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| **> https://www.crowdcast.io/soniccultures <** | |
| **Monday 14 December**  to  **Friday 18 December**  2020 |  |
| Timetable | |

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| **Monday 14 December** | |
| 10:00am - 10:30am | Informal Networking Opportunity |
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| 10:30am - 12:00pm | Conference Welcome and Electronic Soundscapes Panel  chair: David Clayton |
|  | ‘All Those Sounds Lying Dead’: The Haunting Strangeness of Sound Technology in John van Druten’s Flowers of the Forest / Marta Donati  ‘Wireless for the Blind’ and ‘Television for the Deaf’: Disability, d/Deafness, Technology and Sound / Rachel Garratt  Field Recording, Technology, and Creative Listening / Jean-Baptiste Masson  Electronic Musical Instruments as Interactive Exhibits in Museums: Three Case Study Objects / Edward Wilson-Stephens |
| 12:00pm - 2:00pm | Lunch |
| 2:00pm - 3:30pm | Sonic Methodologies  chair: James Mooney |
|  | (Re)creating Sonic Pasts and Cultures: Mechanical Recording Technologies as a Tool in Understanding Early Sound Recording / Inja Stanović  How to Talk about Sound: Semantic Dimensions of Abstract Timbres  / Ben Hayes and Charalampos Saitis  Music and Deaf Culture in the Digital Age / Octavia Rioual  Divergent Sonic Cultures: Investigating the Vocalisations of Large Whales and Birds  / Ann Warde |
| 3:30pm - 4:00pm | Coffee Break |
| 4:00pm - 5:30pm | Instrument Makers  chair: Edward Wilson-Stephens |
|  | The Mysterious Kymographer / Daniel Walden  Sounding the Circuit: Reconstructing the Terpsiton / Christina Dörfling  The Tavil As A Modern Instrument / Thamarai Selvan  Electronic and Sonic Cultures of Techno, House, and Hip-Hop: From Technological Determinism to Musicians’ Creative Practices / Samuel Lamontagne |
| 5:30pm - 6:00pm | Coffee Break |
| 6:00pm - 6:30pm | Performance |
|  | ‘Untitled VII’ / Marianthi Papalexandri-Alexandri and Pe Lang |

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| **Tuesday 15 December** | |
| 8:30am - 9:00am | Informal Networking Opportunity |
| 9:00am - 10:30am | Sonic Futures: Collecting, Curating and Engaging with Sound at the National Science and Media Museum |
|  | James Mansell / Alexandre DeLittle  Annie Jamieson / Aleksander Kolkowski |
| 10:30am - 11:00am | Coffee Break |
| 11:00am - 12:10pm | The Sound Archive - Institutions and Memory  chair: Tim Boon |
|  | Sound Instruments and the Archival Impulse: Recording and Archival Technologies in European Radio, 1930-1945 / Carolyn Birdsall  Listening Instruments and Methods: Auscultating Museological Bodies & Spaces  / Salomé Voegelin and Mark Wright  Stroh Violin and Auxetophones / Aleksander Kolkowski |
| 12:10pm - 2:00pm | Lunch |
| 2:00pm - 3:00pm | Technological Mediations of the Voice-Body  introduction: TBC |
|  | Anna Thomas / Jacob Kingsbury Downs  Jacob Mallinson Bird  Titles TBC |
| 3:00pm - 3:30pm | Coffee Break |
| 3:30pm - 4:40pm | Sound Embodiment  chair: TBC |
|  | Art of Noise, Sculpting Music: The Sound Sculptures of Derek Shiel / Brian Inglis  Tactile Speech and Biosensor Performance as a Case of Voice-Skin / Zeynep Bulut  The Psychotechnics of Musical Listening / Joshua Navon |
| 4:40pm - 5:10pm | Coffee Break |
|  | P.T.O. |
| 5:10pm - 6:20pm | Silence, Noise, Dynamics  chair: Trevor Pinch |
|  | Pauses for Thought: The Political Ecology of Recorded Silence in Jennifer Egan's *A Visit From the Goon Squad* / Michael Hedges  Symphonies of Colour & Sound: Performative Enactments of Deafness  / Jaipreet Virdi  Opera, Musical Theatre, Amplification, Microphones, Dramatic Narrative  / Gabriella Roderer |
| 6:20pm - 7:00pm | Social Session |

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| **Wednesday 16 December** | |
| 8:30am - 9:00am | Informal Networking Opportunity |
| 9:00am - 10:30am | ‘Need We Say More’: Contemporary Responses to the Fairlight CMI  introduction: Paul Harkins |
|  | Paul Harkins / Manuella Blackburn  Rob Puricelli / Stefania Zardini Lacedelli |
| 10:30am - 11:00am | Coffee Break |
| 11:00am - 12:30pm | The Matter of Sound  chair: Annie Jamieson |
|  | Sound as Material: The Design and Performance of Historical Theatre Sound Effects  / Fiona Keenan  Reel-to-Unreel: Early Tape Use at the Groupe de Recherche de Musique Concrète and the Groupe de Recherches Musicales, 1951-1963 / Joseph Kay  EMT 140: What ‘The Sound of Philadelphia’ Sounds Like / Toby Seay  “A Cacophony of Bells, Screams, and Whistles:” “Endless Loop” Tape Tape Machines and the Sound Culture of Top 40 Radio / Alexander Russo |
| 12:30pm - 2:00pm | Lunch |
|  | P.T.O. |
| 2:00pm - 3:30pm | History and Material Culture of Electronic Music  chair: Edward Wilson-Stephens |
|  | “An infinity of timbres:” Sound Synthesis and the Origins of Electronic Instruments  / Cathy Lucas  Real Drums at Your Fingertips: A Close Reading of the LM-1 Drum Computer Interface / Greg J. Smith  Engaging With Electronic Music Technology in Finland in the 1960s and 1970s  / Mikko Ojanen  The Ceno-Orchestra and the Origins of Phonographic Listening  / Reuben de Lautour |
| 3:30pm - 4:00pm | Coffee Break |
| 4:00pm - 5:10pm | Sounding the Nation: Sound, Identity and Power 1  chair: Rachel Garratt |
|  | Sound Instruments and the Politics of Listening / Hugo Boothby  Musical Instruments as Military Instruments: The Sonic Culture of the US Military in World War II / David Suisman  The “Oriental Riff” Mystique: Electrifying Tapping Sounds, Mediating Sonic Popular Cultures / Runchao Liu |
| 5:10pm - 5:30pm | Coffee Break |
| 5:30pm - 6:40pm | Sounding the Nation: Sound, Identity and Power 2  chair: Marta Donati |
|  | Laura Redden and Herman Melville: American Civil War Poetry As Recording Technology / Jamie Fenton  Composing Cyberpunk: Sampling Asian Identity in Acoustic and Non-Acoustic Creative Music Processes / James Rushworth  Collecting Voices as a Cultural Technique. How Listening Cultures Instrumentalised Phonography in the Early Italian National Sound Archive (1928-1932) / Simone Dotto |
| 6:40pm - 7:30pm | Social Session |

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| **Thursday 17 December** | |
| 10:00am - 10:30am | Informal Networking Opportunity |
| 10:30am - 12:00pm | Using Sonic Material to Deepen Literary and  Art Historical Research  introduction: Emilie Morin chair: Deborah Kapchan |
|  | Heidi Stalla / Diana Chester  Madi Lommen  Titles TBC |
| 12:00pm - 2:00pm | Lunch |
| 2:00pm - 3:30pm | Music, Science and Instruments in France  from the 1789 Revolution to the First World War  chair: Graeme Gooday |
|  | Rebecca Dowd Geoffroy-Schwinden / Fanny Gribenski  Jillian Rogers / Sarah Fuchs  Titles TBC |
| 3:30pm - 4:00pm | Coffee Break |
| 4:00pm - 5:10pm | Curatorial Responses to Sound Instruments  chair: Edward Wilson-Stephens |
|  | Cybraphon: A Foray Into Museum Collecting of Social Media / Alison Taubman  Sound Playability and Sonic Mediation. Inside the 'Studio-Son' Sessions for Children by the Philharmonie de Paris / Frédéric Trottier  The Electronic Sackbut Project: How (and Why) We Are Making the World’s First Synthesizer Playable Again / Tom Everrett |
| 5:10pm - 6:00pm | Coffee Break |
| 6:00pm - 7:00pm | Keynote: Trevor Pinch |
|  | In the Moog: Psychedelic Tingles and Timbres |

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| **Friday 18 December** | |
| 10:00am - 10:30am | Informal Networking Opportunity |
| 10:30am - 11:40am | Community and the Co-Creation of Sound,  Music and Art  chair: Marta Donati |
|  | “Do Not Imagine that Because I am Silent I am not Present”: Sonic Communities in Samuel Beckett and Denis Johnston / Rhiannon Moss  Intersections in Musical Instrument Design and Maker Culture: Situating Contemporary Music Hacks and DIY Instrument Practices in the Age of the Makerspace / Jon Pigott & Aidan Taylor  Transforming Sonic Culture: Reformation of Traditional Chinese Musical Instruments in the Twentieth and Twenty-First Century / Joseph Wong |
| 11:40am - 2:00pm | Lunch |
|  | ‘Future Research Directions’ / Lunchtime Discussion (12:30pm - 1:30pm) |
| 2:00pm - 3:10pm | The Sound of Modernity  chair: Jean-Baptiste Masson |
|  | 2020 Vision: Sound Instruments and Virtual Reality / David Cotter & Ella Nixon  The Test-Disc Cultures of the Audio Compact Disc Format / Eamonn Bell  The History of Composing Automata / Nikita Braguinski |
| 3:10pm - 4:00pm | Coffee Break |
| 4:00pm - 5:10pm | Cultures of Sonic Resistance  chair: Mara Mills |
|  | Gender, Race and Power in the Interfaces of Analog Modular Synthesizer  / Asha Tamirisa  Hobbyist Radio Making in Early-Twentieth Century China / Paulina Hartono  “Yo Yon Mon Brooklyn!” The Brooklyn Pirate Radio Sound Map / David Goren |
| 5:10pm - 6:00pm | Coffee Break |
| 6:00pm - 7:00pm | Keynote: Mara Mills |
|  | “Everything is a Filter”? A Social History of the Electrical Filter |

# Abstracts and Biographies

Monday 14 December

Electronic Soundscapes Panel (10:30am - 12:00pm)

Marta Donati

Marta Donati is a current third year PhD student at the University of Sheffield, working on spectrality and bereavement in inter-war British and American theatre. She previously completed a BA in English and Related Literature and an MA in Film and Literature at the University of York. She is part of the WRoCAH Electronic Soundscapes Network.

‘All Those Sounds Lying Dead’: The Haunting Strangeness of Sound Technology in John van Druten’s Flowers of the Forest

In the inter-war period, occultist belief underwent a strong renaissance in anglophone countries. In the United Kingdom alone, the conjunction of thousands of deaths caused by World War I and the increased engagement with new communication technologies fuelled the creation of new metaphors and mythologies, which flourished in the fragmentation that characterised post-war climate and modernist culture. The functioning mechanisms of sound technologies, such as telephone, gramophone and radio, held a certain paranormal lure; the development of the wireless inspired avenues of telepathic research. This paper considers the 1934 occultist war play Flowers of the Forest to discuss the intertwinement of spiritualist and scientific discourse within popular culture. The play stages an instance of telepathic communication with a deceased World War I soldier, framing telepathy as a healing tool for mourners, but this telepathic episode is placed within a larger dramatic context which constantly comments on and showcases the haunting strangeness of recorded sound. Taking into consideration the relationship between physical bodies and disembodied voices, this study follows the trail of the sound within the text, in order to detect, within it, the influence of what Roger Luckhurst has termed ‘the technologisation of the occult’ on inter-war mourning practices.

Rachel Garratt

Rachel Garratt is a third-year doctoral candidate and part of the White Rose Electronic Soundscapes Network. Her thesis focuses on the enabling and disabling effects of talkie cinema, wireless and television on d/Deaf people in the early to mid-twentieth century. Her project explores how d/Deaf people engaged with or rejected new soundscapes, how this contributed to the divergence of d/Deaf identities and how questions of d/Deaf identity are expressed in historiography.

‘Wireless for the Blind’ and ‘Television for the Deaf’: Disability, d/Deafness, Technology and Sound

This paper focuses the campaigns of two organisations that attempted to provide newly emerging technologies for blind and d/Deaf people. The Wireless for the Blind campaign of the late-1920s was born out of an alliance between St Dunstan’s Veterans Hospital and the Royal National Institute for the Blind. The aim of the campaign was to provide blind people in Britain with free radio sets and licenses, presenting the wireless as an essential and ideally suited medium for blind people.

In the early-1950s the National Institute for the Deaf launched their Television for the Deaf campaign. It followed many of the same patterns as its predecessor, the Wireless for the Blind campaign, yet was markedly less successful.

In this paper I explore the factors that led to the success of Wireless for the Blind and comparative failure of Television for the Deaf/ I focus on the predicted use of sound to blind and d/Deaf people, discrepancies in the power advocates for each group held, and how each campaign has been remembered or neglected historically.

Jean-Baptiste Masson

Jean-Baptiste Masson is a composer and PhD researcher in the History Department of the University of York, where he works on listening and its relationships with society and technology, with a special emphasis on field recording, its history and philosophy. He holds a BA in Archaeology (Université de Bourgogne) and a MA in Composition (Université de Reims Champagne-Ardenne). His music covers a broad spectrum, from field recording to string quartet and choir. He often improvises with friends in the bands Jah Poney and Colonne Drone.

Jean-Baptiste is also a cultural organiser, working with different organisations in France (Collège Contemporain, European Creative Academy, Fondation Royaumont, Paravision Music).

Field Recording, Technology, and Creative Listening

While more and more used in music and sound art, field recording remains under theorised. This paper aims to study this practice in relation to technology and to modes of listening. I argue that field recording cannot be fully understood without considering the role of its mediating technological tools: microphones, headphones, recorders and speakers. I discuss that this set of audio technologies acts as a way of ‘translating’ the environment by allowing for a detachment toward what is listened to. I also conceptualise listening as a creative stance. To support my claim, I deploy historical examples from the sound hunting movement alongside recent scholarly works that investigate the role of imagination and empathy in music extending this method to ambient sounds. Finally, I argue that field recording can be used as a method to engage creatively with the environment.

Edward Wilson-Stephens

Edward Wilson-Stephens is a PhD student currently researching the design, use and interpretation of electronic musical instruments as interactive exhibits in museums, as a collaboration between the University of Leeds and the National Science and Media Museum. As part of the upcoming *Sonic Boom* exhibition at the museum, he has designed an interactive exhibit titled *Drum and Bass – Time and Space* as a means of testing a new, flexible model for interaction design that supports the needs of different museum contexts and audiences.

Electronic Musical Instruments as Interactive Exhibits in Museums: Three Case Study Objects

Many music- and science-focused museums around the world have acquired electronic musical instruments within the scope of varying collection remits. Often these objects are used to shape themes and narratives of local, national, and international design innovation in exhibitions of music and sound, and help materialise the history of composition and performance, as well as listening and recording practices, as experienced in amateur and professional settings. Additionally, the inclusion of interactive exhibits based on such instruments can help bring exhibition themes and narratives to life beyond the potential of hands-off object displays, visual culture, and sound stations (for example), by supporting visitors with differing learning styles and offering more engaging multi-sensory experiences.

