

Electrical and Computer Engineering Department



ECE Network

Department Head Remarks and Farewell

“Individual commitment to a group effort — that is what makes a team work, a company work, a society work, a civilization work.” - Vince Lombardi.

As I approach retirement this summer and reflect on my time at Mississippi State, one thing will stay with me, always. It is the remarkable commitment of individuals, each in their own way, to a common goal of excellence.

The ECE head enjoys a wonderful support network because of the commitment of individual faculty members (including those who have retired) and those administering our programs at the college and university levels. No one could have asked for a better office staff or a more helpful advisory board. My own personal support system includes my wife and partner of 43 years, Brenda, and a family of three sons and daughter-in-laws, and grandchildren that number six. My gratitude is extended to each of these individuals and many more.

In thinking about how we were able to work together over the last four years, memorable events and activities come to mind:



Dr. James C. (Jim) Harden

- Working with faculty to develop a strategic plan that includes a statement of common beliefs and values, along with goals for graduate and undergraduate programs, facilities, professional development, and more (including the publication of this newsletter)
- Experiencing success in our assessment process and accreditation review in both electrical and computer engineering programs
- Watching our senior design teams excel in SoutheastCon hardware competitions taking first place twice and third place once in the last four years
- Honoring Roberto Puon with a memorial scholarship made possible through the support of ADTRAN, our alumni, and friends
- Seeing the impact of the contributions of Jim Bagley, TVA, and alumni in support of professorships and chairs

Table of Contents

NASA Earth Science Grants	3	New ECE Scholarship Announced.....	8
ECFC Career Achievement Award	3	Wade Patterson Named Distinguished Fellow.....	9
TVA Substation Visit	4	ECE Advisory Board	9
IEEE HVL Visit	4	Dr. Jim Flanagan to Join College of Engineering	10
Schulz Appointed TVA Professorship	5	Dr. Marion Hagler Retires	11
Du Receives Schillig Funding.....	5	CPE Students Excel in Business Plan Competition	12
ECE Staff Awards	6	ECE Junior Named Goldwater Scholar.....	12
Puon Memorial Scholarship Awarded	6	Next Generation Navy	13
New Faces in ECE	7	Reese Recognized for Teaching Excellence	14
MSU Alumnus to Command AFRL	8	Recent Donor Support	14
Students Participate in Air Force Internships	8	Boldly Going - Women in Engineering	15

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Department Head Remarks and Farewell

- Interacting with senior design students as they made use of new dedicated laboratory facilities and developed their communication skills with the integration of the colleges technical writing program
- Watching our doctoral enrollment and number of journal publications approximately double
- Working with faculty collaboratively to put departmental policies in place for space allocation, faculty selection and promotion, and workload guidelines
- Experiencing the expansion, diversification, and charter revision of the ECE Advisory Board
- Seeing the renewal of the ECE Student Advisory Council and their activities to honor excellence in education and to bring a sense of community to the entire department
- Working with Marion Hagler and our faculty to revamp the electronic circuits core and to provide new learning experiences for our students
- Following the progress in providing students authentic laboratory experiences made possible by new hardware and software
- Participating in refurbishing of the microprocessor, digital system design and VLSI, and robotics education labs and the development of a power research lab
- Working with the Advisory Board and ADTRAN in launching a new telecommunication lab to be used by both ECE and CSE
- Joining with ECE Coordinator Mike Nosser in recruiting trips to high schools in the region and in the development of new recruiting materials and approaches
- Seeing faculty and staff recognized for excellence through new departmental awards for service, education, and leadership; along with college, university, and national recognition of faculty members that include both education and research awards.



ECE Students honor Dr. Harden at a recent Retirement Reception

The thoughts expressed in outgoing President Charles and Pat Lee's April letter to the Mississippi State University family mirror my own. The opportunity to serve MSU is "continually stimulating" and requires "an extension of expectations" of one's self. It is fortunate to be asked to make a stronger commitment to something you already believe in and to experience unexpected personal growth. For this, I am grateful.

I could not be more pleased with the selection of Sarah Rajala as our new head with Professor Pat Donohoe serving in the interim. Dr. Rajala comes to MSU from North Carolina State University where she has served as associate dean for research and graduate programs in the College of Engineering. She will be an exemplary representative of MSU, nationally, and bring leadership to the department informed by years of experience. Dr. Rajala will become head officially on December 1.



Dr. Sarah Rajala

In the transition, we see the commitment of Jim Bagley and other generous alumni reaping rewards. With their support, our students, faculty, and administration are taking significant steps to establish the department as a member of a select group of the region's top programs – one with points of international excellence. This fall will bring the return of Presidential Medal of Science and IEEE Medal of Honor winner, Jim Flanagan to the faculty. After an MIT graduate education, 33 years at Bell Labs, and 11 years as Vice President of Research for Rutgers since teaching at MSU, Jim will return home to work with our faculty and students as a Distinguished Research Professor at MSU. It is my good fortune to leave the department in capable hands and with bright prospects.

- Dr. James C. Harden



Dr. Pat Donohoe

MSU To Evolve the Capability to Prototype the Use of NASA Earth Science Research for Future Operations

Mississippi State will use three NASA grants, totaling \$9.6 million, to help NASA identify, evaluate, validate, verify, and benchmark earth science results, as well as develop prototype products and address systems integration issues. The effort is intended to lead to adoption or adaptation of NASA science research results in operational systems.

Armed with the funding from NASA's Applied Sciences Directorate, MSU's Geo-Resources Institute (GRI) is marshaling its geospatial technology expertise, as well as its computational and computer system expertise, to build a rapid prototyping capability and capacity (RPC) that could have global impacts on such diverse issues as climate change, bioterrorism, transportation, food production, and air quality. The goal of the rapid prototyping capability is to speed the evaluation of potential uses of NASA research products and technologies, and improve future operational systems by reducing the time to access, configure and assess their effectiveness. Robert Moorhead, GRI Associate Director for Research and a professor of electrical and computer engineering, is leading this RPC effort.

"We are using high-performance computing, remote sensing, rapid prototyping, geographic information systems, global positioning systems, and 3-D landscaping visualization capabilities that will come together in a very complementary way,"

said David Shaw, GRI director and a co-principal investigator for the bulk of the funding. The other grants address harvesting and evaluating Earth science research results (SN) and extending Earth science research results (ISS), for which Shaw is PI and Moorhead is a Co-PI.

