Greetings from the Chair

I am happy to announce this first EE Departmental news letter giving an overview of the events of this past year. The Department now consists of 24 faculty members of which 7 are Fellows of the IEEE and 4 are Fellows of the AAAS. The faculty are carrying out vibrant and growing research programs. The number of research dollars won in contracts and grants continues to increase yearly. This increasing research effort funds our increasing graduate student population which has grown from 80 to 115 over the last 3 years. The research leverages the 4 campus and system-wide research centers: the Center for Nanoscale Science and Engineering, the Center for Research in Intelligent Systems, the Center for Environmental Research and Technology, and the UC Light Center. Three of the Center Directors are EE professors. One of the exciting developments is the establishment at UCR of the new Center for Ubiquitous Communication by Light by EE Prof. Z. Xu with members from 4 other UC campuses.

Two new faculty members joined the department. Asst. Prof. A. Mourikis from U. Minn. works in the area of controls and robotics, and Asst. Prof. E. Haberer from UCSB works in the area of electronic materials. E. Haberer was hired under the new, interdisciplinary Materials Science and Engineering Program that offers both undergraduate and graduate degrees.

Looking ahead, I find the department to be in a strong position to meet the demands of the coming year. Most importantly, significant budget surpluses have been accumulated over the last two years which will allow us to weather this year’s budget cuts with few actual cuts in our operations. There are no planned cuts in courses or labs offered. The significant resources provided by the federal contracts and grants add to our buffer from the California budget deficit. I expect another successful year in the EE Department.

Faculty Awards

Professor Jie Chen has been named a fellow of the American Association for the Advancement of Science (AAAS). “For distinguished contributions to the field of systems and control, particularly for development of modeling and identification algorithms and for fundamental understanding of feedback systems.”

The IEEE Board of Directors elevated Professor Albert Wang to IEEE Fellow. Dr. Wang achieved the Fellow designation for his contributions to design-for-reliability and system-on-chip work.

Professor Mihri Ozkan is the national winner of the Society of Engineering Science’s SES Young Investigator Medal. It is awarded to a young researcher whose work has already had an impact in his/her field within engineering science.
Faculty Awards (continued)

Associate Professor Jianlin Liu is one of this year’s recipients of the Army Research Office Young Investigator Program (YIP) Award for his proposal “Electrically Pumped ZnO Ultraviolet Diode Lasers.”

Faculty in the News

An article by Professor Mihri Ozkan and Cengiz Ozkan (Mechanical Engineering) was highlighted on the Winter 2008 cover of The Bridge (r.), a quarterly journal magazine published by the National Academy of Engineering (NAE). Theirs was selected as the frontier engineering research in emerging nanoelectronic devices.

Faculty Promotions

Amit Roy-Chowdhury and Ertem Tuncel were promoted to Associate Professor with tenure. Sakhrat Khizroev, Mihri Ozkan, and Zhengyuan Xu were promoted to Professor.

New Faculty Member

New EE faculty member Anastasios Mourikis received the Diploma of Electrical Engineering from the University of Patras, Greece, in 2003, and the Ph.D. degree in Computer Science from the University of Minnesota in 2008. He has worked as a visiting independent advisor at the NASA Jet Propulsion Laboratory, and as a research and teaching assistant at the University of Minnesota. While at the University of Minnesota, he was awarded the University's 2007 Doctoral Dissertation Fellowship, as well as the Computer Science Department's 2005 and 2006 Excellence in Research awards.

Dr. Mourikis's research interests include vision-aided inertial navigation, multi-robot systems, distributed estimation in mobile sensor networks, simultaneous localization and mapping, and structure from motion.

New Faculty Member

New EE faculty member Elaine D. Haberer received her B.S. and M.S. in Materials Science and Engineering at MIT in 1997 and 1998, respectively and her Ph.D. in Materials Engineering from UC Santa Barbara in 2005. Prior to joining the faculty at UC Riverside, she was a postdoctoral researcher in the California NanoSystems Institute at UC Santa Barbara where she explored viral-based assembly of nano-structured materials for low-cost solar cell applications. Her doctoral work developed a novel semiconductor etching technique used to fabricate low-threshold GaN microdisk lasers. Her professional affiliations include IEEE, MRS, AIChe SBE, and SWE.

