

# Herff Highlights



The University of Memphis

Herff College of Engineering

Fall 1999

## The Dean's Perspective



Dr. Richard C. Warder, Jr.,  
Professor and Dean

As we approach the end of the current millennium, there is a sense of opportunity and change. Engineering often provides the essential ingredient to meeting these challenges with innovations, new technologies, and new solutions to tomorrow's problems. The unique role that engineers play in the innovation process can provide the impetus for increasing our region's industrial and technological productivity.

Engineers are known as problem solvers, and the Herff College of Engineering faculty are educating the problem solvers for the new millennium! They do this in a variety of ways, including accredited modern curricula, introducing new degree programs, through research and through student activities and competitions such as the Society of Engineers Formula Car described elsewhere in this newsletter.

An interesting phenomenon was recently discovered, the so-called "K" craze! First there were nationwide concerns about K-12 education, then came the Y2K issue, and now engineering colleges and faculty nationwide are worried about a-k. Because a-k is a relatively new phrase in the vocabulary of engineering faculty, some details might be helpful. The Fall 1996 *Herff Highlights* first mentioned the new set of criteria proposed by the Accreditation Board for Engineering and Technology (ABET) for accrediting engineering programs. These criteria, Engineering Criteria (EC) 2000, were subsequently adopted by the Engineering Accreditation Commission (EAC) of ABET and become mandatory for all engineering programs seeking accreditation beginning with the Fall 2000 semester. The Technology Accreditation Commission (TAC) of ABET, who accredit our Engineering Technology programs, are considering similar revisions.

The EC 2000 criteria focus on eight areas, namely students, program objectives, program outcomes and assessment, a professional component, faculty, facilities, institutional support and specific criteria for the individual programs. The new criteria, however, are much more succinct

with criterion 3 requiring engineering programs to demonstrate that they produce graduates with the following attributes:

- (a) the ability to apply knowledge of math, engineering, and science
- (b) the ability to design and conduct experiments
- (c) the ability to design a system, component or process to meet needs
- (d) the ability to function on multidisciplinary teams
- (e) the ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) the ability to communicate effectively
- (h) a broad education so as to understand the impact of engineering solutions
- (i) the recognition of the need for and an ability to engage in lifelong learning
- (j) a knowledge of contemporary issues
- (k) the ability to use the techniques, skills, and tools in engineering practice

It is understandable why the a-k phrase occurs so frequently in discussions among engineering educators and administrators.

In every dynamic College of Engineering, personnel changes are continual. Senior faculty retire, new faculty arrive, and adjunct faculty come and go. Our College is undergoing many such changes. Between 1994 and 1999, 21 new faculty joined the College. These positions came from existing open positions, new faculty positions provided by the central administration, and openings due to retirements and resignations. Additional faculty have indicated their intention to retire, and we project that by 2003, eight to 10 new faculty will join the College. The personnel changes that have occurred this past year are described elsewhere in the newsletter.

Our College is fortunate to have so many alumni and friends who are generous with both their time and their financial support. In addition to those who take time to serve on the departmental and College Advisory Boards and Councils, many individuals and organizations have helped provide additional resources to supplement our limited state funding. Last year we reported on the funding by friends and alumni for six professorships to provide recognition and competitive compensation for our most productive faculty. During the past five years, many alumni and friends have established endowed scholarships, and a list of these scholarships is given below. The College faculty, our students, and their families are most appreciative of your support.

The Tennessee Higher Education Commission formally approved the College's proposal for a B.S. in Computer Engineering in July. The only other B.S. in Computer Engi-

neering degree programs available within about a 200-mile radius of Memphis are at the University of Arkansas, Mississippi State and Vanderbilt. We admitted the first students into the new program in September and anticipate major growth in student enrollments. The approval process for the formal transfer of the Architectural Technology concentration to the College of Communication and Fine Arts is underway. After completing campus approval, the proposal will be forwarded to the Tennessee Board of Regents for their approval. Reports from around the College and from your Alumni Association are also included in this newsletter. As always, we look forward to receiving news about your families and careers. Please take time to write a note or e-mail us about what's happening in your life.

## CHANGES

**Connie Hall** was appointed as Assistant Professor in the Joint Graduate Program in Biomedical Engineering at The University of Memphis and the University of Tennessee, Memphis. Hall received her B.S. and M.S. degrees in Bioengineering from the University of California–San Diego and a Ph.D. in Biomedical Engineering from The University of Memphis. Her research areas and interests are in blood coagulation and biomaterials.

**Erno Lindner** was recently appointed as Associate Professor in the Joint Graduate Program in Biomedical Engineering. He holds an M.S. in Chemical Engineering and a Ph.D. in Analytical Chemistry, both from the Technical University of Budapest. His research interests include biosensors, their associated manufacturing methods, and the analytical methods of modeling them.

**Calvin Abernathy** was recently appointed an Assistant Professor in Civil Engineering. He received his B.S. and M.S. degrees in Civil Engineering from Mississippi State University and a Ph.D. degree from Montana State University. His area of specialty is environmental engineering.

**Jeffrey Franzone, Steven Hunter** and **Thomas Slack** were appointed Assistant Professors of Engineering Technology.

Franzone earned a B.S. in Electronics Technology from California State University and an M.S. degree in Computer Technology from Arizona State University. He will teach hardware and software courses.

Hunter earned his B.S. from Berry College, an M.S. in Manufacturing Systems Engineering from Auburn and is currently a Ph.D. candidate in Industrial and Systems Engineering at Auburn. His primary teaching responsibility will be in Manufacturing Engineering Technology.

Slack joined the university from Bell Atlantic Corporation, where he was a systems engineer. His degrees include a B.S. in Electrical Engineering from Arizona State and an M.S. degree in Computer Engineering from Carnegie Mellon. He is currently teaching courses in computer network technology and microcomputer systems.

