Helen S. Weierbach

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EDUCATION

Bachelor of Science, Mathematics: summa cum laude with departmental honors   May 2020

Tulane University, School of Science and Engineering   New Orleans, LA

Minor: Environmental Earth Science

- Honors Thesis: *"Using Surrogate Models to Quantify Uncertainty in Predicting How Background Conditions Influence the Climate Response to Large Volcanic Eruptions"*
  Advisors: James (Mac) Hyman, Cynthia Ebinger, and Brent Goehring
- Study Abroad: *School for International Training: Climate Change in the Arctic, Iceland and Greenland, Fall 2018*

RESEARCH AND PROFESSIONAL EXPERIENCE

Berkeley Lab, Earth and Environmental Sciences Area   Berkeley, CA

Environmental Data Science Research Associate   August 2022- Present

- Implementing Deep Learning models for regional to continental scale stream water temperature predictions, using predictions to analyze long term trends in heatwave events in the continental U.S.
- Running climate warming and drought simulations to analyze the impact of climate change of mountainous hydro-biogeochemistry in the East River Watershed
- Implementing model software management best practices and calibration techniques to enable scalability of observationally-based watershed-scale models to watersheds with sparse observations

Environmental Data Science Research Assistant   August 2020- August 2022

- Implemented Classical Machine Learning models for spatiotemporal stream water temperature predictions across CONUS, aiming to improve during disturbances and climate extremes in watersheds as part of iNAIADS
- Integrated data sources from a mountainous watershed test site into HAN-SoMo Nitrogen Cycling Model, updating model, and ran simulations to predict Nitrogen cycling responses hydrologic disturbance as part of Bouskill Lab
- Synthesized and analyzed hillslope-N budget data synthesis activities for Nitrogen crosscut priority to quantify a 4D understand 4D resolution atmospheric and geogenic sources for the Watershed Function SFA

University of Southern Mississippi, Marine Sciences   Hattiesburg, MS

Research Assistant   Summer 2020

- Performed rotary wavelet analyses on mooring datasets to identify shifts in inertial wave frequencies over time associated with upwelling and downwelling events in the Mississippi shelf

Lamont Doherty Earth Observatory (Columbia University) and the NASA Goddard Institute for Space New York, NY

Lamont REU Summer Intern   Summer 2019

- Set up and assisted in running large scale volcanic climate model simulations for the international Volcanic Model Intercomparison Project in general circulation model GISS E2.1-R
- Organized, analyzed and visualized global model output from Volcanic Model Intercomparison Project experiments for groups of 27 ensembles sampling from nine sets of background conditions

Tulane University, Farrer Lab   New Orleans, LA

Field and Lab Volunteer   Summer 2017

- Assisted in constructing, documenting and categorizing field plots in coastal wetland areas of Louisiana
- Prepared plant specimens for DNA extraction and analysis in a sterile laboratory environment

SKILLS

Computer/Technical: Skilled in Python, Matlab, LaTeX, version control systems (git, GitHub), and Microsoft Office; Proficient in R, Linux scripting, NetCDF file management, QGIS; Basic Knowledge of ArcGIS, SQL, C++

AWARDS AND GRANTS

Lawson Prize: Tulane University award for excellence in undergraduate mathematics research (May, 2020)
Senior Honors Scholar in Environmental Earth Science: Tulane award for highest achieving student in department (May, 2020)
William Wallace Peery Society Member: Tulane Valedictory society (May, 2020)
Phi Beta Kappa Honor Society, Tulane University Chapter (May, 2019)
Dean's Honor Scholarship Recipient: Full Tuition scholarship awarded annually (August, 2016-May, 2020)
American Geophysical Union 2019 Fall Meeting Student Travel Grant Recipient (November, 2019)
Newcomb College Institute 2019 Student Research Travel Grant Recipient (November, 2019)
New Employee of the Year award 2018: Tulane Campus Recreation (May, 2018)

PUBLICATIONS

Weierbach, H., Lima, A. R., Willard, J., Hendrix, V., Christianson, D., Lubich, M., and Varadjarajan, C. *Stream Temperature Predictions for River Basin Management in the Pacific Northwest and Mid-Atlantic Regions Using Machine Learning.* Water, XX Special issue (2022).

Varadharajan, C., Appling, A., Arora, B., Christianson, D., Hendrix, V., Kumar, V., Lima, R., Mueller, J., Oliver, S., Ombadi, M., Perciano, T., Sadler, J., **Weierbach, H**., Willard, J., Xu, Z., and Zwart, J. *Can Machine Learning Accelerate Process Understanding and Decision Relevant Predictions of River Water Quality?* Hydrological Processes, Data Science Special Issue (2022).