"In SN, NASA is looking for a data system that will be globally accessible, globally searchable—sort of a 'Google' for NASA research," he added. "At the end of the two-year grant period, we expect to have this system fully stood up and operational."

Also providing support for the NASA project are the University of Mississippi's Geoinformatics Center, and a team from the Stennis Space Center comprised of the Institute for Technology Development and Science Systems and Applications, Inc.

"I think this positions not only MSU, but the state of Mississippi to be more competitive," said Shaw. "We're going to provide a significant contribution to the base system from which the next generation of research will be determined."

"Our rapid prototyping capability will allow data from NASA's future missions and NASA research results to be transitioned to operational systems more quickly," Moorhead explained.

NASA officials say the Earth science community is now at a time of unprecedented recognition of the need for global

observations—via satellites, manned spacecraft, airplanes, balloons and other sensor tracking systems—to feed data into advanced decision tools for holistic, near and long-range decision-making.

They contend a new integrated global observation system utilizing the latest spatial technology will contribute to greater agricultural efficiency, carbon management, disaster management, homeland security, invasive species detection, water management and other "cross-cutting solutions" programs.

They also predict proposed activities will extend NASA's use of new technology and knowledge about the Earth system to serve society through partnerships with such governmental agencies as the Department of Homeland Security, Environmental Protection Agency, U.S. Army Corps of Engineers, Department of Agriculture, USDA Forest Service, National Oceanic and Atmospheric Administration and the U.S. Geological Survey, as well as various state agencies and industrial groups.

GRI's three-pronged strategic plan will provide a solutions network based on existing knowledge, for easy access by all NASA technology users; a rapid prototyping component that simulates new, improved datasets from existing technology; and an integrated systems solutions approach for conducting actual research.

Robert Moorhead Receives Billie Ball Professorship in Engineering and ECFC Career Achievement Award



Dr. Robert Moorhead

Robert James Moorhead II, Professor of Electrical and Computer Engineering, was recently appointed to hold the Billie Ball Professorship in Engineering and was honored by his colleagues in the Bagley College of Engineering by selecting him for the 2006 ECFC Career Achievement Award.

Robert Moorhead received his BSEE from Geneva College in 1980, his MSEE from NC State in 1982, and his Ph.D. also from NC State in 1985. He served as a Research Staff Member at the IBM T. J. Watson Research Center from 1985 to 1988, after which he joined the faculty in Electrical and Computer Engineering at Mississippi State. He moved through the ranks of Assistant Professor and Associate Professor, and was appointed Professor in 1998. Dr. Moorhead currently serves as the Director of the Visualization, Analysis, and Imaging Laboratory (VAIL) at the Engineering Research Center. Dr. Moorhead has 57 peer-reviewed publications, 5 book chapters, and 5 edited books. He has brought in almost \$2M as principle investigator, and has been a co-PI on over \$5M in externally sponsored research. Robert has advised 7 Ph.D. students and 14 M.S. students to completion of their degrees. He is also an excellent teacher, with an average composite teaching evaluation of a 4.5/5.0.

ECE Students Visit TVA Substation



ECE Students tour 500vK Substation

Senior power students who have been studying power transformers, capacitors, transmission lines and inductors on paper had a chance to see high voltage power system equipment up close and in person by touring a local transmission level substation. Twenty-two ECE seniors and graduate students in the power area donned hard hats and toured TVA's 500 kV substation. TVA Engineer Bruce Dzedzic provided an excellent tour of the substation yard and the control house.

Touring the substation yard, students were able to see the high voltage (500 kV) lines and transformers that supply power to most of northeastern Mississippi. Students also saw shunt capacitors and reactors that help control the voltage on the power system as the load fluctuates.

Inside the control house, students learned about how data and measurements are collected via various communication media within the substation and then monitored both locally in the control house as well as

sent to TVA's main control center in Chattanooga. Also, inside the control center, students saw new and old protection equipment that detects and minimizes the impact of faults on other equipment within the substation.

This substation tour sponsored by TVA is part of TVA's increased involvement in the ECE Department at MSU. TVA has provided funding for a graduate fellowship and endowed professorship. Additionally, TVA has provided framed pictures of power system facilities for Simrall Electrical Engineering Building. TVA also sponsored a two-day trip for ECE students to its facilities in Muscle Shoals and Chattanooga in February of 2005. Support from companies like TVA is essential in helping the ECE department allow students to experience state-of-the-art engineering opportunities in the field.

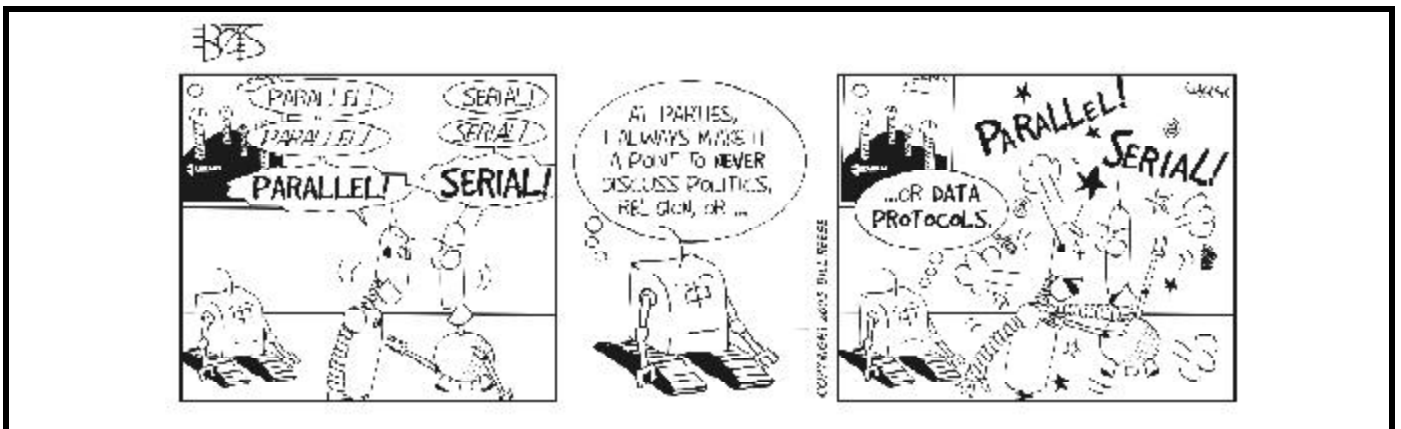
2005 IEEE Conference on Electrical Insulation and Dielectric Phenomena

The Mississippi State University High Voltage Laboratory and Dr. Stan Grzybowski, Director of the HVL, were honored by a visit from four Chinese professors who are highly renowned in high voltage engineering research. Dr. Zhicheng Guan serves as Tsinghua University's Dean of Graduate School, president of the China Electrotechnical Society, and Vice-President of the Chinese Society for Electrical Engineering. Dr. Lijian Ding serves as the Vice-Director of the Beijing Key Laboratory of High Voltage Engineering and EMC at the North China Electric Power University in Beijing. Dr. Zhidong Jia from Tsinghua University in Beijing and Dr. Wei Wang from the North China Electric Power University in Beijing were also among the honored guests. The guests were in the US to attend the IEEE Conference on Electrical Insulation and Dielectric Phenomena (CEIDP/05) in Nashville, TN.

