RESEARCH EXPERIENCE FOR TEACHERS PROGRAM

During this 7-week full-time, research experience, teachers work with a faculty member on an authentic research project and receive professional development virtually by the Penn State Center for Science and the Schools (CSATS) to help translate the experience to the classroom. Teachers will conduct their research either in-person or virtually based on the research placement and the teacher’s location. There are a variety of placements to choose from, but teachers will be placed based on their areas of interest and courses taught.

PROGRAM ELIGIBILITY

- Must be a secondary STEM teacher with at least 3 years of full-time teaching experience
- Must commit to implementing a classroom research project during 2023 - 2024 school year

PROGRAM BENEFITS

Stipends
$6000 stipend for summer research and developing a classroom research project to implement during the academic year
$1500 stipend for implementing the classroom research project with students during the academic year

Conference presentation
Option to present at M.J. Murdock Partners in Science Conference in San Diego, CA, January 2024 (limited travel stipend provided)

Graduate course credit
Opportunity to earn up to 3 graduate credits through Penn State (SCIED 597) - email Tiffany, tzs80@psu.edu for more info!
**Agricultural and Energy Engineering**

*Note: This placement is being offered in-person at University Park or virtually.* Consortium for Cultivating Human And Naturally regenerative Enterprises (C-CHANGE) seeks to optimize the production of renewable natural gas and its byproducts through anaerobic digestion of herbaceous biomass and manure on farms in the upper Midwest and mid-Atlantic regions. *Note: This placement will be conducted virtually with potential for in-person work.*

The summer 2023 placement funded by C-CHANGE will be conducted with Armen Kermanian at Penn State University. The teacher placed in this RET will be engaged in modeling agricultural systems. Models are used to predict realistic systems. Using computer programming language (code), models represent a system in-silico to help researchers gain a deeper understanding of the system without the monumental cost of experiments, thus helping researchers understand what experiment matters. A teacher in our lab will learn to use specific aspects of our simulation models, *Cycles,* a model of the soil-crop-atmosphere system to study how nitrogen nutrition affects plant growth and yield, and nitrogen pollution.

**Biomedical Engineering**

*Note: This placement is being offered in-person at University Park or virtually.* This placement, funded by the National Science Foundation, will allow a secondary STEM teacher to engage in a research experience with Dr. Meghan Vidt, Assistant Professor of Biomedical Engineering and Physical Medicine and Rehabilitation at Penn State University. Building on fundamentals of physics and anatomy, this project will focus on using a computational model understand how the effects of musculoskeletal injury and how treatment can improve function. The primary goal of this Research Experience for Teachers project is to highlight the intersectionality of STEM fields through a research project that will be co-designed as a unit of study to enhance his/her current curriculum.

**Electrical Engineering**

*Note: This placement is being offered in-person at University Park or virtually.* This placement, funded by the National Science Foundation, engages a secondary STEM teacher in a research experience with Dr. Minghui Zhu, Associate Professor of Electrical Engineering at Penn State, University Park. The project aims to use Control Theory and Artificial Intelligence to control autonomous mobile robots, e.g., drones (ex. forest monitoring) and self-driving cars (ex. navigation in an urban area), in photorealistic simulators. The primary goal of this Research Experience for Teachers program is to use this research to co-design a unit of study to enhance his/her current curriculum.

**Bioinformatics**

*Note: This placement is preferred to be in-person at University Park, but could be offered virtually.* The Mahony lab studies how transcription factors and other regulatory proteins control the various cell types that make up our bodies. The RET will participate in a project that aims to understand how the regulatory “circuity” in liver cells has evolved to allow different animals to adapt to different diets. The RET will examine how liver regulatory circuity evolves between species, what genes they regulate on the genome, and what dietary adaptions they might be associated with. No prior bioinformatics or computer programming experience will be required for this RET; the participating teacher will be trained to perform bioinformatics analyses using online tools.

**Meteorology**

*Note: This placement is being offered in-person at University Park or virtually.* This project aims to better understand and document the daytime evolution of the planetary boundary layer - the lowest layer of the atmosphere that is in contact with the Earth’s surface and varies in depth from a few tens of meters at night to a few km during the day. This important atmospheric layer will be observed using data from National Weather Service dual-polarization radars and from small weather balloons launched from Penn State. Teachers will assist in data collection and data processing.