



BRIDGING RESEARCH & EDUCATION IN STEM

OVERVIEW OF PROGRAMS

The Penn State Center for Science and the Schools (CSATS) programs are developed, implemented, and evaluated as broader impacts or outreach components of research grants. Depending on funding and length of time of the research grant, we can include multiple programs and design other supportive activities to maximize impact.

i-STEAM Workshops

The i-STEAM workshops are one to two-day workshops offered during the academic year for K-12 teachers. We engage teachers in inquiry-based activities designed to integrate multiple disciplines, including science, technology, engineering, arts, and math. CSATS offers follow-up support to teachers who elect to incorporate the workshop activities in their classrooms.

Summer One-Week Workshops

One-week workshops are developed in collaboration with STEM researchers. These summer programs aim to build teachers' understanding of ongoing research projects. Workshop activities are designed to engage teachers in current research practices within STEM disciplines in ways that are accessible to K-12 students. After the workshop, CSATS offers follow-up support to teachers who elect to incorporate these activities in their classrooms.

CSATS Fellows: Research Experience for Teachers (RET) Program

7-week immersion experiences that actively involve teachers in authentic research projects alongside university and industry scientists and engineers during the summer. CSATS provides professional development to assist teachers in integrating related research projects in their classrooms. The CSATS fellows participate in the Penn State RET/REU Symposium. CSATS provides academic-year support to teachers as they engage K-12 students in research projects.

Student Opportunities: Young Scholars Program

Offered to rising high school juniors and seniors, our Young Scholar Program is a 7-week immersion research experience with STEM researchers to support precollege students' interest and understanding in STEM and STEM career pathways.



For more information, please visit
CSATS.PSU.EDU/OVERVIEW-OF-CSATS-PROGRAMS

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HIGHLIGHTS OF CSATS BROADER IMPACTS

i-STEAM Workshop: Power in the Wind to KIDWind Challenge for 4th-12th Grade Students

- **RESEARCHER: Susan Stewart, Ph.D.**, Assistant Professor and Research Associate in Aerospace Engineering
- **IMPACT: 25 teachers** in 2016
 - >> The development of renewable and reliable energy resources is important for our society. To locate and select turbines for future wind farms, it is essential to examine factors for obtaining maximum wind power. Teachers dived into the science of wind, calculated wind energy performance from wind measurements, and ran energy economics -all part of a wind project competition that can be implemented in the classroom.

Summer Workshop: Northeast Woody/Warm Season Biomass Consortium (NEWBio)

- **RESEARCHER: Tom L. Richard, Ph.D.**, Professor of Agricultural and Biological Engineering and Director of Penn State's Institute for Energy and the Environment
- **IMPACT: 52 teachers** from 2012–2017
 - >> Renewable Energy alternatives are vital for the health of our planet, and the NEWBio Project, funded by the USDA, has helped us learn more about how to best realize this vision. Teachers from across the nation participated in week-long summer workshops to tie renewable energy research to the classroom working with agriculture engineering researchers and graduate students, the Rock Springs Institute at Penn State, Morning Star Solar Home with the Sustainability Institute and much more.

Summer Workshop: Medium Extended Range Forecasting

- **RESEARCHERS: Steven Fieldstein, Ph.D.**, Professor of Meteorology, and Sukyoung Lee, Ph.D., Professor of Meteorology
- **IMPACT: 10 teachers** in 2015
 - >> In collaboration with meteorology researchers on climate and large-scale dynamics, teachers experienced the complexity of forecasting 2-4 weeks in advance and how to improve these forecasts. The workshop entailed diagnostic and modeling strategies utilized by researchers, relationships between probabilistic weather forecast and climate change, data sites utilized by researchers and how to use them in their classrooms, and interdisciplinary and multidisciplinary aspects of meteorology. Two teachers also continued the forecasting research by developing classroom research projects based on modeling medium range forecasting with other STEM faculty in their schools and students had the opportunity to interact with the meteorology researchers during their investigations.

CSATS Fellows: Research Experience for Teachers (RETs) Program

- **RESEARCHER HIGHLIGHTS:**
 - Susan Troiler McKinstry, Ph.D.**, Professor of Materials Science and Engineering and Electrical Engineering, Director of W.M. Keck Smart Materials Integration Laboratory and Director of Nanofabrication Facility
 - Sukyoung Lee, Ph.D.**, Professor of Meteorology
 - Melissa Rolls, Ph.D.**, Associate Professor of Biochemistry and Molecular Biology
 - Ramakhrisnan Rajagopalan, Ph.D.**, Assistant Professor of Engineering
- **IMPACT: 33 teachers** from 2010-2017
 - >> CSATS Summer Research Experiences for STEM Teachers actively involve K-12 science, technology, engineering, and math educators working alongside university or industry scientists and engineers on cutting-edge research for a six-week summer research experience and integrating related research projects into their classrooms, schools and districts.

To visit our CSATS Fellow alumni, please visit CSATS.PSU.EDU/ALUMNI/RET-ALUMNI



To request a meeting, contact Kathy Hill, CSATS Director, at kathyhill@psu.edu or visit CSATS.PSU.EDU/RESEARCHERS/SUPPORTING-STEM-RESEARCH