However, as every museum and exhibition space is different, and every electronic musical instrument has been designed to offer specific affordances, it is difficult to develop a universal method for re-designing these instruments using approaches from interaction design. Therefore, the aim of this paper is to demonstrate the various challenges in replicating the interfaces, sounds and technologies of ‘vintage’ electronic musical instruments as new interactive exhibits for museums, and discuss ways in which these challenges impact upon the interpretation of such technologies by visitors. These challenges will be explored through a review of museums, based on observations of three case study objects (the Electronic Sackbut, Mellotron M400, and Roland TR-808), the use of the interactive exhibits which accompanied these objects, and interviews conducted with members of exhibition teams in North America, Europe and the UK.

Sonic Methodologies (2:00pm - 3:30pm)

Inja Stanović

Dr. Inja Stanović is a Croatian pianist and researcher, born in Zagreb and currently residing in Sheffield, UK. As a pianist, Inja has performed in Croatia, Australia, France, Germany, Italy, Slovenia, Mexico, the UK, and the US. Inja is also a published author and has held various academic posts. She is currently conducting a research project under the title “(Re)constructing Early Recordings: a guide for historically informed performance” at the University of Huddersfield.

(Re)creating Sonic Pasts and Cultures: Mechanical Recording Technologies as a Tool in Understanding Early Sound Recordings

Musicologists and performers often use early sound recordings as an exemplar of past performing practices; these recordings provide a sonic evidence of how musicians performed, and how they read musical texts at the end of the nineteenth and early twentieth centuries. Although these recordings are gaining increasing prominence within musical research, relatively little is known about the specific conditions of mechanical recordings production or the means of their reproduction. This is problematic, since an understanding how sound was captured in a particular setting, and how it was subsequently transferred into a digital form, is crucial for our understanding of the recording itself. This paper discusses mechanical recording processes in the context of three-year research project (Re)constructing Early Recordings: a guide for historically-informed performance. Supported by the Leverhulme Fund and University of Huddersfield, this unique and highly experimental project focuses upon the production of early recordings made with mechanical technologies, and it aims to understand the extent to which performers needed to adjust their playing in response to the recording medium and recording process. Throughout three years, various recording contexts were reconstructed, including a large number of phonograph cylinder recordings (2 and 4 minutes), 7 and 10 inch records of solo piano and diverse chamber settings. By presenting a selection of recorded materials, and discussing various mechanical recording technologies used during the recording process, this paper suggests ways in which technological and reconstructive contexts form a redefinition of strategies of documentation, thus influencing future readings of early recordings and historically informed practices.

Ben Hayes and Charalampos Saitis

Ben Hayes is an electronic musician and researcher focusing on timbre perception and neural audio synthesis. He is currently completing his masters in sound and music computing at Queen Mary University of London’s Centre for Digital Music, where he is due to commence his PhD later this year, focusing on perceptually motivated approaches to creative sound synthesis. As a musician, he has toured internationally and is currently signed to R&S Records.

Charalampos Saitis is Lecturer in Digital Music Processing at Queen Mary University of London’s Centre for Digital Music, where he studies how humans process and conceptualise sound, what aspects of the sound experience are embodied, and what relations are formed between perception, language and meaning. He has co-edited the volumes Timbre: Acoustics, Perception & Cognition (2019) and Musical Haptics (2018). His research has received funding from the Austrian Science Fund, British Academy and Leverhulme Trust.

How we Talk about Sound: Semantic Dimensions of Abstract Timbres

Synthesisers, in their many forms, enable the realisation of almost any conceivable sound. Their fine-grained control and broad timbral palette call for a descriptive lexicon to enable their verbal differentiation and discussion. While acoustic instruments of the western classical lineage are the subject of an extensive body of enquiry into the perceptual attributes and semantic associations of the sounds they produce, abstract electronic sounds have been comparatively understudied in this regard. In particular, the diverse vocabulary used to describe such classical acoustic instruments can be summarised with three conceptual metaphors — such musical tones have luminance, texture, and mass — but this has yet to be explicitly confirmed for the kinds of electronic sounds that pervade many modern sonic cultures.

In this work, we present an experimental paradigm for studying the semantic associations of synthesised sounds, wherein a group of experienced music producers and sound designers interacted with a web-based synthesiser in response to descriptive prompts, and provided comparative semantic ratings on the sounds they created. The words used for semantic ratings were selected by mining a text corpus from the popular modular synthesis forum Muff Wiggler, and analysing the frequency of adjectives in contexts pertaining to timbre.

The ratings provided by participants were subject to statistical analysis. From 27 initial adjectives, two underlying semantic factors were revealed: terms including aggressive, hard, and complex associated with the first, and dark and warm with the second. These factors differ from those found for classical acoustic sounds, implying a relationship between the qualia of a sonic experience and the language employed to talk about it. Such insight has implications for how sound is conceptualised, understood, and received within sonic cultures — in particular, those predicated on electronic or abstract sound — and applications in developing novel control schemes for synthesis methods.

Octavia Rioual

Always passionate about music, I choose to study this field. In 2017, I wrote a Master’s thesis about the impact of technologies on the different modes of music visualisation. By studying this kind of musical perception - visual -, I came to wonder about the practice and the perception of music within the deaf culture. Now in the second year of a doctorate in musicology at Rennes 2 University, I analyse the impact of technologies through various approaches in the Deaf community.

Music and Deaf Culture in the Digital Age

Over the 20th century, industrialisation of society produced the development of new techniques and new technologies. Since, those devices are taking up more and more space in our daily lives. In art, and more specifically music, technologies have caused a radical break between practices of the previous century and this one : the sound has become an object in its one right. From now on, artists from different horizons use this new object in their practice, giving it new facets. But, what would happen if this new object was used in a culture where his main feature – audio – was no longer in the equation?

Deaf culture is a perfect example. In a world where sound is the centre of everything, the idea that Deaf people practice and perceived music is quite paradoxical. However, new technologies, as oscilloscope, have shown that music may not be simply listen, but also seen, and more… Then, what does sound and music become in the hands of Deaf artists using technologies to increase its expressive power ?

Christine Sun Kim is an American sound artist. Profoundly deaf since birth, she thought for a long time that sound was not part of her life. Yet, she discovered that this wasn’t true. Using performance, and technologies as video or speaker, she decided to questioned the place of sound and music in society, exploring different sound conception or ways of perception – as vibration.

Analysing her work, our purpose here is to interrogate the link between sound instrument and Deaf culture has a multi-sensory comprehension of sound.

Ann Warde

Ann Warde is an independent scholar, composer, and sound artist. Following a Mellon Postdoctoral Fellowship in music at Cornell University, she was an analyst, programmer, and team leader in the Lab of Ornithology’s Bioacoustics Research Program (2004-2014). A 2015-16 US-UK Fulbright Scholar, her publications include scientific bioacoustics articles (Aquatic Conservation, JASA) and forthcoming chapters on spectromorphology (Cambridge Scholars Publishing), ecomusicology (Oxford University Press), and music, technology, and philosophy (Orpheus Institute). zsonics.org

Divergent Sonic Cultures: Investigating the Vocalisations of Large Whales and Birds

The scientific study of sounds made by baleen and sperm whales has historically been a particularly challenging endeavour, due to the extraordinarily large sizes of these animals and the deep marine habitats in which they live. The establishment of scientifically viable mappings of vocalisations to specific whale species is a relatively recent development, expedited by the rapid growth of 21st-century sound instruments and their facilitation of more facile ocean observation. However, many unknowns remain.

Prior to 1948, most cetacean biologists believed whales did not make sound; in 1949, a dictaphone machine recording made by scientists William Schevill and Barbara Lawrence in the vicinity of beluga whales motivated the scientific community to join experienced sailors and indigenous whale hunters in recognizing the acoustic abilities of cetaceans. The set of intercultural interactions and technological procedures leading to the scientific discoveries of sounds made by any large whale species is unique; each spawns a distinct human sonic culture.

The diversity of these methodologies contrasts with the development, beginning in the early 20th century, of a relatively homogeneous sonic culture devoted to the recording of birdsong. The Cornell Lab of Ornithology was one of the first to develop systematic recording approaches, and historically its recordings can be understood to be “composed” by means of a protocol centered on capturing focal recordings of the species of interest without the presence of anthropogenic sound. Intended for quantitative measurement and analysis of bird vocalisations, these recordings also provide materials to assist the general public in gaining expertise in the identification of the songs of specific bird species: early commercial releases issued by the Lab included narrative soundscapes (“An Evening in Sapsucker Woods”).

This talk seeks to explore underlying explanations for the evolution of differently structured sonic cultures within the larger animal acoustic communication community.

Instrument Makers (4:00pm - 5:30pm)

Daniel Walden

Daniel Walden is a Junior Research Fellow at The Queen’s College (Oxford), whose work combines music theory with the global history of science and society, postcolonial studies, and media theory. His current book project examines how entanglements between European and non-European ideas of musical tuning reconfigured geopolitics, and his recent publications have appeared in The Oxford Handbook to Timbre and History of the Humanities, and Early Music History. He is also an experimental pianist ([www.danielwaldenpiano.com](http://www.danielwaldenpiano.com)).

The Mysterious Kymographer

Philosophers and scientists have for centuries begun their inquiry into the nature of harmonic phenomena by contemplating geometrical figures. Platonists speculated that five regular convex polyhedra (tetrahedron, cube, etc.) gave structure to the cosmos; the 14th-century followers of Oresme scrutinised natural phenomena through co-ordinate planes mapping changes in the intensities of their qualities (Gingerich 1992, Tanay/Chen-Morris 2008). Similar visual enchantments held the attention of 19th-century champions of “kymographs,” mechanical instruments for the automatic transcription of complex phenomena developing over time (e.g. blood pressure, tidal patterns—and acoustics) as waves across co-ordinate planes. Scholars scanned the “landscape of curves” generated by kymography in search of commonalities pointing to unified theories of nature, while maintaining that its visual traces eliminated reliance on less trustworthy faculties of perception—like hearing (Brain 2002, Charadrevian 1993).

This context provides the backdrop for my analysis of an unnamed device at the Harvard Collection of Scientific Instruments, of uncertain purpose, date, and provenance. I call it the “Mysterious Kymographer” (M.K.) after Kepler’s Mysterium Cosmographicum (1596)—for I argue that despite their chronological distance, both aimed to provoke speculation on harmonic and acoustical phenomena by producing a lexicon of enchanted graphical shapes. I analyse the M.K.’s “apodeictic” and “epideictic” functions (Creese 2010); connect its operations to instruments by Kelvin, Henrici, Harvey, and Yule in the Science Museum Group collections; and consider the sonic cultures with which it was co-produced by examining its role in the Helmholtz-Koenig debate about the intelligibility of waveforms and timbral perception (Pantalony 2009). Building on STS, object-oriented ontology, and critical media studies, I consider whether we might better classify the M.K. as an instrument of acoustical philosophy instead an acoustical science—for its inscrutable traces were not designed to generate knowledge about the sonic, as much as to inspire passionate contemplation of its enchantments.

Christina Dörfling

Christina is research associate at University of Music Weimar in the research project „Music Objects of Popular Culture“. She studied Media Studies, Musicology and History at Humboldt-Universität Berlin. 2015 to 2018, Christina worked as research assistant at University of Arts Berlin. There she completed her PhD thesis “Circuit Stories: Resonant Circuitry at the Interface of Music and Media” in 2019. She was fellow at Deutsches Museum München and at MPI for the History of Science.

Sounding the Circuit – Reconstructing Terpsiton

In 1932 Russian engineer and cellist Lev Termen presented his latest novelty in a concert at Carnegie Hall New York City, which can be seen as a result of the electro-music euphoria of the 1920s, triggered by instruments such as Theremin, Ondes Martenot and Trautonium. The Terpsiton was a further development of the contactless played Theremin from 1919. While the pitch of the latter is controlled by hands approximating an antenna, playing the Terpsiton requires the whole body-movement – the instrumentalist dances on a platform, a capacitive sensor. Each movement, even the slightest, results immediate in a tone, which makes it almost impossible to play a specific melody. Due to the latter it didn’t find widespread use. Today only one reduced version of original Terpsiton can be found at Moscow, a reconstruction was built by myself and two colleagues in 2013/14.

Although Terpsiton hasn’t found its way into modern orchestras and musical practice, it is worth an investigation. While other early electrophones had been especially designed for orchestral use, Terpsiton is a hybrid. On the one hand its musicological significance derives from the fact that the tone, accompanied by a lightshow, is danced and that it even found its way into post-war composition, implicitly received in John Cages Variations V. The circumstance that the instrumentalist in generating tones gets ‘measured’ by the internal circuitry, forming a feedback loop with the internal circuitry opens on the other hand the possibility of media-scientific investigation, discussing Terpsiton as pre-cybernetic apparatus.

While drawing upon mixed materials like patents, newspaper articles, secondary literature and my own experience in reconstructing it, my presentation will sketch the history of the Terpsiton. Thereby I focus on its circuit and apparatus design, which makes it possible to tell its ambiguous history. In a wider perspective I question methodological potentials of reconstructing absent sound technology.

Thamarai Selvan

Thamarai Selvan, PhD research work is on the histories of musical instrument making in South India. Co-organised the workshop “Craft, Labour, Science: Making Knowledge with Practitioners” with the French Institute of Pondicherry and the Practice Collective. Recently presented a paper “Production of Taste and Sound: Jackfruit wood and Instrument Making’ in the Republic of Plants International conference organised by Moving Crops research group (Max Planck Institute for the History of Science Berlin) and IIT Madras supported by Society of History of Technology (SHOT).

The Tavil as a Modern Sound Instrument

My paper is going to explore the history and the development of the Tavil drum as a modern sound instrument in nineteenth and twentieth century South India. Musicians who play the instrument have been concerned with its sound for a long time. While the Tavil drum is considered an old sound instrument, it has never been static and has undergone many technological and material changes through its history. In the paper, I will focus on the late colonial and post-colonial period. The twentieth century brought many changes to the instrument both by practicing musicians and the instrument making community, and through changes in the supply of raw materials for making the drum, especially wood and leather, which occurred during the world wars. I will discuss how the search for sound motivated the musicians to experiment with craftsmen in improving the sound of the instrument by experimenting with different materials in the last four decades.

My paper approaches the Tavil drum through the History of Technology to understand how various actors (craftsmen, leather workers, technicians, machine builders, musicians), who are part of the instrument’s network, have collaborated and shared their knowledge on sound and material to innovate on the sound instrument in the workshop space. Archives are largely silent in documenting knowledge of this kind, and in order to understand the historical changes in the instrument and instrument making, I study the drums and other data available in colonial and post-colonial museum collections in South India, and interact with contemporary instrument makers and others who are involved in making and using the Tavil drum. This, I argue, will enable us to understand the transformation of the sound instrument in space and time within the sonic culture of a particular local space, as well as the people involved in the process.

Samuel Lamontagne

Samuel Lamontagne is a UCLA Ph.D. candidate in ethnomusicology. My research focuses on electronic music and hip-hop in the particular context of the city of Los Angeles. It further deals with the history of sonic cultures, technology, and media circulation. I am the current editor-in-chief of the UCLA peer-reviewed journal Ethnomusicology Review.

Electronic Instruments and the Sonic Cultures of Techno, House, and Hip-Hop: From Technological Determinism to Musicians’ Creative Practices

Electronic music instruments’ interfaces are often presented as attractive and user-friendly. Presenting them as thus supposes that their potential uses are explicitly suggested in their very morphologies. Such a hypothesis leads to favour particular creative and gestural potential uses as immanent to electronic music instruments. Further following this hypothesis can directly lead us into the pitfall of technological determinism. Regarding technology as independent from social and cultural processes, technological determinism considers the role of technology in transforming culture and society to be located in technology itself. As Bruno Latour reminds us, if technical objects prescribe uses and configure users, it is not because of an inherent and determinate quality. However, we can’t deny that a MPC1000 Akai, a Roland TB-303 or a TR-808, for example, are conceived for musical purposes, and that musicians habitually use them according to specific gestural practices.

