The ECE Current

ELECTRICAL AND COMPUTER ENGINEERING DEPARTMENT, UC SANTA BARBARA

Fall 2011

A Great Journey...

1962 – *ECE founded*

1982 – *ECE ranked 21*
(by National Research Council)

1995 – *ECE ranked 19*

2010 – *ECE ranked 4*

2012/13 – *50th Anniversary*

News Flash

Dear friends, colleagues, and alumni,

The top 5 ranking of our department by the National Research Council derives from our extraordinarily productive faculty and the substantial impact of their work on the field. This has translated into new products, new companies, and exceptional job opportunities for our graduate students. At the undergraduate level, our goal is to prepare our ECE students for a dynamic career built on the principal of lifelong learning, and we are developing and evolving our curriculum accordingly. In the last year, we have formed an industrial advisory board of exceptional leaders and innovators, and they are providing important counsel, feedback, and guidance as we enhance our curriculum, increase our interactions with industry, and provide more opportunities for students.

We will be celebrating the 50th anniversary of our Department during 2012, and we look forward to highlighting and recognizing our progress during the last half century. We are looking to the future with excitement, high expectations, and renewed commitment. As you read this newsletter, you will see many of the reasons for our optimism. We would be pleased to hear from you, and we hope that you will consider supporting our department through the many opportunities highlighted inside the back cover.

Jerry Gibson, Department Chair

Doluca Family Endowed Chair awarded to Professor Mark Rodwell

In April 2011, ECE Professor Mark Rodwell was honored with the Doluca Family Endowed Chair in analog and mixed-signal integrated circuit design in recognition of his exceptional achievements. His research has extended the limits of high-frequency radio, high-speed optical communications, and powerful imaging applications. Rodwell presented a talk on "Transistors & Integrated Circuits, from DC to the (far) Infrared." The endowed professorship was established last year with a $500,000 gift from alumnus Tunc Doluca and his wife, Lale, and proceeds from the endowment provide permanent funding to support the activities of outstanding scholars.

"As an internationally recognized leader in the area of circuit design, Professor Mark Rodwell brings honor and inspiration to our UC Santa Barbara community," said UCSB Chancellor Henry T. Yang. "The Doluca Family Chair is a vital and permanent tool to ensure future campus leadership in this important area of research, and we are immensely grateful to the Dolucas for their visionary and strategic support of electrical and computer engineering."

Rodwell presenting talk at the inaugural ceremony.

New College of Engineering Dean joins ECE faculty

ECE welcomed the newest faculty member to the department this fall. Rod C. Alferness is the Richard A. Auhll Professor and Dean of the College of Engineering at University of California, Santa Barbara. Alferness came to UCSB in 2011 as the former Chief Scientist at Bell Labs. Alferness is world-renowned for his work on integrated-optic devices and optical switching technology and networks. As Chief Scientist at Bell Labs, he was responsible for strategic directions, government and university partnerships, and technical excellence programs. Earlier, as Senior Vice President of Research, he had overall responsibility for the company's global research laboratories.

Alferness received a Ph.D. in Physics from the University of Michigan. He is a member of the National Academy of Engineering and a Fellow of the Institute of Electrical and Electronics Engineers (IEEE) and of the Optical Society of America (OSA). In 2001, Alferness was the recipient of the IEEE Millennium Award. He received the 2005 IEEE Photonics Award and the 2010 OSA Leadership Award. He also has served as President of the OSA and of the IEEE Photonics Society.

To read more, visit: engineering.ucsb.edu/about/engineering-dean/

The ECE Department invites applications for two tenure-track faculty positions with a start date of Fall 2012. For more details please visit: http://www.ece.ucsb.edu.

Alumni Spotlight

JEFF SCHLAGETER

Jeff Schlageter received his BSEE in 1965 and MSEE in 1967, both from UCSB. He was in the first ECE graduating class in 1965. Upon graduation, Schlageter started designing integrated circuits for companies such as GE, Fairchild Semiconductor, and then Advanced Micro Devices. He also worked for Mostek/ST, Actel, Cirrus Logic, and Ortel/Lucent. At Actel he was responsible for the development of the 23 CMOS Field Programmable Gate Array ICs that were on the 1997 Mars Pathfinder mission. In recent years, Schlageter's career continues as a worldwide project management consultant with Project Acceleration, and as an instructor on the campuses of the University of California and Stanford University.

Q: Why did you choose UCSB over other universities?

