics of intercultural collaboration. It provides an outline of the history of the recording industry in the south of Vietnam, seen from its epicenter in Sài Gòn, the capital and central harbour of colonial Indochina. An important player on the scene in Sài Gòn was Asia, the first label owned by a Vietnamese, Ngô Văn Mạnh. Asia was essential in the early phases of *Vọng Cổ*, covering the development up to the early 1950s. What follows thereafter is often referred to as the golden days of *Cải Lương* and of *Vọng Cổ*, stretching from 1950 to 1975. A new label, named after its owner, Lê Văn Tài, was started in 1947 and became important in the 1950s. In 1960, with the creation of the Continental label, Nguyễn Văn Đông entered the music scene in Sài Gòn, and was to dominate it for the next fifteen years. However, the 1960s was the time when the number of record labels literally exploded in southern Vietnam. The focus of the historical backdrop is however the development of a scene for record production which combined techniques and sound ideals from R&B and soul with *Nhạc Vàng* (Yellow Music), a form of popular music which became emblematic of colonial Vietnam, and eventually also of diasporic Vietnamese culture after 1975. Further, the paper describes how the Vietnamese/Swedish group The Six Tones has experimented with this music, and with the stylistic tropes of these pre-1975 recordings, in collaboration with the turntable improviser Matt Wright, in the

creation of a new album with the group. By employing a three-stage gestural language from turntablism, borrowed from hip-hop, the experimental tradition and the incorporation of Digital Vinyl System (DVS) software, new transidiomatic materials are formed. This recording project also forms part of the postdoctoral research of the Vietnamese đàn tranh player Nguyễn Thanh Thủy, which seeks an understanding of the role of music in identity formation among female Vietnamese immigrants in the Nordic countries. Through interviews with women in Norway and Sweden, which also constitute the material for a documentary film, the making of the CD, on which several singers in diaspora also participate, and becomes part of the narrative in the film. In the presentation, the group will perform one song, and illustrate how the sound of the pre-1975 records of *Nhạc Vàng* are reflected in the new recordings, but also provide examples of how the experimentation with the form and sound of this music may constitute a vehicle for renegotiating identity in Vietnamese diaspora.

Session 4 B 10:20-12:00 (1D221)

Chair: Russ Hepworth-Sawyer

Hans Lindetorp: Towards a standard for interactive music (20)

Interactive Media is a rapidly growing market and an increasingly important target for music production. The field has attracted a lot of focus from both the industry and academia, but there is still a great potential for better tools and formats for content creation and implementation. Open standards like HTML, CSS and javascript have contributed greatly to the growth of web-based interactive applications and the wide-spread support for Web Audio API now makes it possible to create dynamic audio applications for almost any device. But even if music is an important component in media production, there is still no open file format for delivering and sharing interactive musical content between different applications. This study aims at finding general requirements for such a format.

Over a period of eight years, students, teachers and researchers from the Royal College of Music in Stockholm have participated with artistic visions, prototyping and testing in the development of a javascript framework called "iMusic". With methods from the design research field this study draws conclusions from 100+ projects with a students-as-composers perspective and reveals several key concepts that arguably should be a part of the specification for an interactive music file format.

The result is compared with concepts used in tools like Ableton Live, LOGIC and Elias Studio and is an invitation to a broader discussion about file formats for sharing interactive musical content.

Jessica Edlom, Jenny Karlsson & Linda Ryan Bengtsson: Innovating music experiences – Creativity in pandemic times

The impact on the music industry due to the Covid-19 pandemic has been significant. When the opportunities to meet and spend time together are reduced, new challenges to build relationships and stay socially connected arise (Davies, 2020; Nguyen et al. 2020; Svensk live, 2020; Tschmuck, 2020). This paper presents a study on how the music industry and music practitioners in Sweden, responds to changed prerequisites, and more specifically how actors engage in innovation initiatives. The study based on an empirical study of music actors in Sweden in general, and the region of Värmland in particular. Data was collected between March 2020 and May 2021, with musicians, music companies, light and sound technicians, and suppliers among others from the music industry ecosystem. A survey was conducted, along with interviews, and participant observations of innovation workshops and processes, with focus on innovative ideas for how to collaborate, integrate and act in new ways, both on a local and global arena.

The pandemic has hindered artists and audiences to physically interact. Therefore has the experimentation predominantly been digital solutions (Hepworth-Sawyer et al, 2019). However, in our data actors have stated a lack of knowledge and technological resources for a digital transformation. It includes how to produce and consume digital events, how to charge for these events, and how to reach and engage their audiences in novel ways. But simultaneously we detected an innovative drive to identify and develop new ways to form music experiences. Our data show experimentation by musicians and event organizers arranging consents in alternative ways, both different types of digital live events and physical events such as for example boat concerts and “culture walks”. Central throughout our data was how physical meeting places were perceived as specifically important, not only as spaces for artists and fans to interact, but also to musicians well-being, identity, and as an arena for co-creative experimentation and learning. Conducting innovation workshops gathering a regional culture scene therefore came to be central to promote learning, creativity, new collaborations thus exploring innovative solutions. Apart from the disruption the pandemic has caused actors in the industry, it implies an opportunity to identify new innovative processes generating innovative solutions

for how to bring the artists and the fans closer together, and to create an economically and socially sustainable music industry.

Alicja Sulkowska: Before Our Spring – towards the concept of intermedial authenticity in a curated K-pop industry. On the example of Kim Jonghyun’s “Blue Night Radio”

One of the unique traits of the modern K-pop industry, often overlooked by mainstream media, focuses on an aspect seemingly unreachable for such a carefully crafted and manufactured genre. The concept of authenticity and personal relatability of creative contents is namely becoming essential for K-pop audiences, often ultimately determining the reception of particular artists. As the interaction with the recipients had always been the key to the dynamics of K-pop structures, this media-dictated view on known authenticity and persona-models becomes in a certain sense vital for the genre dynamics, influencing the emotional engagement of the fans in the interaction with the artists.

The paper aims to reconstruct those narrative mechanisms significantly profiling today's K-pop scene, responsible for its global success. Connecting the characteristics of Hallyu-development to the interactive media platforms, the study portrays K-pop as a medial phenomenon based on an interpretative exchange between fans and artists. The concept of Emotional Memory Impact (EMI), discussed and analysed on the example of texts by Kim Jonghyun and Blue Night (BNR), the radio show he hosted, is therefore presented as a practical, if not necessary, tool enabling the genre a feasible adjustment to today's media reality, directly contributing to the unfolding of authenticity strategies implemented on and off-stage. Based on an interdisciplinary analysis of those formats and their comparison with other texts created in the span of the artist's career, the study presents BNR as an ideal representation of the EMI-model and the fulfilment of the intermedial authenticity principle, oriented on recipients' long-term emotional engagement.

