



GRADUATE STUDY

LEARNING SCIENCES AND TECHNOLOGIES



Worcester Polytechnic Institute



ABOUT OUR PROGRAM

With its graduate program in learning sciences and technologies, Worcester Polytechnic Institute aims to revolutionize the nation's education system to support mastery learning in mathematics and science on a broad scale. It's an essential transformation for the United States to remain competitive on the global stage—and one you can help to lead as part of our small, interdisciplinary teams of faculty and student researchers.

The WPI learning sciences and technologies program has steady streams of major public funding, national recognition, and a growing international reputation for its innovations in intelligent tutoring systems that combine technology-based learning and assessment. At WPI, you are exposed to every aspect of educational technology and can choose your focus, whether to design the pedagogy and/or the software, build it, implement and deploy programs, mine the data collected, or complete other critical functions. Whatever your direction, you will have the one-on-one faculty mentorship and applied learning opportunities that are hallmarks of the WPI experience.

For more information the faculty and the curriculum, contact the program co-directors, Neil Heffernan, 508-831-5569, or Janice Gobert, 508-831-5619.



PREPARED TO MAKE A DIFFERENCE

WPI's graduate programs in learning sciences and technologies attract highly motivated, entrepreneurial graduate students ready to make significant contributions to a challenge of national importance: understanding and improving the educational process. WPI's research in learning science and technologies is focused on the STEM disciplines— science, technology, engineering, and mathematics. In keeping with the WPI principle of integrating theory with practice, you will have the opportunity to go into real classrooms, researching the impact of educational technology with the input of both new and veteran teachers and students whose learning experiences—and future—will be enhanced by your efforts.

Throughout your WPI experience, you will benefit from the pioneering work of WPI faculty, whose scholarship includes cognitive science, which seeks to understand how each child learns, and computer science, which aims to understand and adjust tutoring to students in real time. Here you will be part of a close-knit, collegial community of researchers working on the leading edge of artificial intelligence, cognitive psychology, human-computer interaction, and educational data mining.

Transforming our nation's



ASSIST AND ASSESS FOR MASTERY OF MATH

The National Education Plan cites the work of WPI's researchers to combine online learning and assessment activities into intelligent tutoring systems designed to balance effective instruction with effective testing. Called ASSISTment to reflect a blend of tutoring "assistance" with student "assessment," the system helps students learn mathematics by presenting them with problems, and offering carefully structured assistance as needed to keep them moving forward. Over time, the system "learns" more about the students' abilities and becomes an even better tutor.

Widely used in area school systems—and expanding statewide and nationally—Math ASSISTment is built around hundreds of standardized test items. Ongoing development targets integration with the mathematics curricula used by individual school systems to provide tutoring that's directly related to what students are learning in class. Committed to advancing educational technology and intelligent tutoring, WPI faculty members challenge graduate students to make their own exciting discoveries.

education system



EXPANDING TO SCIENCE, MINING THE DATA

With major funding from the U.S. Department of Education, the National Science Foundation, and other agencies, WPI's learning sciences and technologies program is always investigating new ways to increase the impact of technology in the classroom. Over the past few years that work has extended to science education. Science ASSISTment supports students through the process of scientific inquiry and tracks their strategies as they complete complex science inquiry tasks. The goal is not just to teach content, but to hone skills for scientific inquiry that will transfer across science disciplines.

Whether for math or science, the data that comes out of interactions between students and the software can be analyzed and used to design more effective educational software. Focused WPI research on educational data mining seeks to understand how students respond to educational software, and how these responses impact their learning. Research is under way to develop models for discovery about human learning and learners, and about their cognition, meta-cognition, motivation, and affect.



RESEARCH AREAS

WPI's learning sciences and technologies program is an interdisciplinary program with a range of opportunities for research:

