Congratulations to one and all!

The reception held after the ceremony.

Faculty, parents, relatives, and friends attending

consultation.

C H A I R ’ S
C O R N E R

As you glance through this issue of Real Time you will see that 1998-99 was a year of many events for the Electrical and Computer Engineering Depart-

ment. We saw our relationship with industry grow, and the support that we have drawn from them has been rewarding. We will continue working with industry to provide them with our best service, including special graduate programs for their employees and collaborative research on topics of their interests. We also realize that today's student is busier than ever with personal and professional commitments. This leaves little time to pursue higher education or specialized technical training that can be critical to making oneself more marketable in the workplace. To provide higher education to those who cannot come to the campus for whatever reason, we decided to go to them by offering our graduate level courses through the Distance Learning program. We are developing Web-based courses for some of our undergraduate level courses that do not require participation in the labs. These courses will be available soon.

We saw some of our faculty members leaving to seek new challenges; their contributions are acknowledged. We also saw new faculty members joining the department the 1999-99 academic year. We have great expectations that they will help us with the challenges ahead. We also have two new Fellows in our Department. Dr. Jorge Aunon who is an IEEE Fellow has joined us as Dean of the College of Engineering and Professor of Electrical and Computer Engineering. Dr. Banerjee, now a Fellow of SPIE, will assume a new responsibility as Research Coordinator of the Department starting Fall 1999. We look forward to a noticeable growth in funded research.

We have introduced new courses, new laboratories, and have modernized two of our labs. We also added a double-major option to our undergraduate curricula. We are pleased to announce that ECE students now have an option of majoring in EE, CPE, OPE, EE-CPE, CPE-EE, EE-OPE, and OPE-EE. To provide a better service to our students, we have added "ECE Information and Advising" in the Department. Dr. Charles Corsetti, Assistant Chair, who is in charge of this activity is available for your consultation.

In May, more than 120 ECE students graduated. Faculty, parents, relatives, and friends attending the graduation commencement congratulated the graduates and expressed their pride during the reception held after the ceremony.

Congratulations to one and all!

NSF Awards Grant to UAH
With Support of ADTRAN and Dynetics, Inc.

The National Science Foundation awarded a grant to The University of Alabama in Huntsville for support of the project "Communication Laboratory Enhancement for an Undergraduate ECE Program." The project is under the direction of Dr. John L. Stensby, Dr. Laurie L. Joiner of the Department of Electrical and Computer Engineering, and Dr. Robert Bernat of Dynetics, Inc.

The goal of the proposed Course, Curriculum, and Laboratory Improvement (CCLI) project is to supply equipment for a communication laboratory at the University of Alabama in Huntsville (UAH). The equipment will support the startup of two new, one-credit-hour, undergraduate laboratory courses in communication technology and data networks. The new laboratory courses will be tightly coupled to existing communication-system lecture courses offered by the department.

Original material generated by the principle and co-principle investigators will be used in laboratory experiments. In addition, a number of experiments that are currently in use at the University of Michigan, the University of Hartford, the University of Denver and elsewhere will be implemented at UAH. These experiments deal with modulation/demodulation, phase-locked loops (PLLs), filters, oscillators, RF design and analog/digital communication, and they are documented completely on the Educator’s Corner web site maintained by Hewlett-Packard (also, a compact disc version is distributed freely by HP). Finally, in the areas of PLLs, oscillators, analog/digital communication and related topics, "turn key" experiments from Lab Volt, Inc. will be implemented at UAH.

For the laboratories, manuals will be compiled and disseminated widely. By using the .pdf file format standard, this information will be placed on the world wide web. In addition, original material developed at UAH will be submitted to corporate programs, such as Educator’s Corner. Finally, key personnel at ADTRAN and Dynetics, local technology companies, will serve as independent project reviewers/evaluators.

The proposed project addresses several DUE themes, including diversity, faculty development and the integration of technology in education. Its importance follows from the fact that it directly addresses the nation’s critical need for engineers trained in the science and technology of communication systems, a major engine for economic growth in the 21st century.

Banerjee Named SPIE Fellow

Partha P. Banerjee, Professor of Electrical and Computer Engineering at UAH has been recently elected Fellow of the International Society for Optical Engineering (SPIE). He will receive his Fellow award at the SPIE Annual Meeting at Denver in July this year. Professor Banerjee has been cited for his achievements in the areas of nonlinear optics and photorefractives, optical information processing, and acoustooptics.