Relying on Madeleine Akrich's concept of "script," and the role of the designer in defining the uses of its technical object, this presentation will attempt to question the place of electronic music instruments in the history of the particular sonic cultures of techno, house and hip-hop. This paper will first historically resituate the importance of each electronic instrument (MPC1000, TB-303, TR-808) in the aesthetic development of such popular music genres. Then, in a second phase, it will pay specific attention to the diverse appropriation practices through which musicians have continually re-invented the "script" of those electronic instruments and proposed new scenarios of uses. By focusing on musicians’ practices, this paper proposes a critique of technological determinism, too often taken for granted when studying the role of electronic instruments in the histories of popular music genres and the creative practices at the root of their sonic cultures.

Performance (6:00pm - 6:30pm)

Marianthi Papalexandri-Alexandri

Marianthi Papalexandri-Alexandri (1974/ Greece) is a composer and sound artist based in Switzerland and Ithaca, NY. She is known internationally for her elegant and innovative sound kinetic constructions that she develops both independently and together with Swiss kinetic artist Pe Lang. Papalexandri’s works interweave the borderlines of sound art, composition, visual objects and performance and explore the factors that link these art forms.

Papalexandri’s works have been exhibited internationally, including the Kunstmuseum Basel, MuDA museum of digital art, Zurich; Asmolean Museum, Oxford; Museum of Musical Instruments Berlin; ISEA, Hong Kong; San Francisco Art Institute; ZKM, Karlsruhe; Transmediale, Berlin; Espoo Museum of Modern Art, Finland, Donaueschingen Festival and Venice Biennale of Architecture. Marianthi had received commissions by Neue Vocalsolisten, Klangforum Wien, Ensemble Mosaik and festivals such as MaerzMusik; Japan Media Art; Ultraschall; ECLAT and Archipel among others.

The recipient of the Humboldt-University of Berlin: Cluster of Excellence International Fellowship (2015), Papalexandri has been honoured by numerous awards, residencies and grants, including the ProHelvetia grant, Ernst Von Siemens Foundation Commission, the Berlin Senate Sound Art Grant, the Swedish Arts Council Composition Grant, the Berlin Senate Composition Grant, the International IMPULS Composition Award and the Dan David Prize for Contemporary Music. Papalexandri has been nominated artist in residence at the Akademie Schloss Solitude, the Villa Concordia, the Humboldt-University, the Instrument Inventors Institute and the St John’s College, University of Oxford.

Since 2016, Papalexandri is an Assistant Professor of Composition at the Department of Music of Cornell University, in Ithaca NY. Marianthi is currently collaborating with Guy Hoffman and the International Contemporary Ensemble -ICE on a large scale project titled ‘Human and Machine Improvisation in Action’ supported by a Cornell NYC Visioning initiative grant.

Pe Lang

Pe Lang is known for creating minimal kinetic artworks and installations throughout Europe, Asia, and North America. In a constant process of gaining and losing control, Lang‘s kinetic installation engages a refined and focused exploration of interaction between the kinetic, the visual and the sonic. In 2007, Lang received a one year research residency fellowship at the Swiss Center for Electronics and Microtechnology CSEM. Lang was twice honoured with the prestigious swiss art award (2009 and 2010). Among other awards, Lang received the mediaprojects award in 2005, 2008 and 2011 from the Swiss Federal Department of Culture. Lang has received commissions by Swiss Science Center Technorama, the Villa Empain - Boghossian Foundation in Brussels and the Exploratorium in San Francisco as well as his works can be found in private, museum and foundation collections such as the EMMA - Espoo Museum of Modern Art, the Borusan Contemporary in Istanbul, the Museum of Science, Art and Human Perception in San Francisco, the Maxine and Stuart Frankel Foundation for Art in Mischigan, Futurium in Berlin, HeK Haus der elektronischen Künste in Basel and the Artphilein Foundation in Liechtenstein. Exhibitions of Lang's work include Museum Haus Konstruktiv, Zurich; Gallery Denise René, Kunsthal; Rotterdam; MuDA museum of digital art, Zurich; ZKM, Germany; HeK Haus der elektronischen Künste Basel; Fondation Vasarely, France; Kunsthalle Bern; Martin- Gropius-Bau, Berlin; Centro de Arte Santa Museum Mónica, Barcelona; Ashmolean Museum, Oxford; Art Plus Museum, Donaueschingen; the InterCommunication Center [ICC], Tokyo; Art Basel, Basel.

Untitled VII

Sound kinetic sculptural instrument by Marianthi and Pe Lang.

Untitled VII is a kinetic sculptural 360 degree rotating motor driven instrument that produces sound by a rosined motor driven wheel system that activates nylon strings attached to several elastic membranes stretched over acrylic tubes (resonators) which make the vibration of the strings audible.

Papalexandri’s Untitled VII (2019) solo for kinetic sound sculpture was commissioned for the ZeitRäume Basel Bienniale for New Music and Architecture presented at the Kunstmuseum Basel, supported with a grant from Ernst Von Siemens and ProHelvetia.

https://vimeo.com/433312073

Tuesday 15 December

Sonic Futures: Collecting, Curating and Engaging with Sound at the National Science and Media Museum (9:00am - 10:30am)

James Mansell, Alexandre DeLittle, Annie Jamieson, Aleksander Kolkowski

The Sound Archive – Institutions and Memory (11:00am - 12:10pm)

Carolyn Birdsall

Carolyn Birdsall is Associate Professor of Media Studies, University of Amsterdam. Her publications include Nazi Soundscapes (2012), Doing Memory Research (co-ed. with Danielle Drozdzewski, 2018), and “Listening to the Archives” (2019, co-ed. with Viktoria Tkaczyk). Birdsall is currently leading the NWO-funded project TRACE (Tracking Radio Archival Collections in Europe, 1930-1960), which explores transnational dynamics in how radio was historically recorded, archived, circulated and re-used in Europe.

Sound Instruments and the Archival Impulse: Recording and Archival Technologies in European Radio, 1930-1945

From the early 1930s onwards, new broadcasting houses were unveiled across Europe, often with modernist designs devised in response to the radio medium and its modern culture of sound. In Germany, Berlin’s broadcasting house, in use from early 1931 onwards, was striking not only for a commitment to new acoustic devices, studio design and soundproofing (Lubszynski and Hoffmann, 1931), but also for initiating a sound archive intended to facilitate programme production and historic preservation.

Expanding on recent work attending to the ‘archival impulse’ in the first decades of German radio (Birdsall, 2019), this presentation proposes the necessity of a stronger analytical attention to sonic technologies in the radio archive. It will identify the use of particular sound recording/playback devices – using wax, shellac, wire, steel tape, magnetic tape and flexidisc – along with sound devices facilitating the cutting, editing, copying and pressing of broadcast radio. The paper will attend to technical workflows by which radio productions, either from the studio or outdoor settings, were prepared for the sound archive, and in turn, how innovations in archival practices helped to shape standard practices in programme production.

As such, the paper asserts the necessity for a critical history of sound instruments and radio broadcasting that moves beyond a privileging of the studio setting as a site for new practices with sound technologies. While it welcomes a new critical attention to magnetic tape (Bohlman and McMurray, 2017), this paper argues for further sensitivity to the concomitant use of various disc and tape formats within the context of sonic technologies in the archive. Moreover, practices of collecting, ordering, and reusing broadcast sound will be considered in terms of specific technological developments, as well as in relation to emerging professional sound archival practices.

Salomé Voegelin & Mark Peter Wright

Salomé Voegelin is an artist, writer and researcher who works with and writes about sound as the invisible and mobile dimension of art and the everyday, from which we can gain new insights and formulate new questions to the pressing global challenges of today. She is a Professor of Sound at the London College of Communication, University of the Arts London, and is the PI (Principle Investigator) on the UK research council funded project Listening across Disciplines II www.salomevoegelin.net

Mark Peter Wright is an artist and researcher working at the intersection of sound, ecology and contemporary art. He is the post-doctoral researcher on the UK research council funded project Listening across Disciplines II and an associate lecturer across in Sound Arts and Design, London College of Communication, University of the Arts London. http://markpeterwright.net

Listening Instruments and Methods: Auscultating Museological Bodies & Spaces.

This presentation will reflect on the use of listening instruments and methods within science and social science, and speculate on how such technology and praxis could generate novel approaches to listening in the museum’s context. We will share research from our UK research council (AHRC) funded project “Listening Across Disciplines II” (www.listeningacrossdisciplines.net), which investigates different methodologies and technologies of listening, in order to bring them to the environment and institution of the museum. We aim to debate what such instruments and methods from different disciplines could bring, as technologies, as imagination and as skill to how we curate and install works in a museum, and how we promote a sonic engagement in its collections and artefacts. For example, we will reflect on the stethoscope and its use within respiratory auscultation: a method for transducing the sounds of lungs, and debate how its intimate way of encountering, extending and understanding lungs, could offer a museological sonic imagination; and we will consider the application of listening methods in urban studies to reflect on their potential to engage in the museum as a sonic environment that could be differently sounded and performed in curation.

Aleksander Kolkowski

Aleksander Kolkowski is a composer, violinist and researcher who uses historical sound recording and reproduction apparatus and obsolete media to make contemporary mechanical-acoustic and electronic music. Awarded PhD, Brunel University (2011); Sound artist-in-residence, Science Museum, London (2012); Research Associateships at the Royal College of Music (2013) and Science Museum (2014-15); Composer-in-residence at the British Library Sound Archive (2016-17). Currently a Research Associate at the University of Luxembourg (2019-21).

Stroh Violins and Auxetophones

A demonstration-performance of mechanically-amplified string instruments from the first-half of the 20th Century featuring the Stroh violin of Augustus Stroh, the Violinophone of Claudet & Co. and a newly constructed, air-assisted Auxetophone instrument after Sir Charles Parsons.

The design of stringed instruments underwent a revolution at the turn of the twentieth century, out went the centuries-old resonating corpus, in came new systems of amplifying their tones through diaphragms, oscillating valves and horns, courtesy of the flourishing phonographic technology. Augustus Stroh’s patent of 1899 for Improvements in Violins & other Stringed Instruments describes a new musical instrument that sought to be an advancement on a centuries-old and revered model. It represents the most radical development in stringed instrument design since the Amati violins of the 1600s created not by a luthier, but by one of the most brilliant mechanical engineers of the Victorian age. Charles Parsons, the industrial titan of steam turbine fame, after successfully launching the Auxetophone-Gramophone that played to mass audiences in parks and stadia, used the same motor-driven blower and valved pick-up system to amplify conventional double-basses, cellos and harps through gargantuan horns. His collaboration with conductor Henry Wood sought to revamp the modern orchestra. These instruments were tailor-made for the modernist era and lauded by leading musicians but were largely relegated behind the closed doors of acoustic recording studios or met with open hostility from the musical fraternity. After achieving a short-lived popularity during the jazz age, such instruments were rendered obsolete by the arrival of electronic amplification through thermionic valves and microphones. Their legacy is found in solid-body electric instruments and external pick-ups that are still used today. My performance will feature a reconstructed Auxetophone instrument to be played in public for the first time in over a hundred years.

Technological Mediations of the Voice-Body: Producing, Listening, Performing (2:00pm - 3:00pm)

Anna Thomas, Jacob Kingsbury Downs, Jacob Mallinson Bird

Anna Thomas is a DPhil student in Music at The Queen’s College, University of Oxford. Funded by the AHRC, her research focuses on vocal production in UK Top 40 popular music, combining ethnography and music analysis to study the use of vocal production technologies in commercial pop genres. Previously, Anna gained her BA in Music from the University of Cambridge, followed by an MSt in Musicology from Oxford with a particular focus on analytical approaches to popular music production.

Jacob Kingsbury Downs is a doctoral candidate in the Department of Music at the University of Sheffield. His project, funded by the UK’s AHRC via WRoCAH, considers headphone listening through a phenomenological lens, with emphasis on individuals’ experiences of embodied space, mediated social relations, and the materiality of technology. He holds BA and MSt degrees from the University of Oxford.

Jacob Mallinson Bird is a candidate for the DPhil in Music at St Catherine’s College, Oxford. Previously, he received his MSt in Music from Wadham College, Oxford and his BA in Music from Corpus Christi College, Cambridge. Jacob’s thesis theorises lip-syncing as a mode of voicing and also offers close analyses of specific performers and performances, drawing significantly from the fields of psychoanalysis, phenomenology, and queer theory

Technological Mediations of the Voice-Body: Producing, Listening, Performing

Our panel takes as its theoretical substrate Steven Connor’s claim that sound technologies “produce new configurations of the imaginary space of the body”. We aim to demonstrate that technological mediations of the voice foreground certain critical issues pertaining to embodiment, aesthetics, and personhood. In what ways should recording and post-production technologies be viewed as crystallisations of changing aesthetic ontologies of the voice? How does the technological mediation of the voice problematise certain assumptions surrounding bodily integrity? And to what extent can the mediated voice be regarded as a social phenomenon?

Linked by an emphasis on ethnographic approaches to sonic experience, our collective interdisciplinarity spans phenomenological, psychoanalytical, and anthropological methodologies while sharing a central root in sound and music studies. With primary data driving our contributions, we aim to compound, nuance, and extend received ideas surrounding vocal mediation, interrogating the voice throughout its journey through recording, production, and remediation in studios, personal-listening scenarios, and live performance venues.

We propose a panel comprising a forty-minute “relay” presentation followed by twenty minutes of open discussion. The panel would begin with a five-minute introduction to relevant scholarship linking voice and technology, sounding out our scope. Three ten-minute “position papers” would follow: Thomas exploring how the voice is socially and aesthetically mediated by the use of equalisation plugins in Top 40 pop vocal production, revealing how complex definitions of “natural” and “artificial” vocality pervade contemporary practice and discourse; Downs investigating the phenomenology of mediated vocal intimacy, examining the role of headphones in reported experiences of “parasociality” in music, radio, and audiobook listening; and Bird analysing the multiple mediations of the fragmented voice-body in drag lip-sync performance, with emphasis on the many technologies that structure vocal experience therein. The presentation would conclude with a short summation, interpolated with provocations for discussion during the final “open-floor” section.

Sound Embodiment (3:30pm - 4:40pm)

Brian Inglis

Born in Germany of Scottish and Irish heritage, Brian Inglis is a Senior Lecturer and BA Music Programme Leader at Middlesex University, London (UK). A composer and musicologist, he gained a PhD from City University London in 1999. His music has been performed and broadcast across Europe and beyond, and released on the Nonclassical and Sargasso labels. As a musicologist, Brian specialises in genre and identity, publishing book chapters with Cambridge Scholars, Routledge and Peter Lang.

Art of Noise, Sculpting Music: The Sound Sculptures of Derek Shiel

Between the 1970s and the 2010s, the sound sculptures of the Irish artist Derek Shiel were the focus of concerts, recordings, exhibitions and multi-media performances throughout the British Isles and internationally. The extant secondary literature on Shiel’s sculptures, however, is severely limited. This paper aims to increase awareness of a unique corpus of sound-producing structures by exploring their genesis, history, contexts and practice, drawing on primary sources (including unpublished material) as well as my own auto-ethnographic knowledge and experience of them as composer and performer between 2000 and 2010.

Shiel’s structures originate in a hoard of found metal objects from an electrical workshop in Dublin, reclaimed and repurposed as sound sculptures.

Professional percussionists have been significantly involved with Shiel’s performing ensemble. Composers and non-musicians however form an equally important part of their performance history, born out of classes at London's City Literary Institute, where Shiel taught in the 1970s. This gave the ensemble a radical inclusiveness comparable with that of others originating in the 1970s, such as Cornelius Cardew's Scratch Orchestra. An inclusiveness which was continued in Shiel's workshops with school and college students in later decades.

