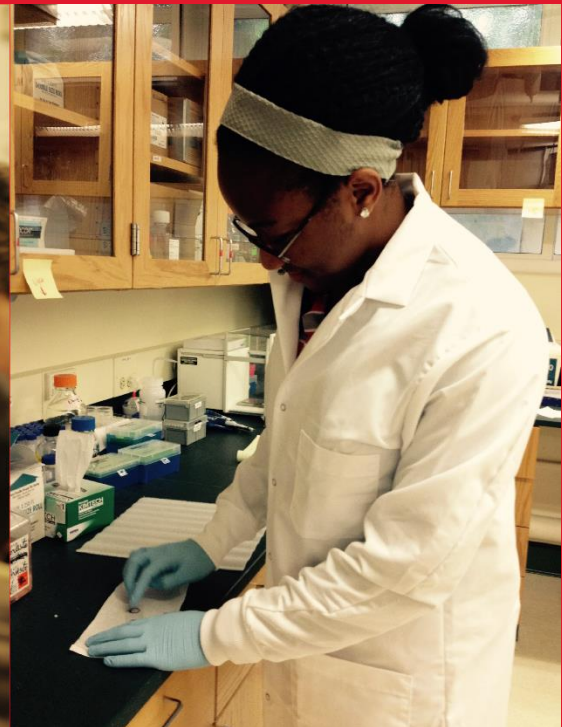




# Northeastern University Center for STEM Education

*Building a Legacy of STEM Engagement*



- ***Our Vision***
- *To build, support and sustain a community of individual, institutional and organizational support in STEM engagement, enrichment and persistence.*
- *To impact advancement in STEM education through expanded collaboration, mentoring and training to increase access and diversity in STEM.*
- *To increase student involvement with STEM subjects and careers by designing, implementing and supporting academic and extracurricular programs in STEM fields.*



## **MISSION**

*The Center for STEM Education at Northeastern University seeks to build and support a community of educators, researchers, and students with the collective goal of strengthening the K-20 STEM (Science, Technology, Engineering, and Mathematics) educational ecosystem.*

## BROADER IMPACT K-12 INITIATIVES

*The Center for STEM Education works in collaboration with 50+ faculty and 75+ undergraduate and graduate student affiliates annually to design and deliver multiple Broader Impact efforts. These initiatives reach a diverse audience of students, providing day-long and multi-week STEM program experiences in addition to supporting and sustaining long-term relationships with those impacted by these program efforts.*

**STEM Field Trips** are offered throughout the academic year for upper elementary and middle school students. Teachers bring their students to Northeastern's campus for a day of STEM lessons and activities. Assisted by our undergraduate and graduate students, these offerings provide an early college experience and engineering exploration. Approximately 1000 students annually spend a full day on our campus supported by undergraduate and graduate students. Teachers overwhelmingly indicated their satisfaction with the field trip series and 100% of surveyed teachers stated they would participate again.

**Building Bridges** is a bi-annual event for high school students, a full day of interactive engineering activities to help students understand the various engineering disciplines, led by College of Engineering faculty and students from each of the engineering departments. Topics covered have included Designing Earthquake Resistant Buildings, Polymeric Hydrogels to Improve Life Quality, and Computing Pi with Parallel Computing.

### Summer STEM Programs

We currently offer two summer programs for middle and high school students (in addition to summer programs for undergraduates and professionals - see REU, stEm PEER, and RET at right). We reach approximately 50 students annually through these initiatives and 1132 students to date have participated in one of our summer program offerings:

**Northeastern University Summer STEM Program (NUSSP)** is a two-week academic day program that takes an active role in shaping STEM education in students entering grades 6, 7 and 8. It seeks to improve students' mathematics/science skills, introduce them to college life, and stimulate their interest in science and engineering as potential career paths.

**Young Scholars Program (YSP)** offers future scientists and engineers a unique opportunity for a hands-on, six-week, paid research experience while still in high school. Students experience college life, conduct laboratory research, and explore career options via presentations, guest speakers, and industry visits. The program is open to Massachusetts residents in commuter distance that have completed their junior year.

### One Day Events

We offer additional one-day events to engage children and their families in STEM. Offerings include but are not limited to: Engineering for Everyone Expo, Harvest Fair, and the BPS Science and Engineering Fair. In addition, our student-run organization, STEMout, hosts STEM outreach activities at various Boston public libraries.

The center also helps run **Faculty Outreach Programs**, providing letters of collaboration, supporting curriculum design, managing paperwork, and recruiting participants. Programs we've helped with include but are not limited to the Genetics Afterschool Program (Henzy), Robotics Afterschool Program (Platt), and Paper Birds Competition (Ramezani).

## CURRENT AFFILIATED GRANT EFFORT

**Engineering PLUS** is an NSF-INCLUDES program that aims to build a system and a network to increase engineering degrees among women and BIPOC (Black, Indigenous, and Other People of Color) nationally. As part of this program, the Center for STEM Education leads the stEm PEER Academy, a 2-year professional development and research experience to support the design and implementation of capstone projects at the participants' home institutions.

**Student Pathways Opening World Energy Resources (S-POWER)** is a five year NSF S-STEM initiative (ends in 2023) that seeks to increase workforce diversity in STEM fields and the energy sector. The program has provided scholarships for 182 undergraduate and graduate students from Clark Atlanta University, Hampton University, Mass Bay, Middlesex and Northern Essex Community Colleges, including 47 students who transferred to Northeastern as part of this grant. This program was institutionalized by Northeastern in Fall 2021 and will support up to 10 new transfer students each year for the future. (NSF #1564653, PI: B. Lehman; Co-PI: C. Duggan, R. Harris, M. Minus).

**REU- (Research Experience for Undergraduates):** we currently support two REU programs, in which undergraduate students are paid to conduct research with professors across the College of Engineering over a 10-week summer experience. Students participate in two engineering design workshops: Solar Energy with Prof. Lehman and Arduino SMART Engineering with Prof. Love, and additional career exploration experiences including field trips and faculty research presentations.

**-PATHWAYS:** focuses on skill development to support long-term success of community college students, whether they join the workforce after their education or transfer to 4-year colleges to earn higher degrees and is a non-residential program exclusively for community college students, with a focus on AI/machine learning, and smart materials/infrastructure/health. (NSF #2150417, PI Ibrahim Zeid, Co-PI: C. Duggan)

**-POWER:** research is focused on topics pertaining to the National Academy of Engineering (NAE) Grand Energy Challenge and cover a broad range of subjects, such as making solar energy more economical or creating energy from fusion, with a particular focus on transcending the barriers and overcoming the challenges to providing ample clean energy to citizens throughout the world. (NSF #1757650, PI: Lehman; EV: C. Duggan)

### PAST PROGRAMS (<https://stem.northeastern.edu/programs/past/>)

**TRANSFORM** was a Northeastern University and MassBay Community College collaboration to design and implement an innovative TRANSFORM model to retool the skill set of liberal arts college graduates to prepare them for careers in manufacturing. (NSF #1407160, PI: I. Zeid; Co-PI: C. Duggan, S. Kamarthi)

**Research Experiences for Teachers (RET)** was an opportunity for Secondary STEM teachers and Community College faculty to engage in collaborative inquiry with mentor faculty at Northeastern University. (NSF #0742924, PI: M. Silevitch; Co-PI: C. Duggan). An NSF proposal to continue this grant was submitted Fall 2022.

# Northeastern University Center for STEM Education

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