Dr. Grzybowski and Dr. Jian Li, a visiting professor at MSU and the director of High Voltage and Insulation Technology Department at Chongqing University in China, had the pleasure of enlightening the visitors about the exciting research taking place in the HVL at MSU. The six discussed the future development and cooperation of the four represented universities in the field of high voltage engineering.



From left to right: Dr. L. Ding, Dr. J. Li, Dr. S. Grzybowski, Dr. Z. Guan, Dr. Z. Jia and Dr. W. Wang



Cartoon compliments of Professor Bob Reese's brother, Bill Reese.

Dr. Noel Schulz Named to IEEE Editorial Board

Noel Schulz, associate professor of electrical and computer engineering was elected to a three-year term on the IEEE Press Board, an editorial board that reviews and approves media policies for IEEE, during a meeting of the organization's Publications Services and Products Board in Orlando, Fla.

"Dr. Schulz is a well-recognized electrical and computer engineering educator who specializes in electric power systems and brings a wealth of knowledge in her area of expertise," said Mo El-Hawary, editor-in-chief of IEEE Press.

In her new position, renewable for up to nine years, Schulz will provide scientific expertise and guidance for the IEEE Press. She also will assist in making recommendations for policy improvements.

"Over the years, faculty members have brought national recognition to our programs at MSU," said Dr. Jim Harden, head of the electrical and computer engineering department, a part of the Bagley College of Engineering. "Noel's appointment to the Press Board and her leadership role on the board of the Power Engineering Society builds on this tradition."

A non-profit organization, IEEE is a leading authority in areas ranging from aerospace systems, computers and telecommunications to biomedical engineering, electric power and consumer electronics. Considered the world's leading professional association for the advancement of technology, it serves some 365,000 members in 10 global geographic regions.



Dr. Noel Schulz

Dr. Noel Schulz Appointed to TVA Professorship in Electrical and Computer Engineering

Noel N. Schulz, Associate Professor of Electrical and Computer Engineering, was appointed to hold the TVA Professorship in Electrical and Computer Engineering.

Noel N. Schulz received her B.S. in Electrical Engineering from Virginia Tech in 1988, followed by her M.S. in Electrical Engineering also from Virginia Tech in 1990. Dr. Schulz received her Ph.D. in Electrical Engineering with a minor in Computer Science from the University of Minnesota in 1995. She has been a faculty member at Virginia Tech, the University of North Dakota, and Michigan Technological University prior to her

appointment at Mississippi State in 2001. Dr. Schulz has published 1 book chapter, 11 journal articles, and over 50 peer-reviewed conference papers. She has advised 3 Ph.D. students and 17 M.S. students to completion of their degrees, and has brought in over \$2.5M in external research funding. Dr. Schulz has been recognized with several awards for her research including the IEEE Power Engineering Society Outstanding Young Power Engineer Award in 2002 and the Eta Kappa Nu (HKN) C. Holmes MacDonald Outstanding Young Electrical Engineering Professor Award also in 2002. Dr. Schulz currently serves on the IEEE PES Board as Secretary. She is also a Senior Member of IEEE and serves as an Associate Editor for Electric Components & Systems.

Dr. Jenny Du Receives Schillig Funding



Dr. Jenny Du

Dr. Jenny Q. Du received funding from the Schillig special teaching project entitled "Improvement of an electrical engineering service course offered to non-electrical engineering major." The project will look for ways to improve the teaching and learning effectiveness of ECE 3183 Electrical Engineering (EE) Systems, offered to non-EE majors, by incorporating disciplinary application-oriented principles into the course lectures and providing the students hands-on experience about the knowledge learned in class.

The co-principal investigator is Dr. Judy Schneider, an associate professor in the Department of Mechanical Engineering (ME). An initial effort is to be made by the ECE and ME departments to coordinate the lectures in ECE 3183 and the experimental studies in ME 3701 Experimental Orientation. If the proposed integration proves to be successful, a similar approach will be applied to other engineering departments.

The Ottile Schillig Special Teaching Projects program provides financial support to encourage new ideas for improving undergraduate teaching. Through this program, teaching activities and/or materials for which usual financial resources do not exist or cannot be used can receive financial support. Proposed projects create opportunities that otherwise would not exist with an eye toward continuing benefits to students.



Mrs. Libby Thompson

Libby Thompson Recognized as Outstanding Professional Woman

On April 12 ECE Budget Manager, Libby Thompson, was recognized by the President's Commission on the Status of Women as the Mississippi State University's recipient of the Professional Non-Faculty Woman Award. She quickly became a "go to" person when she joined ECE in 2001, bringing with her 15 years of research management experience at MSU. Since then, our department has been successful in attracting and managing some \$30M in research. When projects involve collaboration between departments or centers, Mrs. Thompson has been very successful in working with all the parties involved and is known as an excellent liaison with the Dean's Office, Sponsored Programs, and other university offices.

As budget manager, Libby is always on the lookout to improve the financial position of the department; her efforts have significantly enhanced resources available to us on numerous occasions. This includes early identification of impending issues and the development of solutions.

Libby Thompson's concern goes well beyond the numbers she oversees as ECE budget manager. One of the department's great listeners and problem solvers, the department is delighted to see her recognized by this university award.

Daniel May Awarded Roberto Puon Memorial Scholarship

Daniel May is currently a computer engineering graduate student with interest in signal processing, particularly speech recognition. He has been a research assistant since 2001, his freshman year at MSU when he began working for Dr. Joe Picone, ECE professor in speech processing and Hearin Eminent Scholar for the Bagley College of Engineering. Daniel spent the summer of 2005 at Lawrence Livermore National Laboratory accelerating speech recognition applications. Professor Picone calls Daniel's research performance "the best I have seen for an undergraduate in our program."

