Opportunity Title: USDA-FS Economic Analysis and Modeling on Hardwood Management and Novel Markets for Biochar
Opportunity Reference Code: USDA-FS-SRS-2025-0047

Organization U.S. Department of Agriculture (USDA)

Reference Code USDA-FS-SRS-2025-0047

How to Apply ***To submit your application, scroll to the bottom of this opportunity and click APPLY.***

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. 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. 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.

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Application Deadline 5/16/2025 3:00:00 PM Eastern Time Zone

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

USDA Forest Service Office/Lab and Location: A fellowship opportunity is available with the US Department of Agriculture (USDA) Forest Service (FS) within the Forest Service Southern Research Station (SRS) located in Raleigh, North Carolina.

At the heart of the USDA Forest Service's mission is their purpose. Everything they do is intended to help sustain forests and grasslands for present and future generations. Why? Because their stewardship work supports nature in sustaining life. This is the purpose that drives the agency's mission and motivates their work across the agency. It's been there from the agency's very beginning, and it still drives them. To advance the mission and serve their purpose, the USDA Forest Service balances the short and long-term needs of people and nature by: working in collaboration with communities and our partners; providing access to resources and experiences that promote economic, ecological, and social vitality; connecting people to the land and one another; and delivering world-class science, technology and land management.

Research Project: This project will facilitate collaboration between USDA Forest Service Southern Research Station and the Department of Forestry and Environmental Resources at NC State University (NCSU), along with external collaborators at The Ohio State University (OSU) and Yale

University. Under this agreement, NCSU will host an ORISE Research Fellow to support economic analysis and modeling on hardwood management and novel markets for biochar sourced from hardwood pulpwood in the timber supply region that previously serviced the Pactiv Evergreen Paper Mill in Canton, NC. The ORISE Fellow will support an integrated modeling exercise that incorporates inputs from empirical analysis of forest inventory data, spatial analysis of factors influencing management and biomass transport costs, techno-economic and life-cycle analysis of biochar production from hardwood pulpwood (completed by Yale PI Yao) and spatially-explicit intertemporal optimization of hardwood management and markets in the Southern Appalachian Region (SAR).

Current regional, US, and global models of forest management and markets do not adequately capture the nuance of hardwood management (including selective “high grade” harvesting), niche product markets, or environmental outcomes from management choices (mesophication) or non-management (degraded forest health, increased disturbance risk). Further, mixed hardwood systems in the Southern US comprise the dominant share of aboveground carbon stocks in the region, so continued (or improved) management of these systems will be critical to maintain and enhance the U.S. forest carbon sink. Losing large demand pulls such as the Pactiv in Canton, NC could disincentive continued management and result in residual market impacts through suppressed stumpage prices. It is thus critical to assess the potential implications of mill capacity contraction in the SAR and to evaluate novel markets and policy incentives needed to support the utilization of lower valued pulpwood, including for biochar production.

The objectives of this collaboration include the following:

- Quantify the long-term market and inventory impacts of forest product mill capacity contraction in the SAR;
- Combine spatial analysis with forest inventory assessments to identify potential locations for pulpwood biochar facilities in the SAR,
- Develop an intertemporal optimization and spatially-refined model of forest management and markets in the SAR,
- Link this economic model with the TEA/LCA modeling to provide a system-wide perspective on biochar production potential and environmental performance;
- Assess future market impacts and resource use patterns under alternative biochar development scenarios;
- Quantify potential avoided damages from degraded forest health and carbon sequestration capacity in the SAR over the long-term;

The Fellow will learn from NCSU and OSU collaborators to develop a new dynamic economic model of forest management and markets, building on the national- and global-scale approaches outlined in Baker et al. (2023) and Austin et al. (2020). The Fellow will have access to datasets and models maintained by NCSU and OSU collaborators, including the Hardwood version of the SubRegional Timber Supply Model (Dhungel et al., 2023) the Global Timber Model (GTM), and others. The candidate will

gain valuable experience in forest sector modeling and market/policy analysis, while contributing to a growing scientific literature on forest sector modeling and filling key scientific knowledge gaps on hardwood and biochar systems sustainability.

Learning Objectives: This collaborative project between Forest Service SRS, along with Dr. Baker and Dr. Forrester at NCSU and Dr. Sohngen at Ohio State, provides a unique opportunity to link spatial datasets, forest inventory analysis, and economic projections modeling over long time-frames to assess the implications of new markets for hardwood pulp in the Southern Appalachian Region. Mutual benefits to the applicant and project research staff include – (1) scientific advancement in modeling to inform hardwood management alternatives and the development of new markets for hardwood pulpwood in regions that are experiencing a contraction in existing pulp mill capacity, (2) economic projections to assess potential climate benefits of biochar sourced from hardwood pulpwood, (3) scenario analysis to compare policy incentives for supporting hardwood pulpwood markets and hardwood management for improved forest health and carbon sequestration, (4) improved depiction of hardwood management, inventory dynamics, and niche product markets into broader forest sector models, and (5) research that supports sustainable pulpwood biochar systems across federal, state, and private lands.

Additionally, the participant selected for this project will have the opportunity to hone many aspects of their scientific skillset while participating collaboratively with SRS researchers, including:

- Developing economic optimization models of hardwood systems and analyzing simulation modeling results to assess interactions between market dynamics, environmental change, and management interventions;
- Assess new and emerging markets for biochar on the resource base and rural economy in the SAR.
- Communicating with partners within the Forest Service, in academia and in other agencies to share results.
- Writing multiple peer-reviewed publications on research results.

Mentor: The mentor for this opportunity is Tara Keyser (tara.keyser@usda.gov). If you have questions about the nature of the research, please contact the mentor.

Anticipated Appointment Start Date: June 2025. 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 extended upon recommendation of USDA Forest Service 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. **The anticipated stipend is $78,000 annually.**

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. Foreign national candidates may have a mandatory in-person requirement depending on visa status.

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 USDA Forest Service. Participants do not become employees of USDA, USDA Forest Service, 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.SRS@orau.org and include the reference code for this opportunity.

Qualifications

Currently pursuing or have received a doctoral degree in a relevant field (e.g. applied economics, Forest Economics, Forestry, Natural Resources). Degree must have been received within the past five years, or anticipated to be received by 8/31/2025.

Preferred skills:

- Experience conducting empirical and modeling work using the Forest Inventory and Analysis database
- Experience managing, standardizing, synthesizing, analyzing, and visualizing large forest resource data using R, Python, and/or GIS software
- Knowledge of hardwood systems, including management practices, current markets, stand dynamics, environmental change pressures, and disturbance regimes
- Experience building and applying forest sector economic models at regional scales to project the impact of socioeconomic developments, environmental change, and technological/management interventions on future harvest patterns and stand dynamics
- Experience building and applying economic optimization models in GAMS
- Experience modeling of niche markets for hardwood products for both large and small roundwood, along with an understanding of current market issues in the region
- Excellent oral and written communication skills

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- Experience as lead author of peer-reviewed publications
- Can perform independently or as part of an interdisciplinary research team

Point of Contact Justina

Eligibility Requirements

- **Degree:** Doctoral Degree received within the last 60 months or anticipated to be received by 8/31/2025 12:00:00 AM.
- **Discipline(s):**
  - **Environmental and Marine Sciences** (3 👁)
  - **Social and Behavioral Sciences** (2 👁)
- **Veteran Status:** Veterans Preference, degree received within the last 120 month(s).