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Electrical Engineering
Fall 2005

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The challenge of how to explore and discover useful functionalities in a vast configuration space may be addressed using machine-based searches. Our current research effort is focused in a few specific directions such as creating an optimized semiconductor optical modulator, controlling scattering of electromagnetic radiation off aperiodic dielectric structures, and controlling nano-metal-light interactions. In this on-going good-of-principle study, it is already clear that such an approach to device design is going to be worthwhile. The underlying reason is that exposing more degrees of freedom tends to increase accessibility to functionality. The device synthesis methodology we use exploits advances in applied mathematics, computer science, development of realistic physical models, available compute power, nanoscience, and device engineering. Today, our interdisciplinary research effort involves collaborations with the Physics, Mathematics, and Electrical Engineering departments at USC as well as researchers at MIT and NYU. For more information, check http://www.usc.edu/aekv

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Dr. Martin Gundersen is working on improving the depiction of science and engineering in film and television. In August he, along with an elite group of scientists from across the country, gathered in the Hollywood Hills to plot a solution to what officials call one of the nation’s most vexing long-term national security problems: Fewer and fewer students are pursuing science and engineering, so a crisis is looming unless careers in science and engineering suddenly become hugely popular. What better way to get young people interested in science than by producing movies and television shows that depict scientists in flattering ways? Dr. Gundersen’s brainstorm was to teach screenwriting to scientists and consider them as a creative source.

Financed by the Air Force and the Army, the scientists wrestle how to reconcile the cinematic perception of disbelieve with the scientific method and with their basic purpose of bringing accuracy to the screen. With only 500 or so films made a year, Dr. Gundersen conceded that the odds were stacked against any of their protégés, but he is holding out hope. For more information, check http://pulsedpower.usc.edu

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In the News
Dapkus Recognized for Pioneering Work in Nanotech

The Optical Society of America (OSA) has honored Paul Daniel Dapkus with the Nick Holonyak, Jr. Award. “This award is special to me because it is named after my thesis advisor,” said Dapkus, a National Academy of Engineering member who holds the W. M. Keck Chair. The award honors Dapkus’ contributions to the development of quantum well laser devices, which was developed in his USC Compound Semiconductor Laboratory where it has become the standard design for all semiconductor lasers including those used in fiber optic communications, CD and DVD players, laser printers, industrial high power lasers, medical treatment lasers, and most recently in computers.

UCS Researchers Led By Narayanan Receive a Four Year NIH Grant and a Five Year MURI Grant to Study Speech Production

The National Institutes of Health (NIH) has awarded Shri Narayanan (PI), Dan Byrd (Co-investigator), Krishna Nayak, Suntikul Lee, and Richard Laxby an award of $1.75 million for the first research project entitiled Dynamics of Vocal Tract Shaping. This brand new grant takes advantage of the real-time MRI technology — for imaging, data transmission, and other tasks, and now he directs a research unit specializing in the field, the USC Ultrasound Laboratory. Scholtz shares the honor with his frequent ultra-wideband research collaborator and co-author, Moe-Win of the Massachusetts Institute of Technology.

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Viterbi Ultrawideband Specialist Wins IEEE Summer Medal

Professor Robert A. Scholtz has been named a co-recipient of the 2006 IEEE Eric E. Summer Award “for pioneering contributions to ultra-wide band communications science and technology.” Scholtz has been a faculty member in the Viterbi School department of electrical engineering since 1963 and now holds the school’s Fred H. Cohn Chair. For nearly a decade he has been studying how to use ultra-wideband — brief signal pulses spread over a very wide band of the radio spectrum — for imaging, data transmission, and other tasks, and now he directs a research unit specializing in the field, the USC Ultrasound Laboratory. Scholtz shares the honor with his frequent ultra-wideband research collaborator and co-author, Moe-Win of the Massachusetts Institute of Technology.

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Viterbi School of Engineering

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Electrical Engineering

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