Dr. Haberer's research interests include biologically-mediated assembly of materials for electronic, optoelectronic, and energy applications; nano-structured hybrid materials; and novel top-down and bottom-up assembly techniques.
Materials Science and Engineering Program Established

The Department of Electrical Engineering is one of the participating departments in the new interdisciplinary Materials Science and Engineering (MS&E) Program. Seven electrical engineering professors became MS&E participating faculty members, while Professor Alexander Balandin served as a founding chair of the program and led the college and campus efforts for the program development. In September of this year, the UC President approved the campus-wide MS&E graduate program. The MS&E undergraduate program was approved a year earlier and welcomed its inaugural class last Fall. The MS&E undergraduate students will be able to focus in Electronic and Magnetic Materials through a selection of a coherent set of technical electives offered by the electrical engineering faculty members participating in MS&E program. Electrical engineering graduate students have an opportunity to add an M.S. degree in MS&E as a second major. The first full cohort of MS&E PhD students will be admitted in Fall 2010 to study and carry out research under supervision of the faculty members from all departments participating in the program. To learn more about MS&E visit the program’s web-site at http://cmsmse.engr.ucr.edu.

New UC-Light Center

The University of California’s Multicampus Research Program and Initiatives (MRPI) will fund EE Professor Zhengyuan Xu $3.5 million for a 5-year project, starting January 2010, to establish a Center for Ubiquitous Communication by Light (UC-Light). As the principal investigator and director of the new research center, Professor Xu will lead a multi-campus effort from team members of UC Riverside, UC Berkeley, UC Davis, UC Merced, and the Lawrence Berkeley National Laboratory. The next generation of lighting will use more energy-efficient and sustainable white LEDs instead of traditional light bulbs. They are capable of being modulated at a very high speed which is suitable for broadband communications with negligible effects on concurrent lighting. Meanwhile their locations provide excellent references for navigation. Those LEDs will also be widely deployed as traffic lights and vehicle lights whose communications can enhance driving safety. You may be ubiquitously connected where you see light. The picture shows a visible light communication example where radio frequency communication is prohibited in a hospital.

The potential impacts of the research are huge. With a proper data interface to a wired data network such as Ethernet, it will be possible to build low-cost communication and navigation systems on existing lighting infrastructure. Results will be especially important in areas where radio frequencies are limited, such as hospitals and airplanes. The visible light spectrum is several orders of magnitude larger than the crowded radiofrequency (RF) spectrum, and thus has huge potential for low cost, high data rate, ubiquitous communication.

UCR researchers affiliated with UC-Light are EE professors Jay Farrell and Albert Wang, and CSE professor Srikanth Krishnamurthy.

Networking via light could be especially helpful in hospitals and other environments where radio frequencies are limited.
Major Grants Awarded

Professor Sakhrat Khizroev (r.) and Chemical and Environmental Engineering Distinguished Professor Robert Haddon have been named senior investigators as part of the Materials Research Science and Engineering Center (MRSEC) team at Georgia Tech, funded by the National Science Foundation. The new research center at Georgia Institute of Technology is focused on the use of epitaxial graphene as an electronic material. To date, $1.35 million has been awarded to the six-year project.

Prof. Amit Roy-Chowdhury (l.) is part of a team that has received a large, multi-year NSF grant titled "Interactive and intelligent searching of biological images by query and network navigation with learning capabilities".

UCR is part of a team that has won a prestigious grant from DARPA on Video and Image Retrieval and Analysis Tool (VIRAT). Amit Roy-Chowdhury is the PI at UCR. Only 3 teams were selected nationwide. The team UCR is on is led by Lockheed Martin and involves other faculty from UCSB, UT Austin, CMU and University of Central Florida. Phase I of the project is for 18 months and is one of DARPA's new initiatives in the area of video analysis. It will have high visibility as the project will involve some of the top computer vision research groups in the country.

Professor Bir Bhanu (l.) is leading an interdisciplinary team of investigators from Engineering and Life Sciences that will develop a program in video bioinformatics, the study of 5-D (3-D space, time and wavelength) biological processes captured live by video in real-life experiments. The Integrative Graduate Education and Research Traineeship (IGERT) program, sponsored by the National Science Foundation, will support 25-30 Ph.D. students. This highly competitive award is the first for Bourns College of Engineering and the second for the UCR campus.

Amit K. Roy-Chowdhury and B. Bhanu have received a $3.1 million award from the Office of Naval Research for a project on tracking and activity recognition in camera networks. One thrust of the research will be in developing methods for tracking targets over a large area in a video network using a combination of hard (e.g., face) and soft (e.g., appearance, gait, audio) biometrics. Maintaining the stability of tracks over large swaths of space and time is a very challenging problem that this research will address.

Professors Bhanu and Roy-Chowdhury have received an additional $1.2 million award from the National Science Foundation (NSF) for their large-scale video network research, increasingly important for critical applications such as video surveillance, traffic monitoring and elder care.

A group led by Associate Professor Jianlin Liu (l.) (principal investigator) and Professor Roger Lake (r.) (co-principal investigator), working with Physics professor Yi Shi (co-principal investigator) at Nanjing University in China, is studying the possibility of future nonvolatile memories, one to two orders of magnitude smaller than state-of-the-art flash memory. The three-year project is being funded by the National Science Foundation (NSF) and National Natural Science Foundation of China (NSFC).

