

# BENJAMIN MASTERS

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## EDUCATION

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<b>University of Waterloo</b> Master of Applied Science, Systems Design Engineering	Expected Aug. 2024 94.3/100 GPA
<b>Purdue University</b> Bachelor of Science in Engineering, Acoustical Engineering	Aug. 2018 - May 2022 3.74/4 GPA

## WORK EXPERIENCE

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<b>Acoustic Engineer Intern</b> Bose Corporation	June 2022 - Aug. 2022 Framingham, MA, USA
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- Designed a novel time-frequency analysis algorithm to detect air leaks from loudspeakers during production line testing that yielded a 20% increase in defect identification accuracy.
- Streamlined the production process by integrating the algorithm into an end-of-line testing suite using the Audio Precision API and MATLAB, enabling further automation of testing and minimizing reliance on human verification of device performance.

<b>Acoustic Engineer Intern</b> Starkey Hearing Technologies	May 2021 - Aug. 2021 Eden Prairie, MN, USA
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- Innovated upon a vibration sensitivity test for sub-miniature microphones to enable accurate testing of a new design configuration using a shaker, accelerometer, R&S audio analyzer, and Python.
- Designed a vibration testing procedure for balanced armature receivers using a Polytec scanning laser and SoundCheck and developed a visualization tool in MATLAB to simplify device characterization and aid in design of vibration treatment solutions.

## RESEARCH EXPERIENCE

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<b>Graduate Speech and Hearing Systems Researcher</b> University of Waterloo, Speech, Communication, and Hearing (SpeeCH) Lab	Sept. 2022 - Present Waterloo, ON, CA
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- Designing experiments, recruiting participants, and performing studies relating to modulation of the acoustic channel in interactive conversation to assess listening effort.
- Built a conversational analysis framework using Python that identifies the state of a conversation in real time, tracks statistical parameters of speech perception and production, performs data acquisition, and allows for inclusion of custom processing modules to enable comprehensive testing of conversational dynamics.
- Developed an algorithm to implement controlled variable delays in communication lines between speakers in near real-time to test response to delays in interactive conversation.
- Implemented a linear predictive coding based real-time formant estimation and perturbation algorithm to evaluate adaption of speech based on communicative intent.

<b>Undergraduate Hearing Science Researcher</b> Purdue University, Experimental Amplification Research (EAR) Lab	Aug. 2021 - May 2022 West Lafayette, IN, USA
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- Conducted an experiment to measure the directional capabilities of an Arduino/Teensy based open-source hearing assistive platform using signal processing and simulated in-ear measurements that followed relevant standards.
- Developed a calibration procedure to match earpiece microphone responses for optimal directional performance.

## SKILLS

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<b>Acoustics &amp; Audio Design &amp; Analysis Programming Prototyping</b>	Audio Analyzers, Calibration, Test, & Measurement, Modeling, Signal Processing CAD (Creo, AutoCAD), Finite Element Analysis (Abaqus, MATLAB), Simulink MATLAB, Python, C/C++, Git 3d-Printing, Arduino, Hand Tools, Soldering, Woodworking
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