Professor Banerjee has over 75 referred publications in the area of optics, has co-authored a textbook Principles of Applied Optics [Irwin-CRC Press 1991], and is currently finishing a second book with Professor John Jarem, ECE, on Computational Methods for Electromagnetic and Optical Systems [Optical Engineering Series, Marcel Dekker 1999]. He has guest-edited special issues in the SPIE journal Optical Engineering in the areas of photorefractives

(Continued on page 7)
SECURED MAIL, S-MAIL: Students’ Design Protects Postal Mail Electronically

Today, there is a growing problem in some residential neighborhoods. The problem is that residential mailboxes need security features in order to protect owners’ rights and privacy. It is considered a felony in the United States to tamper with mail, yet it is impossible to completely eliminate this problem. For this reason, the United States Postal Service recommends the conversion of current mailboxes to a locking-type mailbox (see U.S. Consumer Products – http://www.consumer-oline.com/products/mailsafe.html).

As part of a requirement for electrical engineering degree, four students, “the team” designed and implemented a mailbox with security features that will help reduce the chances of becoming prone to mail tampering. Also, the mailbox provides residential owners, as well as postal carriers, easy access while providing maximum security to keep unwanted violators out.

We call it “Secured Mail” (S-Mail), a mailbox that protects your postal mail electronically.

The team first determined the security mailbox was feasible from a market analysis they performed. The market analysis consisted of a patent and Internet search for similar products, and a market survey. The market surveys are crucial when making design decisions. Information from surveys, consumer reports, and other useful consumer data will depend on whether there are similar products already on the market or whether the product is breaking new ground.

The task was to come up with a unique design, which is fully operational.

The market survey revealed that out of 100 people questioned, 60% was interested in a security mailbox. Of the 40% not interested, nearly 80% lived in an apartment complex or student dormitory, where the mail is usually delivered in locked mailboxes. The team also established a target product cost of $75.00 for the electronic mailbox. This information was also determined from our market surveys and an economic analysis.

The team conducted a thorough analysis of the competition. This analysis included future competition as well as existing competitors. They analyzed the majority of the competition through patent research. After researching the United States Patent Office’s website, they located thirteen different security mailbox designs.

It is their belief, however, that those mailboxes did not provide the security features that would give the consumer the added security needed for important mail. Also, the knowledge of patents was particularly important in order to avoid costly infringement suits.

The team also obtained information from the United States Postal Service (USPS) that was crucial in developing our design. For example, the mail carrier is not allowed to unlock a residential mailbox, except in extenuating circumstances. With this in mind, the mailbox protects only incoming mail. After extensive research and considering numerous test cases, the team developed a design plan by describing the functional requirements of each component of their final product.

Key features of their final design included an electronic entry keypad, electro-magnetic lock providing more than 300lbs of locking force, and a sound alarm.

The electronics design should allow the postal carrier access to outgoing mail, but also to secure incoming mail by locking the mailbox. The electronics for the mailbox required 12 watts of power from a 12 V battery, and was computed to have a Mean Time Between Failure (MTBF) of 18 years. The cost of the prototype was about $200.

The four engineering students feel their project provided useful skills that they will need to succeed in the workforce. They were given the opportunity to gain valuable experience by working together in a group to design and develop a project. As different problems presented themselves, the group was able to overcome them. Our group learned that introductory classes such as Circuits, Electronics, and Digital Logic Design provides an important foundation for beginning any design.

The team recommends that these classes be taken seriously, because if you have to go back and learn material that you should know it becomes difficult to finish the project. They recommend that individuals try to pick members who they know are reliable, and have a general idea of most of the electrical engineering introductory coursework that they have been exposed to. This way when problems arise, the group has someone who knows where to go to get help.

If everyone in the group does his part, the group operates smoothly together. They also learned that most of the principles taught in classes are ideal theoretical situations. Sometimes when components are integrated, the circuit does not behave as expected. They learned to be patient.

Patience is important when the project isn’t working according to the plan. If you are patient when problems arise, they don’t seem so bad. Finally they learned a completed working project is very satisfying. When you start with an idea, and you conquer each task presented, the end result makes you feel proud.