Daniel graduated in computer engineering in December 2005 with a perfect 4.00 grade point average and was a department nominee for the Charles F. Simrall Award.

His undergraduate research and course work did not deter him from being involved in service and professional activities, including serving as President of Tau Beta Pi and Chair of the IEEE Student Chapter. He also was recognized as a talented creator of fast paced videos and is now working with the MSU Television Center to create a recruiting DVD for the department. Daniel's diversity of interests, including video photography and his interest in helping others made him an ideal choice for the Robert Puon Endowed Scholarship.

Daniel May is the second recipient of the Roberto Puon Scholarship following



Dr. Jim Harden, Daniel May, and Dr. Bob Reese

Nickolas Watkins. Daniel is also a member of the winning team at the first ever 2005 IEEE Regional Ethics Competition, placing ahead of Georgia Tech and the University of Alabama, Huntsville.

ECE Outstanding Staff Member Award - Ardra Morgan

Ardra Morgan was selected by faculty and staff as the recipient of the Outstanding Staff Award for 2005-2006. As those who interact with the department have learned, Ardra is a highly positive, caring, accomplished, resourceful, and responsible member of the department. Since joining ECE in August of 2003 in her role as assistant to the department head, she has quickly gained the respect and appreciation of the entire department.

ECE's success in the recent ABET accreditation review is due in significant measure to Ardra's multifaceted role in ongoing assessment, the self-study, and the evaluator's visit. With the accreditation process based on continuous assessment, the department depends on Ardra to see that details are managed that enable the accumulation and presentation of assessment results. In addition to Ardra's support of the department head, she also provides many general office services and back-up anywhere needed. Before joining ECE, Ardra taught classes in Microsoft Office Software applications. She is available to answer office staff questions and is always generous with information.

Ardra handles all assignments with the highest standards of professionalism and with good humor and grace. Ardra has a talent for making tedious processes appear easy. Her high degree of technical competence, professionalism, and positive attitude personify the spirit of the ECE Staff award.



Mrs. Ardra Morgan

New Faces in ECE



Bryan A. Jones received his B.S. and M.S. degrees in electrical engineering from Rice University in 1995 and 2002, and a Ph.D. in electrical engineering from Clemson University in 2005. From 1996 to 2000, he worked as a hardware design engineer for Compaq, specializing in board layout for high-availability RAID controllers. He is currently an assistant professor at Mississippi State University. His research interests include robotics, real-time control system implementation, rapid prototyping for real-time systems, and modeling and analysis of mechatronic systems.

Professor Jones' goal is to build and develop the robotics programs at MSU at all levels, from high school through undergraduate lab to graduate research in continuum robotics.

Anurag K. Srivastava received his Ph.D. degree in electrical engineering from Illinois Institute of Technology in 2005, M. Tech. in control system from Institute of Technology, Varanasi, India in 1999 and B. Tech. in Electrical Engineering from Harcourt Butler Technological Institute, Kanpur, India in 1997. He is currently working as an assistant research professor at MSU. Before that, he worked as research assistant and teaching assistant at Illinois Institute of Technology and as Senior Research Associate at Electrical Engineering Department at the Indian Institute of Technology as well as Research Fellow at Asian Institute of Technology, Bangkok, Thailand. His research interest includes electric ship, power system security, voltage stability analysis, power system modeling and artificial intelligent application in power system.



Wenzhong Gao received the B.S. degree in Aeronautical Propulsion Control Engineering from Northwestern Polytechnic University, Xi'an, China, in 1988; the M.S. degree and Ph.D. degree in electrical and computer engineering specializing in electric power engineering from Georgia Institute of Technology, Atlanta, USA, in 1999 and 2002, respectively. He is now working as an assistant research professor at MSU. Current research interests include power system modeling and simulation, intelligent system applications in power engineering, electric and hybrid electric propulsion systems, electric machinery and drive.

Wes Reeves received his B.S. in Electrical Engineering at MSU in 1999 and M.S. in Electrical and Computer Engineering from Georgia Tech in 2003, focusing on communications and DSP. During his time at MSU he co-oped with Motorola in Huntsville, AL, and worked at the ERC on distributed parallel computing performance monitoring. After graduating in 1999, Wes was employed at ADTRAN designing hardware and software for communications equipment.

Wes is currently working at MSU as a lecturer and is working with ECE on the telecom lab initiative. "I'm really enjoying my work here, and look forward to establishing a really useful lab for communications projects".



Dr. Pavel Trnka is working as a Post-Doctoral Fellow involving research on E-ship projects performed by the High Voltage Laboratory. The HV Lab is conducting two research projects: "Accelerated Electrical Degradation of Ship Motor Winding Insulation Energized by Distorted Voltage Waveforms" and "Electrical Degradation of High Voltage Power Ship Cables Energized by Switching Impulses". Dr. Trnka is also involved in research and testing performed in the lab for government research units, utilities and industry.

Dr. Trnka received his M.S. in Industrial Electronics and his Ph.D. in Pulse Stress and Insulation Systems at University of West Bohemian.

Dr. Guangda Chen will be working on the E-ship program in order to address control and system architecture issues for power electronic systems in the next generation of U.S. Navy ships. The objective of the research topic is to develop the control architecture such that maximum on-line flexibility of energy management in future naval electric distribution systems is achieved.

Dr. Chen received his B.S., M.S., and Ph.D. from Wuhan University, School of Electrical Engineering, P.R. China.



MSU Alumnus Named Commander of Air Force Lab

Mississippi State University alumnus Maj. Gen. Ted F. Bowlds was named commander of the Air Force Research Laboratory headquartered at Wright-Patterson Air Force Base, Ohio, in January. Bowlds graduated in 1975 from the Mississippi State University Electrical Engineering Department.

Under Bowlds' new position, he is responsible for managing the Air Force's \$1.5 billion science and technology program as well as \$1.8 billion in customer-funded research and development. As commander, he manages a workforce of about 9,500 people in the lab's component technology directorates and the Air Force Office of Scientific Research.

"The successes of graduates like Maj. Gen. Bowlds reminds us of the exceptional human potential that exists in front of us as we walk into a classroom," said Dr. Jim Harden, professor and head of the electrical and computer engineering department. "While we [faculty] can take no credit, we do feel a linkage to this network of students and faculty that extends throughout a lifetime and often inspires us." Bowlds said that his experience at MSU has equipped him not only for his current position, but his engineering career in general.

