

Ellen H. Davenport

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 INFORMATION github.com/eldavenport
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EDUCATION	Scripps Institution of Oceanography	
	PhD Candidate, <i>Oceanography</i>	June 2026
	University of California, San Diego	
	Master of Science, <i>Electrical and Computer Engineering</i>	June 2023
	Dartmouth College	
	Bachelor of Engineering, <i>Control Systems, minor in French</i>	June 2017

PROGRAMMING Python (JAX, PyTorch), C/C++, Fortran, Matlab, Julia, Rust

DEVOPS Git, Docker, Bash, HPC, Sphinx

RESEARCH INTERESTS Data assimilation and inverse problems, atmos. + ocean dynamics and predictability, scientific software, Bayesian inference and optimization, AI in climate

WORK EXPERIENCE

Graduate Student Researcher, Scripps Institution of Oceanography June 2023–Present

- PhD Advisors: Matthew Mazloff and Bruce Cornuelle
- Ocean data assimilation using 4DVar with the MITgcm. Estimation and sensitivity analysis of the Tropical Pacific Ocean to improve representation of Equatorial dynamics including Tropical Instability Waves and Deep Cycle Turbulence.

JCM Software Developer, Scripps Institution of Oceanography Aug 2024–Present

- Development of a differentiable atmospheric model in Python with JAX. Project supervision by Dr. Duncan Watson-Parris.

Graduate Student Researcher, Jacobs School of Engineering *UCSD* Sep 2021– Sep 2023

- PI: Florian Meyer in the Situational Awareness Lab
- First PhD chapter: statistical signal processing applied to underwater robotics (e.g., Unscented Kalman Filters, Particle Filters, and Joint Probabilistic Data Association).

Embedded Software Engineer I & II, Sarcos Robotics *Salt Lake City, UT* Aug 2017–Aug 2021

- Development for the Sarcos Guardian XO (powered exoskeleton) including design, implementation, and testing.
- Collaboration with ME, EE, and controls groups to define, implement, and test robotics control algorithms.
- Development and maintenance of code base for real-time applications in C, C++, and Rust.
- As Level II: Lead technical design on new features, prioritize software team goals, interview and onboard new software team members, travel to customer sites to provide custom solutions.

PUBLICATIONS

- E. Davenport**, V. Madan, R. Gjini, J. Brzenski, N. Ho, T.-Y. Hsu, Y. Liang, Z. Liu, V. Manivannan, E. Pham, R. Vutukuru, Z. Yang, R. Yu, N. Lutsko, S. Hoyer, D. Watson-Parris. JCM: A Differentiable Testbed for Hybrid Atmospheric Modeling, *in preparation*
- E. Davenport**, A. Verdy, B. D. Cornuelle, M. R. Mazloff, R. Pinkel, A. F. Waterhouse, D. B. Whitt (2025). Mechanisms of Zonal Momentum Transport at 0N, 140W in an Ocean State Estimate, *In Review at the Journal of Physical Oceanography*
- E. Davenport**, K. Nguyen, J. Jang, C. Ma, S. Fish, L. Lenain, and F. Meyer (2025). A Landmark-Aided Navigation Approach Using Side-scan Sonar, *IEEE Journal of Oceanic Engineering* DOI:10.1109/JOE.2025.3578230
- K. Nguyen, M. Liang, **E. Davenport**, and F. Meyer (2025). AUV Flight Height Detection and Filtering from Sidescan Sonar Images, *IEEE 28th International Conference on Information Fusion* 10.23919/FUSION65864.2025.11124065
- E. Davenport**, J. Jang, and F. Meyer (2023). Toward Terrain-based Navigation Using Side-scan sonar, *IEEE 26th International Conference on Information Fusion* 10.23919/FUSION52260.2023.10224175
- S. Bi, T. Wang, **E. Davenport**, R. Peterson, R. Halter, J. Sorber, D. Kotz (2017). Toward a Wearable Sensor for Eating Detection *WearSys '17*, <https://dl.acm.org/doi/10.1145/3089351.3089355>