The students would like to thank Dr. Charles Corsetti who spent many hours advising the team members during 1998 Fall semester.
DOCTORS OF PHILOSOPHY, 1998-99

Edward Koplin Doskocz  
Major: Computer Engineering  
Advisor: Dr. Constantine Katsinis

Jonathan J. Drews  
Major: Optical Science and Engineering  
Dissertation: “Four Wavelength Retinal Vessel Oximetry”  
Advisor: Dr. Lloyd Hillman

Michael Tad Hale  
Major: Electrical Engineering  
Advisor: Dr. Reza Adhami

Ricky E. Hawkins  
Major: Electrical Engineering  
Dissertation: “Fractional Turn Primaries: A Modern Development in High Voltage Pulse Transformers”  
Advisor: Dr. Nagendra Singh

Darryl Keith Jones  
Major: Optical Science and Engineering  
Dissertation: “The Dynamics of Controllable Transmissive Resonant Structures with Applications to Optical Phased Arrays and Electro-Optic Switches”  
Advisor: Dr. Richard Fork

Arthur Lompado  
Major: Optical Science and Engineering  
Advisor: Dr. Lloyd Hillman

Basel Ali Mahafzah  
Major: Computer Engineering  
Dissertation: “Applying Message Passing Program’s Measured Characteristics to Queuing Models.”  
Advisor: Dr. William Cohen

Ibrahim Mousa Sahawneh  
Major: Electrical Engineering  
Dissertation: “Numerical Solution for an Interdigitated Anisotropic Inhomogeneous Electrostatic System”  
Advisor: Dr. John Jarem

Brian Jennings Smith  
Major: Electrical Engineering  
Dissertation: “Localized Computed Tomography Utilizing the Wavelet Transform”  
Advisor: Dr. Reza Adhami

Travis Shane Taylor  
Major: Optical Science and Engineering  
Dissertation: “Laboratory Simulation of Atmospheric Turbulence Induced Optical Wavefront Distortion”  
Advisor: Dr. Don Gregory

MASTERS OF SCIENCE IN ENGINEERING, 1998-99

Electrical Engineering

John Robert Berg  
Thesis: “The Design of Disturbance Cancellation Controllers for Noisy Disturbances”  
Advisor: Dr. C.D. Johnson

James Richard Blacklock  
Thesis: “The Design of Disturbance Cancellation Controllers for Noisy Disturbances”  
Advisor: Dr. C.D. Johnson

Mark Anthony Darty  
Advisor: Dr. Fat. D. Ho

Anthony Lee Reid  
Thesis: “Fractional Turn Primaries: A Modern Development in High Voltage Pulse Transformers”  
Advisor: Dr. Fat. D. Ho

Yujuan Si  
Thesis: “Bytewise Selectable 32-Bit Edac implemented in VHDL”  
Advisor: Dr. Rhonda Gaede

Bin Yang  
Thesis: “High Voltage DC Transmission Using Thyristor Control Valves”  
Advisor: Dr. Fat. D. Ho

Computer Engineering

Sonia Lucine Cutts  
Thesis: “Performance Analysis of the Process Cache for Both Instruction and Data Traces”  
Advisor: Dr. Rhonda Gaede

Thuan Dinh  
Thesis: “Performance Analysis of the Process Cache for Both Instruction and Data Traces”  
Advisor: Dr. Rhonda Gaede

Fyodor N. Golos  
Thesis: “Performance Analysis of the Process Cache for Both Instruction and Data Traces”  
Advisor: Dr. Rhonda Gaede

Yi Sun  
Thesis: “Bytewise Selectable 32-Bit Edac implemented in VHDL”  
Advisor: Dr. Rhonda Gaede

Sean W. Thompson  
Thesis: “Bytewise Selectable 32-Bit Edac implemented in VHDL”  
Advisor: Dr. Rhonda Gaede

Mary Susan Tweeton  
Thesis: “Bytewise Selectable 32-Bit Edac implemented in VHDL”  
Advisor: Dr. Rhonda Gaede

Mehran Rezaei  
Brian K. Rutherford  
Advisor: Dr. Reza Adhami

Ngozi Olga Nnedu  
Insuk Pak Sickler  
Guiliang Xing  
Narendar Yalamanchilli

(Commencement List continued on page 5)
The ECE Department Introduces EE 494, EE Design Projects

In the Spring 1999 semester, the ECE Department introduced its revised EE 494 Course, EE Design Projects. This capstone design course is required of all electrical engineering seniors beginning with the 1998-1999 Catalog. Students work as individuals or teams (preferred) under the direction of a faculty member to design, implement, test and evaluate their projects.

Each team is required to identify a problem or opportunity and to assess the marketability of their design concept by conducting marketing surveys, patent and product searches, and a literature search. The design teams prepare their project proposals as well as conduct a midterm and final design review.

