



ELECTRICAL AND COMPUTER ENGINEERING NEWSLETTER

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I would like to take this opportunity to say how excited I am about being appointed Chair of the Department of Electrical and Computer Engineering (ECE) at LSU. Unfortunately, the department has not kept in touch with you and other alumni as we should have. We are pleased to inform you of plans to change this for the future. We expect to provide newsletters to supply you with department news periodically. An alumni page via a link on the ECE home page (<http://www.ece.lsu.edu/>) is also available. I hope you will take the time to update us on your accomplishments since leaving LSU.



The department has a long history of providing undergraduate and graduate education in Louisiana in leading technological fields. As the chair of the department, I look forward to continuing this effort by assisting in a significant revitalization of the department. The factors driving this important initiative are described in more detail in the following Revitalization section.

Once again, I look forward to hearing from each one of our alumni as to their experiences in the “real world”.

Kemin Zhou

Chairman, Voorhies Distinguished Professor, and IEEE Fellow



REVITALIZATION



Mission: To assure that our students are educated so that upon graduation they will be able to pursue a productive career.

This embraces the following:

- To provide BS graduates the background necessary to successfully compete in the job market and for advanced study at LSU or elsewhere should they choose.
- To provide MS graduates the technical depth in one or more areas of specialization necessary for them to compete successfully in the marketplace.
- To provide Ph.D. graduates with the ability to do original and significant research in a chosen area of specialization.

Revitalization Goals:

- Long term: To be in the *top quartile* of Electrical and Computer Engineering programs, both in teaching and research.
- Short Term: To continually be recognized as a *center of excellence in electrical and computer engineering within the southern region* and to develop further our nationally competitive research programs in selected areas.

The ECE department at LSU has the largest undergraduate and the largest graduate student enrollment of any engineering department in the College of Engineering. We also graduate the most students. During the past five years ECE students have been awarded 605 BS degrees, 18 ECE students have been awarded the University Medal (4.0 gpa) and 80 additional students graduated with college honors, 124 Masters and 14 PhD's. This year we project at least 150 graduates.

Welcome New Faculty



Bryan Audiffred, Instructor, M.Eng. (2000) Cornell University, Robotics and Computers



Xue-Bin Liang, Assistant Professor, Ph.D. (2002) University of Delaware, Wireless Communications



Jin-Woo Choi, Assistant Professor, Ph.D. (2001) University of Cincinnati, MEMS & BioMEMS



Bingqing Wei, Assistant Professor, Ph.D. (1992) Tsinghua University, Nanostructured Materials and Devices



Theda Daniels-Race, Associate Professor, Ph.D. (1990) Cornell University, Electronic Materials and Devices



Shuangqing Wei, Assistant Professor, Ph.D. (2003) University of Massachusetts, Wireless Communications

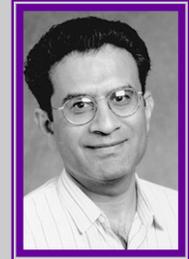


Bahadir Gunturk, Assistant Professor, Ph.D. (2003) Georgia Institute of Technology, Image/Video Processing

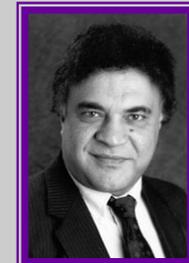


Hsiao-Chun Wu, Assistant Professor, Ph.D. (1999) University of Florida, Signal Processing

Endowed Professorships



Dr. Pratul Ajmera
McDermott Intl.



Dr. Ahmed El-Amawy
Chevron



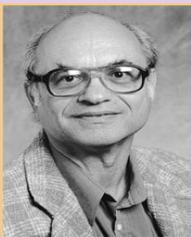
Dr. Guoxiang Gu
F. Hugh Coughlin/CLECO



Dr. Subhash Kak
Elaine T. & Donald Cecil
Delaune

Presenting The Best of The Best!

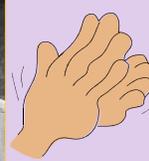
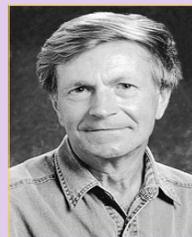
Dr. Martin Feldman is the ECE "Patent King". He has been awarded 33 patents.



