Diego Cuji

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SUMMARY

Ph.D. in Electrical Engineering with extensive experience in wireless communications and signal processing applied to underwater environments. Proven track record of conducting independent research and developing innovative algorithms for wireless communications. Published 14 journal and conference articles.

EDUCATION

Northeastern University — Boston, MA
Ph.D. in Electrical Engineering — July 2025
Awards: Best paper award and second best demo award, WUWNet'2022.

- Developed an acoustic beamforming scheme for time-varying channels, increasing the receiver signal to noise ratio by +10dB and reducing the bit error rate by 3 orders of magnitude (from 1e-2 to 1e-5) compared with conventional methods.
- Developed a multi-channel acoustic testbed for testing acoustic beamforming algorithms. Received the best paper award and the second best demo award during the conference WUWNet'22.
- Demonstrated acoustic testbed to Office Naval of Research representatives (three ranks below the chief).
- Published 14 journal and conference articles from my Ph.D. research.
- Designed and instructed a novel signal processing course with emphasis on wireless communications to 20 students.
- Developed a Delay-Doppler technique for tracking the path-specific Doppler shifts in underwater acoustic channels in high Doppler regimes.
- Collaborated within a group of word-class researchers developing a publicly available library of underwater acoustic channel responses.

Northeastern University — Boston, MA
Master of Science in Electrical and Computer Engineering — 2019
Thesis: OFDM underwater acoustic communication system implementation on FPGA
(Advisor: Prof. Milica Stojanovic)
Awards: Dean's scholarship, Fulbright student scholarship

- Developed an acoustic modem for underwater internet (SEANet project).
- Implemented algorithms such as: front-end filtering (band-pass and low-pass filter design), matched filtering, signal synchronization, channel estimation, equalization, and signal detection in noise.

Universidad Politécnica Salesiana — Cuenca, Ecuador
Bachelor of Science in Electronic Engineering — 2014

RESEARCH EXPERIENCE

Apple, Inc Boston, MA
Research intern in the RF Systems and Architecture Team Summer 2023

- Developed two radio frequency (RF) phased-array algorithms for millimeter wave communications and compared results. Achieved a 5dB improvement in signal to noise ratio, reducing bit error rate by 2 orders of magnitude.
- Implemented a simulation platform for MIMO systems in MATLAB using 3GPP RF (radio frequency) channels models.
- Designed and built a laboratory testbed for developing millimeter wave communication algorithms.
- Results were presented to company leadership two ranks below the president.

Boston Scientific Boston, MA
Research intern in the Concepts Team Summer 2021

- Designed, developed and tested novel array signal processing algorithms for arrhythmia detection.
- Tested algorithms utilizing real data collected from the RHYTHMIA HDx Mapping System, a 3D visualization software used by physicians during cardiac ablation procedures.
- Participated in a preclinical study for monitoring of porcine cardiac rhythm.
- Presented research results to company leadership three ranks below the president.

Meta, Inc Redmond, WA
Research intern in the Audio Team Summer 2020

- Developed array signal processing algorithms for spatial audio applications.
- Held two project presentations showcasing the research results within the entire technology team.

TEACHING EXPERIENCE

Northeastern University Boston, MA
Teaching Assistant
- EECE7204 Applied Probability & Stochastic Processes (Graduate) Fall 2021 - 2023
- EECE5645 Parallel Processing for Data Analytics (Graduate) Spring 2022

Universidad Politécnica Salesiana Cuenca, Ecuador
Lecturer 2015 - 2017

- Taught courses: Computer Networks, Signal Processing, Wireless Communications.
- Led the Telecommunications Laboratory, developed laboratory materials, and guided 20 students per semester during lab experiments.

PUBLICATIONS

Journal articles

1. **D. A. Cuji** and M. Stojanovic, “Path-Specific Beamforming and Non-uniform Doppler Compensation for Underwater Acoustic Communications,” IEEE Journal of Oceanic Engineering. (In-review)
2. Z. Li, **D. A. Cuji**, and M. Stojanovic, “Space-code division multiple access for broadband acoustic networks,” Computer Networks, vol. 246, p. 110 407, 2024, issn: 1389-1286. doi:

https://doi.org/10.1016/j.comnet.2024.110407.

