Galen Egan

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EDUCATION

Ph.D., Civil & Environmental Engineering — June 2020
Environmental Fluid Mechanics & Hydrology
Stanford University, Stanford, CA

M.S., Civil & Environmental Engineering — June 2016
Environmental Fluid Mechanics & Hydrology
Stanford University, Stanford, CA

B.S., Civil Engineering | *magna cum laude* — June 2015
Environmental & Water Resources Engineering
UCLA, Los Angeles, CA

SELECTED EXPERIENCE

Research Scholar, Princeton University, Geosciences Department — 01/2025–Present
Conducting research in ocean-atmospheric interactions and sediment transport.

Assistant Professor, Seattle University, Mathematics Department — 01/2024–12/2024
Taught undergraduate math and graduate level data science courses; conducted research in coastal oceanography.

Data Scientist → **Senior Research Scientist** → **Consultant**, Sofar Ocean — 02/2021–12/2024
Backend software development and customer-facing data science for an ocean path-planning app. Led data-driven vessel dynamics model development during growth from 7 to 300+ customers; developed sensing algorithms for wave measurement buoys; secured Office of Naval Research funding for R&D.

Postdoctoral researcher, Stanford University — 06/2020–12/2020
Advisor: Prof. Oliver Fringer
Improved parameterization schemes for numerical sediment transport models based on results from field data collected in San Francisco Bay.

On-call scientist, Integral Consulting Inc. — 08/2019–02/2021
Supervisor: Grace Chang
Provided data analysis and field work support for Integral's Marine Science & Engineering practice. Example work included a baseline condition assessment for a potential sediment remediation site.

Graduate researcher, Stanford University — 06/2016–06/2020
Advisor: Prof. Stephen Monismith
Led three field deployments in San Francisco Bay with novel instrumentation designed to investigate boundary layer turbulence and sediment transport. Additional projects include hydrodynamic modeling of stratified turbulence in a tidal river, and running laboratory experiments to quantify the mixing of brine discharge from desalination plants.

Undergraduate researcher, UCLA — 01/2013–06/2015
Laboratory for the Chemistry of Construction Materials
Advisor: Prof. Gaurav Sant
Investigated the mechanical and transport properties of low-CO_2 footprint concretes for civil infrastructure applications.

PEER-REVIEWED PUBLICATIONS

Egan, G., Zippel, S., & Smit, P.B. (2024 *in revision*). Observing bulk meteorological parameters and air-sea heat fluxes with a Spotter buoy.

Smit, P.B., **Egan, G.**, & Houghton, I. (2024 *in press*). Continuous peak period estimates from discrete surface-wave spectra. *Journal of Atmospheric and Oceanic Technology*.

Dorsay, C., **Egan, G.**, Houghton, I., Hegermiller, C., & Smit, P. B. (2023). Proxy observations of surface wind from a globally distributed network of wave buoys. *Journal of Atmospheric and Oceanic Technology, 40*(12), 1403-1415.

Egan, G., Chang, G., Manning, A., Monismith, S., & Fringer, O. (2022) On the variability of floc characteristics in a shallow estuary. *Journal of Geophysical Research: Oceans 127*(6), e2021JC018343.

Chang, G., **Egan, G.**, McNeil, J. D., McWilliams, S., Jones, C., Spada, F., Monismith, S., & Fringer, O. (2022). Seasonal particle responses to near-bed shear stress in a shallow, wave-and current-driven environment. *Limnology and Oceanography Letters 7*(2), 175-183.

Cowherd, M., **Egan, G.**, Monismith, S., & Fringer, O. (2021). Phase-resolved wave boundary layer dynamics in a shallow estuary. *Geophysical Research Letters 48*(8), e2020GL092251.

Roberts, D.C., **Egan, G.**, Forrest, A.L., Largier, J.L., Bombardelli, F.A., Laval, B.E., Monismith, S.G., Schladow, S.G. (2021). The setup and relaxation of spring upwelling in a deep, rotationally influenced lake. *Limnology & Oceanography 66*(4), 1168-1189.

Egan, G., Chang, G., McWilliams, S., Revelas, G., Fringer, O., & Monismith, S. (2020). Cohesive sediment erosion in a combined wave-current boundary layer. *Journal of Geophysical Research: Oceans*, e2020JC016655.

Egan, G., Manning, A., Chang, G., Fringer, O., & Monismith, S. (2020). Sediment-induced stratification in an estuarine bottom boundary layer. *Journal of Geophysical Research: Oceans 125*, e2019JC016022.

Egan, G., Chang, G., Revelas, G., Monismith, S., & Fringer, O. (2020). Bottom drag varies seasonally with biological roughness. *Geophysical Research Letters 47*(15), e2020GL088425.