**Rodney Conger** has joined the Ground Water Institute (GWI) as a senior research scientist and GIS specialist. Conger received his B.S. and M.S. degrees in Civil Engineering from The University of Memphis. His specialties are in GIS technology and database management.

**Randy Gentry** has been appointed as research assistant professor and serves as the associate director of the GWI. Gentry received his B.S., M.S. and Ph.D. degrees in Civil Engineering from The University of Memphis. His areas of specialty are in ground water resources engineering and numerical modeling.

**Brian Waldron** was recently appointed as assistant professor in the GWI. Waldron received his B.S. and M.S. degrees from The University of Memphis and a Ph.D. from Colorado State University, all in Civil Engineering. His specialty is multispecies contaminant fate and transport modeling.

**William Janna**, Professor of Mechanical Engineering, has been appointed Associate Dean for Graduate Studies and Research. He replaces **Fritz Claydon**, who joined the University of Houston as Professor and Chair of Electrical and Computer Engineering in the Cullen College of Engineering.

Three new additions to the College staff are **Christine Kirk** as Director of Development, **Kathy Garrott** as Marketing Coordinator, and **Paul Palazolo** as Director of Recruiting and Retention.

Kirk has eight years of experience as an institutional fund raiser. Before joining the University, she was director of development for the Baptist Home for Children and Families in Bethesda, MD. She has also been a development associate for Wesley Theological Seminary and a major gifts coordinator for the American University, both in Washington, DC. She received a bachelor's degree from Messiah College and a master's degree from the American University.

Before joining the University in October, Garrott worked as a marketing and communications consultant, offering customers a wide range of services from strategic planning to writing, design and production of marketing materials. Garrott earned a bachelor of fine arts degree in graphic design from Delta State University.

Paul Palazolo has B.S. and M.S. Degrees in Civil Engineering from Memphis State, and a Ph.D. from the Georgia Institute of Technology. Dr. Palazolo is leading our recruiting efforts, including community outreach programs targeting K-12. He also serves as a contact for new students and will help develop programs for freshmen.

Promotion and tenure decisions approved effective September 1999 were: **Robert Malkin** to Associate Professor of Biomedical Engineering with tenure; **David Russamanno** to Associate Professor of Electrical Engineering with tenure; **Fritz Claydon** to Professor of Biomedical Engineering; and **Shahram Pezeshk** to Professor of Civil Engineering.

**Glen Davis** retired from Engineering Technology at the end of the spring 1999 semester after 30 years of service. His broad technical background enabled him to teach over 30 different courses in the Department. He received the University's Distinguished Teaching Award twice. Teaching and interacting with the students is the part of the job he loved most. He will be missed both by the faculty and students. He still visits the University regularly and has agreed to serve as an adjunct faculty member in the Manufacturing Engineering Technology program.

Friends and colleagues of Glen Davis have established a goal of raising \$25,000, within five years, to fund an endowed scholarship to honor his dedicated service to his students and to the Department. For the Glen Wilson Davis Endowed Scholarship Fund, contributions should be sent to Christine Kirk in care of the College of Engineering.

**John Reece**, Assistant Professor of Electrical Engineering has resigned effective January 1, 2000, to accept a faculty position in the Electrical and Computer Engineering Department at Mercer University. **Robin Lovgren**, Assistant Professor of Civil Engineering, also has resigned effective January 1. Robin and her husband Marty are the relatively new parents of twin girls and Marty has been assigned to Nashville with Bell South.

### ENGINEERING AWARDS DINNER

The first Herff College of Engineering Awards Dinner was held on March 11, 1999. In addition to the recognition of **William Hagerman** (BSCE '74) as the *Outstanding Alumnus* from the Alumni Chapter, several faculty and staff awards, and the first recipients of the *Herff Honor Awards for Distinguished Service in Engineering* were announced. **Becky Ward**, Administrative Secretary in Electrical Engineering, and **Carol Ferguson**, the College Undergraduate Advisor, received *Herff Outstanding Staff Awards*. **Edward Perry**, Professor of Mechanical Engineering, received the *Herff Outstanding Faculty Teaching Award*, and **Shahram Pezeshk**, Associate Professor of Civil Engineering, received the *Herff Outstanding Faculty Research Award*. The faculty and staff awards consist of a check and engraved plaque. *Herff Honor Awards for Distinguished Service in Engineering* were presented to **William Crawford** (BSET '63), retired president of Memphis Light Gas and Water; **Joseph Emison**, CEO of Pickering, Inc.; and **James Speakman**, Senior Vice President of Ensaf, Inc. These awards consist of an engraved plaque.

We encourage you to nominate, for the 2000 *Distinguished Service in Engineering Awards*, those engineers whose professional or personal achievements have brought honor and distinction to the College. Nomination information is available at the College of Engineering Web site:

<http://www.people.memphis.edu/~herffcoll/frame.html>



William Hagerman with Engineering Alumni Board President Barbara Wilson

and are due February 1, 2000. The awards will be presented at the second College of Engineering Awards Dinner to be held in April 2000.

### ENDOWED SCHOLARSHIPS

During the past five years, the generosity of alumni, private sector partners and friends of the College has helped establish the following endowed scholarships:

Weston T. Brooks  
 Paul Y. Isbell #1  
 Paul Y. Isbell #2  
 Bodine Company  
 Looney Ricks & Kiss, Architects, Inc.  
 Don G. Farley  
 Robert E. Magowan  
 Maxwell McDade  
 Shelby-Skipwith, Inc.  
 Southern Fabricators, Inc.  
 Engineers Club of Memphis Proutt Memorial  
 Glen W. Davis

Named scholarships can be established with a minimum endowment of \$25,000, funded within five years. All but four of the above scholarship endowments are fully funded, and the others are close to their goals, except for the recently established Glen W. Davis scholarship. Please consider helping us increase scholarship support for deserving and qualified students. It will be an excellent investment in the future of the mid-South!