A: I chose to go to UCSB after I attended UC Berkeley for one year. I heard that UCSB had an engineering program starting, so I came down and took a look at it, and I liked what I saw. One reason I chose to come here was I could take some of my EE classes in my 2nd year rather than my 3rd. Also the classes were a lot smaller and I wanted more professor contact, and I felt at UCSB the professor would be doing all of the teaching. I was a little concerned about my decision because the school was brand new and not accredited at the time, but I overcame that concern and I never looked back.

Q: What were your favorite classes at UCSB and why?

A: By the time I entered here I was really excited about the courses: everything from the EE classes in applied electrical engineering, where we were dealing with some very unique problems, to microwaves and electromagnetic theory, to the physics department and quantum mechanics. All of that excited me, but the one that really tied in with my goals and desires was semiconductor electronics. I saw this as a newer field and I thought it would be fun to be in a field that was just developing.

Q: As one of the first students in the electrical engineering department (now ECE), what were some of the biggest challenges you observed in establishing engineering here at UCSB?

A: I ended up graduating in the first graduating class in 1965. That class started with about 126 students, and 12 of us graduated three years after I transferred to UCSB. In terms of establishing electrical engineering here at the University, they had a really good core of professors. And by the time I got to graduate school, we had a brand new building. That was Engineering I – it was really a nice building with all the new equipment. So that worked well to continue my interest in UCSB.

Q: What is your advice for students starting their engineering careers this fall as first-year students in Electrical Engineering?

A: For new engineering students, I think back to when I came to UCSB in my second year. The first thing on my mind was getting a good grounding of the fundamentals, because that will stay with you through your whole life. So that was one of my initial focuses. Then I wanted to try to find my passion, and it turned out to be semiconductors and integrated circuits. So I was sure in my first graduate year that was what I wanted to do.

Q: What can the department do to help prepare students for industry?

A: One of the things I've noticed from my career is I entered with very good engineering fundamentals, and I found out that most of the things I was working on were projects with a due date – a quick due date. I found out I didn't really have the tools and techniques necessary to manage projects. So what I recommend the EE department do is to provide access to a project management course for high tech projects, and encourage students to take that before they graduate. Then they will get a jump start in project management, and that's an important part of their career.

To see a video of this interview, visit ece.ucsb.edu/profiles/schlageter/

ECE Alumnus Jeff Schlageter (pictured with spouse) at UCSB Commencement, June 1965. Schlageter was a member of ECE's first graduating class.

Major Research Initiatives

3D High Dynamic Range Video Communications for Handhelds

Handheld devices are fast becoming the center of our connected lives, and natural video communications using these devices is highly desired. High speed wireless networks and multi-camera devices (with both back and front facing cameras) spur this evolution, yet the quality of mobile video communications is hindered by the limits of inexpensive sensors, harsh outdoor lighting conditions, and 2D displays. Research in ECE Professor Jerry Gibson's VivoNets Lab on high dynamic range (HDR) and 3D video uses signal processing to compensate for hardware limitations when acquiring video on handheld devices.

Low Dynamic Range Frame

High Dynamic Range Frame

High Dynamic Range (HDR) Video

Inexpensive cameras capture a fraction of the brightness variations in everyday life, leading to unnatural, poorly exposed scenes. Auto-exposure mechanisms attempt to minimize the number of saturated pixels, yet they fail to correctly expose the entire frame, as seen in the low dynamic range frame above. Here, cars pass through a shadow, while the background is exposed to direct sunlight. As the camera lengthens its exposure time to accomodate for the underlit foreground, the sky and background turn white and overexposed. In still photography, bright regions are captured in shorter exposures, while dark regions are captured in longer exposures, and both can be combined to produce a high dynamic range image. However, when using this technique in video, any uncompensated motion between frames will produce ghosting. Our research efforts in inexpensive HDR video sensing include a dual-exposure algorithm to capture video sequences of alternating short and long exposures. Then, motion estimation and filtering are used to combine the differently exposed frames at the original frame rate, while mitigating ghosting and registration artifacts. The result is improved color and contrast in poorly or harshly lit environments. In the HDR frame shown above, the moving cars in the foreground are now properly exposed, while maintaining natural blue skies.