3. **D. A. Cuji** and M. Stojanovic, "Transmit Beamforming for Underwater Acoustic OFDM Systems," IEEE Journal of Oceanic Engineering, vol. 48, no. 2, pp. 542–553, 2023, issn: 1558-1691. doi: 10.1109/JOE.2023.3295474

Conference articles

- **D. A. Cuji**, M. Stojanovic, A.C. Singer, "Path-specific Angle and Doppler tracking in Dynamic Underwater Channels," in Proceedings of the OCEANS, 2025.
- **D. A. Cuji**, M. Stojanovic, A.C. Singer, "A Method for Adaptive Channel Estimation," in Proceedings of the OCEANS, 2025.
- **D. A. Cuji**, Z. Li, and M. Stojanovic, "High-Rate Information Transmission for Underwater Channels: Path-Specific Beamforming and Doppler Compensation," in 2024 Seventh Underwater Communications and Networking Conference (UComms), 2024.
- Z. Li, **D. A. Cuji**, and M. Stojanovic, "Acoustic Communication in the High Doppler Regime: Synchronization Revisited," in Asilomar Conference on Signals, Systems and Computers, 2024.
- Z. Li, **D. A. Cuji**, M. Stojanovic, and K. Duffy, "Guessing Random Additive Noise Decoding for Underwater Acoustic Communications," in Proceedings of the 18th International Conference on Underwater Networks & Systems (WUWNet), 2024.
- **D. A. Cuji**, Z. Li, and M. Stojanovic, "Joint Beamforming and Tracking for Multi-user Acoustic Communications," in Proceedings of the OCEANS, 2023.
- Z. Li, **D. A. Cuji**, Y. Kida, M. Deguchi, T. Shimura, and M. Stojanovic, "Frequency Offset Estimation for High Data Rate Acoustic MIMO-OFDM Systems," in Proceedings of the OCEANS, 2023.
- Z. Li, **D. A. Cuji**, and M. Stojanovic, "Combined Code Division and Space Division Multiple Access for Broadband Acoustic Networks (**Mario Gerla Best Paper Award**)," in Proceedings of the 16th International Conference on Underwater Networks & Systems (WUWNet), 2022. doi: https://doi.org/10.1145/3567600.3568145.
- **D. A. Cuji**, Z. Li, and M. Stojanovic, "Multi-user Communications for Acoustic OFDM: A Broadband Beamforming Approach," in 2022 Sixth Underwater Communications and Networking Conference (UComms), 2022, pp. 1–4. doi: 10.1109/UComms56954.2022.9905699.
- Z. Li, **D. A. Cuji**, and M. Stojanovic, "A Joint Angle and Delay Detection Scheme using OFDM over Broadband Acoustic Links," in 2022 IEEE International Symposium on Phased Array System and Technology (PAST), 2022. doi: 10.1109/PAST43306.2019.9020805.
- **D. A. Cuji**, Z. Li, and M. Stojanovic, "ACT: an Acoustic Communications Testbed," in IEEE INFOCOM 2022 - IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS), 2022, pp. 1–6. doi: 10.1109/INFOCOMWKSHPS54753.2022.9798284.

POSTERS & PRESENTATIONS

- **D. A. Cuji**, Z. Li, and M. Stojanovic, "Path-Based Frequency Offset Estimation for Acoustic OFDM Systems," in Asilomar Conference on Signals, Systems and Computers, 2023.
- **D. A. Cuji**, Z. Li, Y. Kida, M. Deguchi, T. Shimura, and M. Stojanovic, "Frequency Offset Compensation for Vertical Underwater Acoustic Communication with a Deep Submersible," in Proceedings of the 16th International Conference on Underwater Networks & Systems (WUWNet), 2022. doi: https://doi.org/10.1145/3567600.3568144.
- **D. A. Cuji**, Z. Li, and M. Stojanovic, "Demo: Broadband Acoustic Beamforming for OFDM Systems **(Second Best Demo Award)**," in Proceedings of the 16th International Conference on

Underwater Networks & Systems (WUWNet), 2022. doi:https://doi.org/10.1145/3567600.3569538

AWARDS & HONORS

- Best paper award at WUWNet'22 for the article: "Combined Code Division and Space Division Multiple Access for Broadband Acoustic Networks".
- Second best demo award at WUWNet'22 for the project: "Demo: Broadband Acoustic Beamforming for OFDM Systems".
- Fulbright Student Scholarship (2017-2019)
- Northeastern Dean's Scholarship (2017-2019)

INVITED TALKS & SEMINARS

D. A. Cuji, "Adaptive signal processing for wireless communication systems"
- Seminar of 20 hours duration at San Francisco University, Quito, Ecuador, January 2025.

D. A. Cuji, "Multi-user transmit beamforming for broadband acoustic systems"
- Invited talk at the 184th Meeting of the Acoustical Society of America, Chicago, IL, May 2023.

ACADEMIC SERVICES

Reviewer
- IEEE Journal of Oceanic Engineering
- IEEE Transactions on Wireless Communications
- IEEE Signal Processing Letters

PROFESSIONAL MEMBERSHIPS

- Graduate Student Member, IEEE Oceanic Engineering.