Engineers Club of Memphis President, Ed Eckstein, and Scholarship Committee Chair, Burt Berrill, with President V. Lane Rawlins and Dean Richard Warder at signing of Proutt Memorial Scholarship Endowment agreement.

### FALL ALUMNI RECEPTION

The Second Annual Engineering Alumni Reception was held November 3, 1999, in the VIP room at the Pyramid. Alumni, faculty and supporters of the College enjoyed an evening of socializing and great food. We were honored to have University President V. Lane Rawlins present, and the evening's highlight was an exciting presentation by Dr. O'Neal Smitherman, Executive Assistant to President Rawlins for Planning and Projects regarding the \$102 million campus expansion projects.



President Rawlins, O'Neal Smitherman and alumni at the Engineering Alumni Reception

## BIOMEDICAL ENGINEERING

### FACULTY NEWS AND NOTES

**Doug Goetz** presented papers titled "Particle Size Influences Adhesion Under Flow" and "An in vitro Model for Targeting Drugs to Select Segments of the Endothelium" at the first Joint Meeting of the Biomedical Engineering Society (BMES) and the IEEE Engineering in Medicine and Biology Society. Another paper by Goetz, **Vivek Patil** (MS '99), **Craig Campbell**, and **Karen Crutchfield** (MS '98) titled "CD11b/CD18 Microspheres Adhere To E-Selectin Under Flow" will appear in the *Journal of Leukocyte Biology*. Goetz was also a featured researcher in the Whitaker Foundation 1998 Annual Report on Body Mechanics. **Connie Hall** presented a paper titled "Vascular Smooth Muscle Cells Procoagulant Response to Protein Coated Biomaterials" at the BMES/IEEE Joint Meeting. Hall, co-author with **James Hathcock** and **Vincent Turitto**, also presented a paper titled "Effects of Fluid Dynamic Shear on Tissue Factor Activity In Vascular Smooth Muscle Cells and Monocyte Derived Macrophages" at the University of Washington Engineered Biomaterials Summer Symposium on Diagnostics and Devices in Contact with Blood. **Robert Malkin** recently attended the 1999 Computers in Cardiology Society meeting where the board of directors of the Society officially awarded the 2002 conference to Memphis. He will chair this international conference, bringing experts from around the world to Memphis to present their latest research results. Malkin was also an invited speaker at the International Society of Computerized Electrocardiography Conference in Nara, Japan. He presented his recent work on the safety of medical devices. This work has drawn particular attention from the international community because it highlights a heretofore unknown mechanism by which a medical instrument leaking alternating current might injure a patient. This work by Malkin and his colleagues was the featured research at the conference banquet. The president of the Society presented a synopsis of the findings, highlighting their importance. **Erno Lindner** was invited to the "In Vivo Sampling: Biocompatibility Issues" Symposium at the Pittcon 2000 conference to give a lecture titled "Microfabricated Potentiomet-

ric Sensors and Their In-Vivo Applications." **Michael Neuman** also attended the BMES/IEEE Joint Meeting. He ran an exhibit promoting the Memphis Center for Pediatric Biomedical Engineering and the Joint Program in Biomedical Engineering of The University of Memphis and The University of Tennessee, Memphis. He also attended the Collaborative Home Infant Monitor Evaluation Steering Committee. Neuman attended the National Science Foundation (NSF) grantees' meeting for the Cost-Reducing Medical Technology program and presented a progress report on his grant on sensors for bacterial vaginosis. He participated in a panel reviewing biomedical engineering proposals for the United States Department of Energy research laboratories. **Jae-Young Rho** recently attended the Augustusburg Conference of Advanced Science: Mechanical Properties of Cells and Tissues. He presented a paper titled "The Relationship between Microstructure and the Nanoindentation Properties of Intramuscular Herring Bone," as well as a paper titled "Mechanical Properties of the Individual Lamellae within Osteons by Nanoindentation." Rho was co-author of a presentation titled "Broadband Ultrasonic Attenuation of Bovine Cancellous Bone" at the Annual Meeting of the American Society for Bone and Mineral Research. **Steven Slack** and **Vincent Turitto** attended grant proposal review sessions for the National Institutes of Health. Turitto also attended a meeting of the International Society of Thrombosis and Hematology and the annual Fall BMES meeting, where he chaired the Biophysical Effects in Thrombosis Session. Turitto was co-author of a presentation titled "Smooth Muscle Cells' Procoagulant Response to Protein Coated Biomaterials." He attended the Whitaker Foundation informational meeting for the Leadership Development and Special Opportunity Awards. **Michael Yen** attended the Summer American Society of Mechanical Engineers (ASME) Conference where he co-authored a presentation.

The 2nd Tennessee Conference on Biomedical Engineering was hosted by Vanderbilt. The Conference theme was "Improving Health Care Through Technology in the Tennessee Valley." Its purpose was to bring together professionals and students in biomedical engineering and related professions in Tennessee and northern Alabama in order to increase communication and foster mutually beneficial relationships among industrial, academic and clinical professionals.

**Dr. Geza Nagy**, a visiting professor from Hungary, and **Dr. Livia Nagy**, a Ph.D. chemist, worked with Erno Lindner for three months on a grant that Neuman and Lindner received from Duke University on "Biomedical Sensors for Cost Reducing Detection of Bacterial Vaginosis." **Eva Pergel**, a graduate student from Hungary, also worked with Lindner for three months on the extension of the detection limit of a lead selective electrode to picomolar concentrations. Her stay was supported by the US-Hungarian Joint Fund. The Fund awarded Lindner a one-year grant to organize a workshop in Memphis titled: *Microelectronically Fabricated Chemical and Biosensors In Biomedical Engineering*. The workshop will be held in March 2000 with four to five invited speakers from the Technical University of Budapest and two to three scientists from the United States.

