



COLUMBIA UNIVERSITY
MEDICAL CENTER

Federal Stimulus Gives Local High School Students an Up-Close Look at Columbia University Medical Center Science

NEW YORK (Sept. 2009) – For many high school students (and teachers), summer means no books, lazy days at the beach, and poolside conversations that drift into evenings filled with lightning bugs dotting the dusk. For scores of New York City high school students, however, this summer meant days filled pipetting liquids, measuring sidewalk widths, and performing real litmus tests, thanks to federal stimulus funding for summer research programs at Columbia University.

Columbia is a beneficiary of the recent American Recovery and Reinvestment Act (ARRA) legislation that has provided an unprecedented level of support (\$8.2 billion in extramural funding) to the National Institutes of Health to help stimulate the United States economy through the advancement of scientific research.

Part of the stimulus money, nearly \$562,000 from the NIH, was awarded to Columbia University Medical Center to fund “summer research experience” projects that bring local high school students and teachers alike to campus and into the labs of working scientists for the opportunity to practice real-world research, while getting paid to do it.

Twelve CUMC researchers were awarded summer research experience funding, hosting students from public schools across the city. The students worked on projects ranging from a comprehensive street-mapping survey to designing social networks that disseminate the latest research findings into the community in order to improve diabetes awareness while increasing physical activity among adolescents.

These were just a few of the projects, and a few of the programs are still ongoing – all have involved a fair amount on work in labs and in the field.

Hitting the Pavement

Students who worked in Andrew Rundle’s lab spent their summer pouring over street-view pictures on Google Maps. Dr. Rundle, an associate professor of epidemiology, hosted two students as part of his project to determine the walk-ability of neighborhoods in New York City and the effects of the “built environment” on physical health. With

nearly \$35,000 in funding, Dr. Rundle had his students analyze Google Maps Street-Views of New York City streets.

During the summer, students remotely evaluated how pedestrian-friendly certain blocks were, using a pedestrian environment assessment tool developed by the National Center for Smart Growth in College Park, Maryland. His students then visited the same streets in person to compare the analysis. While full analyses are still under way, the data collected by students show neighborhood walk-ability information can be collected via Google Street-View with high reliability.

Public health experts are highly interested in this sort of data because it affects obesity levels; the more walkable a city street, the more likely it is to be walked, the more calories will be burned – all of this can have an impact on a wide range of health conditions, from diabetes to hypertension, Dr. Rundle says.

A public high school computer science teacher from Chelsea High School, Laszlo Lovasi, was also hired as part of the summer research experience. Each weekday over the summer he randomized the street data from Google Maps and assigned the students in Dr. Rundle’s computer lab a new set of streets to evaluate. He also oversaw the in-field collection of street data by the students.

“I was surprised by how much programming was involved and how hard the students worked at what I gave them,” Lovasi said. “They virtually and literally took to the streets do the evaluations.”

Harnessing Social Media

A second ARRA-funded project involved a \$125,000 supplement to the Center for Evidence-based Practice in the Underserved out of Columbia’s School of Nursing, to fund a science educator and 12 students from Gregorio Luperon High School, a science and mathematics high school that serves the community’s predominant Latino population.

The focus of Dr. Suzanne Bakken’s program was to design new and innovative ways of disseminating and translating research findings into the community through use of information and communication technologies.

“Frequently, the findings of research conducted by CUMC scientists are not effectively disseminated to the local community thus limiting their opportunity to benefit from the discoveries. Information and communication technologies have the potential to help bridge this gap,” says Dr. Bakken, the Alumni Professor of Nursing and a professor of biomedical informatics.

Dissemination and translation of research findings requires an understanding of the target community. Consequently, the students developed video vignettes to help CUMC

researchers understand Dominican culture. The videos will be available online, through the Center's website and on the website of the Irving Institute for Clinical and Translational Research. For the project, the Gregorio Luperon students collaborated with more than 20 CUMC faculty, doctoral students, and post-doctoral fellows to promote physical activity among Latino adolescents on Facebook, the social networking site.

Learning Lab Science

Still a third CUMC faculty member, Samuel Silverstein, M.D., professor of physiology at the College of Physicians & Surgeons, has provided opportunities for metropolitan area middle and high school science teachers to participate in the practice of science through Columbia's Summer Research Program for Science Teachers, a program he founded in 1990 and continues to direct. Studies conducted by the program show significant gains in Regents science exam performance of students of participating science teachers.

"By studying a real-world scientific problem using the tools of contemporary science under the guidance of Columbia faculty," Dr. Silverstein said, "teachers gain a deeper and more complete understanding of the science they teach. Their Columbia research experiences encourage them to implement more hands-on, problem solving exercises in their classrooms. These approaches stimulate students' interest and understanding."

Participating teachers also receive assistance in designing laboratory exercises that help students understand the science they are studying. For example one teacher from a high school in Queens, who worked in the laboratory to develop exercises that will help his students to better understand acid-base chemistry. Students will use electrical conductance to distinguish between strong and weak acids, thereby emphasizing relationships between ionization and acidity.

Another Summer Research Program participant, Stacyann Hood-Collins, who teaches biology at Pathways College Preparatory High School in Saint Albans, New York, developed a laboratory exercise that will engage her students in examining the effects of environmental factors such as temperature, acidity of water, and availability of nutrients on microbial growth. At the same time, the lab will introduce Hood-Collins' students this fall to the concept of experimental controls.

Other researchers at CUMC who received ARRA funding are William Blaner, Raphael Clynes, Franklin Constantini, Joseph Graziano, Jennifer Hirsch, Li Shin Huang, Guohua Li, Steven Marx and Henry Spotnitz.

While NIH Institutes and Centers have broad flexibility to invest in many types of grant programs, they follow the spirit of the ARRA by funding projects that will stimulate the economy, create or retain jobs, and have the potential for making scientific progress in two years. Educating students, science teachers, and the leaders of tomorrow on the fundamentals of science fits all of these categories, and many of the program participants say the benefits will last well beyond the next two years.

For more information on Columbia Summer Research programs, please contact Alex Lyda, (212) 305-0820 or alyda@columbia.edu.

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