The Music Department and the Faculty of Fine Arts present

EXPLORING SOUND

A Digital Audio Arts & Music Student Symposium

Online (Zoom), University of Lethbridge

Thursday March 19, 2020

10.00 am   *Introduction - Dr. Georg Boenn*

Mixing Practices

10:15 am   **The Joyce and Ron Sakamoto Prize for Research in Digital Audio Arts 2019** How Analog Are You? – Ryland Chambers-Moranz and Jordi Shier

10.40 am   The Stress of Mixing: How the Tools You Choose Impact Your Mix – Carter Potts

11.00 am   Is Choking Compression Still Needed in Modern Podcasts? – David Hume

11.20 am   I'm All Ears: How Does Untrained Listeners' Perception of a Mix Differ from That of Studio Professionals – Kelsey Taylor

11.40   *Coffee break*

Keynote: Dr. Andrew Schloss and Robert Van Rooyen

12.00 pm   Radiodrum and Robotics: The History and Design of Unique and Complementary Instruments

1.00 pm   *Lunch break*

Graduate Student Session

2.00 pm   Audio Production Techniques in Genre-Based Music Information Retrieval Systems – Courtney McDermott

2.25 pm   Introducing the Whacky Wizards: Software Tools for Classroom Music – Leo Brooks

2.50 pm   The Disguises of Opera and the Internet's Role in Queer Identity Formation in Nico Muhly and Craig Lucas' *Two Boys* – Ian Mustard

Video Projects

3.15 pm   Listeners Prefer a Western Score over a Chinese Score on a Sci-Fi Film – Fei Fei Du

3.35 pm   Determining the Significance of Visualization vs. Audio Only within ASMR – Michael Tenebro

3.55 pm   *Tea break*

Studio Practices

4.10 pm   The Impact of Different Recording Environments on Pop Artists' Performance – Christian Mercado

4.30 pm   Relationships between Sampled Instruments and Arrangement – Christian Pabaonon

4.50 pm   Death By Click – Leonard Menon

5.10 pm   *The end*

Mixing Practices

***The Joyce and Ron Sakamoto Prize for Research in Digital Audio Arts 2019* - How Analog Are You?**
Ryland Chambers-Moranz, Jordie Shier

Are analog mixing technologies relevant in a digital age? Audio engineers have been globally polarized by the proponents of analog authenticity over digital imitation, and of digital innovation over analog nostalgia. This study attempts further elucidation of the analog/digital dichotomy in regard to mixing practice and audio authenticity through listeners' perception and spectral analyses. To that end, listening sessions were conducted using seven tracks that were mixed on three different analog consoles and two contrasting digital plugin emulations. Utilizing three mixing participants and fifteen audio mixing professionals as trained listening participants between the ages of 19 and 60, our team collected data that correlate and contrast differences between the analog and digital formats in practice and in perception. Results show that trained listeners' preference does not depend on authentic analog representation vs. digital emulation. Also, a set of six spectral features were extracted from the analog and digital mixes providing conclusive analysis that the digital plugins were not a wholly accurate representation of the analog consoles they were representing.

The Stress of Mixing: How the Tools You Choose Impact Your Mix
Carter Potts

The dynamic range compressor (DRC) is the mixing engineer's main tool to control loudness and allow musicians to stand out. DRCs are often chosen based on their sonic character. However, with so many choices for a compressor, it is hard to know what the right tool for the job will be. By narrowing down the options to Empirical Labs' analog hardware Distressor, and its digital emulation by Slate Digital, namely the FG-Stress, we can analyze how these similar tools drastically impact the end result of a mix.

In a perceptual audio experiment comparing the analog Distressor with the FG-Stress for eight samples mixed by two engineers, the quantitative data analysis revealed preference trends towards one version or the other depending on the type of sources that were compressed, for example the bass and the kick. These trends were supported by qualitative data provided by the listening participants. A specific sample tended to be preferred based on how the analog or digital compressor affected the dominant frequency bands of the recorded material. This study alludes that there is no clear winner in the everlasting analog vs. digital battle, but it suggests that each serves a different purpose in achieving the best end result for a mix.