A final project report, prototype demonstration and a product news release are also required for each project. Each group is expected to meet its deadlines and communicate its ideas and concepts effectively. The following three projects were successfully completed during the Spring semester:

Smart-Phone: The Future in Voice Communications

Voice recognition provides a means for enabling a computer or data processing system to recognize spoken commands and input data, and convert them into electrical signals that can allow the system to carry out these commands or accept the data. Voice recognition technology is rapidly growing and finding widespread use in such areas as phone browsers, word processing, interactive electronic technical manuals and wearable computers. New developments in software have made it possible to minimize the amount of training required and increase the success rate for voice recognition.

Four electrical engineering students (shown are three of the four students) developed a voice recognizing telephone known as Smart-Phone as their senior design project. The Smart-Phone allows its user to develop a database of names and telephone numbers. Once the system is trained to the user’s voice, a call can be made by simply using voice commands. When the vocal command is given to call an individual, the computer searches the database until the individual’s name and number are found. Smart-Phone then allows the use of vocal commands to dial the number through a voice modem. Once connected, the user can have a normal conversation over a speakerphone.

Smart-Phone was tested using a notebook computer with a 300MHz processor and 64 MB of RAM. The system requires a full duplex voice modem. Voice control is accomplished using the controls included in a voice recognition software developer's suite. The coding was done in Visual Basic.

Lightwave Communications Using Pulse Frequency Modulation

Another group of four engineering students selected a project that converts an input sound (like voice) into a modulated electrical signal that is sent through an infrared (IR) light emitting diode (LED) and transmitted via free space to a receiver that converts the signal back into sound. The communication system is similar in principle to many optical fiber communications systems used to transmit voice, video, and data over long distance as well as within a local network. The idea for this project came from a project design book.

The design consisted of the transmitter, a transmission media, and a receiver. In the transmitter, the audio is converted into an electrical signal using a microphone. A 555 timer is then used to generate a pulse frequency modulated signal with a carrier frequency of up to 60 kHz. The modulated signal is applied to a high intensity IR LED which transmits a modulated IR signal via free space (the transmission medium) to the receiver. A phototransistor in the receiver circuit detects and converts the incoming light pulses to an electrical signal that is passed through a differentiator and low pass filter for demodulation. The demodulated signal is then fed to a speaker for output.

This project turned out to be much more complex than first expected. The group made one major mistake in the beginning in that they assumed that the design would work as drawn in the schematic provided by the project book. It didn't; the receiver circuit required several modifications before it operated properly. Another useful engineering lesson learned was to make sure the simulations of the circuit are working before you try to analyze problems with the actual hardware. The students found that simulation programs such as MATLAB® and Electronics Workbench® give the information needed to help in the analysis of the circuit.

The ECE Department will offer EE 494 in the Fall and Spring semesters to students of senior standing.
Radar Gun Interface

Baseball ... the American pastime... and a surprising subject of an electrical engineering design problem. Parents of children who play in league baseball or are involved in baseball at any serious level know, radar guns are widely used in pitching training and assessment. It is very common for a radar gun to be used to track a pitcher’s throwing speed.

But radar guns are widely used in industry as well. Automobiles and other vehicles, such as watercrafts, sporting goods, and toys are timing-tested in development with radar guns. One manufacturer of a gun used by large companies, consumer testing magazines and professional racecar teams, offers a complete testing system.

This system includes the radar gun, which many people have already purchased, and then adds the serial cable and the software to process the data for an additional cost. The additional cost may be prohibitive for smaller scale applications. This situation presented itself as a design opportunity for another student: Design and implement affordable, convenient, and user-friendly software/hardware to interface a radar gun output to a notebook computer’s serial port.

The notebook computer was chosen as the desired output device because it is widely available and easy to use. The design included a serial cable built to connector and pin-out specifications provided by the radar gun manufacturer. The manufacturer also provided the data format.

A Graphical User Interface was programmed in Visual Basic for a very user-friendly and easily adjustable environment. Typical information available to the user, specific to baseball or softball, was peak speed and average speed of the pitches as well as graphs displaying different ranges of pitches. The software also allows the user to save and retrieve files for individual pitchers for comparison. The student’s coursework provided the foundation and underlying knowledge that allowed breaking this design problem down into smaller, simpler problems which are easily solved and integrated.

