ECE NEWS

Department of Electrical & Computer Engineering

2000-2001 In Review

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inside

ECE news 2001

editing

Angela Ventura Medyk
Shireen Pinheiro

layout & design

Mary Barbarette
Shireen Pinheiro
Reshma Varghese

written contributions

Mary Barbarette
Ellie Goodwin
Angela Ventura Medyk
Shireen Pinheiro
Reshma Varghese

Coverpage: 2001 John Adam Fleming Medal awarded to Dr. M.A. Uman by the American Geophysical Union

Sah Elected to Chinese Academy of Sciences

by Aaron Hoover, staff writer for UF News & Public Affairs

UF ECE professor Chih-Tang "Tom" Sah, a member of the U.S. National Academy of Engineering, has been elected to the Chinese Academy of Sciences for his pioneering work in developing the silicon chip,a tiny bundle of electronics that is at the center of the informational technology revolution.

The Pittman Eminent Scholar and a graduate research professor in UF's Department of Electrical and Computer Engineering, Sah has been named a Foriegn Member of the Chinese Academy. He is one of only 36 foreign members among the 623 members of the Academy, the highest science and technology honor bestowed in China and one of the most prestigious in the world.

"I am honored to be elected to the Chinese Academy of Sciences, and I look forward to continuing my efforts to advance semiconductor technology," said Sah.

Sah's contributions date back to the 1950's , when transistors and integrated circuits were first being developed. In 1956, he wrote an article with two of the pioneers of silicon technology, Nobel laureate William Shockley and Intel co-founder Robert Noyce. The article described the principle of how the silicon transistor loses efficiency as it amplifies electrical signals. Considered a foundation of transistor technology, the article was long the most cited article in the field, and the priciple still being used today in the design and manufacture of silicon chips.

In the ensuing years, Sah's research led to several advancements pivotal to the maturing of silicon transistor and integrated circuit chip technology. While employed at Shockley Semiconductor Laboratory in 1959, he published the first paper on a method that used silicon dioxide or glass film to prevent the diffusion of phosphorous impurities into silicon- a crucial break through in the invention of integrated circuit chips.

As the director of a large research team at Fairchild Semiconductor Corp. in the early 1960s, Sah wrote several other articles that helped pave the way for modern computer chips. One led to the 1963 development of the "CMOS" transistor circuit, the building block of all computers, watches, cellular phones and portable electronics.

Sah came to the University of Florida in 1988 after spending 26 years as a professor of electrical engineering and physics at the University of Illinois.

In 1998, Sah received the University Research Award from the U.S. Semiconductor Industry Association. The citation reads, "In appreciation of your longstanding contributions and service on behalf of the U.S. semiconductor industry, and most recently in recognitionof your development of the DCIV methodology for rapid determination of the reliability of transistors."

Dr. Jose Fortes

BellSouth Eminent Scholar

by Angela Medyk

The first Eminent Scholar Chair in Computer Engineering and Science at the University of Florida was filled in August 2001. The multi-million-dollar chair was endowed by the BellSouth Corporation in 1987 with matching funds from the State's Eminent Scholar Trust Fund in accordance with the '1979 Endowment Trust Fund for Eminent Scholars Act', which provides for a $400,000 match for every $600,000 donated by an individual or corporation.

Dr. José António Baptista Fortes is UF's new BellSouth Eminent Scholar Chair in the Departments of Electrical and Computer Engineering and Computer and Information Science and Engineering. Dr. Fortes will spearhead research efforts in parallel and distributed computing and in computer architecture.

Fortes was born in Luanda, Angola in 1954 and came to the United States in 1979 following his graduation with a BSEE in 1978 from the Universidade de Angola. In 1981, he received his MSEE from Colorado State University and in 1984 his PhD from the University of Southern California. His doctoral thesis was titled," Algorithm Transformations for Parallel Processing and VLSI Architecture Design."

Following his graduation, Dr. Fortes accepted a position as Assistant Professor at Purdue University's School of Electrical and Computer Engineering where he taught and conducted

research for seventeen years while advancing to Professor and Associate Head. At Purdue, Fortes participated in a variety of scientific initiatives: the development of techniques for the design of application-specific processors, techniques for optimal use of supercomputers in scientific applications, fault-tolerant computing, novel multiprocessor architectures, Internet-based computing portals for computer-aided engineering, and mechanisms for international collaboration in computer science and engineering. His work in Internet-computing led to the deployment of several infrastructures currently used by international communities of scientists and students in the fields of computer architecture, computational electronics, parallel programming, and integrated circuit design.

The Institute of Electrical and Electronics Engineers (IEEE) professional society has recognized Dr. Fortes contributions to engineering by electing him an IEEE Fellow. The IEEE recognized him for his "contributions to the theory and practice of parallel computing." Dr. Fortes was also a Distinguished Visitor of the IEEE Computer Society from 1991 until 1995.

Dr. Fortes is presently on the editorial boards of the following publications: Cluster Computing: The Journal of Networks, Software Tools and Applications, the International Journal on Parallel Programming and the Journal of VLSI Signal Processing. He is a past member of the Editorial Boards of the IEEE Transactions on Parallel and Distributed Systems and the Journal of Parallel and Distributed Computing. He also served as a program director for the U.S. National Science Foundation's Microelectronics Information Processing Systems Division from 1989 to 1990, and as a Visiting Professor of Computer Architecture at the Universitat Politècnica de Catalunya in Barcelona, Spain.

Building on his extensive career experiences, Dr. Fortes is in the process of establishing the Advanced Computing and Information Systems (ACIS) laboratory at the University of Florida. Its broad mission is to study systems that integrate computing and information processing at scales that range from nanometers to the entire globe. Towards this goal, after Dr. Fortes joined the University of Florida, NSF awarded him a prestigious ITR award for the study of biologically-inspired nanoscale computers. This three-year project provides two million dollars to support the collaborative work of Dr. Fortes, Dr. José Principe, and Dr. John Harris at the University of Florida and former colleagues of Dr. Fortes at Purdue University.

The ACIS laboratory is also engaged in beginning projects on global and regional systems for transnational digital government, and on next-generation Internet-scale systems for computing and information processing. These projects involve both faculty from the Departments of Electrical and Computer Engineering and Computer and Information Science and Engineering of the University of Florida and faculty from other leading institutions in the U.S. and the Americas.

The Department of Electrical and Computer Engineering is clearly very fortunate to have Dr. Fortes as a new faculty member of the University of Florida.

Influenced by Barn Owls:

Nature's tips for listening

by Shireen Pinheiro

Can audio equipment communicate with humans intelligently, and among equipment silently and unobtrusively?

Machines could be talking among themselves silently (to humans) using audio within a few years, says Dr. John Harris. Dr. Harris, an associate professor in ECE, specializes in biologically inspired analog and digital signal processing computation. Dr. Harris and graduate student Rahul Ghosh are working on combining the sound localization skills of the barn owl with those of appliance entertainment devices. They have created a computer program that mimics the signal sound processing of an owl. Owls process a sound signal from each ear on two different time delay lines, which helps to pinpoint its target area.

Within the normal human hearing range, the telephone informing the stereo to turn itself down when the phone rings could be a result of this area of research. The television of the future may be equipped to know when a person walks into the room, swivel toward that person, and turn on.

Another graduate student, Paul Baker, has designed an audio communications system that appliances can use to communicate among themselves. These sounds are not audible to the human ear. Such appliances function on efficient and accurate recognition and networking

Dr. Harris and graduate students experiment with computer speech interface

capabilities. Baker says that the system relies on the fact that the ear is insensitive to some types of sounds, and misses sounds that are very brief.

Doctoral student Mark Skowronski has designed a prototype trivia game which demonstrates real-time speech recognition and speech synthesis technology. This game can recognize a person's voice with a hands-free microphone and is based on the TV show "Who wants to be a Millionaire."

A whole new industry based on smarter appliances modeled after how humans interact and how they make sense of things is coming up, says Dr. Harris. We can make smart machines based on how animals and humans function in their environment by exploiting the quirks of human hearing. The result is appliances that communicate with one another without human interference.

One lab demonstration has Ghosh standing a few yards away from the computer and the microphones:

Computer: "Welcome to the localizer test. Please stand at each pin on the ground. Speak now:"

Ghosh:"Hello. This is the localizer demo-I am standing somewhere to the left of the microphone."

Computer: "left 10 degrees. Move to the next angle,"

Ghosh: "I am standing somewhere to the left of the microphone."

Computer: "left 5 degrees. Move to the next angle."

This system has an error of about 8 degrees which is much more accurate than the human ear, which is accurate to about 12 degrees, says Ghosh.

So I don't see a limit. We can make the machines smart based on other principles, but to make them this way is much easier for humans to interact with them because we know how to interact with other humans. We can talk to one another, and I can get my point across and instruct you to do different things," said Dr. Harris.

