

ITEEA's STEM Center for Teaching and Learning Research on Teaching and Learning

The International Technology and Engineering Educators Association's STEM Center for Teaching and Learning™ (STEM CTL™) is engaged in validating the *Technology and Engineering* of STEM through research that focuses on integrative STEM education and data-driven discovery.

Research Focus

The research expertise of the STEM CTL™ in technology/engineering and integrative STEM education draws on decades of experience in national and international surveys, systemwide testing and monitoring, and assessment and reporting. The research focus of the STEM CTL™ seeks to inform STEM educational policy and practice, including research into teacher education, curriculum development, professional development and student achievement.

The research conducted by the STEM CTL™ engages with contemporary challenges of professional practice in integrative STEM education from early childhood to high school. Educational activities are studied within the structures and practices of policies, educational and learning environments.

Partnerships

The aim of partnerships is to provide data-driven evidence of integrative STEM learning for all students. Partnerships with higher education institutions have resulted in several research projects where ITEEA's STEM CTL™ personnel serve as the Co-PI or Expert Specialist.

- *Soft Robotics to Broaden the STEM Pipeline* is an NSF-funded project out of Purdue University which seeks to broaden the STEM pipeline out of Purdue University through the implementation of soft robot design experiences which improves engineering motivation and self-efficacy as compared to traditional robot design experiences. In the second year of the three-year grant, the *Soft Robotics* project seeks to develop a promising method of teaching Science, particularly the Next Generation Science High School Engineering and Technology Standard (NGSS) 1: *Engineering Design*. The proposed intervention is a replacement instructional unit on soft robotics that is exchanged for an existing unit of instruction on hard robotics in the *Foundations of Technology* course. The intervention is designed to maintain learning outcomes while increasing student motivation and engagement, particularly in females, in engineering design and STEM disciplines overall.
- *Engineering for All (EfA)* is a three-year study, led by Hofstra University, to determine feasibility of implementation of design-based, STEM-integrative engineering design-based materials in middle school technology education classrooms. The UN *Millennium Development Goals* and the NAE *Grand Challenges for Engineering* inspire development of curricula that prompt learners to seek solutions to human needs: potable water, sanitation and waste disposal, energy, sustainable transport, and regulated food production.

The STEM CTL™ welcomes opportunities for collaboration!

For more information about the research focus of the STEM CTL™, prospective partnerships, and potential projects, contact Dr. Anita Deck, Director of Innovation, Assessment, and Research, at adeck@iteea.org.