"Not only did my time at MSU provide me with an excellent engineering foundation, but it also gave me the desire to learn more and to ask questions," Bowlds said. "The engineering curriculum at MSU fueled my enthusiasm for science and technology. That same enthusiasm has stayed with me for my entire Air Force career."

Bowlds added: "In general, I truly enjoyed my time at MSU as an undergraduate student. It was an opportunity to learn electrical engineering, something I wanted to do from an early childhood." Bowlds also credits his accomplishments to the Air Force ROTC at MSU.

"ROTC provided me with a great foundation in leadership," he said. "Through the interaction with other cadets and the learning experiences provided by the ROTC curriculum, I had the opportunity to 'experiment' with my approach to leadership." Bowlds added that the ROTC program gave him a better understanding of what it means to be an Air Force officer. "That helped in ensuring for me that the Air Force was the right career choice for me," he said.

Prior to his position as commander of AFRL at Wright-Patterson, Bowlds was assigned to the Aeronautical Systems Center at Wright-Patterson as Deputy for Acquisition. He has also worked as avionics program manager on the B-2 at Wright-Patterson, bomber branch chief at the Pentagon, Chief of Advanced Medium Range Air-to-Air Missile development in the AMRAAM System Program Office at Eglin AFB, and as Commander of the Rome Laboratory in Rome, N.Y.



Maj. Gen. Ted Bowlds, USAF

EE Engineering Students Selected for Air Force Summer Internships

Two Mississippi State electrical engineering majors are among only 32 students nationwide selected for a prestigious summer internship program of the U.S. Air Force.

Nicole C. McGee of Muscle Shoals, Ala., and Theodore R. "Ted" Copeland of Olive Branch will participate in the Air Force Officer Accession and Training Schools Summer Technical Recruiting Internship Program.

"This internship affords me an opportunity to gain experience in electrical engineering and to witness ongoing Air Force research," said Copeland.

Collegiate interns selected for the May 25-July 27 program will work for the Air Force Research Laboratory, a part of the Air Force Material Command, during summer months between their sophomore and junior years.

They are paid a salary of \$4,500 for the 10-week program, plus round-trip airfare, lodging, living expenses, and rental vehicle costs. Upon completion of the training, many interns are offered \$15,000 scholarships to participate in the Air Force Reserve Officer Training Corps.

MSU and Air Force Partner to Provide Engineering Scholarships

Through the Air Force Scientist and Engineer Career Program, Florida-based Eglin Air Force Base is providing \$5,000 in scholarship money. The MSU department will add \$1,000 to the amount to provide \$2,000 per year in scholarships over three years.

Scholarships will be awarded annually to two incoming freshmen—one electrical engineering major and one computer engineering major.

"We are grateful to Bill McBroom at Eglin Air Force Base for his support in encouraging the interest of students in math and science, and particularly in electrical and computer engineering," said MSU professor and department head Dr. Jim Harden.

McBroom, director of Eglin's design and development division, said the U.S. Air Force has a continuing need to recruit bright young civilian scientists and engineers.

"We work closely with universities to identify how the funds are best used to help the university and, at the same time, meet our needs," he said. "We agreed with Dr. Harden that this \$5,000 would be best used to fund scholarships to encourage the brightest high school students to pursue careers in engineering."

Electrical and Computer Engineering Advisory Board



ECE Advisory Board members gathered for a group photo at the Spring 2006 ECEAB Meeting. The Advisory Board was recently recognized for its outstanding leadership by our ABET Accreditation Evaluators. These dedicated advisory board members provide years of senior engineering experience in a broad spectrum of technological areas. Pictured left to right are: Standing Dr. J. Chester McKee, Everette Ramage (ECEAB Chair), Jerry Moore, Glenn Isom, Terry Kemp, Dave Burns, Barrie McArthur. Seated, Wade Patterson, David Dodd, Al Williams, Anthony Wilson, Rich McDonald, Ed Blakeslee. Not pictured are David Bishop, Robert Hunter, Dr. Willie McDaniel, Dr. Damir Novosel, Dr. Sarah Rajala (New ECE Department Head), Bruce Deer, Daniel Steele, Gerald Wilbanks.

Wade C. Patterson Named Distinguished Fellow

Wade Patterson graduated from Mississippi State University in December 1983 with a Bachelor of Science Degree in Electrical Engineering. While at MSU, he participated in the cooperative education program working for NASA at the Kennedy Space Center when the first space shuttle was launched.

After graduation, Mr. Patterson joined Intergraph Corporation as a design engineer. He designed Unix subsystems for workstations and servers and in 1992 became Vice-President of Engineering. In 1996, he was named President and CEO of Intergraph Computer Systems, Intergraph's \$500M worldwide computer workstation business, launching such innovations as 3-D graphics on Windows and multiprocessor Windows workstations.

Mr. Patterson has been an entrepreneur since the age of 26 when he started his first company to design and sell computer controlled showers. This business was sold in 2003. In 2004, he founded Synapse, a supplier of wireless home automation technology where he is President and CEO. Synapse's technology is designed into wireless home lighting systems, water heaters, wireless wall thermostats and numerous other devices. Synapse has generated over 20 patents in the last two years, 18 of which Mr. Patterson is the inventor.

Mr. Patterson serves on two corporate boards in addition to serving on the MSU Electrical and Computer Engineering Advisory Board. He is a board member of Westminster Christian Academy and an elder of Providence Baptist Church. He and his wife Melissa, also an MSU graduate (Computer Science), have two children, Katie and Daniel and live in Huntsville Alabama.



February Distinguished Fellow Presentation to Wade Patterson (left)

MSU Alumnus and NEA Member Joins College of Engineering



Dr. Jim Flanagan visits with ECE Faculty and Staff (Dr. Flanagan second from left)

Globally recognized Mississippi State University alumnus James (Jim) Flanagan was recently appointed a distinguished research professor in electrical and computer engineering for the Bagley College of Engineering, effective Sept. 1. Flanagan is the first National Academy of Engineering faculty member within the college.

In this position, Flanagan will be mentoring young faculty, interacting with the telecommunication initiatives and bringing in notable seminar speakers. He will also be collaborating with faculty on research and providing leadership in the areas of education, research and service.

“This is an opportunity for students and faculty to learn from one of the most honored members of our profession,” said Dr. Jim Harden, ECE department head. “One of the great aspects of a university education is that it widens our horizons and few if any of our alumni have traveled so far or had as illustrious associates as Jim. We look forward to his return home to Mississippi State.”

