

Opportunity Title: USDA-ARS Cotton Fiber Processing and Characterization
Postdoctoral Research Opportunity
Opportunity Reference Code: USDA-ARS-SEA-2026-0322

Organization U.S. Department of Agriculture (USDA)

Reference Code USDA-ARS-SEA-2026-0322

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
- A copy of an abstract or reprint of an article

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

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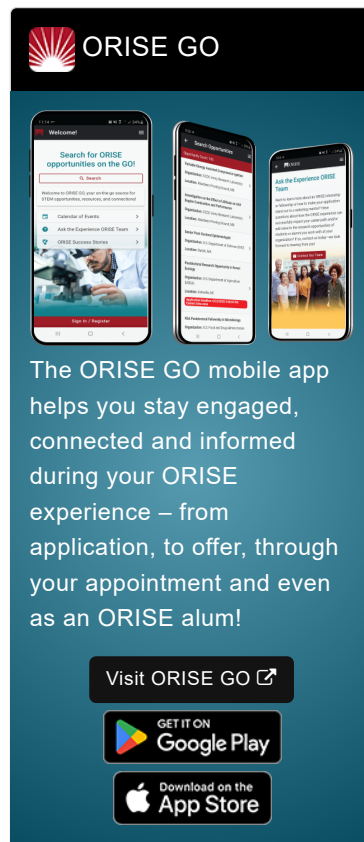
Application Deadline 10/23/2026 3:00:00 PM Eastern Time Zone

Description ***Applications are reviewed on a rolling-basis.**

ARS Office/Lab and Location: A research opportunity is currently available with the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), located in New Orleans, Louisiana.

The Agricultural Research Service (ARS) is the U.S. Department of Agriculture's chief scientific in-house research agency with a mission to find solutions to agricultural problems that affect Americans every day from field to table. ARS will deliver cutting-edge, scientific tools and innovative solutions for American farmers, producers, industry, and communities to support the nourishment and well-being of all people; sustain our nation's agroecosystems and natural resources; and ensure the economic competitiveness and excellence of our agriculture. The vision of the agency is to provide global leadership in agricultural discoveries through scientific excellence.

Research Project: Under the guidance of experienced mentors, you will participate in an educational research opportunity focused on advancing the understanding of cotton fiber characteristics that influence dye uptake and color consistency in fabrics. Activities will include examining fiber properties such as crystallinity, pore size distribution, fiber surface content, and metal ion composition, as well as conducting laboratory-scale dye uptake trials with selected reactive dyes. Dye uptake is a critical aspect of textile coloration because it affects color uniformity, shade consistency, and



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the appearance of defects such as barré—key factors in product quality and consumer satisfaction.

You will also apply statistical and machine-learning tools to explore how physical and chemical fiber parameters relate to dye uptake behavior, dyebath exhaustion, color strength, and dye fixation. These tools may help identify which traits are most influential and whether some of them may be linked to underlying plant genetics, supporting broader efforts to understand how cotton fiber structure affects coloration.

You will engage with a multidisciplinary team spanning chemistry, plant science, textile technology, engineering, and data science. This team is dedicated to improving methods for evaluating cotton fiber quality and identifying characteristics that promote reliable, predictable dye uptake. Through this experience, you will gain hands-on exposure to analytical instrumentation, quantitative analysis, and modern modeling approaches that help connect fiber properties to fabric performance.

Learning Objectives: Under the guidance of a mentor, you will:

- Develop an understanding of cotton fiber characteristics that influence dye uptake and color consistency.
- Learn how to analyze fiber properties such as crystallinity, pore size distribution, surface content, and metal ion composition.
- Understand how to conduct laboratory-scale dye uptake experiments using selected reactive dyes.
- Learn how to evaluate how dye uptake affects color uniformity, shade consistency, and defect formation (e.g., barré).
- Gain experience applying statistical and machine-learning tools to identify relationships between fiber properties and dyeing outcomes such as dyebath exhaustion, color strength, and dye fixation.
- Understand how to determine which fiber traits most strongly influence dye behavior and explore potential links to plant genetics.
- Understand how to engage effectively within a multidisciplinary team spanning chemistry, plant science, textile technology, engineering, and data science.
- Gain hands-on experience with analytical instrumentation and quantitative measurement techniques used in fiber characterization.
- Learn and apply modern modeling approaches for connecting fiber structure to fabric performance.
- Strengthen skills in interpreting research data to support improvements in cotton fiber quality evaluation and prediction of dye uptake reliability.

Mentor(s): The mentor for this opportunity is Michael Santiago (michael.santiago@usda.gov). If you have questions about the nature of the research, please contact the mentor(s).

Anticipated Appointment Start Date: November 2026. Start date is flexible and will depend on a variety of factors.

Appointment Length: The appointment will initially be for one year, but

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may be renewed upon recommendation of ARS 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.

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

Qualifications The qualified candidate should be currently pursuing or have received a doctoral degree in the one of the relevant fields.

Preferred Skills:

- Strong foundation in chemistry, materials science, textile science, or a related field, with interest in how fiber structure affects coloration and fabric performance.
- Familiarity with analytical methods, such as spectroscopy (FT-IR, NIR, UV-Vis), microscopy, or X-ray-based techniques, with willingness to learn cotton-specific applications.
- Ability to interpret physical or chemical property data, including crystallinity, pore-related behavior, surface composition, or other fiber traits relevant to dye uptake.
- Comfort performing systematic dye trials, including preparing dye baths, monitoring dye uptake, and evaluating color responses.
- Beginning or intermediate experience with statistical modeling or machine-learning methods, especially for exploring multivariable relationships or building predictive models.
- Strong written and verbal communication skills, including interpreting results, preparing figures, and presenting findings to interdisciplinary collaborators.

Stipend \$71,678.04 – \$74,678.04 Yearly

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Point of Contact [Sara Beth](#)

- Eligibility**
- Requirements**
- **Citizenship:** U.S. Citizen Only
 - **Degree:** Doctoral Degree.
 - **Discipline(s):**
 - **Chemistry and Materials Sciences** ([6](#) )
 - **Computer, Information, and Data Sciences** ([1](#) )
 - **Engineering** ([7](#) )
 - **Environmental and Marine Sciences** ([1](#) )
 - **Life Health and Medical Sciences** ([6](#) )
 - **Science & Engineering-related** ([1](#) )