Innovative UC Davis Faculty are Finalists for AAMC Award

The Association of American Medical Colleges (AAMC) selected UC Davis and Drs. Nicholas Kenyon and Cristina Davis as a finalist for the AAMC Award for Innovative Institutional Partnerships in Research and Research-Focused Training. Their submission, *Building Bridges: An Engineering Capstone Experience in Translational Medicine*, was selected as a finalist.

The award review committee selected four awardees from the 35 submissions: 1 winner, 2 finalists (your and one other submission), and 1 semifinalist, based on creativity, collaborative partnerships, and impact on institutional practices. A major goal of this award is to identify bright spots and disseminate innovations.

The awardees will be formally announced and awards presented at the 2013 GREAT Group Professional Development Meeting in Atlanta (Sep 19-21, 2013).

The project description:

College of Engineering (COE) students are the glue for a unique partnership that bridges the UC Davis Clinical and Translational Science Center (CTSC) and the School of Medicine (SOM). For the past 5 years, the COE *Capstone Senior Design Course*, with funding from the CTSC Pilot program, has brought together engineering students and clinical faculty in the development of device and therapeutic prototypes. Initially conceived in 2008 by Professors Nicholas Kenyon (Internal Medicine: Pulmonary and Critical Care Medicine) and Cristina Davis (Mechanical Aeronautical Engineering) as an experiment in breaking down the silos of medicine and other disciplines, the effort has succeeded beyond expectations. The program has included 40 faculty mentors, over 100 students and 25 projects. Several positive outcomes have resulted, including a New Technologies Summer Camp for rising COE seniors to deeply engage in clinically relevant translations of engineering innovations. To date, students have produced peer review papers, abstracts, patent disclosures, prototypes and preliminary data to support federal grant proposals. Other outcomes include increased student interest in medical-based commercialization and company formation. This unique UC Davis collaborative shows that effective translational teams can be formed very early in the training experience.

Strong interdisciplinary ties between the UC Davis College of Engineering (COE), Clinical and Translational Science Center (CTSC), and the School of Medicine (SOM) have developed through the Capstone Senior Design Course where clinicians and engineers collaborate on focused medical engineering projects. Initially conceived in 2008 by Professors Nicholas Kenyon (Internal Medicine: Pulmonary and Critical Care Medicine) and Cristina Davis (Mechanical Aeronautical Engineering) as an experiment in breaking down silos between medicine and other disciplines, the effort has succeeded beyond expectations. Professor Davis is the Instructor of Record for the Capstone Course and Professor Kenyon is the director CTSC T32 Pre-Doctoral Training program. Their shared research interests and grants in asthma, breath diagnostics, and sensor development led them to the unique COE-CTSC-SOM collaboration. Each fall, a formal solicitation for project ideas is sent to all SOM faculty. Project concepts with the highest likelihood of success in five months are selected and offered as capstone opportunities to COE seniors. Material and supply costs of $500-$750 per student team are paid by the CTSC Pilot program. COE and SOM faculty mentor student teams as they prototype an instrument or system from design to fabrication and testing.
Since inception, the program has included 40 faculty mentors, over 100 students and 25 projects. The projects have resulted in novel designs and prototypes such as:

- Endoscopic Balloon Drug Delivery Device
- EMG Powered Wheelchair
- Lightweight Portable Wheelchair Ramp
- Procedure Caddy: A New Device to Reduce Risk of Bloodstream Infections
- ’Micro-Bipolar’ Cautery Device for Endoscopic Neurosurgical Procedures
- Kidney Bean Shaped Mechanical Esophageal Dilator to Treat OPD
- Graft Adipose Tissue Exciser
- Intensive Care Patient Self-Hydration Unit
- Self-controlled Powered Mobility Device for Pediatric Development
- Mechanical Walker for Critically Ill Intensive Care Unit Patients
- Electro-Mechanical Automated Pharmaceutical Capsule Sorting Device for Elderly
- Static Multi-Positional Stabilizing System for Ultrasound Transducers Portable
- Low-Cost Pediatric Treadmill for Home Use by Disabled Children

The Capstone collaborations have produced 1 peer review publication, 30 abstracts, 3 patent disclosures, 25 prototypes, along with preliminary data to support federal grant proposals. Other outcomes include student reports of increased interest in medical-based commercialization and company formation. The institution and faculty have benefited from the demonstrated practical experience of bridging the gap between technical know-how and medicine. To extend the collaboration further and engage promising students even earlier in their undergraduate years, a New Technologies Summer Camp was started two years ago. The most talented junior students are recruited for summer internships on selected translational biomedical engineering topics. The summer camp culminates with a poster session and presentations and students continue collaborating with engineering and medicine faculty for independent study during their senior year.

The UC Davis COE-CTSC-SOM Capstone collaborative shows that effective translational teams can be formed very early in the training experience. The COE students bridge the collaboration, making it highly visible across colleges and schools, and their success has led to novel device and therapeutic prototypes that may ultimately benefit many doctors and patients.