



STEM

EDUCATION CENTER

WORCESTER POLYTECHNIC INSTITUTE



Licensure and Degree Programs
Professional Development
Research on Teaching and Learning

STEM

EDUCATION CENTER

Preparing and supporting educators in Science ♦ Technology ♦ Engineering ♦ Mathematics

WORCESTER POLYTECHNIC INSTITUTE has been a leading force for reinvigorating K–12 science, technology, engineering, and mathematics (STEM) for more than a decade. Now, the STEM Education Center at WPI takes this important work forward, offering specialty degree programs, professional development, and research that can be applied to improve how we teach and how children learn

EXPLORE THE AWARD-WINNING PROGRAMS AND
ENRICHMENT OPPORTUNITIES THAT WPI OFFERS
EDUCATORS AND ADMINISTRATORS.

LICENSURE AND DEGREE PROGRAMS

Graduate Programs in Mathematics for Educators

WPI proudly offers two options for educators looking to earn master's degrees. Both require students to take a majority of courses in mathematical content. These content courses help participants in either option expand their depth of mathematical knowledge and think about unique ways to apply this knowledge to the classroom. Both programs are a total of 30 credits.

The **Master of Mathematics for Educators** program (MME), established in 1976, is made up solely of content courses and a self-designed project that applies the content to the educator's classroom. Technology is regularly incorporated into courses to introduce participants to new ways of delivering materials to their students.

wpi.edu/+msstem

The **Master of Science in Mathematics for Educators** program (MMED) builds upon the content courses and applied project of the MME program. In addition to these two areas, which make up the majority of the degree, participants also take classes in assessment and evaluation theory to support them in rethinking how they assess and evaluate their classrooms in meaningful and efficient ways.



Graduate Program in Physics for Educators

The **Master of Science in Physics for Educators** program (MPED) brings together a focus on physics content courses with assessment and evaluation theory courses. The only program of its kind in the Central Massachusetts area, MPED is designed specifically for educators so they can enhance their knowledge of physics while finding

support in how they assess and evaluate their teaching outcomes in meaningful and efficient ways. Participants in the program also take part in a self-designed project to apply what they've learned directly to their classrooms.

wpi.edu/+msstem

Graduate Program in Learning Sciences and Technologies

The Learning Sciences and Technologies program at WPI attracts highly motivated graduate students interested in contributing to a challenge of national importance: understanding and improving the educational process, namely learning and assessment. Students will be part of small, interdisciplinary, and award-winning teams of faculty and student

researchers. Whether you are pursuing a master's or doctoral degree, you'll learn from leaders in learning sciences and educational data mining whose groundbreaking research is used in classrooms nationwide. Participants in this program can earn either an MS or a PhD.

wpi.edu/+lst



PROFESSIONAL DEVELOPMENT

ASSISTments

ASSISTments describes both a non-profit research project and a classroom tool that hundreds of U.S. teachers use every day. The free, web-based platform, hosted by WPI, allows teachers to write individual lessons that are composed of questions and associated hints, solutions, and web-based videos that engage students and teachers in active learning. Teachers who choose

to bring this resource into their classroom attend system trainings to learn how to best use this program based on their needs. ASSISTments' biggest advantage is that it corrects and interprets results so that teachers can spend more time reflecting, responding, and planning.

assistments.org

Camp Reach Mentors

Middle school STEM educators are invited to be part of the camp that made headlines for winning the Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring. Camp Reach, a two-week summer residential program for girls entering 7th grade, encourages young

women to have fun with technology, tackle real problems, and get up close and personal with the way things work in their own community. Participating educators coach a team of campers in a service-learning design project, while becoming familiar with engineering and the engineering design process.

wpi.edu/+reach

Massachusetts Academy of Mathematics and Science

Mass Academy, an accelerated high school for 11th and 12th graders interested in STEM, offers multiple professional development opportunities for educators across the state. Mass Academy is an official Texas Instruments Training Center and host to Super Saturdays, a series of math technology training sessions that reaches hundreds of teachers each year. The Academy's

master teachers present workshops in the summer and during the academic year on a variety of topics including technical writing, using Movie Maker software, podcasting in foreign languages, interdisciplinary learning in humanities, STEM integration, starting science fairs and web design. On-site professional development and outreach opportunities can be arranged for Massachusetts school districts.

massacademy.org



Project Lead The Way

Project Lead The Way (PLTW) is a nationally acclaimed STEM curriculum for grades 6–12 that is standards-based, project-based, and uses real-world problem solving as a framework. Its curriculum programs in engineering and biomedical sciences engage and prepare students for postsecondary education and careers in STEM. WPI is one of 38 affiliate universities involved in the PLTW engineering program; it runs a two-week professional development summer institute to prepare educators to teach PLTW courses in their schools. WPI certifies PLTW high schools, assists with program implementation, and provides ongoing support to PLTW schools and teachers in Massachusetts.

wpi.edu/+pltw

The Research Experience for Teachers (RET) Program

The National Science Foundation is funding a six-week program at WPI during the summers of 2012, 2013, and 2014 for middle school teachers interested in furthering their research experience in biomedical engineering and their understanding of how to incorporate the engineering design process into their existing curricula. Teachers and WPI researchers working together participate in cutting-edge research on topics such as tissue engineering and regenerative medicine. Teachers will leave the workshop with invaluable experience in the lab, and will have developed a teaching unit or project to use with their students during the following academic year.

wpi.edu/academics/bme/ret.html



Science Inquiry Learning Group

The Science Inquiry Learning Group focuses on developing technology-based science materials and analytic techniques to support students' learning and teachers' assessment in real time.

