

Success Story

UC Davis Students Design Sophisticated Radar System Using NI AWR Design Environment

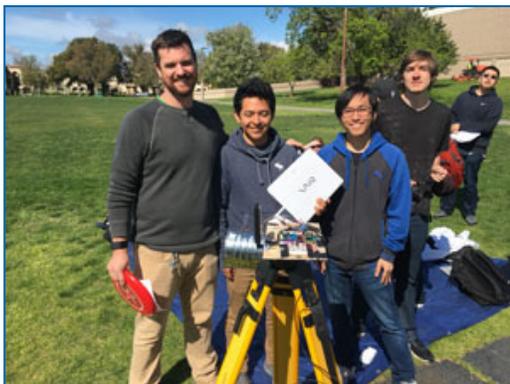
Company Profile

The University of California, Davis, is a public research university and land-grant university as well as one of the 10 campuses of the University of California system. Since its founding in 1962, the College of Engineering, in keeping with the UC Davis land-grant mission, focuses on finding technical solutions to some of our nation's most challenging problems, while also preparing thousands of highly skilled engineers to join in this challenge.

The Design Challenge

Professor Xiaoguang "Leo" Liu teaches a senior project course, Design of RF/Microwave Systems in which students build small radars in the class. The course was created to satisfy the need for a senior project course for students who are interested in high-frequency electronic systems. The two-quarter long course emphasizes system-level design concepts and strives to provide a hands-on experience. As the course evolves, the projects start to encompass many facets of electrical engineering, including system engineering, antenna design, analog circuit design, embedded systems, and digital signal processing.

The first project option is the implementation of a frequency-modulated continuous-wave (FMCW) radar system that can perform range, Doppler, and synthetic aperture radar (SAR) measurements. In the first quarter, the students go through a series of structured labs to learn the basic system design concepts and acquire the necessary skills for putting together a high frequency system. In the second quarter, they propose and implement improvements to their radar system in terms of measurement accuracy, resolution, weight and power consumption.



A student team field testing their radar system.

UCDAVIS

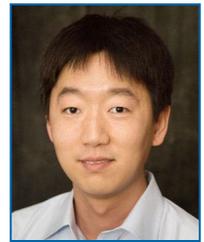
Application:

Radar Design

Software:

NI AWR Design Environment

Microwave Office



“*The ability of my students to successfully design and implement a sophisticated radar system that can perform range, Doppler, and SAR measurements is greatly enhanced by the use of NI AWR Design Environment. My classroom time is significantly enhanced because the students spend more effort on learning RF/microwave concepts and skills and less on learning the software.*”

– Xiaoguang "Leo" Liu
Assistant Professor

Electrical and Computer Engineering,
University of California, Davis
ucdavis.edu

The Solution

To add a little competitive component to the class, at the end of the course the students participate in a radar competition. This year, the AWR Group of National Instruments provided a \$100 gift card and complimentary one-year full license of NI AWR Design Environment to the winning team.

All teams within the class were able to complete the competition and the best performing team had an excellent result. The scores are calculated roughly equal to accuracy, power, and weight of the radar, and the team whose device has the smallest number wins. The winning team of Michelle Chang, Michael Meegan, Gene Uehara, and Vladislav Vakulchik had a score of 0.02866 and the scores of the other teams ranged from 0.1993305664 for the second-place team down to 2.3064825 for the lowest-placed team.

Why NI AWR Design Environment

NI AWR software is used in the classroom for the Design of RF/Microwave Systems class, as well as other undergraduate and graduate engineering design classes at UC Davis. Prof. Liu likes the software because its ease of use and intuitiveness enables his students to focus on design concepts and skills rather than learning to use the software.



Student teams in action: building and testing their radars.

To learn more about the UC Davis competition, visit: ucdart.github.io/education/eec134.html.