Egan, G., Cowherd, M., Fringer, O., & Monismith, S. (2019). Observations of near-bed shear stress in a shallow, wave- and current-driven flow. *Journal of Geophysical Research: Oceans 124*(8), 6323-6344.

Monismith, S.G., Hirsh, H., Batista, N., Francis, H., **Egan, G.**, & Dunbar, R.B. (2019). Flow and drag in a seagrass bed. *Journal of Geophysical Research: Oceans 124*(3), 2153-2163.

Hogg, C. A., **Egan, G.**, Ouellette, N. T., & Koseff, J. R. (2018). Shoaling internal waves may reduce gravity current transport. *Environmental Fluid Mechanics 18*(2), 383-394.

Egan, G., Kumar, A., Neithalath, N., & Sant, G. (2017). Re-examining the influence of the inclusion characteristics on the drying shrinkage of cementitious composites. *Construction and Building Materials 146*, 713-722.

FUNDED PROPOSALS

ONR: N00014-22-1-2405 Distributed, real-time observations of the air-sea interface. 2022-2024
Role: Lead PI, coordinating field work, analysis, and deliverables. Collaboration with UCSB/WHOI.
Total Award Amount: $675,342

NSF EAR-PF (Declined) Data-driven parameter estimation for sediment transport models. 2021-2023
Role: Lead PI for Postdoctoral Fellowship working with Prof. Steven Brunton (UW)
Total Award Amount: $174,000

INVITED TALKS

"A Century of Better Sampling: Data Science for a Changing Ocean." Seattle University Mathematics Department, February 2023, Seattle, WA

"Buoys in the water, forecasts in the cloud: full stack oceanography at Sofar Ocean." UW Applied Physics Lab, May 2022, Seattle, WA

"The bottom boundary layer in San Francisco Bay: waves, turbulence, mud, and worms." Coastal Ocean Fluid Dynamics Laboratory Talk, September 2019, Woods Hole, MA

"What we learned from three muddy field deployments in San Francisco Bay." Integral Consulting Marine Science and Engineering Webinar, May 2019, Santa Cruz, CA

"Cohesive sediment and the friction velocity." Stanford Environmental Fluid Mechanics Laboratory Seminar, April 2019, Stanford, CA

"Stratification and turbulence in a tidal river: observations and 1D modeling." Stanford Environmental Fluid Mechanics Laboratory Seminar, September 2017, Stanford, CA

CONFERENCES

Egan, G., Zippel, S., & Smit, P.B. "Proxy observations of air-sea fluxes from a Spotter buoy." (poster). 2024 Ocean Sciences Meeting, New Orleans, LA.

Egan, G., Dorsay, C., Prieto, A., Lichtenheld, T., & Smit, P. "Real-time, low-cost proxy observations of ocean rainfall from a distributed buoy network." (talk). Oceans 2022, Virginia Beach, VA

Egan, G., Houghton, I., & Dorsay, C. "Real-time proxy observations of ocean rainfall from a distributed buoy network." (talk) OSM 2022, Virtual.

Egan, G., Chang, G., Spada, F., Manning, A., Jones, C., Monismith, S., & Fringer, O. "Settling velocity observations in a shallow estuary: Deviations from Rouse dynamics."(poster) AGU Fall Meeting 2020, Virtual

Egan, G., Cowherd, M., Spada, F., Scheu, K., Manning, A., Jones, C., Chang, G., Fringer, O., & Monismith, S. "Cohesive sediment erosion in a shallow, wave- and current-driven flow."(poster) 2020 Ocean Sciences Meeting, San Diego, CA

Cowherd, M., **Egan, G.**, Monismith, S., & Fringer, O. "Wave phase-decomposed near-bed currents and turbulence on the shoals of South San Francisco Bay."(poster) 2020 Ocean Sciences Meeting, San Diego, CA

Chang, G., **Egan, G.**, Spada, F., Jones, C., Manning, A., Monismith, S., & Fringer, O. "Variability of particle characteristics in a wave- and current-driven estuarine environment."(poster) 2020 Ocean Sciences Meeting, San Diego, CA

Egan, G., Cowherd, M., Spada, F., Scheu, K., Manning, A., Jones, C., Monismith, S., Chang, G., Fringer, O. "More than mud: bottom boundary layer observations in an estuary."(poster) Gordon Research Conference: Coastal Ocean Dynamics, June 2019, Manchester, NH.

Egan, G., Cowherd, M., Spada, F., Scheu, K., Manning, A., Jones, C., Monismith, S., Chang, G., & Fringer, O. "*In situ* observations of near-bed turbulence and cohesive sediment transport."(presentation) AGU Fall Meeting 2018, Washington, D.C.

