

11 May 2009



Underwater Robotics Competition at Stevens, June 3, 2009

LEGO Robotics is the Vehicle to Increase Student Interest in Engineering and Science

HOBOKEN, N.J. — Don't let the LEGOs fool you: The annual Build IT competition at the Stevens Institute of Technology to be held June 3 is all about serious science and engineering.

The event will bring more than 200 middle- and high-school students from all over New Jersey and the New York metro area to Stevens, where they will design and program robots made of LEGO parts to meet a complex challenge in an underwater environment. The competition is scheduled to happen between 12 noon and 2:15 p.m.

The event, to be held on June 3, 2009 outside the Babbio Center at the university's Castle Point campus in Hoboken, will feature NASA Shuttle Astronaut Dr. Charles Camarda as the keynote speaker, beginning at 9:30 a.m. Dr. Camarda was onboard the Return to Flight mission STS-114 Discovery from July 26 -August 9, 2005 and has logged over 333 hours in space.

Why underwater robots?

"Unlike robotics projects that involve land-based robots, the Build IT project challenges students to design robots to move in three dimensions instead of just two," said Beth McGrath, director of the Center for Innovation in Engineering & Science Education (CIESE) at Stevens, which is organizing the event.

"This added vertical dimension," she continued, "in which teams must be able to control the robot's up-and-down motion in the water, is a novel problem that challenges students who have already experienced other types of robotics projects."

Through the iterative design process and the ease of assembly with LEGO parts, students are able to try things out quickly and get an intuitive understanding of the scientific principles that underlie their robot's performance.

"These underwater robots, or ROVs (remotely operated vehicles) are, in effect, the vehicle to interest more students in science and engineering careers," said McGrath.

This competition is part of a major effort by the National Science Foundation to engage middle and high school students in innovative technology experiences that will spur their pursuit of study and careers in these disciplines. The Build IT project is a \$1.2 million NSF-sponsored grant, with additional funding provided by the Motorola Foundation, to spark student interest in science and engineering. Build IT employs an innovative design challenge and require students to problem-solve using successively deeper levels of science understanding, the engineering design process, teamwork and communication and information technology.

According to McGrath, research has shown an increasing demand for science and engineering workers over the last 20 years, with job growth increasing by 4.2 percent between 1980 and 2000, but only a 1.5 percent increase in degrees earned in those fields during the same period. Women and minorities are also particularly underrepresented in these fields, so programs such as Build IT make special efforts to engage girls and minorities.

According to the National Science Board, twenty-six percent of all science and engineering degree holders in the labor force are age 50 or over, and are expected to retire in the next 10-12 years. "At all levels, from President Obama to local companies, there is a growing urgency to interest students in engineering and science and increase the pipeline of students who will fill these technical jobs," said George P. Korfiatis, Provost and University Vice President at Stevens. "Our economic future and quality of life depend upon technological progress and invention. Programs like the Build IT project are excellent vehicles to engage students in the excitement and relevance of engineering careers."

Among the 40+ schools that have been involved in the Build IT program, there has been a significant increase in student interest in engineering and science, and in student learning of science and mathematics concepts.

The students' hard work over the last school year, and their competitive spirit will be on display as the program culminates in a day-long challenge that will put their robots through a series of increasingly complex and sophisticated underwater tasks. A PDF list of participating schools is located [here](#).


Additional information on the BUILD IT event may be found at <http://www.ciese.org/buildit/index.html>

About Stevens Institute of Technology

Founded in 1870, Stevens Institute of Technology is one of the leading technological universities in the world dedicated to learning and research. Through its broad-based curricula, nurturing of creative inventiveness, and cross disciplinary research, the Institute is at the forefront of global challenges in engineering, science, and technology management. Partnerships and collaboration between, and among, business, industry, government and other universities contribute to the enriched environment of the Institute. A new model for technology commercialization in academe, known as Technogenesis®, involves external partners in launching business enterprises to create broad opportunities and shared value.

Stevens offers baccalaureates, master's and doctoral degrees in engineering, science, computer science and management, in addition to a baccalaureate degree in the humanities and liberal arts, and in business and technology. The university has a total enrollment of 2,150 undergraduate and 3,500 graduate students, with about 250 full-time faculty. Stevens' graduate programs have attracted international participation from China, India, Southeast Asia, Europe and Latin America. Additional information may be obtained from its web page at www.stevens.edu.

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Contact: Patrick A. Berzinski, +1-201-216-5687, Patrick.Berzinski@stevens.edu
Stevens Institute of Technology, Castle Point on Hudson, Hoboken NJ 07030-5991 USA +1.201.216.5000

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This page was last updated 11 May 2009.