Those dynamics, interpretative exchanges, and performative gestures contributing to the final authenticity-effect are discussed on the example of the interactive structures and engaging semantic networks developed by Kim on multiple medial levels. His music and lyrics, combining diverse cultural references and aestheticised means of expression, initiated namely a long-term emotional interaction with the audience, influencing both sides in their (auto)creative journey within the medial frames.

Analysing Kim's book, solo albums, and his radio show, the paper investigates the gradual construction and stabilisation of the authentic artistic identity

Jonghyun developed inside those formats, reflecting on the emotionally engaging impact this concept had on the audience of different medial products. Considering the analysed formats' unique character and narrative qualities, the paper explores those textual networks and their performative potential in terms of audience's input in the actual co-creation of both the artist's identity and fans' receptive integrity on medial matrixes.

While interdisciplinary mapping and analysing the threads and storylines of Jonghyun's texts, the article presents a complex image of the Korean entertainment industry and characterises its unique concept of artistic authenticity, a priori thought as an interactive one. Presented with the help of diverse medial and sociological concepts, as well as observations of the intensive content exchange between the audience members, the emotional authentication strategies, as the ones visible in the pioneering work of Kim, are viewed here as community-grounding instances, intensifying the genre's communicative potential.

Dave Fortune: Composing Without Keys: The LFO as a Composition Tool

Since the advent of contemporary music sequencers, two methods have been dominant for the purpose of generating and inputting musical motifs; the discrete step sequencer, and the MIDI keyboard. Early versions of the step sequencer, such as those found on the Moog Modular Synthesizer 1p (released in 1969), allowed the user to choose multiple CV (control voltage)-generated pitches manipulated by potentiometers; while later permutations, including those favoured by Roland and Sequential Circuits on several of their widely used 80s synthesizers, used similar CV technology, but controlled by a conventional chromatic keyboard. More recent, software-based sequencers and DAWs favour the use of a digital MIDI keyboard which is typically used to record MIDI note data in real time. While these methods are commonplace and highly effective in most instances, many contemporary composers and producers seek to employ methodologies that eschew these familiar musical interfaces in favour of alternatives that may engender less predictable results.

This paper explores the creative potential of one of the most primitive and commonplace synthesizer components, the LFO (low frequency oscillator), for generating melodic content. The LFO's conventional use is as a modulation source, one that can create cyclical variations in characteristics such as volume, timbre or pitch. It is typically employed to add vibrato or other subtle embellishments to synthesizer patches, or in some cases to generate more drastic effects characterised by aggressive rhythmic pulses. Its use as a melodic tool has been explored to some extent within the domain of

modular synthesis, however modular synthesis's inherent limitations make it less than ideal for this purpose where convenient parameter recall, duplication, precise synchronisation and multitimbrality are characteristics which are both preferable and sometimes difficult to achieve in the modular domain, particular for users with access to limited resources. This paper, therefore, focusses on research of the LFO's capabilities within the digital domain, specifically within the Max/MSP for Live environment. This not only allows for favourable performance with regard to the aforementioned characteristics, but also has the potential to be accessible to a wide range of practitioners within the field of DAW-based composition. The research herein seeks to benefit the wider community of practitioners who wish to augment the existing conventional and generative methodologies available to them for musical creation.

Session 4 C 10:20-12:00 (1E207)

Chair: Rob Toulson

Mads Walther-Hansen & Anders Eskildsen: Forceful Action and Interaction in Non-Haptic User Interfaces for Music Production

One key challenge for the design of meaningful and intuitive user interfaces without haptic or visual feedback is to provide users with a clear sense of agency similar to that which characterizes everyday motor cognition (Jeannerod 2006). Drawing on the study of force dynamics (Johnson 1987) as a fundamental and embodied structure of human imagination and reasoning, this paper explores how the categories of action and interaction factor into a user's experience and understanding of interfaces.

Previous research shows that music interfaces built on embodied concepts are easier to learn (e.g., Antle et al. 2009) and more intuitive to use (Leman and Godøy 2010). Still, embodied concepts are difficult to implement in interfaces for complex tasks such as music production which often operate on a symbolic level that is distinct from the bodily gestures of users (Magnusson 2009).

We argue that these difficulties are connected to variations in how users make sense of their body movements in relation to sound and how users conceive of sound in general. Some users may be predisposed to understand sound as something caused by their bodily actions, for instance, singers and instrumentalists who generate sound through and with their body and, accordingly, think of sound (in the act of singing and playing) as something that originates from their forceful actions. Other users may instead be predisposed to conceive of sound as

something that already flows outside the boundaries of their body. In this case, body movements change the sound or make it audible as an effect of interaction with sound.

To better understand the effect on user behavior of these predispositions and expectations, we designed and tested a force dynamics-based, mid-air interface which distinguishes between action-like operations and interaction-like operations. The interface was designed using Supercollider and LEAP-motion sensors.

Based on observations of user behavior and qualitative inquiries into the user experience of music production with the interface, we assess how users make sense of the interface and its affordances. We discuss the implications for non-haptic interface design, including different ways in which body movements can be mapped to sound-creating actions and sound-interaction patterns to produce a meaningful and intuitive user experience.

Charles Norton, Justin Paterson & Daniel Pratt: Musical connections and enhanced performance control, a strategy to reduce complexity

This paper considers the forging of fresh and creative connections between performers and their sound-generating systems. The activity of routing and combining performative modulation signals requires focus, and attention to the detail delivered both to and from the logical parts of the brain. Such issues pervade numerous disciplines, for example the designers of ‘new instruments’, or the dance movement-sensor community. During both the design phase of a new instrument, and the performance of a construct, it is the process of making such connections that will define and influence the final output in the most profound way. However, this process is often tedious, time-consuming, and is broadly incompatible with achieving and maintaining the crucial state of flow.

Views of a group of creative practitioners were explored through semi-structured interviews, and many themes were then identified and unified using thematic analysis.

This research illuminated two key issues, and these are presented in this paper. Firstly, such practitioners need to deploy any control interface that they possess or design, regardless of the quantity and style of physical controls and their direct compatibility with the target system. Secondly, they generally have a strong desire to not repeatedly reconfigure each new sound structure to provide compatibility with their performance apparatus. In response, a prototype solution to these problems is presented. Using a combination of suitable technologies, strategies to unify two different systems will be demonstrated. Deploying Symbolic Sound's Kyma sound-design platform as a host to

generate a dynamic set of sound structures which contain a number of varied control types, Max and Node.js (JavaScript) server are then used to map, combine, and route control signals which can be assigned, merged, and swapped in real-time without interrupting the sound processing or performer flow. This system allows one or more performers and their director to interact with the same system, turning an offline logical configuration process into a real-time reflexive act. The paper charts the genesis of this research, demonstrates the current strategies, and extrapolates towards future requirements and development.