Three post-doctoral fellows joined the Biomedical Engineering Department: **Dr. Douglas Guan** from China, **Dr. Robert E. Gyurcsanyi** from Hungary, and **Dr. Marcel Roy** (Ph.D. '99) from The University of Memphis.

#### STUDENT ACTIVITIES

**Jian Gao**, Ph.D. candidate, presented "Studying Mechanical Properties of Human Lung Parenchyma" and James Hathcock, Ph.D. candidate, presented "Fluid-Dynamic Shear Stress Facilitates the Release of Tissue Factor from Smooth Muscle Cells and Monocyte Derived Macrophages" at the Summer ASME Conference. **Jason Haga**, Ph.D. candidate, presented a poster titled "Characterization of Anti-Platelet Antagonist Interaction with Purified Glycoprotein IIb-IIIa (GP IIb-IIIa)" at the XVIIth Congress of the International Society on Thrombosis and Haemostasis. James Hathcock and **Viji Balasubramian**, Ph.D. candidates, have accepted post-doctoral positions at Mount Sinai Medical Center in New York City. Marcel Roy (Ph.D. '99) presented a paper titled "Osteocalcin and the Microstructural Elastic Modulus of Bone" at the 21st Annual Meeting of the American Society for Bone and Mineral Research. Yang Yun (Ph.D. '99), presented a paper titled "Porous Media Modeling of Flow in Lateral Cerebral Aneurysms Treated with Metallic Coils" at the ASME National Heat Transfer Conference.

#### RESEARCH EXPERIENCES FOR UNDERGRADUATES (REU) PROGRAM

The REU program has been funded by the National Science Foundation for the previous three years and recently supported 20 undergraduate students from The University of Memphis, Rhodes College and various universities from across the United States. Each student spent a 10-week period at The University of Memphis working on a biomedical project with faculty from the Joint Program, other departments in the College of Engineering, several departments in Arts and Sciences, and Rhodes College. The Joint Program faculty members involved in this effort are **Eugene Eckstein**, Doug Goetz, Robert Malkin, Mike Neuman, Jae-Young Rho, Steven Slack, and Vincent Turitto.

#### CENTER FOR BIOMEDICAL ENGINEERING PEDIATRICS

The Memphis Center for Biomedical Engineering in Pediatrics is a new educational program that applies biomedical engineering in clinical and clinically-related basic science areas of children's health care. This communitywide activity brings together renowned pediatric institutions with the Joint Graduate Program. The Center is the first U.S. group to target biomedical engineering education and research in pediatrics with an emphasis on providing clinical as well as engineering experience to the participating students. The training will employ hands-on activities and case reports that will augment the traditional biomedical engineering coursework of the Joint Program. This will help students to better understand the environment in which their technology will be applied, as well as to recognize the benefits and limitations in applying this technology in the real clinical world.

## CIVIL ENGINEERING

#### FACULTY NEWS AND NOTES

**Charles Camp**, **Shahram Pezeshk**, and **Russell Deaton** from Electrical Engineering have been conducting research on a promising new device for detecting scour around bridge piers. The new device, which uses temperature measurements to track the interface between the water and the stream bed, is showing promise as an accurate, inexpensive, robust, and low maintenance scour detection system. This research is being funded by the Tennessee Department of Transportation. Department Chair **Martin Lipinski** was recently appointed to serve on the Memphis Light Rail Task Force. He continues to serve on the Uniport Board of Directors, the Memphis Metropolitan Planning Organization Citizen's Advisory Committee, and the Memphis Chamber of Commerce Local Roads Task Force. In January he presented a paper titled "Assessment of Emissions and Fuel Use Changes Resulting From Modal Shifts in the Upper Mississippi River Basin" at the 78th Annual Transportation Research Board. In April he presented "Intermodal Facilities-Safety Challenges, What Is New Between Truck and Rail" at the Institute of Transportation Engineers Conference. In June he served as a panel member at the ASCE Specialty Conference on Content Sensitive Highway Design Workshop. In August he presented "Goods Movement Characteristics as They Relate to Terminal Design" at the Annual Meeting of the ITE. He also co-authored papers presented at the Urban Street Symposium and the 10th International Conference on Traffic Safety on Two Continents. **Roger Meier** recently completed his term as President of the West Tennessee Branch of the ASCE and has resumed his former role as faculty advisor to the ASCE student chapter. He continues to serve as an Editorial Board Member for the ASCE *Journal of Geotechnical and Geoenvironmental Engineering*. In June he presented a paper on "System Calibration Sampling Design By Genetic Algorithms" at the 26th Annual ASCE Water Resources Planning and Management. In January he will chair a technical session on "Collection and Interpretation of Deflection Data" at the 79th Annual Transportation Research Board. He is currently working with researchers from the University of Tennessee to determine the influence of climatic and environmental factors on the strength of asphalt pavement. **Shahram Pezeshk** recently traveled to Taiwan with a reconnaissance team to investigate damage to structures caused by the September 21, 1999, earthquake. He was also elected to serve on the Board of Directors of the newly formed Western Tennessee Structural Engineers Association and has recently been named as an Associate Editor of the *ASCE Journal of Structural Engineering*. **William Segui**, author of the textbook *LRFD Steel Design*, recently co-taught a one-day short course on the topic with Pezeshk. This course, sponsored by the West Tennessee Branch of the ASCE, provided local engineers an opportunity to become current with the latest design specification of the American Institute of Steel Construction.

## NEW COURSES

Since 1995, all civil engineering students have had to take a three-course introductory sequence that integrates basic concepts of measurement, analysis, and computation with engineering problem-solving strategies. Evolving from traditional courses in surveying, microcomputer applications, and programming, the integrated sequence emphasizes written and oral communication skills, teamwork, and problem-solving skills, while introducing basic engineering design concepts.

