

Opportunity Title: USDA-ARS SCINet AI Machine Learning in Maize Genomics

Postdoctoral Fellowship

Opportunity Reference Code: USDA-ARS-2022-0158

Organization U.S. Department of Agriculture (USDA)

Reference Code USDA-ARS-2022-0158

How to Apply

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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.

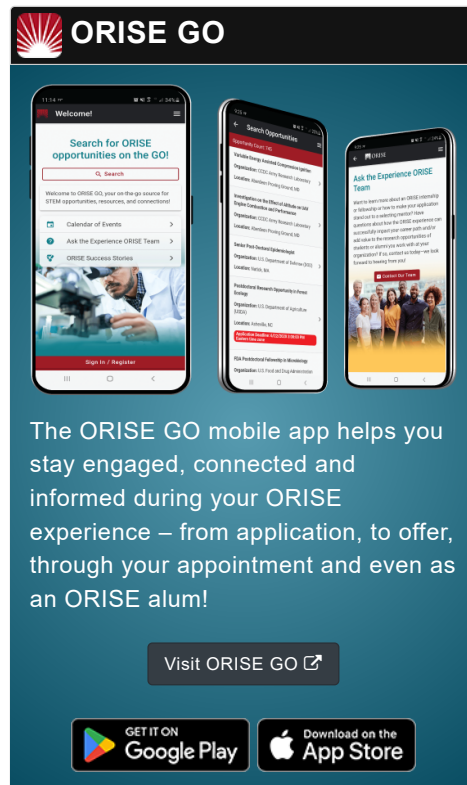
Application Deadline 6/29/2023 3:00:00 PM Eastern Time Zone

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

ARS Office/Lab and Location: A postdoctoral research opportunity is available in the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), with the Corn Insects and Crop Genetics Research Unit located in Ames, Iowa.

Research Project: The U.S. Department of Agriculture - Agricultural Research Service (USDA ARS) mission involves problem-solving research in the widely diverse food and agricultural areas encompassing plant production and protection; animal production and protection; natural resources and sustainable agricultural systems; and nutrition; food safety; and quality. The programs are conducted in 46 of the 50 States, Puerto Rico, and the U.S. Virgin Islands. For ARS to maintain its standing as a premier scientific organization, major investments in computing, networking, and storage infrastructure are required. Training in data and information management are integral to the integrity, security, and accessibility of research findings, results, and outcomes within the ARS research enterprise. Nearly 2000 scientists and support staff conduct research within the ARS research enterprise.

The SCINet/Big Data Research Participation Program of the USDA ARS offers research opportunities to motivated postdoctoral fellows interested in collaborating on agricultural-related problems at a range of spatial and temporal scales, from



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the genome to the continent, and sub-daily to evolutionary time scales. One of the goals of the SCINet Initiative is to develop and apply new technologies, including AI and machine learning, to help solve complex agricultural problems that also depend on collaboration across scientific disciplines and geographic locations. In addition, many of these technologies rely on the synthesis, integration, and analysis of large, diverse datasets that benefit from high performance computing clusters (HPC). The objective of this fellowship is to facilitate cross-disciplinary, cross-location research through collaborative research on problems of interest to each applicant and amenable to or required by the HPC environment. Training will be provided in specific AI, machine learning, deep learning, and statistical software needed for a fellow to use the HPC to analyze large datasets.

This research opportunity will be part of the MaizeGDB (<https://www.maizegdb.org>) ARS research project. Under the guidance of a mentor and in collaboration with scientists and support staff, the participant will have the opportunity to gain experience and learn about the challenges of using machine learning approaches to gain structural and functional insights into genes at a pan-genome level, including identifying genes associated with climate adaptability, using predicted protein structures to assess gene annotation quality, predicting trait-based protein-protein interaction and regulatory networks, and explore the genomes of wild progenitors or closely related species to identify novel target genes.

Learning Objectives: The participant will learn HPC computing technologies and will help develop and co-lead ARS-wide workshops, resulting in a community of scientific practice on the relationships between protein structure, function, and phenotype, recent advances in machine learning and their application in agricultural research, and pan-genomic applications of machine learning. The participant will have the opportunity to collaborate with multiple USDA ARS scientists on using machine learning approaches and comparative genomic approaches with the maize genome and to write scientific papers applying these approaches to improve climate adaptability in crops.

USDA-ARS Contact: If you have questions about the nature of the research, please contact Carson Andorf (carson.andorf@usda.gov).

Anticipated Appointment Start Date: Spring - Summer 2022. 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 the mentor and ARS, and is contingent on the availability of funds.

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Level of Participation: The appointment is full-time.

Participant Stipend: The participant(s) will receive a monthly stipend commensurate with educational level and experience.

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.

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](#). If you have additional questions about the application process please email ORISE.ARS.SCINet@ornl.gov and include the reference code for this opportunity.

Qualifications The qualified candidate should have received or be pursuing a doctoral degree with anticipated completion by August 31, 2022 in one of the relevant fields (e.g. Bioinformatics, Computational Biology, Computer Science, Biology, Genetics, Genomics).

Preferred skills:

- Experience in machine learning and artificial intelligence
- Experience in computer science, bioinformatics or computational biology
- Experience with working with genetics and genomic data
- Experience working with large, diverse datasets and data mining approaches
- Proficiency in Linux and computational programming
- Strong computational and analytical skills
- Strong oral and written communication skills

Eligibility Requirements

- **Degree:** Doctoral Degree received within the last 60 months or anticipated to be received by 6/30/2023 12:00:00 AM.
- **Discipline(s):**
 - **Computer, Information, and Data Sciences** (6 )
 - **Engineering** (1 )
 - **Life Health and Medical Sciences** (14 )
 - **Mathematics and Statistics** (2 )

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