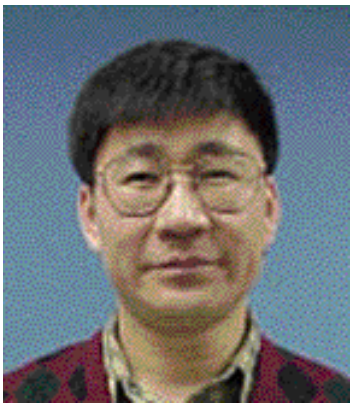
A sound pitched slightly higher and quieter than normal conversation is inaudible if it is only a few milliseconds long. People can hear well between 20 hertz and 20 kilohertz. Sounds in this range bounce easily around a room. Radio waves such as Bluetooth constantly have to hop frequencies so they don't interfere with each other. Dr. Harris says his system allows many computers to operate simultaneously at the same frequencies as long as they are near one another. This system will also cope with open plan offices and apartments where several computers run simultaneously. " We build rooms and walls so that sounds stay localized," says Dr. Harris.

Would the utilization of the listening techniques of the barn owl disturb other animals? Dr. Harris does not think so because the sounds are fairly low intensity.

On the Move....

with wireless networks

by Mary Barbarette



Dr. Yuguang "Michael" Fang joined the ECE faculty at UF in Fall 2000 as an Associate Professor. His areas of research are wireless networks and mobile communications, and personal communication services. Before his arrival at UF, Dr. Fang was an Assistant Professor in Electrical and Computer Engineering at the New Jersey Institute of Technology.

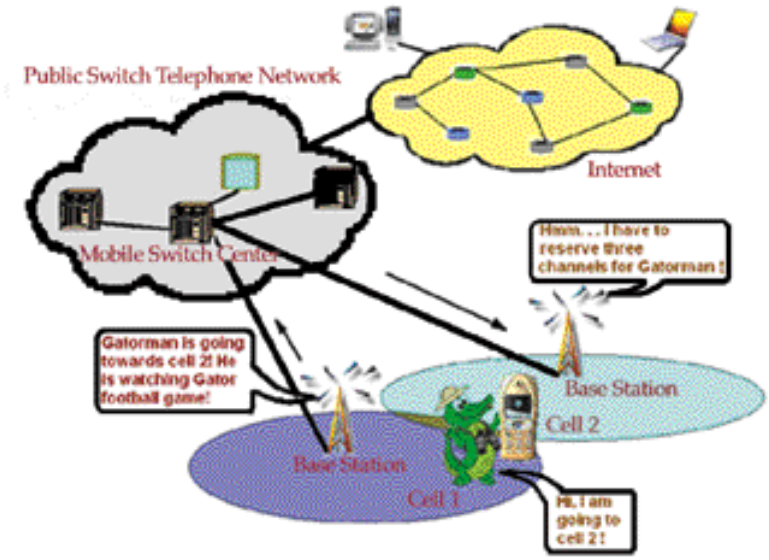
Dr. Fang obtained a PhD in Systems and Control Engineering from Case Western Reserve University in 1994, and a second PhD in Electrical and Computer Engineering from Boston University in 1997.

Wireless is the buzzword these days. From cellular phones to hand-held devices, modern technology is increasingly liberating itself from those cumbersome wires and wall sockets. In their place, our conversations and transactions are taking place upon wireless transmission media such as radio and microwaves."The wireless basically provides the freedom of communication, no matter where you go, you are connected," states Dr. Fang, but it comes at a price. Security and quality of services are big issues for the wireless network. Research in wireless technology confronts the challenges posed by the service transmission of users on the move. Dr. Fang tackles a variety of these issues and explores new avenues of progress in wireless mobile communications.
One of the great demands of wireless communication is the Quality of Services (QoS) for requested connections from mobile users. To make everybody happy with his/her service and to utilize the very limited wireless resources more efficiently and effectively, mobility management and resource management have to be carefully considered. In traditional wireless cellular systems, each user will demand the same amount of resources for his/her service request (e.g., a normal cellular phone conversation). This will change for the future generation of wireless networking. "A user who wants to watch a streaming video on the train from an Internet site will demand more resources than a cellular phone user," states Dr. Fang. In order to deliver such varied services over the wireless media, the network has to know where a user is and the amount of resources he/she requests. The main thrust of Dr. Fang's research addresses how to intelligently utilize rare wireless resources and provide optimal customer satisfaction for future generation wireless networks. Dr. Fang is exploring innovative strategies based upon

the prediction of a user's future location. "If we could predict a mobile user's movement based on his/her movement history, the network could make appropriate resource reservation around the moving trajectory to overcome the potential call drops or service degradation." Recently, Dr. Fang received the prestigious ***National Science Foundation Faculty Early Career Award***, a grant that will support his project for the next five years.

Ad hoc networks is another area of Dr. Fang's interest. Wireless mobile ad hoc networks have no standard or fixed infrastructure. The nodes of the operation are constantly shifting position, much like mobile computers. These networks have tremendous value for both military and commercial applications, yet they face many design challenges. Ad hoc networks are bandwith- and power-limited, they are susceptible to jamming and interference, they maintain a lack of viable privacy and security, and they enlist a great number of battery-powered devices. To confront the hostile ad hoc network environment, Dr. Fang proposes the use of cross-layer design, which enhances security and data transmission services. For example, he proposes a scheme called ***SPREAD*** (Secure Protocol for REliable dAta Delivery) to enhance the end-to-end security by taking advantage of the distributed nature of wireless ad hoc networks.

In addition to his expertise in engineering research, Dr. Fang prepares students for the lucrative market in wireless technology that awaits them. As an educator, Dr. Fang offers his students a philosophy of learning based upon critical thinking, problem solving, and analyzing the concepts behind the technology. Through a solid background in mathematics, Dr. Fang believes students can make a "quantum leap to a certain philosophical level" in their understanding of the technology and in the creation of new ideas. Outside of class, Dr. Fang has been actively involved in professional conference organizations and has been an editor/associate editor for four professional journals.



Dr. Janise McNair:

Crossing Geographical Barriers

by Shireen Pinheiro

The Department of Electrical and Computer Engineering extends a warm welcome to Dr. Janise McNair, who came to the University of Florida in Fall 2000 from the Georgia Institute of Technology. She is presently an Assistant Professor. Her research interests are next generation global wireless systems and Mobile Internet Protocol (Mobile IP) networks. She is interested in mobility / resource management research that will provide mobile users with high bandwidth, high quality mobile multimedia services, and nomadic computing research that will help users receive personalized telecommunication service at any fixed or wireless device. She was attracted to UF by the presence of quality faculty doing research that is complimentary to her interests. Dr. McNair's main objective is to design, develop and analyze new network protocols that will allow mobile computer users to travel between different types of networks with minimal degradations in service and without losing calls in progress. Currently, a person typically may carry several different mobile terminals, including a cellular telephone, a pager, a laptop, and a palm pilot, just to be able to access the different services they need. This is because each network service provider has different standards for delivering services to the mobile user. Dr. McNair's research focuses on the design of systems that can provide universal coverage for a single mobile terminal that can adapt within a world of multiple standards. Specifically, new protocols are being developed for location registration, update, paging, and handoff techniques for heterogeneous network systems.

One of the challenging goals for Dr. McNair's research is to develop a comprehensive system model to analyze the protocols for

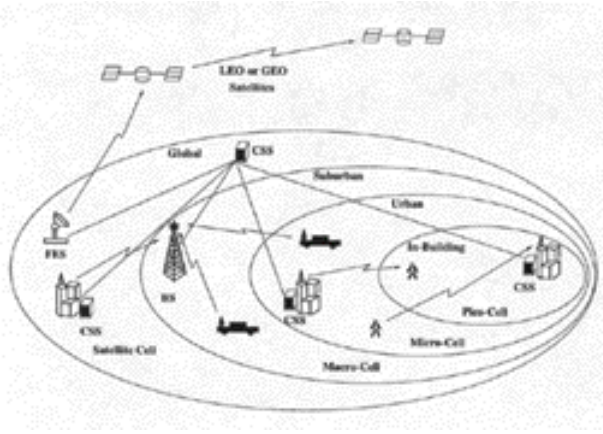


Figure 1: **Next Generation Heterogeneous Network Services**

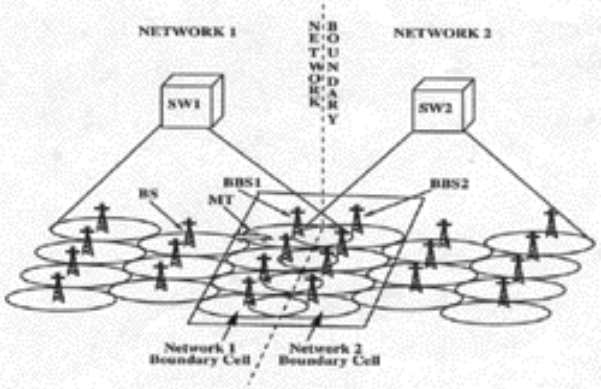


Figure 2: **Inter-System Boundary Cells**

the next generation wireless system. In the real world there are many different factors that affect each protocol, such as the mobility patterns of each user, the varying quality of unreliable wireless channels that lose connections far more often than wired telephones, and the limited bandwidth available in wireless networks. However, she hopes to develop analysis techniques that are simple enough to be intuitive, yet detailed enough to capture the essence of the mobile networking problem. Some of the work involves modeling personal behavior, e.g., whether a pedestrian user may follow the street or wander aimlessly, or whether a user in a car may follow the highway, or circle through the side streets. Systems must be designed that can predict which multimedia services will be needed and where people will use them. This will ensure that the majority of customers can be served to their satisfaction without wasting resources. In other words, the system should operate so that congested areas will have lots of bandwidth available, and sparse areas with only a few people will have much less bandwidth assigned to them. To summarize, the main challenge is to develop these techniques and then perform analyses that reflect real world conditions, but are still resolvable.

