

Students Become Scientists Through SIUE's STEM Center Programs

by Kalli Collins
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EDWARDSVILLE – Southern Illinois University Edwardsville’s Center for STEM Research, Education, and Outreach is inspiring area middle and high school students to see themselves as scientists, to become critical thinkers, problem solvers and innovators, by presenting them with opportunities to engage in authentic scientific research.

The STEM Center, along with the College of Arts and Sciences’ Department of Environmental Sciences, the School of Education, Health and Human Behavior’s Department of Applied Health, the East St. Louis Center’s (ESLC) Upward Bound Math and Science (UBMS) Collinsville High School program and a colleague from the University of Southern Maine’s Public Health Program, engaged with students during hands-on learning sessions held in June and July.

“Through these programs, we aimed to support student interest in science by engaging them in authentic science experiences,” said Carol Colaninno, PhD, research associate professor and program director for the SIUE STEM Center. “We also placed focus on supporting students’ identities as scientists.”

The summer programs were made possible thanks to support from two-national grant programs—the National Science Foundation Innovative Technology Experiences for Students and Teachers (NSF ITEST) and the Science Education Partnership Award (SEPA) of the National Institute of General Medical Sciences of the National Institutes of Health

With funding from the NSF ITEST grant, the STEM Center and its partners offered the Youth-Led Citizen Science Network for Community Environmental Assessment (Y-CITYSCI) program. Participating students were from the ESLC’s UB Math and Science Collinsville High School program, a competitive academic initiative designed to prepare students to complete a four-year degree in a STEM field.

“The program provided high school students who are from groups historically underrepresented in STEM fields, the opportunity to lead and participate in scientific research,” said Colaninno. “Students investigated issues in the community related to air quality, noise level, soil pollutants, and human modifications of the environment. They focused on the community and integrated technology into their investigations. We empowered the students to take ownership over their research projects by making the program student-centered and student-driven.”

Scientists and science teachers led participants through the process of collecting, analyzing, and interpreting data.

“My project was about air quality all over SIUE and questioned if it is dangerous towards people who have varying health conditions,” said Alejandra Alcala, a senior from Collinsville High School.

“Our research project involved going to different buildings that were randomly selected to assess the number of recyclable materials in trash cans,” said Brian Castro, a junior from Collinsville High School. “Based on our research, we would suggest the University adds more recycling bins outside to improve convenience.”

“The STEM Center wants students with an interest in science to have the opportunity to pursue a career in science” added Colin Wilson, SIUE STEM Center instructor and outreach specialist. “We want science to be engaging for students and for students to feel empowered to do science. When students have the opportunity to investigate questions that they have an interest in, they become even more engaged and more confident in their abilities as scientists.”

The Environmental Health Investigators program ran simultaneously with the Y-CITYSCI program with support from the NIH SEPA grant. The program focused on preparing students who identify with groups who are historically marginalized in STEM to pursue careers and education that focus on health sciences.

“Students learn and develop knowledge on the ways the environment impacts human health,” said Colaninno. “They then develop a research question related to the topic of air, noise, and soil pollution and determine ways that they can address that research question.”

Attendees of the Y-CITYSCI and the Environmental Health Investigator programs participated in a poster symposium, presenting their work to friends and families to conclude the summer programs.

“The U.S. Department of Education requires that all UBMS programs provide participants with exposure to STEM faculty, college students and practical science lab experimentation,” said UBMS Program Director Desiree Tyus. “Through this partnership, our students were able to accomplish these requests. Furthermore, having authentic experiences like this, allows students to recognize that they can conduct collegiate-level research and, inevitably, encourages them to pursue their own scholarly research in the future. Their confidence was bolstered even more when nearly 80 people came to preview their showcase and inquired about their findings.”

“The SIUE STEM Center is masterful at developing and applying programming that positively impacts both youth and educators,” said research partner Ben Greenfield,

PhD, assistant professor in the Public Health Program at University of Southern Maine. “The vastness of what is being studied in these programs is extremely exciting. The STEM Center is a perfect place to not only implement these projects, but also see the impact of them scientifically. Its scholars and collaborators then analyze outcomes to inform colleagues nationwide.”

For more information, visit siue.edu/STEM.

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The Southern Illinois University Edwardsville Center for STEM Research, Education and Outreach comprises an independent group of researchers and educators, innovating ways to engage students and the public in science, technology, engineering and math (STEM). Within the SIUE Graduate School, the Center brings together research faculty, graduate students and practitioners to conduct education research. The Center contributes educational expertise to SIUE undergraduate classes and provides professional development for K-12 teachers. The Center boasts a significant library of equipment and resources, which are available for loan at no cost to campus and regional instructors. For more information, visit <https://www.siue.edu/stem/> or contact STEM Center Director Sharon Locke at (618) 650-3065 or stemcenter@siue.edu.