HAWAII CENTER FOR ADVANCED COMMUNICATIONS

Presents:

RET HAWAII SEMINAR SERIES

Research Experiences for Teachers Middle School Outreach Program

By: Professor Cynthia Furse, Ph.D

Tuesday, March 18, 2008
2:00 p.m. – 3:00 p.m.
University of Hawaii at Manoa . Holmes Hall Room 287

New ECE Laboratories -- Integrated System - Level Design

As students go through a traditional ECE program, they learn a great deal about individual components and tools -- transistors, op amps, diodes, resistors, transmission lines, and Fourier transforms. In a traditional lab, they build and test these individual units. But when the lab is done, whether or not it worked, they can more or less "forget it". And when the class is finished, they stash their notes and move on to the next subject, often forgetting much of what they have learned. In spite of all of our lecturing, students often do not see the relevance of what they are supposedly learning, do not see how it fits into a system, do not see how they will ever use it. Their motivation suffers, their grades droop, and the bright, energetic, creative and optimistic student becomes mired in a morass of disconnected abstraction, ... before transferring to another major.

Imagine if instead, from first day of class, students are challenged to build a simple but complete system using most of the concepts they will learn in the class. Piece by piece they learn about the components they need, design and test them, perhaps good-naturedly competing with their fellow students for the best designs. When they ask if their designs are "good enough", they are encouraged to check it out for themselves... and predict how it will affect their system in the end. At the end of the semester, the systems are integrated and tested, and all of the designs work, of course! (OK, so sometimes the world IS perfect.)

This presentation describes the new ECE laboratories developed in the University of Utah Electrical and Computer Engineering Department as part of an NSF-sponsored department level curriculum reform (DLR) project. These new labs integrate concepts from multiple classes and have improved students' understanding of system design and how various components they learn in their several classes fit together. In addition, students like these labs better (an indication of motivation). These new labs are more motivational and encourage more active student participation. We have also greatly expanded the technical communication (writing and speaking) experiences in these laboratories to facilitate technical learning ('write to learn').

Dr. Furse received her B.S. in electrical engineering with a mathematics minor in 1985, M.S. degree in electrical engineering in 1988, and her Ph.D. in electrical engineering from the University of Utah in 1994. She is currently a professor at the University of Utah and has taught electromagnetics, wireless communication, computational electromagnetics, microwave engineering, antenna design, and introductory electrical engineering. Dr. Furse works to interest young students, particularly women and minorities in engineering and routinely volunteers in Utah's K-12 schools as an engineering mentor, science educator, and engineering career guidance counselor and is active with the Society of Women Engineers, Junior Engineering State, Expanding your Horizons, School-to-Careers, MESA, Girl Scouts and Boy Scouts. Dr. Furse was the Professor of the Year in the College of Engineering at Utah State University for the year 2000. She is the Director of the Center of Excellence for Smart Sensors, an active, funded research program including electromagnetics for biology and remote sensing. The Center focuses on imbedded antennas and sensors in complex environments, including sensors for location of faults on aging aircraft wiring and telemetry systems in the human body. Dr. Furse has directed the Utah Smart Wiring program, sponsored by NAVAIR and USAF, since 1998. She is Chief Scientist for LiveWire Test Labs, Inc., a spin off company commercializing devices to locate intermittent faults on live wires.

RSVP to Kari Nettel nettel@hawaii.edu or call (808) 956-9687