Formal compositions for the corpus commence with Julia Usher’s A Grain of Sand in Lambeth (1987). Since then, the instruments’ musical potential has been investigated by a wide variety of international composers. I will conclude by examining the different strategies used by composers to capture and exploit the sculptures’ sounds, including electroacoustic sampling/manipulation and scoring strategies ranging from conventional notation to graphic and instruction scores.

Zeynep Bulut

Zeynep Bulut is a Lecturer in Music at Queen’s University Belfast. Her research interests include voice and sound studies, experimental music, sound and media art, technologies of hearing and speech, digital media and culture, deaf performance and culture, and music and medicine. She is currently completing her first manuscript, titled, Building a Voice: Sound, Surface, Skin. Her articles have appeared in various volumes and journals including Perspectives of New Music, Postmodern Culture, and Music and Politics. Alongside her scholarly work, she has also exhibited sound works, and composed and performed vocal pieces for concert, video, and theatre. Her composer profile has been featured by British Music Collection. She is sound review editor for Sound Studies: An Interdisciplinary Journal, and project lead for the collaborative research initiative “Map A Voice.” The proposed presentation is part of Bulut’s project, Tactile Speech, which was developed during her visit to the Max Planck Research Group “Epistemes of Modern Acoustics,” led by Prof. Dr. Viktoria Tkaczyk at the Max Planck Institute for the History of Science. Tactile Speech is part of Bulut’s first monograph, Building a Voice: Sound, Surface, Skin.

Tactile Speech, and Biosensor Performance as a Case of Voice-Skin

This talk will discuss biosensing musical interfaces (such as the BodySynth, devised by Van Raalte in 1986 and developed with Severinghaus in 1996; the BioMuse, created by Knapp and Lusted in 1988; Xth Sense, conceived by Donnarumma between 2010-2014) together with cases of tactile speech, particularly with contemporary speech technologies developed for deaf and hard of hearing people (such as the signing gloves SignAloud, devised by Thomas Pryor and Navid Azodi, and sign language interpreter, Motion Savy’s UNI, which translate sign language into text or/and automated speech).

Biosensing musical interfaces are interactive and kinetic systems. They comprise sensors that detect performer’s physical gestures and bioelectrical or biophysical signals, hardware, and software that amplifies, filters, and digitises the signals and translates them into audio. With this set-up, they interactively shape bodily gestures, signals and sounds. The interfaces have been explored in relation to human-computer interaction, digital musical instruments, affective computing, machine and human learning, assistive technology, and music and wellbeing.

I examine biosensing musical interfaces in a both related and different way. Referring to histories of vibrotactile communication and speech recognition and synthesis, I suggest that biosensing musical interfaces are both touch-driven and voice and speech-driven technologies. I then address the convergences and divergences between tactile speech technologies and biosensor performances. The former aims at functional translation and communication by using auditory and verbal tools. The latter explores expression and stimulation through intentional variation and control of physical gesture. Looking at these cases together, I argue the following: Skin and voice have been both treated as mediums for stimulation, expression, articulation, computing, and translation. Biosensor performances, however, evoke a case of voice as skin, which is not limited to verbal language or linguistic exchange, encouraging us to revisit what we mean by mediation and communication.

Joshua Navon

Joshua Navon is a lecturer in music at Columbia University, where he earned his PhD in Historical Musicology in 2019. His research analyses various pedagogical and scientific arenas in which musical expertise has been defined and produced, with a focus on music conservatories and the psychological sciences in the nineteenth and twentieth centuries. His first book project explores how the development of German conservatory training reshaped classical musicians’ practices and predominant discourses of human musicality

The Psychotechnics of Musical Listening

“Ear training” forms a central component of undergraduate curricula in music conservatories and university music departments. Despite the international prevalence of techniques of listening like music dictation and sight-singing in elite music-educational institutions, scholars have not yet asked how “aural skills” became an accepted object of pedagogical knowledge and intervention.

Focusing on the institutionalisation of ear training (Gehörbildung) in German music conservatories around 1900, this paper considers several major drivers behind the development of audile techniques designed to produce “musical” listeners. Drawing from various archival and published sources, I argue that ear training’s historical emergence was coextensive with aural perception’s rise as a common matter of concern in the fields of music education, experimental psychology, and psychotechnics (now more commonly called applied psychology). More specifically, I ask how exchanges between the emergent sonic cultures of psychological laboratories and music classrooms led to a novel kind of pedagogical power in classical music, one that takes students’ listening capacities as explicit objects of observation, measurement, comparison, and training.

I begin by outlining several problematics that linked everyday music educators with experimental psychologists from the 1880s onwards, not least the newfound concern for understanding and measuring individual differences in aural expertise. These actors not only perceived homologies between their respective domains, but actively cultivated cross-disciplinary exchange and the formation of common research topics such as “the feeling for tonality” (Tonalitätsgefühl) and “melodic comprehension” (Melodieauffassung) (e.g., Brehmer, 1925; Kuhn, 1918; Leo, 1904). Moreover, ear training techniques and experimental investigations of musical listening shared similar underlying social arrangements, carefully constructing perceptual conditions so that a student/subject performs their aural experience for the teacher/experimenter—thereby rendering the supposedly “internal” experience of listening observable. By way of conclusion, I consider how “musical listening” functioned as a mutually beneficial “switch point” for music pedagogues and psychologists (Foucault, 2003).

Silence, Noise, Dynamics (5:10pm - 6:20pm)

Michael Hedges

Michael Hedges will begin a WRoCAH-funded PhD at the University of Leeds in October 2020. He completed an MA in English Literary Studies at the University of York in 2019. Michael’s research concerns the representation of sound technology in contemporary fiction. His PhD thesis will examine contemporary authors whose works articulate anxieties about recorded music's eventual decay, including Richard Powers, Paul Beatty and Jennifer Egan.

Pauses for Thought: The Political Ecology of Recorded Silence in Jennifer Egan’s A Visit from the Goon Squad

This paper will examine sound reproduction in Jennifer Egan’s A Visit from the Goon Squad (2010) alongside recent research into recorded music’s political ecology – or how recordings are made and what they are made of. Central to this is Kyle Devine’s call for a musicology without music. Devine argues that we must not allow the cultural value we place on recorded music to obfuscate the industry’s complicity in the unsustainable practices of petrocapitalism. I will argue that fiction about recorded music, like Goon Squad, emerges as a valuable tool

with which to challenge the musical exceptionalism that Devine identifies above. Recordings as rendered by fictional narrative are stripped of the inhibiting complications of their musical aesthetics. Without the merits of auditory art to distract us, I argue that literary narrative can direct our attention towards a vital but underacknowledged consideration for all modern sound cultures: the staple commodities and natural resources on which sound reproduction depends. The penultimate chapter of Goon Squad exemplifies how fiction’s handling of reproduced sound can alert readers to recorded music’s political ecology. The pauses in rock music recordings that so concern the narrator’s brother serve to amplify the ineluctable noise linking extraction and inscription: though the music pauses, tape hiss and other medial artefacts persist; these noises belong to the fossil fuels from which plastic-based storage media are produced. My analysis of the chapter takes its structure from the following three statements, each derived from Jacob’s Smith conditions for eco-sonic media. Firstly, Goon Squad is an eco-sonic text because it narrates sound instruments that provide a sense of place and planet. Secondly, Goon Squad uses sound instruments to represent environmental crisis. Finally, the solar panels scattered throughout Egan’s speculative desert landscape prompt us to reflect on the relationship between sound instruments, energy consumption and sustainability.

Jaipreet Virdi

Jaipreet Virdi is a historian and Assistant Professor at the University of Delaware whose research focuses on the ways medicine and technology impact the lived experiences of disabled people. She is author of Hearing Happiness: Deafness Cures in History (University of Chicago Press, 2020) and co-editor of Disability and the Victorians: Attitudes, Interventions, Legacies (Manchester University Press, 2020).

Symphonies of Colour & Sound: Performative Enactments of Deafness

For nearly sixty years, British deaf painter Dorothy Eugiené Brett (1883-1977) made use of multiple hearing prostheses as both technologies of assimilation and as objects of power to negotiate the often-consented boundaries between hearing and deafness. Other modern sound technologies enabled Brett to participate in soundscapes that were previously unattainable for her—including the phonograph and radio—and make use of a wider range of acoustic sensibilities that she then conveyed to her art. These varied sound technologies thus inform Brett’s synchromist artistic style and embody her acoustemology, shaped by what she describes as a “different communication” containing elements of movement and rhythm aided by her interpretation of sounds through her hearing prostheses. Her paintings thus reflect an affirmative and self-proclamation of hearing through deaf ears: on the canvas, sounds and colours are harmoniously orchestrated in intervening colours to create a visual melody.

What do we learn by analysing deaf representations of sound, especially sound guided through sound technologies? This paper positions Brett’s technologies and artistic representations of sound to examine how her performative enactments of hearing enabled her to affirm her identity as a deaf woman. Such performances capture what Michele Friedner and Stefan Helmreich refer as “productive articulation,” the navigation through continuums between the multiplicity of sensory capabilities limited or enhanced by technologies. While Brett presented her hearing prostheses to dominate conversational space, her paintings become crucial indicators of her introspective denial, and then claiming of, deafness. In alignment with Rosemarie Garland-Thomson’s discussion of “reconstructive narratives,” this paper explores how one person’s lived experiences of deafness can prompt crucial questions about identity formation and the anxieties of transcending acoustic limitations through technology.

Gabriella Roderer

Gabriella Roderer is a researcher, performer, and educator. She is a member of Project c4, a classical contemporary improv ensemble based in Kansas City, and Plaza Winds, the University of Missouri - Kansas City Conservatory’s graduate scholarship woodwind quintet. She is currently pursuing the DMA in Flute Performance and MM in Musicology at UMKC.

Opera, Musical Theatre, Amplification, Microphones, Dramatic Narrative

Music is primarily an auditory art form as it is perceived through soundwaves. Any manipulation of soundwaves can change the outcome of a musical performance, and not just the aural outcomes but the emotional outcomes as well. As media designer Joe Herrington once stated, “Half of the storytelling ability is sound.” Nowhere is storytelling more essential than in opera and the theatre. Through the lenses of drama and narrative, this paper compares and contrasts the influence that amplification technology has had on the development of musical theatre versus opera in the twenty-first century. The interaction of variables such as performance culture, acoustics and venues, audience expectation, sound projection, and styles of singing illuminate the relationship between storytelling and the use of amplification. One vital variable is that of the "human element." Opera and musical theatre have used this element differently, but for the same end: drama. Traditionally, the opera genre has pushed the physical limits of the human capacity as a way to express emotion through art music, while the musical theatre genre has used technology to assist in the exploration of the limits of human emotion. Technology is becoming an increasingly important element of musical theatre and opera productions, but with a distinction between the use of mixed media and amplification. The culmination of this paper provides instances of how this information can inform performers' interpretative choices. Six examples from the opera and musical theatre repertoires are included. They are as follows: Dead Man Walking by Jake Heggie (2000); Dr. Atomic by John Adams (2005); Written on Skin by George Benjamin (2012), and Wicked, music and lyrics by Stephen Schwartz and book by Winnie Holzman (2003); Next to Normal, music by Tom Kitt, book and lyrics by Brian Yorkey (2008); Hamilton, music, lyrics, and book by Lin-Manuel Miranda (2015).

Wednesday 16 December

Contemporary Responses to the Fairlight CMI (9:00am - 10:30am)

Manuella Blackburn, Paul Harkins, Rob Puricelli, Stefania Zardini Lacedelli

Dr Manuella Blackburn is a lecturer at Keele University in Music Technology (since 2019) and previously worked at Liverpool Hope University between 2010 - 2019. Her practice-based research covers the exploration of short soundfile use within compositional activity along with methodologies for handling larger quantities of these materials. Manuella has written on topics such as sampling, cultural sound borrowing, intercultural creativity, and music education.

Dr Paul Harkins is a lecturer in music at Edinburgh Napier University. His PhD research was about the history and uses of sampling technologies and his book, Digital Sampling, was published in 2019 by Routledge. He has written articles for Popular Music, Popular Music & Society, IASPM@Journal, Journal on the Art of Record Production, and Reseaux. He is currently working on projects about digitalisation and democratisation, Syco Systems and the distributors of musical instruments, and Kate Bush's use of the Fairlight CMI.

Rob Puricelli is a music technologist, podcaster, and instructional designer with a passion for classic synthesizers and their history. Alongside former Fairlight Studio Manager Peter Wielk, he restores Fairlight CMIs so that they can enjoy prolonged and productive lives with new owners. Rob also writes articles for his website, failedmuso.com, and guests on numerous music technology podcasts and shows. He is often found at synthesizer shows demonstrating new & old technology, as well as delivering seminars and workshops.

Stefania Zardini Lacedelli is a PhD researcher at the University of Leicester. Her research, funded by the AHRC Midlands4Cities DTP, explores how museums can evolve into platforms for sound culture. She lives between UK and Italy, where she co-founded the virtual museum DOLOM.IT, and delivers training for museum professionals in the field of digital transformation. During her placement at the Science Museum Group, she designed an online participatory project inviting people to share memories and stories around sound technologies.

‘Need we Say More’: Contemporary Responses to the Fairlight CMI

Often described as the first digital sampler, the Fairlight Computer Musical Instrument (CMI) was primarily a digital synthesizer and computer workstation. Launched in 1979, it was one of the technologies that were used to re-shape the practices of music making and the sounds of popular music in the 1980s. In 2017 the National Science and Media Museum adopted sound technologies as a major component of its collecting and exhibitions remit and one of its first acquisitions was a Fairlight CMI. In this panel, we want to explore the social life of this instrument and how it continues to shape cultures of music making.

For the past decade, Rob Puricelli has been working with Peter Wielk, former Studio Manager at Fairlight Instruments, to acquire, restore, and re-sell Fairlight CMIs around the world. Rob’s contribution will focus on the issues involved in the preservation and restoration of Fairlight CMIs and the importance of keeping these machines working for future generations. In the last year, Stefania Zardini Lacedelli began a placement at the Museum to explore how digital platforms can expand the narratives as well as the communities around its Sound Technologies collection. Her contribution will describe the development of a YouTube playlist dedicated to the Fairlight CMI and the online conversation it generated. Finally, Manuella Blackburn will present a collection of samples from the library of the Fairlight CMI in preparation for a new composition of electronic music. Her work to date has focused on short sound materials and the CMI samples present a similar challenge as they were limited to one second. One of the earliest advertising slogans used to sell the Fairlight CMI was ‘Need we Say More’. In this panel, we will bring its many stories to life and reconnect the object with its sound cultures.

The Matter of Sound (11:00am - 12:30pm)

Fiona Keenan

I am a Lecturer in Sound Production at the Department of Theatre, Film, Television and Interactive Media (TFTI), University of York. My research and practice explore the experience of performative soundmaking, whether acoustic or digital - focusing on mechanical sound producers, theatrical sound props, augmented instruments and softwarebased systems.

Sound as Material: The Design and Performance of Historical Theatre Sound Effects

Sound design was once an exclusively performance-based practice. Before the age of recorded sound, mechanical devices and carefully selected configurations of acoustic materials were used to produce reliable and repeatable sonic events such as wind, rain and thunder. This paper explores the design practice that created sound effects for late nineteenth and early twentieth century theatres and examines how its sound instruments – mechanisms and materials activated by the body in performance – were constructed. It also considers the sonic culture of sound effects, examining practitioners’ skills in listening, prototyping, and navigating material resistances to achieve consistency in performance. I will argue that this historical understanding of performative soundmaking has the potential to both inform and challenge present-day methods of designing and interacting with digital sound, building a bridge between a world of sound as material and the seemingly infinite possibilities of the digital. Along the way I will consider how this embodied sonic culture might offer us new ways to learn, or teach, sound performance in the present day.

