**Growth and Opportunities**

**ECEN** is experiencing an exciting period of truly unprecedented growth. During 2005 and 2006 we will welcome seven outstanding new faculty members, including four new positions, bringing our total size to 25 — the largest ever. This has allowed us to greatly enhance computer engineering and also expand into the bio area. Expect big changes in ECEN in the next few years. Three new faculty are profiled in this newsletter.

ECEN has a remarkable history of extraordinary and highly committed faculty. Among these are Dr. H. Jack Allison and Dr. Rao Yarlagadda. Dr. Allison retired from OSU in 2005 after 44 years as a faculty member in ECEN, but continued to teach through spring 2006. Dr. Yarlagadda retired from OSU in June 2006 after 40 years as a faculty member in ECEN and continues to be active. Both of these distinguished men have had an enormous impact on students and on their profession during the course of their careers. The lead article tells the story of how 21 of Dr. Yarlagadda’s Ph.D. graduates returned recently to Stillwater to pay tribute to his contributions.

The US suffers from a critical shortage of scientists and engineers, and our competitiveness in science and technology is eroding. ECEN was recently granted a prestigious NSF Department Level Reform grant that will allow us to redefine how we develop students into engineers. Dr. Alan Cheville, the project director, provides an overview of this effort in Engineering Students for the 21st Century. This grant, funded in excess of $1M, provides a wonderful opportunity for ECEN and its students.

Our program depends on exceptional faculty, students and staff. In this issue, we profile two outstanding graduates of ECEN. In Focus on Students you’ll meet Kristoffer Lemosins, a 2005 BSEE graduate from Edmond, who recently joined the CIA in the Washington, D.C. area as an analyst. In On the Shoulders of Giants you’ll learn about Joe Campbell, a 1992 Ph.D. graduate, who has had a remarkable 27-year career with National Security Agency and, more recently, MIT Lincoln Laboratory developing speech and security technologies that are currently used worldwide.

I hope you enjoy this issue of the **ECEN** Newsletter. As always, it’s wonderful to hear from alumni and old friends, prospective students, and others. Your support of ECEN and its students and faculty is sincerely appreciated.

*Keith A. Teague, Ph.D. PE*
*Head, School of Electrical and Computer Engineering*
After 40 years of exemplary teaching, research and mentoring in the School of Electrical and Computer Engineering — and as rumored to occur for the last 16 years — Professor Rao Yarlagadda officially hung up his spurs in June 2006. In joining the College of Engineering, Architecture and Technology’s emeritus faculty, a group whose most esteemed members never really “retire,” he certainly will continue his daily trips to campus, maintaining an office and a level of contribution to the department that his wife, Marceil, and his health will allow.

A tribute suitable of Dr. Yarlagadda and the extraordinary duration of his distinguished career of service is almost inconceivable, but this past year his Ph.D. students rose to the task. Gathering at the ConocoPhillips OSU Alumni Center on Sept. 23, 2005, to honor their friend and collaborator, their visit included the announcement that $15,000 had been raised to endow a fellowship in Dr. Yarlagadda’s name to support graduate study in signal processing at OSU. Making the surprise event all the more memorable, and befitting, was the number in attendance. Of the 30 people from here and abroad that Dr. Yarlagadda personally served as Ph.D. adviser over the years, 21 returned to campus to participate in the celebration, along with their spouses and children.

Feature Article
Dr. Yarlagadda Has His Day

Sept. 23, 2005, to honor their friend and collaborator, their visit included the announcement that $15,000 had been raised to endow a fellowship in Dr. Yarlagadda’s name to support graduate study in signal processing at OSU. Making the surprise event all the more memorable, and befitting, was the number in attendance. Of the 30 people from here and abroad that Dr. Yarlagadda personally served as Ph.D. adviser over the years, 21 returned to campus to participate in the celebration, along with their spouses and children.

Operation “Occidental Symposium”
The tribute to Dr. Yarlagadda was the culmination of a full year of planning and coordination, including via a website established to allow former students and colleagues around the globe to exchange information. To maintain the surprise, veiled communications referred to the convening of the “Occidental Symposium” at OSU. Dr. Joseph Campbell, senior member of the Technical Staff at MIT’s Lincoln Laboratory who completed his Ph.D. in 1992 under Dr. Yarlagadda, provided the inspiration for the event.

“In 2004, there was again another cycle of rumors that Dr. Yarlagadda might be retiring,” Campbell says. “I had been handed the reins of editing Digital Signal Processing Journal, the publication Dr. Yarlagadda founded with John Hershey, and thought maybe we should do a special issue inviting all of his former students to submit articles.”