To learn more visit: vivonets.ece.ucsb.edu/

Handheld 3D

Input Left/ Right Frames

Comfortable 3D Output

Stereoscopy enhances realism by presenting different views to each eye, producing an illusion of depth. Views of faces can be dramatically enhanced by 3D, as the mind naturally expects faces to exhibit particular structure and depth features. Traditional 3D displays are unsuitable for video communications simply because they require wearing glasses. However, recently available glasses-free, autostereoscopic displays create a new opportunity for handheld 3D video communications, using front-facing stereo cameras adjacent to the screen (depicted below). A key difficulty in producing 3D content for handheld displays is finding a balance between "deep" 3D perception and viewing comfort. Ongoing work in the VivoNets Lab investigates optimal camera placement for a 3D video communications device, along with other handheld 3D viewing concerns. For example, to maximize both viewer comfort and depth perception, objects nearest to the cameras should appear on the screen, rather than project outward. In the input left/right frames shown above, there are large disparities due to the short distance between the cameras and the user, making the 3D image uncomfortable to view and impossible to fuse. In the output frame, the left and right images are dynamically shifted to limit disparities and align the user's face onto the screen surface, thus providing a natural and comfortable 3D viewing experience on handhelds.

Front Facing Stereo Camera

Did you know?

The ECE IT Support Group

*** Is responsible for more than 1600 network connected systems in 4 different buildings.**

*** Maintains student accounts, software, and hardware for 7 instructional labs and 120 computer workstations.**

*** Manages Email servers, software application servers, software licensing servers, Web servers, data backup servers, and database servers for more than 400 users.**

*** Provides computer and network support for all instructional, research, and administrative operations.**

ECE IT staff include: Ken Dean, Information Technology Manager, Conan Dooley and Keith Grant, Computer Network Technologists

Multi-campus University Research Initiatives (MURI)

PARTICIPATING INSTITUTIONS

DRIFT:
Carnegie Mellon University
Massachusetts Institute of Technology
North Carolina State University
Ohio State University
University of Michigan
Vanderbilt University

DEFINE:
Arizona State University
Harvard University
Massachusetts Institute of Technology
Ohio State University
Stanford University
Yale University

3D Circuits for CMOS/RRAM integration:
Stony Brook University
University of Michigan at Ann Arbor
University of Massachusetts at Amherst

Design for Reliability Initiative for Future Technologies (DRIFT)

With a MURI funded by the Office of Naval Research (ONR), ECE Professor Umesh Mishra and collaborators have launched a comprehensive effort to study the electrical, environmental, and thermal reliability of GaN field effect transistors (FETs). The goals are to identify the underlying physical mechanisms limiting reliability, construct reliability models with predictive value, develop methodologies for accelerated reliability evaluation of FET technologies, and propose device and process design rules to enhance reliability. Although the final testing and design protocols will be material independent, this MURI mainly focuses on the study of GaN devices with important feedback from Si and GaAs reliability.

Dielectric Enhancements For Innovative Electronics (DEFINE)

Professor Mishra also co-directs a comprehensive study of the science and technology of various high-k and low-k dielectrics on GaN-based semiconductors with the objective of establishing a fully characterized, robust set of manufacturable and scalable dielectrics with appropriate properties such as low interface state densities. This will be achieved through a systematic optimization of dielectric films using atomic layer deposition, characterization of bulk, interfacial and electrical properties of the deposited dielectrics, and ab-initio calculations of dielectric/GaN interfaces. The goal of this ONR-funded MURI is to foster the science and technology of dielectrics on GaN-based semiconductors, address the question of "why these dielectrics and not others?", and ultimately establish a fully characterized, robust set of dielectrics for GaN-based semiconductors to enable novel functionalities in GaN-based electronic devices.

Capacitance - Voltage measurements in progress to study the dielectric/GaN interface

Integrating CMOS with a novel RRAM technology in 3D circuits

ECE recently won a $7 million award from the DoD's MURI program to develop solutions for building new three-dimensional (3D) integrated circuits that can monolithically integrate CMOS subsystems with nanowire-based Resistive Random-Access Memory (RRAM) arrays.

Co-directed by ECE professors Tim Cheng and Dmitri Strukov at UCSB, this project includes efforts from 4 campuses and a total of 9 faculty research groups. "This is a true multidisciplinary team, including physicists, materials scientists, device engineers, circuit designers, and computer architects," said Cheng "which enables the exploration ranging from applications, architectures, circuits, to device technologies for these novel 3D systems."

The proposed solution combines the advantages of CMOS technology with the extremely high density of nanowire-based RRAM devices through novel integration. Such 3D CMOS/RRAM hybrid circuits will overcome major limitations pertinent to current IC and packaging solutions as well as other 3D IC technologies (such as through-silicon vias). If successful, this proposed solution can achieve unprecedented memory density (up to 1014 bits on a single 1-cm2 chip) and enormous memory bandwidth (up to 1018 bits per-second per-cm2) at manageable power dissipation. Such performance represents a significant step towards addressing the most pressing needs of electronic systems, in particular, those for high-performance and cloud computing, military command and control, surveillance, and communications.