Zanchettin, D., Timmreck, C., Khodri, M.,… & **Weierbach, H**. *Effects of forcing differences and initial condition uncertainties on inter-model agreement in the VolMIP volc-pinatubo-full experiment.* Geoscientific Model Development, VolMIP Special Issue (2022).

Crystal-Ornelas, R., Varadharajan, C., Bond-Lamberty, B., Boye, K., Burrus, M., Cholia, S., … **Weierbach. H,**. & Agarwal, D. A. (2021). *A guide to using GitHub for developing and versioning data standards and reporting formats.* Earth and Space Science (2021).

Buijsman, M.C., Earls, J. & **Weierbach, H**. *Modulation of near-inertial motions on the Mississippi-Alabama Shelf.* Ocean Dynamics (2021).

PRESENTATIONS

Weierbach, H., Maavara, T., Woodburn, E., and Bouskill, N. *Integrating Models and Observations to Understand the Impact of Changing Climate on Mountainous Watershed Nitrogen Cycling.* Flash Talk and Poster Presentation at the Goldschmidt, Honolulu, HI., July 2022

Weierbach, H., Lima., A. R., Lubich, M., Ombadi, M., Christianson, D., Hendrix, V., Wong, C., and Varadharajan, C. *Using Classical Machine Learning for Widespread Stream Temperature Predictions*. Planery Flash Talk at the HydroML Symposium, Penn State University, State College, PA., May 2022

Weierbach, H., Lima., A. R., Willard, J., Christianson, D., Hendrix, V., and Varadharajan, C. *Predicting Stream Temperature Across Spatial Scales With Low Complexity ML*. Poster Presentation at the American Geophysical Union Fall meeting, New Orleans, LA., December 2021

Weierbach, H., Maavara, T., Woodburn, E., and Bouskill, N., *Modelling the Impact of Future Climate on Mountainous Watershed Nitrogen Cycling* vPICO Presentation at The European Geophysical Union, virtual meeting, April 2021

Weierbach, H., Lima., A. R., Christianson, D., Hendrix, V., and Varadharajan, C. *A Comparison of Data-Driven Models for Predicting Stream Water Temperature* Poster Presentation at Climate Change AI and AI for Earth Science Workshops of NeurIPS Conference, virtual meeting, December 2020

Weierbach, H. *Using Surrogate Models to Quantify Uncertainty in Predicting How Background Conditions Influence the Climate Response to Large Volcanic Eruptions* Oral Presentation at Scientific Computing Around Louisiana. Baton Rouge, LA., February 2020

Weierbach, H., LeGrande, A.N. and Tsigaridis, K. *The Effect of Background ENSO and NAO Conditions on the Climatological Response to a Pinatubo Sized Volcanic Eruption*. Poster Presentation and Student Travel Grant Flash Presentation at the America Geophysical Union Fall meeting, San Francisco, CA., December 2019

SERVICE AND ENGAGEMENT

Earth and Environmental Sciences Inclusivity, Diversity, Equity and Accountability,
Committee Member.   September 2022-Present
- Working with lab leadership to advance initiatives in Diversity, Equity, and Accountability including new field work safety protocols, establishing relationships with minority serving institutions, and improving employee onboarding

Unlearning Racism in Geoscience (URGE), (Lawrence Berkeley National Lab)
Pod Member   January 2020 – Present
- Participating in an URGE pod at LBNL educating Earth and Environmental Scientists on racism in geoscience, and identifying strategic actions for improving the racial climate at our institution.
- Working closely with operations to enhance the onboarding process to be more inclusive and equitable.

Early Career Employee Resource Group
Policy and Networking Committee Member   December 2021 – Present
- Working with lab leadership to improve access to resources for Early Career employees

Science Accelerating Girls' Engagement in STEM (SAGE)
Professional Growth Committee Member   February 2020 – August 2022
- Prepared and presented educational materials for girls in SAGE program for a variety of topics including leadership, forming habits and cultivating a growth mindset in STEM careers

HydroML Symposium Planning,
Travel Grant Committee Member   December 2021 – May 2022
- Developed travel grant application questions and reviewed travel grant applications using a quantitative review rubric for HydroML Symposium held at Penn State University in May, 2022

Tulane Outdoor Adventures, *Manager, Trip Leader*   August 2016 – May 2020
- Lead day and overnight hiking, paddling, and backpacking trips in the Gulf South for 10-15 participants
- Taught outdoor leadership course in risk management, outdoor preparedness, environmental knowledge of the Gulf South and Leave No Trace Principles to incoming trip leaders
- Managed a staff of 10-15 leaders; assigned, organized and prepared a weekly trip schedule

INTERESTS:
Rock Climbing, Snowboarding, Ultimate Frisbee, Mountain Biking, Hiking, Backpacking, Cooking