



### **Who we are:**

Center for Science and the Schools (CSATS) builds and implements innovative STEM education programs on external grants and gifts. As former K-12 science educators, our team has a variety of backgrounds with individuals having advanced degrees in science, science education, and K-12 administration as well as experience in conducting STEM research and working in industry. CSATS works collaboratively with scientists and engineers at Penn State and in industries to design, develop, and implement many outreach programs and workshops for K-16 education. Operating since 2004, our experience in STEM education programs and strong collaborations with researchers have enabled us to build meaningful interdisciplinary programs. Ultimately, our programs seek to support teachers in preparing the future STEM workforce by providing learning experiences that engage students in the practices and thinking used by scientists and engineers.

### **Goals:**

Current teaching standards in STEM require teachers to incorporate the practices and 21<sup>st</sup> century thinking skills of STEM research into their teaching. CSATS works collaboratively with scientists and engineers at Penn State and in industries to design, develop, and implement many outreach programs and workshops for K-16 education. These programs promote teachers' abilities to prepare the future STEM workforce by providing learning experiences that engage students in the practices and thinking used by scientists and engineers.

### **Programs and Resources for K-12 Educators:**

- **i-STEAM Workshops** – During the academic year, CSATS works with Penn State STEM researchers to offer one-day workshops for teachers. The i-STEAM workshops 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. To meet the increasing demand, we are seeking support to allow for additional i-STEAM Workshops during the year.
- **Week-Long Summer Workshops for STEM Teachers** – In collaboration with Penn State STEM researchers, CSATS faculty and staff develop week-long summer workshops that 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 Summer Research Experiences for Teachers (Industry and Academic Placements)** - Research Experiences for Teachers (RET) Program provides 7-week immersion research experiences to teachers in academic and industry placements during the summer and builds their capacity to develop and implement classroom research projects. CSATS provides follow-up support to teachers during the academic year as they engage K-12 students in research projects. We are looking to grow and expand this program to provide teachers with research experiences in various settings and support in developing learning experiences for K-12 students relevant to STEM industries in their own backyard.
- **CSATS, CIU #10, and BLaST IU#17 STEM Collaborative** – The STEM Collaborative is a partnership to build school districts' capacities for developing and implementing Next Generation Science Standards (NGSS) and integrated STEM approaches in curriculum K-12. Through a multi-year initiative, CSATS will support each participating district in developing a pilot STEM project with a citizen science approach. We are currently in the first year of this program. Based on the characteristics of each district, such as the needs, current initiatives, conditions,

culture and climate, we will provide tailored professional development and resources in future years to implement and expand STEM integration across participating districts.

- **CSATS Curriculum Center** – The CSATS Curriculum Center houses over 2,000 titles of commercial and noncommercial materials for teaching K-16 science, in addition to National Academies Press titles on a wide variety of research based topics related to science education and school reform. CSATS offers curricular materials for teachers to use in their classrooms through CSATS Blue Boxes, individual suitcases containing a classroom set of materials for implementing inquiry-based activities from CSATS workshops with their students. We are currently working to expand the dissemination of workshop activities through online modules.

#### **Programs for K-12 Students:**

- **Young Scholars in STEM** – CSATS provides a limited number of paid summer research experiences to rising high school juniors and seniors with STEM researchers at Penn State through federal grant funding. We have observed the positive impact of our teacher professional development programs through precollege students' increased interest in STEM. To support this interest, we want to make these STEM research opportunities available to more students.
- **The KidWind Challenge** – With Penn State Aerospace Engineering, CSATS facilitates the KidWind Challenge in PA – the ultimate wind energy experience for students that teaches physics, engineering, environmental science, and policy as teams work to build a device that converts moving wind into electricity. CSATS holds workshops designed to prepare teachers to coach student teams for the KidWind challenge.

#### **CSATS Impact:**

As of 2016, Center for Science and the Schools has worked with over 150 scientists and engineers across all six Penn State STEM Colleges and with four Pennsylvania industries on education outreach projects impacting over 1,300 teachers across 137 school districts in 17 states. Our programs also increase the capacity of Penn State faculty and graduate students to effectively develop outreach programs and communicate with non-technical audiences. In addition, CSATS facilitates critical relationships between K-12 schools, districts, intermediate units, institutes of higher education, and industries needed to make relevant improvements to STEM education.