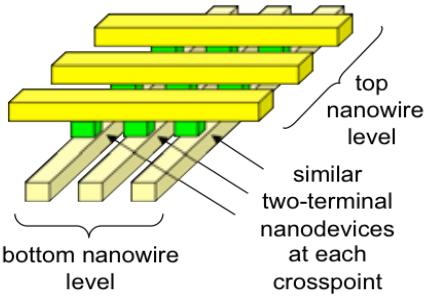

Illustration of the add-on layer: nanowired-based RRAM array

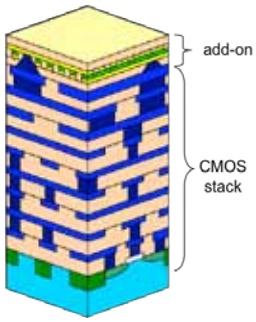

Illustration of 3D hybrid circuit: CMOS subsystem+nano-RRAM add-on

Q & A with
DAVID WONG

David Wong received his BSEE, MSEE, and PhD from UCSB in 1973, 1975, and 1979, respectively. He went on to be involved in multiple start-ups, including D2 Technologies, which he founded in 1993 and for which he is the current CEO and chairman. He helped spearhead the College of Engineering's Technology Management Program, and he currently serves on the TMP board, as well as the ECE Advisory Board and the COE Dean's Cabinet. In 2007 Wong was presented with the College's Alumni Award to acknowledge his generosity and service to the department, college, and university as a whole.

Q: How did you become interested in Electrical Engineering?

A: I wasn't exactly sure what Electrical Engineering was. In high school my grades were good all around. I could have gone into medicine; I almost did. I could have gone into science or engineering. I got some advice that Electrical Engineering was a really flexible undergraduate degree, and that it's harder to go from science into engineering, but I could go from engineering into science. So I chose Electrical Engineering.

Q: What are some specific ways that Electrical Engineering at UCSB propelled you in your career path?

A: A really big influence was the course work in my junior year. I took a course in engineering analysis from Dr. Gray who actually became a lifelong good friend of mine. He was very inspiring. I wasn't exactly a tinkering engineer who liked putting things together; I was more of an analytic engineer. I took just as many math courses as I did engineering classes. So when I took analysis, I thought, "oh perfect, the two of them together – it's practical and it's math."

Q: Having studied as an undergraduate, masters, and PhD student in the ECE department, what did you find to be unique about Electrical Engineering at UCSB?

A: Well for one, I've had life long relationships with a number of my professors, who inspired and guided me through my early years. And the other thing that made my experience unique is that my interests were very broad. When I was at UCSB I took a tremendous amount of philosophy classes. One of the philosophy professors ended up being my neighbor and we became very good friends. I took music classes and the music teacher said I was the first engineering student he had in a music class. I think UCSB encourages the kind of environment where I felt free to explore a wide range of interests. And I think that's been very helpful in my career. Running a business you have to be aware of things like media and social networking; and these are not engineering disciplines. These are sociological, philosophical, and related to language, media and art. So I think engineers today need to branch out beyond math, computer programming, computer architecture, etc, and understand the broad fields of media, communications, languages and more.

Q: For you, what factors lead you to start or invest in a company?

A: In terms of startup and investment, my first start up was really kind of a challenge to myself. I just wanted to see what it was like and whether I might like it. Now I'm involved in about four companies and chairman of three. I get involved and interested in what some of the younger people want to do. I want them to do what I was able to do with the same good advice I got from my investors and partners. And investing really keeps my mind stimulated. Every company eventually has to figure out what it is. Some figure it out, some never do.

David Wong as an undergraduate student in ECE at the Santa Barbara harbor during a visit with his father.

And there's a path for the founders also, to discover who they really are and what they really want to do. It's a very interesting discovery, and a learning and teaching process. I think that's why it keeps me interested. I don't actively pursue investments; they come to me. I start out a little interested, then a little more, and then I'm all the way in. That's how I ended up in 5 or 6 different companies. It was not planned.

Q: What advice do you have for students who aspire to be entrepreneurs?

