

Océane E. Boulais

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EDUCATION

Ph.D. in Oceanography | Thode Environmental Acoustics Lab

Discovery-oriented deep learning approaches for underwater ecosystem monitoring
Scripps Institution of Oceanography, University of California San Diego

2022 – Present
San Diego, CA

Master of Media Arts and Sciences | Computational Innovations for Fisheries

Massachusetts Institute of Technology

2018 – September 2020
Cambridge, MA

Bachelor of Science | Major: Electrical Engineering, Minor: Computer Science

Florida Atlantic University, Cum Laude

2013 – May 2018
Boca Raton, FL

EXPERIENCE

Graduate Student Researcher

Scripps Institution of Oceanography, Thode Environmental Acoustics Lab

2022 - Present
San Diego, CA

- Co-led an acoustic enrichment field experiment (Summers 2022-25, Kāneʻohe Bay, Oʻahu) with Dr. Aaron Thode to attract herbivorous juvenile reef fish and suppress algal growth; deployed and analyzing data from burst-mode autonomous cameras, a seafloor vector-sensor recorder, and mono-channel hydrophones.
- Developing a contrastive learning-enabled predictive autoencoder to detect and classify migrating bowhead whale call types and estimate spatial distributions; employing unsupervised clustering on latent feature vectors to identify distinct call classes, with applications to other complex vocalizers (gray and humpback whales, walrus, other pinnipeds, and select terrestrial species).
- Managing a team of lab interns (Levels ranging from High school, Undergrad to Masters), meeting twice a week to lead the development of stereovision-enabled autonomous cameras; developing a novel fish larvae detector leveraging physics-based particle tracking velocimetry.

Software Product Manager

Oceanit Laboratories

July 2021 – July 2022
Honolulu, HI

- Supported a team of researchers and data scientists in the software development of a portfolio of research projects: an automated in-situ root analysis system for crop growth optimization, local ecosystem monitoring for offshore aquaculture fish farms, lesion formation detection on retina surfaces and the temporal tracking of invasive pig species in state-protected forest zones.

Machine Learning Research Engineer

Northern Gulf Institute/National Oceanic and Atmospheric Administration

November 2020 – December 2021
Starkville, MS

- Led curation of the first large-scale Gulf of Mexico reef-fish image dataset and coauthored a workshop paper at the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 8th Fine-Grained Visual Categorization workshop (FGVC8), in collaboration with the National Oceanic and Atmospheric Administration's Southeast Fisheries Science Center (NOAA SEFSC); applied few-shot learning and clustering to classify rare species and assess similarity-based grouping.
- Managed a team of developers to deploy semi-supervised learning algorithms for automated species identification and length estimation of reef fish in the Gulf of Mexico.

Research Intern

NASA and SETI Frontier Development Lab

May 2020 – August 2020
Mountain View, CA

- Performed data wrangling and evaluation metric development for a base layer model in the development of a novel physics-based generative-adversarial neural network that predicted coastal flooding utilizing satellite imagery of the US East Coast. Demo at trillium.tech/eie/

Graduate Student Researcher

Massachusetts Institute of Technology Media Lab, Responsive Environments Group

September 2018 – September 2020
Cambridge, MA

- Trained a multi-object tracking and classification model that stored accuracy probabilities on safety objects to efficiently perform scene assessment of video data from the main deck on industrial tuna fishing fleet vessels to enhance at-sea fisher safety.

Hardware Engineering Intern

Meta (Formerly Facebook)

Summer 2017
Menlo Park, CA

- Supported the characterization and testing of equipment reliability of key data center server components and scripted experiments for polling, logging and parsing data from each testing cycle.

SKILLS

Languages: English and French (Native), Spanish (B1)

Certificates: AAUS Scientific Diver, PADI Advanced Open Water Diver, Certified Paragliding Pilot (Stage 3), GCP Associate Cloud Engineer, Renewable and Sustainable Energy Technology (2015)

Programming: Python, Figma, HTML/CSS, Tensorflow, LaTeX, C, C++, MATLAB, SQL, JavaScript

Hardware: Eagle, AutoCAD, Inventor, SolidWorks, Verilog (FPGA), Roland GS-24, Arduino

Relevant Coursework: Underwater Bioacoustics (Scripps Institution of Oceanography), Modeling and Applied Machine Learning (MIT)

Shop Tooling: 3D printing, Waterjet, Laser Cutter (Epsilon)

SELECTED PUBLICATIONS

Generating Physically-Consistent Satellite Imagery for Climate Visualizations 2024

B. Lütjens, B. Leshchinskiy, **Boulais, O.***, F. Chishtie*, N. Díaz-Rodríguez*, M. Masson-Forsythe*, A. Mata-Payerro*, C. Requena-Mesa*, A. Sankaranarayanan*, A. Piña, Y. Gal, C. Raïssi, A. Lavin, D. Newman; *equal contribution
IEEE Transactions on Geoscience and Remote Sensing, 62:4213311. DOI: 10.1109/TGRS.2024.3493763

