

# Galen Egan

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## EDUCATION

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<b>Ph.D.</b> , Civil & Environmental Engineering Environmental Fluid Mechanics & Hydrology Stanford University, Stanford, CA	June 2020
<b>M.S.</b> , Civil & Environmental Engineering Environmental Fluid Mechanics & Hydrology Stanford University, Stanford, CA	June 2016
<b>B.S.</b> , Civil Engineering   <i>magna cum laude</i> Environmental & Water Resources Engineering UCLA, Los Angeles, CA	June 2015

## SELECTED EXPERIENCE

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<b>Assistant Professor</b> , Seattle University, Mathematics Department Teaching undergraduate math and graduate level data science courses, and conducting research in coastal oceanography.	01/2024–present
<b>Data Scientist</b> → <b>Senior Research Scientist</b> → <b>Consultant</b> , Sofar Ocean Developed optimization algorithms and simulated vessel hydrodynamics for Wayfinder, Sofar's commercial ship routing application, and developed embedded sensing algorithms for Sofar Spotter buoys. As a consultant I am driving R&D efforts related to air-sea interactions.	02/2021–present
<b>Postdoctoral researcher</b> , Stanford University Advisor: Prof. Oliver Fringer Improved parameterization schemes for numerical sediment transport models based on results from field data collected in San Francisco Bay.	06/2020–12/2020
<b>On-call scientist</b> , Integral Consulting Inc. 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.	08/2019–02/2021
<b>Graduate researcher</b> , Stanford University 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.	06/2016–06/2020
<b>Undergraduate researcher</b> , UCLA Laboratory for the Chemistry of Construction Materials Advisor: Prof. Gaurav Sant Investigated the mechanical and transport properties of low-CO <sub>2</sub> footprint concretes for civil infrastructure applications.	01/2013–06/2015

## PEER-REVIEWED PUBLICATIONS

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- Egan, G.**, Zippel, S., & Smit, P.B. (2024 *submitted*). 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 flocc 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

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- 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

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- "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

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- 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

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**DATA 3320: Data Science Methodology and Applications, Seattle University** Spring 2024

Instructor: Currently teaching an interactive, project-based data science course for undergraduates. Topics include data science ethics, data visualization, high-dimensional regression, time series analysis, and image classification, with applications drawn from social and environmental science.

**MATH 2310: Probability and Statistics, Seattle University** Winter & Spring 2024

Instructor: Prepared and delivered all content for the undergraduate probability and statistics course, receiving an average 4.57/5 student evaluation score for Winter 2024.

**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.

## AWARDS AND CERTIFICATIONS

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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

## GENERAL INTERESTS AND SKILLS

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**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:* Rust, Fortran, AWS Tools (S3, EC2), SQL, ArcGIS, ROMS, Adobe Illustrator

## SERVICE, MENTORING, AND OUTREACH

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### **Peer Reviewer**

2019–Present

Reviewed publications for: *Journal of Geophysical Research: Oceans*, *Journal of Geophysical Research: Earth Surface*, *Marine Geology*, *Estuaries & Coasts*, *Continental Shelf Research*

### **Session Organizer**

2022

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

### **Undergraduate research mentor**

2018–2021

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

### **Undergraduate research mentor**

2018–2019

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

### **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.