“We’re still working on that, but in an e-mail message to all his former students I mentioned in passing maybe we could set up some sort of scholarship fund,” Campbell says. “I included it, literally, while going through the last edit, but then Sherry Teague saw the message and went wild and spearheaded this whole scholarship effort and putting together the reception.”

Sherry Teague, whose husband Dr. Keith Teague is another of Dr. Yarlagadda’s Ph.D. students and is associate professor and head of electrical and computer engineering at OSU, began the event planning by contacting all the former scholars to gauge their interest. Among the first to respond and offer assistance was Dr. Legand Burge Jr., dean of the College of Engineering, Architecture and Physical Sciences at Tuskegee University. Under Dr. Yarlagadda’s tutelage, Burge in 1979 had been the second African-American to complete a Ph.D. in electrical engineering at OSU.

“I thought it was a great idea, not only to recognize Dr. Yarlagadda in a way that will continue in perpetuity, but also to give encouragement and provide financial assistance to graduate students in the area of signal processing,” Burge says.

Far-reaching Legacy
Dr. Yarlagadda’s impact on signal processing includes being the co-founding editor of Digital Signal Processing Journal and chairing one of the initial International Conferences on Acoustics, Speech and Signal Processing, but his groundbreaking contributions are not limited to the dissemination of new knowledge.

Uniting OSU faculty from electrical engineering, physics and geology, he helped improve underground exploration for the oil and gas industry by developing techniques for the modeling of acoustic responses in down-hole
tools. This endeavor in the de-convolution of well log signals led to the establishment of laboratory facilities and a productive research program at OSU that enjoyed the support of a 12-member consortium of the world’s leading companies for more than two decades.

Work to improve the integrity of digital image processing involved Sandia National Laboratories. Dr. Yarlagadda’s collaboration with Dr. John Hershey, who completed his Ph.D. in 1981 and subsequently received the CEAT’s highest alumni honor, the Melvin R. Lohmann Medal, resulted in the development of the encoding technique, Naturalness Preserving Transform, or NPT.

The School of Electrical and Computer Engineering’s participation in the development of techniques for speech coding and recognition and data transmission and compression with the National Security Agency perhaps best exemplifies Dr. Yarlagadda’s legacy at OSU.

“Lee (Burge) came to work at my old place, and none of the people there were aware of Oklahoma State,” Campbell says. “Lee was a Ph.D. so we all wanted to know where he had studied, and then, through Lee’s contacts, we started a research contract with Dr. Yarlagadda to look at alternative norms to solving the linear prediction equation for speech, an area he’d done work in previously for oil and seismic exploration.”

“We thought, ‘let’s try this on speech and establish a contract with Dr. Yarlagadda and Oklahoma State,’ and before we knew it, a lot of people were getting Ph.D.’s here,” Campbell says.

The list included Rich Dean, Tina Kohler and Campbell."

“In my case, for example, I won a fellowship and the option to go anywhere I wanted for a Ph.D.,” says Campbell, who did his undergraduate and master’s work at, respectively, Rensselaer Polytechnic Institute and The Johns Hopkins University. “Because of Dr. Yarlagadda, I decided I would come to OSU, and a lot of people asked, ‘why are you not going to MIT? What are you doing?’”

“I mentioned to one of the guys headed to MIT that I was going to Oklahoma State, and he said, ‘where is that?’ and I said, ‘well, it’s with Dr. Yarlagadda.’ And even he had heard of Dr. Yarlagadda,” Campbell says. “It’s really all about what an amazing person he is and why he’s attracted so many really top people to come here and encouraged them and helped them.”

Unparalleled Respect for Students

During the Occidental Symposium, Dr. Yarlagadda, his wife and children were feted with personal anecdotes of how his deeds as a teacher, mentor and friend helped advance his students’ scholarly and professional achievement. In personal testimonials by all on hand and in letters and videos sent in by the few unable to attend, they described him compiling nomination materials for career awards and helping secure housing and unpack U-hauls. They told of his efforts to regain the ability to do research in time and to critique dissertations following a debilitating heart valve surgery and a mild stroke. And they spoke of his encouragement to pursue greatness by applying seasoned knowledge to important tasks.

While acknowledging their collective accomplishments, they recognized the quiet compassion and humility of their former professor and the lasting example he sets in the way of treating others. For Dr. Yarlagadda, who is given to gush only when talking about his students’ success, there could not be a more perfect tribute.

“One of the things I did was recruit older graduate students, and many of them I had known for years,” says Dr. Yarlagadda. “They were professionals and had degrees from top schools all over the country.”

“They wanted to come to OSU because we had the kind of Ph.D. program that allowed them to work on projects related to their jobs and the kind of people at the university who accepted them, and I guess I was a part of that because I happened to be working in their areas,” he says.