A major characteristic of the courses is small design groups assisted by an undergraduate mentor. Students work in teams rather than as individuals to define requirements, design, manufacture, assemble, and quantitatively test a series of civil engineering products. Typically, in the fall semester, each student group is responsible for three products during the semester: a topographic model of a site, a concrete beam, and a water filtration system. The concrete beam and water filtration system projects are not "models," but rather they are pilot-scale designs. Each group's design product must satisfy a set of design and operational criteria and are evaluated based on a performance measurement. Success in the course is based on a technical presentation of the design and analysis of the product and its performance. This course is very dynamic, with active interactions between faculty and students.

This fall, our entering freshmen are participating in a pilot research project conducted by Charles Camp, Paul Palazolo, and Larry Moore from Civil Engineering, and Anna Phillips from the English Department. The project seeks to further improve the writing skills of the students by providing technical writing instruction on a "just-in-time" basis. Thus, Phillips' writing instruction is specifically tailored to individual course assignments, which may require everything from a letter of transmittal to a design report for a group project.

Among the projected benefits of this team-teaching project is an increased awareness of the types of writing required of engineers and enhanced communication skills in general. So far, in student surveys, most students remarked that the team approach to writing instruction has improved their writing skills and produced high overall satisfaction with the course. The research will continue into the second course in the sequence this spring.

## ELECTRICAL ENGINEERING

### FACULTY NEWS AND NOTES

In October, **Russell Deaton**, (BSEE '84) Associate Professor, and doctoral student, **John Rose**, visited the University of Tokyo to discuss Molecular Computing research with colleagues. Deaton gave a talk titled "Current Biomolecular Computing Trends in the United States," and Rose gave a talk on his Ph.D. work, "Statistical Thermodynamics of Error in a N-ary DNA Computing Mixture." Rose has been offered a post-doctoral research position for a year at the University of Tokyo.

The College has worked to provide recognition and competitive compensation for faculty. Engineering Professorships are three-year appointments and provide a salary supplement for the appointee. Most recently, Deaton was appointed the ECI Professor of Engineering. This professorship is supported by Stephen Olita (MSEE '76), President of Electronic Controls, Inc. of Collierville, Tennessee.

From June to August **Steve Griffin** was resident at the Stennis NASA facility near New Orleans. This facility conducts static tests on NASA and commercial launch vehicles, tests reusable subsystems, such as the space shuttle main engine, develops and implements remote sensing devices and applications, etc. The project conducted by Griffin included the identification and development of sensors for static test applications. He is continuing this work at the University.

In March, **Timothy Wilson** presented a paper at a joint meeting between the Acoustical Society of America and the European Acoustics. Also integrated into the meeting was the 25th German Acoustics DAGA Conference. He presented a paper titled "Cochlear Wavelength Representation of Acoustic Frequency Content." Simple models of the inner ear cochlea were presented with emphasis on furthering the understanding of frequency representations in the cochlea.

## COMPUTER ENGINEERING PROGRAM

The Department of Electrical Engineering has proposed to change its name to the Department of Electrical and Computer Engineering. This reflects the recent approval of a Bachelor of Science degree in Computer Engineering (B.S.Cp.E.) by the Tennessee Higher Education Commission. The objectives of the new program are to provide an in-depth education in hardware, software, and the integration of both aspects into a comprehensive package for students.

The Computer Engineering program is concerned with all elements of information processing. These include the application environment, paradigms for representing information and processing information, and tools for designing computer systems. Application environments in computer engineering address visualization of the results of computation and artificial intelligence. Numeric and non-numeric algorithms, symbol manipulation, and language processing are all models for representing information. Paradigms for processing information include distributed computing, software engineering, information storage and retrieval, hardware execution models, and neural networks. Design tools for computer systems such as CAD tools for trace routing are also included in the program.

## ENGINEERING TECHNOLOGY

### FACULTY NEWS AND NOTES

**Dean Smith**, Assistant Professor, presented two papers at the ASEE Annual Meeting. "A Revised Assembly Language Programming Course for a Computer Engineering Technology Program" was written with **Bob Douglas**, Associate Professor, and "A Computer Engineering Technol-

ogy Concentration for a Master of Science in Engineering Technology" was written with **Ron Day**, Chair and Associate Professor. Smith also attended the IEEE/ABET TAC Program Evaluator Education Workshop. **Hank Javan**, **Scott Southall** and **Lee Drouin**, Assistant Professors, wrote "A Computer Aided Design Program," which was also presented by Smith.

#### INDUSTRIAL INVOLVEMENT IN CURRICULUM DESIGN

Engineering programs continually strive to produce graduates prepared to enter the job market. The dilemma educators face is one of determining what knowledge base, skill set, and personal traits are currently required for graduates to be successful in a particular industrial environment. This information is typically acquired using industrial advisory committees, alumni surveys, and employer surveys. The Department has established a *DACUM Center* to facilitate a new methodology in curriculum design to help meet the new ABET EC 2000 criteria, the anticipated new TAC criteria, and to assist area industry in developing training programs.

The methodology is called the *DACUM process*, and it is useful for capturing this information and documenting it in a structured format called a DACUM chart. DACUM (**D**esigning **A** **C**urricul**U**M) is an innovative approach to occupational analysis. It is an effective method of determining the competencies needed for tasks that must be performed by persons employed in a given occupational area. It operates on the following premises:

- Expert workers are able to describe/define their jobs better than anyone else.
- Any job can be effectively and sufficiently described in terms of the tasks that successful workers in that occupation perform.
- All tasks have direct implications for the knowledge and attitudes that workers must possess to perform the tasks correctly.

The results from the DACUM analysis are a detailed portrayal of the skills/competencies involved in the occupation being studied. It can be used for curriculum identification and design. It also is an outcomes assessment tool that can be used to perform a gap analysis between an engineering program's curriculum and industry's need for a well trained workforce.