Kjell Andreas Oddekalv: Rap as composite auditory streams: Techniques and approaches for layered vocal production in hip-hop and their aesthetic and philosophical implications

A recording of a rapped verse is a musical object encoded with many layers of meaning. It communicates the emcee's musical and lyrical message, but also his or hers implicit values of “realness”, cultural belonging and skill. But even when we as listeners consider a recording a “performance”, accepting that it has been frozen in time and will forever be exactly the same (physically, at least), that performance will typically consist of multiple layers of audio coming together as one composite auditory stream.

The degree to which the layers of the composite auditory stream blend together or drift apart will impact the reception of the whole in various ways. Musicians and producers take different approaches when utilising layers of vocal takes in rap flows, from the subtle and minimal – preserving an illusion of the rap being a single utterance from a single voice – to the transparent – giving the different layers different musical roles.

This paper presents and analyses various vocal layering techniques applied in hip-hop recordings. Ranging from the ever-present “backtrack” that is almost inseparable from the main track of the recording, via more novel (but still fairly subtle) techniques like hard panned double-takes and sung backtracks, to more experimental blending of multiple tracks with different filter effects applied to them.

The application of such techniques have not only straight-forward aesthetic implications, but also more essentially philosophical ones. One question is if there is a certain suspension of disbelief – who is really the performer, and is the performer “fully human”? Another is how techniques like this can use the already blurred line between speech and song that rap straddles – and if this has implications for

how we experience the music. Finally, one example will showcase how a production and mixing technique can both make the rap's composite auditory stream, and its shifting from blend to separation and back again, emphasise and add onto the lyrical theme and content of a song.

**Liucija Fosseli: Music Business
Present and Future Innovations.
Perspectives of international
songwriters and producers working
towards China's market**

The issue of unfair remuneration for music through streaming services and frustration of needing to give royalty shares to artists who did not contribute to the songs are the two most discussed problems within this sector which even resulted in "Pay Songwriters" movement in England. It seems that the pressure for change is increasing and considering the technological developments there is a belief that the music industry is moving towards another disruption that will change the industry and the business models within it.

The past disruption has shifted the industry from low volume/high value to the high volume/low value structure though leaving operations of existing intermediaries somewhat the same. Therefore, there are some controversy on the idea that the next revolution and development of technologies such as blockchain, AI or Big Data would change those industry structures and the power dynamics within it. However, changes seem to be difficult to implement in the west due to the strong influence and presence of the major players, something that is not present in countries such as China. China has international ambitions, power to implement quick changes and technological capabilities which allow them to innovate and reform the way the music business has been operating.

My research will be based on qualitative interviews with intermediaries such as publishers and A&Rs and international songwriters (topliners, lyricist, and producers) who write songs for Chinese pop artists. I aim to identify current challenges and opportunities as well as new alternatives for songwriters and producers to manage their royalties in international market f.e. through blockchain based music companies such as Kobalt. Why do songwriters choose to work with Chinese songwriters and producers? Is it a profitable market to be at for a songwriter considering still existing copyright uncertainty? What are the advantages and challenges for writing songs for Chinese artists? How does the development within the blockchain technology affect the international music business? These are the key questions I am aiming to answer with my PhD project.

**Keynote 4: Håkan Lidbo 13:00-
13:50 - 1C103 (Lilla salen)**

What is music really? How do we create it, what does it give us, how do we use it and how can what we call music sound? These are questions that the music producer, artist and inventor Håkan Lidbo



explores. This is the second time that Håkan Lidbo is a keynote on Innovation in music and we are very happy to have him with us again!

**Session 5 A 14:00-15:40 - 1C103
(Lilla salen)**

Chair: Henrik Frisk

**Stefan Östersjö & Jan Berg, Anders
Hultqvist: A Deepened 'Sense of
Place': ecologies of sound and
vibration in urban settings and
domesticated landscapes**

Much "acoustic ecology" approaches the environment and its sounds in objectifying terms, making recordings of "environmental" sounds as raw material for artworks. Numerous cultural critics have noted that our cultural tendency to objectification is rooted in the empirical sciences, in taxonomic systematization and measurement, and in the generalised and ubiquitous dominance of sight over sound. Much acoustic ecology relies on the model of preservation (recording), an ecological strategy that has less and less credence in contemporary environmental debate. Against this is

proposed a participative approach to the sonic environment, where performers and audience produce sounds in dialogue with the specific sites explored, in keeping with the more participative and engaged turn in contemporary environmentalist thinking.

This paper outlines the conceptual framework of Invisible Sounds, an ongoing project, combining sound art, musical composition and audio technology. So far, two sub-projects have been executed and preliminary findings of these are reported and discussed. Invisible Sounds is a study of experimental sound art which aims at revealing and exploring environmental sounds that are not audible to the human ear but otherwise physically perceptible, if subconsciously - sound/vibrations that are not typically the object of our attention, and that we may actually, mentally "filter out" (i.e., traffic rumbling, room tone, lighting buzzes, etc.). Still these "invisible sounds", surround, affect and are affected by human beings and their presence in the world. In the media industry, particularly film and games, the performance of audio-visual systems and thus the ability to convey a finer level of detail constantly increases; thus, small but significant auditory cues can be reproduced. By studying structurally meaningful musical and sonic interaction through sensor technologies, the project aims to expand our human understanding of, and engagement with, the "more-than-human" world. Earlier explorations of acoustic instruments adapted for site-specific work have shown that the "background noise" of the specific place - the rushing of water, wind in pine trees - is an essential element if the musico-sonic interaction is to really have a sense of place. Increasingly, we find unnatural ambient sounds mixed in with the wind and water, even in the most natural of places. When such sounds are captured and subsequently reproduced by means of a spatial audio system, the sensation of being enveloped by sound enhances this experience of being present in the environment, and potentially the unnatural finds its place in the soundscape. The interaction between a performer and the acoustical space is a significant component in any performance. Invisible Sounds seeks to enhance such experiences through the use of sensor technologies and spatial recording techniques, and the paper discusses how such experiences can be represented and further communicated through digital media. Ultimately, the paper proposes that mediating technologies can be designed for developing better awareness of place, through the interaction between sensor technology, spatial recording techniques and an approach to ecological sound art that is participatory rather than passive.