Is choking compression still needed in modern podcasts?
David Hume

We've all seen the fallout from the loudness war, degrading sound quality through a constant drive to be the loudest. Modern day podcasts still suffer from over compression practices, often using ratios that are much higher than needed. With modern playback technology, is this practice still needed or is there a better way to do compression for podcasting that is more pleasing to the listener?

I'm All Ears: How does untrained listeners' perception of a mix differ from that of studio professionals?
Kelsey Taylor

Any creative professional will tell you that you spend your time learning rules just so that you can break them. The standards that have been established in the audio industry function under the collective understanding that there is not a single 'correct' way to record, mix, and produce music, but rather there exists a general consensus of what the 'wrong' way may be. The ultimate purpose of these standards is to ensure a certain level of quality of music production before being released. While the set of skills required to meet these standards is vast and diverse, the general level of audio literacy held by the average music listener is likely much lower than that of your average audio engineer. Does the average music listener hear the details that we have been told to pay attention to? If not, should we as audio engineers adapt our mixing approach to what the average music listener can perceive? To explore these research questions, I conducted semi-directed interviews with eleven 'untrained listener' participants after I presented them with both an unmixed and an 'industry standard' mixed version of a hip-hop song and of a rock song. Results show that these untrained listeners do have a certain level of understanding of what they hear in a mix, the main difference with the audio engineers being the vocabulary that they have at their disposal to describe sound.

Keynote

Radiodrum and Robotics:
The history and design of unique and complementary instruments

by Dr. Andrew Schloss and Dr. Robert Van Rooyen

This presentation explores the history and evolution of gesture recognition and robotics in the context of musical instruments. From early work at Bell Labs and Stanford, to recent innovations in Software Defined Radio and its related hardware, the Radiodrum has a rich history spanning research, design, and live performance. In parallel, robotic instruments have continued to expand the reach of artists from the early days of audible automatons, to cutting edge designs that push the limits of mechatronic systems research. When combined, these unique instruments can offer a rich canvas upon which to explore new and interesting musical expressions. In addition to a historical perspective, the presentation will include live demos of the instruments along with information about the related technology and the process by which they were researched and developed.

Andrew Schloss is known primarily as a performer, improviser and virtuoso on the radiodrum, an instrument based on Max Mathews' radio baton, but optimized for percussive gesture-sensing. Using this instrument, he has created new works and collaborated extensively with composer David A. Jaffe on numerous musical projects involving both acoustic and electronic sounds.

In addition, he has pushed the envelope with regard to electroacoustic music combined with Cuban jazz, performing extensively with Cuban pianist Hilario Durán, as well as maestro Chucho Valdés and Ernán Lopez Nussa. In public art, he has collaborated with Trimpin, Nobuho Nagasawa, Buster Simpson, and Don Fels.

Schloss was a Fulbright Scholar at IRCAM per invitation of David Wessel in 1987, which is when he began working on the radiodrum combined with the very first version of Max/MSP (originally called "Patcher"). He has received grants from the National Endowment for the Arts, the BC Advanced Systems Institute (ASI), La fondation Daniel Langlois, The Canada Council for the Arts, NSERC (Natural Sciences and Engineering Research Council), SSHRC (Social Science and Humanities Research Council), along with commissions from the British Columbia Arts Council, Jack Straw Foundation, among others. He is a co-founder of Music Intelligence and Sound Technologies (MIST) with a mission to research and develop new musical instruments and related accessories that will extend the reach of musicians, and educators.

Schloss studied at Bennington College, the University of Washington, and Stanford University, where he received his Ph.D. in 1985 working at CCRMA. He has taught at Brown University, the University of California at San Diego, The Banff Centre for the Arts, and currently at the University of Victoria. Along with colleagues George Tzanetakis and Peter Driessen at the University of Victoria, he created a new combined program in Music and Computer Science, which has opened up new avenues of study for many students in the age of digital media and the internet.

Dr. Andrew Schloss

Robert Van Rooyen is a multi-discipline engineer/scientist and has served as the principal and/or key contributor to several large and small technology companies over the past three decades. He holds several patents and has published both academic works and industry whitepapers. Robert is also the CEO of Summit Scientific, Inc., which is a software, hardware, and mechanical engineering/research consulting firm that specializes in the development of embedded systems spanning several industries that include medical devices, research equipment, and industrial control systems. In addition, he is a co-founder Music Intelligence and Sound Technologies (MIST) with a mission to research and develop cutting edge instruments and related accessories that will extend the reach of musicians, and educators.