Sciences ASSISTments, one project by the group, is an assessment environment system for science inquiry built around microworlds in physical, life, and earth sciences that assesses students as they conduct inquiry. Students make hypotheses, conduct experiments, interpret data, and communicate their findings.

Inq-Its, a new system currently being developed by the group, will provide real-time scaffolding to students as they engage in inquiry with microworlds in the physical sciences. Here, Rex, a cartoon dinosaur, identifies students who

are flailing at specific inquiry skills, and gives them multilevel feedback targeted toward helping them understand both conceptual and procedural aspects of inquiry. Teachers can get involved by allowing their classrooms to be used as the system is being developed.

sling.org

"The use of technology in the classes gave birth to a new way for me to teach high school mathematics and it brought new energy, interest, joy, and excitement to my teaching."

Donald Cameron '03 MME
Mathematics Department Head, Brooks School
North Andover, Massachusetts

STEM Integration Program for District Leaders

The STEM Education Center offers an exclusive year-long program, supporting teams of district leaders as they develop models of STEM integration in their schools. By interweaving theory and practice, participants explore different models of STEM integration, evaluate current STEM programs in their district, explore funding opportunities, and are mentored to develop a STEM plan that will fit their district's needs. The program consists of face-to-face and online meetings and is designed for teams of 3–5 leaders from each district. Acceptance to the program is based on applications submitted annually in the spring. For more information about the application process and the program, visit our website (below) or contact us at stemcenter@wpi.edu.

wpi.edu/+pd



STEM Education Center Teacher Workshops

The STEM Education Center offers professional development opportunities for educators and administrators at all levels in STEM areas and concepts. Our programs support STEM educators from preschool through high school, and run during the academic year, as well as in the summer. Topics include robotics, STEM teaching methods in elementary school, project-based learning, and methods for assessing STEM learning.

The workshops focus on enriching STEM education in the classrooms at both the subject specific level and as fully integrated subject content across STEM fields. From any session, participants will take away planning concepts and tools they bring back to their schools. If you are looking for a particular type of professional development and you don't see it listed on-line, contact us at stemcenter@wpi.edu.

wpi.edu/+pd



Teaching Practicum Mentor Program

Mentor a WPI student during a teaching practicum and provide that student with a positive role model in the education environment.

Mentors play an important role in educating students in WPI's Teacher Preparation program. They help students develop effective presentation strategies and solid classroom management skills. Mentors also share insights on other concepts learned best through hands-on experiences. This experience stays with students long after graduation.

When they enter their own classrooms during that challenging first year, graduates continue to call upon excellent examples of effective teaching experiences in their practicums. To indicate interest in becoming a mentor, visit our website or contact us at teaching@wpi.edu.



"WPI students really make a difference in the science classroom. They bring new ideas and experiences to the teaching and learning process, which helps middle school students see the subject in a new light."

Angela Lamoureux
Science Teacher
Forest Grove Middle School
Worcester, Massachusetts

wpi.edu/+teachingmentor

RESEARCH ON TEACHING AND LEARNING

Many WPI faculty members lead award-winning and nationally recognized research projects that support all aspects of teaching and learning. Programs informed by this research, such as ASSISTments and Science ASSISTments, result in tools that teachers can use directly in their classrooms to improve student outcomes. Other innovative and inspiring research provides important insight that teachers can use to direct their instructional practices to improve how children learn. Additionally, this information supports administrators to work with their educators to improve how children are taught.

Find out more and learn how you can partner with WPI faculty on teaching and learning research, visit our website, and click on the research tab on the left.

Contact us about a research proposal you are interested in collaborating on at stemcenter@wpi.edu.

wpi.edu/+stem

"The WPI STEM Education Center is going to help address national problems by training teachers in both the content knowledge and the pedagogy. By incorporating the professional development piece with in-service teachers as well as the research piece—WPI is doing something unique. Research on education and development is really our mission at the National Science Foundation. And NSF, I think, is here to help with these efforts that you're undertaking."

*Barbara Olds
Acting Deputy Assistant Director
Education and Human Resources
National Science Foundation*

*Keynote speaker at the launch
of the STEM Education Center
at WPI in March 2012.*



ABOUT WPI

One of the nation's earliest technological universities, WPI has been breaking new ground since its founding in 1865. At WPI, education has always been distinguished by combining rigorous theory with practical experience, preparing students to be innovative thinkers who can solve problems. WPI has more than 50 undergraduate and graduate degree programs in science, engineering, technology, business, the social sciences, and the humanities and arts. The STEM Education Center at WPI builds upon the university's strong K-12 foundations and aims to improve preparedness of educators so they can inspire and engage young people in science, technology, engineering, and math.



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