Opportunity Title: Spatial Prediction of Ecological Indexes in USA Lakes, Rivers, and Streams
Opportunity Reference Code: EPA-ORD-NHEERL-WED-2019-02

Organization U.S. Environmental Protection Agency (EPA)

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How to Apply

A complete application consists of:

- An application
- Transcripts – Click here for detailed information about acceptable transcripts
- A current resume/CV, including academic history, employment history, relevant experiences, and publication list
- Two educational or professional recommendations

All documents must be in English or include an official English translation.

If you have questions, send an email to EPArpp@orau.org. Please include the reference code for this opportunity in your email.

Application Deadline 8/1/2019 3:00:00 PM Eastern Time Zone

Description

***Applications will be reviewed on a rolling-basis.**

A research opportunity is currently available at the Environmental Protection Agency (EPA), Office of Research and Development (ORD), National Health and Environmental Effects Research Laboratory (NHEERL), Western Ecology Division (WED) in Corvallis, Oregon.

The US EPA's Office of Water has conducted probability surveys of the Nation's aquatic resources for decades. These surveys, which sample a small fraction of the resource (e.g., there is one stream site sampled for every 1000 km of stream length), provide population estimates with good confidence. However, for many purposes, managers benefit from estimates of the status of aquatic ecosystems at sites not sampled. Researchers at EPA's Western Ecology Division have begun to demonstrate methods to develop such estimates. We now seek to extend those methods for a broader set of aquatic ecosystem features. For example, the USEPA currently has estimates of observed-to-expected (O/E) taxonomic richness available at several thousand lake, river, and stream sample sites that were sampled as part of the National Aquatic Resource Surveys (NARS; https://www.epa.gov/national-aquatic-resource-surveys). This measure of biotic integrity is of great interest to a broad range of researchers, including economists interested in estimating the willingness to pay for changes in aquatic ecosystem health. For analyses such as these, both regional and fine-scale estimates of aquatic condition are required. There are comparable needs for other estimates of fine resolution indicators for a broad range of other applications. This research project will seek to develop models and spatial predictions (interpolations) of O/E and other measures of aquatic ecosystem status that can achieve both the spatial resolution and accuracy/precision required by a wide range of researchers and practitioners. The research participant will contribute to the development of a research program that inter alia, model existing NARS O/E (or other biological indicator) estimates or develops new O/E predictions from individual- or multi-taxon niche models with various statistical or machine learning techniques, including evaluation of model accuracy. Separate models will be developed for lakes and rivers/streams and will likely use the USEPA's LakeCat (Hill et al. 2018) and StreamCat (Hill et al. 2016) datasets for development and application of each. The research participant will learn about the use of spatial indicators and watershed data, and will learn to develop, test, and apply national-scale models. The research participant will also further develop an expertise in spatial analysis using large national datasets. The research participant will have access to a team of experts collaborating in and across disciplines on problems of crucial importance to the EPA's mission.

Research activities may include:

- Assembling NARS and StreamCat/LakeCat data for model development and application
- Using GIS to develop new spatial predictors of aquatic condition
- Developing quality assurance and model evaluation approaches for predicting/mapping aquatic condition
- Collaborating with researchers examining the economics of biological condition and willingness to pay for incremental improvements in biological condition
- Collaborating on related national mapping activities
- Conducting scientific synthesis, data analysis, manuscript preparation and literature searches

Hill, R. A., M. H. Weber, R. M. Debbout, S. G. Leibowitz, and A. R. Olsen. 2018. The Lake-Catchment (LakeCat) Dataset:

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characterizing landscape features for lake basins within the conterminous USA. Freshwater Science 37:208-221.

Hill, R. A., M. H. Weber, S. G. Leibowitz, A. R. Olsen, and D. J. Thornbrugh. 2016. The Stream-Catchment (StreamCat) Dataset: A Database of Watershed Metrics for the Conterminous United States. Journal of the American Water Resources Association (JAWRA) 52:120-128.

The mentor for this opportunity is Dr. Paul Ringold (ringold.paul@epa.gov).

Anticipated Appointment Start Date: August 1, 2019

This program, administered by ORAU through its contract with the U.S. Department of Energy (DOE) to manage the Oak Ridge Institute for Science and Education (ORISE), was established through an interagency agreement between DOE and EPA. The initial appointment is for one year, but may be renewed upon recommendation of EPA and is contingent on the availability of funds. The participant will receive a monthly stipend commensurate with educational level and experience. Proof of health insurance is required for participation in this program. The appointment is full-time at EPA in the Corvallis, Oregon, area. Participants do not become employees of EPA, DOE or the program administrator, and there are no employment-related benefits.

Qualifications

The qualified candidate should have received a master's or doctoral degree (preferred) in one of the relevant fields, with a strong background in spatial analysis and multivariate statistical analysis of ecological communities, or be currently pursuing one of the degrees and will reach completion by the start date of the appointment. Degree must have been received within five years of the appointment start date.

Preferred skills:

- Experience in watershed or statistical modeling and spatial analyses at broad spatial scales and use of aquatic monitoring data and GIS analyses
- Strong background in aquatic ecology and landscape analysis of aquatic systems
- Experience with ArcGIS, R statistical software, statistical/machine learning approaches (e.g., random forest), and large national datasets
- Experience with watershed data and the National Hydrography Dataset Plus V2
- Exceptional communication skills, including writing skills, verbal skills, and public speaking experience
- Demonstrated skills collaborating as part of a group

Eligibility Requirements

- **Citizenship:** LPR or U.S. Citizen
- **Degree:** Master's Degree or Doctoral Degree received within the last 60 months or anticipated to be received by 8/1/2019 11:59:00 PM.
- **Discipline(s):**
  - **Earth and Geosciences** (2 👁)
  - **Engineering** (2 👁)
  - **Environmental and Marine Sciences** (6 👁)
  - **Life Health and Medical Sciences** (4 👁)
  - **Mathematics and Statistics** (1 👁)