# KATE STAGL HUGHES, MS

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## EDUCATION

**PhD** University of California, Davis — Not Completed
Civil & Environmental Engineering
Minor: Physical Oceanography
Dissertation: "Basin-scale circulation in an ice-covered lake"
Committee: Alexander Forrest, Fabian Bombardelli, Steven Sadro

**MS** University of California, Davis — Dec 2021
Civil & Environmental Engineering
Thesis: "Physical processes in ice-covered lakes"
Advisor: Alexander Forrest and Fabian Bombardelli

**BS** Oregon State University, Civil Engineering — March 2017
Concentration in Water Resources

## TEACHING

**Instructor,** Shiley School of Engineering, University of Portland

**Statics**
Semesters taught: Fall 2022, 2023, 2024, Summer 2023
*Description:* Quantitative description of forces, moments, and couples acting upon engineering structures. The free-body diagram is used to understand the equilibrium of a whole physical system through isolation of each component particle or body.

**Surveying**
Semesters taught: Fall 2023, 2024
*Description:* Introduction to surveying. Topics include theory of measurements and error analysis; distance and angle measurements; traverse, area, and volume computations; horizontal and vertical curves; topographic surveys; construction surveys and mapping. This course will provide you with an overview of surveying principles. The major purpose of this course is to introduce civil engineering students to the theory of measurements and error analysis; distance and angle measurements; traverse, area and volume computations; horizontal, vertical curves computations; topographic surveys and mapping.

**Surveying Laboratory**
Semesters taught: Fall 2022, 2023, 2024
*Description:* Introduction to basic surveying emphasizing construction-related activities; use of automatic level, theodolite, and total station; field activities include taping, differential leveling, traverses, horizontal curve layout, construction layout and mapping.

**Mechanics of Materials**
Semesters taught: Spring 2022, 2023, 2024, 2025, 2026
*Description:* Behavior of deformable body systems under various external loadings is presented with analysis of stress, strain, and deformation due to axial, torsional, bending and combined loads. Topics include statically indeterminate structures.

**Water Resources Engineering**
Semesters taught: Fall 2022
*Description:* Fundamentals of hydrologic and hydraulic engineering. Hydrology topics include precipitation, infiltration, evapotranspiration, and runoff. Hydraulic engineering topics include closed-conduit flow, including flow in branched and parallel pipe systems, open channel flow, and pump design. Application of water resources principles to water distribution and stormwater design.

**Water Resources Engineering Laboratory**
Semesters taught: Fall 2022
*Description:* Students will apply the concepts learned in CE 362 in the laboratory. Lab activities cover pipe flow, pumps, open channel flow, and hydrology.

**Environmental Engineering**
Semesters taught: Spring 2026
*Description:* Experiments on chemical and biological analysis of water including alkalinity, turbidity, hardness, biochemical oxygen demand, dissolved oxygen, solids; softening, jar testing and reactor tracer studies are also conducted.

**Environmental Engineering Laboratory**
Semesters taught: Spring 2023, 2024, 2025, 2026
*Description:* Experiments on chemical and biological analysis of water including alkalinity, turbidity, hardness, biochemical oxygen demand, dissolved oxygen, solids; softening, jar testing and reactor tracer studies are also conducted.

**Bridge Design and Fabrication**
Semesters taught: Spring 2024
*Description:* The course will explore the design process and constructability of a small-scale steel bridge. The finished steel bridge will be tested at the American Society of Civil Engineers (ASCE) conference.

**Teaching Assistant**, Civil & Environmental Engineering Dept., University of California, Davis
**Senior Design Course** Jan 2019 to June 2022
*Description:* Two-quarter design experience for Civil & Environmental Engineering (CEE) majors working in a group setting to practice researching, analyzing, implementing, and validating solutions to real-world problems. Students are advised by faculty, consulting clients, city officials, and teaching assistants to receive constant feedback and guidance throughout the design process.

*Responsibilities:*

- Mentored 5 teams of students (20-25 students total)
- Conducted weekly meetings with student teams to monitor progress, provide feedback on design process, and offer conflict resolution solutions when needed
- Reviewed CATME (team survey website) to identify team conflicts and assess students' mental health to further assist students to succeed in their education
- Graded homework assignments and edit student reports

***Introduction to Civil & Environmental Engineering Lab*** Sept 2017 to Dec 2020

*Description:* Provides demonstrations, hands-on activities, and discussion of all disciplines within Civil & Environmental Engineering (i.e., transportation, geotechnical, water resources, mechanics of materials, structures, etc.).

*Responsibilities:*

- Taught weekly 3-hour labs (16 students) with each lab focused on a different discipline of CEE (e.g. construction of popsicle stick bridge and concrete cylinders to be tested for strength in the Universal Testing Machine)
- Presented pre-lab material to provide context of activities
- Graded homework assignments and lab reports
- Conducted weekly office hours
- Adapted select labs to be virtual and created new lesson plans to accommodate virtual learning during the COVID-19 pandemic

***Hydraulic Engineering Lab*** Jan 2018 to Mar 2018

*Description*: Laboratory experiments and demonstrations of fluid dynamics including flow characteristics and measurements, sluice gates, weirs, hydraulic jumps, and pumps.

