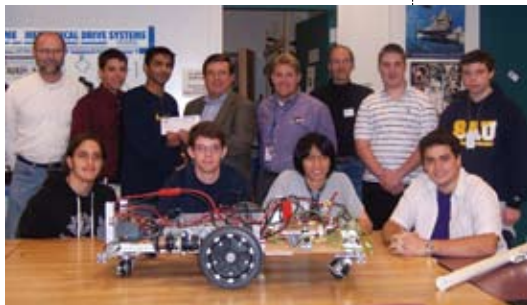


# Beyond Robotics

ENGINEERING STUDENTS  
IN A CHANTILLY, VIRGINIA,  
CAREER ACADEMY  
PROGRAM ARE LEARNING  
MORE THAN SCIENCE  
AND TECHNOLOGY.  
THEY ARE LEARNING  
HOW TO TRULY MAKE  
A DIFFERENCE IN THEIR  
COMMUNITY.



**C HANTILLY HIGH SCHOOL ACADEMY** Robotics Team Number 612 from Chantilly, Virginia, is an award-winning team of high school students actively involved with FIRST (For Inspiration and Recognition of Science and Technology), a multinational nonprofit organization that inspires students to transform culture—making science, math, engineering and technology as cool for kids as sports are today. Each year, students from Chantilly Academy’s engineering systems and physics classes, taught by Marty Rothwell, compete in the FIRST Robotics Competition. This is a nationally recognized robotics competition in which teams of high school students across the nation design, build and test robots in a three-day tournament.

The overall goal of the FIRST program is to generate enthusiasm for science and engineering fields at the high school level and to encourage students to continue their studies at college. The academy students agree that they gain a healthy appreciation for science and engineering by pulling together their knowledge in mechanical, electrical and software engineering to design and build the robot, as well as learn valuable project management, marketing and team-building skills. The student-led team receives valuable guidance from former engineers and science specialists, as well as many former team members attending college who have come back to assist the next generation.

The FIRST robotics contest starts in January of each year when FIRST releases the rules of the competition in an internationally televised kickoff event provided by NASA. Immediately following the telecast,

each team receives a kit of parts and a list of other eligible components that can be used to build the robot. Teams are given exactly six weeks to design, build, test and ship a robot. The competition rules change each year and typically reward creativity of design and game play over brute strength of the robot.

A project this size takes a tremendous amount of teamwork, planning, commitment and money. Team 612’s operating budget is \$25,000 to \$30,000 per year, and students, teachers, mentors and parents give up a large amount of their free time to work on the robot. Without the generous donations from Northern Virginia corporate sponsors such as SAIC, Mitretek Systems, Northrop Grumman, Fiserv, Integrity Applications Inc, IEEE, Raytheon, Crest, OEC Engineering and Curry’s Auto Corp, the students would not be able to participate in FIRST competitions.

The donations pay for competition registration fees, purchase of new parts, transportation to events, and other required resources that the team needs to keep the program running. The mentors have also helped the team gain invaluable insight into the design and production of their robot by allowing access to professional quality labs to fabricate uniquely designed parts.

## Advanced Training

Chantilly Academy Team 612 consists of more than 30 students from Chantilly High School and surrounding Fairfax County Public Schools (FCPS) enrolled in engineering systems or engineering physics. Chantilly Academy is one of five academies in FCPS that enable students to actively explore career fields in scientific and engineering technology and health and human services. The Chantilly Academy is a center within an existing high

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school that offers 18 advanced technical and specialized courses to approximately 1,200 high school students who commit to spending part of their school day at the academy. The academy successfully integrates career and academic preparation so that students have a variety of postsecondary options available to them upon graduating from high school.

Chantilly Academy provides classes that enable students to participate in meaning-

ful career experiences such as paid work internships and to earn national certifications, Virginia Standards of Learning verified credits and articulated credits that can be transferred to college. This year, Rothwell obtained an articulation agreement with George Mason University (GMU), School of Engineering, whereby high school students can earn college credit at GMU after successfully taking an engineering class at the Chantilly Acad-

emy. This is the first articulation agreement in the state of Virginia between a public high school and four-year university, and several academy students have already taken advantage of it.

There is eight million dollars in scholarship money available to high school students through FIRST, and many of Rothwell's engineering students have gone on to college with merit-based scholarships due to their involvement with Chantilly Academy's engineering classes and FIRST Robotics.

### A Winning Team

Robotics Team 612's tremendous accomplishments were acknowledged at the March 2–4, 2006, NASA/Virginia Commonwealth University (VCU) Regional Competition. They competed against 63 other high school teams from across the U.S. and Canada, and received the second-highest award bestowed by FIRST, the Engineering Inspiration Award. This award celebrates outstanding success in advancing respect and appreciation for engineering and engineers within a team's school

## Giving to the Community

After reading an article in a local newspaper about Chantilly Academy's robotics team's 2005 success at the championship competition, Kathy Cummins, who works for Fairfax County's Infant Toddler Connection, contacted Rothwell and Skene. The Infant Toddler Connection specializes in early intervention and child development, so Cummins spoke about the possibility of collaboratively working on a mobility project with Team 612 for a specific toddler with physical disabilities.

The toddler, Rahim, is 19 months old, strong willed, smart and determined to feed himself. This basic, daily living skill may seem simple to many, but it is extremely difficult for Rahim due to a birth defect. Rahim was born with Grebe's dysplasia, a disease that left him with partially formed arms and legs.

