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UC San Diego's CREATE and SDSC Awarded National K-12 STEM Grant

Innovation bloc grant part of \$75 million U.S. Department of Defense initiative

The U.S. Department of Defense's (DoD) Defense STEM Education Consortium ([DESC](#)) has awarded a one-year grant to the San Diego Supercomputer Center ([SDSC](#)) at UC San Diego and the [UC San Diego Mathematics Project](#) housed at the university's Center for Research on Educational Equity, Assessment, and Teaching Excellence ([CREATE](#)), to introduce computing into high school math classrooms.



Image credit: UC San Diego CREATE

The DSEC Innovation Bloc grant, called ICAT through DM - short for Introducing Computing and Technology Through Discrete Math problem-solving - will fund a Summer Institute for regional high school mathematics teachers and a Summer Academy for military-connected, underserved, and underrepresented rising seniors.

Robert Sinkovits, director of SDSC's scientific computing applications and lead for SDSC's Education and Training program; and Osvaldo Soto, director of the UC San Diego Mathematics Project at CREATE, are the Principal Investigators for the grant.

The DSEC Innovation Bloc grant was awarded as part of a five-year, \$75 million award by the DoD under which DSEC focuses on K-16 (kindergarten through college) STEM enrichment programs for military-connected and/or low-income students and educators, as well as workforce engagement, program evaluation, and public outreach efforts across the nation. The consortium is comprised of 18 organizations, includes UC San Diego CREATE, which serves as a program hub lead on the DSEC grant.

“UC San Diego CREATE is helping our campus to leverage its contacts and networks to support STEM learning for all students, particularly those from less advantaged backgrounds, to make use of learning opportunities funded by the DoD and its many STEM partners,” said Susan Yonezawa, associate director of CREATE and a co-director of the UC San Diego Math Project. “We’re pleased the DSEC Innovation Bloc grant, a collaboration between the UC San Diego Mathematics Project and SDSC, will bring crucial computer and mathematics skills and knowledge to military-connected, underserved, and underrepresented students in San Diego.”

The ICAT through DM’s Summer Institute professional development program for teachers and Summer Academy for students were slated to be held at SDSC, but because of COVID-19 restrictions the programs have been moved online. The online Summer Institute will be held June 22-July 2, 2020, for 20 teachers from the Oceanside Unified School District, San Diego Unified School District, San Marcos Unified School District and Sweetwater Union High School District. Teachers will explore Discrete Math content and be introduced to Python computer language through games of strategy, cryptography and counting techniques. The curriculum will focus on identifying the best conditions for using computing and technology to solve math problems (an example of Standard for Mathematical Practice #5: Use appropriate tools strategically).

The online Summer Academy, led by the Institute teachers, will be held the following week, July 6-10, 2020, for 24 military-connected, underserved, and underrepresented rising seniors from the teachers’ high schools.

“Computational and mathematical thinking are essential to the DoD workforce in nearly every domain, from climate simulations and aerodynamics to analyzing large volumes of text data and satellite imagery,” said Sinkovits. “Discrete mathematics is particularly important in areas as diverse as cryptography, logistics, communications networks and complex decision making.”

Mathematics is traditionally taught using a pencil-and-paper approach and often lacks a real-world context, frequently leading to a sense of alienation among middle and high school students along with missed opportunities to advance critical mathematical and computational ways of thinking, noted Sinkovits.

“Many of today’s real-world problems require mathematical solutions that can only be solved using computational techniques and resources and a strong understanding of key mathematical concepts backed with the power of technology to help students – as well as teachers – better connect empirical and deductive reasoning,” Soto said.

SDSC's involvement with UC San Diego CREATE began when Sinkovits and SDSC Education Manager Ange Mason met Yonezawa to discuss ideas for SDSC's summer program for teachers.

"One could say that Susan was our matchmaker," said Sinkovits. "She suggested that we meet with Osvaldo from the UC San Diego Math Project, as well as Trang Vu, a veteran math teacher and one of the developers of the Discrete Math Pre-Collegiate Curriculum. Together, the ideas started flowing quickly for a proposal to DSEC to fund a discrete mathematics program for teachers and their students. We're excited to be involved in this very worthwhile initiative."

"As the project got underway, we were fortunate enough to recruit more outstanding teachers to help prepare for our summer activities: Tony Claudio, a computer science teacher from Sweetwater Union High School District, and Jorge Hernandez Leon, a math teacher from San Diego Unified School District," said Soto.

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