Jim Flanagan had visited the department and President Lee on November 30, 2005. He discussed opportunities in the telecommunication area with faculty, visited with students, and presented a seminar on multimodal communication. President Lee, VP of Research Colin Scanes, and BCOE Dean Kirk Shulz were instrumental in bringing Dr. Flanagan to the department in his new fall 2006 assignment.



Dr. Flanagan will participate in the development of a new telecommunication laboratory started with help from ADTRAN's President, Danny Windham (foreground, center right)

Flanagan is known worldwide for his scientific contributions in speech technology. His ideas have contributed to the development of modern automatic speech recognition systems, audio codecs such as MP3s and modern voice-over Internet protocol technology.

Flanagan, a Greenwood native, is a 1948 electrical engineering graduate from MSU. He received his master's and doctoral degrees in 1950 and 1955, respectively, from the Massachusetts Institute of Technology. He has received numerous awards for his contributions to the engineering field, including the National Medal of Science, which was awarded to Flanagan by former president Bill Clinton in 1996 for merging engineering techniques with speech science to solve basic problems in speech communication.

Dr. Marion Hagler Retires

After five years as Guyton Chair holder, Dr. Hagler retired in December 2005. Dr. Marion Hagler has been highly instrumental within the Department of Electrical and Computer Engineering in bringing about important revisions in introductory and core electronic and circuits courses for all our students. Through his efforts, students have greatly expanded opportunities for hands-on learning outside the classroom and the ability to use theory, simulation, and experimentation to gain greater understanding of key course material. Dr. Hagler has coupled these course changes with laboratory project assignments that give students a greater appreciation for electronic systems and a context for learning about subsystems.



Dr. Hagler with ECE Students at Retirement Reception



Building AM/FM Radio in Intermediate Circuits

Dr. Hagler, who joined the ECE faculty in January 2001 was the first to hold the Robert D. Guyton Professorship for Teaching Excellence. Prior to that, he had been at Texas Tech University for 33 years where he was chairperson for many years and P.W. Horn Professor. He has published some 160 journal and conference publications. Dr. Hagler has a long list of service activities to senior IEEE committees including serving as chair of the Education Society beginning in 2001. He also contributed as an editor for IEEE Transactions on Education and IEEE educational conferences.

In the fall of 2005, Dr. Hagler received the IEEE Education Society's Distinguished Member Award. This award, presented the first time in 2005, recognizes outstanding long-term service to the IEEE Education Society and significant contributions in the fields of interest to the IEEE. The specific citation for his award is "for outstanding service to the Education Society as an officer and society president, for service to the IEEE and the profession, and for significant contributions to electrical and computer engineering education." The presentation of the award was at the 2005 Frontiers in Education Conference in Indianapolis, Indiana.

*"Dr. Hagler seems to show genuine concern for the long-term success of his students ... He's willing to spend time."
-student comment*

Shortly after Dr. Hagler's retirement, the ECE Student Advisory Council announced that Dr. Hagler had been chosen by vote of the undergraduate students as the 2005 Electrical and Computer Engineering Educator. Wesley Holland, ECE SAC Chair spelled it out in a letter to Dr. Hagler, "Although this award is certainly in recognition of [your] Dr. Hagler's professional accomplishments, its greater significance lies in the fact that its recipient is student-chosen. This implies that the receiver embodies not only those aspects desirable in a professor, but also the spirit of a mentor, role-model, and friend".

Dr. Jim Fowler advances core initiative begun by Dr. Hagler

With the retirement of Dr. Hagler, ECE is happy to report that Dr. Jim Fowler, ECE Associate Professor, has stepped up and will be coordinating the Circuits cluster. Here are a few words from Dr. Fowler.

Coordinating the Circuits and Electronics cluster of courses is rather complicated, due to the number of classes involved—Intro, Intermediate, and Advanced Electronic Circuits as well as Signals and Systems—a number of faculty must coordinate each semester. In an effort to achieve this coordination, the faculty teaching the courses, as well as any teaching assistants, have been holding a weekly lunchtime meeting throughout the semester. Through these meetings, the instructors gain an understanding of the topics covered in all the courses of the cluster, participate in resolving issues as they arise, and plan future evolution of the course cluster. In the works is a website intended to serve as a central resource for faculty teaching the courses, facilitating the passing of content to instructors new to the cluster, and increasing uniformity in course coverage.

-Dr. Jim Fowler



Dr. Jim Fowler

ECE Students Excel in Business Plan Competition

ECE Computer Engineering students Matthew Young and Michael Young (no relation) took first prize (\$1,000) in the Business Plan Competition sponsored by the Bagley College of Engineering, Engineering Entrepreneurship Program. Kyle Cullen, also a CPE, took third prize (\$300).

"2006 was another great year for the business plan competition," reported Gerald Nelson, Director and Chair of the Entrepreneurship Program. "The teams seem to be getting better each year, and the decision by the judges was very close. ECE is doing an excellent job of preparing students for the next step. I fully expect to have some of these certificate graduates back as speakers someday soon."



Matthew Young and Michael Young

ECE Junior Named Goldwater Scholar

A computer engineering junior with a perfect 4.0 grade-point average is Mississippi State's latest Barry M. Goldwater Scholar.

Wesley J. Holland of Brandon is among only 323 students selected nationally on the basis of their academic accomplishments in mathematics, science and engineering. More than 1,000 students were nominated for the 2006 awards by collegiate faculty members.

The two-year scholarships are considered the premier undergraduate award of their type. Covering the cost of tuition, fees, books, and room and board up to a maximum of \$7,500 annually, they serve as the official congressional memorial to the former 20th century political leader and United States senator from Arizona.

Holland, a 2004 Florence High School graduate, becomes the tenth MSU student selected for the recognition since 1999.

"What a tremendous honor for Wesley to be named to such a select group of students," said Nancy McCarley, the University Honors Program director who also coordinates MSU's Distinguished Scholarship Program. "He has a true passion for his research and no doubt that impressed the selection panel."

An interest in ham radios and video games led to his decision to study computer engineering, Holland said. Even as an undergraduate, he has conducted university-sponsored research in signal processing.

"I'm specifically interested in natural language processing, or how to make computers not just translate but understand the spoken voice," he explained. "That's a human-computer interaction issue that interests me."