Andy Visser & Justin Paterson: HAPPIE: The Haptic Audio-Production Pipeline – A novel method for accomplishing audio-production tasks using haptic feedback within a Mixed Reality [MR] environment

The 'Haptic Audio Pipeline for the Production of Immersive Experiences' (HAPPIE) project is an Innovate-UK-funded consortium effort that is developing a new protocol to unify all forms of haptic hardware and relevant software. As part of this, an audio-production pipeline (H-APP) has been developed that employs 6DOF high-resolution multi-point force feedback. Audio is modelled as an abstraction in a virtual environment, that the user can touch and reshape with their hands according to physics modelling properties such as friction, centre of gravity and resistance. The shape is mapped to numerous audio-production parameters via semantic relationships that enable neural-network-driven parameter reduction, and as the user manipulates the shape with their hands, complex and intuitive control of the audio can be exerted. The system operates in mixed reality so that the user can superimpose this mode of interaction upon their natural field of view and continue to simultaneously operate a conventional hardware or software production setup. Mixed-methodology user testing has been conducted to appraise the relevant HCI issues and implications. This paper presents a detailed insight into this project.

Jon Marius Aareskjold-Drecker & Ragnhild Brøvig-Hanssen: Vocal Chops: Balancing the Uncanny Valley

Vocal chops have become one of the defining musical features of pop and EDM during the twenty-first century, and can be characterized as samples that are juxtaposed, rearranged and re-pitched to create hooks and effects. Vocal chops are usually manipulated to create a peculiar non-human sound—they are often transposed about an octave higher than the average speech pitch range—and rearranged into a melody with abrupt and often illogical transitions between the sounds. In this paper, we will first explore vocal chops' historical roots, framing it as the most recent incarnation of producers' and listeners' enduring fascination with vocal manipulation and androids. Among its predecessors we trace are specific examples of vocal manipulation within electroacoustic music, electronic music, turntablism and hip-hop sampling, and experimental forms of popular music. As well as pointing to the fascination with android vocals, we also discuss their perception as residing in the "uncanny valley," where such sounds might evoke responses such as unease and strangeness. We

further relate the discussion of divergent responses to various theoretical perspectives from popular music studies addressing ambiguous responses to technological manipulation of sounds (i.e. Frith 1986; Haraway 1991; Katz 2004, Kelly 2009, Laing 1991, and Prior 2009). We also draw on some cognitive perspectives that relate aesthetic experiences to violation of expectations (i.e. , including Huron 2006; Menninghaus et al. 2019; and Meyer 1956). Next, we demonstrate various approaches to making vocal chops and various effects that can be achieved by using this technique. As well as relying on our hands-on experience with music production, we here also draw on interviews that we have conducted with distinguished Norwegian EDM Producers, including SEEB and TRXD who make extensive use of this technique in most of their songs.

Jacob Westberg: Ludonarrative Harmony: Music production through the lens of game design

This is a study of how game design has influenced my artistic process as a music producer for a video game called *Sang: The Desert Blade*. The artistic practice is used to explore a concept in game design called ludonarrative. The experiences gathered from this exploration are presented with examples of music that have been created and implemented for the game during this study. The music examples are contextualized together with video documentation from my creative process and video recordings of the game. The study concludes that videogame music is directly interconnected with game design and its aesthetics is directly affected by the degree to which a music producer is included in the development team. The study also shows how unpredictability is a fundamental part of game design and suggests how it can be explored in future artistic research of video game music.

Session 5 B 14:00-15:40 (1D221)

Chair: M. Nyssim Lefford

Thomas Bårdsen: Improving the republishing process of legacy music productions through documented source selection and reformatting

Music streaming services not only make available a broader palette of contemporary music but also makes back catalog productions increasingly available. The revenue from catalog music is growing fast, and by many accounts, it is growing even faster than its contemporary counterparts. As a

result, both evaluations for catalog rights and the demand for even more available legacy content is escalating.

At the same time, criticism regarding republished recordings is, unfortunately, a returning problem. This criticism is primarily focused on three main aspects: the selection of source material, the transfer/reformatting process, and the manipulations done in the remastering stage. This paper seeks to address the first two aspects. The background for the inquiry is the National Library of Norway and its function as the main domestic music production archive and transfer studio. Recording studios, artists, and record labels archive their original master tapes and other media assets at the National Library. In addition, the National Library provides services regarding both preservation, transfer, and re-use of legacy productions. The National Library collaborates with the music industry on hundreds of projects annually with over 3000 tracks republished last year.

Rather than the somewhat romantic idea of the master tape being a fixed defined object sitting in a vault clearly labeled and with a defined way of reproduction, the reality in the music production archive is far more complex. Based on broad knowledge the archivists and audio engineers need to balance a variety of factors selecting the best source and procedure for each case.

Building on work by Luca Cossetini and Angelo Orcalli and their approach for critical editing of electronic and mixed music, a tentative framework for evaluating and documenting source selection and reformatting efforts in the Norwegian music production archive is proposed and exemplified. Using this framework, the archivists and engineers could possibly find help in their assessment. The framework would also help document the process in a structured way, and thus provide transparent information to labels, mastering engineers, and possibly the public. What objects were available, what was their condition and on what ground were the preferred sources selected? Was the source treated prior to playback, what playback equipment was chosen for the transfer, what playback settings were in use, and on what grounds was this exact procedure selected? As time goes by the number of documents, objects, and information regarding a production would only grow. At the same time, the degradation of original sources and equipment would continue. Current digital safety copies and remastered editions would in themselves become valuable new entities for future re-evaluation. Documentation on past assessments would be of great value in future re-evaluations of the production.

Toivo Burlin: Mobile Classical Music – Recording, Innovation and Mediatization. Three Swedish case studies from the 1940's to 2021

The mobile-produced recording and its methods are as old as the recording technology itself. As well is mobile recording, with analogue or digital equipment, of Classical music. The technologically logical continuation on the earliest mobile recording studios, is the network studio of the 1990's or the modern mobile DAW (Digital Audio Workstation), which has developed in the recent years of the pandemic from 2020 and onwards. It has had its effects on classical recording.

In this paper I present and compare three cases of mobile-produced Classical music recordings – in its widest sense – from the 1940's to 2021 in a Swedish context.

The first case study is record company Swedish Society Discofil's recording tours with bus and car around Sweden in the 1940's, producing innovative recordings of amateur choirs and orchestras. The company first recorded on 78's, then started to use reel-to-reel tape recorders and microphones of highest quality. Together with for example Metronome they were marking the beginning of a more self-aware and confident Swedish music industry after World War II. I specially will present the not so well-known 78 recordings.

The case study number two is Bis, which in the beginnings was a Swedish one-man company producing advanced low budget recordings with a mobile studio. Bis' mobile recordings of the 1970's and 1980's, released on LP's and then, as one of the first companies in the world on CD's, laid the foundation for one of the few globally successful record companies specialized on Classical music.