(Continued from page 3)
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<td>3</td>
<td>Real Time &amp; Embedded Systems</td>
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<tr>
<td>CPE542</td>
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<td>Parallel Processing</td>
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<tr>
<td>CPE610</td>
<td>3</td>
<td>Selected Topics in Computer Engr</td>
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<tr>
<td>CPE644</td>
<td>3</td>
<td>Analytic Models of Interconnection Networks</td>
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<tr>
<td>CPE699</td>
<td>3</td>
<td>Master’s Thesis</td>
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<tr>
<td>CPE749</td>
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<td>Neural Networks &amp; Their Application</td>
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<tr>
<td>CPE799</td>
<td>3</td>
<td>Doctoral Dissertation</td>
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</table>
Changes in the Electrical and Computer Engineering M.S.E. Degree Programs

The M.S.E. degree program has two options: Plan I which requires 24 hours of coursework plus a thesis or Plan II, 36 semester hours including the ECE capstone course package. The ECE capstone courses are:

CM 601: Communication for Engineers
Credit hour: 1
CM 601 provides an introduction to technical presentations for advanced engineering students. Students are briefly introduced to rhetorical theory, provided training in oral communication skills, and given the opportunity to practice rhetorical communication. The class meets for eight two-hour class periods.
First semester to be offered: Fall 1999
Frequency of offering: Fall and Spring

EE691: Graduate Seminar I
Credit hour: 1
Seminar presentations by representatives from industry and/or faculty members to promote the skills required to organize and deliver oral and written presentations. The presentations introduce the student to a wide variety of current topics relevant to the technical and career aspects of electrical, computer, and optical engineering. The student is required to present a summary of his/her research interests. The class meets for eight two-hour class periods.
First semester to be offered: Fall 1999
Frequency of offering: Fall and Spring

EE692: Graduate Seminar II
Credit hour: 1
Written report and oral presentation by student on individual research or on journal articles. The class meets for eight two-hour class periods.
First semester to be offered: Spring 1999
Frequency of offering: Once a year

In both MSE plans, one of the minors in the basic plan of study must be mathematics or mathematical methods in engineering (i.e., EE528, EE628, etc.), usually a two-course sequence approved by the student’s advisor. For Plan I, the student must defend his/her thesis as a final examination. For Plan II, the advisory committee may require a final comprehensive examination. Based on the student’s performance in the M.S.E. program, the advisory committee may recommend the student to the Ph.D. program without the required preliminary examination.

Dual Major? Of Course!

The ECE Department provides the opportunity for a double major with primary major in CPE, EE, or OPE, and a distinctly different secondary major selected from EE, OPE, or CPE. None of the secondary major courses are permitted as primary major electives. The request for a double major should be submitted to the ECE Information/Advising Office. Listed below are the possible double major combinations.

CPE-EE: EE100, 307, 313, 384, and two courses from EE424, 425, 426, or 448.
EE-OPE: OPE 451, 454, 455, OPT341, 342, 411, and EE447 as an EE Option elective.
OPE-EE: EE100, 416, 425, 448, 494.
EE-CPE: CPE 203, 302, 352, 353, 433, and one course from CPE403, 468, or 492.

Banerjee Named SPIE Fellow

(August 1995) and acoustooptics (July 1999), is on the technical committee of Photorefractive Materials and Devices Symposium at the SPIE Annual Meetings since 1998, and session chairman in many SPIE and Optical Society of America Meetings. He also received the UAH Foundation Award for Research and Creative Achievement in 1995, and the National Science Foundation Presidential Young Investigator Award in 1987.

To date Professor Banerjee has advised 16 Ph.D. students in ECE and OSE. He is on sabbatical leave this year and has spent part of his time at Osaka City University in Japan working on photorefractive polymers, and at Army Research Labs in MD working on adaptive phase distortion correction in imaging systems. Professor Banerjee is also a Fellow of the Optical Society of America (1995), and a senior member of IEEE.

Dr. Banerjee will assume a new responsibility as Research Coordinator of the Department starting Fall 1999.
Computer Engineering Option in Computer Networks

Major Courses:

EE 504: Introduction to Data Communications  Fall
CPE 610: Programming For Communications  Spring
CPE 532: Real-Time and Embedded Systems  Fall
CPE648: Computer Networks  Spring

First Minor:

EE 500: Random Signals and Noise  Fall
CPE 644: Analytical Models for networks  Fall

Second Minor:

Choose two courses from

EE 534: Optical Fiber Communications  Fall
EE 634: Optical Communications  Spring
CPE 582: Introduction To VLSI  Spring
CPE 682: Advanced VLSI  Fall
EE 528: Analytical and Computational Methods in EE I  Fall
EE 628: Analytical and Computation Methods in EE II  Spring

Support Courses:

ECE capstone course package plus three of the following:

