Safety and ergonomics programs thriving

The Occupational Safety and Ergonomics (OSE) and Occupational Injury Prevention Research Training (OIPRT) programs had a very successful 04-05 academic year. One doctoral and five master’s students were graduated, four of whom transitioned to jobs as practicing safety professionals and one master’s student continued on to a doctoral program. Student participation in national professional conferences was the best ever, with our students receiving recognition from the American Society of Safety Engineers and the Institute of Industrial Engineers.

During the summer semester our students interned with Xerox Corporation in Rochester, N.Y, Delta Airlines in Atlanta, and U.S. Pipe Company in Birmingham. Fall semester brings three new master’s and three new doctoral candidates who are studying in the OSE/OIPRT areas and increase our graduate student population to 10 doctoral and 15 master’s students.

On the faculty side, we of course are still reflecting on the tragic and untimely passing in February of Brian Carnahan, but his legacy continues in his influence on students and fellow faculty, and in the many unique research thrusts he began while with us.
Faculty changes for the 05-06 academic year include the transitioning of Jerry Davis from a research to a tenure-track position, the addition of Lewis Payton as an assistant research professor, and Nathan Dorris as a visiting assistant professor. Davis will serve as the research director for the OSE and OIPRT programs, while Payton will teach our Biomechanics graduate course and direct research in that area. Dorris will teach our Human Factors Engineering graduate course and supervise research in that area. Professor Rob Thomas begins his 10th year as director of the OSE/OIPRT programs.

Finally, our federal grants supporting both the OSE and OIPRT programs have been renewed and will provide support for both students and faculty for the current academic year. Along with programs from the Schools of Public Health and Nursing at the University of Alabama at Birmingham, our program comprises the Deep South Center for Occupational Health and Safety, one of 16 Education and Research Centers nationwide established by the Centers for Disease Control/National Institute for Occupational Health to prepare individuals to participate in the nation’s professional safety practice and research communities. This center affords our students an excellent educational experience and brings outstanding students, research initiatives and exposure to Auburn’s Department of Industrial and Systems Engineering.

Message from the chair

We are embarking on our 76th or so fall term as a department and probably not much has changed since you were a student here. There is a myriad of class changes and adjustments, a scurrying for office space, a battle for parking and a number of dazed faces (often, including those of faculty!) throughout campus. There is also incredible energy as we welcome new folks to the Auburn family, catch up with those we haven’t seen for a few months and gear up for classes and football (or is it football and classes?).

Our spring 2005 graduating class made out well in the employment market (see exit survey within). Demand for Auburn industrial and systems engineers is strong across all business sectors — manufacturing, transportation, government, utilities and service. I tell prospective students and their parents that one of the greatest advantages of an ISE degree is its usefulness in almost any employment venue. Our students take jobs from managing a shop floor team to international technical marketing to data analysis and systems optimization.

One hot area remains that of quality, and more specifically, total quality management and the six sigma concept. To support this, we are implementing an exciting and novel opportunity for our students — to earn their six sigma green belt certification during their senior year. Victoria Jordan, instructor, is becoming a certified black belt and will develop a follow-on course to INSY 4330, our required senior course in quality control, to be taught during spring 2006, that will further cover six sigma and lead to green belt certification. We owe a big thanks to Rick Reynolds, ISE Alumni Council member and leading quality consultant, for helping to make this happen.

If you travel to the Plains for a game this fall, please consider dropping by Dunstan Hall. It is always a pleasure for faculty, staff and students to see alumni and learn about the paths they have traveled since receiving their IE, IM or ISE degree from Auburn.
Alumna writes from Kennedy Space Center

I am from a family of proud Auburn alumni and my father graduated with an electrical engineering degree. He shared his love of math, science and Auburn University with me.

My experience at Auburn, specifically the bachelor's degree in industrial and systems engineering I received in 1990, has been extremely beneficial to my work at NASA. During my early years in Space Shuttle Operations, I was able to apply industrial engineering fundamentals to numerous process redesign and improvement initiatives required to make testing and checkout of the orbiter system more efficient and cost effective.

I work in the International Space Station (ISS) and Payload Processing Directorate and continue to use my experiences and education as our team performs numerous tasks related to the test, checkout and processing of ISS elements, resupply modules and research experiments.

The ability to design systems and processes that effectively bring together resources, both people and hardware, and perform complex operations is fundamental to the work accomplished at the Kennedy Space Center (KSC). Industrial and systems engineering prepared me to analyze a system as an entity and as its respective components. This perspective continues to have unique and diverse applications throughout the operations at KSC, from ground processing operations on the space shuttle to integration and test activities for the ISS. In addition, future NASA exploration initiatives, including returning humans to the moon and landing the first humans on Mars, will require developing and adapting new processes across all project phases and disciplines.