The third case study presented is a very modern one: during the period of the Covid 19 pandemic, many musicians, composers and producers / engineers have tried to find new, safe ways to make music together: composers with their own labels, networks, and the formation of distance orchestras, and producing and releasing music through digital but non-physical distribution as Bandcamp. In this example, aleatory symphony orchestras recorded different parts of newly written compositions in different places, after which the parts are edited by the composer and the producer into electro-acoustic compositions, without the musicians even having met.

Overall: in this study I investigate the relation between mobile recording technologies and practices, in a historical context, and Classical music: how has the shifting styles of "Classical music" been affected by mobile music- and recording technology? At the same time, I asking questions of musical and technological innovation as well as mediatization, of recorded music.

David Thyérn, Jan-Olof Gullö, Per-Henrik Holgersson & Thomas Florén: Icebreakers and clusters within the Swedish music wonder

In our ongoing project Searching for Sophia in Music Production, we explore factors that have been of great significance for the Swedish music wonder. In this paper, the aim is to identify important individuals in various genres that have paved the way for Sweden's international success in music. One hypothesis we are working with is that a few innovative individuals who acted as "icebreakers" created smaller "clusters" centered around record companies that were highly influential. We present a selection of musical icebreakers and clusters that have successfully contributed to the Swedish music wonder: Stig "Stikkan" Anderson and Polar Music International AB, Bert Karlsson and Mariann Records, Ola Håkansson with Sonet and Ten Music Group, Robert von Bahr with BIS Records, Per-Olof "Pelle" Karlsson with Prim Records and Dag Volle "Denniz PoP" with Cheiron Studios. The study is methodologically based on literature studies and an inventory of source material as well as interviews with key people in Swedish music life. Theoretical perspectives include Jennifer Lena's and Richard Peterson's (2008) model for the life cycles of genres, with stages of creation, development, conservation and stagnation, Paul Thompson's model for creativity in record production (2019) and Mats Trondman's theories of folk musical expression (1999). In addition, the analysis also uses theories in motivational research (Deci & Ryan, 2000) and entrepreneurial research with relevance to music and music industry development (Tschmuck, 2006; Östman 2018). Our analysis clearly shows that single theories cannot explain all essential parts of the Swedish music wonder. A combination of several theories and explanatory models is therefore needed. In our presentation, core issues around this are discussed.

Russ Hepworth-Sawyer, Rob Toulson & John-Paul Braddock: UDPI Mastering Protocol

Mastering engineering has evolved considerably in recent years, owing to new and resurgent delivery platforms, and also in response to the emergence of equal loudness playback and the adoption of EBU R-128 loudness and true peak measurements. A further recent consideration is spatial audio content, which has first been adopted by Apple Music who utilise the Dolby Atmos format. As a result, mastering engineers have seen, in recent years, an increase in the request for additional master 'versions' to be delivered alongside the final stereo master. Additional versions may include the common instrumental, and often one with just backing vocals.

However, many mastering engineers are also regularly requested to export mastered stems for remix engineers to utilise, to deliver masters at different bit rates and resolution levels, and to normalise versions to different average and true peak requirements. Multiple master versions are therefore expected by the client, yet usually without the necessary recompense for the mastering engineer. It is therefore hypothesised that a new and more efficient audio archive format can be developed; one which allows mastering engineers to deliver a single artefact that can automatically render the different master versions that may be required by different clients, broadcasters, CD manufacturers, vinyl plants and digital distributors.

Here, the authors bring together prior informal discussions held at the Audio Engineering Society's first UK Mastering Conference in 2018 at the University of Westminster and those further formalised within a chapter for the conference proceedings book 'Mastering In Music' (Braddock et al. 2020), in which the Universal Description Protocol image (UDPi) system is proposed. UDPi is an encapsulated format for mastering delivery to labels and clients, bringing several benefits including a highly flexible archival format, incorporating detailed metadata, which has opportunities to enable more efficient and reliable methods for distributing music masters to all relevant stakeholders. During this presentation the UDPi proposal will be described and justified further, alongside a practical demonstration of the UDPi encoding and decoding methods. The authors will therefore present their research-in-progress, promoting further discussion and seeking support for a future format for audio master delivery.

Session 5 C 14:00-15:40 (1E207)

Chair: Hans Lindetorp

Mads Walther-Hansen: Music Production Entrepreneurship – Between Art and Business

This paper explores the relationship between music production as an artistic practice and music production as a business. Drawing on the principles from LEAN-entrepreneurship (Reis 2009) and the idea of the minimum viable product (MVP), I, first, argue for the need to employ more entrepreneurial thinking in the music production business, then, second, I offer an account of the challenges entrepreneurial methods pose for music producers with a passion and love for the music they produce.

LEAN entrepreneurship emerged as a method in the software industry to develop products faster and reduce the risk of economic loss. A key feature of

this method is the MVP that was designed as the basis for continuous iterations with customers. The MVP is a means to learn from the market: to find out who the customers are, to learn what the customers value about the product, and to develop further based on feedback from customers. But how do these principles work when the product is not software but a music track – an artistic creation of aesthetic value? And, if music production is an artform – as Edward Kealy argued in 1979, and several other scholars in the decades that followed – how do iterations of music productions, based on customer feedback, challenge artistic integrity?

Independent music producers today have more possibilities than ever to publish, promote, and distribute their own music, and the number of entrepreneurship modules in music and music production higher education courses continues to grow. However, recent reports from Danish music conservatories show that many music students see entrepreneurship as antithetical to artistic practices (Hosbond 2019; Zachariassen 2016), and several international studies conclude that musicians, more broadly, simply dislike the term entrepreneurship (e.g., Gangi 2015; Dumbreck and McPherson 2016).

In dealing with these challenges, I aim to reframe entrepreneurship as a practice that balances art and business, and I suggest that music producers can make good use of LEAN entrepreneurship principle to navigate the inherent instability of the music market.

Thomas Arctaedius, Martin Q Larsson, Emilie Lidgard & Madeleine Jonsson Gill: Experiences from a Learning Lab – Cross Innovation in Music/Arts

Today Cross-innovation is by many considered as a key-factor in generating innovative and disruptive ideas. Having a look beyond the boundaries of one's own sector is becoming increasingly important; cross innovation can foster unexpected growth. Cross-sectoral innovation means collaborative and user-driven innovation that happens across sectoral, organizational, technological and geographic boundaries, transferring approaches from other branches to one's own field of business and thus creating something new. Methods, tools and processes are transferred between different areas of work

In a project called LLCI Learning Lab – Cross Innovation, we created a series of workshops where three groups of people met: students from the Royal College of Music, entrepreneurs from the culture incubator KLUMP and persons from industry with management roles within areas of innovation, development and research.

In the LLCI project we define Cross Innovation as applying methods, perspectives and tools from the

cultural and creative sector on other sectors in society, e.g. software, finance, industry, public or health care sectors.