CPE 513: Advanced Techniques in Computer Design  Fall
CPE 631: Architecture of Parallel Processors  Spring
CPE 542: Parallel Processing  Fall
CPE 642: Parallel Computation  Spring
The Electrical and Computer Engineering Department Announces
Three MSE Options Available Through Distance Learning

Communications Option

Major Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Term</th>
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</thead>
<tbody>
<tr>
<td>EE500 Random Signals and Noise</td>
<td>Fall</td>
</tr>
<tr>
<td>EE506 Communication Theory</td>
<td>Spring</td>
</tr>
<tr>
<td>EE504 Introduction to Data Communication Networks</td>
<td>Fall</td>
</tr>
<tr>
<td>EE642 Data and Digital Communications</td>
<td>Spring</td>
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</table>

First Minor

<table>
<thead>
<tr>
<th>Course</th>
<th>Term</th>
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</thead>
<tbody>
<tr>
<td>EE528 Analytical and Computational Methods in Electrical Engineering I</td>
<td>Fall</td>
</tr>
<tr>
<td>EE628 Analytical and Computational Methods in Electrical Engineering II</td>
<td>Spring</td>
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</table>

Second Minor (Select a two-course sequence)

<table>
<thead>
<tr>
<th>Course</th>
<th>Term</th>
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<tbody>
<tr>
<td>EE601 Linear Systems</td>
<td>Summer</td>
</tr>
<tr>
<td>EE648 Digital Signal Processing</td>
<td>Fall</td>
</tr>
<tr>
<td>EE603 Random Signals in Communication</td>
<td>Fall</td>
</tr>
<tr>
<td>EE745 Modulation and Phase Locked Techniques in Communications</td>
<td>Spring</td>
</tr>
<tr>
<td>EE619 Introduction to Radar Systems</td>
<td>Fall</td>
</tr>
<tr>
<td>EE725 Advanced Radar Techniques</td>
<td>Spring</td>
</tr>
<tr>
<td>EE505 Introduction to Control and Robotic Systems</td>
<td>Spring</td>
</tr>
<tr>
<td>EE701 Advanced Linear Control Theory</td>
<td>Fall</td>
</tr>
<tr>
<td>EE534 Optical Fiber Communications</td>
<td>Fall</td>
</tr>
<tr>
<td>EE634 Optical Communications</td>
<td>Spring</td>
</tr>
<tr>
<td>EE527 Electromagnetic Waves</td>
<td>Fall</td>
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<tr>
<td>EE610 Antenna Design</td>
<td>Spring</td>
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Plan II Option

<table>
<thead>
<tr>
<th>Course</th>
<th>Term</th>
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<tbody>
<tr>
<td>EM697 Engineering Management Project I</td>
<td>Fall</td>
</tr>
<tr>
<td>EM698 Engineering Management Project II</td>
<td>Spring</td>
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</tbody>
</table>

Choose two more graduate courses including the ECE capstone course package

Plan I Option

6 hours of EE699 and an approved thesis by advisory committee.

Digital Signal Processing Option

Major Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Term</th>
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</thead>
<tbody>
<tr>
<td>EE500 Random Signals and Noise</td>
<td>Fall</td>
</tr>
<tr>
<td>EE601 Linear Systems</td>
<td>Summer</td>
</tr>
<tr>
<td>EE648 Digital Signal Processing</td>
<td>Fall</td>
</tr>
<tr>
<td>EE604 Digital Image Processing Algorithms and Applications</td>
<td>Spring</td>
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</tbody>
</table>

First Minor

<table>
<thead>
<tr>
<th>Course</th>
<th>Term</th>
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<tbody>
<tr>
<td>EE528 Analytical and Computational Methods in Electrical Engineering I</td>
<td>Fall</td>
</tr>
<tr>
<td>EE628 Analytical and Computational Methods in Electrical Engineering II</td>
<td>Spring</td>
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</table>

Second Minor (Select a two-course sequence)

<table>
<thead>
<tr>
<th>Course</th>
<th>Term</th>
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<tbody>
<tr>
<td>EE504 Introduction to Data Communication Networks</td>
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<tr>
<td>EE642 Data and Digital Communications</td>
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<tr>
<td>EE506 Communication Theory</td>
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<td>Fall</td>
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<tr>
<td>EE610 Antenna Design</td>
<td>Spring</td>
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Plan II: Non-Thesis Option

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>EM697 Engineering Management Project I</td>
<td>Fall</td>
</tr>
<tr>
<td>EM698 Engineering Management Project II</td>
<td>Spring</td>
</tr>
</tbody>
</table>

Choose two more graduate courses including the ECE capstone course package

Plan I: Option: Thesis Option

6 hours of EE699 and an approved thesis by advisory committee.
Dr. Charles Corsetti Named Assistant Chair

On January 4, Dr. Charles Corsetti joined the ECE Department as its Assistant Chair. In his new position, he will assist Dr. Adhami in creating a more “student friendly” environment within the department.