“I think almost all of my students are brighter than I, and I think they are very serious people. When you work with serious, senior people, it’s amazing how much you can accomplish,” Dr. Yarlagadda says. “Every other lecture in classes now, I name individuals and point out what my students have done. All of them have done remarkably well.”

continued on page 14
One of the critical challenges for the United States is creating enough engineers to support our economy, infrastructure, and national defense; all of which rely heavily on technology. Unfortunately, the long term outlook for meeting this challenge is dismal. While it is impossible to give a balanced view of the interdependent societal, economic, and cultural factors involved in training future engineers in two pages, I would like to give a snapshot of some alarming statistics.

• The number of students obtaining a B.S.E.E. degree dropped 40% nationwide from 1987 to 1998. While the total number of graduates has increased slightly since 1998, the fraction of engineering degrees granted compared to other degrees fell 12% from 1998 to 2001.

• 95% of today’s engineering students cheat at some point in college, primarily to keep up with the pressure and workload. 67% will cheat more than once in a semester.

• Since 1982 the cost of a college degree has risen 220% more than inflation.

The government, National Academies, and some business leaders are acutely aware of this looming crisis in the United States’ continual demand for a scientific workforce. Several national-level panels have been formed to give advice on this need, but it is still an open question about how universities can accomplish reform that is cost effective and sustainable.

For several years a core of dedicated faculty in ECEN have been quietly and systematically looking at the causes of these problems and examining possible solutions. This work paid off this year when ECEN won a prestigious and competitive National Science Foundation award to redefine the process by which students become engineers. This one million dollar grant, Engineering Students for the 21st Century (ES21C), will enable ECEN to begin the slow process of redefining how we prepare tomorrow’s engineers.

OSU is not tackling these issues alone. The pressing questions that all universities are struggling with are: what should replace production and distribution of information, and what

Coming Down the Pipe
Engineering Students for the 21st Century

• About half of the students who start off in engineering will graduate with an engineering degree. If you are female or a minority the odds you will complete your engineering degree falls to one in three.

• Only 13% of engineering students are women, and less than 16% are Black, Hispanic, or Native American.

• Nationally, 56% of all graduate engineering degrees are to foreign citizens.

• One decade ago the smallest feature size China’s integrated circuit industry could create was five times larger than their US competition (smaller feature sizes allow more powerful chips). Today the difference is less than 50%.

• Nationally, 56% of all graduate engineering degrees are to foreign citizens.

• One decade ago the smallest feature size China’s integrated circuit industry could create was five times larger than their US competition (smaller feature sizes allow more powerful chips). Today the difference is less than 50%.

• 95% of today’s engineering students cheat at some point in college, primarily to keep up with the pressure and workload. 67% will cheat more than once in a semester.

• Since 1982 the cost of a college degree has risen 220% more than inflation.

The government, National Academies, and some business leaders are acutely aware of this looming crisis in the United States’ continual demand for a scientific workforce. Several national-level panels have been formed to give advice on this need, but it is still an open question about how universities can accomplish reform that is cost effective and sustainable.

For several years a core of dedicated faculty in ECEN have been quietly and systematically looking at the causes of these problems and examining possible solutions. This work paid off this year when ECEN won a prestigious and competitive National Science Foundation award to redefine the process by which students become engineers. This one million dollar grant, Engineering Students for the 21st Century (ES21C), will enable ECEN to begin the slow process of redefining how we prepare tomorrow’s engineers.

Currently, our program — as are most undergraduate programs — is built on the paradigm that covering a specific set of concepts will prepare students for a career in engineering. The assumption inherent in this paradigm is that specialized information can only be found and learned at universities. Today, with the rise of the Internet, the validity of this underlying hypothesis is questionable. As pointed out several years ago in the journal Science, “Today’s production and distribution of information are undermining the university structure, making it ready to collapse in slow motion once alternatives to its function become possible”. Our program, at its core, like all others, offers information that can often be found elsewhere. For example, all of MIT’s course materials are available on-line at no charge.

OSU is not tackling these issues alone. The pressing questions that all universities are struggling with are: what should replace production and distribution of information, and what

continued on page 15
If you’re in Washington, D.C., and you see a man wearing orange, chances are it’s Kristoffer Lemoins. The 2005 Oklahoma State University electrical engineering graduate, who now works for the Central Intelligence Agency, says he proudly wears orange as much as possible to show his affiliation to OSU.

“I work with people who graduated from Stanford, Princeton, Harvard and MIT and have both master’s and Ph.D.s,” Lemoins says. “To work with such brilliant individuals and still have valuable contributions shows the outstanding teaching and research done at Oklahoma State University.”

While a student at OSU, Lemoins took advantage of the many opportunities available to him. He participated in research with Dr. Cheville in the Optics Laboratory and with Dr. Guoliang Fan in the VCIPL developing a MATLAB interface for his Diabetic Retinopathy research.