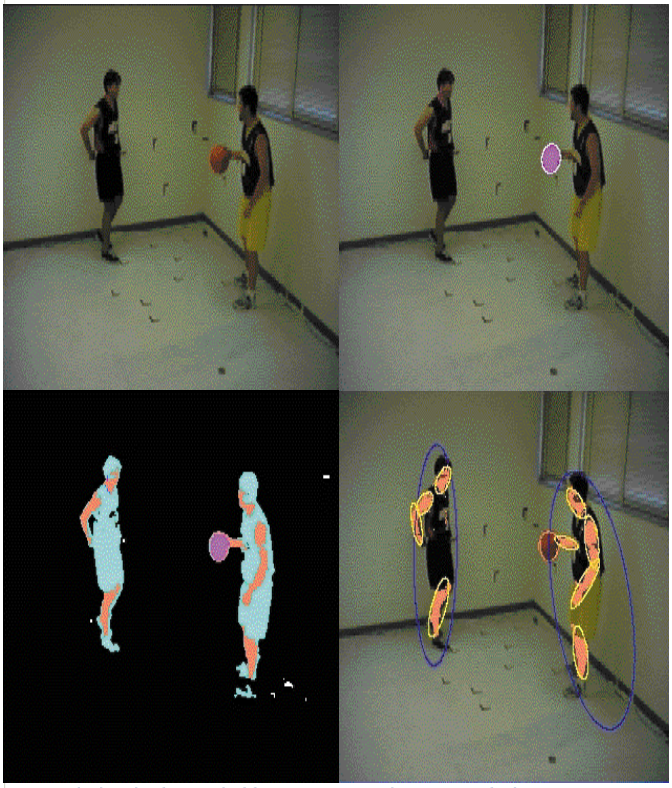
Dr McNair has a word of advice for aspiring women engineers: “no matter what the challenge, keep persevering and never give up. There are great benefits when you achieve your goals”. She says women engineers are needed in all areas of engineering and can make significant contributions to the profession. Not only does Dr. McNair spend time teaching and researching but she also spends a lot of time with family and friends.

Something she enjoys very much, to get her mind off of academia, is going to the beach. Which leads one to wonder if Dr. McNair is researching into providing more mobile computing services between Gainesville and St. Augustine? Dr. McNair smiles.

Computer Based

Vision for the Future

by Shireen Pinheiro



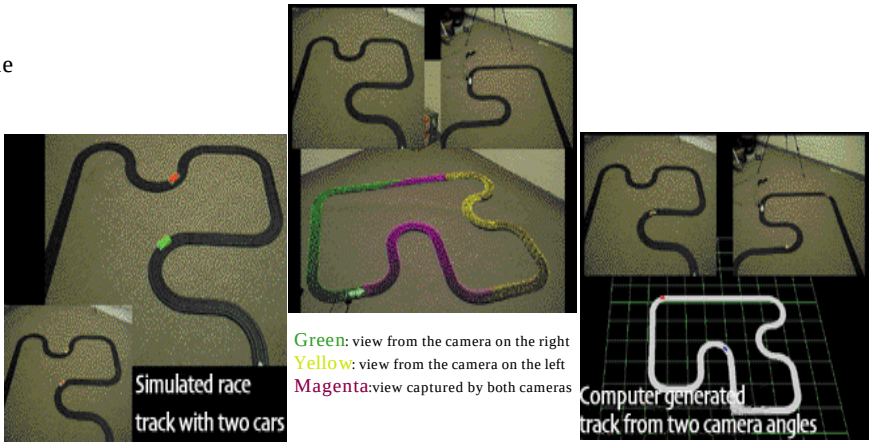
Models define different attributes of the image

Dr. Michael Nechyba, who completed his doctorate in 1998 at the Robotics Institute at Carnegie-Mellon University and then joined the ECE faculty as an Assistant Professor, is involved in a range of research activities, all of which fall under the broad category of Computer Based Vision Research. Modeling the NASCAR race, a basketball game, and flying an airplane are some of his current favorites.

His research tries to replicate what people do on a continual basis, that is, recognize the world around them. The problem is difficult because of the large amount of data that needs to be processed, and the relatively small computational power of current computers vis a vis the human brain.

Dr. Nechyba wants to construct 3-D images and replicate motion in a virtual graphics environment. In order to attain 3 dimensional images Dr. Nechyba makes use of two or three cameras, which generate two or more intersecting lines in space thus leading to three-dimensional images. This technique is not the same as producing a video game wherein all the movement is simulated ahead of time, for example simulating a sportstars' body movement by placing sensors on the body. However, Dr. Nechyba would like the computer to understand the movement and the

environment from the camera image. For example he would like to have the computer mention ‘ Michael Jordan makes a basket’ each time the ball goes through the hoop. Thereby the computer is able to identify both the person and the action. Statistics can then be calculated to keep score of the game. Once this is attained a spectator can view the game from any vatange point, including Michael Jordan’s. In other words a game could be viewed from any angle and not just from the TV camera’s angle.



In order to recognize the players,the computer should be able to recognize various factors like the player’s skin tone, jersey number, height, and other characteristics that identify the player. To do this, Dr. Nechyba and his students apply statistical color and shape models.

In order to identify the player Dr. Nechyba needs to construct models ahead of time. For example in basketball, the player’ s hand, face, and leg need to be modeled. In the case of the NASCAR racetrack, models for the different cars and the track can be used. Dr. Nechyba’s lab has two cameras that view the race track from different angles. The captured images from each angle is then recreated to get the whole picture. The second picture on the top right depicts parts of the image captured by two cameras and the dark pink region indicates the part captured by both cameras. Face recognition is a field in itself, due to the variety of facial features like the skin tone and eye color that are involved in identification.
Dr. Nechyba strives for efficiency and optimal utilization of time. This could be a challenge because to overcome the persistence of vision of the human eye to an image would need more than 15 frames a second. A full resolution picture uses about 640x480 pixels while a video consists of about 300 thousand separate pieces of information every 15th of a second. Random errors can be corrected but a sequence of errors could break the continuity in a video.

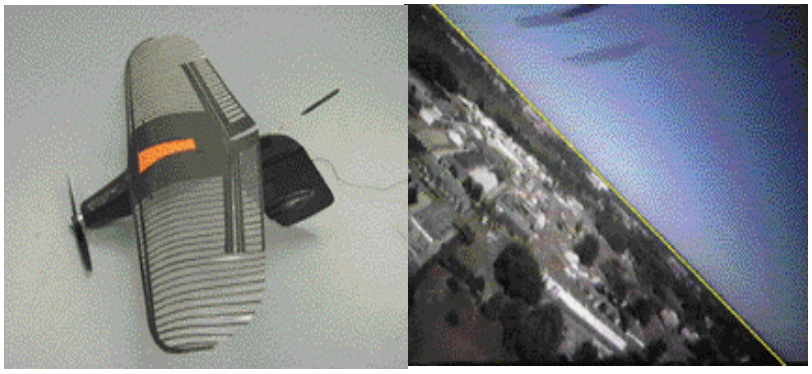
An obvious solution would be the usage of faster computers but a more efficient technique would be to recreate the whole image by transferring only a part of the data. This can be accomplished by sending the fixed portions of the scene in advance (the racetrack, the structure of the car, etc) and during the actual event, sending only the positions of the cars. This allows a real-time viewing of the event at the cost of transferring of only a few numbers.

And that’s not all!

Recently, Dr. Nechyba began to collaborate with Dr. Ifju (Department of Aerospace Engineering) to apply computer vision to the problem of flight stability and control of micro air vehicles (MAVs) and small unmanned aerial vehicles (UAVs), fitted with a small camera. The goal of the computer vision algorithm is to track the horizon line, so that the MAV has enough information to keep itself level with respect to the ground. Horizon detection is challenging because of the changing appearance of both the sky and ground. Changing weather, different times of the day, rural vs. urban conditions are all examples of this minute-to-minute, day-to-day variability.

Despite these difficulties, Drs. Nechyba and Ifju along with their students have conducted a number of autonomous flights of long duration, based on a successful horizon-detection algorithm.

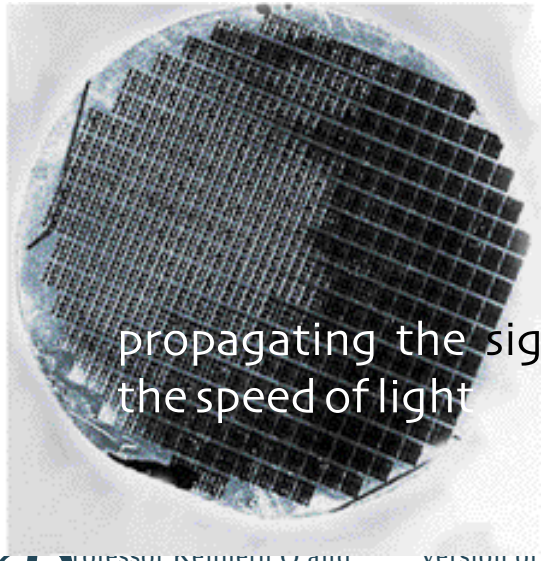
In a recent article in the Gainesville Sun, Dr Nechyba was quoted on his views about the futuristic movie A.I. He sounded a little pessimistic when he says” I don’t even know if ultimately you can get to a completely human like robot, like the boy in ‘A.I.’” All this proves that we are truly a unique race.