Dr. Corsetti received his B.E. degree in Electrical Engineering from Manhattan College in New York City, and his M.S. and Ph.D. degrees in electrical engineering from the Air Force Institute of Technology in Dayton, Ohio. Prior to coming to UAH, Dr. Corsetti served in the Air Force for more than 24 years, working in the research and development engineering career field. He has held many engineering positions, from that of a flight test engineer to that of an assistant chief engineer for a major program. He has received many awards, including an Air Force Scientific Achievement Award. His experience has allowed him to work with and supervise engineers and scientists at all levels with vastly different backgrounds. With this experience, he hopes to establish a good working relationship with the students in the department.

One of Dr. Corsetti’s major responsibilities will be to do the graduation certification for all graduating seniors in the department. However, his door is always open to offer assistance to any of the department’s students. And while appointments are required for graduation certification, many services like approval of course registration or change forms can be done on a “no waiting/no line” basis. His office is EB 265, and he is looking forward to meeting with all of our students.

Visit Our Department on the Web:  www.eb.uah.edu/ece

CRASH: Computer Research on Architecture and Systems

During the past year, the ECE Department formed a research group known as CRASH: Computer Research on Architecture and Systems in Huntsville.

The CRASH group is involved in the various cutting edge research issues related to Computer Systems Architectures, Operating Systems, Compilers, Performance Tuning, Dynamic Load Balancing, Parallel and Distributed Processing for Engineering Applications, Mobile Computing, Special-Purpose Architectures for Multimedia and Memory Management. A laboratory has been established in Technology Hall (S309) and currently houses various Unix, Linux and NT systems. The equipment was funded by several NSF research grants. In addition, the research in Computer Architecture is also supported by a separate NSF research grant. Recently, NSF awarded us a Research Experience for Undergraduates site award to bring junior/senior level undergraduate students from regional colleges and universities for summer internships and provide the students with hands-on experience in conducting research.

The regular CRASH victims include, Krishna Kavi, William Cohen, Emil Jovanov, Hyong-Shik Kim, Roberto Giorgi, Mohamed Aborizka, Joseph Arul and Mehran Rezaei. Several other members of ECE faculty (Earl Wells and Rhonda Gaede) and students (e.g., Diana Hecht and Steve Conrad, John Berg) occasionally work in the laboratory.

Krishna Kavi is a Professor and an Eminent Scholar in Computer Engineering. He has extensive research experience in Computer Systems Architecture, Load-Balancing, Performance Analysis and Memory Management. After 15 years living in the Dallas metro area, he moved to Huntsville in 1997, and likes the terrain here.

William Cohen is an Assistant Professor in Computer Engineering. His research is in the area of Parallel Processing and Performance Measurement. Originally from the midwest, he has been on UAH faculty for 5 years.

Emil Jovanov is currently a visiting faculty member in Computer Engineering. His research interests are in Embedded Architectures and Accelerators for a variety of real-time applications. He comes to Huntsville from Belgrade and feels completely at home with the people, place and southern hospitality.

Hyong-Shik Kim is a post-doctoral research associate and works in the area of Computer Systems Architecture. However, the rest of us feel that he is the “heart” behind the lab and rely on him to solve the problems associated with the computing facilities. He is originally from Seoul, Korea, and likes living in Huntsville, particularly since his wife Sina joined him here recently.

Roberto Giorgi is the newest member of the group and is currently working as a post-doctoral researcher on Multithreaded Architectures. He joined us in February, 1999, and enjoys the warm hospitality at UAH, and even more, that of the CRASH group. He can claim “kinship” with Galileo Galilei since he received his degrees from the University of Pisa where Galileo once served as a faculty member. He is newly married and lives in Huntsville with his wife.

Mohamed Aborizka is working for his PhD in the general area of load-balancing in distributed systems using intelligent agents. He is newly engaged and eager to get married in summer. He comes from Egypt.

Joseph Arul is working for his PhD in the area of computer systems. Born in India, Joseph lived in Chicago and Taipei (Taiwan). He speaks Tamil (an Indian language) and Chinese (Mandarin) fluently, in addition to English.

