Opportunity Title: Robust Watershed Management Optimization Modeling
Opportunity Reference Code: EPA-ORD-NHEERL-AED-2019-14-A

Organization	U.S. Environmental Protection Agency (EPA)
Reference Code	EPA-ORD-NHEERL-AED-2019-14-A
How to Apply	**This is a repost of a previous posting. If you previously submitted your application to this reference code without the "-A" at the end, then you do not need to reply. Example: If you applied to "EPA-ORD-NERL-IO-2020-13" you do not need to reapply to "EPA-ORD-NERL-IO-2020-13-A".**

A complete application consists of:

- An application
- Transcript(s) – For this opportunity, an unofficial transcript or copy of the student academic records printed by the applicant or by academic advisors from internal institution systems may be submitted. All transcripts must be in English or include an official English translation. 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	7/31/2020 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), Center for Environmental Measurement and Modeling (CEMM), Atlantic Coastal Environmental Sciences Division (ACESD) in Narragansett, Rhode Island. EPA ORD recently reorganized and these are the newly named Centers/Divisions/Branches. This was formerly in the Atlantic Ecology Division (AED) within the National Health and Environmental Effects Research Laboratory (NHEERL).

The participant will be part of two Research teams that are developing and applying tools to 1) assist in robust decision-making (RDM) for Integrated Water Management on community and watershed scales and 2) watershed management optimization at regional basin scales. The first project involves the application of EPA's Watershed Management Optimization Support Tool (https://www.epa.gov/exposure-assessment-models/wmost) at the HUC12 to HUC10 watershed scales. WMOST is a decision-support tool designed to facilitate cost-effective integrated water management by communities and watershed organizations involving elements of stormwater, drinking water, wastewater, and land conservation programs. Version 3.01 of the tool enables users to plan how to meet selected targets related to water quantity-related goals such as maintaining base flows, minimizing peak flows and flooding risks, and maintaining storage within watersheds as well as water quality goals such as water

quality criteria, loading targets for total maximum daily loads, or minimization of combined sewer overflow events through the use of combinations of management options, which combine both gray and green infrastructure. Version 4 of the tool (in progress) will enable users to evaluate ancillary co-benefits as well as minimizing overall cost. Use of the WMOST tool requires exploration of goals and possible management scenarios, identification of input data, running WMOST, and collaborating with stakeholders to use WMOST outputs in their decision making. Robust decision making involves applying strategies to ensure that management options selected will be viable not only under current conditions (e.g., land-use, climate, population) but also under uncertain future conditions.

The second project involves development and application of Tier 1 of a tiered optimization strategy to identify locations and types of management practices to implement in order to achieve annual loading targets across broader regions, including targets both at intermediate points and the downstream outlet of that basin. This approach will take advantage of the structure and supporting data for existing regional USGS SPARROW models that are built on the NHDPlus hydrologic framework. Coding for this optimization strategy is being generated in R to take advantage of the USGS recent release of RSPARROW. We will be developing R code to generate the required AMPL code to run optimization programs available on the online NEOS server.

The research participant will have the opportunity to run existing models (e.g., SWAT, HSPF, SWMM, GWLF-e) using both historic and future climate scenarios to produce the time series with appropriate spatial and temporal resolution required for WMOST, to learn how to apply a preprocessor to format HSPF and SWAT model outputs to match WMOST input requirements, and to learn how to apply WMOST v3.01 (and subsequent versions) as part of a robust-decision-making framework. The reseach participant will also have the opportunity to contribute to RDM case studies involving the application of WMOST to communities in different climatic regions across the country. The case studies are conducted as collaborative exercises involving communities and watershed organizations and will involve stakeholder engagement. The research participant may contribute to development of interfaces and databases for a tiered optimization approach, with Tier 1 optimization conducted at larger river basin scales to meet annual loading targets at multiple locations. The initial Tier 1 pilot will focus on the upper Connecticut River basin, with later efforts planned for the Puget Sound watershed, and (pending funding) a portion of the Mississippi River basin. The research participant may participate in the development of decision processes within communities/watersheds that may increase utilization of Green Infrastructure approaches.

The mentor for this opportunity is Dr. Naomi Detenbeck (detenbeck.naomi@epa.gov).

Anticipated Appointment Start Date: June 1, 2020

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 Narragansett, Rhode Island, area. Participants

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do not become employees of EPA, DOE or the program administrator, and there are no employment-related benefits.

Completion of a successful background investigation by the Office of Personnel Management (OPM) is required for an applicant to be on-boarded at EPA. OPM can complete a background investigation only for individuals, including non-US Citizens, who have resided in the US for the past three years.

Qualifications

The qualified candidate should have received a masters or doctoral degree in one of the relevant fields, or be currently pursuing one of the degrees and will reach completion by June 1, 2020. Degree must have been received within five years of the appointment start date.

Preferred skills:

- Experience with one or more of the following models would be useful: SWMM, SWAT/HAWQS, HSPF and/or other semi-lumped parameter water quality models
- Training and experience in ArcGIS and R (including geospatial functions)
- Familiarity with water resources, watershed management practices including green infrastructure stormwater control measures and agricultural BMPs, and optimization principles (linear, nonlinear, mixed linear or nonlinear/integer, genetic algorithms), algebraic modeling languages (esp. AMPL)
- Familiarity with USGS SPARROW models, NHDPlus v2 hydrologic framework, VBA, linking R and/or Python with Excel (e.g., RExcel or Python library openpyxl), RShiny
- Ability to write technical documents and journal articles
- Stakeholder engagement/communication experience

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Master's Degree or Doctoral Degree received within the last 60 months or anticipated to be received by 6/1/2020 11:59:00 PM.
- **Discipline(s):**
  - **Computer, Information, and Data Sciences** (1 👁)
  - **Earth and Geosciences** (3 👁)
  - **Engineering** (27 👁)
  - **Environmental and Marine Sciences** (13 👁)
  - **Social and Behavioral Sciences** (2 👁)