Mini aircraft fitted with camera captures the horizon

Wireless *InterConnects* for Chips

compiled by Shireen Pinheiro



propagating the signal at the speed of light

Professor Kenneth O and two of his graduate students, Brian Floyd and Chih-Ming Hung, were awarded $20,000 for the phase I contest of the Semiconductor Research Corporation Copper Integrated Design Challenge, and another $25,000 for finishing in second place in phase 2 of the design challenge. The objective of the contest was to create novel circuit designs to accelerate the adoption of new semiconductor copper technology. The topic for O's group was, "A Wireless Clock Distribution System: Clock Receiver and Transmitter Circuits."

In June 2001 at the VLSI (Very Large Scale Integration) Symposium and Circuits at Kyoto, Japan, Brian Floyd and Chih-Ming Hung presented a paper on 15 gigahertz wireless interconnects, a paper that is an updated version of the paper that was presented at the International Solid-State Circuits Conference (ISCC) in San Francisco, early 2000.

At the 2000 ISCC, Dr. O, Brian Floyd, and Ki-Hong Kim presented a paper on the use of radio frequency (RF) signals for communication within integrated circuits (IC). As the size of the clock frequency of microprocessors are increased, distributing a clock signal becomes extremely challenging. One way O's group would get around it is by broadcasting a clock signal using microwaves. "By propagating the signal at the speed of light, we're trying to reduce the clock skew," O says. "You could also send a wave down to a multichip module and provide equal clock phase to a very large area, which was previously thought not possible." They have a working test chip that can receive a RF clock signal at 7.4 GHz. Floyd says that the next step would be to increase the frequency of the transmitter and receiver circuits to 24 GHz, which will make the antennas smaller. Professor O believes the same technology could be used for data transfer between chips.

The major challenge is to maintain good signal-to-noise ratio across a die with millions of switching transisitors and interference from metal structures. The fact that the system divides the received RF signal by 8 to provide local clock signal alleviates this problem. However, O is still unsure if this approach can overcome the signal to noise problem. Another challenge is the synchronization of the clock receivers across the chip. Dr. O and his students are currently working to solve these challenges.

Dr. Douglas Jordan *Returns* to ECE

by Mary Barbarette

After a long history with the ECE department at the University of Florida and ten years away, Dr. Douglas M. Jordan is back. Dr. Jordan began as a student in UF Electrical Engineering, where he obtained his B.S. in 1979, his M.S. in 1981, and his Ph.D. in 1990. Ten years later, in August of 2000, Dr. Jordan joined the department as a lecturer in electromagnetics, circuits, and electronics.

Dr. Jordan also assumed the position of ECE's Undergraduate Coordinator, a role that underscores his dedication to teaching undergraduate students. "I've done primarily undergraduate education, because that's something that I enjoy." Dr. Jordan has compassion for students, which stems from his own experience of struggling with school. "I wasn't always the perfect student myself and I understand that people go through phases in their lives when it comes to academics."

When discussing his academic and professional career, Dr. Jordan stresses the importance of undergraduate education. "I try hard at teaching," he says, and his commitment to students has been honored three times with the Teacher of the Year award.

Dr. Jordan began his academic career as Assistant Professor in Electrical Engineering in UF's joint program at the University of North Florida. After four years of teaching and a one-year break spent working in industry, Dr. Jordan helped establish the UF/UWF joint program in engineering, at the University of West Florida in Pensacola. "I was involved at the beginning of both of those programs. We learned a lot at UNF about what we wanted to do differently at UWF." The UF/UWF program is a cooperative arrangement between the two universities that provides students at UWF the opportunity to obtain a four-year degree in electrical or computer engineering from UF without leaving Pensacola. Dr. Jordan taught at UWF for seven years attaining the rank of tenured Associate Professor before joining UF's faculty.

Lightning research has also been a large part of Dr. Jordan's activities in academia. His involvement with UF's lightning research lab reaches back almost to the lab's conception. In 1977, after leaving the Naval Submarine Service, Jordan began working in the lightning lab as an undergraduate, and has maintained his affiliation with the lab ever since. He has published a number of reviewed journal articles, primarily dealing with the optical properties of lightning.

His research resulted in the establishment of the Remote Sensing and Image Processing Lab at UF, through a grant from Kennedy Space Center. While heading the RSIPL, Jordan was involved in some of the very early work on Magnetic Resonance Imaging, for which he was inducted into the Space Technology Hall of Fame in 1994.

His work has also taken him to Vienna, Austria where he lectured at the Institute Polytechnia, and conducted lightning research in cooperation with ALDIS, the nationwide lightning detection system.

Whether working abroad, at other universities, or in business, Dr. Jordan has always remained close to the University of Florida. From student to teacher, his history with UF has come full circle, and as Dr. Jordan says, "it's nice to get back home."

Dr. Gugel

Designs on the Future...

by Angela Medyk & Reshma Varghese

B.S.E.E. - Michigan Technological University, 1981
M.S.E. - Florida Atlantic University, 1987
Ph.D. - University of Florida, 1993

Speed and Optimization are the objectives in the signal processing industry. Dr Karl Gugel, an ECE lecturer in the area of Intelligent and Information Systems and an instructor for Digital Computer Design and Microprocessor Programming has made speed and optimization his life's work. Gugel, a1993 alumnus of the ECE department is the founder of DiCon Lab. Inc, a company which designs, manufactures and sells general purpose Digital Signal Processing (DSP) hardware.

Among Dr. Gugel's list of accomplishments, most notable is the diversity of areas in which he has worked and the ingenuity with which he has applied his skills. In 1993, he won a National Science Foundation (NSF) Small Business Innovation Research (SBIR*), in collaboration with NeuroDimension, Gainesville for a project involving the partitioning of neural networks onto parallel DSP platforms. This spurred him to start his own company - DiCon (Digital Control) Lab Inc. (www.diconlab.com), which recently completed a DSP based cement production optimization system for Blue Circle Cement of England. DiCon is presently involved in a project for GE Medical, to build a test platform for exercising high speed multiple MRI systems.

In 1994, Gugel released a general purpose floating point ISA bus based DSP card with assembler, linker debugger and CODEC attachment board. In the same year, he assisted in developing an automated dialing and answering system for IBM. This technology was incorporated into Citibank of America and allowed Citibank employees to automatically cycle through a list of phone numbers of callers to the company and connect only when a human voice was detected on any of them.

In 1995, Gugel developed three aerospace products based on his modified DSP board for Tao Systems of Virginia. The products were Maximum Spectra Analyzer, Time Constant Analyzer and Interactive flow and measurement/ Analysis System.

In the subsequent years, Gugel put his energies into the world of sound. When Tim Tucker, an engineer himself and owner of Tucker Davis Technologies (TDT) – the world leader in psycho-acoustic signal processing research equipment and software, wanted to develop a head tracker unit, he utilized Dr. Gugel's expertise. The project resulted in the development of a tracker for 3-D sound synthesis, based on an ultra-sonic sound transducer and multiple subminiature microphones. Gugel also developed algorithms for time expansion and compression of music for Sabine Music Corporation.

At UF, Gugel is involved in expanding the capacities of Wireless Local Area Networks (WLANs). WLANs have the advantage of inexpensive network configurability and more importantly, user mobility, over the wired local area networks (LANs). However the WLAN applications are seriously limited due to the low and uncertain data rates. The data rates of existing WLANs - at 11Mbps – are still much lower than wired LANs. In July 1998, the IEEE 802.11 standardization group selected Orthogonal Frequency Division Multiplexing (OFDM) as the basis for the new 5 GHz physical layer standard for data rates as high as 54 Mbps.
This past year, Dr Gugel joined Dr Jian Li of the ECE department in her project, working to advance high data rate WLANs. This research focuses on the techniques to overcome the challenges posed by packet based implementation using OFDM in real-time hardware implementation and makes significant changes to WLANs in the form of higher data rates and international availability. The outcome of Dr. Gugel's research is expected to provide significant insights into the usability of OFDM to expand the capabilities of WLANs.

Dr. Karl Gugel can be reached at University of Florida, 370, Benton Hall (Tel: (352) 846-1275) or via email: gugel@ecel.ufl.edu

** The federal SBIR program provides approximately $1 billion annually to American small businesses for early-stage research and development projects*

Faculty

Accolades & Awards

Dr. Latchman was named the Boeing A.D. Welliver Faculty Summer Fellow and spent two months in Seattle during 2000 . He is the first UF professor to be appointed as a Boeing Summer Fellow. The objective of the Boeing program is to influence the content of Engineering education in ways that will better prepare tomorrow's graduates for the practice of engineering in a world-class industrial environment.