Aside from schoolwork and research, Lemoins served as Webmaster for the ALPHA Program and CEAT Student Services, CEAT Student Council Representative and CEAT Career Liaison, among many other activities.

Lemoins proved himself to be an outstanding campus employee as well. In April 2005, he was awarded the Student Employee of the Year Award. Lemoins continued on to compete against students from 19 other universities to win the regional Student Employee of the Year title.

“It felt extremely excited and honored when I won the award,” Lemoins says. “I immediately went and thanked the people in the two offices that nominated me, CEAT Student Services and the Division for Student Affairs.”

Lemoins says these opportunities to succeed helped him obtain his dream job as an analyst for the CIA.

“My undergraduate coursework helped build a foundation of electrical engineering principles, and my research helped bolster my credentials,” Lemoins says. “I was able to answer every question presented to me with some experience I had at Oklahoma State University.”

Now four months into his career with the CIA, Lemoins analyzes national security issues, such as foreign weapons development, weapons proliferation, information warfare and emerging technologies. He will have opportunities for foreign travel and language training.

His advice to future students is to take your own initiative.

“Find out what opportunities are out there to pursue your interests,” Lemoins says. “There’s always something out there.”

Courtney Hentges

Kristoffer Lemoins

Date of Birth: August 24, 1982
Family: father, Michael; mother, Anna; brother, Paul.

Education: B.S. – 2005, Oklahoma State University, Stillwater, OK.


Research Interests: Emerging Laser Technologies

Hobbies: Reading, watching movies, watching CSI, designing Web sites, travel, listening to music.

Focus on Students
Orange in CIA
Papers Appeared in Print (2005):


On the Frontier
Research & Scholarship


The following paper was left out of the 2004 issue of ECEN Newsletter.


Grants/Contracts Awarded (2005):


Fan, G. and Yen, G. G. $45,000. Advanced Retinal Imaging for Non-Invasive Disease Study. Oklahoma Center for the Advancement of Science and Technology.

Fan, G., Mahesh, R. and Johnson, T., College of Arts and Sciences. $21,000. Using a Multi-Resolution GIS-Modeling Approach to Evaluate the Carbon Sequestration Potential in Texas County. University of Oklahoma for NASA EPSCoR.


Fierro, R. $12,000. Hierarchical Hybrid Control of Multi-Vehicle Systems - REU Supplement. National Science Foundation.

Grischkowsky, D. R. $175,000. Two Dimensional THz Photonics and Waveguide THz-TDS. National Science Foundation.


Johnson, L. G. $7,500. Distributed Neural Interface. University of Oklahoma for the Oklahoma Center for the Advancement of Science and Technology.


Ramakumar, R. G. $25,000. Engineering Energy Lab II. OSU Foundation.


Stine, J. E. $5,831. Development of a 3-D Lithography Hardware Simulator. PDF Solutions, Inc.


Yen, G. G. $49,520. Tec-Masters, Inc. KC-10 Electronic Data Sheet Palm Application. Tec-Masters, Inc.


Eta Kappa Nu (HKN)

Eta Kappa Nu is the only Honor Society for Electrical Engineers. Eta Kappa Nu recognizes the highest academic achievements of students majoring in Electrical and Computer Engineering. Outstanding students are invited into HKN primarily from the top one fourth of the junior class and top one third of the senior class of accredited undergraduate programs.

The purpose of HKN is to further scholarship, research, and professional opportunities for all electrical engineering students. The organization aims to support the School of Electrical and Computer Engineering by assisting its members throughout their lives in becoming better professionals and better citizens. This was the goal of the founders of HKN in 1904 and has been carried on by subsequent generations within the Oklahoma State University Omega Chapter of HKN. In honor of the achievements of the Omega Chapter it is pursing placing a monument in front of Engineering South.

Simply stating these goals, however, will not be enough to achieve what HKN stands for. Last semester, HKN hosted a Professor/Student game titled ECEN College Gameday. Students and Professors were asked “Jeopardy” style questions and then asked to build giant puzzles for final JeopardyEE. Dr. Scheets and his team won the competition with Dr. Latino’s team being a close second. Dr. Scheets donated his prize of free yardwork to Kameoka Trail. HKN members and initiates gathered this semester in cleaning the trail.

HKN continues to offer free tutoring for almost all courses in Electrical Engineering and holds informational sessions in which Professors can speak to students about undergraduate and graduate research that they conduct. We hope that this will give students a deeper understanding of the different fields available.

Last Semester a new faculty advisor for HKN was elected. Dr. James Stine accepted the invitation at the first meeting of the Fall semester. Dr. Stine spearheaded the awarding of the Naeter Scholarships and continues to be an active part of the organization.

