Opportunity Title: USFS Research Opportunity for Wildland Fire Research: 3D Fuel Mapping, Fire Modeling and Analysis
Opportunity Reference Code: USDA-USFS-RMRS-2023-0458

Organization U.S. Department of Agriculture (USDA)

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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. Click **Here** for detailed information about acceptable transcripts.
- A current resume/CV
- Two educational or professional recommendations. At least one recommendation must be submitted in order for the mentor to view your application.

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

Application Deadline 1/19/2024 3:00:00 PM Eastern Time Zone

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

USFS Office/Lab and Location: There are research opportunities available with the U.S. Department of Agriculture (USDA) Forest Service's (USFS) within the Missoula Fire Sciences Laboratory located in Missoula, Montana.

On September 12, 1960, the Northern Forest Fire Laboratory was dedicated in Missoula, MT. The facility included a 66-foot-high combustion chamber that allowed for burn tests in controlled conditions. Since then, the Northern Forest Fire Laboratory name has changed to the Missoula Fire Sciences Laboratory. However, the original focus of developing a greater understanding of wildland fire and using the best technology available to get that knowledge into the hands of fire managers continues to be the way of life for researchers. The complex and has expanded to include numerous research resources including; a wind tunnel, combustion chamber and emissions lab, ecophysiology, tree ring and fuels lab as well as soils, metals, welding, electronics and instrumentation facilities. Today, after more than sixty years, the Missoula Fire Sciences lab continues to be a center for fire research on a national and international level. For more information about the lab, visit our web page here: https://www.firelab.org/about-the-fire-lab

Research Project: Wildfires increasingly threaten communities and firefighter safety in many parts of the country. At the same time, drought and other factors have threatened forest health in many locations, with some areas experiencing an alarming and rapid forest die off at an unprecedented scale. The intersection of fires and the deteriorating condition of our forests leads to significant uncertainty regarding the long-term resilience of forest ecosystems. One the key questions of interest in

current fire science research is how the structure, composition and spatial patterns of fuels affect fire behavior and resulting fire effects under different weather conditions. A growing body of evidence suggests that management actions such as prescribed fires and fuel treatments can alter fuels in ways that reduce subsequent fire intensity, facilitating more effective fire management efforts while promoting ecosystem resilience, but many aspects remain unclear: how much do you need to thin the forest to achieve these objectives? Under what conditions will they continue to be effective? For how long? To properly explore these interactions, new understanding regarding the properties, spatial patterns, and structure of wildland fuels is needed, data must be collected in field and lab experiments, and fire models must be used to examine their interactions over a range of conditions. This project seeks to advance our understanding of wildland fuels through a diverse, multidisciplinary effort combining field data collection, occasional laboratory research examining fundamental fuel properties, exploration of new techniques in 3D fuel mapping with light detection and ranging (LiDAR) or Uncrewed Aerial Systems (UAS), and physics-based fire modeling. With this opportunity, ORISE fellowship participants will have opportunities to learn about and contribute to research spanning several of these topics.

Wildland fire and fuels research is a rapidly growing but broad field in which numerous scientific disciplines intersect, including computer science, artificial intelligence, remotes sensing, biometrics, dendrometrics, statistics, physics, hydrology and ecology. ORISE learning opportunities with this program will thus potentially include a wide range of activities, such as conducting research with experimental and remote sensing data, testing and development of new measurement or sampling approaches, laboratory experiments to determine combustion properties or other physical parameters needed for physics-based fire modeling or examining interactions between fuels (live or dead) and fire, in various ways. Fuel mapping research will explore the use of new technologies and data sources in the development of new approaches for mapping wildland fuels in three dimensions, using a combination of traditional field sampling as well as emerging new technologies, including light detection and ranging (LiDAR), and imagery from unmanned aircraft systems (UAS). Over the last few years, our team has collected a growing body of data capturing numerous aspects of research prescribed burns. These datasets often include pre- and post-burn 3D fuels data, multiple weather stations, thermal imagery capturing fire behavior, and often very specialized datasets from unique sensors. with physics-based fire models will offer opportunities to evaluate models against field or laboratory experimental data, test different fuel/fire interactions, and otherwise augment the multidisciplinary efforts in these themes.

Learning Objectives: Over the course of this learning opportunity, participants will be exposed to spatial and tabular data processing and analysis, use of specialized software, programming, analysis and visualization. The skills acquired through this opportunity are in high demand in multiple fields.

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Mentor: The mentor for this opportunity is Russell Parsons (russell.a.parsons@usda.gov). If you have questions about the nature of the research, please contact the mentor.

Anticipated Appointment Start Date: December 2023; start date is flexible (earlier or later).

Appointment Length: The appointment will initially be for 3 to 9 months but may be extended 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 a monthly stipend commensurate with educational level and experience. **Stipend range between $22-$35 per hour.**

Citizenship Requirements: This opportunity is available to U.S. citizens only.

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 ORISE.USFS.RMRS@orau.org and include the reference code for this opportunity.

Qualifications

The qualified candidate should have a Bachelor's Degree, Master's Degree, or Doctoral Degree received within the last 60 months or anticipated to be received by 11/27/2025 11:00:00 PM.

Preferred Skills:

- Ideal candidates will be curious, energetic, attentive, able to focus, and willing to learn.
- Familiarity with forestry and fire related issues is desirable but not required.
- Familiarity with GIS and different kinds of spatial data is desirable but not required.
- Familiarity with programming and/or analysis is desirable but not required.

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Bachelor's Degree, Master's Degree, or Doctoral Degree received within the last 60 months or anticipated to be received by

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11/27/2025 11:00:00 PM.

- **Overall GPA:** 2.00
- **Academic Level(s):** Post-Bachelor's, Postdoctoral, or Post-Master's.
- **Discipline(s):**
  - **Computer, Information, and Data Sciences** (17 👁)
  - **Earth and Geosciences** (21 👁)
  - **Engineering** (27 👁)
  - **Environmental and Marine Sciences** (14 👁)
  - **Mathematics and Statistics** (11 👁)
  - **Physics** (16 👁)
- **Age:** Must be 18 years of age
- **Veteran Status:** Veterans Preference, degree received within the last 120 month(s).