Mehran Rezaei is a PhD student developing new algorithms for embedded architectures and Intelligent Memories (IRAM). He has been in Huntsville for the past 4 years.

All of us feel a strong camaraderie, and aid each other in conducting collaborative research. If you are interested in finding out more about us, our research or interested in joining us, contact Krishna Kavi by email (kavi@ece.uah.edu) or by phone (256-890-6380). Our web address http://crash.eb.uah.edu/
Nagendra Singh, Professor

Conference Papers


Electron Devices
Fat Duen Ho, Professor

Journal Articles


Hardware and Software Engineering
Krishna Kavi, Professor and Eminent Scholar of Computer Engineering

Journal Articles


Conference Papers

Invited Talks

Also, Dept. of Computer Science, University of South Alabama, Mobile, Alabama, Feb. 22, 1999.

Also, Dept. of Electrical and Computer Engineering, University of Alabama in Birmingham, Birmingham, AL, March 22, 1999.

Also, Dept. of Electrical and Computer Engineering, Auburn University, Auburn, Alabama Jan. 15, 1999.


Research Grant
NSF Research Experience for Undergraduates-Site, Amount Funded: $150,278, June 1999-May 2002 (with Dr. Will Cohen)

Other Recognition
Selected as an ABET evaluator for Computer Engineering programs from fall 1999.

Optics
Gregory Nordin, Assoc. Professor

Conference Papers


Research Grants


Signal Processing / Communications
Reza Adhami, Professor and Chair

Honors
In April 1999 the Institute of Environmental Sciences and Technology has named Reza Adhami and Michael Hale recipients of the 1999 Maurice Simpson Technical Editors Award for design, test, and evaluation for their paper: “Operational Vibration Specification of Helicopter Stores Using Wavelet Analysis” published in the September/October 1998 Journal of the IEST

Solid State
Timothy Boykin, Assoc. Professor

Journal Articles


The Students for the Exploration and Development of Space Satellite (SEDSAT) was launched as a secondary payload on a NASA Delta II launch vehicle at Cape Canaveral, Florida. SEDSAT-1 was launched from Cape Canaveral at 0808 EDT (1208 UTC) on 24-Oct-98. The launch was virtually flawless with all events happening very close to the nominal schedule. SEDSAT separated from the Delta II second stage 5303 seconds after launch over the eastern pacific.

The SEDSAT project began around 1992. It was designed and built primarily by a group of ECE engineering students and faculty at the University of Alabama in Huntsville (UAH) in close cooperation with NASA and with considerable financial assistance from private companies. SEDSAT became an international project with collaborations on a ground station and donations of equipment from the National Cheng Kung University in Taiwan, and collaboration on a panoramic imaging system with Dr. Pal Greguss of the Technical University of Budapest.

The Delta II secondary payload space was provided by NASA on the JPL Deep Space I mission. As a secondary payload SEDSAT is carried without interference to the primary mission. Although a small payload, SEDSAT will be conducting a variety of experiments. The primary objectives, like Deep Space I, are in technology studies. SEDSAT is flying an experimental panoramic imaging system that will be used to capture images of the receding Delta second stage, and test algorithms for wide area visual attitude determination.

SEDSAT is also carrying a number of commercially derived electronics designs and new batteries provided by the NASA Marshall Space Flight Center. Once on orbit SEDSAT will serve as a worldwide amateur radio communications link, using both digital and analog repeater modes. SEDSAT will employ its panoramic and telephoto cameras with narrowband spectral filters to image the earth, atmospheric band, and cloud coverage. The resulting data will be disseminated in near real-time on the Internet to foster interest and permit the hands-on participation of science and engineering students in NASA's space activities.

SEDSAT is a 12-inch cube-shaped satellite weighing 75 pounds. It is self-contained with its own power, antenna, and telemetry systems. Gallium-arsenide-germanium solar cells cover all sides of the satellite except the bottom where SEDSAT attaches to the Delta II second stage. The solar panels provide power and charge-up the nickel-metal-hydride batteries. Magnetic torquers are used to provide de-spin and stabilization. The nominal SEDSAT orbit is 500 by 1000 km at 31.5 degrees inclination. The design lifetime is three years, although it will be in orbit considerably longer.

Updated orbital data, telemetry, and utilities for observing SEDSAT are being posted to www.seds.org.

We want to hear from you!
The ECE Department looks forward to hearing your views and your success stories. Contact us to share your news and comments about your career and interests. Your story should be sent to realtime@ece.uah.edu

ECE Dept., UAH 12 Real Time