Recently, the Department of Mechanical Engineering developed a series of DACUM charts, each relating to a specific professional environment that employs a significant number of their graduates. The first chart identifies the duties and tasks of an engineer working in a manufacturing environment. Members of the departmental industrial advisory committee, with local manufacturing facilities, sent one of their engineers to serve on the DACUM panel. A trained facilitator conducted a structured interview of this panel where seven general areas of responsibility or duties were identified. As panelists discussed their job functions, useful pieces of information surfaced that the facilitator recorded on lists under the headings of general knowledge and skill requirements (of the job); worker behaviors (or desirable attitudes and traits); tools, equipment, and supplies; and future trends/concerns. Collectively, these charts will be a use-

ful tool for designing a curriculum to better prepare mechanical engineering graduates for professional success.

#### SME GRANT

**Scott Southall** recently completed implementation of a \$164,039 grant from the Society of Manufacturing Engineers (SME) Education Foundation. This grant is the latest in a series received from the Foundation, which totals approximately \$1.9 million in support of the Manufacturing Engineering Technology program.

The grant provided equipment funding for several projects, including the purchase of new computers and programming software for the Industrial Controls Laboratory. The grant also provided for new metallurgical specimen preparation equipment for the Industrial Materials Laboratory and funded the purchase of a benchtop CNC machining center and lathe.

**Paul Isbell**, of Southern Fabricators, Inc., provided funding for a three-ton punch press for use in the study of tool design and manufacturing processes. Students in Manufacturing Engineering Technology will use the CNC equipment to fabricate punch-and-die sets and forming dies for use with the press.

The grants received from the SME Education Foundation help students to have firsthand experience with current technology and to become proficient with the most up-to-date manufacturing techniques.

## GROUND WATER INSTITUTE

The Ground Water Institute (GWI) has undergone significant changes over the past year. The Institute has increased its presence in regional research with the aquifer systems of the Northern Mississippi Embayment and has established new relationships with the United States Geological Survey (USGS) in order to further develop research partnering at a regional level. The Institute has been active in seeking funding from USGS, the Tennessee Department of Environment and Conservation, the Shelby County Ground Water Quality Control Board, the National Science Foundation, the Environmental Protection Agency, and the American Water Works Association Research Foundation.

In the summer of 1999, **Stephanie Ivey** joined the GWI. Stephanie is working toward a Ph.D. in Civil Engineering with a focus in ground water resources. The GWI routinely utilizes undergraduate students to aid with developing and maintaining GIS databases.

The GWI has also sought to foster multidisciplinary research efforts in the area of ground water resources. Dan Larsen of Geology is working with the Institute on several research projects and continues to play an important role in the research at GWI. The Institute is also working with the Center for Earthquake Research and Information to better define the geologic stratigraphy of the regional area in a GIS database. The GWI has also worked with Scott Franklin in the Department of Biology to determine the hydrology of wetlands prior to dechannelization efforts.

## INDUSTRIAL AND SYSTEMS ENGINEERING

**Robin Lovgren** and **Mike Racer** recently had two papers accepted for publication. The first was submitted to ASCE's education journal and documents their success in getting students to understand and value group dynamics. The second focuses on finding a solution to the mixed-model-sequencing problem, a concern of many manufacturers. The focus of INSE faculty during the past year has been in the classroom. This is the third semester that the INSE Program has offered self-paced courses, which have been quite successful. Our statistics classes continue to benefit from the inclusion of a series of two-week mini-projects, which have been extremely useful in introducing students to the nuances of statistics, particularly the how-to, and recognizing when statistics can be employed successfully.

The undergraduate program has continued to grow, almost doubling in size with the new arrivals in September. In May, we will have our second and third graduates from the B.S. program: Ryan Hamlin and Nick Kayali.

## MECHANICAL ENGINEERING

### FACULTY NEWS AND NOTES

In addition to his research in mechanical design, **Teong Tan** is working on an externally funded project titled "Development of Animated Graphical Interactive Virtual Experiments (AGIVE) As Teaching Supplements Using Web Browser Java Programs." **Gladius Lewis** collaborated with Wright Medical Technology on optimizing conditions for cross-linking of ultrahigh molecular weight polyethylene, used widely in hip and knee implants. He also served on the Technical Review Panel for proposals submitted to the U.S. Department of Education under the Graduate Assistantship in Areas of National Needs program. **Srikant Gir** has been developing curricular materials on entrepreneurship in a technical environment. Over the past year our newest faculty member, **Gary Qi**, presented and published several papers on wavelet-based methods for NonDestructive Testing and has entered into a collaborative effort with researchers at the St. Jude Children's Hospital to develop innovative X-ray detection equipment. **John Ray** continues his collaboration with a local industrial partner to study the impact loading of the human foot during a normal walk. **William Janna** has continued his research on non-uniform melting of ice cylinders in air in addition to his responsibilities as the new Associate Dean for Graduate Studies and Research. In addition to continuing his research on microgravity processes, **John Hochstein** worked with a graduate student and colleagues from the Biomedical Engineering Department to modify a computational tool developed to simulate cryogenic propellant flows into a tool suitable for investigation of blood flow in life-threatening aneurysms. The first results of that research were recently published. **Ed Perry** authored a paper for the annual ASEE conference titled "Direct Com-

petency Testing—Is It For You," in which it was shown how a competency-based course program could improve the education process. **Jiada Mo** obtained external support to add combustion modeling to his list of ongoing research projects. He recently presented a paper titled "The Effect of Downstream Suction on the Delta Wind Leading-Edge Vortex" at the Eighth Asian Congress of Fluid Mechanics in Shenzhen, China. Continuing his history of bringing innovation into the classroom, **Sam Thomason** introduced several of his classes to new computational tools that support various aspects of flow and thermal analysis. He shared the results of this experience in a presentation titled "Using Computers in Teaching Gas Dynamics" at the annual ASEE conference. **Ed Lin** continues to make regular contributions to the literature on the optimal performance of helical gear transmissions. He has helped a local company redesign a product that will reduce friction and noise, and he continues to serve as Director of Engineering Technical Support for the College of Engineering.

