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UCLA receives $12.5 million grant to increase computer science instruction in urban schools

Project utilizes cell phones, Web technology to foster student engagement

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UCLA has been awarded $12.5 million from the National Science Foundation to help advance new and innovative computer science instruction in high schools, especially those in large urban school districts.

The new project, MOBILIZE: Mobilizing for Innovative Computer Science Teaching and Learning, is a targeted mathematics and science partnership among Center X at UCLA's Graduate School of Education & Information Studies; the Center for Embedded Networked Sensing (CENS) at UCLA's Henry Samueli School of Engineering and Applied Science; and the Los Angeles Unified School District.

Using CENS-developed participatory sensing technologies, MOBILIZE will develop and implement challenging, engaging, hands-on projects and curricula for high school computer science courses, as well as for standards-based mathematics and science classes. Participatory sensing allows students to collect and analyze data using mobile phones and Web technology.

The pilot project will initially launch in urban Los Angeles high schools and later be disseminated to schools throughout the country.

"Our goal is the increase student engagement and achievement in computer science, mathematics and other sciences," said Todd Ullah, principal of Washington Preparatory High School in Los Angeles and former LAUSD director of science education.

Through the project, high school teachers will work with UCLA science, technology, engineering, mathematics and education faculty to develop new computer science materials

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that leverage mobile phone–based participatory sensing to involve students in observing and analyzing environmental and social processes where they live, work and play.

"This project is about students in the LAUSD being equipped with mobile and Web technology and learning about interdisciplinary problem-solving and the logical thinking of computing," said Jane Margolis, co-principal investigator and a senior education researcher at UCLA. "MOBILIZE is about equity and increasing access to learning opportunities critical for the 21st century. Through MOBILIZE, students will learn about collecting, analyzing and representing data, enabling them to communicate their stories about issues that are of concern to them, their families and their communities. It is a fantastic opportunity to show students the connections between their lives and learning about math and science."

"MOBILIZE takes a technology that is near and dear to students' hearts — the mobile phone — and turns it into a tool for collecting and analyzing data and for applying the scientific method to local environmental and urban issues," said Deborah Estrin, the project's principal investigator and a professor of computer science at UCLA. "Moreover, the data analyzed and insights gained will be about places and things that are important to the students' daily lives."

"Computer science, and perhaps more broadly, information technologies, have reshaped nearly every disciplinary practice, and we therefore believe that computational thinking, as a pedagogical device, has an important role to play in expanding science and math education, " said co-principal investigator Mark Hansen, a UCLA professor of statistics.

In addition, the teacher-development aspect of the project will help create a new cadre of teachers with expertise in both computer science content and pedagogy.

"We are also developing an innovative model of professional development for current and future high school teachers to include multidisciplinary teams of teachers organized into learning communities with STEM (science, technology, engineering and mathematics) and education faculty," said Jody Priselac, also a co-principal investigator and executive director of Center X. "The faculty will provide a new pre-service computer science methods course."

The software, curricula and research findings obtained through MOBILIZE will be disseminated nationwide, enabling policymakers and other school districts to utilize them.

The UCLA Graduate School of Education & Information Studies (GSE&IS) includes both the department of education and the department of information studies. Together, the two embody the school's commitment to understanding and improving educational practice, information systems and policy in a diverse society. GSE&IS's academic programs bring together faculty and students committed to expanding the range of knowledge in education, information science and associated disciplines. Its professional programs seek to develop librarians, teachers, administrators and information professionals within the enriched context of a research university.

UCLA's Center for Embedded Networked Sensing is a research enterprise focused on developing innovative sensing systems and applying them to scientific and social pursuits. With the participatory sensing research area, the center is exploring a future in which individuals, neighbors, friends and relatives can use readily available technology to observe, discover and act on the patterns that shape their lives. Whether one's passion is personal or global, whether one's interest is in health or the environment, whether one acts alone or in a group, participatory sensing is a new approach that empowers all of us to illuminate and change the world around us.

The UCLA Henry Samueli School of Engineering and Applied Science, established in 1945, offers 28 academic and professional degree programs, including an interdepartmental graduate degree program in biomedical engineering. Ranked among the top 10 engineering schools at public universities nationwide, the school is home to eight multimillion-dollar interdisciplinary research centers in wireless sensor systems, nanotechnology, nanomanufacturing and nanoelectronics, all funded by federal and private agencies.

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