Dr. J. (Ram) Ramanujam received the National Science Foundation's Young Investigator Award in 1994.

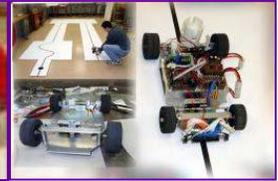


Dr. Leszek S. Czarnecki was elected to the grade of IEEE Fellow in 1996.



TIGER PRIME

The robot by LSU IEEE



The IEEE robotics team is a group of Electrical and Computer Engineering undergraduate students working to design and win the annual Region 5 Student Robotics Contest. Students work outside of a structured class with the support

of the department and sponsors.

The objective of the contest was to design a robotic "car" that follows a black line track on a white background in the fastest time. The ECE team beat its nearest competitor by 30%. Team members were Ricky Capone

(Team Leader), Lauren Hatchell (IEEE President and Vision Subgroup Leader), Aaron Ard and Colin Hamilton. Bryan Audiffred was the faculty advisor.

Visit the IEEE link on the ECE website for more details (<http://www.ece.lsu.edu>)

Spotlight on Research



New Technology Applied to Make an Old Technology More Efficient



Bingqing Wei, ECE Assistant Professor, and colleagues have reported the fabrication and testing of **light bulbs** made from macroscopic single-walled and double-walled carbon nanotube filaments. The prospects for more efficient light bulbs could have a dramatic effect on every segment of society given the extent that this "everyday" item is used.

Their work "**Carbon nanotube filaments in household light bulbs,**" (Applied Physics Letters, Vol. 84, No. 24, pp. 4869-4871, 14

June 2004) reports comparisons with bulbs containing tungsten filaments. The nanotube bulbs have lower threshold voltage and higher brightness at the same voltage when compared to their tungsten filament counterparts. Additionally, the resistance of the nanotube filaments did not change with temperature up to about 1750° K. This means that the nanotube filaments could be used to make precision resistors that work at high temperatures.

Review comments in *Nature* include "Now carbon filaments might make a comeback, thanks to the discovery that bundles of car-

bon nanotubes provide robust filaments in household bulbs and have some advantages over tungsten.

The site for Physics Web, <http://physicsweb.org/article/news/8/6/3>, is an article discussing this research.

Dr. Wei has published more than 120 papers in refereed international journals, including *Nature* and *Science*, in his major field of interest "Carbon Nanotubes and Nanotechnology." These articles can be found at <http://www.ece.lsu.edu/bwei/webpage.htm>.

ECE CONTRIBUTES TO AIRCRAFT SAFETY



NASA has approved a two-year extension of a multi-university project to enhance

aircraft safety headed by Professor Jorge Aravena as Principal Investigator and Kemin Zhou, Chair of the Department and head of the fault tolerant control team. The project also includes research teams at the University of New Orleans and the University of Louisiana at Lafayette and was initially

funded by a \$1.6 million grant from NASA and Louisiana Board of Regents. The extension provides more than \$1 million in additional funding.

The goal of the project is to develop better aircraft self-diagnostic tools and integrate them with smarter flight control systems allowing the plane's computer system to detect a problem earlier, recommend the best course of action or, if necessary, take control of the flight.

The ECE team is responsible for the development of "fault tolerance strategies" that are capable of preserving the integrity of the

plane even when problems have occurred. This "automatic safe recovery" is implemented through novel techniques first proposed by Zhou. To help with their mission, the LSU researchers are using software provided by NASA, including a mathematical model of an entire Boeing 747.

The recently completed three-year work is the first phase of a project that is part of the Aviation Safety and Security Program (AvSSP) which is a joint venture through NASA and the Federal Aviation Administration involving major aerospace industries and several other universities.

ECE Advisory Board



The members of the Advisory Board were charged in September, 2004 by Dean Zaki Bassiouni to determine its own role and goals. The Dean asked for Board members' assistance in guiding the department in preparing our graduates for the Electrical and Computer industry of today and tomorrow. The Board has met once and indications are they will be a positive force for the department in the future. Each member of the Board is a successful leader in our field.