HKN inducted fifteen new members in the fall. The new members and professors attended the initiation banquet in which the Naeter scholarships and awards were given. HKN hopes to continue what it has done in the past as well as do another Gameday this semester based on “Wheel of Fortune.”

Eric Larson
President
OSU HKN Omega Chapter

Institute of Electrical and Electronics Engineers (IEEE)

Through the OSU student chapter of the Institute of Electrical and Electronics Engineers, or IEEE, students have the opportunity to learn more about the profession, receive information about job opportunities, and gain much needed social skills and leadership abilities. Students network with other students, faculty members, and company representatives through social functions and monthly meetings.

We started out the year with a very successful Fall Picnic where both students and faculty enjoyed hamburgers, mingling, frisbee, and volleyball. This was a chance for the two groups to improve relationship by mixing informally outside the classroom.

Representatives from National Instruments, Nomadics, and Nextel/Sprint spoke at the monthly meetings. In addition to introducing representatives from a variety of companies, one of the goals of IEEE was to also focus on the influence of Electrical Engineering and its technology in the world today. The Nextel presenter spoke on personal experiences repairing the Nextel/Sprint network in New Orleans during the Katrina disaster relief.

We wrapped up the year with a ‘Study Break’ during pre-finals week. Students took a break from projects and studying with games and coffee from a local coffeehouse known as The Third Place.

In the spring, speakers representing companies from different aspects of the Electrical Engineering discipline will continue to share each month, but the much anticipated event of the semester is always the Spring Banquet. Students have a chance to interact personally with companies to learn more about them, network, and hand out résumés while enjoying a nice dinner. Companies have a chance to promote themselves by donating door prizes and last year the coveted prize was a 40 GB Apple iPod.

Another small project that IEEE completed this year was to create a new message board, so students who pass through the department can see what our activities are. The old message board, originally built by Greg Blackburn (MS. ‘80), had not been replaced in many years. The students of the Oklahoma state chapter of IEEE continue to improve our professional society. By bringing in speakers from across the profession, developing better relations between students and department faculty, and supporting the lifelong bonds of friendship developed during college, IEEE has made itself a vital and dynamic part of the department.

We encourage any alumni who wish to become involved to contact any of the IEEE officers. Although our membership changes every year, please contact officers by visiting our website (ieee.okstate.edu). The website also contains information concerning the organization and its upcoming events.

Lesley Hess
President
IEEE OSU Chapter
From 1979 to 1990, Campbell was a member of NSA's Narrowband Secure Voice Technology research group. He and his teammates developed the first DSP-chip software modem and LPC-10e, which enhanced the Federal Standard 1015 voice coder and improved US and NATO secure voice communications systems. He was the principal investigator and led the US Government's speech coding team in developing the CELP voice coder, which became Federal Standard 1016 and is the foundation of digital cellular and voice over the Internet (VoIP) telephony systems.

From 1991 to 1998, Dr. Campbell was a senior scientist in NSA's Biometric Technology research group, where he led voice verification research. From 1994 to 1998, Joe chaired the Biometric Consortium, the federal government's focal point for research, development, test, evaluation, and application of biometric-based personal identification and verification technology.

“Voice biometrics incorporates biological and behavioral traits,” Campbell said. “The natural signals produced by a voice give it interesting advantages where you want to use it so that the speaker doesn’t know or realize they’re being recognized.”

“The combined biological and behavioral elements of the analysis also make speaker recognition a very attractive form of authentication for security and access-control purposes.”
From 1998 to 2001, he led the Acoustics Section of NSA’s Speech Research branch, conducting and coordinating research on and evaluation of speaker recognition, language identification, gender identification, and speech activity detection methods.

“The ability to recognize different speakers has all sorts of growing, large scale applications,” Campbell said. “Access control was very popular and done at Texas Instruments many years ago, but, more recently, we’ve seen it employed in everything from law enforcement to the Home Shopping Network to analyze thousands of calls a day ….”

Campbell said that utilizing speaker recognition in monitoring unfamiliar voices presents a more daunting challenge for researchers

“Our ability to recognize different voices stems form our familiarity with the speakers, including high-level distinctive phrases and common knowledge,” he said. “We use all of this familiar knowledge when it comes to recognizing a talker and you don’t have that when it comes to unfamiliar speakers, so the majority of our challenge in using speech processing forensically is recognizing the unfamiliar.”

“This high-level-based speaker recognition work that has been going on since about 1999,” he said. “It’s a challenge that requires us to fuse together lots of information, seemingly effortlessly, and it’s extremely difficult to do properly with machines.”

In the past few years at MIT Lincoln Laboratory, Campbell’s group has also been working on machine translation, including text-to-text and speech-to-speech translation.

