Mitchell McDermott

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EDUCATION

Masters of Science in Sound & Music Computing | Queen Mary University of London | London, UK | 2023 | Distinction

- *Thesis: "Unheard Potential: Exploring Haptic-Auditory Feedback in Joint Action Tasks"*

Bachelors of Music in Electronic Production & Design | Berklee College of Music | Boston, MA | 2021 | Magna Cum Laude

- *Thesis: "Morphology Pro: A Four Way Spectral Sample Morphing Audio Plugin"*

EXPERIENCE

Audio Research Intern | Human Robotics Group, Imperial College London | London, UK | February 2023 - August 2023

- Collaborated in a team environment across multiple scientific and engineering disciplines to investigate multisensory feedback in joint action tasks.
- Designed two experimental studies investigating effects of real-time audio feedback in human-robot interaction tasks (MATLAB, Simulink, Pure Data).
- Coordinated participant recruitment and scheduling for experimental studies involving over 50 individuals.
- Conducted data analysis, demonstrating the effectiveness of spatial audio-haptic feedback in improving time synchronization in joint tasks (R and Python).

Design Consultant – Accessible Instruments | Queen Mary University of London | London, UK | March 2023 - April 2023

- Provided design feedback and technical insights in an apprenticeship-based learning study, enabling more efficient and effective research.
- Collaborated with a PhD candidate to prototype an accessible digital musical instrument, contributing to the design and iterative refinement process.
- Incorporated a Bela real-time audio processor, employing techniques in electronics assembly and fabrication for seamless hardware integration (C++).

Audio Software Developer | Sonik Architects | Remote | February 2022 - December 2022

- Collaborated with electronic music pioneer BT on a cutting-edge initiative, developing a generative real-time audio system with blockchain integration.
- Architected audio pipeline, designing software instruments, audio effects, and custom digital signal processing algorithms (JavaScript, TypeScript, Tone.js).
- Collaborated on a small development team to build and debug a scalable, performant system, ensuring real-time responsiveness and smooth user experience.

Audio Research Software Engineer | Boulanger Labs | Boston, MA | September 2021 - December 2021

- Collaborated on a student research team with Dr. Richard Boulanger to develop tools enabling improved Csound integration within Unity environments.
- Designed a stochastic synthesis VR instrument application in Unity, implementing gesture mapping for intuitive parameter control.
- Consulted on user interaction design for C# audio utility classes, providing insights to inform the development of real-time VR audio experiences.
- Provided technical support and troubleshooting during the team's performance of 'Trapped In Convert' at the *International Csound Conference 2022.*

Audio Experience Designer | MIT Media Lab | Boston, MA | September 2021 - December 2021

- Designed a real-time audio system for Ferrofluid Concerto, enabling electromagnetic field interaction to freeze and manipulate live audio (Max/MSP, Arduino).
- Led development of Immersive Emotion, transforming audience devices into a spatial audio system controlled by performer gestures (Max/MSP, JavaScript).
- Both projects premiered at *Hyperfest*, showcasing novel approaches to audio-visual interaction and audience immersion to an audience of 100+ participants.
- Demonstrated multifaceted leadership in a collaborative environment, balancing creative direction, technical development, and team coordination, enhancing skills in project management, network engineering, and interdisciplinary collaboration.

PROJECTS

MARBL: A Physical Rotating Sequencer

- Built a novel digital musical instrument with a rotating platform, integrating pressure sensors and gyroscope data for intuitive, embodied musical expression.
- Developed a sample-based playback engine, mapping physical interface parameters to control real-time audio (Max/MSP, C++, Arduino).
- Designed a user interface, providing sound selection, quantization, microtonality, and effects parameter adjustments, enhancing the user's creative control.

Spectral Morphing Pedal

- Designed and prototyped a real-time spectral morphing guitar pedal on the Bela platform, enabling expressive blending of live guitar with sampled sounds.
- Implemented audio DSP algorithms for monophonic pitch tracking, envelope following, spectral morphing, and compression (C++).
- Optimized code for an embedded system and modified a wah-wah pedal as the analog control for real-time physical manipulation of the morphing effect.

COURSEWORK

Fundamentals of Digital Signal Processing | MATLAB, LTI Systems, Z Transforms, DFT, FFT, Spectrum Analysis, FIR/IIR Filters

Music and Audio Programming | C++, Digital Signal Processing, Embedded System Design, Real-Time Audio

Interactive Digital Multimedia Techniques | C++, Max/MSP, Pure Data, Arduino, Analog Circuits, Fabrication

SKILLS

Software: C/C++, Python, JavaScript, TypeScript, Git, Max/MSP, MATLAB, Tone.js, Node.js, Blender, Unity

Soft Skills: Analytical Problem Solving, Design Thinking, Collaboration Skills, Intellectual Curiosity, Sense of Humor, Unrelenting Passion

Ethos: Democratize Creativity, Design Accessibly, Develop Bizarre, Craft Extraordinary Musical Experiences