Robert holds a PhD in Computer Science from the University of Victoria in British Columbia, Canada where he studied human motion and robotics in the context of percussion instruments. He also holds a Master of Science in Computer Science from California State University, Chico, and a Bachelor of Science in Computer Engineering from California State University, Sacramento.

Aside from his professional and academic pursuits, he is an avid motorcycle rider and musician. With regard to the latter, Robert has owned and operated a recording studio as well as performed in several bands over the years including the California State Marching Band. Robert's experience with music and technology extends back to the mid 1980's when he developed one of the first chromatic MIDI accordions. His latest creation is the MechDrum™, which is the result of his doctoral research at the University of Victoria. He was honored in 2018 with a technical achievement award for the MechDrum™ at the Margaret Guthman musical instrument competition at Georgia Tech.

Dr. Robert Van Rooyen

Graduate Student Session

Audio Production Techniques in Genre-based Music Information Retrieval Systems
Courtney McDermott

Music streaming platforms have become the future of the music industry. Music information retrieval systems (MIRs) that are used to organize music in streaming platforms are now intertwined into our daily lives. Both MIRs and manual auditory classification systems (MACs) use cultural and musicological features to classify musical genres. Audio production techniques are not always accounted for in MIRs, which rely typically on music theory, but they are in MACs. By observing, participating, and examining audio production techniques used in relation to various musical genres, I argue that a correlation between the treatment of audio compression in the snare and kick drums and genre classification exists. Consequently, I have developed a coding system that relates the amount of compression used on the kick and snare drum to specific subgenres. This coding system can be tested as a genre-based audio compression 'thumbprint' through a MAC-based perceptual experiment with audio professionals as participants. The results will provide a method to incorporate audio compression 'thumbprints' of MACs' into MIRs systems, which will increase genre classification reliability.

Introducing the Whacky Wizards: Software Tools for Classroom Music
Leo Brooks

Leo Brooks worked for many years as an independent music instructor, offering percussion workshops in schools. Concerned with the lack of general music instruction in many of these schools, he sought a way to offer his unique approach to a broader audience. His research project, for which he was awarded a SSHRC grant, aims to develop a web-based program that could be employed by elementary teachers to help them offer regular music instruction in their classrooms, primarily employing Boomwhackers percussion tubes. At the heart of the project are two software applications that Leo has been developing. These are intended to be projected on a screen in a classroom, and designate when the Boomwhackers are to be struck to accompany the music. Leo will demonstrate the current versions of these applications, review their development, and explain what his ultimate goals are for them in the future.

The Disguises of Opera and the Internet's role in Queer Identity Formation in Nico Muhly and Craig Lucas'
Two Boys
Ian Mustard

Disguises have long been a staple in opera; however, only in the twenty-first century did these disguises take on significantly more dangerous, real-world, applications with the rapid growth of the internet. Nico Muhly and Craig Lucas' opera, *Two Boys,* takes its inspiration from real-life events: it is about Jake, a queer youth trying to find his identity, who takes on various chatroom personas to gain sexual and social power over another boy, Brian. In this presentation I will show how *Two Boys* takes the fanciful and often comedic disguises of past operas and reimagines them with more sinister real-world consequences in anonymous digital space. Furthermore, *Two Boys* showcases how the internet paradoxically acts as an anonymous, unsafe, "safe space" for queer youth to explore their burgeoning identities.

Video Projects

Listeners Prefer a Western Score over a Chinese Score on a Sci-Fi Film
Fei Fei Du

In the Chinese film industry, there are more Western scores than Chinese scores, with Western orchestration used in all genres of Chinese films. In contrast, in Western films, Chinese music is only used to give the viewer a geographic cue or an Asian style setting. If Chinese film music can comfortably move between the two musical traditions, can Western film music do the same? Forty participants watched two identical film excerpts of Avatar (2009) with two different style of film music, i.e. a Western score and a Chinese score. Then, they were asked to rate how well the music fitted the scene on a scale of 1 to 10, and to explain the reasons for their rating. Results show that 63% of the participants prefer the Western score over the Chinese score. In conclusion, Chinese scores could be more used in none-Chinese genre films for the audience to feel less of a disconnection to the film.