To create an environment and processes where cross innovation can occur is difficult. Crossing barriers involves the need of listening and understanding in new ways. Participants must be able and willing to be open and curious, language barriers must be handled and an expectation must be managed.

The LLCI project focused on the artistic process and how to put the artistic perspective and practice in new areas and problem domains. The project explored how students from artistic education and cultural entrepreneurs can work with external parties to together create new opportunities and projects. The project posed a creative challenge in how artistic perspectives and methods can be brought into new contexts.

Learning Labs is an exploratory environment where we combine different areas of discipline and working methods. Together with external organizations, we investigate cross-sectoral innovation on a small scale.

During the workshops in LLCI we used the The Double Diamond design process model, developed at the Design Council in 2005. The process model is graphically based on a simple diagram describing the divergent and convergent stages of the design process, which gives the model the form of a double diamond.

We share our experiences from our LLCI project as results structured as (1) examples of methods and principles that are needed to foster the emergence of cross innovation projects, (2) reflections from participants and (3) examples of cross innovation collaborations that was created as a result of the project.

Daniel Pratt & Toby Seay: Time, place, and reflexivity: the recording space as an instrument

The recording engineer is an experienced actor in the studio environment often overlooked in academic literature in favour of the more romantic notion of the record producer. In this paper, we frame the recording engineer as a mediator that operates the recording studio as an interactive instrumentalist. To evaluate the engineer in their habitat, we conducted a series of recording sessions over three days in June 2019 at three different institutions in Brisbane, Australia (JMC Academy, Queensland University of Technology, and Brisbane Boys College). We documented and participated in these recording sessions and analysed how the recording engineer operates in the environment using three key themes. After the initial investigation, we are continuing to address the changing state of the recording environment, and to address the shifting boundaries

of who is participating in these environments. This paper represents the ongoing progress of this project by observing how younger, more diverse engineers are approaching the recording environment, and how this compares with the current doxa that frames the recording engineer. To better understand these processes, we will present up to date observations from sessions recently conducted at the Stockholm Royal College of Music by two student participants.

Samantha Talbot: Song Worlds: Spontaneity, Intimacy, and Immersion. Music Video from Glencoe

This practice-based presentation demonstrates the making of spontaneous songs of soul and intensity composed in the moment of production from the intimacy of the vocal booth to the studio, to contested or threshold spaces, to imaginary worlds, to make timely onto-epistemological connections between spontaneity, performance, the feral or nomadic, embodiment and everyday doing.

One-take impromptu records exist (Broughton, 2005; Bitchin Bajas and Bonnie Prince Billy, 2016; Springsteen, 1982) yet those by women songwriters (Cluck, 2006, 2014; Talbot, 2018) generate a lacuna in the literature. There are precedents: Patti Smith's seminal, incantatory *Horses* (1975) and PJ Harvey's compelling demos (1993, 1995; Mongredien, 2020) which resemble forces of nature. Aptly, Gustav Thomas (2019: 69), seemingly summing up my songwriting methods, distinguishes 'Wild Pop' from improvisation in its 'commitment to make the final version in the moment of its inception; to make definitive performative statements without preconception, planning or rehearsal'.

Similarly, Bonnie 'Prince' Billy's 'immersive songwriting' (Deusner, 2016) and Bill Callahan's pioneering imminence (Clarke, 2020) conceivably dwell in a radical phenomenology of time (Barbaras, 2008; Csikszentmihalyi, 1975; Merleau-Ponty, 1962) as Other than labour (Graeber, 2018), affording '...more lucid explorations, less urgency' (Fisher, 2017). There may be at play a Žižekian tension of 'embrace or escape' (Parker, 2004: 123) between getting lost in the material and emerging through it; symptomatic of albums being 'a general confrontation with the world' (Grubbs, 2014: xi). There is a social restlessness at work in many songwriting practices, indicative of the ambiguity of Bob Dylan's recent 'live stream' 'Shadow Kingdom. The Early Songs of Bob Dylan' (Har'el, 2021).

This practice-based presentation charts the role of a female songwriter inhabiting various song worlds to elicit what a nomadic creative practice might look like in the contemporary moment. An original spontaneous song recorded at St. Mary's Space, Scotland, underwent various cycles of transformation. It then morphed into music video/audio-visual composition in the wilds of Glen

Coe, with BAFTA New Talent award winning Scottish director, Simone Smith. The methods draw upon the vitality of contemporary DIY models of music production and marketing, such as the impromptu videos of American electronic artist Omar S and his band walking in downtown Detroit (2020), and instances of ‘haptic visuality’ (Marks, 2000), prophetic (Halprin, 1947) or ‘feral’ (Monbiot, 2013) performance, resulting in an alternative form of songwriting and music video production in the genre.

Concert & Paper presentation: Henrik Frisk - Lilla salen 16:00

Literate programming and documentation of artistic processes

The general question of how to document artistic processes is largely unsolved, mainly because each process is relatively unique (See Frisk (2018) for a related discussion on documentation). The particular case of documenting compositional processes in electronic music, let alone attempting to document the actual sonic objects that are the result of such processes, has its own set of challenges. Not only due to the fact that it is difficult, the benefit of documenting is sometimes less than the time consumed by doing it. There are at least two aspects to this: (i) In a world where almost everything is constantly recorded or potentially so, meticulous documentation of ones process may seem ubiquitous. Almost everything leaves a digital trace and that this may be difficult to trace later is easily forgotten. (ii) Even if the compositional process may be of interest to the composer or others, it is still not necessarily worth the while. Recreating from memory may be just as valid, and perhaps artistically more apt. After all, the documenting force is to some degree rooted in a modernistic view where the key to the work lies in the material with which it was created.

Though the elements of the process as material for an interpretation is questioned, an assumption in this paper is that the artistic work process constitutes knowledge and that this knowledge may be useful for the development of the process. This kind of knowledge is difficult to grasp and assess, due to its elusiveness and refusal to adopt to predefined categories. Part of the ambition here, however, is to show that the method presented may not only exemplify a method for documentation, but that it may also create an understanding of artistic knowledge.

The method is built on using a technique referred to as literate programming. Literate programming was proposed by Donald Knuth (1984) to allow for a different structure for programming, one that is

more closely related to natural language than machine code, and that is structured the way that humans understand logic rather than how machines understand it. Needless to say, what this meant in 1984 is quite different from what it may mean today and the method here may appear arcane to users of GUI based systems for composition such as some of the modern DAWs or software like Max or PureData that has improved the situation for for human friendly computing. Knuth's ideas, however are interesting in the context of music composition precisely because it allows the user to structure the music programming process in a way that is less governed by the logic of the language and more structured in a way that improves structure and understanding.

Practical examples from an ongoing compositional process is presented and discussed and the particular feature of literate programming that allows documentation be embedded with the code is demonstrating the self documenting aspect of the method.