Joseph Kay

Joseph Kay is a sound artist and researcher based in London. He recently completed a doctorate at the University of Oxford, undertaking research on the ecological functions of noise, noise and queerness, Artaud, and the semiotics of notation. Studying under Martyn Harry and Eric Clarke, his work was funded by the AHRC. He has presented his research at numerous conferences and his work as a composer and performer has been featured across Europe and Japan.

Reel-to-Unreel: Early Tape Use at the Groupe de Recherche de Musique Concrète and the Groupe de Recherches Musicales, 1951-1963

Magnetic tape reels with ambiguity, it is wound up with contradictions. Compared with previous recording technologies it is relatively stable, and yet the same process by which tape is encoded can also decoded it. Tape’s encodings, unlike its analogue classmates, are invisible, illegible and yet tape too is analogue; its signal is physically inscribed onto/into it, and so is its history.

In this paper, I listen into a period of tape’s history: the so-called mechanical period at the Groupe de Recherche de Musique Concrète and the Groupe de Recherches Musicales. I question the usefulness of this kind of labelling and, along the way, identify two contradictions that I believe to complicate things further. One is between material and its perception or, put another way, the medium and the message: in their search for reduced listening, the GRMC and GRM in fact became more and more reliant on increasingly complex technologies. The second lies in the difficult reconciliation involved in integrating a military invention of the Third Reich into a distinctly nationalist French project, managed under the auspices of Radiodiffusion-Télévision Française. Invoking the phenomenon of print-through, I suggest that refocusing into tape’s particular material qualities is essential to an understanding of its complex history.

Toby Seay

Toby Seay is Professor of Sound Recording and Music Production at Drexel University, and has had a long career in the music industry as a musician, recording engineer, technical consultant, and audio preservationist. Toby Seay has engineered multiple Gold and Platinum Certified recordings, including eight Grammy winners. Toby’s research interests include audio preservation practices and standards, and the study of sonic signatures within music production. Toby is the Director of Drexel’s Audio Archives.

EMT 140: What ‘The Sound of Philadelphia’ Sounds Like

Most modern record productions implement close microphone techniques that virtually eliminate the acoustic space from the recording. The space heard on these recordings is often a construct of artificial reverberation devices that present the illusion of a natural acoustic space. This construct is worthy of exploration regarding its own identifiable characteristics, as the sound of the recording space is often attributed as an identifiable sonic signature in well-known music productions. However, it can been shown that the sound of the actual room is rarely the identifiable signature in the recording, rather how the room was used during the recording (instruments placed, stacked vs. live performance, microphone placement, etc.) and the use of artificial reverberation devices that creates the signature.

This presentation explores the EMT 140 plate reverb and how it was employed at Sigma Sound Studios in creating Philadelphia soul recordings. Using multi-track recordings, reference mixes, the original EMT plate reverb units from Sigma, and procedures gleaned from Sigma engineers, the author will describe how the use of artificial ambience helped create the lush signature of Sigma Sound Studios recordings. Recordings by the Delfonics, Lou Rawls, Billy Paul, and The O’Jays will be examined.

Alexander Russo

Alexander Russo is an Associate Professor in the Department of Media and Communication Studies at The Catholic University of America in Washington, DC. He is the author of Points on the Dial: Golden Age Radio Beyond the Networks, Duke University Press, 2010. He has also written articles and book chapters on the technology and cultural form of radio and television, sound studies, the history of music and society, and media infrastructures.

‘A Cacophony of Bells, Screams, and Whistles:’ ‘Endless Loop’ Tape Machines and the Sound Culture of Top 40 Radio

The cultural memory of Top 40 radio is linked to the voice of the disk-jockey so, perhaps surprisingly, in 1961 Newton Minnow purportedly called it “a cacophony of bells, screams, and whistles” (Routt 6). This description speaks to the sonic culture of the format, one that was the product of the technological moment of its zenith. This paper proposes to recast the history of the Top 40 format as one inextricably linked to cartridge and sonically-indexed tape devices.

Histories of audio tape tend to focus on the recording studio, not the broadcast studio. It is true that the new possibilities for multiple takes and multi-track recording radically transformed production practices across musical genres. Still, while there has been some attention paid to tape based-instruments like the Chamberlain and the Mellotron, these were relatively rare, as least compared to the ubiquitous presence of “endless loop” machines like those developed by Fidelipac, the American Tape Company, and Gates. When they entered broadcast studios in the late 1950s they were initially designed as labour-saving devices for station automation. Quickly though deejays (and sometimes their engineers) embraced the creative possibilities of integrating recorded sounds with live performance. These machines allowed quick and easy access libraries of prerecorded sounds – both commercially produced and made by inhouse production staff. In an era when stations were reconfiguring their sonic signatures from the staid, mass address of the network era, bumpers, station ids, jingles, and other effects proved crucial for establishing a distinctive and consistent aural identity. It was these elements that are hallmarks of the era’s Top 40 sound. Finally, although the particular use of these sonic elements faded from fashion fairly quicks, as sonic instruments, endless loop devices could be reconfigured for different formats and were a constant part of radio until the late 1990s.

History and Material Culture of Electronic Music (2:00pm - 3:30pm)

Cathy Lucas

Cathy Lucas is a finishing MSc student in the history and philosophy of science at UCL. Her interests lie at the intersections of science, technology and modernist aesthetics in the nineteenth and early twentieth centuries, and her research is focused on acoustics and the development of scientific and musical instruments during this period. She is currently preparing a PhD application in Sound Studies, also at UCL, and continues to work as a practicing musician, principally as the producer and singer in art-pop group Vanishing Twin.

‘An Infinity of Timbres’: Sound Synthesis and the Origins of Electronic Instruments

Histories of synthesisers tend to begin with the objects themselves, their origins framed as a happy marriage of technological innovations and the revolutionary impulses of early twentieth-century aesthetic cultures. Here I argue that it’s almost half a century earlier, in the science of acoustics, and in particular the work of German physicist Hermann von Helmholtz, that new techniques for the analysis and synthesis of sound helped to create the conditions and the desire for limitless sonic plasticity. The first half of this paper traces the emergence of synthesis as a way of knowing and working with sound (see Pickstone 2000). Drawing on the work of Joseph Fourier and Georg Ohm, Helmholtz developed a theory of tone and a series of objects for their analysis into a series of upper partials. He also designed an instrument, known as the Helmholtz Synthesiser, for recombining these in novel ways so that, in principle, any sound was synthesizable. In the second half I explore the influence of Helmholtz on Thaddeus Cahill, a young American inventor widely credited as the creator of the first synthesizer. After reading Helmholtz’s influential book On the Sensations of Tone (first published 1863), Cahill filed a patent in 1897 for an ‘Art of and Apparatus for Generating and Distributing Music Electrically’, a document containing the designs for the Telharmonium, an instrument that would become a touchstone for a number of subsequent theorists and designers. I ask, how did Helmholtz influence Cahill’s vision of infinite timbral possibility, and to what extent were the techniques of synthesis used for the Telharmonium analogous to those set out in On the Sensations of Tone? By tracing these networks of influence, I draw new links between science, technology and aesthetics, positioning a transformative moment in nineteenth-century acoustics as pivotal to the development of twentieth century instruments.

Greg J. Smith

Greg J. Smith is a writer, cultural producer, and PhD candidate within the Department of Communication Studies and Multimedia at McMaster University. He is the Editor of HOLO and a regular contributor to Musicworks, and his writing has appeared in a range of publications including Creative Applications Network, Rhizome, and Back Office.

Real Drums at Your Fingertips: A Close Reading of the LM-1 Drum Computer Interface

The promotional copy on a LM-1 Drum Computer magazine ad entices with claims of authenticity and tactility: “real drums at your fingertips.” Designed by guitarist Roger Linn and released through his company Linn Electronics in 1980, it was one of the first programmable drum machines. As Samantha Bennet has argued, the LM-1 is part of a constellation of 1980s electronic instruments and sound technologies that “redrew the boundaries of the recording workplace,” reconstituting the sound of pop in the process (2019, 37); adopted by musicians including Michael Jackson (“Thriller”) and the Human League (“Don’t You Want Me”), it was perhaps most perfectly programmed by Prince (1999), who adored the machine and foregrounded its punchy rhythms within his singular ‘Minneapolis Sound.’

In this paper I will examine the LM-1’s interface as anticipating shifts in 1980s music making practices. Linn has stated his design goals were to aid real-time beat entry with audio feedback, and limited reliance on numeric displays (Bjørn 2017, 213); between the central faderbank that allowed a player to sculpt their mix of of ‘real’ drum voices (8-bit samples) , and its introduction of quantisation and swing, its intuitive controls prototyped functionality that would be standard in later sampling workstations.

My mode of inquiry is inspired by Ian Bogost and Nick Montfort’s call for a platform approach to media studies, one that goes ‘deeper’ than content analysis and delves into functionality and materiality (2009). I will discuss the LM-1 as an electronic instrument—hardware—where its designer exposes certain sound parameters to the user to control; while others are inaccessible “fixed in the darkness of the [black] box" (Magnusson 2019, 35). Drawing on adjacent scholarship on the synthesizer (Théberge 1997; Pinch and Trocco 2002; Lavengood 2019), and the drum kit (Brennan 2020), I will use the LM-1 interface to discuss shifting notions of musical time and authenticity, and sonic aesthetics in the 1980s.

Mikko Ojanen

Mikko Ojanen (MA 2007 Univ. Helsinki, Musicology) studies the history of electroacoustic music in Finland in the 1960s and 1970s in the Doctoral Programme for Philosophy, Arts and Society. He works as a part-time lecturer at the university’s Electronic Music Studio and as an information specialist in the Helsinki University Library Data Support. Ojanen also performs frequently as a musician, sound technician and music producer in several electronic, experimental and popular music projects and groups.

Engaging with Electronic Music Technology in Finland in the 1960s and 1970s

The 1960s was a time of intensive interplay between music technological utopia and the contemporary reality. The decade marked a significant turning point in electronic musical instrument design. Both the transistor-based integrated circuits and their digital logic applications in sound synthesis, processing and sequencing methods strongly challenged the prior designs. The development occurred widely in the international contexts – as well as at grass-roots level in local scenes. In Finland, the music technological rupture inspired Mr. Erkki Kurenniemi, one of the pioneers of electronic musical instrument design, to seek new means to implement the novel technology and strive for utopia. For Kurenniemi, the electronic musical instrument of the future was a tool for realizing automated and algorithmic musical processes.

In addition to Kurenniemi’s ten unique instruments, my research material consists of approximately 100 musical works realised with Kurenniemi’s instruments by twelve Finnish and Swedish composers and artists, who also collaborated with Kurenniemi. My analysis strengthens the notion that instrument design processes are deeply socially constructed and the implementation of new technology is significantly dependent on the users’ willingness to engage with equipment at hand. The willingness to engage with the technological solutions, on the other hand, is affected by the users’ background.

In this case study, the composers’ and artists’ points of departure for their artistic work were based on 1) fully technologically oriented processes, where technological solution even played the most significant role, on 2) listening-based creative processes employed in real-time interaction with the

technology, or on 3) their initial ideas for a work, which then were realised with the current technological solution. Composers and artists either accepted Kurenniemi’s designs as is, or rejected them altogether. They rarely modified his designs, therefore the user experiments did not feed back to his design process leaving the instruments in the prototype phase.

Reuben de Lautour

Reuben de Lautour writes about music technologies and listening practices, and composes music for instrumentalists and computers. He is Senior Lecturer and Head of New Music at the School of Music, University of Canterbury. Prior to this he taught composition and sonic art at Istanbul Technical University’s Center for Advanced Studies in Music, where he founded the Program in Sonic Arts in 2012.

The Ceno-Orchestra and the Origins of Phonographic Listening

On the evening of April 25th 1933, a group of eminent musicians and scientists including conductor Leopold Stokowski and physicist Harvey Fletcher carried out a test of arguably one of the largest and most expensive sound instruments ever created: a 136-mile network of telephone cables, amplifiers, filters, microphones, and loudspeakers connecting two concert halls in the American Northeast. Dubbed the “ceno-orchestra”, the purpose of the instrument was to capture a symphonic concert performed at the Academy of Music in Philadelphia and reproduce it flawlessly in real time for an invited audience seated in Constitution Hall in Washington, D. C. The event was the culmination of a years-long collaboration between Stokowski, the Philadelphia orchestra, and Bell Laboratories, and is remarkable for its cost, infrastructure, and physical scale. Equally noteworthy is the fact that the test, and the years of research leading up to it, took place around the same time as Fletcher and his collaborator W. A. Munson’s influential study of loudness perception. In this paper I will argue that these two research projects helped to crystallise a style of listening that emphasises attention to the quantitative aspects of musical sounds, for example their dynamic range, tone colour, or spatial origin. I will examine two contemporaneous scientific papers that document the ceno-orchestra project and Fletcher & Munson’s study of loudness respectively, focusing on the central role played by subjective listening tests. I will show that the key elements of this new listening style were forged in the methodology of these tests and the associated standards and practices adopted in the laboratory and the concert hall. Finally I show that echoes of this style, which I call “phonographic listening,” can be found in subsequent theories and practices of musical listening, in particular those of Pierre Schaeffer and Theodor Adorno.

Sounding the Nation: Sound, Identity and Power 1 (4:00pm - 5:10pm)

Hugo Boothby

Hugo Boothby is a PhD candidate in Media and Communication Studies, with a specialisation in Sound Studies, at Malmö University, Sweden (2019-present). Before taking up a post teaching Media and Radio Production at Malmö University (2010 – 2019) he worked for 10 years as a sound engineer and radio producer with BBC World Service Radio in London (2000 – 2010). He has published on Conviviality and Popular Music (2020), Community Radio (2019) and Digital Media Practice (2012).

Sound Instruments and the Politics of Listening.

This paper takes sound instruments and the cultures of listening they afford as its primary focus. The sound instruments under interrogation here are consumer electronics specifically Apple’s iPod and iPad technologies. The presentation draws on continuing PhD research that employs practice-based methodologies to explore the possibilities and limitations of mediated listening and its empowering or disempowering spaces. Listening is defined as the “relations of attention” (Bickford, 1996, p. 24) within communication processes. Progressive political listening is understood then to emerge within those intersubjective spaces that permit shifts in relations of attention capable of disrupting existing power dynamics.

The paper draws on empirical material from two sites of research. The first a musical instrument created by the author that uses 12 iPods, the MP3 and Voice Sample to produce and perform a piece of generative music (Boothby, 2019; Eno, 1996). The iPod and MP3 are the chosen sound instruments for this performance because they are emblematic of shifts toward individual and privatised listening (Bull, 2007). Appropriating near obsolete media such as the iPod and MP3 to create a musical instrument places this work as media archaeology (Parikka, 2012), and as part of a strategy to disrupt habitual listening practices, challenging linear narratives of technological development that demand progress towards normative ideals of listening. The second site of research is a Swedish community arts initiative that facilitates collaboration between the differently abled in composition and performance of electronic music. In this work I follow an integrated ensemble formed to explore the potential of iPads to facilitate inclusive composition and performance.

Both case studies privilege listening as a primary site of engagement and agency, seeking to challenge dominant approaches within Media Studies where agency is most often ascribed to the articulation of voice and freedom of expression within communication processes.