*Responsibilities:*

- Perform demonstrations of experiments for students (25 students) to replicate and take measurements to use for data analysis and lab reports
- Conduct weekly office hours
- Grade lab group reports

***Urban Metabolism and Sustainability*** Apr 2018 to June 2018

*Description*: Technical writing course focusing on urban metabolism and sustainability practices in relation to CEE

*Responsibilities:*

- Graded and provided feedback for three technical writing essays throughout the quarter related to course description (60 students)
- Graded weekly homework assignments
- Conducted weekly office hours

## PUBLICATIONS & PRESENTATIONS

***Journal Papers***

Hughes, K.S., Forrest, A.L., Cortés, A. et al. Transitional circulation patterns from full ice cover to ice-off in a seasonally ice-covered lake. Aquat Sci 86, 40 (2024). https://doi.org/ 10.1007/s00027-024-01044-3

***Oral Presentations***

Hughes, K. Stagl, Forrest, A. L., Bombardelli, F. A., "Modelling Hidden Valley Lake," California Lake Management Society Conference. 2018.

Hughes, K. Stagl, Forrest, A. L., Bombardelli, F. A., Cortés, A., "Under-ice cyclonic gyre formation in a narrow, elongated lake" 2023, Presentation on my behalf, *Physical Processes in Natural Waters,* Brescia, Italy

***Poster Presentations***

Hughes, K. Stagl, Forrest, A. L., Oldryod, H. J., and Bombardelli, F. A., "Rotational motion inducing horizontal transport during ice break-up in a deep, narrow lake" AGU and UC Davis Environmental Water Resources Showcase. 2019.

## RESEARCH & PROFESSIONAL EXPERIENCE

**Lake Massawippi Monitoring** 2019-Present
*Graduate Student Researcher*

- Designed long term field experiment of oceanographic instruments to monitor under-ice circulation patterns in Lake Massawippi
- Performed deployment and recovery procedures of instruments for ice-on and ice-off deployment and recovery from boat
- Data processing of water temperature, dissolved oxygen, water velocities, conductivity, water level, flowrate, wind speed, wind direction, air temperature, relative humidity, and shortwave radiation over the course of 4 winters and 4 summers

- Community outreach with local organizations and citizens

**Lake Shasta Flow Field Experiment** 2021
*Graduate Student Researcher*

- Flow analysis in front of Shasta dam to determine critical flow path of cold-water pools during different flow conditions
- Lead operator of data collection including measurements of water velocity with an Acoustic Doppler Current Profiler, and temperature profiles

**AECOM** June 2016 to Dec 2016
Civil Engineering Intern

- Construction Inspector – daily site inspection, documentation of time and material and stringent force account reports for stormwater treatment facility
- Covanta Stormwater Runoff Modeling – detention pond sizing by modeling the stormwater runoff at Covanta's Energy-From-Waste site to maintain permissible discharge

**City of Portland Water Bureau** Mar 2015 to Sept 2015
Civil Engineering Intern

- Surveying – construction staking, preliminary topographic surveys, resolved property lines between PWB/Forest Service
- Transmission Line Design – included preliminary research, topographic survey, code evaluation, construction staking and tapped the main line to include services.

## HONORS AND AWARDS

**Civil & Environmental Engineering Best Teaching Assistant Award** 2020
Each department within the College of Engineering selects the Best Teaching Assistant to recognize graduate students who consistently perform above and beyond to teach, encourage, and inspire the next generation of engineers and leaders.

**California Lake Management Society (CALMS) Fellowship** 2018
The CALMS fellowship supports graduate students in the field of lake and reservoir limnology and management.

**Johannes "Joe" DeVries Endowed Graduate Student Award** 2018
This UC Davis, Civil & Environmental Engineering Department award is given to an outstanding graduate student studying water resources engineering.

## COMPUTER SKILLS

**Programming Languages**: MATLAB, Python, R

**Software**: ArcGIS, AutoCAD, Micro Station, LaTex, General Lake Model, HEC-RAS, SonarWiz (sonar bathymetry and sidescan),

## LEADERSHIP & COMMUNITY OUTREACH

**High School Basswood Bridge Competition Coordinator** 2024 - 2025
*Description*: The Basswood Bridge competition is a national competition for high school students to design, build, and test their basswood bridge. UP has hosted this event for the past few years and I have been the point of contact for ASCE's coordination.
*Responsibilities:*
- Planning in collaboration with ASCE
- Reserving spaces, tables, equipment
- Day of point of contact helping with logistics of setup, tear down, etc.

**Showcase Coordinator - Society of Water and Environ. Grad Students** 2019 - 2020
*Description*: The event was created to bridge the gap between current academic researchers and industry members to inspire future collaboration. The event also provided a networking event for graduate students seeking job opportunities. In 2019, the event hosted 50 industry members and 50 faculty and graduate students from UC Davis. In 2020, the event was modified to be a virtual format.
*Responsibilities*:

- Created event format which included speakers, poster presentations, and networking opportunities for graduate students
- Coordinated with faculty to select a keynote speaker for the event
- Outreach to graduate students to find volunteers for speaking at the event
- Coordinated rental of event space, event equipment, and food/beverages for event
- Facilitated a poster review session with faculty for graduate students
- Adapted event to be hosted in a virtual format during the COVID-19 pandemic

**EDL Diversity, Equity, and Inclusion (DEI) committee co-founder** 2020

*Description*: Two fellow graduate students and I created a committee to assess and address DEI issues in our immediate research lab the Environmental Dynamics Lab (EDL) at UC Davis (~30 people)

*Shared Responsibilities:*

- Created anonymous google survey to assess atmosphere and discrimination experiences by students, faculty, and researchers within our lab
- Presented results of survey to the EDL to facilitate a discussion of the experience of individuals within our lab
- Facilitated a discussion to brainstorm actionable items (e.g., quarterly DEI trainings, DEI reading group, establishing protocols for advertising and hiring interns, organizing annual survey of EDL climate, etc.) to prioritize DEI within our lab
- Asked for volunteers for actionable items to ensure the completion of each task
- Co-wrote a "New Student Handbook" with campus resources and guidance from current graduate students to help new students navigate graduate school. First generation graduate students were the motivation for the document.