Dr. Latchman was also the recepient of the Fulbright Fellowship to teach and conduct research at the University of Prague from August 2000 to May 2001.

Dr. Latchman was awarded the IEEE 2000 Undergraduate Teaching Award and is cited for " innovative and inspirational teaching and advancing the use of information technology in education."

Dr. Jose Principe has been appointedfor a three year term as the Editor in Chief of a prominent biomedical engineering journal, "IEEE Transactions on Biomedical Engineering," the flagship publication of the Institute of Electrical and Electronics Engineers' Biomedical Society.

He was elected to the grade of **IEEE Fellow** in 2000 by the IEEE Signal Processing Society with the following citation, "For development of the gamma neural model and for its applications in signal processing."

Further, Dr. Principe has been elected to the Administrative Committee (Adcom) of the IEEE Engineering Medicine and Biology (EMB) Society representing Region 3 during 2000 and 2001.

Dr. Martin Uman, Professor and Chair, received the 2001 John Adam Fleming medal from the American Geophysical Union (AGU). AGU awards the Fleming Medal annually, "for research and technology leadership in geomagnetism, atmospheric electricity, agronomy, space physics and related sciences." AGU, an international scientific society with more than 35,000 members in over 115 countries, is dedicated to advancing understanding of the earth and its environment in space. This award is one of the AGU's most prestigious.

Dr. Donald Childers was elected by the Voice Foundation for the Quintana Award. This award recognizes individuals with an engineering background who have made significant contributions to the field of voice.

Dr. Muhammad Rashid was elected an IEEE Fellow "for leadership in power electronics education and contributions to the analysis and design methodologies of solid state power converters."

Dr. Vladimir Rakov was appointed the chair of the Committee on Atmosphere and Space Electricity of the American Geophysical Union (AGU) with a term from July 1, 2000 to June 30,2002.

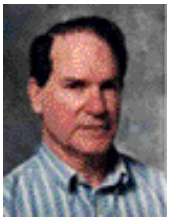
Dr. Mark Law was elected a Scientific Member of the Bohmische Physical Society. Members are chosen based on their contributions to the field of particle-solid interactions as demonstrated by independent original research.

Dr. Norman Balbanian is the recipient of the IEEE Third Millenium Medal.

Drs. Sheng Li, & Stanley Su were named 2000 UF Foundation Professors. The University of Florida Research Foundation (UFRF) professorship award was created to recognize faculty who have established a distinguished record of research and scholarship that is expected to lead to continuing distinction in their field.

Dr. Vladimir Rakov (pictured above) has been awarded theUniversity of Florida Research Foundation(UFRF) professorship award from 2001-2003.

Welcome...



Mr. Joe E. Brewer is ECE's industry professor for the 2000-2001 academic year. Mr. Brewer has a long career in the private sector, most recently with Northrup Grumman Corporation. He is a professional engineer, a member of the American Association for the Advancement of Science, the New York Academy of Science, and the Institute of Electrical and Electronic Engineers (IEEE). Mr. Brewer plans to utilize his expertise to introduce or reacquaint ECE faculty and students to industry executives in an effort to increase funding opportunities. He has been appointed as the IEEE Press Coordinator for the Electron Devices Society effective January 1, 2002.

Dr. Glenn K. Heitman, Lecturer at the Electrical and Computer Engineering Department joined the University in the Summer of 2001. He has a Doctorate in Computer, Information and Control Engineering from the University of Michigan. His research interests are modeling and identification of classes of input-output systems and communication channels, nonlinear and stochastic systems, equalization in slowly varying channels such as those occuring in mobile communications, functional analysis, and approximation theory.

Business & Engineering

A Joint Master's degree program by the College of Business Administration and the College of Engineering has been approved effective Fall 2001. This program will permit graduate students to earn a Master of Science degree from the Electrical and Computer Engineering Department, MS(EE), and a Master's degree from the Department of Management, MS(MGT) in the Warrington College of Business.

This program comes into being due to an existing need to prepare students for careers in corporate and engineering management. Many engineers have a desire to diversify and gain management knowledge in preparation for successful careers in industry, and this program is built to fill this need. The anticipated number of students admitted will be 5 to 10 in the first year with a slight increase thereafter depending on the demand for the program.

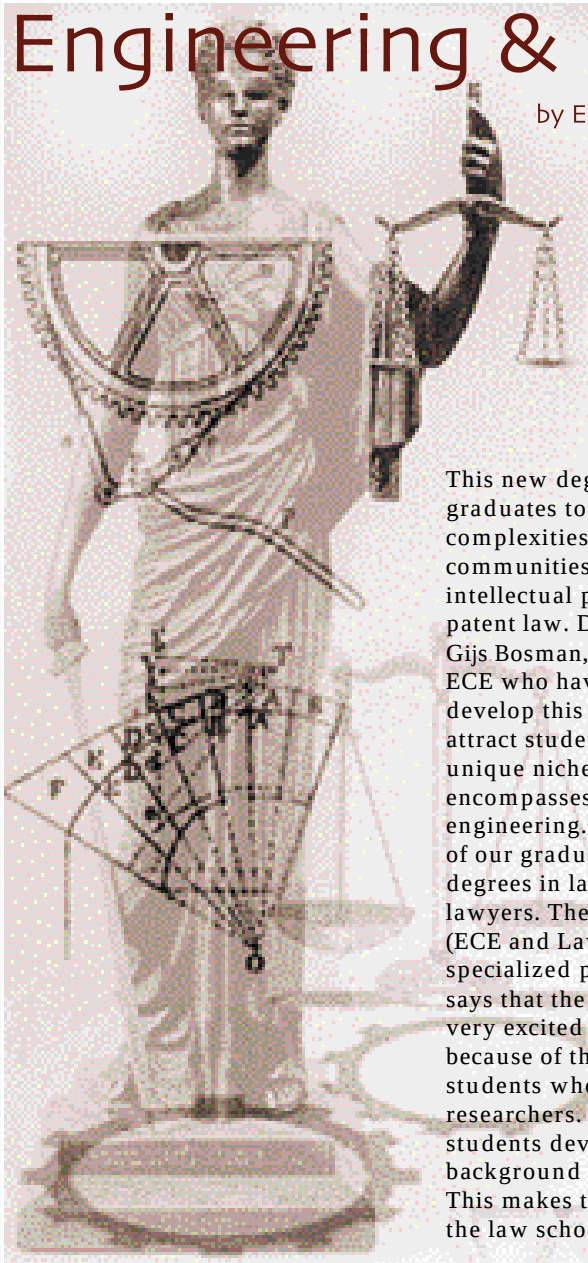
Students will be admitted based on their interest in the business aspects of Electrical and Computer Engineering. A total of 53 credit hours will be required for the MS(EE) / MS(MGT) joint degree. This program eliminates 12 credits from each department from the total required for each program. Six graduate credits from the ECE degree can be shared with the Management degree, and six credits from the Management degree can be shared with the ECE master's degree.

The MS(MGT) is a non-thesis degree while MS(EE) has the non-thesis and thesis option, with both options requiring the same number of credit hours. Each MS(EE) / MS(MGT) student must pass a final comprehensive examination to be given and supervised by each department independently. The admission requirement must be met separately for entry into the two programs. Minimum requirements for admission into the program are a GPA of 3.0; GRE (Verbal and Quantitative combined) of 1000, TOEFL (paper-based) 550, or 213 (computer-based). Admission for either program is not guaranteed for students meeting minimum requirements and selection is also based on academic excellence, extra curricular activities and personal character.

Students will be permitted to receive the MS(EE) and the MS(MGT) in separate terms provided they have met the requirements for the intended degree.

Engineering & Law

by Ellie Goodwin



In a bold move intended to address the needs of communities in the 21st century, the faculties of the College of Engineering and the College of Law have approved a joint degree program. This new program will culminate in a Master of Science degree in Electrical and Computer Engineering, awarded by the College of Engineering and a Juris Doctor degree from the College of Law.

This new degree will enable graduates to address the complexities of electronic communities and commerce such as intellectual property rights and patent law. Drs. Jacob Hammer and Gijs Bosman, faculty members from ECE who have been working to develop this program, feel it will attract students with an interest in a unique niche—one that encompasses both law and engineering. "Over the years, many of our graduates have gone on to get degrees in law and become patent lawyers. The faculties of both units (ECE and Law) saw a way to create a specialized program." Dr. Hammer says that the Law School at UF is very excited about this program because of the need to have law students who are excellent researchers. "Electrical engineering students develop a strong background in research procedures. This makes them very attractive to the law school."

Under the joint degree program, a student can obtain both degrees in approximately two semesters less than it would take to obtain both degrees if pursued consecutively.

