

**Opportunity Title:** USFS Postdoctoral Fellowship in Spatial Data Analysis & Modeling

**Opportunity Reference Code:** USDA-USFS-2021-0080

**Organization** U.S. Department of Agriculture (USDA)

**Reference Code** USDA-USFS-2021-0080

**How to Apply** *Connect with ORISE...on the GO!* Download the new ORISE GO mobile app in the [Apple App Store](#) or [Google Play Store](#) to help you stay engaged, connected, and informed during your ORISE experience and beyond!

A complete application package 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. Selected candidate must provide proof of completion of the degree before the appointment can start. All transcripts must be in English or include an official English translation. Click [Here](#) for detailed information about acceptable transcripts.
- A current resume/CV
- Two educational or professional recommendations

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

**Application Deadline** 5/17/2021 3:00:00 PM Eastern Time Zone

**Description** \*Applications may be reviewed on a rolling-basis.

**USFS Office/Lab and Location:** A research training opportunity is available at the USDA Forest Service located in Oxford, Mississippi.

The Aquatic Conservation and Ecology Team focuses on the biology, ecology, and community function and structure of warmwater fishes, mussels, and crayfishes of bottomland hardwood and upland stream ecosystems. You can find more information at [https://www.srs.fs.usda.gov/cbhr\\_redesign/research/ace/](https://www.srs.fs.usda.gov/cbhr_redesign/research/ace/).

**Research Project:** Predicted climate change effects have been widely modeled for cool- and coldwater ectothermic species but much less so for warmwater taxa. Our research goals are to elucidate relationships between thermal and biotic characteristics of Coastal Plain stream sites, with emphasis on darters (*Etheostoma* spp.), and to evaluate physical processes influencing the stream temperatures. In 2011, we established a network of stream temperature recorders in the Little Tallahatchie River drainage, Mississippi, and expanded the network south into the Yocona River drainage in 2012, for a total of 67 sites. Most recorders were in place for at least 5 years, with the last ones removed in 2019. In 2012, we quantitatively sampled fish and crayfish communities at temperature recording sites in order to evaluate correlations between temperature regimes and fish and crayfish communities. The resulting temperature database has over **6.67 million temperature records**. In the unstable, sand-bed stream channels characteristic of the region, thermographs tended to become intermittently buried by sediment over time. We installed additional thermographs to test the effects of burying; preliminary analyses suggest that the sand acted as an insulator, moderating microclimates



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around the thermographs. Although this effect can be detected and accounted for mathematically, it vastly increases the difficulty of preparing the data for analyses.

We seek a post-doc with data analysis, and preferably hydrologic modeling experience to help analyze the data and collaborate on publishing results in peer-reviewed journal articles.

Under the guidance of a mentor, the participant will:

- "clean up" the stream temperature dataset, accounting for recorder burial and other oddities in the data
- conduct spatial statistical analyses of the stream temperature and biological data to address the research questions
- participate in writing manuscripts
- possibly conduct additional hydrologic or spatial modeling using other publicly available spatial data
- possibly contribute to study design and data analyses for laboratory experiments of temperature effects on darter spawning
- possibly incorporate stream temperature data from other southeastern streams for broader analyses

**Learning Objectives:** The participant will: gain experience in statistically analyzing a large dataset; learn about integrating physical with biological data; improve writing skills; and have an opportunity to help design future studies (including across all southeastern Experimental Forests) or conduct additional hydrologic modeling. The participant could potentially be lead or junior author on at least four publications, each addressing one of the following objectives:

- Develop analytical solutions to stream temperature data challenges, especially periodic burial of temperature loggers, on the Gulf Coastal Plain.
- Relate stream temperatures to physical processes (e.g., water impoundment) and model relationships between air and stream temperatures to facilitate extrapolations of stream temperature data to years lacking recorded water temperature data.
- Relate distributions of Yazoo and Yoknapatawpha darters to stream temperatures.
- Explore temperature in relation to warmwater fish and crayfish community metrics and identify fish or crayfish species with distributions possibly limited by temperature.

#### **Professional development opportunities**

- The participant will have the opportunity to author or co-author several peer-reviewed scientific papers using existing data.
- They will network with aquatic ecologists, fisheries biologists, hydrologists and others in the SRS as well as in other FS research stations.
- They will have a platform to demonstrate quantitative skills and to refine communication skills.
- They will have the opportunity to present results as professional society

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meetings, if travel funds can be secured.

**Mentor(s):** The mentor for this opportunity is Dr. Susan Adams ([susan.adams@usda.gov](mailto:susan.adams@usda.gov)). If you have questions about the nature of the research please contact the mentor(s).

**Anticipated Appointment Start Date: Spring or Summer 2021.** Start date is flexible and will depend on a variety of factors.

**Appointment Length:** The appointment will initially be for one year, but may be renewed an additional year upon recommendation of USFS and is contingent on the availability of funds.

**Level of Participation:** The appointment is full-time.

**Participant Stipend:** The participant will receive \$6,606.50 as a monthly stipend, as well as a health insurance stipend supplement to cover medical and prescription coverage.

**Citizenship Requirements:** This opportunity is available to U.S. citizens, Lawful Permanent Residents (LPR), and foreign nationals. Non-U.S. citizen applicants should refer to the [Guidelines for Non-U.S. Citizens Details page](#) of the program website for information about the valid immigration statuses that are acceptable for program participation.

**ORISE Information:** 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 USFS. Participants do not become employees of USDA, USFS, DOE or the program administrator, and there are no employment-related benefits. Proof of health insurance is required for participation in this program. Health insurance can be obtained through ORISE.

**Questions:** Please visit our [Program Website](#). After reading, if you have additional questions about the application process please email [USForestService@orise.orau.gov](mailto:USForestService@orise.orau.gov) and include the reference code for this opportunity.




**Qualifications** The qualified candidate should have received a doctoral degree in one of the relevant fields, or be currently pursuing the degree with completion by June 18, 2021. Degree must have been received within the past five years.

Preferred skills:

- Data processing: proven experience processing and analyzing large data sets
- Mathematical modeling.
- Statistics: spatial analysis skills, including advanced GIS skills; experience using environmental statistical programs; R programming
- Good scientific writing skills and primary author on peer-reviewed publications
- Knowledge of hydrology
- Experience with both physical and biological systems or data

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- Eligibility Requirements**
- **Degree:** Doctoral Degree received within the last 60 months or anticipated to be received by 6/18/2021 12:00:00 AM.
  - **Discipline(s):**
    - **Computer, Information, and Data Sciences** ([3](#) )
    - **Environmental and Marine Sciences** ([7](#) )
    - **Mathematics and Statistics** ([5](#) )