Earlier, Holland successfully competed for a research position at MSU's Center for Advanced Vehicular Systems. That honor was earned through the National Science Foundation's Research Experiences for Undergraduates program.

"I am delighted by Wesley's selection as a Goldwater Scholar", said Dr. Jim Harden, ECE Head. "No student at Wesley's current academic status has impressed me more in my over 20 years at MSU. In just a year and one semester he completed 73 credit hours of course work including 20 hours of honors classes and is now over halfway through his program. Even with a 20 credit hour per semester load, Wesley somehow found time to provide constructive, positive leadership for the ECE Advisory Council as a freshman member. Wesley's academic background, record of achievement, and desire to contribute make him an outstanding Goldwater Scholar selection."

To fulfill the Goldwater scholarship requirement of participation in an ongoing research effort, Holland is part of a CAVS effort to develop and evaluate a non-invasive spoken dialogue system for mobile and hand-held computing devices.

"Wesley has shown a passion for theoretical work and a strong desire to communicate his ideas to a larger community, two qualities critical to success in research," said Dr. Julie Baca, the assistant research professor who is directing Holland's work.

Following his 2007 projected graduation from Mississippi State, Holland will pursue master's and doctoral degrees with a goal of returning to higher education.



Wesley J. Holland

ECE Faculty and Students Contribute to Next Generation Navy

On March 9, 1862, the *CSS Virginia* (formerly the *USS Merrimack*), hoped to accomplish what it had the day before, defeat Northern warships. The newly built iron-clad, the *USS Monitor*, was trying to defend the *USS Minnesota*, a steam frigate that had run aground, the *Minnesota* was “dead in the water”.

April 15, 1912, the *RMS Titanic* embarks on its maiden voyage across the Atlantic. Most Americans know the fate of that ship after sideswiping an iceberg, it was “dead in the water.”

October 12, 2000, the US Navy destroyer *Cole* was attacked by a suicide terrorist in a small boat loaded with explosives, killing 17 and injuring 39 others. The water pumps were not damaged, but the power system needed to run the pumps was. The *Cole* was “dead in the water”.

According to the web page, the Electric Ship (see *What is an Electric Ship*) Research and Development Consortium (ESRDC) “brings together in a single entity the combined programs and resources of leading electric power research institutions for research on near to mid-term electric ship concepts.” Managed by the Office of Naval Research, the consortium of several universities, including MSU, has been given grant money to not only provide state-of-the-art experimental equipment, but to encourage students in the area of electric power.

Dr. Noel Schulz, associate professor and principle investigator at MSU, states, “Our efforts relate to research activities to look at ‘what if’ scenarios. The idea is to develop a shipboard power system that has the flexibility to reconfigure after damage, to allow the ship to either continue to fight or to flee.”

During the first four years of the consortium, Mississippi State has involved 10 faculty and between 35-40 students; currently 25 graduate students are on the project.

Assistant Research Professor, Dr. Anurag Srivastava noted the following benefits of the E-ship project, “Being involved with E-ship...we are not only working in the interest of the nation, but also developing our expertise being involved with different technical issues....It’s a win-win situation for not only faculty, but also for students, the department and MSU.”

With the help of the ESRDC and ECE faculty and students, the United States will be in a better position to avoid having a ship that is “dead in the water.”



E-Ship Faculty and Students

What is an electric ship? How is it different from current Navy ships?

Current non-nuclear Navy ships use large diesel engines to turn the propellers. As a side task they also drive generators to supply the ship with electricity for lights, electronics, radar, cooling systems, the coffee machine, etc. So the engines are connected mechanically to both propellers and generators.

The electric ship is quite different. Power still begins in the form of burning diesel fuel but in this case the diesel engines are not connected directly to the propeller by mechanical links (some kind of transmission system with gears, etc.) instead the engines are connected directly to very large generators. The generators convert all of the energy from the burning of diesel fuel into electrical form and the electricity is sent via cables to an electric drive system including very large electric motors that are connected to the propellers.

So now the engines are not connected directly to the propellers of the ship. This gives significantly more flexibility. For example, it is possible to divert electrical energy from the propulsion system to other loads such as high power electricity-based weapons system such as lasers, electric guns, and other high-tech armaments. Also, power from any engine can be routed to any electric motor since they are all connected through the electrical system. This redundancy provides robust power distribution and avoids the loss of a propeller because a single diesel engine has malfunctioned.

The Navy would have liked all of these advantages before, but the efficiency of such an electrical drive train has only recently become comparable to traditional systems because of advances in power electronics and motor technologies.

MSU Alumni Association Undergraduate Teaching Excellence Award Goes to Dr. Robert Reese

In the late 1980's, university faculty in electrical and computer engineering departments across the nation faced the challenge of bringing computer aided design (CAD) tools for chip design into the classroom. Industry tools were specialized and expensive, and available university tools were relatively primitive and problematic. Coming to MSU with related industry experience at MCC in Austin, Dr. Reese assumed the leadership role in meeting this formidable challenge and his success significantly enhanced the University's position nationally in this important area. His efforts provided the infrastructure for one of the components that led to the selection of MSU for an NSF ERC: expertise at MSU in VLSI hardware design. As a nationally recognized university leader in university CAD environments for education, Dr. Reese held a workshop for U.S. university faculty on *The Use of Logic Synthesis in the Classroom* under a National Science Foundation award.

The most important result of these efforts has been the opportunities afforded to his students. Dr. Reese can count among his graduates employees of essentially all of the major VLSI design houses across the nation (Intel, Cypress Semiconductor, Motorola, Dallas Semiconductor, Sun Microsystems, etc.).

These opportunities were made possible through the systematic integration of design synthesis, simulation, and implementation into his classes, both undergraduate and graduate. Dr. Reese has personally been responsible for developing extensive original hardware and software content in computer engineering undergraduate courses in Digital Devices, Microprocessors I, Microprocessors II, Digital Systems Design, and Computer Architecture; EE undergraduate course in Software Tools for EEs; and for graduate courses in Parallel Computing Architectures, Switching Theory II, VHDL Simulation, and VLSI Systems. Always innovative in providing hands-on experiences in the classroom, early in his career Dr. Reese won the ASEE Thomas Evans Award for best instructional paper for his computer simulations that enabled students to manipulate the instruction sequencing and data movement in a pipelined processor architecture. Dr. Reese was the earliest of faculty to provide course materials online and pioneered electronic submission and grading of lab reports in our department that is now the standard practice in the EE and CPE curricula. When new curricula initiatives in embedded system design went into effect in 2005, Dr. Reese, as he has done countless times before, took the lead in providing students the tools they require. He once again revised ECE 3724 (Microprocessors I) providing course content and all laboratory exercises. His book, *Microprocessors: From Assembly Language to C using the PIC18Fxx2*, is based upon this course revision and was published in the summer of 2005.