A few of the essential criteria relating to the joint degree program are as follows:

- Candidates for the program must meet the entrance requirements for and be accepted by both colleges. Both colleges must be informed by the student at the time of application to the second program, that he/she intends to pursue the joint degree program. Students are encouraged to announce their intent of seeking a joint degree as soon as possible.
- The joint degree program is not open to students who have already earned one of these degrees.
- A student must satisfy the curriculum requirements for each degree before either degree is awarded.
- A student enrolled in the joint degree program may spend the first year in either the College of Law or the Electrical and Computer Engineering Department of the College of Engineering. Students must carry the minimum number of credits required by either college.
- Electrical and Computer Engineering Department courses which are to be credited toward the J.D. degree must carry a grade of B or higher and will not be counted in the College of Law grade point average. College of Law courses which are to be credited toward the M.S./J.D. degree must carry a grade of C or higher and will not be counted in the grade point average at the College of Engineering.
- Students enrolled in the joint degree program must complete the College of Law's advanced writing requirement. An approved master's thesis in Electrical and Computer Engineering will satisfy the advanced writing requirement of the College of Law if so certified by a law school faculty member. Non-thesis students must still satisfy the College of Law's writing requirement.
- The program began in Fall 2000.

Short Takes

Dr. Pramod P. Khargonekar, who received his doctorate in Electrical Engineering in 1981 and his master's in Mathematics in 1980, both from UF, is the new dean of the UF College of Engineering. His last position was as chairman of the Department of Electrical Engineering and Computer Science at the University of Michigan.

IEEE picks EMTP modeling Paper for Award

"EMTP Modeling of a triggered-Lightning Strike to the Phase Conductor of an Overhead Distribution Line", a paper co-authored by the ECE departments's Carlos T. Mata, Mark I. Fernandez, Vladimir A. Rakov and Martin A. Uman, won the IEEE Power Engineering Society's SPDC (Surge Protective Devices Committee) Prize Paper Award.

This award is given annually to IEEE members in recognition of their contributions and achievements.

Semiconductor Research

Dr. Jerry Fossum has been working with Purdue University in assessing the performance potential of extremely scaled double-gate (DG) CMOS, which could become mainstream technology near the end of the SIA International Technology Roadmap for Semiconductors (ie. in about 10 years).

While Purdue University is focused on the device physics Dr. Fossum is developing physics-based models that can be used for predictive DG CMOS circuit simulation, including device and circuit parasitic effects which will be unavoidable in such a complex technology. The goal is to assess design tradeoffs to exploit the highly unique, near- idealistic features of the intrinsic DG MOSFET while keeping the parasitic effects under adequate control.

Dr. Jose Principe has been invited to serve on the Science Board to the Food and Drug Administration Advisory Committee for a term commencing immediately and ending December 31, 2004 subject to prescribed appointment procedures and to periodic review of the Board's functions.

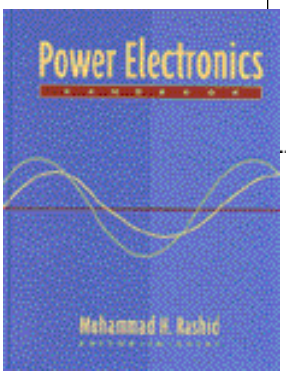
The Subjugator robot submarine, built by a student team from the Machine Intelligence laboratory, took third place and a $3000 prize at the fourth International Autonomous Underwater Vehicle Competition. First place among the 12 entries went to MIT. The annual contest was held July 11-15,2001 at the U.S.

Naval Academy, Annapolis, MD. The contest is sponsored by the Office of Naval Research and the Association for Unmanned Vehicle Systems International. The UF team advisor is Associate Professor Tony Arroyo, Electrical & Computer Engineering Department. Project leader is Scott Kanowitz. Major sponsorship for SubjuGator is provided by the Harris Corp.

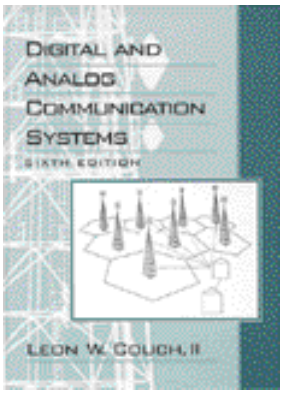
Dr. Ramakant Srivastava has been awarded a Fulbright Scholorship and will be in Malaysia at the Universiti Tenaga Nasional for six months beginning December2001.

Latest Faculty Books

Rashid, M. H. has published *Microelectronics Laboratory Using Electronics Workbench: A Self-Study Course* with IEEE Press in 2000.

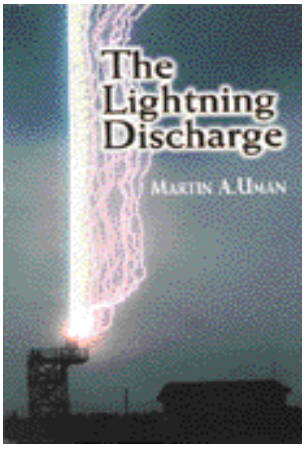


Rashid, M.H. has published *Power Electronics Laboratory using SPICE: A self study course* with IEEE Press in 2000.



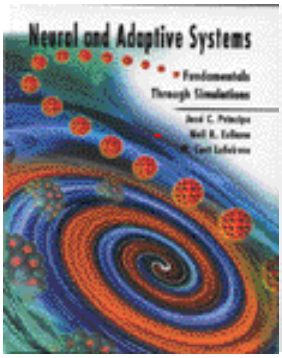
Dr. Leon Couch, II released the Sixth Edition of his book *Digital and Analog Communication Systems*, published by Prentice Hall,758 pages.

Exceptionally up-to date, this text provides a balanced coverage of both digital and analog communication systems, with an emphasis on design of digital communication systems.



Uman, M.A. has a revised edition of *The Lightning Discharge*- Academic Press, London (1987), by Dover Publications, New York, 2001.

Principe, J., Euliano, N., and Lefebvre, C. have released *Neural Systems: Fundamentals through Simulations*. This is a CD-ROM textbook by John Wiley, 2000.



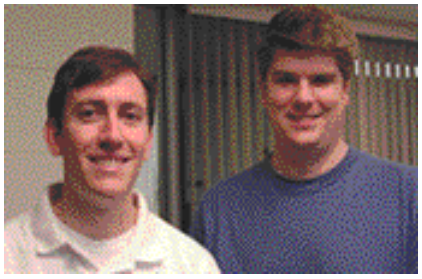
Haykin, S., Sandberg, I., Wan, E., Principe, J., Fancourt, C.,and Katagiri, S. have published *Nonlinear Dynamical Systems:FeedforwardNeural Network Perspectives*, John Wiley, 2001.

Dr. Peyton Peebles, Jr. has published the 4th edition of his book *Probability,Random Variables, and Random Signal Principles*, 462 pages, publication date 2001.

This book has been popular for more than 20 years since the first edition in 1980. It has a companion solution manual , 389 pages, 2001 publication date, which is also from McGraw Hill Publisher.

Accomplished Students

Compiled by Reshma Varghese



Matthew Radlinski & Matthew Chidester

NSF Graduate Fellow Matthew Radlinski joined the ECE department this year, makng him the second NSF fellow to do so, the first being Matthew Chidester, who graduated in Summer 2001 and joined Intel Corporation.

Both of them were doctoratal students under Dr. Alan George, working on 'chip-multiprocessors', a technology which allows the incoporation of two or more processors into a single chip, along with the connecting hardware. It is an attempt to bridge Computer Architecture and Computer Networks: two significantly vital, though unrelated fields.

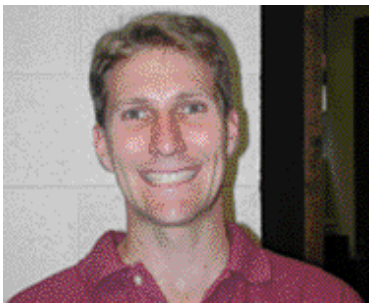
Each year, the NSF awards fellowships to 900 students based on their potential excellence in research and exceptional academic performance. In all, there are only five NSF fellows studying at UF.

The Department is proud to announce that two of our students, Zachary C. Gray and Tina C. Zhong, received the William L. Everitt Award of Excellence. The award is given by the International Engineering Consortium. The students receive a congratulatory letter and a presentation Cross pen set with an engraved name plate. The university receives a customized 2000-2001 student name plate to be added to its IEC Everitt Award plaque.

Zachary, pictured below, is an Air Force ROTC Wing Commander and a member of the Golden Key National Honor Society.

Tina, pictured above, graduated in May 2001 with honors. She was the Treasurer of Eta Kappa Nu. Both students were pursuing their Bachelors degree.

Zachary Gray receives the William L. Everitt Award from Department chairman Dr. Martin Uman.



James Caserta

ECE student, James Caserta, won the Outstanding Student (circuit) Designer Award given by Analog Devices Inc for his project on"Wireless Clock Distribution". ADI sponsored $1,500 for his trip to International Solid-State Circuit Conference (ISSCC) in San Francisco,CA, and presented him a certificate for his work.

He was nomimated for this award by his advisor, Dr Ken O. ADI gives ten such awards each year to the best graduate students from Platinum Universities across the country. The award gives young circuit designers an opportunity to meet experts in the field and a chance to work with ADI after graduation.