### CURRICULUM DEVELOPMENT

Our curriculum development project marches on! A significant event this fall has been a DACUM workshop, conducted for the department on September 14 and 15 by the new DACUM Center (see Engineering Technology article in this issue), to identify the knowledge base, skill set, and personal traits expected of our graduates who choose to pursue their careers in a manufacturing environment. Although we believe this is the first time it has ever been used to support curriculum development for an undergraduate mechanical engineering program, DACUM is a formal process for acquiring this type of information, which has evolved over the past 30 years and has proven to be very successful for a wide range of occupations. The faculty are currently reviewing the task descriptions and performing a gap-analysis to determine what modifications should be made to our curriculum to better prepare our graduates for a career in this field.

The department plans to conduct another workshop this spring to help define the needs of another environment in which our graduates pursue their careers. The goal is to assemble, through a sequence of workshops, a set of DACUM charts that will help the department accurately ascertain the true needs of prospective employers of our graduates. We hope that our alumni will choose to play an important role in this project. The faculty will acquire the data required for informed decisions that will best serve our students. Alumni who wish to help in any capacity, or who would like to contribute to this process in any way, should contact the department chair (901-678-2173, [jhochste@memphis.edu](mailto:jhochste@memphis.edu)).

### STUDENT PROJECTS

Our faculty remain active in pursuing research agendas, and contributing to advances in engineering education. One example of external recognition of the quality of our programs is the AIAA Abe Zarem Award won by Jeff Marchetta. Our undergraduate enrollment has remained approximately flat for the last few years, but we have enjoyed a whopping 100 percent increase in full-time and part-time graduate enrollment. Our Departmental Honors program has contin-

ued to develop, and our first graduate of that program received his diploma at the August '99 commencement. Our student groups continue to be involved with local activities and participation in regional and national events. All aspects of department life have enjoyed growth over the past year as our faculty and students strive to build on the successes of the past to produce a bright future for the department.

#### ENGINEERING STUDENT WINS NATIONAL AWARD

A Mechanical Engineering graduate student has won a prestigious national award for a study that may lead to new ways of designing fuel tanks in space vehicles.

**Jeff G. Marchetta**, who is now working on a doctorate in Mechanical Engineering, will accept the Abe Zarem Award for Astronautics in January, during the annual meeting of the American Institute of Aeronautics and Astronautics. He conducted his award-winning research while working on his M.S. degree. John Hochstein, Chair, served as Marchetta's faculty advisor.

The Zarem Award was established in 1987 to recognize outstanding graduate students for work in aeronautics and astronautics. Two awards are given annually in this national competition, one for aeronautics and one for astronautics. The awards include a bronze medal, and selection is based on originality, technical merit, and practical application.

Marchetta's winning entry was titled "A Computational Model of Magnetic Positive Positioning of a Paramagnetic Fluid in Reduced Gravity." Hochstein said the study dealt with the feasibility of using magnetic fields to position cryogenic (supercooled) propellants in spacecraft tanks. Under zero gravity conditions in space, the propellant can move around within the fuel tank. During certain times, such as when lighting a main engine, the fluid must be in a particular location within the storage tank. Although there are existing techniques for controlling the fluid location, a magnetic field might prove to be a more efficient method.

The research was sponsored by the National Aeronautics and Space Administration's Marshall Space Flight Center in Huntsville, Alabama. Hochstein and Marchetta are now expanding the work to examine the effects of magnetic fields on tanks of varying sizes and shapes.

#### FORMULA SAE CAR

Mechanical Engineering students and a recent graduate are working to design and build a Formula SAE car for competition with student-built cars from other schools at the Mini-Indy Competition. **Lentz Gatlin**, **Roy Lim** and **Allen Myrvik** are working on the car and plan to have it ready for the May 2000 race in Detroit. The Formula SAE race is sponsored by General Motors, Ford, Daimler-Chrysler, and the SAE. There are a variety of events: Autocross Endurance, Autocross Sprint, Skid Pad Test, Acceleration Test, and Cost & Design Competition. The vehicle is powered by a supercharged, modified, Honda 400 cm<sup>3</sup> fuel-injected engine that delivers about 70 hp. The Memphis vehicle is expected to be a top performer among the 90-plus competitors.

Most top school teams have budgets ranging from \$30-\$40,000. Thus far, the Memphis team has raised \$17,000 and has most major components in place. In addition to the Col-

lege of Engineering, supporters of this project include Autozone (a major supporter), Hypertech, Competition Cams, Godman Enterprises, B & R Gear, Powder Coating Specialists, Cummins Diesel, and a number of individual contributors.

## ENGINEERING ALUMNI

#### ALUMNI CHAPTER

This has been a year of change for the Engineering Alumni Chapter Board of Directors. To coincide with the U of M Alumni Association, the term for officers was changed from May-April to January-December. Thus, my term as President was extended until the end of 1999, so you get another message from me!

Beginning January, 2000 your Board President will be Bob Rogers (BSME 1982, MSINSE 1989). Please support Bob as he leads the Board into the next millennium (which, of course, we all know doesn't *really* start until 2001). As an alumnus of the Herff College of Engineering, you are automatically a member of the Engineering Alumni Chapter. The Board of Directors is the governing body for the Chapter. I encourage you to join the Board and help us achieve our mission: to strengthen the relationship between the engineering alumni and the various disciplines within the Herff College of Engineering in order to effectively support the priorities of the University and the College. Board participation requires only 8-10 hours per year, and provides a valuable opportunity to interact with other engineering alumni and community leaders, and to actively support the College and University.

