ON TOUR.

Exceptional undergraduates embark as Engineering Ambassadors—giving middle and high school students a hands-on introduction to Better World Engineering.

Their motto is "find your passion and engineer it!", and for the undergraduate engineering students selected as engineering ambassadors, they are turning that motto into a reality.

Bryan Licata
Mechanical Engineering

"I wanted to be an Engineering Ambassador because when I was in high school, engineering seemed to be a very daunting life path. I had heard from several people that engineering was a very hard major and that a lot of students dropped it. Nobody ever told me that if you were dedicated and motivated, that everything would be alright."

Adriana Rojas
Chemical Engineering

"Originally an arts major, I switched to chemical engineering as a result of my readings about the energy crisis. I wanted to take an active role in implementing clean energy for our world. Now through the EA program I get to share all the exciting opportunities in engineering relating to clean energy."

MacKenzie Ott
Aeronautical Engineering

"I want to help introduce more young people to the world of engineering and show how fun it is. Many people think engineers are boring people who sit around and do math all day. That needs to change. Engineering is one of the most interesting and fun fields out there."

A year in the making: building the Engineering Ambassador (EA) program

Now entering its second year, the EA program started in the Spring 2011 semester with the selection of 26 students from a highly competitive applicant pool. EAs include 23% under-represented minorities, 38% women, and students from Aerospace, Electrical, Chemical, Mechanical and Materials engineering.

In the Fall 2011 semester, EAs participated in a rigorous three-day communications training program with Rensselaer's partner universities, Pennsylvania State University (Penn State), Worcester Polytechnic Institute (WPI) and the University of Connecticut (UConn). During the training, EAs identified engineering challenges, created engaging presentations and studied the techniques behind delivering a strong and impassioned message on Better World Engineering. With their presentation in place, each EA team of 2 to 3 students worked with a faculty advisor, who helped them develop and verify all aspects of their technical content—an essential step for ensuring a high quality technical presentation.

Armed with their approved presentations, each EA team moved onto the next phase of the program, a complimentary hands-on activity for their younger audience to experience. The Archer Center for Student Leadership Development at Rensselaer provided key leadership skills training through a variety of interactive learning experiences, such as team development and effective communication.

After much practice, EAs were ready to go into regional middle and high schools spending the day making presentations and engaging students in science, technology, engineering and math (STEM) classes.

Taking it on the road—putting on an EA program at local middle and high schools

Being an EA is both an honor and a commitment. Often on the day of a program, EAs meet their teammates by 6:00 am, making sure they have enough time to arrive and set up at the school before the middle or high school students even arrive.

Students arrive and EAs, dressed in their red EA shirts, are ready to dive-in and share their expertise. Typically, five to six EA teams present in multiple classrooms throughout the day, so by the end of their visit over 300 students are exposed to EA messages. Then, as a culminating activity, EAs facilitate a panel discussion with the students—articulating how exciting and important engineering is during these innovative and challenging times. Of course, they also provide invaluable first-hand knowledge about the college application process and how to get the most out of college life.

But it doesn't stop there. Rensselaer EAs support many campus-wide educational outreach diversity programs, including Black Family Technology Day, Exploring Engineering Day and Design Your Future Day *(see page 25)*.

In the 2011–12 school year, over 2300 students were exposed to EA presentations centered around Better World Engineering at Rensselaer, and the National Academy of Engineering: Change the Conversation topics, illustrating how engineering is essential to our health, happiness, and safety.

Fully prepared—EAs field tough questions

The benefits of being an EA go well beyond the classroom. By the time EAs complete the year-long program, they have honed their communication and leadership skills to a very fine point. Successfully engaging with a younger audience and communicating difficult engineering concepts, demands EAs know their material inside and out, ready to answer the myriad of questions younger students ask, and are prepared to handle the unique scenarios bound to occur during classroom visits. These types of "think on your feet" experiences are invaluable for EAs.