Acoustic enrichment in Hawai'i using autonomous cameras for reef fish larval detection 2024

Boulais, O., Schar, D., Levy, J., Kim, K., Levy, N., Reichert, J., Schiettekatte, N., Wangpraseurt, D., Madin, J., Thode, A.
Proceedings of Meetings on Acoustics, DOI: 10.1121/2.0001870

FathomNet: An underwater image training database for ocean exploration and discovery 2021

Katija, K., Schlining, B., Lundsten, L., Barnard, K., **Boulais, O.**, Woodward, B., Bell, K. C.,
Marine Technology Society, DOI:10.4031/MTSJ.55.3.20

SEAMAPD21: a large-scale reef fish dataset for fine-grained categorization 2021

Boulais, O., Alaba, S. Y., Yu, J., Iftekhar, A. T., Zheng, A., Prior, J., Moorhead, R., Ball, J., Primrose, J., Wallace, F.
Proceedings of FGVC8: The Eighth Workshop on Fine-Grained Visual Categorization (CVPR 2021)

Physics-informed GANs for Coastal Flood Visualization 2020

Lütjens B., Leshchinskiy B., Requena-Mesa C., Chishtie F.,
Díaz-Rodríguez N., **Boulais, O.**, Piña A., Newman D., Lavin A., Gal Y., Raïssi C.
IEEE Transactions on Neural Networks and Learning Systems

Interpolating GANs to Scaffold Autotelic Creativity 2020

Epstein, Z., **Boulais, O.**, Gordon, S., Groh, M.
Joint Proceedings of the ICCV 2020 Workshops

HONORS AND FELLOWSHIPS

Regents Fellowship 2022

Merit-based fellowship for graduate students at Scripps Institution of Oceanography at University of California, San Diego

Conservation International/Northrop Grumman Fellowship 2019

Merit based grant for the research of AI-enabled fisheries management in the Pacific Islands

Ocean Exploration Fellow, MIT Open Ocean Initiative/National Geographic 2019

Merit based grant to co-deploy drop cameras in the Galapagos for benthic mapping

Elements Fellowship, MIT Media Lab 2018

Merit based scholarship to support thesis research and conference travel

IEEE Power and Energy Society Plus Initiative & Schweitzer Meritorious Scholar 2014 - 2016

Nation-wide and reoccurring merit based scholarship given to the highest GPA-scoring engineering students

TEACHING

Teaching Assistant Marine ArcGIS (SIOB 296)

Scripps Institution of Oceanography, University of California San Diego

2024 Winter
La Jolla, CA, USA

Mentor, Scripps Institution of Oceanography Applicant Support Knowledgebase A mentorship program for prospective SIO graduate students from underrepresented backgrounds	Fall 2023-Present La Jolla, CA
Teaching Assistant Blockchain Ethics (MAS 201) Massachusetts Institute of Technology	Fall 2018-19 Cambridge, MA
Afterschool Code for America Teacher, STEAM Engineering Held weekly creative coding workshops for middleschoolers in underrepresented regions meant to engage students without typical access to computers; held soldering workshops for Arduino-enabled electronic design.	Fall 2015 - Fall 2016 Broward County, FL

CONFERENCES AND PRESENTATIONS

Field demonstration of enhanced coral larval settlement using acoustic enrichment, mesoscale artificial structures, and engineered biofilms (Press Conference Presentation and Conference Talk) 188th Meeting of the Acoustical Society of America, New Orleans, USA	May 2025
Applied Acoustic Enrichment of Hawai'i Reefs (Poster) Acoustical Society of America, Sydney, Australia	December 2024
Computer Vision for Fishermen Safety (Conference Talk) The Pew Charitable Trust Global AI in Fisheries Summit, Atlanta, USA	January 2023
SETI/NASA Earth Intelligence Engine (Presentation) Frontier Development Lab (Remote)	August 2020 tinyurl.com/fdlpresentation
Ganimals: The Underwater Sea Creatures of Our Computational Dreams Ocean Sciences Meeting, Imagining Ocean Science: Education and Outreach	February 2020 animals.media.mit.edu
Stone to Sea 11th International Conference on Computer Vision, Computer Vision Art Gallery	July 2019 stonetosea.github.io
Integrating Art with STEM Education TEDxBoca Raton, USA	March 2015 https://tinyurl.com/tedxoceane

PEER REVIEW CONTRIBUTION

- The Journal of the Acoustical Society of America — Reviewer (January 2025)
- Environmental Science Journal — Reviewer (October-December 2024)
- JASA Express Letters — Reviewer (June-July 2024)
- NOAA Small Business Innovation Research (SBIR) — Grant Reviewer (June-August 2021)