



ABOUT C-STEM

The UC Davis C-STEM Center aims to transform computing, science, technology, engineering and mathematics (C-STEM) education in both formal and informal in K-14 programs through integrated learning, guided by two key objectives:

- Close the achievement gap by broadening participation of students traditionally underrepresented in computing and STEM related careers and post-secondary study.
- Develop students' 21st century problem-solving skills to tackle real world concerns through integrated computing and STEM education.

Through cutting edge research with funding from the National Science Foundation, the C-STEM Center, in collaboration with our industry partners, has developed innovative educational computing and robotics technologies for K-14 hands-on learning. By working with K-14 educators, the C-STEM Center integrates computer programming and robotics into teaching STEM subjects by creating project-based computing and robotics activities, integrated curriculum, and hands-on personalized and collaborative learning strategies aligned with Common Core State Standards and CTE Standards. This integration helps students make meaningful connections between regular STEM topics and their relevance to real life applications as well as help develop students' critical thinking and problem-solving skills while preparing all students to be career and college ready.

C-STEM joins a distinguished group of programs with UC A-G Program Status. Schools can easily add the A-G approved rigorous C-STEM curriculum to their own school's A-G course lists to satisfy the UC/CSU admission requirements. C-STEM is also a UC Approved Educational Preparation Program for Undergraduate Admission for all UC campuses, meaning that participation in the C-STEM program is recognized in the UC admissions process as achievements that have explicitly prepared students for college and career.

The C-STEM Center and our partners organize annual curriculum-based RoboPlay Competitions in various regions to further engage students in project-based team activities and to showcase their accomplishments and creativity in not only math and engineering, but also in writing, art, music and film production. The C-STEM Center provides unique professional development for STEM educators who have no prior computer programming or robotics experience to implement C-STEM curriculum in both formal and informal programs. Working together, we can transform K-14 education and inspire students to pursue computing and STEM related careers and post-secondary study.

Harry H. Cheng

C-STEM Center Director and Professor

C-STEM PROFESSIONAL DEVELOPMENT

C-STEM provides unique professional development at UC Davis and on-site for teachers without any prior computing and robotics experience to offer C-STEM curriculum as stand-alone courses or integrate them into the existing STEM courses and after school programs. Currently, the C-STEM Center offers three types of professional development, each geared towards implementing different C-STEM curricula. C-STEM also provides tailored on-site professional developments.

“Oh my gosh! I barely can contain myself....soooo fun!!! So challenging and so rewarding at the same time!!!”

— Jessica Fernandez
Math Teacher
Glen Edwards Middle School
California



C-STEM 2-DAY ACADEMY ON INTEGRATED COMPUTING AND STEM EDUCATION

The C-STEM 2-Day Academy on Integrated Computing and STEM Education in various regions will provide K-14 teachers with hands-on experience on how to use freely available C-STEM Studio and RoboBlockly, as well as C-STEM integrated curriculum with interactive computing, programming, and robotics that aligns with the Common Core Math and ICT Sector standards to develop students' 21st century problem-solving skills and better prepare students for college and careers.

C-STEM 1-WEEK INSTITUTE ON INTEGRATED COMPUTING AND STEM EDUCATION

The intensive C-STEM 1-Week Institute on Integrated Computing and STEM Education is designed to provide professional development for K-14 teachers on the principles of robotics and computing and how to integrate them into STEM classes. Teachers learn computer programming, computational thinking, and problem-solving with coding using freely available C-STEM Studio and RoboBlockly. Teachers will learn specific teaching pedagogy and classroom implementation strategies for integrating computing and robotics activities into math, science and engineering curricula, as well as how to support the Common Core State Standards (CCSS) and Next Generation Science Standards (NGSS) using the C-STEM integrated curriculum with interactive computing, programming, and robotics. Teachers also learn how to teach and reinforce mathematical concepts through practical applications with hands-on computing and robotics activities. These activities reinforce logical reasoning and critical thinking skills through computing activities in which students write functions, visualize, process, save and plot experimental and hypothetical data. Teachers will get the first-hand experience of C-STEM RoboPlay Competition and learn to advise their students to participate in this level-playing field robot competition.



C-STEM DAY

The C-STEM Day is organized to build public awareness and advocate for Integrated Computing and STEM education. The C-STEM Center and our partners organize curriculum-based RoboPlay Competitions in various regions on the annual C-STEM Day in May to further engage students in project-based team activities and to show-case their accomplishments and creativity in not only math and engineering, but also in writing, art, music and film production. Various C-STEM awards and scholarships are presented at the awards ceremonies to outstanding students to recognize their achievement and inspire them to pursue computing and STEM related careers and post-secondary study.

“Speaking I feel for all of us who were “first timers” at Orange County site, the day was amazing. We saw teams “bounce back” after disappointing starts, leaders “take command” as the clock ticked, students and their teacher jumping in unison at a score, and some very competent teams that almost always knew exactly what to do. Obviously, technical skills in programming the bots was the official contest, and I think it teaches very well basic engineering values of achieving goals with precision and accuracy, under time constraint, and sometimes against unpredictable obstacles. The Judge Awards, in my opinion, are a superb complement to the technical scoring. We all know that “soft skills” are important in business, so recognizing those attributes gives stronger context to the competition. Finally, the video competition certainly added an artistic dimension, entering the realm of C-STEM.”

- Chris Harrington, Head Judge for RoboPlay Challenge Competition at UC Irvine, a former Vice President for Toshiba American Information Systems.

ANNUAL C-STEM AWARDS

- Award of Achievement (for middle-school students)
- Girl’s Leadership Award (for middle-school girls)
- Award of Excellence (for high-school students)
- Scholarship of \$500 (for upcoming college students)



C-STEM Curriculum

Summer Camps:

- Exploring Mathematics with Computing and Robotics

Middle School:

- Math 7 with Computing
- Math 8 with Computing
- Computer Programming with Ch
- Robotics and Film Production

High School:

- Algebra I with Computing *
- Algebra I with Computing and Robotics *
- Integrated Math I with Computing *
- Integrated Mathematics 1 with Computing and Robotics *
- Computer Programming with C *
- Computing with Robotics *
- Introduction to Computer Programming for Engineering Applications (a UC Davis Engineering Course)

* A-G approved for UC/CSU admission

For more information visit:
<http://c-stem.ucdavis.edu>



Summer Camps:

Exploring Mathematics with Robotics	(Grades 5-6)
Computer Programming with STEM Applications	(Grades 6-8)
Robotics and Digital Media	(Grades 6-8)
Computer Programming with Robotics	(Grades 6-8)