Members:

Mr. Ravi Arimilli
EE'84
IBM Fellow
IBM Server Group

Mrs. Karen Brack
EE'84
Electrical Engineer
Honeywell Foundation

Mr. Richard M. "Dick" Brown
E and I Senior Section Supervisor
ExxonMobil

Mr. Donald "Cecil" Delaune
EE'39
Retired, ExxonMobil

Mr. Joseph Domino
EE'70
President/CEO
Entergy Services, Inc.

Mr. David Eppler
President/CEO
CLECO

Mr. W. L. "Bill" Higgins
EE'65
President/CEO
WLH Management & Consulting

Mr. J. Keith Hollier
EE'79
Control Systems Section Supervisor
ExxonMobil

Mr. Edwin "Burt" McNeil
EE'46
Retired, ExxonMobil

Mrs. Anita Schreiber
EE'85
Senior Staff IP Design Engineer
Xilinx

Mr. Newton Thomas
EE'67
President and Chairman
Newton Group, Inc.

Dr. Eugene "Gene" Tims
EE'43
Professor Emeritus
LSU, Electrical & Computer Engineering

Dr. Charles H. Voss, Jr.
EE'49
Professor Emeritus
LSU, Electrical & Computer Engineering

The fast changing technology in wireless communication, microelectronics and computers, which are the core of information technology and a major focus of this department, demands constant updating of our teaching and research techniques and upgrading our teaching and research facilities. The most significant challenge we now face is the pressing need to overcome aging lab facilities, arrange for additional teaching assistants, lab support personnel, and other faculty support necessary to upgrade our academic and research programs.

Revitalization has already started with the hiring of eight new top researchers and teachers in the past three years. With startup funds provided to new faculty, a BioMEMS Lab and a Nanostructured Materials and Devices Lab are being developed. Additionally, the Electronic Material and Device Lab is being upgraded. This is possible because the funding was available from vacant faculty positions and additional personnel funding from the University (state support). With the new faculty joining the current faculty, the ECE Department is assembling a faculty that can and will move the Department forward very quickly with proper support.

Significant space is being renovated and will be available to ECE to house new laboratories and provide office space. Additionally, the ECE Advisory Board has been reconstituted and met in October. This group projects a vital interest in the well being of the department and will be an important resource.

This is a good start. However, ECE maintains more than 10 undergraduate teaching laboratories, many of which will need significant upgrading within two-to-three years. Our most critical short-term needs (equipment replacement) will cost about \$500,000. Additional new labs needed to begin meeting our goals are wireless communication teaching and research labs, design automation, signal processing and radio frequency design laboratories

Unfortunately, additional financing is NOT available for the needed significant upgrades to existing laboratories and infrastructures or creation/completion of new facilities for research or the academic program. This will require a large fund. **We must face these issues and succeed lest we fall so far behind that recovery is impossible.** We will be vigorously seeking support from various resources, including contributions from corporations and individual donors.

We are asking you to consider joining other alumni and friends of the department to help make the Electrical and Computer Engineering program at LSU one of the top ones in the nation. We have set a goal of \$2M over the next two years.

An LSU Foundation account has been created to receive donations for this initiative. It is the **"ECE Revitalization Fund"**. Please contribute now and, if you work for a "Matching Gift" company, please complete the Matching Gift Form to maximize your tax-deductible contribution.

For those of you who would like to participate in the ECE Revitalization initiative with a gift, an insert and a return envelope have been included for this purpose. Your contribution should be made payable to "LSU Foundation".

Revitalization (cont. from p.1)

Two faculty members hold the title IEEE Fellow, one faculty member received an NSF Young Investigator award, 8 text have been authored over the past 8 years, and one faculty member holds 33 patents. Of special interest is the recent award of a grant from NSF for the development of an undergraduate Integrated Laboratory for Harmonic Filters and Compensator Design, Power Electronics, and Adjustable Speed Drives. These activities are a few notable achievements resulting after obtaining research grants and publishing results, reviewing papers for publication by peers at other institutions, continually upgrading course content and teaching methods, etc. Two research projects are highlighted elsewhere in this newsletter. The point is that ECE has been an important department over the years. We are barely able to keep-up given the current fiscal situation. Instead of just keeping-up we feel ECE should regroup and work toward a complete modernization and revitalization.

Please visit our Web site at: www.ece.lsu.edu