Panel 4: Final reflections & Future perspectives 16:40

Chair: Mats Trondman

In this last session, we summarize our experiences from the conference and discuss the upcoming publication. And we must also look ahead: Where will the next Innovation in Music conference be held? And when? Panelists are Russ Hepworth-Sawyer, Justin Paterson, Rob Toulson, J-O Gullö & Dave Hook.

CONFERENCE PROGRAMME - Innovation in music 2022

FRIDAY 2022-06-17

15:00	KMH FOAJE - Registration
15:30	Welcome to Innovation in music 2022! - Lilla salen
15:45	Keynote 1: Armen Shaomian
16:30	Panel 1: Copyright, Entrepreneurship & Innovation in Music Armen Shaomian, Christian Råsmark, Linda Portnoff, Thomas Arctadius & Örjan Strandberg
17:30	Seminar with online presenters Paul Novotny: <i>How to Put Together a Premium DIY Dolby Atmos 'Tiny Studio' on a Budget</i> (44); Anders Lind: <i>Music for the mobile phone orchestra, string orchestra and analog synthesizers: An evaluation of a concert hall performance including 15-year-old non musicians as performers</i> (22); Pedro Miguel Ferreira: <i>Road(ies) To Nowhere? A Portuguese live music perspective</i> (7); Eirik Askerøi: <i>Sonic Markers in Popular Music: Innovation - Trend - Tradition</i> (40); Ola Buan Øien: <i>The Dialogue of Mr. Question Mark and Sylvia Massy: Challenging norms at the intersection of crafts and creativity in music recording contexts</i> (70); . Chair: J-O Gullö
18:15	Wine reception

SATURDAY 2022-06-18

08:45	Welcome with music: Henry Mikkonen & Martin Åberg - Lilla salen		
09:00	Seminar with online presenters Yuxiang Cai, Rui Liu and Xuefeng Zhou: <i>An investigation of piano timbre preference based on employing equalizer to adjust the harmonic loudness</i> (14); Martin Koszolkó: <i>Connecting across borders: communication tools, group structures and practices of remote music collaborators</i> (8); Hussein Boon: <i>Two Production Strategies for Music Synchronisation As Speculative Entrepreneurship</i> (39); Yngvar Kjus, Ragnhild Brøvig-Hanssen & Solveig Wang: <i>Encountering new technology: A study of how female creators explore DAWs</i> (43); Scott Stickland & Nathan Scott, Rukshan Athauda: <i>The DAW Collaboration Framework: Improving Creative Opportunities and Authenticity in Collaborative Online Audio Mixing</i> (55); Samuel Lynch & Helen English, Jon Drummond, Nathan Scott: <i>Exploring Dynamic Music Methods to Extend Compositional Outcomes</i> (Chair: J-O Gullö)		
09:50	Coffee break		
10:20	Papers (parallel sessions)		
	Session 1 A	Session 1 B	Session 1 C
	1C103 (Lilla salen) Chair: Justin Paterson	1D221 Chair: Russ Hepworth-Sawyer	1E207 Chair: Rob Toulson
10:20-10:40	Ingvald Koksvik: <i>Staging Nations of Space: Developing a Creative-Based Model for Compositional Design</i> (76)	Claus Sohn Andersen: <i>The space is the place - Interplay and interaction in an extreme location</i> (24)	Matthias Jung & Vegard Kummén: <i>Hacking the concert experience - exploring co-creative audience interaction at a chiptune live performance</i> (56)
10:45-11.05	Henrik Langemyr: <i>Henrik Langemyr: Music(al) Production: To Compose and Produce Musical for Recorded Medium: Based on the Perspective of Music, and Media Production</i>	Matthew Lovett: <i>Artificial creativity and tools for understanding: music, creative labour and AI</i> (34)	Haoran Jiang: <i>A History of Taiwan's Recording Industry: Production and Promotion Strategies of Campus Song Records by Synco Corporation</i> (52)
11:10	Marc Estibeiro: <i>An interactive chamber work for two classical guitars and electronics which uses the natural sound of the acoustic instruments as both source material for electronic processing and as a means of controlling the electronic part</i> (33)	Tony Dupé: <i>Self Production as a Creative Practice</i> (86)	Mat Dagleish: <i>Unconventional Inputs: The Modular Synthesizer as One-Handed Instrument</i> (97)
11:35	Stephen Bruel: <i>Remastering Elton John's Goodbye Yellow Brick Road</i> (18)	Leigh Shields: <i>Exploring the history of distortion in Drum and Bass</i> (36)	Shib Shankar Chowdhury: <i>Autoethnography and composition for Innovative music creation about Pandemic with reference to "I Am Virus"</i> (47)
12:00	Lunch		
13:00	Keynote 2: Susanne Rosenberg		
13:50	Short break		
14:00	Papers (parallel sessions)		
	Session 2 A	Session 2 B	Session 2 C
	1C103 (Lilla salen) Chair: J-O Gullö	1D221 Chair: David Thyrén	1E207 Chair: Per Henrik Holgersson
14:00	Håkan Lindberg: <i>Innovation solving problems with vocal recordings</i> (51)	Florian Hollerweger: <i>Audio beyond Demand: Creative Reinventions of the Broadcast Listening Experience</i> (57)	Kirsten Hermes: <i>Levelling up chiptune: nostalgic retro games console sounds for the ROLI Seaboard</i> (65)
14:25	Emil Kraugerud: <i>Closeness beyond closeness: The technological facilitation of acousmatic hyperintimacy</i> (9)	Sven Ubik, Jakub Halak, Martin Kolbe & Jiri Melnikov: <i>Comfortable playing together over distance</i> (106)	Ambrose Field & Ling Ding: <i>Innovation and music business: a new approach for international partnership in music</i> (69)
14:50	Bjørnar Sandvik: <i>Sample, Slice, and Stretch! Four Innovative Moments in the History of Waveform Representation</i> (58)	Mattias Petersson: <i>A new morphology – Strategies for innovation in live electronics performance</i> (46)	Egor Poliakov & Martin Pfeleiderer and Christon-Ragavan Nadar: <i>Analyze! Development and integration of software-based tools for musicological and music theoretical needs</i> (88)
15:15	Antti Sakari Saario: <i>"Yesterday's Charm, Today's Precision": Martin B. Kantola and the design of a new 'classic' microphone (Nordic Audio Labs NU-100K)</i> (94)	Zachary Diaz: <i>Signifyin(g) Producers: The Roland SP-404 and The Evolution of Live Instrumental Hip-Hop Performance</i> (13)	Christos Moralis: <i>The 'Performable Recordings' model: Bridging the gap between the 'Human' and 'Non-Human' in Live Electronic Music Performance</i> (104)
15:40	Refreshments		