Rahim may never learn to walk, and he had

difficulty identifying with cause and effect using physical movement. But now he can move and spin about with his peers and siblings by pressing buttons, thanks to his custom-made robotic baby walker. Some high-tech company did not build Rahim's motorized baby walker. Instead, it's the creation of some bright, motivated teenagers—the Chantilly Academy robotics team!

Seaton noted this accomplishment by the Chantilly team in his remarks at the award ceremony in Annapolis, saying, "Due to the publicity this team has generated in local newspapers with their public





### Robot on Wheels

A student prepares a robot before competition.

and community, and it earned Team 612 a place among the 225 teams competing at the international competition held in April at the Georgia Dome in Atlanta.

Team 612's accomplishments continued at the Chesapeake Regional Competition, held March 16-18 at the U.S. Naval Academy in Annapolis, Maryland. Competing once again against 63 other high school

teams from across the U.S. and two from Great Britain, Chantilly Academy came away with the highest and most prestigious award at the regional level, the Chairman's Award. This award honors the team judged to have created the best partnership effort among team participants and to have best exemplified the true meaning of FIRST.

In presenting the award, Jeff Seaton,

chief technology officer, NASA Langley Research Center, stated, "This team really gets it! They have inspired the judges and should inspire each of you. They exemplify all the criteria for this honor.

"Within their school community, they have found unique ways to generate excitement for technology, such as building a special robot to race the principal

outreach, a family contacted them who had a disabled infant whose mobility was severely limited. The team jumped into action! They designed a switch-activated motorized baby walker in which the child could merely touch a button with the end of his limb and the device would be set in motion. Today, a year later, he is moving about the house, getting into all kinds of trouble that all toddlers get into. Never being satisfied with their level of accomplishment, they are now developing a partnership with area occupational and physical therapists to continue this type of work."

The baby walker is powered with a motorcycle battery and a microchip. The entire device was designed, machined, assembled and programmed by the academy's engineering students, Robotics Team 612. Within three weeks, the students had the walker built. They equipped it with sensors that stop near stairs to keep Rahim safe.

"I feel good knowing that our knowledge can help out the community; it is very rewarding," says Nate Laverdure, who was part of the student team.

On the surface, the teens have given Rahim the gift of mobility. But they've also opened up his family's eyes, creating endless possibilities for his future. The class has an ongoing partnership with the

child's family and has promised to make repairs and upgrades to the walker as Rahim grows.

The walker and team 612 have been featured on Channel Nine local news, Fairfax County Educational TV Channel 21, Channel One (a national education TV channel), and several newspapers, including *The Washington Post*. While no money has changed hands, it has been a win-win situation for both Rahim's family and the team.

The team is continuing to work on projects that help children with physical disabilities, particularly two projects that are currently in the planning and design stages. One will provide mobility to a 10-year-old boy with

cerebral palsy through the use of a voice-activated wheelchair. The second project, for an eight-year-old boy also with cerebral palsy, will allow his therapist a greater degree of control over his posture through an innovative restraint system.

The Academy's robotics team, engineering instructor Marty Rothwell, class and team mentor Jerry Skene, parents, volunteers and the local business community have enhanced many people's lives this past year: an 18-month-old toddler learning to become mobile, and 40 high school students who learned about teamwork, mechanics and perseverance.



at the homecoming, and creating another robot to throw basketballs at home game halftimes, both to the roar of the cheering crowds.”

Seaton also cited the team’s work that moves beyond their school walls, bringing the joy of engineering to unique groups in the community.

“For example,” said Seaton, “they use LEGOs to bring a sense of accomplishment and excitement to students impacted by learning and emotional disabilities. Furthermore, to capture a broader audience, they volunteer and exhibit their robot at the Smithsonian National Air and Space Museum Udvar-Hazy Center in Chantilly, Virginia.”

Team 612’s senior mentor, Jerry Skene, also has been acknowledged for his contributions to the high school students. In receiving FIRST’s Woodie Flowers Award at the Chesapeake Regional Competition, Skene was singled out as an outstanding engineer and teacher “...who best dem-

## Beyond the Basics

For more information about the Chantilly program, visit these Web sites:

Chantilly Academy

[www.fcps.k12.va.us/ChantillyAcademy/](http://www.fcps.k12.va.us/ChantillyAcademy/)

Chantilly Academy Robotics Team—see

“Gift of Mobility” movie

[www.chantillyrobotics.com/](http://www.chantillyrobotics.com/)

Video on baby walker

[www.chantillyrobotics.com/team/video/Gift\\_Of\\_Mobility.mov](http://www.chantillyrobotics.com/team/video/Gift_Of_Mobility.mov)

To learn more about FIRST and its competitions, visit [www.usfirst.org](http://www.usfirst.org).

onstrates teaching excellence in teaching science, math and creative design.” Skene donates more than 500 hours of his time annually in mentoring the students of Team 612.

### Continuing the Mission

All of the engineering seniors are going on to a four-year university this fall. They all plan to enter into engineering or technical fields of study, thanks to the experience they gained through the Chantilly Academy’s engineering classes and

robotics team.

The Chantilly robotics team is continuing to grow by working on projects that advance the team’s technical competencies and professional leadership as well as expand the understanding of science and technology in the school and community. The team is working on creating a FIRST LEGO League team (robotics for elementary students) and a VEX team (robotics for middle school students). The team hopes to continue making a difference in today’s world. ■