The industrial and systems engineering education and experience I received at Auburn has contributed to the success I've experienced at NASA, and I look forward to its future application as we journey back to the moon and beyond. War Eagle!

Dorris returns to AU as visiting professor

Nathan Dorris, vice president and principal of Dorris and Associates, Inc. in Atlanta, has accepted the position of part-time visiting assistant professor for 2005-06. He has a doctorate and a master's degree in industrial and systems engineering from Auburn and a bachelor's degree in management from Georgia Tech.

Dorris is a human factors specialist who studied under the late Brian Carnahan, former Auburn ISE associate professor. His primary interests include the design and implementation of research pertaining to the usability, comprehensibility, and overall effectiveness of safety messages by end users.

Dorris is teaching INSY 7080, Human Factors, during fall term. He will also serve on graduate committees and participate in miscellaneous educational activities throughout his appointment.

"I was very pleased that Dr. Smith and the rest of the ISE faculty took my offer to help out seriously," says Dorris. "It will be personally gratifying to assist in the academic and research missions of the department, and I am truly excited by this opportunity to rejoin the ISE family at Auburn."

On a more personal note, he adds, "I married my beautiful wife Linda in April and rooted for my alma mater at the Auburn/Georgia Tech football game."
Caspar takes seat on ISE alumni council

The Department of Industrial and Systems Engineering is pleased to announce the addition of Kathryn Caspar to the ISE Alumni Council. Caspar, formerly Kathryn Gardner, is a 2001 Auburn ISE graduate who as a student worked as an ISE student recruiter. Now employed as a manufacturing variance program division specialist for Cooper Lighting, a division of Cooper Industries, in Peachtree City, Ga., she previously held positions of manufacturing engineer, production supervisor, and production planner at divisions of Cooper in Sumter, S.C. and Black Mountain, N.C.

Cooper Industries — a leading worldwide manufacturer of electrical products, tools and hardware — manufactures thousands of products through its seven electrical products divisions, which generate more than 80 percent of annual revenues, and its two tool divisions, which produce power tool and hand tool lines. Headquartered in Houston, Cooper has annual revenues of approximately $4.1 billion, employs more than 28,000 people and operates more than 100 manufacturing facilities around the world.

Cooper Lighting is the largest division within Cooper Industries, representing 40 percent of all revenue and cost of goods sold. Cooper partnered with The George Group Consults to develop its own Six Sigma/Lean Manufacturing Program. Caspar has been certified as an MVP Expert — the equivalent of an advanced black belt. She is responsible for working with 10 manufacturing facilities (seven domestic and three in Mexico) on cost and inventory reduction projects with a goal of saving $16.5 million dollars this year. She also assists with teaching and coaching new green belt training sessions and coordinates Kaizen events at all Cooper Lighting facilities.

Caspar is a native of Bear Creek, Ala. and is married to Mark Caspar, a civil engineering alumnus of the University of Louisville. They enjoy mountain biking, hiking, and camping with their two dogs. They are active in their local church and enjoy teaching Sunday school, and of course, would never miss an Auburn football game.

ISE looks forward to Caspar’s contribution to the council. She can be contacted at kcaspar@cooperlighting.com.

Student travels for NSF research program

Richard Ivey, a junior in industrial and systems engineering from Huntsville, spent the summer at the University of Oklahoma in a Research Experience for Undergraduates (REU) Program, funded by the National Science Foundation (NSF) and affiliated with Shivakumar Raman and the University of Oklahoma’s School of Industrial Engineering.

The focus of Ivey’s research was to assist in the development of a wireless sensor network that will detect dangerous traffic conditions such as ice and moisture. The REU program provided hands-on research experience and an opportunity to share work experiences with students from other universities.

The 10 participants from universities across the nation, from Harvey Mudd College in California to Worcester Polytechnic Institute in Massachusetts, were involved in activities including an individual project, a team-based project, workshops, seminars, laboratory tours and industrial tours. Faculty from various engineering disciplines at the University of Oklahoma sponsored an individual research project on which the students focused a majority of their time. Ivey was selected to work with the Civil Engineering Department on calibration and testing of wireless sensors that will be used to detect road conditions, which is being developed for the Oklahoma Department of Transportation under the direction of Jinsong Pei.
The network is comprised of three sensors, nodes that communicate the information from each of the sensors, and a laptop that gathers the information. The three sensors are a temperature sensor, an ice sensor, and a moisture sensor, and each is integrated on a sensor board and sends information to a corresponding node. The node then sends the information throughout the network until it is received by the laptop, or base station.

