Tyler Waterman

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Education

Duke University

PhD Candidate in Civil and Environmental Engineering, Hydrology and Fluid Dynamics Track

- Certificate in College Teaching

University of California Berkeley

B.S in Civil and Environmental Engineering 05/2019

- 2018 Honors Research Thesis: *Developing a Framework for Modern Modeling of Interception Loss in Forest Canopies* advised by Dr. Sally Thompson
- 2017 Honors Research Thesis: *Development of Efficient CRISPR-Cas9 Genome Editing in Desulfovibrio vulgaris Hildenborough (DvH) for Studying Anaerobic Microbial Functions and Interactions* advised by Dr. Lisa Alvarez Cohen

Academic Interests

Earth systems science, land-atmosphere interactions, big environmental data, hydrology, boundary layer meteorology, ecohydrology, numerical modeling, machine learning, remote sensing, turbulent exchange, pedagogy in environmental data analysis, pedagogy in earth systems science

Research Experience

Duke University: Dr. Nathaniel Chaney Hydrology Lab

Research Assistant (August 2019 – Present)

- Created a publicly accessible codebase to complete preprocessing workflow for the Weather Research and Forecasting Hydrologic Model Hydrologic Model (WRF-Hydro)
- Analyzed a large database of eddy flux measurements across the United States to improve the surface boundary conditions of turbulent temperature variance in atmospheric models
- Developing a two column implementation of Cloud Layers Unified by Binormals (CLUBB) to parameterize the effect of heterogeneity induced secondary circulations in Earth System Models

University of California Berkeley: Dr. Sally Thompson Ecohydrology Lab

Undergraduate Researcher (May 2018 – January 2019)

- Developed an independent honors research project to create an improved model framework for interception of precipitation by tree canopies
- Collected environmental samples for a fire ecology project, including basic meteorological data, soil moisture and fuel moisture, in field sites in Yosemite National Park

Teaching Experience

Duke Civil and Environmental Engineering

Environmental Spatial Data Analysis – Teaching Assistant (Fall 2021)

- Taught and helped develop materials for four course lectures
- Codeveloped course assignments with instructor, graded them, and answered student questions

Fluid Mechanics – Teaching Assistant (Fall 2022)

- Managed undergraduate lab sessions and experiments
- Held office hours and graded student coursework

Berkeley Civil and Environmental Engineering

International Water Development – Student Instructor (Spring 2018)

- Established and created the curriculum for a lower division Berkeley undergraduate course on water systems in developing countries
- Taught basic computer aided design and principles of water development, water systems, social implications of water, and the design process to Berkeley undergraduate students

Honors and Awards

2022 Preparing Future Faculty Fellow ($500)
2022 Duke Professional Development Fund ($250)
2020 NSF Graduate Research Fellowship Program – Honorable Mention
2019 Pratt Gardner Fellowship Recipient ($10,000)
2018 Slotman Award for Excellence in New Student Services
2015 Croul Family Scholarship ($4,000)

Publications

Waterman, T., Bragg, A., Katul, G., Chaney, N. (2022) "Examining Parameterizations of Potential Temperature Variance Across Varied Landscapes for use in Earth System Models" *Journal of Geophysical Research: Atmospheres*, 127, https://doi.org/10.1029/2021JD036236

Talks, Posters and Presentations

Waterman, T., Chaney, N. "A Multi-Column Approach to Resolving Heterogeneity Induced Secondary Circulations" European Geophysical Union General Assembly, Talk, Remote, 2022

Waterman, T., Laura, T., Chaney, N. "Exploring How Heterogeneities in Land Surface Temperature Drive the 'Missing Flux'" Frontiers in Hydrology Meeting, Poster, 2022

Waterman, T., Chaney, N. "Capturing the Effects of Surface Flux Heterogeneity on the Lower Sub-grid Atmosphere in Earth System Models with a Multi-Column Approach" American Geophysical Union Fall Meeting, Poster, 2021

Waterman, T., Chaney, N. "A Multi-Column Approach to Resolving Heterogeneity Induced Secondary Circulations" Coupling of Land and Atmospheric Sub-grid Parameterizations (CLASP) Fall Project Meeting, Talk, Remote, 2021

Waterman, T., Chaney, N. "Evaluating and Improving Parameterizations of the Variance of Temperature Fluctuations Over Heterogeneous Landscapes for Surface Boundary Conditions in Atmospheric Models", European Geophysical Union General Assembly, Talk, Remote, 2021

Waterman, T., Chaney, N. "Parameterizing the Variance of Temperature Fluctuations Over Heterogeneous Landscapes for Surface Boundary Conditions in Atmospheric Models", American Geophysical Union Fall Meeting, Talk, Remote, 2020

Waterman, T., Chaney, N. "Improving Higher Order Surface Turbulence Statistics for CLUBB", Coupling of Land and Atmospheric Sub-grid Parameterizations (CLASP) Fall Project Meeting, Invited Talk, Remote, 2020

Leadership, Outreach and Service

Duke Hydrology and Fluid Dynamics (HFD) Seminar

Founder and Organizer (January 2022 – present)

- Facilitating a biweekly space for students and postdocs in the HFD program to practice talks

Engineers Without Borders (EWB) UC Berkeley Chapter

Chapter Education Director (November 2017 – November 2018)

- Established an educational curriculum for new members of the chapter, teaching technical and soft skills necessary to promote EWB's mission of international development

Chapter Vice President (May 2017 – January 2018)

- Organized and coordinated chapter meetings and project managers,

Project Manager (May 2016 – May 2017)

- Managed a 1500-person water project for a developing community including basic research, finances, design, planning, construction scheduling, and coordination between 30+ project members and professional contacts

UC Berkeley New Student Orientation

Orientation Mentor (December 2016 – May 2019)

- Organized events and trained orientation leaders including intensive diversity and mentor training

Memberships

American Geophysical Union (2019 – present)

Member Society of Duke Fellows (2019 – present)

American Meteorological Society (2022 – present)

Member UC Berkeley Chi Epsilon Civil Engineering Honors Society (2016 – 2019)