Jianlin Liu also received a three-year grant from the Department of Energy (DOE) to investigate zinc oxide thin films for solid state lighting.

Associate Professor Sheldon Tan (PI, left) and Professor Yingbo Hua (co-PI, right) received three-year grants from National Science Foundation and Semiconductor Research Corporation (SRC) for exploring new techniques of building compact parameterized, transient thermal models for efficient thermal-aware design space explorations in multicore microprocessor designs.
**Major Grants Awarded (continued)**

Professors Amit Roy-Chowdhury and Jay Farrell received a three-year grant from ONR for research in control and information fusion in sensor networks consisting of video cameras, augmented with other sensors (e.g., audio).

Professor Alexander Balandin (l.) was invited to join a multi-university team funded by the US Department of Energy (DOE) with the goal to develop the high-efficiency nanostructured photovoltaic cells for solar concentrator systems. The 1.11 million-dollar DOE project supports research at the Rochester Institute of Technology, University of California - Riverside and NASA Glenn Research Center to develop photovoltaic cells with the very high efficiency, selective spectral sensitivity and favorable thermal properties for applications in the concentrator photovoltaic systems.

**Workshop sponsored by NSF, ONR and ARO**

In May 2009, over 70 leading researchers in large-scale video networks met at the Bournes College of Engineering for an invitation-only workshop to survey the challenges facing the technology and discuss future research directions.

DVSN 2009 (Distributed Video Sensor Networks) was sponsored by the National Science Foundation, the Office of Naval Research and the Army Research Office. The event featured numerous presentations by participants, small specialized working sessions and culminating discussions on possible future research directions.

Professors Bir Bhanu, Chinya Ravishankar (Computer Science and Engineering) and Amit Roy-Chowdhury, who are the principal investigators for several grants and contracts totaling more than $5 million supporting the work in this field, served on the Organizing Committee with Bir Bhanu as chair.

**Department News**

In US News and World Report, Electrical Engineering was ranked 57 with a peer assessment score of 2.7.

**Graduate Students in the News**

PhD student Irene Callizo received the Gordon Watkins Award at the UCR Honors Convocation. The prestigious award, named for UCR’s first provost, is presented each year to an outstanding graduate student for exceptional community service. The latest of Irene’s numerous volunteer activities was coaching a robotics team of girls. She served as advisor to the group known as Robo Girlz, an offshoot of Engineer IT Girls.

PhD student Robert Fernandez won a prestigious National Science Foundation (NSF) award which was created to introduce U.S. graduate students to East Asia and Pacific science and engineering in the context of a research setting, and to attend the program in Singapore.

PhD student Sheng Chu’s Applied Physics Letters paper (APL 93, 181106(2008)) on “Electrically pumped ultraviolet ZnO diode lasers on Si” is among the top 20 (placed the 2nd) most downloaded papers of Applied Physics Letters in November 2008.

Yiming Li and Professor Bir Bhanu won the Best Paper Award at the Second ACM/IEEE International Conference on Distributed Smart Cameras (ICDSC). The conference took place Sept. 7-11 at Stanford University. The paper was chosen from a field of 61. Li and Bhanu’s paper, titled “Utility-Based Dynamic Camera Assignment and Hand-off in a Video Network,” proposes an approach for multi-camera, multi-person seamless tracking that allows camera assignment and hand-off to other cameras as the subject goes out of the frame. The approach is based on game theory.

M. A. Khayer won 1st prize for graduate student paper at the IEEE EDS Mini-Colloquium on Microelectronics for his paper, High-Speed and Low-Power Performance of InSb and InAs Nanowire Field-Effect Transistors in the Quantum Capacitance Limit co-authored with R. Lake.

Anthony Bianchi (Dr. Bhanu’s Ph.D. student) was selected by NSF to participate in East Asia and Pacific Summer Institutes for U.S. Graduate Students (EAPSIS). Anthony spent summer 2009 at Intelligence Computing Laboratory (ICL) at the National Chi Nan University, Taiwan.

Koichiro Yamauchi (Dr. Bhanu’s Ph.D. student) received the Best Student Paper Award for his paper on “Recognition of Walking Humans in 3D” at the IEEE Computer Society Workshop on Biometrics held in conjunction with IEEE Conference on Computer Vision and Pattern Recognition, held in Miami, Florida in June 2009.

Hoang Nguyen (Dr. Bhanu’s Ph.D. student) was nominated for Best Paper Award for his paper on “Tracking Multiple Objects in Non-stationary Videos,” at ACM Conference on Genetic and Evolutionary Computation (GECCO) held at Montreal, Canada, July 2009.
Statistics

This past year, there were a total of 37 graduates from the Graduate Program, 25 MS and 12 PhD, and there were a total of 33 graduates from the B.S.E.E. program. This Fall 2009, 44 new students entered the Graduate Program, and 64 students entered the EE Undergraduate Program. Currently, there are 145 Graduate students and 199 Undergraduates in the EE Program.

