Opportunity Title: Postdoctoral Research Opportunity in Uses of Byproducts from Agricultural Waste Streams
Opportunity Reference Code: USDA-ARS-2019-0036

Organization U.S. Department of Agriculture (USDA)

Reference Code USDA-ARS-2019-0036

How to Apply A complete application consists of:

- An application
- Transcripts – 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 USDA-ARS@orau.org. Please include the reference code for this opportunity in your email.

Application Deadline 6/5/2019 3:00:00 PM Eastern Time Zone

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

A research opportunity is available with the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), Coastal Plains Soil, Water and Plant Research Center located in Florence, South Carolina.

The mentor for this opportunity, Dr. Novak, is a Soil Scientist at the center and has a research program geared to develop beneficial uses of byproducts from agricultural waste streams. Animal manures and waste effluents represent some of these waste streams. At the laboratory, thermal carbonization processes have been developed to produce biochars from various feedstocks. Our research has shown that biochars can be used as amendments in agricultural soils for soil health improvement and in mine waste reclamation for improved phytostability. Additionally, our research has shown that biochars can be activated using chemical methods to enhance their phosphorus (P) binding potentials. Thus, these activated biochars have potential uses as amendments to sequester P and as a sorbent phase to bind P in waste streams (manure effluent or storm water runoff). Under the guidance of a mentor, the selected candidate will conduct research in a professional environment to collect poultry litter feedstocks, create/develop/refine methods to chemically activate biochars, characterize their P binding potential and ability to sequester P in soils/waste streams. The participant will learn how to use a battery of tests to characterize the surface chemistry of biochars including advanced spectroscopic instrumentation to elucidate P binding mechanisms. Additionally, the participant will have the opportunity to interpret scientific results, compose manuscripts for submission to peer-reviewed scientific journals, and make presentations at scientific meetings.

The opportunity consists of both greenhouse and laboratory experiments with a project goal to develop methods to produce activated poultry litter biochar for enhanced phosphorus (P) binding soils and waste streams and to determine its ability to serve as a slow release fertilizer. In this research, the participant will develop methods to modify the surface chemistry of biochars using various reagents, characterize their surfaces using advanced spectroscopic techniques (e.g., SEM, FTIR, etc.) and to perform laboratory phosphorus sorption/desorption experiments. Additionally, the selected candidate will participate in collection of phosphorus enriched field soil and animal waste effluent samples and will conceive plant-greenhouse experiments to determine if bound phosphorus can serve as a slow release fertilizer.

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The participant will be able to travel to travel to regions of the continental United States to collect soil and feedstocks, develop working relationships with colleagues for professional development involving spectroscopic methods to characterize biochars. Additionally, the participant will have the opportunity to interface with associate colleagues/employees to produce biochars and conduct laboratory and greenhouse studies.

Anticipated Appointment Start Date: September 3, 2019

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. The initial appointment is for one year, but may be renewed upon recommendation of ARS and is contingent on the availability of funds. The participant will receive a monthly stipend of $5,186. No relocation allowance will be provided. Proof of health insurance is required for participation in this program. The appointment is full-time at ARS in the Florence, South Carolina, area. Participants do not become employees of USDA, ARS, DOE or the program administrator, and there are no employment-related benefits.

This opportunity is available to U.S. citizens only.

For more information about the ARS Research Participation Program, please visit the **Program Website**.

Qualifications

The qualified candidate should have received a doctoral degree in one of the relevant fields, or be currently pursuing the degree and will reach completion by September 3, 2019.

Preferred skills/experience:

- Analytical skills to prepare solutions and chemicals for activating feedstocks
- Skills to produce biochars using pyrolysis techniques
- Ability to use advanced analytical instruments (FTIR, SEM, EDX, etc.) and interpret results
- Experience to conduct and interpret phosphorus sorption/desorption isotherms
- Experience to compose and publish manuscripts in peer-reviewed scientific journals and make presentations at meetings
- Ability to conduct research in a professional setting with other scientists
- General understanding of basic soil science principals and plant nutritional requirements

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Doctoral Degree.
- **Discipline(s):**
  - **Chemistry and Materials Sciences** (5 👁)
  - **Communications and Graphics Design** (1 👁)
  - **Computer, Information, and Data Sciences** (2 👁)
  - **Earth and Geosciences** (2 👁)
  - **Engineering** (3 👁)
  - **Environmental and Marine Sciences** (3 👁)
  - **Life Health and Medical Sciences** (3 👁)
  - **Mathematics and Statistics** (2 👁)
  - **Physics** (1 👁)

Affirmation

I have received a doctoral degree, or am currently pursuing the degree and will reach completion by September 3, 2019.

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