Campbell received the B.S. degree in electrical engineering from Rensselaer Polytechnic Institute in 1979, the M.S. degree in electrical engineering from The Johns Hopkins University in 1986, and the Ph.D. degree in electrical engineering from Oklahoma State University in 1992.

Campbell was an Associate Editor of the IEEE Transactions on Speech and Audio Processing from 1991 to 1999. He taught Speech Processing at The Johns Hopkins University from 1991 to 2001. He is a former IEEE Signal Processing Society Distinguished Lecturer and member of the IEEE Signal Processing Society’s Board of Governors. Campbell is currently a Coeditor of Digital Signal Processing journal, a member of Sigma Xi, a Co-chair of the International Speech Communication Association’s Speaker and Language Characterization Special Interest Group (ISCA SpLC SIG), a full member of the ISCA and the Acoustical Society of America, and a Fellow of the IEEE.

Adam Huffer
The development of a versatile laboratory, with the ability to study power systems, power electronics, and energy conversion, which can be used to complement the theory taught in class, is an important investment in US and global welfare in the years to come. We have completed many of these laboratory goals by building a brand-new state-of-the-art laboratory at OSU Tulsa, and more recently by significantly upgrading the lab at OSU in Stillwater. The equipment available in these labs acquires and displays data in real time so that students can immediately see the effects of changes in their circuit or voltages, currents, or mechanical loads, rather than the more traditional approach of 1) turn knob, 2) write some numbers down, 3) do laborious calculations later, and 4) hopefully figure out what these numbers mean just before the lab report is due. Because of the digital acquisition, processing and real-time display, students can see instantaneously the effect a change in circuit parameters and/or topology through real-time phasor diagrams and current and voltage harmonics, as well as current, voltage, real and reactive power, etc. The display of this data is done using National Instruments’ LABVIEW software; the data is acquired by NI boards after signal conditioning and isolation have been done by our own in-house design. Processing and display of information collected by the hardware can be changed at will simply by writing a new LABVIEW program.

We hope that we can further increase the versatility of the lab by inclusion of a flexible power electronics module, which would allow us to perform experiments in machine drives, flexible AC transmission systems (FACTs) in addition to experiments we can already perform. Our concept of such a unified power electronics laboratory is discussed in a paper in a special section of the IEEE Transactions on Power Systems (Feb 2004) focusing on power engineering education. The lab to date can support courses in energy conversion and power systems, as well as some senior design projects. The addition of a flexible power electronics module would support several courses in power electronics and increase the ability to complement courses in power systems. We are in the process of building individual pieces of such a module through senior design projects.

These upgrades were conducted by Dr. Thomas W. Gedra, who designed much of the circuitry and wrote the LABVIEW programs. Over the years, many students helped to build the lab, and while all their contributions are greatly appreciated, two students played crucial roles in the most recent labs’ construction or upgrades: Dr. Seungwon An (Ph.D. from OSU ECEN), project manager of the Tulsa lab construction, and Mr. Qamar H. Arsalan (pictured with Dr. Gedra above), assistant project manager for the Tulsa lab, project manager of the upgraded Stillwater lab, and Ph.D. candidate in ECEN.

Thomas Gedra,
Associate Professor at ECEN

Notes and Notices
Upgrade of the Power Engineering Laboratory
Three New ECEN Faculty Members
James E. Stine received the Ph.D. degree in Electrical Engineering from Lehigh University in 2000. From 1999 to 2005, he was an assistant and associate professor at Illinois Institute of Technology, where he directed the VLSI Computer Architecture, Arithmetic and CAD Research Laboratory. He is currently an associate professor in the School of Electrical and Computer Engineering at Oklahoma State University. Dr. Stine specializes in research and teaching in VLSI, computer arithmetic, computer system architecture, and digital design. His research contributions have been extensively published in journals and conference proceedings. He is the author of two monographs in the area of computer arithmetic. Dr. Stine has been involved in organizing the IEEE Euromicro Symposium on Digital Symposium and the ACM Great Lakes Symposium on VLSI, as well as serving on the technical program committees for several high-profile conferences on VLSI and processor design. He is a member of the ACM, the IEEE Computer Society, and a Senior Member of the IEEE.

Ohum Sohoni’s research interests are broadly in the area of computer architecture and performance analysis. His primary field of research is the cache memory performance of memory-intensive applications. Besides mainstream cache memory systems, his research spans distributed systems, multimedia applications and low power architectures for general-purpose and embedded systems. He is highly interested in the development of graphical visualization tools for classroom and laboratory instruction, and believes that classroom instruction needs to incorporate the presentation techniques of today, as well as new teaching methodologies such as case studies and team learning.

