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Opportunity Title: USDA-ARS Postdoctoral Fellowship in Bioinformatics/Statistics
Opportunity Reference Code: USDA-ARS-2022-0018

Organization U.S. Department of Agriculture (USDA)

Reference Code USDA-ARS-2022-0018

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

Application Deadline 4/29/2022 3:00:00 PM Eastern Time Zone

Description ***Applications may be reviewed on a rolling-basis and this posting could close before the deadline.**

ARS Office/Lab and Location: A postdoctoral fellowship in bioinformatics/statistics is currently available with the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), Southern Regional Research Center located in New Orleans, Louisiana.

Research Project: Food allergy costs the US $25 billion a year, is the primary cause of FDA food recalls and creates significant market barrier/challenges for farmers, the food industry and regulators. The only way to definitively diagnose a food allergy, is by feeding someone the food in a clinical setting. The promiscuousness of the allergen binding antibodies that mediate the symptoms of food allergy result in misdiagnosis and improper treatment when in vitro tests are used. The purpose of the project is to identify diagnostic peptide-biomarkers for peanut/tree nut allergy and 2) create a searchable database that will allow us to develop better treatment, diagnosis, and therapeutics.

The participant will use bioinformatics to analyze a big data microarray project. The data is derived from screening of microarray bound peptides with human antibodies from peanut and tree nut allergic individuals to identify binding sites. More specifically, our group has data from 750 patients recording the IgE and IgG4 binding to 112 intact allergens and 2000 allergen peptides from 40 major peanut and tree nut allergens. The postdoc on the project will be trained to make antibody binding and de-identified patient data available through Google Big Query. The regularized logistic regression models to predict allergies from peptide binding arrays have been developed. This project will improve on this by developing new models that use information about the structure of the allergen. Specifically, the software Deepchem will be used to identify binding pockets from allergens with 3D structures. The epitope arrays data will then be converted to binding pocket features, and regularized feed-forward neural networks will be trained to predict allergy status.

Learning Objectives: Food allergy is a unique disease in that it effects every industry from farming, to the food industry, pharmaceutical industry,

regulatory agencies, healthcare industry, and consumers. The postdoctoral fellow will learn about the biochemistry and immunology and the global expansion of food allergy. They will also learn about the possibility of endless opportunities emerging for bioinformatics and data science in the field of allergy/immunology in solving problems in diagnostics, treatments, therapeutics that can revolutionize the field. The postdoc will be trained in critical thinking, collaborating with data scientists, immunologists and the pharmaceutical industry.

Mentor(s): The mentor for this opportunity is Soheila Maleki (soheila.maleki@usda.gov). If you have questions about the nature of the research please contact one of the mentors.

Anticipated Appointment Start Date: As soon as a qualified candidate is identified. 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 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 and Lawful Permanent Residents (LPR) 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 USDA-ARS@orau.org and include the reference code for this opportunity.

Qualifications

The qualified candidate should have received a doctoral degree in one of the relevant fields.

Candidates must be familiar enough with computer data sciences to learn and understand machine learning and R programming and application.

Eligibility Requirements

- **Citizenship:** LPR or U.S. Citizen
- **Degree:** Doctoral Degree.
- **Discipline(s):**
  - **Computer, Information, and Data Sciences** (2 👁)
  - **Engineering** (1 👁)
  - **Life Health and Medical Sciences** (3 👁)
  - **Mathematics and Statistics** (1 👁)