David Suisman

David Suisman earned his B.A. at Yale University and M.A. and Ph.D. at Columbia University and is currently associate professor of history at the University of Delaware, where he specialises in cultural history, the history of music, sound studies, and the history of capitalism. His books include Selling Sounds: The Commercial Revolution in American Music (Harvard University Press, 2009), winner of numerous awards and prizes, and Sound in the Age of Mechanical Reproduction (University of Pennsylvania Press, 2010), co-edited with Susan Strasser. His articles and reviews have appeared in the Journal of American History, Social Text, Radical History Review, The Believer, American Historical Review, Journal of Social History, and other publications. He is also associate editor and book review editor of the Journal of Popular Music Studies and a sometime disc jockey at freeform radio station WFMU. He lives in Philadelphia.

Musical Instruments as Military Instruments: The Sonic Culture of the U.S. Military in World War II

Although music has been connected to the waging of war since time immemorial, probably no military force has used so much music in so many ways to advance its cause as the United States military did in World War II. This paper argues that music was a substantial, if little recognised, part of the American war effort, using music, in effect, as an instrument of waging war.

The paper focuses on the work of two entities created to oversee and coordinate a broad range of activities related to music in the U.S. military—the Music Branch of the Special Services Division of the armed forces and the music subcommittee of the Joint Army-Navy Committee on Welfare and Recreation. Behind these nondescript, bureaucratic names, these groups promoted making and listening to music on a vast scale. Some of their work consisted of initiatives that had contributed to previous wars (e.g., training military bands; encouraging soldiers to participate in group singing). Much of their work, however, was unprecedented, including:

* the manufacture and distribution of tens (maybe hundreds) of thousands of small musical instruments—recorders, ocarinas, and new kind of flute called the tonette—all made out of unbreakable plastic and sent free to soldiers
* the publication and distribution of a monthly song compendium called the Army Hit Kit, mailed gratis to G.I.s.
* the shipment of packages of full-size musical instruments to military units stationed around the U.S. and abroad
* the design, manufacture, and distribution of a special phonograph that could be used by G.I.s in the field
* the creation of a record label, V-Discs, featuring top-name musical artists who recorded exclusive content for the military
* and, most expansive of all, the creation of the worldwide Armed Forces Radio Network, most of whose programming consisted of music.

This paper, then, explores the “sonic culture” of the U.S. military, showing how making and listening to music were centrally directed as part of military culture.

Runchao Liu

Runchao Liu is a PhD Candidate in Communication Studies at the University of Minnesota. Liu specialises in critical-cultural media studies through the lens of popular music. Her research interests include affect, sound, performative activism, and intercultural communication. She is working on her dissertation project titled Sounding Orientalism: Sonic Affect, Musical Radicals, and Countercultural Troubles. She has upcoming and published works in Cinéma & Cie: International Film Studies Journal and Communication and Critical/Cultural Studies.

The ‘Oriental Riff’ Mystique: Electrifying Tapping Sounds, Mediating Sonic Popular Cultures

Oriental riff, Asian riff, Asian jingle. These are some common monikers of the artificial sonic representations of East Asia. Sonically mimicking some xylophone type of instrument, Oriental riff is a cliché melody that usually consists of nine notes stretched out over two 4/4 bars which goes like “dee-dee-dee-dee dee dee, dee dee dee ~” in tapping sounds and variations abound. These sonic representations have an origin in as early as the 1800s American popular culture (Moon, 2005) and have been popularised among multiple western mediascapes, ranging from opera and video games to films and cartoons (Solomon, 2014). In popular music, Oriental riff saw a “resurgence” during the later cold war period in hit songs such as Carl Douglas’ “Kung Fu Fighting” (1974), New York Dolls’ “Bad Detective” (1974), The Vapors’ “Turning Japanese” (1979), and David Bowie’s “China Girl” (1983).

Scholars have researched how the sounds of Oriental riff, when used in combination of multimedia effects such as linguistic and cinematic techniques, often produce racially stereotypical messages which reflect both the Orientalised and their usually western white subjects (Garret, 2004; Solomon, 2014). In this paper, instead of seeing Oriental sounds as passive creations of western imagination, I examine the different ways that racially charged sounds of Oriental riff in turn influence the messages conveyed in these hit songs. Particularly, I compare how Oriental riff creates inflict the meanings in two popular sonic cultures by creating unique yet different affects in rock-genres versus pop-genres. Ultimately, I argue for a change of view of Oriental riff as non-autonomous sounds and instead seeing it as an agency creating differing sonic cultures.

Sounding the Nation: Sound, Identity and Power 2 (5:30pm - 6:40pm)

Jamie Fenton

Jamie Fenton is a PhD researcher at the University of Cambridge. His dissertation explores the sound effects of American Civil War poetry, as part of a broader interest in the interaction between sounds studies and lyric theory.

Laura Redden and Herman Melville: American Civil War Poetry as Recording Technology

The historical and critical rewards of studying the soundscapes of environments before electro-magnetic audio recording have become manifest. Such studies, though, must constantly confront the problem of evidence. Any attempt to sketch the sounds of the pre-electromagnetic past relies on the belief that written texts are a kind of recording technology. As Mark Smith declares in Keywords in Sound (2015), ‘writers could use, quite deliberately, the printed word to convey and even reproduce the sounds of words and events’. This paper takes issue with Smith’s statement. I want to propose that more attention needs to be paid to how the form of a literary text might act as a kind of interference to the sounds it supposedly records. Does the sound of poetry interfere with the sounds in poetry?

My case study for this proposal is the poetry of Laura Redden. Redden, who developed total hearing loss after a childhood illness, worked as a journalist in Washington D.C. throughout the American Civil War, and in 1864 published Idyls of Battle and Poems of the Rebellion. This volume, like many, goes about relating the sounds of war, and thus presents poetry as a possible sound technology. In the context of Redden’s hearing impairment, however, the volume problematies this acoustic potential. Redden was compelled to prove her ability to write in what was held as a sounded medium, but experimented with tactics to resist that very soundedness.

Melville’s Battle-Pieces (1866) plays a corrobarative role. Using tactics developed in reading Idyls of Battle, I will show that Battle-Pieces, too, has a fraught relationship with sound. Redden and Melville both wrote in the context of the Civil War as a uniquely journalistic conflict. The new ubiquity of the telegraph ensured that reports from battlefields could arrive at the homefront in a matter of hours. Latent in this technology was the promise of others which would soon follow – phonography and telephony. This paper asks whether Civil War poetry tried to bridge that gap, and how wary we should be of treating poetry as a recording instrument.

James Rushworth

James Rushworth is a PhD candidate at the University of Hull, working within the Chinese Whispers Research Cluster on projects focused on cross-cultural music-making within the fields of Electronic and Popular music. His research relies on aspects of Ethnomusicology, Popular Musicology and the practicing of Electronic Composition through the persona of Keangnan; the works of which engage topics such as Cyberpunk culture, traditional Chinese Music culture and the wider socio-cultural implications of Chinese identity.

Composing Cyberpunk: Sampling Asian Identity in Acoustic and non-Acoustic Creative Music Processes

This paper shall engage with two different topics within the fields of Electronic Music Studies, Popular Musicology and Ethnomusicology. The first of these is the topic of ‘sampling culture’ and its techniques and their effects within contemporary music-making processes. ‘Sampling’ as a process revolves around the re-utilisation of already-existing audio within creative musical production, being crucial to the formation of styles of Popular and Electronic music (such as Hip Hop of the late-20th century and UK Jungle). ‘Sampling’, along with other non-Acoustic workflows such as Synthesis, has reshaped the process of musicality and the unconscious perceptions of its mainstream audience. Spurred by both digitalism in the form of the workspace and in the varying universality of sound access.

As music and its creation processes have become increasingly diverse, there becomes a need for confrontation of its effects upon musical culture. The traditional workflows of Acoustic music and the oral traditions of non-Western musical cultures indicate a potential area in which there has and will be a further problematised interaction of musical cultures, with Chinese Music culture acting as a case study for the delineation of traditional practices through digitisation according to Western criteria.

The stylistic imprints of non-Acoustic workflows within music composition and production are traceable throughout many 21st century styles of music. The second and summary focus of this paper reflects on the music of Cyberpunk and Asian Futurism, the subsequent formation of a new Popular Electronic music culture and its expediency throughout multiform media. Not only can this be analysed in correlation with the development of a media subculture throughout the prior sixty years, but the formation of new stylistic tendencies and the undercurrents of globalised music-making makes for a captivating analysis through practice of the potential hybridity of Acoustic and non-Acoustic musical creativity.

Simone Dotto

Simone Dotto is a post-doc research fellow and a lecturer in History of Television and New Media at the University of Udine, Italy. He deals with film and media history and media archaeology, with a focus on the cultural history of sound technology in Italy before and during WWII. He is one of the scientific coordinator of the FilmForum International Film and Media Studies Conference and he recently authored his first monograph, Voci d’Archivio (Meltemi 2019).

Collecting Voices as a Cultural Technique. How Listening Cultures Instrumentalised Phonography in the Early Italian National Sound Archive (1928-32).

Far behind other western countries, Italy founded its first state-owned sound archive only in the late 1920s, when the Fascist Party was already in charge. During its early years, the institution pursued the tasks set by two significantly different agendas: while actors in the emerging field of acoustics, linguistics and ethonomusicology advocated the need of a fully equipped laboratory for the study of sound and voice, the newly established political regime saw the archive as an opportunity to increase its means of propaganda.

Taking cue from a renewed interest in the sound archive as an historical subject (Lange 2017; Birdsall –Tkaczyk 2019), my contribution will reconstruct how the institutionalisation of phonography as an archival medium mirrored these intertwined cultural geneaologies. By drawing both from Sound Studies and German medientheorien I will thematise the intervolved relation between cultures and technical instruments by referring to the notion of ‘cultural technique’, through which “technology is scrutinised with a view toward its instrumental and anthropological determination, and culture is scrutinised with a view toward its boundaries” (Siegert 2015: 10). From this perspective I will enlighten how the cultural formations at stake instrumentalised phonography for different purposes: whereas “epistemic cultures” of listening (Knorr Cetina 1999) used them to produce evidences and inscriptions, with the aim to analyse ‘sound in itself’, the great amount of “vocal portraits” of political leaders and military men captured by the National Archive can be associated to fascist monumental culture (Dogliani 1999; Ben-Ghiat 2017), wherein sound recording was adopted as a means to eternalise the ‘sound of the self’.

As I will argue, these competing views of the same technological principles did not only result in different set of sonic skills and specific instruments for sound-archivisation, but also contributed in establishing two different modes of listening to and through (archival) media.

Thursday 17 December

Using Sonic Material to Deepen Literary and Art Historical Research

(10:30am - 12:00pm)

Heidi Stalla, Diana Chester and Madi Lommen

Dr. Heidi Stalla is Assistant Professor of Humanities at Yale-NUS College. Her teaching, writing, and research interests include Twentieth Century English Literature, Transnational Modernisms, Virginia Woolf, and Experimental Life-Writing. Stalla has published literary criticism and creative nonfiction, and is working on a collection of audio essays that use modernist texts to reckon with contemporary social and political events.

Dr. Chester is a sound studies scholar, multimedia artist, composer, and educator. Her work draws from sound studies, archival studies, and the ethnographic study of expressive culture in religious festivals and traditions. Her current scholarly research includes three primary strands, the study of sound and culture focused on religion and the environment, the audio essay as a form of sonic scholarship and pedagogical innovation, and new artistic research methodologies and practices at the intersection of spacialised media technologies and scientific research.

Madi Lommen, Research Assistant on this project, is a senior at Yale-NUS College majoring in Literature (to explore storytelling the world over) and minoring in Global Affairs (to study the systems in which these stories form). Founding a social enterprise in 2012 to connect locals in her hometown with refugees overseas has led her to the Middle East in recent years, where sounds of modern life animate her current audio project on the Maqamat.

The Surround Sound of Ling Shu Hua’s Friendship Scroll: Using Sonic Material to Deepen Literary and Art Historical Research

How might sound studies contribute to serious literary and historical research? Heidi Stalla, Diana Chester, and Madi Lommen take up this question as they describe their process of exploring the mysteries of a hundred years old Chinese handscroll. In 1925, in what was then Peking, writer Ling Shu Hua gave poet Xu Zhimo her empty scroll to take with him on a journey to England. Ling asked him to invite members of the famous Bloomsbury Group to paint or write on the scroll. Xu’s time in England was brief; he returned to China within months. But Ling’s scroll continued its journey back and forth between China, England, Paris, and Japan for the next 60 years, and holds the markings of at least 19 contributors from East and West. The scroll, in a private collection until recently, is an evocative artifact of friendship, artistic collaboration, and cross-cultural exchange that invites literary, artistic, historical, cultural, and creative explorations. Modernist scholar Heidi Stalla and Sound Studies specialist Diana Chester are collaborating in an interdisciplinary partnership to use literary and historical research, imagination, and an exploration of that dimension that is typically absent from historical narratives—sound—to uncover some of the mysteries of the scroll and the political and social tensions and friendships that are represented in and around its journey. This is the third in a series of collaborations that have resulted in audio essays—an academic form of expression that uses sound as well as disciplinary research to pursue a question or argument. For this project, the researched sounds of the historical narrative—which include, for example, interviews, recordings, film and music clips, as well as original composition performed on contemporaneous sound instruments—influences the development of the paper’s argument. This panel consists of four parts: an audio paper about the journey of the scroll, followed by three short papers by Stalla, Chester, and Lommen explaining how working across disciplines with sound disrupts and expands their research processes.

Music, Science, and Instruments in France from the 1789 Revolution to the First World War (2:00pm - 3:30pm)

Rebecca Dowd Geoffroy-Schwinden, Fanny Gribenski, Jillian Rogers and Sarah Fuchs

Rebecca Dowd Geoffroy-Schwinden (University of North Texas, Rebecca.Geoffroy-Schwinden@unt.edu) has published her research in Music & Letters, Women & Music: A Journal of Gender and Culture, and Studies in Eighteenth-Century Culture, among others, and her book about professional musicianship and property during the French Revolution is under contract with Oxford University Press. She received a Music & Letters Centenary Prize for best original article in musicology and her archival research has been supported by the M. Elizabeth C. Bartlet Award from the American Musicological Society.

Fanny Gribenski (IRCAM, gribenski@ircam.fr) is the author of L’Église comme lieu de concert. Pratiques musicales et usages de l’espace (1830–1905) (2019). She is currently completing her second monograph, Tuning the World. She has been a Fondation Thiers fellow, a Fulbright postdoctoral fellow and visiting scholar at UCLA and a Dibner fellow in the history of science and technology at the Huntington Library. In 2018-2019, she was a research scholar at the Max Planck Institute for the History of Science in Berlin within the research group “Epistemes of Modern Acoustics”. She is a book review editor for the Revue de musicologie.

Jillian Rogers (Indiana University, rogersjc@indiana.edu) examines relationships between music/ sound and how people have historically experienced and coped with trauma. Her interests in French modernism, affect and psychoanalytic theory, sound studies, and trauma and performance studies coalesce in her current book project, Resonant Recoveries: French Music Between the World Wars (forthcoming 2021). In addition to co-editing special issues of Nineteenth-Century Music Review and Journal of Musicology, Jill is a founding researcher of the Sonic Histories of Cork City Project.

Sarah Fuchs (Syracuse University, sefuchss@syracuse.edu) explores how audio-visual technologies shaped musical culture over the long nineteenth century and how such technologies affect the arts and humanities today. Her research has been supported by grants and fellowships from the American Association of University Women, the Houghton Library at Harvard University, and the Presser Foundation. Her essays have appeared in the Cambridge Opera Journal, Nineteenth-Century Music Review, and the edited collection London Voices, 1820–1840 (eds. Roger Parker and Susan Rutherford).