Egan, G., Monismith, S.G., & Hench, J.L. "1D water column modeling of stratification and turbulence in a tidal river."(poster) 2018 Ocean Sciences Meeting, February 2018, Portland, OR

TEACHING

DATA 5100: Data Science Foundations, Seattle University Fall 2024
Instructor: Graduate-level course focused on Python programming and mathematics (linear algebra, vector calculus, optimization) for data science. Average student evaluation score: $4.6/5$.

DATA 3320: Data Science Methodology and Applications, Seattle University Spring 2024
Instructor: Interactive, project-based data science course for undergraduates. Topics included data science ethics, data visualization, high-dimensional regression, time series analysis, and image classification, with applications drawn from social and environmental science. Average student evaluation score: $4.44/5$.

MATH 2310: Probability and Statistics, Seattle University Winter & Spring 2024
Instructor: Probability and statistics course for undergraduate science and engineering students. Average student evaluation score: $4.57/5$.

CEE 262H: Observations in Coastal Oceanography, Stanford University Spring 2020
Co-instructor: prepared and gave lectures related to turbulence and sediment measurements and data analysis in coastal environments.

CEE 262B: Transport and Mixing, Stanford University Winter 2017, 2018
Teaching assistant: prepared and taught lessons for weekly supplementary class session, held office hours, and graded assignments.

OSPGEN 53: Corals of Palau, Stanford/Bing Overseas Program Summer 2017
Teaching assistant: Prior to the course, coordinated shipping and programming all scientific instruments used for three week summer course in Palau. During the course, helped mentor student research projects, coordinated field excursions, and directed student life abroad.

CEE 101B: Mechanics of Fluids, Stanford University Fall 2016
Teaching assistant: held weekly office hours and review sessions, set up and assisted with the laboratory portion of the course.

CEE 201S: Computations in CEE, Stanford University Summer 2016
Teaching assistant: held weekly office hours, graded assignments, and led supplemental discussion section for a MATLAB-based programming class. Taught to a wide audience, from high school seniors to Stanford Continuing Studies students.

GENERAL INTERESTS AND SKILLS

Technical interests:
Environmental fluid mechanics, coastal oceanography, sediment transport, air-sea interactions, numerical modeling, optimization, machine learning, data assimilation, STEM education

Software tools:
Advanced: Python (including Keras, PyTorch, sklearn, NumPy, SciPy, pandas), MATLAB, git
Proficient: R, Rust, Fortran, AWS Tools (S3, EC2), SQL, ArcGIS, ROMS, Adobe Illustrator

SERVICE, MENTORING, AND OUTREACH

Peer Reviewer 2019–Present
Reviewed publications for: *Physical Review Fluids*, *Journal of Geophysical Research: Oceans*, *Journal of Geophysical Research: Earth Surface*, *Marine Geology*, *Estuaries & Coasts*, *Continental Shelf Research*, *Environmental Research Letters*

Undergraduate research mentor 2018–Present

1. Obtained internal funding to advise a research project for two Seattle University undergraduates during Summer 2024. Trained students in signal processing, data analysis, and technical writing, with a journal publication currently in preparation.
2. Mentored an undergraduate researcher (now PhD student at UC Berkeley). Trained in field work and data analysis, and held weekly meetings for honors thesis project. For reference, contact Marianne Cowherd at cowherd@berkeley.edu
3. Assisted an undergraduate researcher (now PhD student at UC Berkeley) with her honors thesis, which won the Firestone Medal for Excellence in Undergraduate Research. For reference, contact Sienna White at siennaw@berkeley.edu

UW Data Science in Oceanography Instructor/Project Advisor 2024
Presented a lecture on oceanographic applications of machine learning and advised two research project teams for a two-week summer course.

Ocean Sciences Meeting 2022 Session Organizer 2022
Co-hosted a session, entitled IoT and Distributed Sensing in Ocean Science and Research.

Stanford CEE Graduate Life Committee Environmental Engineering Representative 2017–2019
Planned and led quarterly town hall meetings to gain insight into problems experienced by graduate students in CEE, including issues related to diversity and inclusion, advisor relationships, and admissions procedures.

National Ocean Sciences Bowl Volunteer - Stanford, CA 2017
Assisted with judging and logistics for Ocean Sciences quiz bowl for local high school students.

AWARDS AND CERTIFICATIONS

Centennial Teaching Assistant Award Recipient	2018
Outstanding Student Presentation Award, AGU Fall Meeting	2018
Charles H. Leavell Graduate Student Fellowship	2017–2018
John K. Vennard Fellowship	2015–2016
California EIT #157339	2016