

Robots Take Over at Scotland

By [Alex Scofield/The Almanac](#)

August 25, 2004

Colby Moore discovered that real-life robots are different from what he expected. After a weeklong project in which he helped build three robots, he knows what it takes to construct one that can follow a painted path through an obstacle course.

"I thought it was going to be robots that we can control," said Colby Moore, a Bullis sixth-grader. "Actually, we kind of control it, but not with a remote control."

"I thought it was going to be made out of metal," said Demetrius Norton, a Tilden sixth-grader, who joined teammates in building robots made out of Legos.

Moore and Norton were two of more than 30 elementary and middle-school students attempting to build a better robot as part of the Innoworks program last week at Scotland Community Center. Led by volunteer college students who reside in the Potomac area, the students formed teams that designed, built and operated a sorter robot that could distinguish colors, one that could follow a path through an obstacle course, and another robot that played basketball - offense and defense.

Moore and Brianne Evans, a Frost eighth-grader, worked together on one team. For the obstacle course robot, their team had to go back to the drawing board after the struggles of their first robot. "That was pretty hard," said Moore. "It kept on moving backwards."

"It didn't like the track," Evans added.

After dismantling the first design, their second robot was much more successful in navigating the track. When the robot reached the end of the course (under a miniature light post), it responded with a "victory dance" programmed by the students.

On another team, Mohamed Makkawi, a Cabin John seventh-grader, also was rewarded for helping his team rework the robot. "At first it couldn't detect light that well," he said. "We couldn't make it turn, and when we made it to turn, it was really, really slow. ... But we made the program better."

"Mostly we had to take the whole thing apart," said Demetrius Norton, his teammate.

It wasn't just the grade-school students learning from the Innoworks program — the college students were impressed with the creations of each team, and how quickly they picked up the fundamentals.

"When I was these kids' age, I didn't know how to do anything like this," said Noah Grosfeld-Katz, a Blair '02 graduate attending the University of Maryland who volunteered with Innoworks. "I definitely underestimated these kids."

STUDENTS CONSTRUCTED ROBOTS out of Legos, but had touch sensors, light sensors and wheels. Students used computer programs to preview the robots before building them.

Innoworks Project

Innoworks began last week with a weeklong robotics instruction course for students at Scotland Community Center. A student-founded and student-run program, Innoworks' goal is to design fun and stimulating workshops in science and engineering for students without easy access to such opportunities.

See www.innoworks.org.



Photos by Alex Scofield/The Almanac
Sheyi Ayeni (Stanford '06), Alex Pei, 10, and Andrew Kiang (Churchill '02, Carnegie Mellon '06) watch the robot they built as it cruises through an obstacle course. The robot contains sensors that cause it to follow the black line through the course.



Photos by Alex Scofield/The Almanac
Michael Li, a Blair '02 graduate, and Devon Norton, a Cabin John 8th-grader, build a robot that will shoot a basketball through a hoop — and play defense.

Christopher Huang, a Cabin John eighth-grader, worked on his team's basketball robot last Friday. "It's going to score baskets and try to beat the opponents," said Huang. "You can make the arm bend [and] its front arm pushes the opponent aside."

The nuts-and-bolt approach is what William Hwang, a Blair '02 graduate attending Duke, hoped to see when he first thought of the Innoworks project.

"The focus is on robotics as a medium to explore other areas... to get them to see the connections and see that other scientific fields have to collaborate," said Hwang. One such application was the sorter robot, which sensed different colors of paper, and selected appropriate sheets which students then used to make recycled paper.

Even the robot's "victory" reactions are designed to make the students take a scientific approach - it makes them think of the externalized ways people show emotion, then program a machine to do the same, said Hwang. One team created a robot that flapped wings and spun circles when it reached the finish line of the obstacle course.

HWANG DREW UP the initial plans for the Innoworks project last year. He'd hoped to launch it last year, but had difficulty funding the project until sponsors from Duke and Montgomery County agreed to help out. Innoworks received a research grant for \$20,000, which helped purchase computers, software, Legos and other project materials.

Michael Li, a Blair '02 graduate from Potomac and now a junior at Maryland, helped direct the program this summer while Hwang was out of town. Li and Hwang enlisted the helps of local students attending the University of Maryland and Carnegie Mellon, Duke and Stanford universities.

Li and Hwang hope the program will expand to different areas, the first one likely in Durham, N.C. "There's a lot of potential," Li said.