The Powers of Sound: Music, Science, and Instruments in France from the 1789 Revolution to the First World War

This panel examines relationships between sound instruments and sonic cultures in France during the long nineteenth century. Our focus on France—with its centralised political, scientific, and musical systems, allows us to foreground power relations. Exploring a great variety of practices, the papers show how various authorities utilised sound instruments as tools to engineer new communities in civic, religious, educational, and musical circles. In so doing, we demonstrate how these instruments shaped and were shaped by scientific and musical practices, while also offering crucial sites for rethinking broader histories of society, culture, and politics. In “Musical Mechanisation and the Revolutionary Industrial Agenda: The Advisory Board for Arts and Trades, 1791–1807,” Rebecca Geoffroy-Schwinden analyses funding applications for musical inventions in the archives of the Musée des arts et métiers, demonstrating that the revolutionary government adopted musical instruments as part of a plan to revitalise France’s economic health through scientific industrialisation. Fanny Gribenski, in “‘Monstrous Sirens’: Music, Science, Religion, and Technology in Nineteenth-Century France,” probes parish archives and organ builders’ papers to show that organ inaugurations transformed churches into showrooms for organ building and musical virtuosity, revealing the centrality of these venues for broader histories of sound, modernity, and religion. In “Politicizing Sonic Vibrations: Music, Sound, Medicine, and Power in France’s Long Nineteenth Century,” Jillian Rogers examines instrument catalogues and patents to illustrate how medically-oriented, vibrational sound instruments were intertwined with national constructions of citizenship, industry, and power. Finally, in “The Pathological Voice in the Third Republic,” Sarah Fuchs investigates medical treatises, singing manuals, chronophotographic images, and sound recordings to suggest that the Institution Nationale des Sourds-Muet’s and the Paris Conservatoire’s uses of audio-visual technologies similarly pathologised the voices of those who could not speak and those who could not speak or sing in proper French.

Curatorial Responses to Sound Instruments (4:00pm - 5:10pm)

Alison Taubman

Alison has worked at National Museums Scotland for 18 years, with responsibility for the Communications collections in the Department of Science & Technology. She previously worked with the energy collections at the Science and Industry Museum, Manchester and at National Museums Liverpool where she was project curator on the Transatlantic Slavery Gallery, which opened at the Merseyside Maritime Museum in 1994.

Cybraphon: A Foray into Museum Collecting of Social Media

In 2013, National Museums Scotland collected Cybraphon, an interactive autonomous internet-connected emotional robot band, created in 2009 by artists’ collective and musicians FOUND (https://bit.ly/31jphwo, http://foundcollective.com/about/ ). Inspired by 19th century mechanical instruments Cybraphon consists of instruments and found objects operated by over 60 robotic actuators, all housed in a modified wardrobe. These elements are controlled by a MacBook Air in one of the drawers via MIDI, DMX, and Arduino boards.

The makers’ aim was to create a robotic band that mimicked the behaviour of a real one. Regularly Googling its name to check its popularity, Cybraphon registered the results on a voltmeter repurposed to calibrate emotions, ranging from ‘despair’ to ‘delirium’. This triggered analogue music played on the instruments in the wardrobe. It captured its makers’ interest in social media interaction at a point in time, 2009, when the phenomenon was still relatively new. Activity rested in the hands of the online community and as such provided the Museum with a means of collecting online social interaction manifested through a physical entity that appeared analogue, pre-electric even.

From July 2016 Cybraphon was on display at the National Museum of Scotland, at the intersection of the Science and Technology and Art & Design galleries. Originally built by its makers to last six months, it needed constant maintenance to keep it operating until its removal in September 2019. Museum staff agreed to decommission it in April 2020.

The proposed case study will present how collecting Cybraphon tested museum capabilities and challenged museums protocols. The Museum worked to maintain the physical and digital forms of this emotional robotic band while trying to remain faithful to its creators’ original vision. Questions remain over how we preserve its physical, digital and therefore its emotional state, long-term, as a non-working object in store.

Frédéric Trottier

Frederic Trottier is an ethnologist and music/urban anthropologist mainly working on electronic music and music as social action. He got his PhD in December 2018 about ‘Techno music’s worlds in Detroit (USA)’. He works as an ATER at Université de Reims, and as a researcher-adviser for Philharmonie de Paris – Cité de la Musique since 2017.

Sound Playability and Sonic Mediation. Inside ‘Studio-son’ Sessions for Children by Philharmonie de Paris

How much (in)visible are electronic music instrumentarium? How much electronic music practices are understood? In a broad EDM or more specific techno context, my research journey started from Detroit to Paris, focusing on what electronists i.e artists, musician, technician working on/with electronic instruments/tools gave us in order to access to a variety of music/technology interaction or perception depending on staging and performance context. DJ or producers playing in a bar, at a festival, a home party, a concert hall, a bedroom or elsewhere, introduce to an audience ways of listening but also looking at how making music works (composing or performing). If many music engineers work on vivid, synesthetic and playable electronic instruments for musicians, some artists also try to connect their audience to their sound instruments and sonic culture. And, how about this audience is only composed by children?

In 2016, Philharmonie de Paris – Cité de la Musique [French music institution] started a project named ‘Traditions musicales du Monde’ [Music traditions from all over the World]. Taking place in a socio-cultural centre of a marginalised area of Antony, a city located in southern suburbs of Paris, this project enables to children aged from 6 to 12 years old to have access to specific « music traditions » during each holiday week. Between Sabar tambour from Senegal, Txalaparta from Basque Country, Cuban percussion classes…, our young trainees could have a ‘Studio-son’ [Sound studio] session. Every session cares about cultural and music tradition and learn in a non-Western musicological way how to practice an instrument. So how ‘Studio-son’ finds its place in this programme, how to work with sound instruments but also to tackle the question of tradition?

From a participating-observing methodological point of view, I will extract a pedagogical and socio-anthropological analysis about which unique sonic culture/sound instrument ‘Studio-son’ brings to life. Coordinated by Luciana Penna-Diaw (head of vocal and non-Western music department) and Christophe Rosenberg (head of new technology and popular music department), every session is handled by an artist (Laurence Bouckaert, Francesco Russo) and a technician, giving peculiar music guidances in such ways it affects listening, learning and practicing. Children experience instruments - Korg pad, Alessis Micron, CS Moog… - but also an aesthetics and ethics of attempt/try/repeat/mix sounds.

Tom Everrett

Dr Tom Everrett is Curator of Communications at Ingenium: Canada’s Museums of Science and Innovation. He also holds an Adjunct Professorship at Carleton University, Ottawa, where he teaches Sound Studies. He curated the Canada Science and Technology Museum’s permanent *Sound by Design* gallery (2017), and is currently leading two historical instrument reconstructions: Bell and Blake’s 1874 Ear Phonautograph and Le Caine’s 1948 Electronic Sackbut. He is co-editor of *Living Stereo: Histories and Cultures of Multichannel Sound* (2015).

The Electronic Sackbut Project: How (and Why) We Are Making the World’s First Synthesizer Playable Again

The Electronic Sackbut, built by Canadian Hugh Le Caine (1945–48), is widely regarded as the world’s first modern synthesizer. Yet we still know surprisingly little about how it works. Complex electrical routing, buried capacitors, brittle wires, broken solders, and other material challenges have made knowledge-generation difficult. Thanks to a two-year conservation effort, led in 2015 by electronic instrument technician J.L. Leimseider (National Music Centre, Canada), we now know more about the Electronic Sackbut’s design and functionality than ever before. Yet without being able to *play* the instrument – an impossibility given the degraded state of its original electronic components – our understanding of the Electronic Sackbut’s instrumentality remains limited. Although written descriptions, photographs, and audio recordings do exist, researchers have yet to unearth any film footage that might help us understand exactly how Le Caine built the instrument, or how he achieved the sounds that he did in performance. Moreover, the surviving audio recordings reflect prevailing musical sensibilities (traditional and experimental) of the 1940s-50s. As such, they offer only a glimpse at the instrument’s technical capabilities and musical potentials.

Recently, curatorial and conservation staff at Ingenium: Canada’s Museums of Science and Innovation (Ottawa) initiated a project to restore playability/soundability to the Electronic Sackbut. The idea is to retain the functioning of the instrument’s well-preserved mechanical elements – pressure-sensitive keyboard, finger-controlled filter and modulator, sliding tone wheel, various pots and switches – while safely bypassing the instrument’s original electronics with modern digital components. If the project is successful, the Electronic Sackbut will be playable once more, for the first time in over half a century, thereby presenting new opportunities for hands-on experimentation, public performance, and fuller material culture exploration. This paper will describe the background and current state of the restoration project, including reflections on the many practical, ethical, and interpretive issues involved.

Keynote (6:00pm - 7:00pm)

Trevor Pinch

In the Moog: Psychedelic Tingles and Timbres

When the Moog electronic music synthesizer was first developed in the period 1964-1968 it was a new sound instrument but as yet no sonic culture had formed around it. Electronic sounds were still largely unknown and unrecognizable to most listeners. For a sonic culture to form around a new sound instrument there must be a way for it produce recognizable and reproducible sounds. There must also be a performance practice capable of generating such sounds. The instrument itself must also be sufficiently stable and standardised that it can make recognizable and reproducible sounds even if these sounds are unexpected and unanticipated. In this lecture I will trace the evolution of a sonic culture built around the Moog synthesizer.

I will show how particular technological features of the Moog (and the later Minimoog) allowed particular sounds to be made and controlled. I will discuss how sounds stabilise and the language used to describe such sounds. I will show how in quite a short period of time sounds, first described as “weird shit”, become recognizable sounds that Moog session musicians can be asked to make and reproduce. The recording industry, the world of advertising, concerts, festivals and happenings play a key role in this process. The talk will be accompanied by audio and video clips of the relevant sounds.

I will conclude by speculating about how the psychedelic culture of the 1960s shaped the sounds made and how the Moog sounds were an integral part of that culture. The use of the Moog by Mick Jagger in the cult movie “Performance” provided both sonic and visual motifs to a world of transcendence and transmogrification. The use of the Moog by George Harrison on “Here Comes the Sun” added a psychedelic frisson to a beautiful Beatle’s recording. Even familiar music such as that of J.S. Bach, made famous by Wendy Carlos on “Switched on Bach” (still one of the best-selling classical albums of all time) used the Moog to add psychedelic tingles to conventional timbres.

Friday 18 December

Community and the Co-Creation of Sound, Music and Art (10:30am - 11:40am)

Rhiannon Moss

My research focuses on Irish modernism in literature and culture, with a focus on transnationalism and the politics of literary form. Until 2019, I was a lecturer in Modern Irish Writing and Twentieth Century Literature at Queen Mary, University of London, where with Kester Richardson-Dawes I established the interdisciplinary Centre for Sound Cultures in 2017. I am currently completing my book Ireland, Modernism, Transnationalism, while developing my new project on late modernism and new technology in the mid-twentieth century.

“Do Not Imagine that Because I am Silent I am not Present”: Sonic Communities in Samuel Beckett and Denis Johnston

This paper considers the work for radio produced by Samuel Beckett and Denis Johnston in the mid-twentieth century, arguing that at key points in the development of the medium, both writers used the possibilities of sonic drama to investigate the formation of culture and community. In particular, both explored the ways in which the form could interrogate and destabilise the idea of boundaries, national and conceptual, as part of a late modernist preoccupation with liminal space.

Johnston was a pioneer in the early BBC in both radio and television, a strand of his career which began with his 1936 appointment to the Northern Ireland regional staff. This move, which he claimed allowed him to be “in Ireland yet out of it,” allowed him to experiment with radio as a form which could create a sonic community while reimagining national boundaries. His early works included Lillibulero, a potentially controversial dramatisation of the Siege of Derry, described by Johnston as a sonic ‘diorama’, which utilised the radio form to experiment with ideas of community and nation across boundaries of time and space.

Beckett too engaged with sound as a form which could question spatial, temporal and metaphysical boundaries, between absence and presence, belonging and alienation, transmission and reception. His 1950s work with the BBC was closely associated with the formation of the Radiophonic Workshop, and radio plays such as All That Fall and Embers used bruitage techniques alongside the spoken, and unspoken, voice to create a conceptual space crossing temporal and national borders. Both writers, emerging from a context in which questions of national and transnational identities were shifting and unstable, used radiogenic forms to explore new conceptualisations of culture and community through sound.

Jon Pigott & Aidan Taylor

Aidan Taylor is a musical instrument maker who is currently studying for PhD at Cardiff Metropolitan University. He has been involved in both online and real-world maker communities for over a decade, and his practice involves participatory electronic instrument making workshops. He designed and built an analogue synthesizer called “Turbo” and today is working on an open source hardware series of modular electronics circuits under the brand “Electric Noodle Box”.

Dr Jon Pigott is an academic based within the School of Art and Design at Cardiff Metropolitan University. His research and teaching are practice orientated and focused on sound art, kinetic sculpture and science and technology studies (STS). He previously worked in the audio industry, helping bring numerous high-profile projects to fruition. Jon’s PhD in Electromechanical Sound Art was awarded by Bath Spa University in 2017, he is a Senior Fellow of the HEA and has exhibited and published work internationally.

Intersections in Musical Instrument Design and Maker Culture: Situating Contemporary Music Hacks and DIY Instrument Practices in the Age of the Makerspace

There is a rich history of DIY practice and approaches in experimental music, sonic art and musical instrument design as can be found in the work of Don Buchla, David Tudor and Nicolas Collins among numerous others. The Maker Movement as a newer DIY sub-culture which includes hackspaces and Fablabs, brings political, technical and social contexts to this field. What are the relationships between contemporary music hack practices and the online and offline spaces of maker culture, and how should we situate this relationship against previously established DIY music practices? In what ways have the social intentions, democratisation of tools and open source design approaches inherent in the Maker Movement influenced the sonic culture of hardware DIY practices?

In this article, the investigators provide an interdisciplinary review on this topic grounded in an expertise in electronic instrument making and from working within a variety of maker communities. A critical narrative is drawn from the position of creative music and hacking practice. Attitudes towards ownership, making and community are described through examples of both archival and new works by artists and makers. Samples of the investigators creative making practices involving community and open source hardware are also presented.

The spaces of Maker Culture offer alternative models of working and fabrication for musical instrument makers, and potentially new venues and audiences for sonic cultures. This article aims to explore the of these intersecting worlds.

Joseph Wong

Joseph Wong studied music at the University of York, where he obtained his PhD respectively. Wong’s research interests covers the areas of music analysis, composition theory, music and visual media, and Chinese musical culture. His works were presented at international conferences in United Kingdom, Norway, Taiwan, and Hong Kong, and some of his recent papers were published by Springer Nature, Intellect Books and Zhejiang University Press. Wong is a member of the Hong Kong Composers’ Guild.

Transforming Sonic Culture: Reformation of Traditional Chinese Musical Instruments in the Twentieth and Twenty-first Centuries

Like many Western musical instruments, traditional Chinese instruments have undergone continual modifications over their long history of development. However, the twentieth century saw a series of large scale and systematic reformations on these instruments. Such acts of reforming traditional instruments were motivated by the urgent needs to revive the traditional Chinese musical culture and create a new orchestral sound that represents the nation.