A: At some point as a student you need to think about if you're a strategic thinker or non-strategic one. And you need both kinds in any company. You need to first decide which kind you are. If you're a big picture strategic guy, I think the department offers basic training, but it's up to the individual to pursue other knowledge. If you are going to be working on technology for medicine, for example, you should certainly find out more about medical issues. And if you want to do things with consumers, you need to learn about consumer marketing, branding, and so forth. I think the department offers a framework, but each student needs to pursue his her interests. As a student I got that opportunity because the department was small and nobody had time to stop me from roaming around and exploring different interests on campus, which has proved very useful. I think that breadth of experience is good for strategic thinkers, big picture thinkers.

Q: From an alumni prospective, why it is important to give back to the college?

A: In terms of giving back, to me, I don't give back for a reason. Giving is a privilege. Giving is its own reward. I certainly felt UCSB took care of me very well. It was the turning point in my life when I came to UCSB in 1969 from Hong Kong. I had no idea what Electrical Engineering was. I had no idea what a venture capitalist was or what a startup was. And it's really through UCSB that I got introduced to that world and it has been a very exciting and rewarding experience. I would certainly like to see more students be given the same opportunities I was given.

Q: How/why do you still work with the College of Engineering? Do you find it beneficial to you?

A: I work with UCSB for the same reason I get involved in start-ups. It is very exciting to get involved with faculty who are either more senior like myself, working on the same goals as mine, or with junior faculty that have exciting new prospects, and to see all these students with bright futures ahead of them. It's exciting to be involved with people when they are at the threshold of their career. They have all these opportunities and prospects in front of them. Most of the people I see at UCSB and in start-ups are in their 20s or 30s. It's a privilege to be involved in that stage of their personal and career development.

To see a video of this interview, visit: ece.ucsb.edu/profiles/wong/

David Wong accepting his Alumni Award at Senior Send-Off 2007.

Q & A with George Matthaei

Professor Emeritus George Matthaei came to UCSB in 1964 when the department had just been formed. Matthaei is an IEEE Fellow and member of Sigma Xi and Tau Beta Pi. He worked for the ECE department for 27 years until he retired in 1991. He reflects on his career and the evolution of the department.

Q: What originally made you interested in the electrical engineering field?

A: I knew I wanted to be an engineer from a very early age. I used to build model airplanes and was active in competitions involving design, flying, and craftsmanship of models. But I went to the University of Washington, which had a very good Aeronautical Engineering program, but after a year and two thirds, I went into the army and got into radar. And that finally switched me over to Electrical Engineering.

Q: What are one or two of the biggest changes you have seen over the years in the ECE Department?

A: One thing that people may not have realized is that at that time, there was no college of engineering. There was a school of engineering, under the thumb of College of Letters and Sciences. When the accreditation people came they told the Chancellor that unless the School of Engineering got out from under the thumb of College of Letters and Sciences, they wouldn't give any accreditation. And so we got it: the College of Engineering. It loosened things up so we could have a competitive curriculum. That was pretty important.

Q: What classes have been your favorite and why?

A: I think I liked to teach Electromagnetic Theory best, especially things having to do with microwave engineering. I like the aspect that you could add to the mathematics with graphical drawings and things like that. I used to take some of the kids on field trips.

Q: Given your successful career as an engineering professor, would you recommend students to become professors?

A: Not necessarily. If they like to explain things, then yes. But if they don't particularly like to explain and get impatient, then I would say no – do something else. If a student at the Master's level thinks they might be interested in teaching, it's good for them to have a teaching assistantship and get some experience dealing with students. However, if they're in the PhD level, I think it is in the best interest for the student to get a research assistantship because very often this leads to the research project for the student's dissertation. So if they have a research opportunity, that's the way to go.

Q: What is your advice for students starting their engineering careers this fall as new freshman and as first-year students in MS or PHD programs?

A: As I got into graduate work, I learned a lot about how to study. One thing that I would certainly advise – I didn't get to really doing this myself until graduate school – is to take lots of notes and leave lots of space for adding comments, and after class in the evening while you go over it, try to explain it to yourself. And add notes if you figure out what the fundamentals were, so you have useful notes. I think that's quite important in many classes perhaps in engineering and physics more so than some. What you learn in the beginning, the rest builds on top of it and if you don't learn the first part then you're handicapped for learning the rest. So it really pays to keep up with it. I learned with exams to go through the material and make an outline of the high points. It made good study material for the second exam.

Q: What do you consider your own greatest achievement in research?

A: I did a lot of research on microwave components, particularly microwave filters, which are used in communication for separating out signals and that sort of thing. And there is one kind that I worked on called the interdigital filter, and that became used fairly widely afterwards. I think that was a quite useful contribution.

