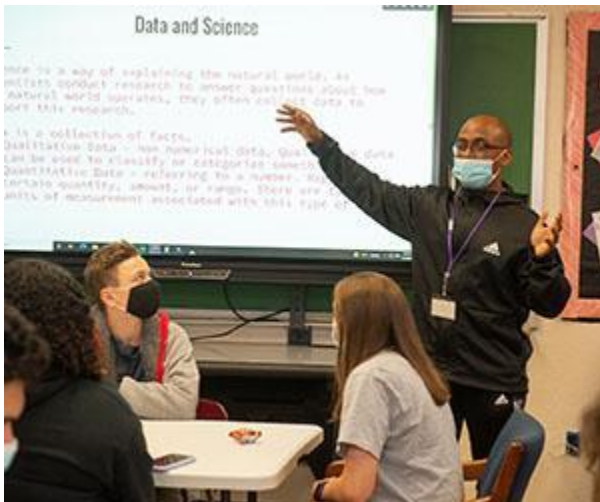




# SIUE's UBMS Students Introduced To Environmental Science, Courtesy Of STEM Center NSF Grant

by Megan Wieser

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EDWARDSVILLE - Robots helping to improve the environment, like removing pollution from oceans, is scientific work that 14-year-old Kaylee Cooper would like to help conduct when she gets older.

Cooper, a Southern Illinois University Edwardsville Upward Bound Math and Science (UBMS) program student, is excited to learn about environmental science as part of the Youth-Led Citizen Science Network for Community Environmental Assessment ([Y-CITYSCI](#)) program presented by UBMS.

The new UBMS offering at Collinsville High School is being made possible with the help of a National Science Foundation (NSF) Innovative Technologies for Students and Teachers (ITEST) grant for middle and high school students awarded to the SIUE

Center for STEM Research, Education, and Outreach, according to Desiree Tyus, UBMS program director.

“Our students, who are conscientious and eager to learn, readily grasp new concepts and ideas,” said Tyus. “Our students’ average GPA is 3.5 this semester. They continually demonstrate their desire to challenge themselves academically, while voluntarily engaging in authentic STEM learning experiences.”

“There is the pollution aspect to consider,” continued Cooper, a freshman at Collinsville High. “You can build robots to do things humans can’t, in order to help out the environment. If we pollute the ocean, then we can’t use its water. If we pollute the air, we won’t be able to breathe.”

Cooper joined her UBMS classmates after school on Thursday, Dec. 2 at Collinsville High for the second session of the semester course, which will be an ongoing offering into the spring and summer.

The program is a collaboration between UBMS, the SIUE Center for STEM Research, Education and Outreach, and the SIUE Department of Environmental Sciences.



“STEM Center faculty and staff direct, manage and support the YCITYSCI program through the design of educational activities and the coordination of youth research experiences,” explained principal investigator (PI) Georgia Bracey, PhD, SIUE STEM Center research assistant professor. “Environmental sciences faculty and graduate students support the youth program and mentor the high school students, bringing expertise in science content and the use of a variety of hi-tech sensors and drones to collect and analyze soil, air, noise, and landscape data. Working together, the project team guides the high school students in conducting authentic, relevant environmental research.

“We hope that by engaging in authentic science, these students will gain a greater awareness of what doing science is like and what a career in science might be like.”

“This grant equips our students with opportunities for experiential learning outside of the classroom and permits them to make meaningful connections and apply their learning in the real world,” added Tyus. “Poverty is a significant hurdle to career development of youth in low-income communities, and ITEST helps eradicate that barrier. The ongoing exposure to a variety of STEM professions cultivates knowledge and promotes the students’ ability to visualize their future as data specialist, microbiologist, environmental or conservation scientist, hydrologist, and more.”



During the afterschool session, Harben Branco Filho, UBMS graduate student, presented “Data and Citizen Science.”

“The goal of the presentation was to expose the students to what data is, and why it is important to collect data in science,” said Filho.

“Science is a way of explaining the natural world,” he continued. “Data is a collection of measurements and observations, and there is qualitative data, which is non-numerical, and quantitative data, which refers to a number. Citizen science is the participation of the general public in scientific research, often through data collection. Citizen science is useful in conservation efforts, environmental justice, community engagement, research, and more.”

Students were divided into groups and viewed [scistarter.org](https://scistarter.org) on iPads, provided by the grant. On the website, the general public has contributed to scientific research, according to Filho.

“At the end of next semester, students will do their own projects,” offered Filho. “But in order for them to do their own projects, they need to understand what is data and what is science. After each session, students will build up their knowledge base. Then in the spring, they will do a group project to benefit the community. All materials to be used will be provided for by the grant.”

“This is an awesome grant program,” said Collinsville High School Principal Daniel Toberman. “Anytime we bring in more people with STEM skills to work closely with our students, it is great. The diversity of experiences they are receiving is wonderful. We do have classes here that provide a lot of STEM education, but this program offers enrichment to our curriculum, which is exciting.”

“My hope is that we empower students to take what they learn about their environment, and share their personal passions or concerns with others in their community,” said Candi Johnson, SIUE STEM Center program coordinator and resource manager. “It is important for our youth, especially those of groups traditionally underrepresented in STEM fields, to be educated and supported as they learn to form their own opinions about the importance and health of their environment. We are excited to help our students learn ways to effectively express those opinions to find solutions to problems, or ways to support assets, that affect them as well as their neighbors.

The SIUE Upward Bound Math & Science (UBMS) program helps youth prepare for higher education and serves students from Collinsville. Participants receive instruction in advanced mathematics and science during the school day, homework assistance and hands-on STEM workshops twice a week after school, and cultural, career and college preparation on Saturdays. During the summer, students participate in a six-week residential program that allows participants to reside on Southern Illinois University Edwardsville’s campus and undergo college preparedness. Services provided prepare students for successful high school completion and entrance into post-secondary STEM degree programs. The program is designed to serve low-income and/or potential first-generation college students who are currently in grades 9-12. For more information about how you can get involved in our program, please visit us at [collinsvilleubms.com](http://collinsvilleubms.com).

The SIUE 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, provides professional development for K-12 teachers,

and 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 [siuestemcenter.org](http://siuestemcenter.org).