In 2009, Hong Kong Chinese Orchestra (HKCO) launched their first generation of EcoHuqins - Chinese bowed string instruments: including gaohu, erhu, zhonghu, gehu, and bass gehu (Chinese counterparts of the string instruments in Western orchestra). According to HKCO, the main focus of this reformation project is “on the expansion of their physical capabilities while preserving their traditional timbre and mode of performance”. By redesigning the sound box and replacing the python skin (attached on the sound box) with synthetic (PET) membrane, these instruments can not only meet the requirements of environment protection and custom regulations, but also produce a more blended sound across the section. In fact, eco-huqins is just one of the prominent examples of instrument reformation. In the past century, other traditional Chinese instruments were also modified in many different ways: new members were added to individual families of instruments to extend the mid and low range, finger hole position of wind instruments and fret position of plucked string instruments were adjusted so that they can play equal-tempered chromatic scale, metal extension were attached to the end of the pipes of wind instruments for sound amplification, etc. Although criticised by some musicians as unauthentic, the sound produced by these reformed instruments has formed the basis of the development of the modern Chinese orchestra and contemporary Chinese sonic culture.

This paper aims to trace the paths of the reformation of selected traditional Chinese instruments and the motivations behind such modifications. It also discusses how these developments have transformed the Chinese sonic culture over the past few decades.

The Sound of Modernity (2:00pm - 3:10pm)

David Cotter & Ella Nixon

David Cotter is currently reading for his PhD in Music (The Collaborative Guitar) at the University of Cambridge under the supervision of Professor John Rink. In 2019, he gave the world-premiere of the first ever piece for classical guitar and virtual reality headset during the EXPO2 Festival at the University of Oxford, built self-playing guitar robots in Norway, and presented and performed in Belgium, Hong Kong, Ireland, Malaysia, Portugal, and Singapore.

Ella Nixon is a PhD candidate at the University of Northumbria under the supervision of Dr Claudine van Hensbergen and in collaboration with the Laing Art Gallery, Newcastle upon Tyne. Her interests lie primarily in curatorial and educational practices. Her research uncovers the gendered power relations embedded within regional art galleries, using the Laing Gallery as a case study, to explore the often hidden contributions of women within histories of collecting and display.

2020 Vision: Sound Instruments and Virtual Reality

Virtual reality headsets, as a particularly recent technology, are sound instruments which afford both performers and listeners innovative opportunities to produce, manipulate, and interact with sound within shared sonic cultures. This paper illustrates the artistic, curatorial, musical, and sonic possibilities which virtual reality creates in the twenty-first century.

In 2019, the world’s first composition for guitar, electronics, and virtual reality headset (entitled ‘BREKEKEKEX’) was premiered at the University of Oxford. The piece explores the interface between physical and virtual realities in the context of musical performance, developing Berkowitz’s ‘principles of virtual space-as-form’ by testing virtual environments as dynamic platforms for re-composing and re-interpreting past repertoires in the present moment. Fragments of John Dowland’s ‘Flow My Tears’ (1596) appear and disappear in a panoramic field around the performer, forcing embodied decision-making. Movement decides content (ie. the fragment of material the performer is looking at), but also context (ie. The process of reading the panoramic score affects the live electronics). Sounds are created by the guitar and electronics, but mediated by the performer’s gaze, and the location of their headset in relation to on-stage sensors. While musical fragments are microtonally distorted, and the performer and audience are blind to one another, some familiarity remains in the physiological similarity of performing these historic melodies: a kind of ‘muscle memory’.

This paper demonstrates how VR headsets, as ever-developing sound instruments, allow existing repertoires to be (re)composed, enable experimental and unprecedented curatorial practices in the sonic domain, and offer literal and metaphorical opportunities for artists and musicians to transcend genre boundaries and enter ever-evolving contemporary performance contexts. Headsets function as fulcrums around which the multiple identities of artist, composer, curator, listener, and performer can be interrogated (in myriad hybridised and simultaneous configurations) and consistently recombined (conceptually and experientially).

Eamonn BellEamonn Bell is a Research Fellow at the Department of Music, Trinity College Dublin (TCD). His current research examines how the digital audio Compact Disc (CD) format was designed, subverted, reproduced and domesticated for musical ends. He holds a PhD in music theory from Columbia University (2019) and a B.A. (Mod.) in Music and Mathematics from TCD (2013). His research focuses on digital technology as it relates to music and sound.

The Test-Disc Cultures of the Audio Compact Disc (CD) Format

Test media have long been used by manufacturers, consumers, and artists to assess the reproductive definition and durability of sound media. In this paper, I discuss the test disc as a class of twentieth-century sound instrument that has convened listeners in assessments of how new media sound - and how they ought to. In this paper, I draw on examples of test discs roughly contemporaneous to the launch of compact disc digital audio format (CD) in 1982. Drawing on recent writing about the co-operative function of media (Schüttpelz 2019, Volmar 2020) and Pinch (1993) on testing, I examine the variety of “test-disc cultures” of the CD.

Some test discs were deliberately designed to be evaluated quantitatively or qualitatively by expert listeners and measuring technologies, depending on the listening ethic of a particular test-disc culture. I examine test discs used by engineers and product designers at Sony and Philips during the development of the CD standard in the early 1980s and, relatedly, CD recordings marketed to high-end audio consumers that promised a full-spectrum assessment of the purchaser’s home-audio system.

But any disc can become a test disc by convenience or by convention: some test discs were simply ready-to-hand in a particular context. Or, their combination of material form and sonic content was held to be especially testing. Yet other CDs were featured in ostentatious public “trials of strength” (Latour 1990) designed to propagandise for the durability of the novel consumer audio format.

To conclude, I reflect on what makes test-disc culture distinctive. Disc-shaped media formats have special affordances for manipulation: witness turnablism. This facilitates testing. However, the turn to submicroscopic inscription techniques and optoelectronic readout in the CD makes them difficult to handle during testing. Therefore, the test-disc cultures of the CD represent a kind of limiting case for test-disc culture more generally.

Nikita BraguinskiDr. Nikita Braguinski is a postdoctoral researcher at the Music Department of Humboldt University of Berlin. In his current project, he investigates the influence of historical forms of automatic and assisted composition on today’s use of artificial intelligence in music.

His recent publications on music-generating systems include:

- "428 Millions of Quadrilles for 5s. 6d.": John Clinton's Combinatorial Music Machine. 19th-Century

Music. Fall 2019, 43/2.

- MUSOFUN. Joseph Schillinger's Musical Game Between American Music, Soviet Avant-Garde, and

Combinatorics. American Music, volume 38, no. 1, 2020: 55–77.

- RANDOM. Die Archäologie der elektronischen Spielzeugklänge. Bochum: Projekt Verlag, 2018.

The History of Composing Automata

Composing automata - machines and sets of instructions that enable automatic or assisted composition - have existed long before the advent of today’s machine learning. Contrary to the common sense understanding of the underlying technologies, a digital computer is also not a prerequisite for the mechanisation of composition. Paper-based arrangements of musical snippets in sortable trays, and even simple wooden slides in a box, have for centuries made possible the automatisation of parts of the composer’s thinking process.

In this presentation, I will propose a framework for a unified discussion of both historical and contemporary composing machines. I will show how historical attempts at the mathematisation of musical theory and practice have over time accumulated into beliefs that continue to inform current developments. I will illustrate this process with examples of music-generating systems from different technological periods, including a 17th-century proposal, a 19th-century apparatus for creating piano scores of dance music, a musical game from the 1940s, and a composing program from the second half of the 20th century which does not yet employ modern machine learning techniques.

For a long time, apparatuses aiming at composition (as opposed to mere playback) have remained relatively obscure pieces of technology. However, I will argue that, in addition to their direct musical use, they have played a crucial role in showcasing the more general possibilities of the underlying techniques - from encryption in the case of the historical wooden box with movable slides to automatic segmentation and generation of data in the case of machine learning.

Cultures of Sonic Resistance (4:00pm - 5:10pm)

Asha Tamirisa

Asha Tamirisa [she/her/hers] works with sound, video, film, and researches media histories. Asha has performed at venues such as the ICA Boston, Bitforms Gallery (NYC), has given talks at the University of Michigan, Mount Holyoke College, Oberlin College, and Wheaton College, and held residencies at The Media Archeology Lab (Boulder, CO), Perte de Signal (Montreal, CA) and I-Park Foundation (East Haddam, CT). Asha’s work has been mentioned in the Oxford Handbook of New Audiovisual Aesthetics and the 5th Edition of Electronic and Experimental Music: Technology, Music, and Culture (Routledge). Along with many colleagues, Asha cofounded OPENSIGNAL, a collective of artists concerned with the state of gender and race in electronic music and art practice. Asha has taught courses at Brown University, the Rhode Island School of Design, Girls Rock! Rhode Island, and Street Level Youth Media in Chicago. Asha holds a PhD in Computer Music and Multimedia and an M.A. in Modern Culture and Media from Brown University, and is currently an Assistant Professor at Bates College.

Gender, Race and Power in the Interfaces of Analog Modular Synthesizer

Audio cultures have had a tendency to disregard the amalgam of social, political, and cultural conditions tied to the tools and technologies used in the production of sound, allowing the status of such tools to remain as "objective" or "neutral". This lecture/performance weaves the historical, technical, and interpretive by examining the ways in which specific configurations of gender, race, and power are articulated, and in some instances subverted, in the interfaces of analogue modular synthesizers. In particular, I will analyse and critique the gendered labour and technical design associated with modular patching interfaces. The lecture thinks through how we might look to the interface as a cultural artifact itself, rather than thinking teleologically about instruments as products of their “inventors” or thinking about “users” and the media objects they produce as the only phenomena worthy of analysis.

The format for this presentation will be a multimedia lecture/performance. Alongside my text/prose, I will perform audio with a live video feed of my patching which will offer a sonic and visual counterpoint to my lecture. The live feed will be paired with archival footage and reference images as well. This style of lecture/performance can be seen in another piece of mine called Ravel, which can be viewed here: https://vimeo.com/374650068/27952c873a

Paulina Hartono

Paulina Hartono is a scholar of Chinese science and technology, history, and media cultures. She is a Ph.D. candidate in the Department of History at the University of California, Berkeley, where she is completing a dissertation on the political and social history of radio in twentieth-century China.

Hobbyist Radio Making in Early-Twentieth Century China

In the 1920s, Chinese customs bans on foreign radio imports were created out of an abundance of caution. Radio, which to some in China symbolised a luxury commodity for entertainment, had another association among officials—the military. As a technology used on the battlefield, radio was helpful in coordinating movements, sharing tactical strategies, and transmitting time sensitive communications. The dual affordances of radio as a tool for government military intelligence and radio as a general-purpose technology enjoyed by mass media audiences forced a tension for ordinary listeners, particularly in the context of war with Japan. Could popular radio listening be an unpatriotic act?

This essay explores how ordinary listeners responded to the fraught politics associated with radio listening in Republican China, by examining amateur radio tinkerers. Making radios against the backdrop of anti-imperialist boycotts and rising nationalist sentiment, these enthusiasts challenge how we might understand the politics of popular technology in early-twentieth century China.

Neither military actors nor passive consumers of media, they reveal a picture of how citizens navigated state interests and were technology makers who made active choices in how to engage with radio. By balking at the idea of purchasing foreign radio sets, they turned towards making radios that they could create themselves and even used their activities towards patriotic ends. This paper lies at the intersection of STS and social history, as I explore who these amateurs were, their homemade radios, and the story of their technical experimentation at a time of nationalist ferment in China.

David Goren

David Goren is an award-winning radio producer/audio archivist based in Brooklyn, NY. He’s created programming for the BBC, National Public Radio among others. In 2016, he was an artist-in-residence at Wave Farm, a center for the Transmission Arts. David released The Brooklyn Pirate Radio Sound Map in July 2018 and in April 2019 produced “New York City’s Pirates of the Air” for the BBC World Service. He’s given related talks at the HOPE conference and Yale University.

‘Yo Yon Mon Brooklyn!’ The Brooklyn Pirate Radio Sound Map

Every day across Brooklyn’s sky, illegal radio signals drift over immigrant neighbourhoods. These invisible, culturally charged clouds of radio energy continually shift and transform, following the lifecycle and pulse of the streets.

Konpas, Soca and Reggae DJ’s transform time and space from clandestine studios tucked behind storefronts and down basement steps, mixing the sounds of ancestral homes with the thump and struggles of the new. Jolted by electrified fingers of Signal, the old radio poetry of hiss and hum leaps from a scattered forest of rooftop antennas jacked-in to clandestine transmitters. The signals touch down on Flatbush Avenue, wafting through boomboxes on street corners, in dollar vans, bakeries, and houses of worship.

By accessing an analogue technology that is essentially free for the listener, economically marginalised communities avoid the subscription and data fees built in to the conveniences of the digital age. Listeners wield their antennas like dowsing rods, catching the elusive vibrations of crucial music, news and information rarely found on the legal side of the dial.

Six years ago I began recording these stations and seeking out their operators and listeners. In the process I learned about the historic potency and freedom of radio to West Indians and how this unregulated sonic community has been able to sustain itself, nurturing their communities in the shadows of the law for over 25 years.

In July 2018, I released the Brooklyn Pirate Radio Sound Map <pirateradiomap.com> which was featured in the New Yorker magazine, and continues to inspire a lively debate across social media and in the academic radio preservation community. For the Sound Instruments and Sonic Cultures conference, I propose to deliver a 20-45 minute workshop/presentation, examining the soundprint of pirate radio in Brooklyn via the sound map integrated with interviews, photographs and a live networked tuner based in Flatbush.

Keynote (6:00pm - 7:00pm)

Mara Mills

‘Everything is a filter’? A Social History of the Electrical Filter

It’s a cliché of computer music and signal processing that “everything is a filter.” The human throat, a musical instrument, an algorithm—anything, to paraphrase CCRMA’s Julius Smith, that modifies sound in some way. But where did this concept of “filtering” sound and other signals come from?

Early twentieth-century communication engineers pointed to the vacuum tube and the “electric wave filter” as revolutionary inventions that transformed electroacoustics and scientific research on sound, making signal processing possible. The vacuum tube has received extensive attention for its contributions to “the birth of electronics,” yet very little has been written about the history of filtering.

Electrical filters were independently developed by Karl Willy Wagner in Germany and George Campbell in the United States around 1915. This talk will offer a social and technical history of the latter. Working first in the laboratories of Boston Telephone and later for Western Electric in New York, Campbell arrived at the idea of electrical filtering as a by-product of his work on “loading coils,” devices inserted into telephone wires to extend the distance that a signal could be carried in the years before electronic amplification was possible. I will frame Campbell’s work in the context of several decades of public and engineering dreams of “long distance,” deterred not only by the attenuation or dissipation of the voice signal, but by wild disturbances of distortion, noise, and interference from other wires in the burgeoning electroscape.

Whereas Thomas Hughes described technical development in large-scale electrical systems as a pattern of overcoming or eliminating “reverse salients” (key problems or lags in technical knowledge), I track here the instrumentalisation of adverse effects in the pursuit of long distance telecommunication: from harnessing electromagnetic phenomena that might otherwise cause interference (“induction”), to harnessing signal “sluggishness,” to harnessing attenuation itself in the case of the filter.

I will also discuss some of the semantic and technical shifts that filtering underwent as it became electroacoustic: it referred to the separation of signal components, the removal of unwanted components, and the shaping or processing of a signal through various means.

# Sound Season @ NSMM

If not for the COVID-19 pandemic, this conference would be taking place at the National Science and Media Museum (NSMM), as part of our ‘Sound Season’ of events to accompany our Sonic Boom exhibitions, the first ever exclusively sound-themed exhibitions at the museum. ‘Sound Season’ will now take place in summer 2021. We hope that you will be able to visit us then to experience a suite of specially-commissioned sound installations, exciting sound-related events and, of course, our free Sonic Boom exhibition. Tours of the Museum’s collection will also be available.

# Electronic Soundscapes

Electronic Soundscapes is a network of PhD researchers and academics from the Universities of Leeds, Sheffield, and York, who seek to address the themes of collective invention, strategic interests, and social inclusiveness using the orientating question: “what were the opportunities and challenges created by the advent of modern sound technologies?”

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