Q: If you could ask ECE alumni to do one thing, what would it be?

A: I think the main thing is to contribute. And with regard to time, there are unique situations where some can help a lot with their special expertise.

To see a video of this interview, visit ece.ucsb.edu/profiles/matthaei/

Yearbook photo of the faculty of the 1969 ECE department
Front row: C. William Harrison, John Skalnik, James Howard, Glen Wade, A.G. Conrad, George Matthaei. Second row: Joseph Sayovitz, Philip Ordung, Jorge Fontana, John Baldwin, Jr.

Advisory Board

Electrical & Computer Engineering 2011/12 Advisory Board

Left to right: Waguih Ishak, Yulun Wang, David Wong, Robert Hammond, Gordon Bell, Dennis Monticelli, Tom Lookabaugh, Hamid Ahmadi

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The ECE Advisory Board:

· Is made up of individuals who have diverse and strong technical backgrounds, are experienced in their industries, and are recognized leaders in the profession.

· Serves as a critical component in our renewed outreach efforts.

· Provides the department with counsel concerning curriculum, industry trends, and new programmatic directions.

· Was formed in 2010.

· Meets annually at UCSB and bimonthly over the phone.

For more information, visit ece.ucsb.edu/advisory-board/

Recognitions

National Academy members include:
Rod Alferness (2003)
David Auston (1989)
John Bowers (2005)
Larry Coldren (2004)
Arthur Gossard (1987)
Petar Kokotovic (1996)
Herbert Kroemer (1997)
Umesh Mishra (2009)
Sanjit Mitra (2003)
Lawrence Rabiner (1983)

Current Endowed Chair Holders are:
John Bowers,
Fred Kavli Chair in Nanotechnology
Larry Coldren,
Fred Kavli Professor of Optoelectronics & Sensors
Herbert Kroemer,
Donald W. Whittier Chair in Electrical Engineering
Mark Rodwell,
Doluca Family Chair in ECE

Thank you to our 2010/11 Donors!
July 1, 2010- August 31, 2011

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HTC America Innovation Inc.
International Foundation for Telemetering
JDS Uniphase Corporation
JustGive
Mentor Graphics
Alfred P. Sloan Foundation
SAIC
Teledyne Scientific Company

Congratulations to our award winning faculty!

Katie Byl

Awarded a Sloan Research Fellowship in Neuroscience in recognition of distinguished performance and a unique potential to make substantial contributions to their field.

Jerry Gibson

Awarded the 2010 IEEE Transactions on Multimedia Best Paper Award for the paper co-authored by Dr. Hu and Dr. Choudhury entitled, "Video Capacity of WLANs with a Multiuser Perceptual Quality Constraint."

Arthur Gossard (Emeritus)

Elected fellow of the American Association for the Advancement of Science (AAAS). Election as a fellow is bestowed upon members by their peers for meritorious efforts to advance science or its applications.

Luke Theogarajan

Awarded a National Science Foundation CAREER award for his work in the NSF program area of biosensing entitled, "CMOS Integrated Nanopores for Biomolecule Detection."

Andy Teel

Awarded the 2010 IEEE Control Systems Magazine Outstanding Paper Award for the paper, co-authored with former student Ricardo Sanfelice and former post-doc Rafal Goebel entitled, "Hybrid Dynamical Systems."

Li-C Wang

Awarded the Technical Excellence Award by Semiconductor Research Corporation in Microelectronics Research for his work in Data Mining and Learning for Test and Validation.

Teaching Awards

Steve Butner and Luke Theogarajan

Professors Steve Butner and Luke Theogarajan were selected as the outstanding Faculty Members in Computer Engineering and Electrical Engineering, respectively, for 2010-11. The graduating seniors in the program made this selection based on teaching excellence.

For more information, visit ece.ucsb.edu/news/

Invest in the Department of Electrical and Computer Engineering

The goal of the Department of Electrical and Computer Engineering at UC Santa Barbara has always been to provide our students with the best possible opportunities to learn and develop. The faculty, students, and administration at UC Santa Barbara have created an atmosphere of interdisciplinary and collaborative research that is renowned throughout the Nation and that is the cornerstone of our success. Our students have the opportunity to conduct research alongside distinguished faculty as well as benefit from faculty expertise in the classroom.

Your investment in the Department of Electrical and Computer Engineering plays a critical role in our ability to fulfill our mission and provides essential support of ECE's teaching program and research enterprise.

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