Dr. Reese's educational philosophy is that you have to do in order to learn. He makes sure every course has a strong out-of-the-classroom component, either a formal lab that follows closely with the course or structured homework or project exercises. He says he has also learned "not to underestimate our students - if you challenge them, they will respond, often with surprising results." In the words of one of his computer engineering students, "The quality of his instruction is unmatched by any faculty member I have had thus far at MSU. He teaches his subject thoroughly and clearly, and provides as much outside-the-classroom help as is needed."



Dr. Robert Reese

Recent ECE Donors - as reported 06/21/2006

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It is through the generosity of supporters such as yourselves, that ECE is able to provide important enhancements that help bring distinction to our programs and students.

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<http://www.msufoundation.com/>

Click on Make a Gift tab and complete the form. To direct a gift to a specific ECE fund, go to Part IV, select Other and type in the fund name.

BOLDLY GOING....

Women in ECE

... possibly the most famous opening television monologue ever: "Space, the final frontier. These are the voyages of the starship Enterprise. Her five-year mission: to explore strange new worlds, to seek out new life and new civilizations, to boldly go where no man has gone before."

Jump from the 1960's television days to present-day Mississippi and change the 'man' to 'woman'. Is it difficult for a young woman in the 21st Century to go into a field that has been primarily male? Is it being bold?

Here are some responses to questions sent faculty and students, both men and women, that may provide clues: (See if you can guess whether the answers come from male or female.)

Why did you choose a career in engineering and how young were you when you first developed an interest?

- I've always wanted to be an astronaut...since the age of 5. Engineering seemed like the obvious choice because I was also always interested in how things work.
- I first gained interest in engineering when I was a sophomore in high school. I had an amazing (male) teacher in physics who convinced me that I was extremely gifted in the ability to learn and comprehend math and science. I further took his AP physics classes where my interest in the specifics of engineering were deepened. I was about 16 years old.

Was there one particular person who was a parent/friend/teacher/mentor who encouraged you to go into engineering?

- My mother and father always encouraged me however they could. I had several high school literature and history teachers who couldn't stand the idea of me becoming an engineer. They enjoyed me too much as a writer.
- My mother really encouraged me to go into engineering. She truly believed, and still believes, that there was nothing I couldn't do if I just set my mind on it. When I was an undergraduate, I Co-oped with the U.S. Army Strategic Defense Command (now known as SMDC). One of my supervisors, Harold Holmes, told me that I "would" go to graduate school. He probably doesn't even remember having that conversation with me. But it truly made a difference in my life.

Where do you see yourself in 10 years and what would you like to have accomplished/what advances in engineering (in the ECE area) do you foresee?

- In 10 years, I hope to have finished all my school, including my Ph.D. studies and would be working for Johnson Space Center full-time (I Co-op there, now). I may or may not have already been selected to the astronaut corps, but if there was an application period open, I certainly would've applied.
- One advancement that I think will be very meaningful is the ability to efficiently and effectively conduct data mining. We

have moved from the 'data age' to the 'information age' by converting data into information, information into knowledge, and knowledge into wisdom. Otherwise, the archives are pointless.

What are some factors that discourage young women from entering the field of engineering?

- In junior and senior high school, I saw a lot of females encouraged to go into various liberal arts fields, education, but not really science or math.
- I think one of the main factors is they're receiving messages that tell them they don't belong in engineering. They range from stereotypes of engineers that are used in movies to direct comments made by their teachers or parents.

What advice would you give to young women considering a career in engineering/what one thing might enhance your learning experience at MSU and promote participation for women in engineering?

- I think pointing out where women have impacted the field of science, math, and engineering more during the Intro to Engineering courses would greatly help secure more females in engineering. Among the reasons I've heard for many females here at MSU not staying in engineering is the knowledge that it is still a "man's world" in the engineering field, and the work is not worth it if they won't be allowed to go as far as a man could with the same qualifications.
- If they are considering it at an early age, I would consider taking more math and science in high school. That way they have a stronger background when they are taking the "weed" courses.

How did you do? Could you tell which were "typically" male or female answers? If you guessed that all first answers were from either male faculty or students and that the second answer in each case was from a woman, you would be correct.

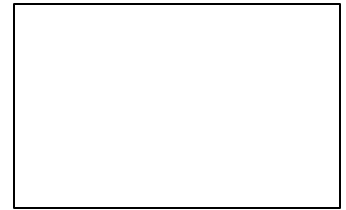
The point being that, yes, there have been and are still challenges for women to enter a field of study that has been predominately male, but, the division between what both sexes can learn and accomplish is not stereotypical and the current/future faculty and students in ECE can, with confidence, go boldly where no *human* has gone before.



Dr. Lori Bruce and Sarah Jackson, recent CPE Graduate



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2006 Mississippi State Football Schedule

Aug. 31	*South Carolina (ESPN - TV)	
Sept. 9	*Auburn	
Sept. 16	Tulane	
Sept. 23	at UAB	
Sept. 30	*at LSU	
Oct. 7	West Virginia	
Oct. 14	Jacksonville State	
Oct. 21	*at Georgia	
Oct. 28	*Kentucky	
	Nov. 4	*at Alabama
	Nov. 18	*Arkansas
	Nov. 25	*at Mississippi



* - Denotes SEC game

EE and CPE Educational Objectives

Alumni, employers, faculty and students participate in a process used to develop educational objectives for the undergraduate programs in Electrical Engineering and Computer Engineering.

Students completing the baccalaureate degree in Electrical or Computer Engineering will:

- Demonstrate a strong foundation in fundamentals through an applied competence in mathematics, science, computing, and engineering.
- Demonstrate the ability to apply innovative techniques to address unstructured problems specific to technical specialties in Electrical or Computer Engineering by identifying and implementing solutions using the proper tools, practical approaches, and flexible thinking.
- Interact with others, both individually and within multidisciplinary teams using effective oral and written communication skills and possessing the ability to deal with both technical and non-technical subjects when working with peers, supervisors, and the public.
- Develop an appreciation for the ethical duties incumbent on an Electrical or Computer Engineering professional including a commitment to lifelong learning and a concern for society and the environment.