PRESENTATIONS

- E. Davenport** “Mixing Parameterizations in GCM’s: An introduction to why they are necessary and challenging”, 2025 COMCEPTS (Combined Ocean Mixing Course, Experiments, and Practices for Turbulence Sampling). (invited lecture)
- E. Davenport**, et al. “JAX-GCM: An Intermediate-Complexity, Differentiable Atmospheric Model”, 2025 Gordon Research Conference on Machine Learning for Actionable Climate Science. (poster)
- E. Davenport**, M. R. Mazloff, A. Verdy, and B. D. Cornuelle. “Understanding Tropical Mixing Processes and Their Parameterization Using an Ocean State Estimate”, 2025 Wyrтки Symposium. (poster)
- E. Davenport**, M. R. Mazloff, A. Verdy, and B. D. Cornuelle. “Understanding Tropical Pacific Upwelling and Mixing with the 140°W EquatorMix Study and an Ocean State Estimate”, 2024 Gordon Research Conference on Ocean Mixing. (poster)
- E. Davenport**, M. R. Mazloff, A. Verdy, and B. D. Cornuelle. “Understanding Tropical Pacific Mixing Processes with an Observational Campaign and a State Estimate”, 2024 CaCAO Days (Chaos, Computation and Optimization at SIO). (invited talk)
- E. Davenport**, M. R. Mazloff, A. Verdy, and B. D. Cornuelle. “EquatorMix Remix: Modeling of Tropical Upwelling Processes Informed by the 140°W EquatorMix Study”, 2024 Ocean Sciences Meeting. (talk)

FUNDING AND AWARDS

NCAR Exploratory Allocation *500,000 compute hours*

Sep 2023–Present

WORKSHOPS AND HACKATHONS

SIO Python for Earth Science (organizer) <i>San Diego, CA</i>	Aug 2025
CADRE-EPIC Data Assimilation Training <i>Fort Collins, CO</i>	Jun 2025
NASA ECCO Hackweek <i>Pasadena, CA</i>	Oct 2024
JAXathon: JAX-GCM Hackathon <i>San Diego, CA</i>	Aug 2024
US CLIVAR Ocean Uncertainty Quantification Summer School <i>Miami, FL</i>	Jul 2024

RESEARCH CRUISES

NSF MOTIVE II <i>Pacific Cold Tongue, R/V Sikuliaq</i>	Nov-Dec 2025
NSF MOTIVE I <i>Pacific Cold Tongue, R/V Sikuliaq</i>	Nov-Dec 2024
ONR SwellEx <i>Coastal California, R/V Sally Ride</i>	Sep 2022

TEACHING EXPERIENCE

SIO Software Workshop for Earth Science <i>Scripps Institution of Oceanography</i>	Aug 2025
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- Organized and instructed a community-wide software workshop to teach Python, Bash, and Git in the Earth Sciences.
- Created lesson content and recruited and trained other instructors.
- Instructed and obtained funding for 4 workshop sessions (40+ attendees including students, professors, research scientists, and engineers).
- Workshop content, including tutorials, can be found at [the workshop website](#).

Software Carpentry Instructor Training <i>UCSD</i>	Dec 2023
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- 16-hour training in evidence-based teaching practices for science and computational research.

Teaching Assistant , Thayer School of Engineering <i>Dartmouth College, Hanover, NH</i>	2014-2017
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- Scientific Computing, Digital Electronics, Intro to Material Science, Solid Mechanics

MENTORSHIP AND VOLUNTEERING

Community Outreach Science Guide , SCOPE	2022–Present
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- Guiding science tours at Scripps to highlight ongoing research in addition to local ecology and geology.

Graduate and Undergrad Student Mentor , Marine Physical Lab & SIO	2022–2024
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- Mentorship of undergraduate and graduate engineering and oceanography students. Topics: graduate studies, model development, robotics development, software engineering, and embedded systems design.

Last Updated October 28, 2025