**Opportunity Title:** USDA-ARS Postdoctoral Fellowship in Agricultural Systems & Climate Change
**Opportunity Reference Code:** USDA-ARS-2022-0207

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| **Organization** | U.S. Department of Agriculture (USDA) |
| **Reference Code** | USDA-ARS-2022-0207 |
| **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
- 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.

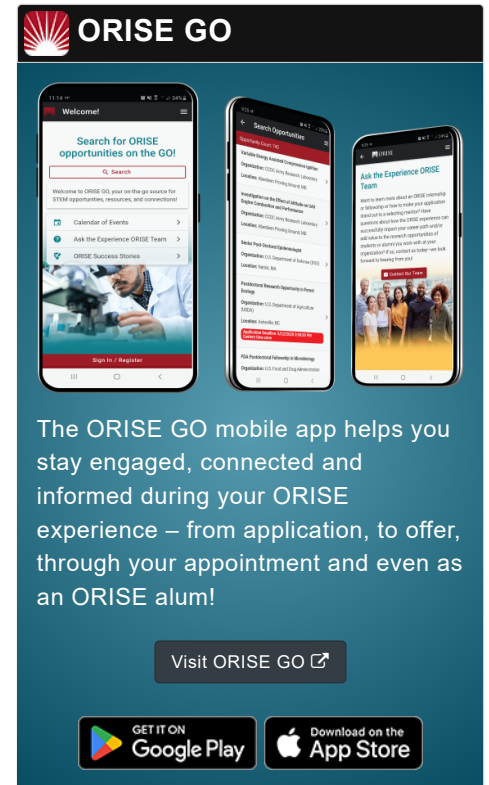| | |
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| **Application Deadline** | 12/15/2022 3:00:00 PM Eastern Time Zone |
| **Description** | **\*Applications are reviewed on a rolling-basis and this posting could close before the deadline.** |

**ARS Office/Lab and Location:** A research opportunity is available with the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), Beltsville Agricultural Research Center (BARC), Adaptive Cropping Systems Laboratory located in Beltsville, Maryland.

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 the agency is to provide global leadership in agricultural discoveries through scientific excellence.

**Research Project:** The Adaptive Cropping Systems Laboratory (ACSL) applies systems theory as well as basic and applied research to the complex problem of managing and adapting agricultural systems within a background of changing climate. The laboratory carries out research to: 1) assess and understand the responses of crops to changes in carbon dioxide, temperature, light and water; 2) improve nutrient use efficiency and food safety; and 3) develop safe and beneficial uses for agricultural and industrial byproducts. Scientists in ACSL are successfully developing models, databases, and expert systems to assess and identify the complex interactions of the changing environment on crop growth, and the environmental impacts of agriculture.

Given these ubiquitous responses there is a merited interest in

understanding the link between rising carbon dioxide and temperature and evaluating crop responses to climate change at physiological process level. Under the guidance of a mentor, the participant will be involved in the following research activities: (1) review and assessment of current information regarding the established links between $CO_2$/temperature, water and nutrition for cereals, with a focus on soybean, cotton, corn and rice; (2) Quantification of major physiological processes like photosynthesis, respiration, transpiration, growth and development under a range of environmental conditions; and (3) determining the potential basis for $CO_2$ induced changes in the nutritional components. This research is expected to provide a genetic and physiological basis in establishing the role of recent and projected carbon dioxide levels on qualitative and quantitative changes in various crops of importance to United States agriculture, and to link these changes to subsequent nutritional impacts.

The purpose of this project will be to develop databases of the responses of physiological processes of crop plants to climate change. Plants will be grown in the field or in temperature controlled outdoor environmental chambers. Responses of photosynthesis, dry matter accumulation and leaf area development to atmospheric carbon dioxide enrichment, air/soil temperature and moisture availability will be determined and will be used to develop or improve mathematical equations incorporated into specific crop simulation models for a given crop species. Genotypic variation among crop species will also be evaluated with respect to various climate change variables and these findings will be used to develop specific phenotypic, molecular and biochemical markers for improved plant growth and yield.

### <u>Learning Objectives</u>:

- Will provide training on use of equipment to measure various plant physiological process like photosynthesis, respiration, transpiration
- Training in the use of sunlit Soil Plant Atmosphere Research chambers to evaluate crop responses to climate change variables like changes in $CO_2$, temperature, drought, and their interactive effects on plant physiological processes.
- Development and use of mechanistic, process level crop and soil simulation models to evaluate future climate change impacts on productivity of major crops of interest to U.S. Agriculture.

<u>**Mentor(s)**</u>: The mentor for this opportunity is V.R. Reddy (vangimalla.reddy@usda.gov). If you have questions about the nature of the research please contact the mentor(s).

<u>**Anticipated Appointment Start Date**</u>: **2022.** Start date is flexible and will depend on a variety of factors.

<u>**Appointment Length:**</u> 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, 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. 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.

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| **Qualifications** | The qualified candidate should have received a doctoral degree in one of the relevant fields, with special emphasis on plant physiology, studies on the impact of various abiotic stresses (such as heat, drought, salinity stress etc.), and other environmental variables affecting photosynthesis and crop yield. The candidate should have publications in peer reviewed journals. |

Preferred skills:

- Ability to measure various plant physiological process like photosynthesis, respiration, transpiration, growth, and developmental processes.
- Experience and capability to work with crops such as rice, corn, soybean, wheat, cotton etc.
- Ability to use various laboratory equipment like Licor (6400-XT, 6800), and other equipment to conduct research.
- Skills to use indoor growth chambers.

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| **Eligibility Requirements** | - **Degree:** Doctoral Degree.<br>- **Discipline(s):**<br>  - **Communications and Graphics Design** (2 👁)<br>  - **Engineering** (1 👁)<br>  - **Life Health and Medical Sciences** (9 👁) |