

**Picatinny promotes science education for students through robotics**

**Ed Lopez and Ed Petersen Friday, March 23, 2012**

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| [Picatinny promotes science education for students through robotics](https://www.pica.army.mil/eVoice/Uploads/PC_robotics.jpg)Students from Newton High School compete in the international finals.  |

It is often said that the difference between men and boys is the cost of their toys.

An organization called “For Inspiration and Recognition of Science and Technology” (FIRST) allows them to play together.

In fact it encourages not only men and boys--but also girls and women --to join in the same activities.

FIRST exists to encourage students from many nations to experience technology and engineering through competitive robotics challenges at several levels.

Personnel at Picatinny Arsenal are involved in advancing the learning and cooperation that the program fosters, and in the process promoting education in science, technology, engineering and mathematics (STEM).

Douglas Wong, an engineer with the Enterprise and System Integration Center, has been involved with the program for about five years in part because of a background in robotics.

“The real reason it drew me in was that it was part of the educational outreach that STEM provides and I’m a big fan of STEM,” Wong said.

Over the years, he has served as a mentor, evaluator and judge. Wong said he gets satisfaction not only from observing the results of his feedback, but from also watching kids who doubted their abilities to later grow in confidence.

“Once they try--and dip their toe in the pool--they become consumed by it,” Wong said. “It’s a great thing to observe.”

As part of the FIRST program, younger students learn using small Lego robots in the FIRST Lego League.

Middle school and high school students advance to larger machines with the FIRST Tech Challenge.

High School students can sharpen their skills in the FIRST Robotics Competition, where autonomous and wirelessly guided robots exceed 100 pounds and perform sophisticated tasks.

The average size of a team is about 20 students, but can range from single digits to almost 100 members.

More than 2,000 teams are involved in a series of district and regional competitions leading to the International Finals this year in St. Louis, Mo.

FIRST is in its 21st year of operation and was founded by inventor Dean Kamen.

Last year, more than $14 million in scholarships were awarded to FIRST participants.
The challenge presented to the students changes each year. There is a time limit of six weeks to design and build the robot.

To be successful, the high school teams are expected to seek assistance from sponsors and mentors who donate time, money, and skills.

The most valuable assistance comes from the professional engineers and scientists who work with the students throughout the design and construction process.

LEARNING GOES BOTH WAYS
Jim Giacchi, an engineer with the Weapons Systems and Technology Directorate, has been involved with FIRST since he was student in the eighth grade and continued participating through all of high school.

In his professional career, Giacchi has been a mentor for nine years.

“It’s amazing how much you can learn,” Giacchi said. “You learn more from the kids than you wind up teaching them because you realize what you don’t know.”

For kids who are initially intimidated by the idea of building robots, Giacchi said the key is to get them started on small projects. “Later, they will say, ‘Gee, I just built a gear box.’”

While FIRST is based on competition, cooperation and collaboration are considered more important. Teams are encouraged to share knowledge and materials with other teams.

“Whether you’re a veteran or a rookie, it’s important to share information, even pieces and parts,” Wong said.

“It’s not so much what you see in industry--where things can get highly competitive or cutthroat at times--but with kids we try to promote a sense of community within the competition.”

In keeping with these goals, the DOTC (Department of Defense Ordnance Technology Consortium) STEM Education Office has been working to bring together the Picatinny scientists and engineers to act as mentors for FIRST robotics teams in the local area.

The scientists and engineers have exchanged ideas and discussed solutions to common problems. This is particularly helpful for persons who serve as mentors for rookie teams.

FIRST Robotics Challenge (FRC), First Tech Challenge (FTC) and FIRST Lego League (FLL) are differentiated by both grade levels as well as difficulty.

FLL is the easiest and least expensive of the programs. Thus it is undertaken by late grade school students to early middle school students.

FTC is the “middleweight,” both with respect to expense, technical know-how required and team size. Most FTC teams are later middle school students to early high school students.

FRC is the “heavyweight” and as such is the most expensive of the programs requiring the greatest technical knowledge for build and function as well as extensive community support. Hence, most FRC teams are high school students.

The challenges are also proportional. FLL has the easiest challenge. FTC has a somewhat harder challenge and FRC’s challenge requires the most thought. However, there are no limitations.

If a group of middle school students feel that they are up for the task, they can enter a higher level challenge if they wish.

Teams from New Jersey, Eastern Pennsylvania, and Delaware belong to the Mid-Atlantic Robotics Region.

District competitions are held within the region to help prepare teams for higher-level tournaments.

Recently, the Newton High School’s robotics team placed 7th in a field of 42 in a regional competition at Rutgers University.

In addition, the team received the “Innovation in Control Award” for its innovations, including the use of an infrared camera, and computer-based vision processing.

Earlier this year, the team was invited to compete in the FIRST World Championship April 25-28 in St. Louis, Mo. This will be the team’s second trip to the world championship, having previously competed in 2010.

In their support of the robotics program, Picatinny scientists and engineers also serve as judges and officials at the competitions.

For Picatinny employees who might consider getting involved with FIRST, Giacchi suggests that they attend one of the competitions to get a good understanding of how they work.

“It’s really difficult to understand it unless you’ve seen it,” he said.

Picatinny personne4l interested in becoming part of the FIRST experience, described as the varsity sport for the mind, should contact the DOTC STEM Education Program Office. Contact Ed Petersen, Program Manager x7169 or Shahram Dabiri, Science and Technology Manager, x5575.

More information about the robotics competition can be found at http://www.stlouisfirst.org/.