2019 Great Lakes Summer Fellows Program

The Cooperative Institute for Great Lakes Research (CIGLR) announces the 2019 Great Lakes Summer Fellows Program, in partnership with the National Oceanic and Atmospheric Administration (NOAA) Great Lakes Environmental Research Lab (GLERL). The Great Lakes Summer Fellows Program exposes students to a broad range of disciplines and provides an exciting opportunity for students to conduct research in the Great Lakes region under the mentorship of a CIGLR or GLERL scientist.

Description:

- We are offering nine (9) full-time, twelve-week positions. Eight positions are located at the NOAA Great Lakes Environmental Research Laboratory (GLERL), 4840 South State Road, Ann Arbor, MI 48108. One position is located at the Grand Valley State University Annis Water Resources Institute (AWRI), 740 W. Shoreline Drive, Muskegon, MI 49441.
- Positions will last for twelve weeks from the start date. The start date will be in early May, but this can be flexible (i.e., early June start) based on the selected candidate's schedule or project needs.
- We seek to use these fellowships to increase diversity in STEM disciplines (science, technology, engineering and math) and strongly encourage applications from students who identify with groups that have been traditionally underrepresented in government and academic workforces.
- There is a stipend of $6,500 for the twelve-week period, paid in two installments of $3,250.
- Fellowship position summaries are on the reverse side.

Eligibility:

- The program is limited to currently enrolled undergraduate (juniors and seniors preferred) and graduate students. We will also consider post-baccalaureate or post-masters students who have graduated within the past 12 months (of your fellow position start date) if the position fits directly within a student's career goals.
- You must be either a U.S. citizen or a foreign national who is residing in the U.S. on a current Student Visa.
- Immediate relatives of any CIGLR or NOAA GLERL employees are not eligible to participate in this program, consistent with NOAA guidelines.

To Apply:

- Visit ciglr.seas.umich.edu/opportunities/student-fellowships/ to complete an online application, including cover letter, résumé, and transcript upload.
- Deadline: **22 February 2019 at 11:59 PM EST**
- Applicants will be notified of their status by 22 March 2019.

For application & more information, visit:
ciglr.seas.umich.edu/opportunities/student-fellowships/

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SEE REVERSE FOR FELLOWSHIP POSITION SUMMARIES

2019 Great Lakes Summer Fellow Positions More details at ciglr.seas.umich.edu/opportunities/student-fellowships/

Investigating the accuracy of over-lake meteorological forcing used in operational hydrodynamic modeling (Mentor: Dima Beletsky, UM CIGLR) In this project, we will test the accuracy of NOAA High-Resolution Rapid Refresh (HRRR) operational atmospheric model HRRR (air temperature, wind speed and cloud cover) by comparing model predictions with observations of several meteorological variables over the lake that impact surface heat balance. The fellow will extract modeled meteorological variables driving the FVCOM hydrodynamic model and compare them with archived over-lake observations.

Ice-wave-surge interaction analyses for the western Alaska coastal region (Mentors: Ayumi Fujisaki-Manome, UM CIGLR; Jia Wang, NOAA GLERL; Philip Chu, NOAA GLERL) Storm surges are a hazardous phenomenon along Alaska's western coast, and sea ice plays a key role in altering their intensity by amplifying or dampening waves. The fellow will work with a team on developing a model for storm surge forecasting. Specifically, the fellow will help analyze simulation results from sea ice, wave, and storm surge models by comparing them with available observations.

Fate of the heavy metal manganese during hypoxic events in Lake Erie (Mentors: Casey Godwin, UM CIGLR; Deric Learman, CMU) Among the risks posed by hypoxia is contamination by manganese, a naturally occurring heavy metal that is released from sediments during hypoxia, and if not removed during treatment, turns drinking water yellow and potentially toxic. The fellow will perform field work and laboratory experiments linking manganese biogeochemistry to the problem of seasonal hypoxia in Lake Erie. Specifically, the fellow will perform experiments to determine which factors control the oxidation of manganese and to measure the rate of oxidation under the conditions present in the lake.

Skill assessment of Lake Erie HAB Tracker models using different satellites (Mentors: Qianqian Liu, UM CIGLR; Eric Anderson, NOAA GLERL; Mark Rowe, NOAA GLERL) The HAB-tracker model in Lake Erie uses the predicted currents from a numerical hydrodynamic model and a particle tracking model to produce a 5-day forecast of harmful algal blooms (HABs). Different satellites have been used to initialize cyanobacterial harmful algal bloom (CHAB) concentration in the model. The fellow will evaluate the skill of HABs forecast in 2017 and 2018 and investigate how the utilization of different satellites affects the model's performance in HABs detection.

Fine-scale diel vertical distribution, size structure, and biomass of *Mysis* in Lake Michigan (Mentors: Doran Mason, NOAA GLERL; Ed Rutherford, NOAA GLERL; Lars Rudstam, Cornell) Knowledge of fine-scale changes in distribution and size of *Mysis* is essential for determining how changes in their biomass may impact the upper food web (fishes). This project builds on past results of *Mysis* research and uses a new technology in the Great Lakes (Multiple Opening and Closing Net and Environmental Sensing System- MOCNES) to measure the fine-scale vertical distribution, size structure, and biomass of *Mysis* in Lake Michigan.

Processing and visualization of environmental data collected by Autonomous Underwater Vehicles (AUV) in the Great Lakes (Mentors: Lacey Mason, NOAA GLERL; Russ Miller, UM CIGLR; Philip Chu, NOAA GLERL) CIGLR and NOAA GLERL have deployed gliders in Lakes Michigan, Huron, and Ontario since 2012 to collect environmental data throughout the water column. To increase access to this information, the summer fellow will develop a workflow to process profiling glider data from raw sensors to IOOS standardized format. Once the data are processed into a standardized format, the fellow will develop data visualizations including static graphics and potentially, interactive visualization applications. The summer fellow will also have an opportunity to go out in the field for the deployment and retrieval of a profiling glider.

Invasive round goby reproductive strategies across an environmental gradient (Mentors: Charlyn Partridge, GVSU AWRI; Ashley Elgin, NOAA GLERL) In their native region, male round gobies display different alternative reproductive tactics during mating. The fellow will conduct bi-monthly sampling of round gobies from different drowned-river mouth lakes along the eastern side of Lake Michigan that represent a range of anthropogenic influence to determine the proportion of alternative reproductive tactics for each location and the influence of anthropogenic disturbance.

Defining bottlenecks to fish larvae growth, survival, and potential recruitment in Lake Michigan (Mentors: Ed Rutherford, NOAA GLERL; Doran Mason, NOAA GLERL; Hank Vanderploeg, NOAA GLERL) Analysis of fish larvae diets suggests that *Dreissena* mussel veligers have replaced native copepods as prey and may have caused a decline in fish larvae growth rate in Lake Michigan. The fellow will participate in surveys and laboratory analysis to learn how *Dreissena* veligers affect diet and growth of larval yellow perch and alewife.

Great Lakes Ice Climate and its Impacts on the Water Quality of Lake Erie (Mentors: Jia Wang, NOAA GLERL; Hongyan Zhang, UM CIGLR; James Kessler, UM CIGLR) In this project, in-depth research will look for links between climate teleconnection patterns (e.g., North Atlantic Oscillation) to the Great Lakes climate, ice cover, and water quality, such as hypoxia in Lake Erie. The fellow will develop regression models for predicting ice cover and hypoxia using climate teleconnection indices and physical forcings.