Determining the significance of visualization vs. audio only within ASMR
Michael Tenebro

The therapeutic effects of ASMR (Autonomous Sensory Meridian Response) attract millions of viewers online on free platforms such as YouTube. This phenomenon found its first online community in 2007 and since then, the ASMR YouTube community has grown tremendously. There are many creators, also known as ASMRtists, who maintain channels with millions of subscribers, including *SAS ASMR*, who currently has the largest audience of 8 million of subscribers. However, ASMR has yet received scant attention in Psychology and Social Sciences. My study aims to determine the significance of visualization vs. audio only within ASMR content through comparisons of stimuli with and without visual content. Fifteen ASMR-experienced listeners participated in this perceptual audio-visual experiment for which the use of high-quality headphones was crucial. Participants were given 2 versions of 4 different ASMR contents to compare: one version containing only audio and another containing the same audio with visualization. I created one of the ASMR content for the purpose of this study. The other three were chosen from successful YouTube contents. Results show that each participant may achieve different levels of ASMR for the two conditions and may have different preferences between the two conditions. While some participants find the visualization very important, some preferred the audio only versions.

Studio Practices

The Impact of Different Recording Environments on Pop Artists' Performance
Christian Mercado

Top charts in pop music contain a great quantity of the best performances ever recorded. Songs that are capable to cut through the market are typically defined by the performance of its artists. In order to express a remarkable musical display, various mediums are involved. For instance, the utilization of specific workflows has the potential to draw the best possible performance out of the artists. This study aims to explore the relationship between pop artists' performances and the recording environments where their skills are executed. More specifically, the goal is to investigate which environment can impact pop artists' performance the most in producing admirable songs for listeners of the genre. The controlled environments that were employed in this research were a 1) Live Version: *Audience-Present Session* and an 2) Edited Version: *Producer and Artists' Collaboration*. The variations and distinctness in the performances were then observed through the recording of a cover of two high-charting pop songs in the two different contexts. Subsequently, 21 participants completed an online survey in which they were asked to choose between the presented versions as well as their reasoning behind their preference. The participants' responses were compiled into criteria that determined which environment was their favourite. Results revealed that even though the live versions had a pleasing *vibe*, 69% of the participants preferred the edited versions because it displayed an enjoyable *expressivity* that best fits the genre.

Relationships Between Sampled Instruments and Arrangement
Christian Pabaonon

A surprisingly vast amount of the music and sound that is present in media we consume today is created using sampled instruments. Arrangement is an integral step in music-making, composing and production. In this study I aim to explore how the use of sampled instruments affect arrangement practices. To accomplish this, I interviewed three composers currently working in the film/television industry about their backgrounds, processes and experiences working with sampled instruments, while trying to draw connections to their own arrangement practices. Each composer was asked the same eight questions. I found that each composer, despite having dissimilar approaches, incorporated the use of sampled instruments in their processes in ways that both benefit their workflows and reflect what is required of them in the film/television industry.

Death by Click
Leonard Menon

In social situations such as recording sessions in the studio, we consistently put ourselves under pressure of being musically accurate. Click tracks provide musicians with important cues that assist them in getting the perfect performance, both in a live scenario and in overdubbing. The volume of the click relative to the volume of the music being re-injected through the monitoring system is an artifact that may damage the performance as well as the performers' aural health. This user study compared three different monitoring techniques with four performer participants, a singer-songwriter performing on banjo while singing, a solo pianist, and a musical duo with drums and electric guitar. The first two monitoring methods played the roles of control tests, i.e. using the cue sends and bussing individual mic feeds to the musician, and using the KLANG:vier [KV] in stereo with the same cue sends. Active Headphones [AH] were assembled with four microphones affixed around the head. These microphone feeds were sent into the KV to be binauralized and sent back to the performer so they can monitor the room in real time while receiving a click track in the center of the head. After the participants tested each monitoring setup, they were asked to complete a questionnaire about their experience. Using a metering plugin (like the Waves WLM Meter), the click track was measured for a finite amount of time, along with three to four other sample points per monitoring method. In the first two control tests, an average dynamic range of 5.1 LUFS was measured, alluding to the participant receiving consistently higher volumes. Data measurements from the AH revealed a dynamic range of 19.6 LUFS between click track and music, giving the performers' ears a break from unfluctuating, high-output headphones.