Dr. Sohoni has published in highly ranked peer-reviewed conferences and journals such as ACM SIGMETRICS and the IEEE Transactions on Computers, and has won numerous awards as a graduate student, including the URC graduate student summer fellowship in 2002 and 2003. He received his Ph.D in computer engineering from the University of Cincinnati in 2004 and his bachelors in electrical engineering from Pune University in 1998.

Daqing Piao received his B.S. in Physics from Tsinghua University in Beijing, China in 1990, M.S. in Biomedical Engineering in 2001, and Ph.D in Biomedical Engineering in 2003, both from University of Connecticut, Storrs, CT. Before he pursued graduate study, he had been employed as an MRI engineer from 1990 to 1994 at Guangdong Weida Medical Apparatus Corporation (Guangdong, China), and as an R&D engineer/program manager from 1994 to 1999 at Shanghai Kangli Medical Engineering Co. Ltd (Shanghai, China). After his Ph.D., he received post-doctoral training at University of Connecticut from 2003 to 2004, and worked as Research Associate at Dartmouth College from 2004 to 2005. Daqing Piao is the recipient of the Guanghua Prize from Tsinghua University in 1989, Outstanding Engineer from Guangdong Weida Corp in 1993, Postdoctoral Traineeship Award from Department of Defense in 2002, and the Best PhD Thesis Award of UCONN Engineering School in 2003. His research area is in biomedical optical imaging, with specialization on endoscopic optical tomography for accurate selective biopsy of cancer.
The complete list of Dr. Yarlagada’s 30 Ph.D. graduates is shown below.

- **Eddie Fowler (‘69)**  
  – professor emeritus, electrical and computer engineering, Kansas State University
- **Lewis Minor (‘69)**  
  – engineer, Lockheed Martin
- **Fun Ye (‘72)**  
  – Dean, engineering college, Tamkang University, Taiwan
- **Kal Massad (‘75)**  
  – Devry University, Houston, Texas
- **B. Suresh Babu (‘78)**  
  – Mitre Corporation, Boston, Massachusetts
- **Lee Burge (‘79)**  
  – Retired U.S. Air Force colonel; dean, College of Engineering, Architecture and Physical Sciences at Tuskegee University
- **James Ledbetter (‘79)**  
  – Retired U.S. Air Force colonel, Albuquerque
- **John Hershey (‘81)**  
  – technical staff, General Electric Global Research, Schenectady, New York
- **Meemong Lee (‘81)**  
  – senior engineer, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California
- **Ahmad Milyani (‘81)**  
  – K.A. University, Jeddah, Saudi Arabia
- **Rob Preuss (‘83)**  
  – BBN Technologies, Boston, Massachusetts
- **Keith Teague (‘84)**  
  – associate professor and head, electrical and computer engineering, OSU
- **Steve Patton (‘85)**  
  – engineer, Lockheed Martin, Littleton, Colorado
- **Jim Shroeder (‘85)**  
  – professor, electrical engineering, University of Adelaide, DSpace, Australia
- **Jack Cartinhour (‘87)**  
  – professor, electrical engineering technology, OSU
- **Dwight Day (‘87)**  
  – associate professor, electrical and computer engineering, Kansas State University
- **Chuck Kriel (‘88)**  
  – consultant, Boeing, Wichita, Kansas
- **Jim Lansford (‘88)**  
  – chief technology officer, Alereon, Austin, Texas
- **Robert Hayes (‘89)**  
  – Retired, dean, Electronics, Devry University; currently, visiting professor, engineering technology, University of North Texas
- **Antone Kusmanoff (‘89)**  
  – Retired U.S. Air Force Colonel, L-3 Communications, Dallas, Texas
- **Rich Dean (‘90)**  
  – Retired, Executive Service, National Security Agency; currently, lecturer, Morgan State University, electrical and computer engineering
- **John Endsley (‘90)**  
  – Sandia National Laboratory, Albuquerque, New Mexico
- **Scott King (‘91)**  
  – Frescale, Austin, Texas
- **Larry Paden (‘91)**  
  – Electrical Engineering, Engineering & Transmission Headquarters, Grand River Dam Authority, Broken Arrow, Oklahoma
- **Matt Perry (‘91)**  
  – formerly, president and CEO, Transmeta Corp., San Jose, California
- **Joe Campbell (‘92)**  
  – senior staff, MIT Lincoln Laboratory
- **Alan Higgins (‘96)**  
  – Voice Vault, San Diego, California
- **Nikki Bruner Ibarra (‘98)**  
  – Seagate, Longmont, Colorado
- **Charlotte Fore (‘99)**  
  – Sciperio, Stillwater, Oklahoma
- **Tina Kohler (‘00)**  
  – National Security Agency, Maryland

**Coming Down the Pipe**

Engineering Students for the 21st Century

continued from page 3

is an engineering degree if it isn’t mastery of some set of knowledge? OSU’s new administration has chosen to follow most other universities by: 1) building research infrastructure to produce more information (and the potentially lucrative intellectual property it creates), 2) embracing technology to help distribute information more efficiently, and 3) continually updating the curriculum to keep up with the exponential growth of information produced by universities. Whether this model is sustainable is questionable since it creates built-in positive feedback that demands ever-increasing investment.