The Computer Engineering undergraduate program, jointly administered with the Department of Computer Science and Engineering, graduated 14 students last year. Fall 2009 added 80 new CE students with a current total of 209 in the CE Program.

Graduates: Where are they now?

Irene Calizo (PhD) is now at National Institute of Standards and Technology (NIST). Vladimir Djapic (PhD) is at NATO Undersea Research Centre as a Scientist with the Autonomous Mine Countermeasure Program. Kevin Christopher (MS) is at Boeing. Wenjie Dong (PhD) is a tenure track assistant professor at University of Texas—Pan America. Yilei Xu (PhD) is a Research Scientist at Cognex. Cristian Soto Wilder (MS) is a Software Engineer at Western Digital. Rabee Ikkawi (PhD) is a Senior Engineer at Western Digital Corporation in San Jose, CA. Rabee is in charge of a project to develop a next-generation information storage technology for the company. Nissim Amos (PhD) has two open job offers from both Seagate and Western Digital. Bi Song (PhD) and Zheng Yang (PhD) are both Postdoctoral Scholars at UCR. Weihua Zhu (PhD) is a Postdoctoral Scholar at CERT under Matt Barth and Meng Cao (PhD) is a Postdoctoral Scholar at UC Berkeley. Several MS graduates who remain at UCR include Sayed Md Jaffrey Al Kadry, Shermin Arab, Vivek Goyal, Guanxiong Liu, Craig Nolen, Jie Yu, Anh Vu, Matthew Hudgins, Mohammad Khayer, Jennifer Reiber-Kyle, Miroslav Penchev, Javed Khan, Hai Wang, Duo Li, Luis Gonzalez-Argueta, Sushmee Badhulika, and Miaogeng Zhang.

Undergraduate News

A team of EE undergraduate students including Andrew Juarez, Jorge Carrillo and Jacob Leung has completed a very successful US-China IRES Program in June and July, 2009. This is the 2nd year of the NSF sponsored US-China International Research Experiences for Students (IRES) Program designed to expose American undergraduates from UCR to fast-changing global research environments. It aims to prepare American students to better understand the outside world and become globally competitive in their future careers. This US-China IRES program was directed by Prof. Albert Wang. This year UCR students spent the summer in two Chinese Universities, Tsinghua University in Beijing and Hangdian University in southern China.

Despite the inconvenience caused by the global H1N1 flu, IRES 2009 was very successful. During their summer stay in China, UCR students conducted various academic projects in the local host universities ranging from semiconductor device simulation, fabrication, and testing to FPGA circuit design, as well as IEEE student activities, etc. In addition, the UCR students enjoyed good times with their Chinese host students and experienced the Chinese culture. A post-IRES seminar will be held at UCR in October. All students are invited to the seminar and are encouraged to apply for the UC-China IRES Program for the summer 2010. For more information, please refer to the UCR IRES website at http://www.ee.ucr.edu/~ires/.
Student News

On April 17, 2009, the IEEE Electron Device Society (EDS) Mini-Colloquium on Microelectronics was held at UCR. This mini-colloquium was organized to celebrate the establishment of the new IEEE EDS UCR Student Branch Chapter. Three IEEE Distinguished Lecturers attended the mini-colloquium to deliver three seminar talks: “Nanotechnology Research Challenges for More Moore and Beyond” by EDS President, Prof. Cor Claeys from IMEC; “Millibits to Terabits/pS and Beyond – 60+ Years of Innovation” by EDS President-elect, Prof. Renuka Jindal from University of Louisiana; and “Advanced on-Chip ESD Protection in CMOS/BiCMOS” by EDS Vice President, Prof. Juin Liou from University of Central Florida.

The event started with an official inauguration of the EDS UCR Student Chapter by EDS President, Prof. Claeys, who handed over the EDS banner to the UCR Chapter Officers. This EDS mini-colloquium was jointly held with the 1st IEEE Student Research Forum @ UCR (ISRF-UCR), a new annual student research symposium organized by the EDS UCR Student Chapter as its first major academic event. ISRF-UCR means to provide an interactive forum for students, both graduate and undergraduate, at UCR to share their research outcomes and experiences to promote the research sprits among students. About forty student papers, including 20 undergraduate research papers, were accepted for interactive presentations.

Our EDS guest speakers also served as the judges to select the Best Student Papers for both graduate and undergraduate student presenters. The events were very well received by an audience of about 80 people on campus. Our students also enjoyed the interactions with our EDS guests very much.

A Shout Out to Our Alumni

I would love to hear from you. Let me know where you are and how you are doing. Shoot me an email at

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Best regards,
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