CURRICULUM VITAE

CONTACT

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EDUCATION

McGill University *Montreal, Canada* *2022 - Present*	Ph.D. Music Technology
Stanford University *Stanford, California* *2020 - 2022*	M.A. Music, Science, and Technology
University of Southern California *Los Angeles, California* *2015-2020*	B.S. Electrical Engineering B.A. Art and Design

RESEARCH INTEREST

Physical modeling, virtual analog, digital filter design

RESEARCH EXPERIENCE

PhD Student Computational Acoustic Modeling Laboratory *McGill Univeristy* *Sept. 2022 - Present*	Pursuing doctoral research on musical acoustics and machine. Investigating methods to acoustically measuring musicians, improve computational models of woodwind instruments, and apply deep learning to the field of musical acoustics. Operating in a collaborative lab environment with other lab members.
Master's Student Center for Computer Research in Music and Acoustics *Stanford, CA* *Sept. 2020 - May. 2022*	Worked on filter design and acoustic physical modeling. Developed technique for accurate discretization of analog filters based on conformal mapping. Produced JUCE plugin with efficient acoustic model of a pipe organ using the Faust programming language.
DSP Engineering Consultant Eventide Inc. *Little Ferry, NJ* *Sept. 2019 - Oct. 2020*	Digitized A/D and D/A filter chain in vintage digital rack unit. Designed recursive filters using least-squares optimization to fit measured transfer function of unknown ICs. Improved digital filter performance near Nyquist limit and published techniques in engineering brief.

Audio Engineering DSP Intern Eventide Inc. *Little Ferry, NJ* *Jun - Aug. 2018*	Analyzed a rare vintage guitar pedal to create a complete virtual model of the effect. Completed model and software implementation within two-month period to produce beta of program. Research and analysis of vintage pedal culminated in an accepted peer-reviewed conference paper and oral presentation.
Undergraduate Lab Intern Signal Analysis and Interpretations Laboratory *Los Angeles, CA* *May – August 2017*	Worked under a PhD candidate in the SAIL at USC doing preliminary digital signal processing for psychotherapy research. Solely responsible for assessing sound quality of recorded psychotherapy session using MatLab. Created test cases to test and fine tune existing neural networks.

PUBLICATIONS

Journal Articles

C. C. Darabundit, J. S. Abel, and D. Berners, "Nyquist band transform: An order preserving transform for bandlimited discretization," *Journal of the Audio Engineering Society*, vol. 70, no. 9, pp. 674–689, Sep. 2022.

Peer-Reviewed Conference Papers

C. C. Darabundit, J. S. Abel, and W. Woszczyk, "Probabilistic reverberation based on echo density and kurtosis," in *26th International Conference on Digital Audio Effects (DAFx23)*, Copenhagen, Denmark, Sep. 2023.

C. C. Darabundit, D. Roosenburg, and J. O. Smith, "Neural nets tube models for wave digital filters," in *25th International Conference on Digital Audio Effects (DAFx20in22)*, Vienna, Austria, Sep. 2022.

C. C. Darabundit and J. S. Abel, "Conformal maps for the discretization of analog filters near the Nyquist limit," in *24th International Conference on Digital Audio Effects (DAFx20in21)*, Vienna, Austria, Sep. 2021.

C. C. Darabundit, R. Wedelich, and P. Bischoff, "Digital grey box model of the Uni-Vibe effects pedal," in *22nd International Conference on Digital Audio Effects (DAFx-19)*, Birmingham, UK, Sep. 2019.

Peer-Reviewed Abstracts

C. C. Darabundit and G. Scavone, "Torwards data-driven physical modeling synthesis," in *Acoustics 2023 Sydney*, Sydney, Australia, Dec. 2023.

C. C. Darabundit and M. Rau, "Modeling and correction of piezoelectric string instrument pickups," in *183rd Meeting of the Acoustical Society of America*, Nashville, Tennessee, USA, Dec. 2022.

C. C. Darabundit and J. O. Smith, "Efficient digital waveguide synthesis of a pipe organ," in *181st Meeting of the Acoustical Society of America*, Seattle, Washington, USA, Dec. 2021.

Engineering Briefs

C. C. Darabundit and R. Wedelich, "Generalized digital second order systems beyond Nyquist frequency," Audio Engineering Society, Tech. Rep., 2020.