Engineering Students for the 21st Century addresses some of the difficulties inherent to the third point, updating the curriculum. Curriculum updates are typically attempted through removing “legacy material”; knowledge that is no longer useful or current. ECEN’s attempts to update the program this way have generally never been entirely successful. We have learned from experience that removing legacy material is nearly impossible since there is no universally accepted way to identify what constitutes legacy material. What knowledge is useful depends entirely on the context in which it is used rather than any intrinsic merit of the material itself. Since over 40% of newly minted BSEE’s take a job outside electrical engineering, and only 50% work in an area closely related to what they studied, it is impossible to foresee what students need to know.

If removing legacy material will not help us teach future engineers, what can ECEN do? The key thesis of ES21C is that all knowledge must be learned in context. Without practicing being an engineer, it is difficult to train a student to become an engineer. Engineering Students for the 21st Century, changes our degree program from the old, knowledge-based paradigm (acquiring a set of concepts) to one that is development-based (emphasizing students’ development). Students at all levels will be taught how engineers tackle design problems, how to monitor their own development, and how to find, evaluate, and communicate information. This approach redefines the role of both faculty and the university, and represents a fundamental shift in the focus of an engineering degree. During the next three years ten courses will be tagged as development courses and focus more on teaching students how to solve engineering problems than any specific set of concepts. If you are interested in the specifics of how Engineering Students for the 21st Century will redefine an engineering degree, keep an eye on our web site and future newsletters.

Will we succeed? The odds are against it. Machiavelli once commented that changing institutions is the hardest thing a man can attempt because everyone knows exactly what they have to lose while no-one can judge accurately what they have to gain. Two decades of investment in engineering education has yielded little change, and OSU is both conservative and tradition-bound. Help from our alumni is needed to support change as well as to forge long-term partnerships with industry that will support the facilities and equipment needed by our students. Ultimately, the question “will we succeed?” is not important; the attempt must be made since the problems that loom in our country’s future are too great not to try. The opportunity is enormous. As Tennyson said in the closing of Ulysses:

> It may be that gulfs will wash us down … [but]
> Tho’ much is taken, much abides; and tho’
> We are not now that strength which in old day
> Moved earth and heaven; that which we are, we are:
> One equal temper of heroic hearts,
> Made weak by time and fate, but strong in will
> To strive, to seek, to find, and not to yield.

Alan Cheville
Associate Professor of ECEN

Graphic design and layout by Paul Woodard, University Marketing.

Oklahoma State University in compliance with Title VI and VII of the Civil Rights Act of 1964, Executive Order 11246 as amended, Title IX of the Education Amendments of 1972, Americans with Disabilities Act of 1990, and other federal laws and regulations, does not discriminate on the basis of race, color, national origin, sex, age, religion, disability, or status as a veteran in any of its policies, practices or procedures. This includes but is not limited to admissions, employment, financial aid, and educational services. Title IX of the Education Amendments and Oklahoma State University policy prohibit discrimination in the provision of services of benefits offered by the University based on gender. Any person (student, faculty or staff) who believes that discriminatory practices have been engaged in based upon gender may discuss their concerns and file informal or formal complaints of possible violations of Title IX with the OSU Title IX Coordinator, Dr. Carolyn Hernandez, Director of Affirmative Action, 408 Whitehurst, Oklahoma State University, Stillwater, OK 74078, (405) 744-5371 or (405) 744-5576 (fax). This publication, Job#1373 issued by Oklahoma State University as authorized by the Department Head, Electrical and Computer Engineering, was printed by Oklahoma University Printing at a cost of $<<<>>>. 5M/June/06.
Yes. I want to support the OSU School of Electrical and Computer Engineering. Enclosed is my gift amount of $__________________________

[ ] My employer matches gifts. I have enclosed a form.

Method of Payment

[ ] Check. Make check payable to: OSU Foundation (School of Electrical and Computer Engineering).

[ ] Credit card. Complete the following:

Credit Card #

Expiration (MMYYYY)

[ ] VISA  [ ] MasterCard  [ ] American Express  [ ] Discover

Update your info:

Name: ________________________________________________________________________________
Address: ________________________________________________________________________________
City __________________________ State ________ Zip __________________________
Home Phone __________________________ Work phone __________________________
Email ________________________________________________________________________________