The Board serves as the planning group for the two major events sponsored each year by the Engineering Alumni Chapter: an alumni reception in the fall and an awards banquet in the spring. In spring 2000, the Alumni Chapter will present the Outstanding Engineering Alumni Award at the second Annual Engineering Awards Dinner. This award is given to a U of M Engineering alumnus who has demonstrated outstanding achievement in personal and professional activities, academics, research activities, community involvement, or service.

For information on joining the Engineering Alumni Board, or for more details on award criteria, and to submit nominations, contact Christine Sturm Kirk at [cskirk@memphis.edu](mailto:cskirk@memphis.edu) or (901) 678-4374.

**Barbara A. Wilson, President**

#### ALUMNI NEWS

This section reports information on the careers and families of graduates of the Herff College of Engineering so you can keep up with classmates that you knew while you were here. Just as you like to receive information about your classmates, they would like to know what's happening in your life. Please fill out the form on the back page and return it back to the College. We want to hear from you!

### 1970s

**Larry McDaniel** (BSCE, '73) is Program Manager of Storm Water Quality for the City of Dallas. He was named Texas Public Works Leader of the Year in 1997. His division recently won the EPA Environmental Excellence Award.

**Jim Lewallen** (BSET, '74) is Senior Project Manager for Promus Hotel Corporation. He received the President's Award during the third quarter of 1998.

**William Hagerman** (BSCE '74), President and CEO of ETI has been appointed to the Herff College of Engineering Advisory Council.

**Benny Lindermon, III** (BSCE '75, MSCE '79) has served as the Director of Public Works for the City of Memphis since 1988. Lindermon will leave City Hall early next year to head a new private, nonprofit corporation devoted to developing the Memphis riverfront.

**Calvin Williams** (BSME '76) is currently affiliated with The University of Memphis Small Business Development Center.

**Dennis C. Elrod**, (BSET, '77; MSTE, '83) is a project architect/quality assurance specialist for Hnedak Bobo Group, Inc. He was recently appointed secretary for the Memphis chapter of AIA.

### 1980s

**Elizabeth A. Healy** (BSEE, '88) is now with Worldwide Strategic Sourcing at Ingersoll-Rand in Mooresville, NC.

**Kevin Crowe** (BSME '89) is currently working as a Senior Manufacturing Project Engineer for Dura Automotive Inc. (Hannibal, MO), a major supplier for automotive controls and mechanisms. Crowe's responsibilities include powertrain and transmission controls for several automotive platforms.

### 1990s

**Shawn Holladay** (BSEE, '90) is employed by TCI in Englewood, CO.

**Matthew K. Jones** (BSET, '92) is a flight instructor for the U. S. Navy. He recently completed a three-year assignment in Japan flying the E-2C Hawkeye. He now resides in Pensacola, FL with his wife, Sarah.

**Jeff Jones** (BSET, '93) is Engineering Manager for Lowes Foods in Winston-Salem, NC. He is responsible for their \$20-million capital building program.

**Erin Foraker** (BSME '95) left the Tennessee Valley Authority, and recently took a position as a Mechanical Engineer with the U.S. Bureau of Reclamation working in Operations and Maintenance on their hydroelectric dams.

**Shauntell L. (McGee) Harper** (BSME, '96) is Packaging Development Engineer for Smith & Nephew, Inc. She was promoted to Level II Engineer in July 1998 and was married in August 1998.

**Michael Morton** (BSME '97) is a Senior Liaison Engineer employed by the Boeing Commercial Airplane Group in Wichita, KS. As a member of the Materials Review Board, Morton is responsible for Support Operations.

**Michael L. Smith** (BSME, '99) is enrolled in the graduate Biomedical Engineering program at the University of Virginia, Charlottesville.

**Gary Bledsoe** (Ph.D. '99) recently accepted a position as Assistant Professor of Biomedical Engineering at Saint Louis University.

**Marcel Roy** (Ph.D. '99) has been appointed as a Research Associate in Biomedical Engineering at the Herff College of Engineering.

### College Administration

Dr. Richard Warder, Dean  
Dr. Charles Bray, Associate Dean  
Dr. William Janna, Associate Dean  
Ms. Carol Ferguson, Academic Advisor  
Dr. Jerry Anderson, Director, Ground Water Institute  
Ms. Christine Kirk, Director of Development  
Dr. Paul Palazolo, Director of Recruiting/Retention  
Dr. Ed Lin, Director of Engineering Technical Services

### Department Chairmen

Dr. Vincent Turitto, Biomedical Engineering  
Dr. Martin Lipinski, Civil Engineering  
Dr. Babajide Familoni, Electrical Engineering  
Mr. Ronald Day, Engineering Technology  
Dr. John Hochstein, Mechanical Engineering

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Herff College of Engineering  
The University of Memphis  
201 Engineering Admin Bldg  
Memphis, TN 38152-3170

Or send by FAX to (901) 678-4180.

Editor: William S. Janna  
Newsletter Contributors: College Newsletter Committee,  
Department Chairs, faculty and staff

# Alumni Feedback

Mail to: Herff College of Engineering, The University of Memphis; 201 Engineering Admin Bldg; Memphis, TN 38152-3170

Name \_\_\_\_\_ Degree(s) \_\_\_\_\_ Year(s) Graduated \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Home Telephone \_\_\_\_\_ Work Telephone \_\_\_\_\_

Employer \_\_\_\_\_ Position \_\_\_\_\_

Position Responsibilities \_\_\_\_\_

Recent Accomplishments \_\_\_\_\_

What information would you like to see in *Herff Highlights*? \_\_\_\_\_

I would like information on the following:

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- Donating equipment and other gifts-in-kind to the Herff College of Engineering
- Establishing a matching gift program with my employer

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Enclosed is a check in the amount of \$ \_\_\_\_\_ to the Herff College of Engineering.

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