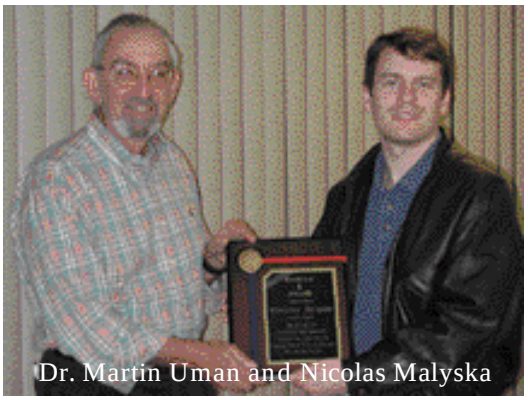
Electric E Awards

The Electric E Award is presented to Undergraduate students from the Department of Electrical and Computer Engineering with highest honors, and an overall GPA exceeding 3.9

FALL 2000


Dr. Martin Uman and WeiFeng Chen


Dr. Martin Uman and John Bradley


Dr. Martin Uman and Nicolas Malyska


Jose Nunez

SUMMER 2001


Dr. Leon Couch and Daniel Allred

FALL 2001

Sandia Fair
Summer 2000

Sandia Labs exhibit on the foyer of the New Engineering Building. The exhibit showcased Sandia's research and innovative technology. Their aim was to recruit students, engineers, and scientists.

In Memory

Professor Ervin S. Priem

Ervin S. Priem, a retired member of the Department of Electrical and Computer Engineering faculty, passed away on April 17, 2000 at the age of 89. Prof. Priem was an Associate Professor Emeritus who specialized in electric energy conversion, instrumentation and engineering technology.

Born in Shawano, Wisconsin on October 9, 1910, Prof. Priem earned his BSEE from the Milwaukee School of Engineering in 1932. After his graduation, Mr. Priem worked in the private sector and briefly for the United States Navy from 1935 to 1951. He joined the faculty in the Electrical Engineering Department at the University of Florida in August 1952, retiring in 1977.

A memorial service was held at the First Assembly of God in Gainesville on April 19, 2000. Professor Robert Bailey, a colleague and friend of Professor Priem's was present and gave the eulogy which follows:

"In his early years he came to Gainesville and the University of Florida in 1952. In 1961-65, he and I had adjacent offices in the basement and 2nd floor of Weil Hall on the campus. Because of the arrangement we had frequent interactions and our friendship developed.

About 1966, the Power Engineering Program began to form under the leadership of Dr. Olle Elgerd. We called it the "Electric Energy Engineering Program" or EEE or sometimes E^3. Erv and I were invited to join this effort and we laid our professional careers on the line that this old facet of electrical engineering could be successfully resuscitated, made interesting to students and be a viable part of electrical engineering educational programs. Subsequently Erv taught undergraduate courses in electric machines, electric energy systems, laboratories for power, creative problem-solving, instrumentation and later, courses in engineering technology.

I especially appreciated his expertise and practical skills in helping us with the power labs—setting them up and helping run them. I appreciated also his help with the creative problem-solving course. He was a continued inspiration to me during the writing of the text. He later helped with teaching the course. Here we taught students how to invent and design new future products for the betterment of mankind, the essence of what engineering is about.Erv, respected colleague, we were special friends for forty years. You're with the Ultimate Power Source now. "

Dr. Ronald Yii

Dr. Ronald Yii who retired after many years of teaching at the Department's Graduate Engineering and Research Center (GERC) in Shalimar, Florida passed away on June 6, 2001 at his home in Palm Beach Gardens. He was a professor at the department since 1968.

His field of specialization was solid-state physics, circuits and systems, digital computer hardware, military applications. He held several patents, a book to his credit.

Albert L. Holloway Graduate Research Endowment

The Albert L. Holloway Graduate Research Endowment has been established to support the research expenses of graduate students in the Department of Electrical and Computer Engineering.

Albert L. Holloway was born in Boyton Beach, FL, in 1927. He received a B.E.E. degree (with high honors) in 1959, an M.E.E. degree in 1962, and a PhD in 1990, all from the University of Florida at Gainesville.

He was a member of Tau Beta Pi, Phi and Pi MU Epsilon. He held several U.S. patents in the field of antenna technology and published in the fields of microwave and antenna technology.

Alumni Connections

Friends we will miss...

Alumni	Degree(s)
Aaron, Jennings B. Jr.	BSEE,1958
Benedict, William R	BSEE,1969
Brown, Lincoln	BEE ,1949
Cabbe, Jon A.	BEE, 1962
Collins, Wilson R.	BSEE,1935
Dryden, Robert E	BSEE,1950
Dugoff, Leon	BSEE,1951
Franklin, Harold V.	BSEE,1959
Fry, Dwayne N.	BSEE,1961
	MSE,1962
Gano, Ovid R.	BSEE,1945
Haug, George W.	BSEE,1932
Howard, Edwin O	BEE ,1960
Huffer, John C.	BSEE,1932
Houghton, Richard	BSEE,1959
Jaundoo, Dave A.	BSEE,1995
Johnson, William L., Jr.	BSEE,1955
Kreher, Stephen	BSEE (BE),1983
Kuhl, Victor W., Jr.	BEE ,1950
Lang, Gene J.	BEE ,1957
	MSE ,1959
	PHD,1963
Newton, Miles	BSEE,1949
Ogan, Servetus W	BEE, 1953
Parker, Richard L.	BEE,1958
	MD,1965
	JD,1989
Raval, Mihirkumar V.	MS,2000
Russell, Dallas W.	PHD,1975
Scott, Colonel John M. Jr.	BSEE ,1961
Sells, Ronald L.	BEE ,1959
Smallwood, Mark H.	BEE ,1955
	MSE ,1963
	PHD,1969
Sturgell, Charles Chester Jr.	BSEE,1948
Thompson,Kenneth	BSEE,1935
Todd, James H.	BEE,1959
Van Eepoel, Robert P.	BSEE,1948
Ward, Harold Anson Jr.	BSEE ,1926
Wiggin, Macdonald J.	MSEE,1938
Wray, Fredrick E.	BSEE,1928

1967

Bill Waggener, MEE, 1967, published his second technical book, *Pulse Code Modulation Systems Design*, Artech House, Boston, 1999. The book chronicles the struggle of binary bits in a hostile analog world.

1993

Matthew Albert, P.E., BSEE, 1993, has started a new company, System Integration, Inc. based in Jacksonville, FL. producing electrical design and programming services for industrial automation systems.

1983

Kevin D. Scott, BSEE, 1983, is currently working as the Accessories Group Leader and Project Manager for the Bluetooth Project at MMCD Panasonic. MMCD Panasonic is a design center for TDMA cellular handsets.

Donors

Corporations & Foundations

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Aetna Fdtn.
Agilent Technologies, Inc.
Analog Devices, Inc.
BellSouth Corp.
Boeing Co.
British Broadcasting Corp.
CH2M Hill Fdtn.
Compaq Computer Fdtn.
Exxon Mobil
FPL Group Fdtn., Inc.
GE Fund
Halliburton Fdtn.,Inc.
Harris Fdtn.
Heinrich,Gordon,Hargrove, et al.
Hewlett-Packard Co.
Honeywell Fdtn.
IBM Corp.
Intel Fdtn.
Lockheed Martin Corp.
Lucent Technologies
Motorola Fdtn.
Nortel Networks
Northrop Grumman Corp.
Raytheon Co.
Sony U.S.A.. Fdtn., Inc.
Sun Microsystems, Inc.
United Technologies Corp.

Private

Mr. Ruben J. Alvarez
Mr. Steven M. Anderson
Mr. Donald E. Armold
Mr. Stephen Barilovits III
Mr. Robert A. Bednarek
Mr. Randall A. Bell
Mr. James H. Beusse
Mr. Warren A. Birge
Mr. Edward Bleckner, Jr.
Mr. Fred J. Block
Mr. Harold L. Boyd
Mr. W. W. Branning
Mr. Millard S. Brickerd Jr.
Mr. Michael C. Brinkmann
Mr. Theodore E. Brown, Jr.
Mr. Richard C. Burner

