Generation ENG

Seeing Fun in the Future
Recruiting the Next Generation Requires More Fun

By Kathleen S. Carr

It’s like walking into a U2 concert. Arena is full of loud music, and a lot of energy greets the crowd—which ranges in age from 6 to 82. Parents bring young kids, teens cluster as though they were grandparents and whoo-grandchildren, but no one is here for a rock concert—they are here for the FIRST Robotics Competition. Robots, and the high school students controlling them, take center stage. The intense contest pits robots against each other, as students maneuver their handcrafted machines through complex tasks requiring dexterity and strength. The event—Full Inspiration and Recognition of Science and Technology—is just one of the ways Boston University is appealing to a younger generation to combat the foreboding statistics facing the future of engineering in the United States.

Historically, the United States has been a world leader in providing higher education in science and engineering, according to the National Science Foundation. For the past three decades, however, the U.S. has lagged behind Japan, China and South Korea. In a 2006 report, “Science and Engineering in the United States,” the U.S. was put out great engineers.”

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without lettering are “ringers.” Black tubes are “spoilers.”

During a 15-second autonomous period that begins each match, the robots operate without driver control, using a color vision tracking system. The goal is to put a keeper tube on one of the rack’s spokes. During a two-minute period that follows, robots have the benefit of their tick-tack-toe, they earn extra points.

Teams can also form alliances, earning themselves more points by getting one robot to zoom up another’s platform and balance there. But making this happen involves some frantic tugging on jousting, jockeying of opponents and a lot of team encouragement. Often, a team will get its bot to climb the ramp, only to see it top off and get damaged. It’s tough to watch.

Some of the robots function solely as stick-like contraptions. Robots add ringer and spoiler tubes to the rack. If a spoiler is placed over a ring, that ring no longer counts. If a team gets three rings in a column or row, like tic-tac-toe, they earn extra points.

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The Boston University College of Engineering fully supports the BU Academy team’s robot, RoboRhett, and the pizza- and soda-fueled weekend brainstorm sessions began. “We spend one week fighting through our ideas and then Brandon Menacing, [a BU student mentor], comes in,” says Schultz. “He listens to our ideas and helps us weed some of them out. We’re a huge pile of junk and he’s our alter.”

The philosophy begins immediately, too. The BU Academy team opens its doors that first weekend, and every day thereafter, to other teams who might need a space to work, tools, ideas and the know-how that come with participating in this competition for nine years are shared in the team’s workspace in the basement of the College of Engineering building at 44 Cummington Street.

This concept of “gracious professionalism” is central to the first competition and teams that practice it are rewarded. Woodie Flowers, a FIRST national advisor and MIT professor of mechanical engineering, coined the term that has served as the competition’s motto. Gracious professionalism encourages fierce but respectful competition and teamwork. The concept of teamwork and selflessness to build the vehicle’s motor and drive them on their creativity to design the protective exterior. Miniature catapults, shields and barricades were just some of the devices students used to hold off their opponents.

“Infantry” ideas—gracious professionalism, the advent of the versatilist engineers and the teamwork off-engineers with younger, undecided students—began—by reaching out to students, by encouraging them to reach out to each other, and by getting inside their world, where the music is loud, deter-

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— Jason L. London

High School Students Driven to Design

Legos, duct tape, elastic, action figures, tennis balls—associate these items with high school students and you’re more likely to think of the bottom of their closets than the national finals. The BU Academy team puts the credos into practice regularly. The team gloats, not about its own standing, but about the standings of the rookie teams it has helped this year. “Last year we had six teams working in our building, and this year we had 12 teams in our lab. That shows you how much we’ve progressed. We’re role models now,” says Schultz.

College of Engineering freshman Victor Liu is here, too. He is one of several engineering students who volunteer to work with the high schoolers. He emphasizes the importance of alliances within the competition. “It’s important to get noticed and form friendships,” he says. “It’s a valuable lesson. He’s referring to the part of the competition in which the top eight teams pick alliance partners to join them in the rest of the competition. So even if the team is not in the top eight, it still has a chance to compete in the finals if a winning team picks it as a partner.

There’s Payoff in the Giving

Although the BU Academy team did not finish in the region’s competition—the top three—which would have meant an automatic berth in the national finals—it did gain passage to Atlanta on the strength of its gracious professionalism. “We qualified for nationals because we got the engineering inspiration award,” says Garber, the team’s coach and a physics teacher at BU Academy. “One of the main reasons we got it was because of all the outreach we did with other Boston schools.”

And they’re not stopping there. They already have plans to do even more to help other teams next year. “We’re getting pretty good at this,” says Garber. “But,” he emphasizes, “there’s lots of room for more undergrads and professors to help us.”

This is where the movement towards not only more engineers, but well-rounded, thoughtful, creative and collaborative engineers begins—by reaching out to students, by encouraging them to reach out to each other, and by getting inside their world, where the music is loud, determination is fierce and grace is rewarded.

These ideas—gracious professionalism, the advent of the versatilist engineer and the teamwork of engineers with younger, undecided students—can change the future of engineering in the U.S. Increasing the leadership and influence of U.S. engineers with younger, undecided students—began—by reaching out to students, by encouraging them to reach out to each other, and by getting inside their world, where the music is loud, determination is fierce and grace is rewarded.

“We were kind of scared going in because last year our vehicle fell off the ramp and shattered,” said Nicole Repina, who, as a member of the 2007 winning team from Newton South High School, is eligible for a BU scholarship. “This year it fell but didn’t break, so we were really hoping to win after that.”

Throughout the competition, all the students experienced the highs and lows of designing and engineering their own vehicle. “Getting a beanbag to drop into a hole sounds simple but it’s actually extremely difficult,” Hopkinton High School’s Andrew Ruggeri said. “But it’s cool just to build your own car from scratch and see it go up and down. Beating another team is always good, too.”

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No remote controls were allowed.

At the top, and hold position against an opposing vehicle for victory. A beanbag through a hole, climb back up the ramp, knock over a flag at the top, and hold position against an opposing vehicle for victory. No remote controls were allowed.

Alex Schultz (BUA’07) heads into a RoboRhett tune-up session at the FIRST competition.

RoboRhett takes action, placing a “keeper” tube on the rack.