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EA's premier sponsor is United Technology Corporation (UTC)

EA Support

The program's premier sponsor is United Technology Corporation (UTC). EA also benefits from university funding which creates strategic partnerships with faculty. In fact, many faculty throughout the School of Engineering open laboratories to EA students and provide Undergraduate Research Program (URP) opportunities, enabling EAs to include their research experience in their EA presentations.

The NSF-funded Smart Lighting Engineering Research Center (ERC) at Rensselaer works closely with EA students. Each semester, the ERC sponsors up to four EA students who develop programs related to digital lighting technology. These programs are then deployed at regional middle and high schools, giving pre-college students interesting, real world engineering applications of Smart Lighting. This enables the ERC to reach pre-college students in a meaningful way.

Looking forward,the Engineering Ambassador program will grow in two ways. First, the EA program will include representation from *all* Rensselear engineering disciplines, thus expanding the engaging library of presentations on how engineers are meeting the challenges of today's world. Second, school visits will increase by a staggering 75%, introducing Engineering Ambassadors to over 4,000 students in the 2012-13 school year.

These ambitious plans are all dependent upon increased support from the friends of Rensselaer School of Engineering and Educational Outreach Programs.

Engineering Ambassador Presentations

Craig Hoffstein, Alec Rudd	"Drag Force: Shape Matters"
August Coretto, Mackenzie Ott	"Engineering Design Process: Steps Behind a Bicycle"
Whitney McKenzie, Jeffrey Morton	"The Future of Light"
Nico Rappoli, Michelle Cruz	"Biomedical Engineering: Changing the Way We Heal"
Adriana Rojas, Michelle Decepida	"Thermoelectric Devices: Solving the Energy Crisis"
Chelsea Ehlert, James Kern	"Fuel Cells: Energy of the Future"
Maranda Wong, Bryan Licata	"Manufacturing Polymers"
Chris Kraemer, Jason Griffith	"Multi-Body Spacecraft"
Aimee Konet, Chris Waitkus, Lauren Brumbaugh	"Snowboards: It's all about the Ride"
Dan Bingel, Brendan Lenz	"Semiconductor Devices"
Joshua Klimaszewski, Christian Biederman ,Sam Germano	"Sustainable Energy Sources: Solar"
George Moraru, Anda Lupse, Matt Klompas	"Sustainability by Design: Implementing Wind Turbine Technology"

"The Engineering Ambassador program has proven to be a win-win experience for both Rensselaer engineering undergraduates, and middle and high school students. Ambassadors develop confidence with presenting complex engineering concepts in an engaging way—middle and high school students see what engineering is all about first-hand."

Elizabeth Herkenham
K-13 Education Outreach Director
School of Engineering

Design Your Future Day

More than 200 10th and 11th grade girls from New York state, and across New England participated in the 15th annual "Design Your Future Day (DYFD)" program at Rensselaer in April. The event is designed to engage students in activities to inform and excite them about degree programs and career opportunities in science, technology, engineering, and math (STEM) disciplines.

"According to the U.S. Bureau of Labor and Statistics, in 2010 women comprised 47 percent of the civilian labor force that is 20 years old or older," said Barbara Ruel, director of Diversity and Women in Engineering programs at Rensselaer, and program director of the day's events. "Yet the most current data from the National Science Foundation indicates that in 2006, women made up 14 percent of the science workforce and 12 percent of the engineering labor force.

"Rensselaer is working to change that," Ruel added. "Design Your Future Day gives young women the opportunity to explore intellectually stimulating and exciting careers in math, science, technology, and engineering."

This year's keynote speaker was Rachel Gitajn, class of 2006, who was a double major in mechanical engineering and product design. Gitajn is a project engineer for Burton Snowboards (see page 17).

Since its inception, over 3,000 students have participated in Design Your Future Day.

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DYFD receives support from BAE Systems and the Gene Haas Foundation.