Signal and Information Processing for the Smart Grid

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Location: Holmes Hall 244, Date: Thursday, September 10, 2015, Time: 4:30 – 5:30 pm

About the speaker: Dr. Kuh received his B.S. in Electrical Engineering and Computer Science at the University of California, Berkeley in 1979, an M.S. in Electrical Engineering from Stanford University in 1980, and a Ph.D. in Electrical Engineering from Princeton University in 1987. Dr. Kuh previously worked at AT&T Bell Laboratories (79-82) and has been on the faculty in Electrical Engineering at the University of Hawai‘i since 1986. He is currently a Professor in the Department and is also currently serving as director of the interdisciplinary renewable energy and island sustainability (REIS) group. Previously, he served as Department Chair of Electrical Engineering. Dr. Kuh's research is in the area of neural networks and machine learning, adaptive signal processing, sensor networks, communication networks, and renewable energy and smart grid applications.

Dr. Kuh won a National Science Foundation Presidential Young Investigator Award and is an IEEE Fellow. He was also a recipient of the Boeing A. D. Welliver Fellowship and received a Distinguished Fulbright Scholar’s Award working at Imperial College in London. Dr. Kuh was an Associate Editor for the IEEE Transactions on Circuits and Systems, served on the IEEE Neural Networks Administrative Committee, served on the IEEE Neural Networks for Signal Processing Committee, and was a Distinguished Lecturer for the IEEE Circuits and Systems Society. Dr. Kuh co-chaired the 1993 International Symposium on Nonlinear Theory and Its Applications (NOLTA) and served as the technical co-chair for the 2007 IEEE ICASSP both held in Honolulu. He was serving as the IEEE Signal Processing Society Regions 1-6 Director at Large (2013-2014). He is currently on the Board of Governors of the Asia Pacific Signal and Information Processing Association, and as a senior editor of the IEEE Journal of Selected Topics in Signal Processing.

Abstract
This talk will first give an introduction to Hawaii’s energy landscape and the REIS program. We will then discuss using signal processing to assist in processing of information for the smart grid. This consists of getting information about the electrical grid and environment via sensor networks, interpreting information received via signal processing and machine learning, and then using the information to make intelligent decisions about the grid using control and optimization algorithms. The focus is on the electrical grid beyond the last substation, the distribution grid. For the smart distribution grid there is an increasing amount of distributed renewable energy sources and possible distributed storage. This necessitates gathering more information about the electrical grid, environment data, and building energy usage. With this information we can forecast distributed renewable energy sources and develop algorithms for distributed state estimation. We can then develop demand response algorithms to control loads (e.g. appliances, thermostats, air conditioners, hot water heaters). While this talk is an overview talk we will also discuss some details of our research efforts in these areas.