Mr. Richard C. Campos
Mr. Joseph B. Carley
Mr. Lawrence H. Carson
Mr. William S. Caruthers
Dr. Kefeng Chen
Mr. David J. Cheney
Mr. Edward B. Clark III
Mr. GeorgeW. C1ark, Jr.
Mr. Chris A. Cochran
Mr. John D. Corry
Dr. Leon W. Couch ll
Mr. Robert V. Croft
Mr. Michael J. Cullen
Mr. Charles R. Curley
Mr. Elbert J. Davenport, Jr.
Dr. Francisco H. De La Moneda
Mr. Titus J. Diamond
Mr. Clyde Dickens, Jr.
Mr. Michael J. Dion
Mr. William M. Droste
Mr. Walter L. Elden
Mr. Scott R. Evans
Mr. Julian G. Farrow
Mr. Eduardo Fernandez
Mr. Fred B. .Fetzer
Mr. James R. Fielland
Mr.Norman D. Fledell
Dr. Ross M. Fleischman
Mr. David Fontanez
Dr. Charles E. Fosha, Jr.
Mr. James M. Fowler III
Mrs. Elizabeth M. Froling
Mr.Carlos R. Gamero
Mr. Carlos M. Garcia
Mr. Harold V. Gardner, Jr.
Lt. Col. Robert A. Glista
Mr. John L. Gnagy
Mr. David S. Graf
Mr. James Y. Graves
Mr. Ashford C. Greeley
Dr. Michael J. Grove
Mr. Sant D. Gupta
Dr. Fumio Hamano
Mr. Kerry M. Hancock
Mrs. Saundra K. Hand
Mr. Reid R. Harrison
Mr. Patrick Harshman
Mr. Isaah M. Haynes
Mr. Robert T. Healy, Jr.
Mr. Harold L. Hess
Mr. Lee B. Hinkle
Mr. Robert M. Hurley
Mr. Mark H. Inman
Mr. Don A. Irons, Jr.
Mr. Gerald G. Isaac
Mr. James I. Jaffee
Mr. Mark G. Jager
Mr. Michael T. James
Mr. Michael S. Jecen
Mr. Larry E. Jones
Mr. Samuel A. Jordan,Jr.
Mr. Barry S. Katz
Mr. Jonathan A. Kaye
Mr. Theodore C. Kellermann,Jr.
Dr. Robert C. Kemerait
Mr. Jeffery I. Ketner
Mr. Mark C. Kilby
Mrs. Janet S. King
Mr. James Koppenberger
Dr. Jack L. Kouloheris
Mr. Kevin C. Kreitzer
Mr. Micah D. Krider
Dr. Ashok K. Krishnamurthy
Mr. Barry A. Kritt
Mrs. Elise C. Kurtz
Mr. Kevin T. Langston
Mr. Kha V. Le
Mr. Frank D. Leonhartsberger
Mr. Samuel A. Leslie
Mrs. Gretchen H. Letvin
Dr. Minchang Liang
Mr. Carlos Liendo
Mr. Leonardo Liendo
Colonel Luis C. Linares
Mr. Matthew J. Lishok
Dr. Der H. Lo
Mr. Jon A. Loschke
Lt. John J. Losinski
Mr. Joseph E. Lounds
Mr. Clint L. Madsen
Mr. Matthew D. Markel
Mr. Edward L. Masters,Jr.
Mr. S. Joseph Mather
Mr. Lamar May
Mr. Frederick K. McCann
Mr. Alan G. McDaniel
Mr. David A. McNamara
Mr. Alfoncio Michel
Mr. Chester R. Miller
Mr. Roger F. Moonen
Mr. William V. Murray
Mr. J. Jeffery Nauful
Mr. Robert D. Niekum
Mr. Jeffrey R. Nuckols
Mr. Timothy A. Palm
Mr. John A. Paramore
Mr. John F. Pearce
Dr. Richard K. Peterson
Mr. Michael Pilo
Mr. Scott M. Pitkethly
Mr. Eugene P. Powell
Mr. Harvey H. Purcell
Dr. Hans B. Puttgen
Mr. Saurel Quettan
Mr. Ronald M. Rasmussen
Ms. April Ray
Mr. Richard A. Rayos
Mr. Kiran M. Rege
Mr. Clifton F. Reynolds
Mr. Richard H. Ribbe
Mr. Thomas N. Richardson
Mr. Timothy G. Ricketts
Mr. Bartow T. Robbins
Mr. Kenneth E. Rodd, Jr.
Mr. Brian K. Rosier
Mrs. Ann S. Ruckstuhl
Mr. Frank J. Russo
Mr. William R. Ryan, Jr.
Mr. Robert G. Saenz
Mr. Alex D. Sawyer
Mr. Albert F. Schultz
Mr. Williem L. Schultz
Mr. Matthew J. Schumacher
Mr. E. Fred Sharp, Jr.
Mr. Eric M. Shaw
Dr. Muhanmed A. Shibib
Mr. John Wayne Simmons
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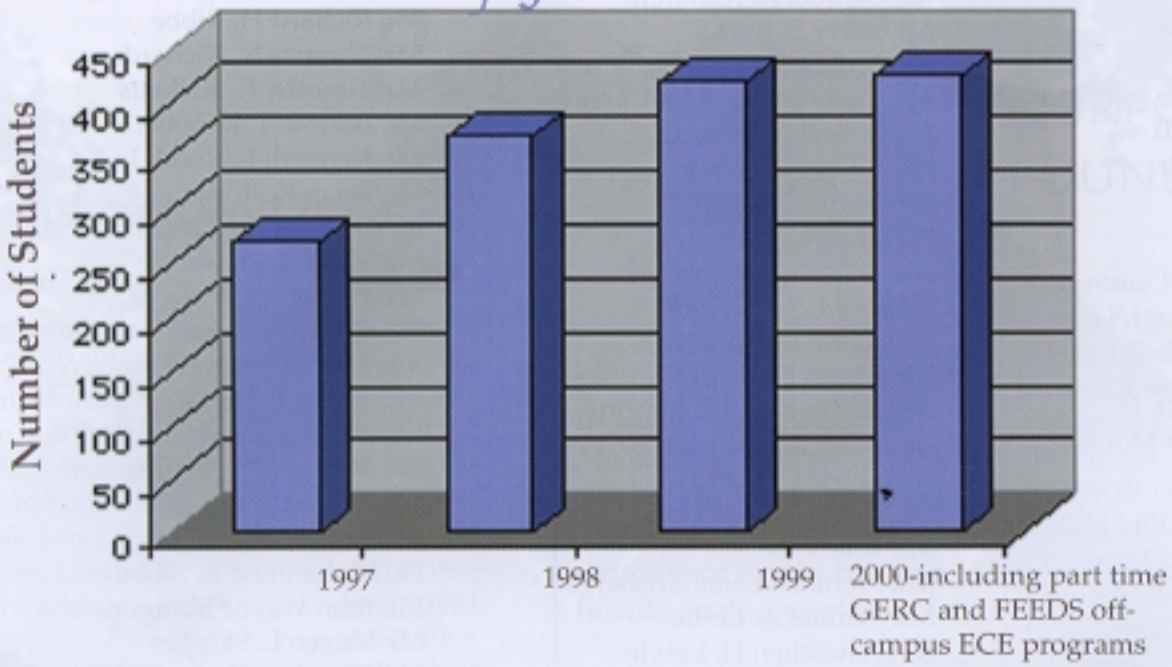
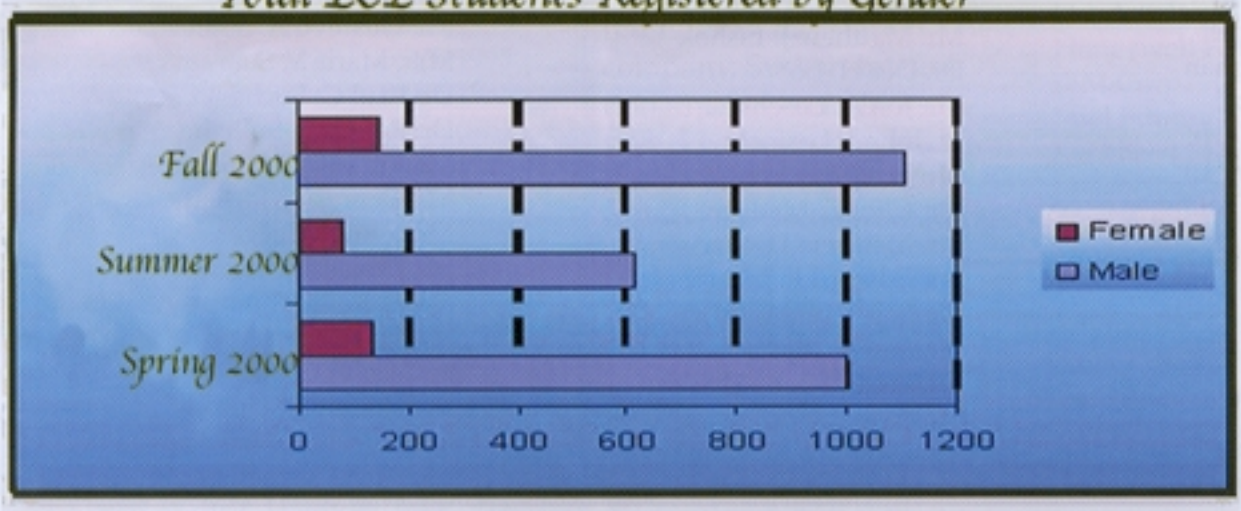
Mr. William D. Woodward, Jr.
Mr. David M. Woolley
Mr. Daniel M. Wright
Mr. Brent r. Yamauchi
Mr. F; E. Yanaros, Jr.
Mr. James Yontz, Sr.
Dr. Jiann-Shiun Yuan
Mr. George G. Zipfel, Jr.

Total Number of Graduate Students at ECE



Total ECE Students Registered by Gender



University of Florida Rankings:

Rank	Source
#5:	US News Best Values: Top 10 National Universities
#6:	2000 National Freshman Merit Scholars, Public & Private Universities; 166 Scholars
#13:	2000 US News Top Undergraduate Engineering Programs, Public Universities
#16:	2000 US News Graduate Engineering Schools, Public Universities
#16:	Overall Rank, Top 50 AAU Public Universities

alumni, we've missed you!

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CITY STATE ZIP

DEGREE/YEAR UF/UNF/UWF PROGRAM

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Current position, title, company, publications, recognition, etc. Please use the space below to provide current information...or, email us at: ecenews@ece.ufl.edu

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I am enclosing $_____ for Department teaching programs.
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