16:00	Papers (parallel sessions)		
	Session 3 A	Session 3 B	Session 3 C
	1C103 (Lilla salen) Chair: J-O Gullö	1D221 Chair: David Thyrén	1E207 Chair: Per Henrik Holgersson
16:00	Scott L. Miller & Carla Rees: <i>Telematic Performance and Recording of Interactive Electroacoustic Chamber Music</i> (35)	Phil Harding: <i>Transforming A Pop Song: The Journey of the Extended Club Remix</i> (11)	Henrique Portovedo & Ângelo Martingo: <i>Transforming Performance with HASGS: research-led artistic practice in augmented instruments</i> (54)
16:25	Online Concert	M. Nyssim Lefford & Gary Bromham: <i>David Moffat: From Intelligent Digital Assistant to Intelligent Digital Collaborator</i> (16)	Ambrose Field: <i>Rethinking the relationships between space, performance and composition in notated acoustic composition: Quantaform Series</i> (92)
16:50		Brendan Williams: <i>Creative Potentials for Dolby Atmos: Presenting the self-balancing acoustic ensemble</i> (49)	Hans Lindetorp: <i>Gesture-controlled synths with WebAudioXML</i>
17:15	Short break		
17:30	Panel 2: How to get published? And Book releases Chair: Rob Toulson - Hannah Rowe - Editor at Routledge Taylor & Francis Group; Kirsten Hermes, Russ Hepworth-Sawyer, Paul Thompson,		
18:15	Keynote 3: Sven Ahlbäck, Christian Råsmark & Rob Toulson		
19:00	Tour of the Royal College of Music		
19:30	Conference dinner - KMH Atrium		

SUNDAY 2022-06-19

08:45	Welcome with music: Henry Mikkonen & Martin Åberg - Lilla salen		
09:00	Panel 3 : Exploring Dolby Atmos: Past Present and Future Chair: Dan Pratt - Andy Visser, Bruce Woolley, Andrew Bourbon		
09:50	Coffee break		
10:20	Papers (parallel sessions)		
	Session 4 A	Session 4 B	Session 4 C
	1C103 (Lilla salen) Chair: Justin Paterson	1D221 Chair: Russ Hepworth-Sawyer	1E207 Chair: Rob Toulson
10:20	Enric Guaus & Alex Barrachina, Gabriel Saber, Victor Sanahuja, Josep Comajuncosas: <i>Exploring a network setup for music experimentation</i> (75)	Hans Lindetorp: <i>Towards a standard for interactive music</i> (20)	Mads Walther-Hansen & Anders Eskildsen: <i>Forceful Action and Interaction in Non-Haptic User Interfaces for Music Production</i> (32)
10:45	Paul Thompson, McNally Kirk & Toby Seay: <i>Multiple Takes: Multitrack Audio as a Musical, Cultural, and Historical Resource</i> (72)	Jessica Edlom, Jenny Karlsson & Linda Ryan Bengtsson: <i>Innovating music experiences – Creativity in pandemic times</i> (64)	Charles Norton, Justin Paterson & Daniel Pratt: <i>Musical connections and enhanced performance control, a strategy to reduce complexity</i> (91)
11:10	Jo Lord & Michail Exarchos: <i>Dynamic meta-spatialisation: Narrative and recontextualisation implications of spatial stage stacking</i> (26)	Alicja Sulkowska: <i>Before Our Spring – towards the concept of intermedial authenticity in a curated K-pop industry. On the example of Kim Jonghyun's "Blue Night Radio"</i> (79)	Kjell Andreas Oddekalk: <i>Rap as composite auditory streams: Techniques and approaches for layered vocal production in hip-hop and their aesthetic and philosophical implications</i> (53)
11:35	Stefan Östersjö, Thanh Thuy Nguyen & Matthew Wright: <i>Yellow music in diaspora: Re-inventing the sound of pre-1975 record production in Sài Gòn</i> (66)	Dave Fortune: <i>Composing Without Keys: The LFO as a Composition Tool</i> (83)	Lucija Fossell: <i>Music Business Present and Future Innovations. Perspectives of international songwriters and producers working towards China's market</i> (90)
12:00	Lunch		
13:00	Keynote 4: Håkan Lidbo		
13:50	Short break		
14:00	Papers (parallel sessions)		
	Session 5 A	Session 5B	Session 5C
	1C103 (Lilla salen) Chair: Henrik Frisk	1D221 Chair: Chair: M. Nyssim Lefford	1E207 Chair: Hans Lindetorp
14:00	Stefan Östersjö & Jan Berg, Anders Hultqvist: <i>A Deepened 'Sense of Place': ecologies of sound and vibration in urban settings and domesticated landscapes</i> (100)	Thomas Bårdsen: <i>Improving the republishing process of legacy music productions through documented source selection and reformatting</i> (29)	Mads Walther-Hansen: <i>Music Production Entrepreneurship – Between Art and Business</i> (38)
14:25	Andy Visser & Justin Paterson: <i>HAPPIE: The Haptic Audio-Production Pipeline – A novel method for accomplishing audio-production tasks using haptic feedback within a Mixed Reality [MR] environment</i> (30)	Toivo Burlin: <i>Mobile Classical Music – Recording, Innovation and Mediatization. Three Swedish case studies from the 1940's to 2021</i> (45)	Thomas Arctaedius, Martin Q Larsson, Emille Lidgard & Madeleine Jonsson Gill: <i>Experiences from a Learning Lab – Cross Innovation in Music/Arts</i> (50)
14:50	Jon Marius Aareskjöld-Drecker & Ragnhild Brøvig-Hanssen: <i>Vocal Chops: Balancing the Uncanny Valley</i> (42)	David Thyrén, Jan-Olof Gullö, Per-Henrik Holgersson & Thomas Florén: <i>Icebreakers and clusters within the Swedish music wonder</i> (31)	Daniel Pratt & Toby Seay: <i>Time, place, and reflexivity: the recording space as an instrument</i> (111)
15:15	Jacob Westberg: <i>Ludonarrative Harmony: Music production through the lens of game design</i>	Russ Hepworth-Sawyer, Rob Toulson & John-Paul Braddock: <i>UDPI Mastering Protocol</i> (78)	Samantha Talbot: <i>Song Worlds: Spontaneity, Intimacy, and Immersion. Music Video from Glencoe</i> (41)
15:40	Refreshments		
16:00	Concert: Henrik Frisk		
16:40	Panel 4: Final reflections & Future perspectives Mats Trondman (chair) Russ Hepworth-Sawyer, Justin Paterson, Rob Toulson, J-O Gullö & Dave Hook		
17:15	End of conference - FAREWELL BAR		
17:45	Tour of the Royal College of Music		