



## The Sky's the Limit for Summer Science Undergrads

July 28, 2010 — College students visiting for a special summer research program at the University of Virginia got up close and personal with the world's largest steerable telescope in Green Bank, W.Va. last week. The undergrads also are conducting original experiments cross-linked with chemistry and engineering in the eight-week program, which concludes July 30.

"We learned to operate an actual telescope and were given individual research problems to complete," student Arianna Seabrooks said.

Over the summer, Seabrooks and 11 other minority students in the Virginia-North Carolina Alliance have conducted hands-on research as part of the program, devoted to boosting the number of underrepresented-minority students in science, technology, engineering and math fields, the so-called STEM disciplines.

The Va.-N.C. Alliance, formed by U.Va. in 2007 and funded by the National Science Foundation, partners with seven colleges and universities in the two states to provide enrichment activities to students who are pursuing STEM degrees, with the goal of recruiting and retaining more students in these disciplines. The Va.-N.C. Alliance is part of the NSF umbrella program, the Louis Stokes Alliance for Minority Participation, which sponsors multi-institution programs all over the country.

Chemistry professor Brooks Pate of the College of Arts & Sciences, who won a MacArthur Foundation "genius" grant in 2001, led one of two research tracks for the students. Gregory Gerling, assistant professor of systems and information engineering in the Engineering School, headed the other curriculum in engineering.

A rising junior in chemical engineering at Virginia Tech, Seabrooks said the chemistry program gave her valuable research experience she did not have before, including "the opportunity to work with a variety of different equipment, such as spectrometers and radio telescopes," like the kinds at the Green Bank Observatory.

The observatory is home to the Robert C. Byrd Green Bank Telescope, the largest fully steerable dish in the world, as well as several other telescopes, said Tony Remijan, an astronomer with the National Radio Astronomy Observatory in Charlottesville, who accompanied the students to Green Bank. The telescope is 450 feet high, and the size of the main dish is more than two acres across, which is the same as two football fields sitting next to each other, Remijan said.

The summer program, offered for the first time this year, has provided an opportunity for students from smaller institutions with fewer resources to participate at a major research institution, according to Dr. Marcus Martin, interim vice president and chief officer for diversity and equity.

"We wanted the program to give students the opportunity to build confidence, lasting relationships and a positive experience in research," Martin said.

For Bassam Dourassi, an electrical and computer-engineering senior at George Mason University, "being here this summer has confirmed to me that as a systems engineer, I will still have a variety of disciplines to work in."

Dourassi has been working with Gerling in developing a simulator for detecting prostate cancer, involving research, design and testing an intermediate interface between a laptop computer and the simulator.

"It was crucial that the communication ... assure a fast response so that the doctor, nurse or any practitioner be able to get feedback in real time to make their decisions as efficiently as they can," Dourassi said. He also had to change the software program being used, for better compatibility and security, he said.

"I would never have been exposed to what others do in other fields such as astronomy, if it wasn't for the LSAMP program," he said, adding that most people wouldn't get to visit "the highest and biggest telescope worldwide" in their whole lifetime.

"We got to do what real physical chemists do," said Sanjay Ramdon, a senior electrical engineering student at St. Augustine's College in Raleigh, N.C. He worked with Pate's research team, which built a spectrometer and programmed it to operate on its own, in order to participate in ongoing research that is being conducted in U.Va.'s Center for Chemistry of the Universe.

Ramdon said the most important skill he has learned is "how to do research, from looking into past research on the topic, to actually building an instrument that does the job, then using that instrument to obtain data that we need and then to analyze that data.

"We got to know about different professors working in the field and got invaluable exposure to careers in the field."

In addition, the students learned about lab safety, ethics in science, approaches to scientific writing and referencing, and intellectual property considerations.

Alliance students also attended several lectures organized for other student groups – in the U.Va. Medical School's summer research internship program and the summer medical and dental education program.

On July 20, Alliance students swapped programs for a day. The chemistry and astronomy students switched labs with the systems engineering students so each group had the opportunity to explain their research to the others, Martin said.

He said the professors involved have been pleased with the students' performance and some of the students definitely want to return to U.Va.

The Va.-N.C. Alliance comprises eight colleges and universities: in North Carolina, Bennett College for Women in Greensboro, Elizabeth City State University, Johnson C. Smith University in Charlotte and St. Augustine's College in Raleigh; in Virginia, U.Va., George Mason, Virginia Commonwealth University and Virginia Tech .

On the final day of the program, July 30, the students will present their research to friends, family members and their colleagues at the National Radio Astronomy Observatory, followed by a closing reception.

Since this program targeted students early in their undergraduate career, they will have the opportunity to apply to additional research programs next summer, strengthening their record for application to graduate schools, Martin said. Several alliance students indicated a strong interest in applying to U.Va.

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