PRESENTATIONS

(2023) "Torwards data-driven physical modeling synthesis," Acoustics 2023 Syndey, Sydney, Australia.

(2023) "Probabilistic reverberation based on echo density and kurtosis," 26th International Conference on Digital Audio Effects (DAFx23), Copenhagen, Denmark.

(2021) "Efficient digital waveguide synthesis of a pipe organ," 181st Meeting of the Acoustical Society of America, Seattle, USA.

(2021) "Conformal maps for the discretization of analog filters near the Nyquist limit," 24th International Conference on Digital Audio Effects (DAFx20in21), Vienna, Austria.

(2020) "Generalized second order systems beyond Nyquist frequency," 149th Audio Engineering Society Convention, New York City, USA.

(2019) "Digital grey box model of the uni-vibe effects pedal," 19th International Conference on Digital Audio Effects (DAFx19), Birmingham, UK.

AWARDS AND HONORS

McGill Graduate Travel Award
  $800 CAD, McGill University, Dec. 1 - Dec. 14 2023

Down Under Funder Travel Funding
  $1000 USD, Acoustical Society of America, Dec. 1 - Dec. 14 2023

CIRMMT Travel Award
  $1,200 CAD, CIRMMT, May 15 - Sep. 14 2023

Differential Fee Waiver for International Students
  $15,019 CAD, McGill University, Sep. 2022 - Apr. 2023

Graduate Excellence Award in Music
  $10,000 CAD, McGill University, Sep. 2022 - Apr. 2023

Friends of Music Scholarship
  $2,250 USD, Stanford University, Sep. 2021 - May 2022

Denning Family Fellowship for the Arts
  $46,436 USD, Stanford University, May 2020

Renaissance Scholarship
  University of Southern California, May 2020

Cum Laude
  University of Southern California, May 2020

Viterbi School of Engineering Dean's List
  University of Southern California, Jan. 2016 - May. 2020

TEACHING EXPERIENCE

Co-Instructor MUMT 302 *McGill University* *Winter 2023-Winter 2024*	MUMT302 New Media Production, is an undergraduate course focused on the technology behind music production tools. Instructed students on concepts behind production tools using PureData.
Teaching Assistant MUSIC 320C *Stanford University* *Spring 2022*	Audio DSP Projects in Faust and C++ is a graduate course focused on developing software projects in C++ and the JUCE plugin framework. Led lab sessions and course lectures. Unblocked students on project and programming assignments.
Teaching Assistant MUSIC 424 *Stanford University* *Spring 2022*	Signal Processing Techniques for Digital Audio Effects is a graduate course on the DSP theory behind audio effects. Held office hours and helped prepare audio demonstrations in course.
Research Assistant MUSIC 320C *Stanford University* *Winter 2022*	Helped to redesign course material, designing assignments and redesigning course website.
Teaching Assistant MUSIC 422 *Stanford University* *Winter 2022*	Perceptual Audio Coding is a graduate course focused on the theory behind perceptual audio coding method such as in MPEG. Led lab course each week and helped students prepare for assignments in Python.

WORK EXPERIENCE

SPG Acoustics Intern Apple Inc. *Cupertino, CA* *Jun. - Sept. 2019*	Remote position. Worked in Special Projects Group (SPG) developing new technology using acoustic measurement and machine learning.
DSP Engineering Consultant Eventide Inc. *Little Ferry, NJ* *Sept. 2019 - Oct. 2020*	Remote position. Created library code for calculating gain of equalizer filters using C++ templates. Designed API to streamline digital filter implementation. Developed virtual analog model of A/D and D/A of vintage digital rack unit and integrated model into existing products.
Luxury Audio Engineering Intern Harman International *Northridge, CA* *May - Aug. 2019*	Responsible for calibration of three anechoic chambers on site. Updated turntables in chambers and designed interface in Altium to communicate with legacy systems over ethernet. Used Klippel software to measure loudspeaker units from oversea manufactures and modified crossovers to match system engineer specifications.

Audio Engineering DSP Intern
Eventide Inc.
Little Ferry, NJ
May 2018 - May 2019

Architected model of a vintage effect pedal. Optimized model to run on Linux ARM Cortex-A9. Designed variable triangle wave generator module to aid model and support other R&D projects. Improved existing spring reverberation algorithm through filter parallelization, resulting in 11-16% increase in efficiency. Ported legacy Motorola 56K Assembly tone deaf decoder software to C++ for use in updated emergency response systems.