MATTHEW CASALI

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PROFESSIONAL SUMMARY

Innovative and creative engineer and data analyst with a proven ability to apply technical expertise to diverse problems in acoustics and the physical sciences primarily through the skilled use of data analytics and high-fidelity acoustic modeling. Extensive experience in acoustic measurements, signal processing techniques, machine learning, transducer design, and test system architecture to produce groundbreaking products, novel research, and solutions for sponsors.

NOTABLE WORK

- Novel metamaterial-based beamforming acoustic transducer developed under funding from DARPA.
- Modeling and design of passive and active large aperture array beamforming for government sponsors.
- Patented ultrasonic method for non-destructive evaluation of composite materials for the U.S. Air Force.
- Focused ultrasound transmission techniques to reduce stress of nuclear waste canister welds for the DOE.
- Wireless acoustic sensor system for monitoring gas properties in DOE nuclear waste canisters.

PROFESSIONAL EXPERIENCE

Data Analyst and Acoustic Modeler — May 2024 - July 2025
Johns Hopkins University Applied Physics Laboratory

- Increased accuracy and reliability in performance modeling of cutting-edge beamforming sensor systems through the design of high-precision analytical and finite element methods.
- Innovated signal processing algorithms by leveraging machine learning and image processing techniques, enabling highly accurate signal detection and noise characterization.
- Streamlined modeling workflows and expanded the applicability of acoustic analysis methods across varied use cases by developing and maintaining object-oriented MATLAB toolboxes.
- Enhanced underwater acoustic simulations by integrating diverse data sources, improving predictive accuracy for real-world applications.

Research and Development Engineer — Sept. 2023 - Jan. 2024
X-Wave Innovations, Inc.

- Regularly presented innovative technical approaches and findings to multidisciplinary teams of engineers and scientists by translating complex acoustic data into actionable insights that guided decision-making.
- Authored technical reports and proposals for government sponsors, contributing to solutions across various acoustic modeling and data analysis domains.
- Designed and evaluated multiple test systems from scratch, including a force measurement apparatus and a vibrational analysis system for high power ultrasound.
- Improved the efficiency and accuracy of ultrasonic technology by enhancing power usage and focusing capabilities through the application of advanced optimization algorithms.

Data Consultant — Oct. 2020 - Dec. 2020
Conservation Metrics, Inc.

- Oversaw the organization and analysis of hundreds of hours of ultrasonic recordings of bat calls from over 20 National Forests in collaboration with the North American Bat Monitoring Program, providing valuable insights into bat population dynamics and conservation efforts.
- Informed precise action on the conservation of bat species through the synthesis of diverse data modalities into quantifiable and accessible reports on bat population statistics.

RESEARCH AND INTERNSHIPS

Graduate Research Assistant   Sept. 2021 - Aug. 2023
UT Austin, Applied Research Laboratories

· Pioneered new methods for acoustic sensing by measuring material interactions with sound in water, advancing the design of next-generation sensing systems.
· Developed composite materials that allow precise measurement of sound pressure and direction at a single point lowering the cost and increasing the accuracy of acoustic sensing systems.
· Enhanced the sensing capabilities of materials by applying advanced optimization techniques to the modeling of custom sensor components.

Research Intern   Jan. 2020 - Apr. 2020
UC Santa Cruz Fort Ord Natural Reserve

· Proposal and execution of a unique and novel case of environmental monitoring, resulting in a project that is currently used for educational outreach by the natural reserve.
· Developed a Python program to identify hummingbird calls and map their flight paths using data from a custom-built 3D microphone system.

EDUCATION

The University of Texas at Austin   2023
Master of Science, Mechanical Engineering (Acoustics)

University of California - Santa Cruz   2020
Bachelor of Science, Applied Physics

AWARDS AND APPOINTMENTS

· **Fellow, Cockrell School of Engineering.** Awarded in recognition of exemplary academic performance in pursuit of a Bachelor's degree and strength of application materials.
· **Secretary, Acoustical Society of America, Austin Student Chapter.** Tasked with social events, outreach, and community engagement.
· **Member, College Scholars Program – UC Santa Cruz.** Awarded in recognition of exemplary academic performance in high school and first-quarter courses.

SELECTED PUBLICATIONS AND PRESENTATIONS

· **Matthew A. Casali**, "Material property extraction procedure for electromomentum coupled metamaterials." Master's Thesis, 2023.
· Samuel P. Wallen, **Matthew A. Casali**, Benjamin M. Goldsberry, and Michael R. Haberman, "Polarizability of electromomentum coupled scatterers", Proc. Mtgs. Acoust. 46, 065002 (2022) https://doi.org/10.1121/2.0001597.
· **Matthew A. Casali**, Andrew R. McNeese, Samuel P. Wallen, Michael R. Haberman (2022) "Impedance tube method for characterization of one-dimensional electro-momentum coupled materials" Presented at the 182nd Meeting of the Acoustical Society of America, Nashville, TN.