Artificial intelligence

Cognitive psychology

Educational data mining

Human-computer interaction

Instructional technologies

Intelligent tutoring system design

Learning with visualizations and
simulations in science

Machine learning

Pedagogy

RESEARCH FACILITIES

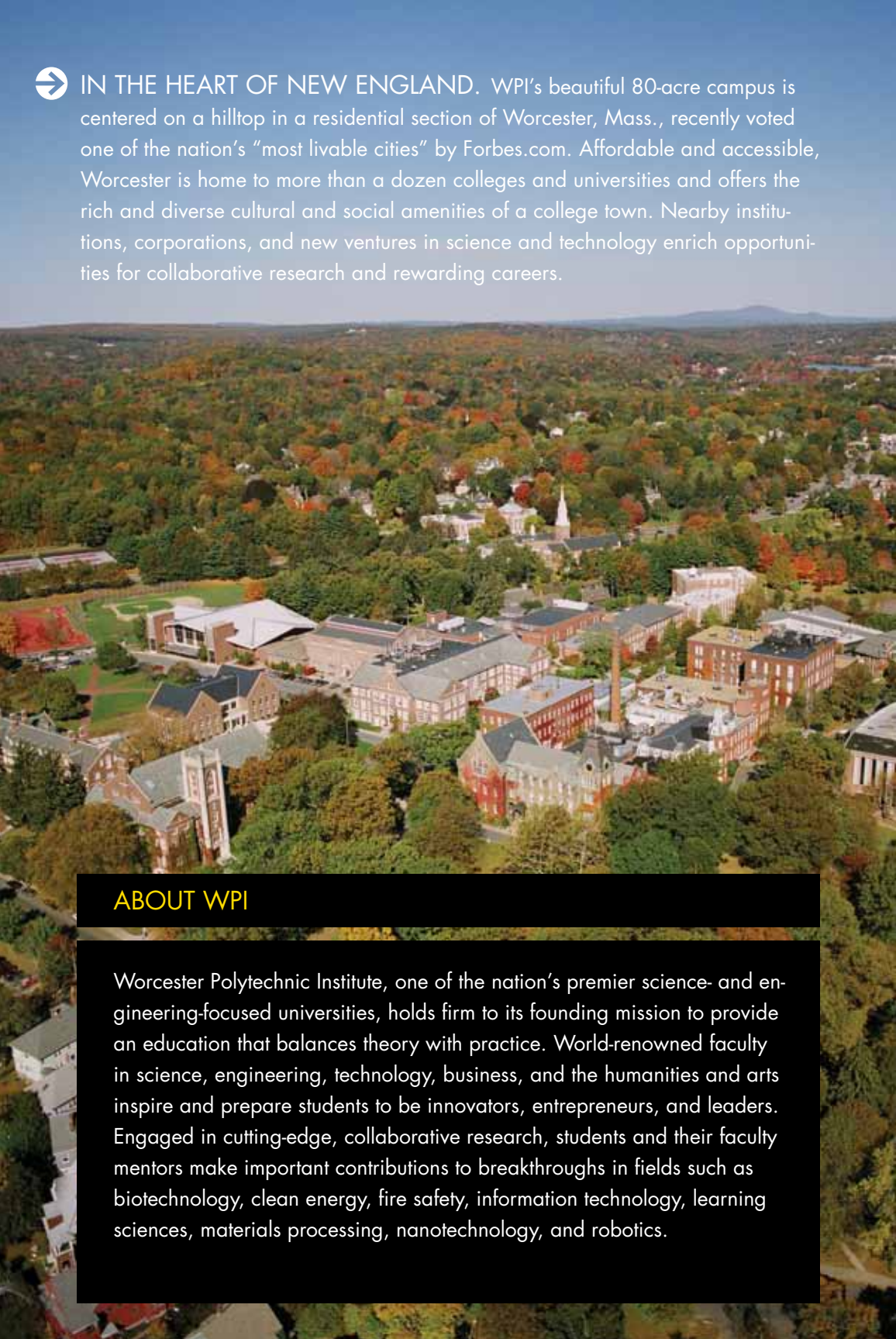
Artificial Intelligence and Intelligent Tutoring Laboratory

Educational Psychology Laboratory

Human Interaction in Virtual Environments Laboratory

Knowledge Discovery and Data Mining Laboratory

Learning Sciences Laboratory



➔ **IN THE HEART OF NEW ENGLAND.** WPI's beautiful 80-acre campus is centered on a hilltop in a residential section of Worcester, Mass., recently voted one of the nation's "most livable cities" by Forbes.com. Affordable and accessible, Worcester is home to more than a dozen colleges and universities and offers the rich and diverse cultural and social amenities of a college town. Nearby institutions, corporations, and new ventures in science and technology enrich opportunities for collaborative research and rewarding careers.

ABOUT WPI

Worcester Polytechnic Institute, one of the nation's premier science- and engineering-focused universities, holds firm to its founding mission to provide an education that balances theory with practice. World-renowned faculty in science, engineering, technology, business, and the humanities and arts inspire and prepare students to be innovators, entrepreneurs, and leaders. Engaged in cutting-edge, collaborative research, students and their faculty mentors make important contributions to breakthroughs in fields such as biotechnology, clean energy, fire safety, information technology, learning sciences, materials processing, nanotechnology, and robotics.



DEGREE PROGRAMS

Master of Science
Doctor of Philosophy

BEYOND WPI

Graduates of WPI's learning sciences and technologies program are prepared for rewarding careers as designers, programmers, consultants, and educational researchers in this growing field.