The phase of the project in which Ivey was involved was the calibration and testing of each of the sensors, achieved by placing the sensor board inside an environmental chamber and using LabVIEW to extract the voltage output of each sensor at various temperatures. An optimal algorithm was then defined for the detection of various conditions of the road. Each sensor board is housed inside a casing that Ivey then tested for durability by driving over it with different weighted cars to simulate the pressure that would be exerted on the casing if it was to be run over. The system will eventually be located on the pavement to the side of the road in order to decrease traffic interference with the wireless signal. Therefore, damage to a casing will not come into play unless a car was to pull over to the side of the road or run off the road.

The group project in which Ivey was involved was the design of a computer program that will aid a user in selecting the proper metrology equipment given a list of parameters. The project involved researching different types of metrology equipment on the market and implementing a program that asks the user specific questions about the application of the equipment. After posing five to 10 questions to the user, the program will reply with the optimal metrology equipment to use.

The REU program provided Ivey with practical research experience and the use of many tools he believes will enhance his education. He assisted in the progression of the wireless sensor network that will be deployed by the end of 2006 and may be published for his efforts. If you have any questions or comments about this research or Ivey’s experiences, please contact him at iverya@auburn.edu.

Alumna Downs reports from post in China

Andrea Downs (formerly Ryburn) is a 1995 Auburn ISE graduate who went on to earn an Outstanding Engineering of the Quarter Award. In 1989 she began employment with Intel, and over the past 15 years has worked her way up to Chengdu Microprocessor Organization Factory industrial engineering department manager.

“I have always believed that life is a journey of unexpected adventures,” says Downs. One of those adventures is her current tenure in Chengdu, China, working on Intel’s construction team to finish the building design for its newest assembly and testing facility, expected to be operational within two years. Her responsibilities include optimizing factory layout, capital planning, equipment forecasting, order and delivery, and ensuring that output will run as expected.

As Downs experiences new things overseas, one of her mottos is “The sky is the limit, so have some fun, because we only live once.”

Richard Ivey, a junior in industrial and systems engineering from Huntsville, participates in a Research Experience for Undergraduates Program at the University of Oklahoma this past summer.

Andrea Downs holds a red panda in China, where she is employed with Intel.
Faculty attend institute in Quebec City

Kevin Gue and Emmett Lodree, professors of industrial and systems engineering, recently attended the Material Handling Teacher’s Institute hosted by the University of Laval in Quebec City, Canada. The biennial event is designed to bring professors up to date on the latest teaching tools for courses involving material handling. Auburn University was represented by Gue’s presentation on High Density Warehouse Storage Systems.

In addition to presentations on curricula and lecture material, this year’s institute featured two interactive web-based games, one involving supply chain coordination and the other addressing facility layout, in which Gue placed first among approximately 30 professors and industry leaders, and will use in his graduate course in Manufacturing Systems.

The institute also included sessions related to supply chain management and featured speakers from both the hardware and consulting industries. It provided resources including software, case studies, and company contacts that Lodree will integrate into his graduate course in Production and Inventory Control Theory.

Emeritus Black named fellow of ASME

The American Society of Mechanical Engineers has named J T. Black, professor emeritus of industrial and systems engineering, a fellow, citing his pioneering work in the use of transmission and scanning electron microscopy to metal cutting and his fundamental contributions to the dislocation theory of metal cutting.

Black performed the first metal cutting experiments inside a scanning electron microscope and performed the first high voltage transmission electron microscopy of dislocation structure in machining chips.

In 1998 he was named a fellow of the Society of Manufacturing Engineering (SME), in 1999 a fellow of the Institute of Industrial Engineers, and in 2004 was awarded the SME Education Award. At Auburn he teaches a combined undergraduate and graduate course in lean manufacturing.
ISE hosts Civil Air Patrol campers

Occupational Safety and Ergonomics doctoral candidates Adam Piper and Rani Muhdi from Auburn and Eric Cho from Jinhae, South Korea spent a recent Friday afternoon demonstrating the importance of human factors engineering to a group of Civil Air Patrol (CAP) high school students visiting AU from across the nation.

Muhdi and Cho discussed the importance of evacuating people from various structures and events, and how such factors need to be accounted for in the design of facilities and manufacturing environments.

Piper introduced the students to human performance measurement techniques via an interactive session with the department’s Balance Master System, used to study occupational accidents involving falls from elevations. Jerry Davis, ISE assistant professor, guided a grip-strength demonstration emphasizing the principles involved with designing items such as tools and equipment while taking into account variability between end users.

All three activities were well received by the CAP camp students. For their time and effort, the officer-in-charge presented the ISE participants with commemorative shirts and cups.

Students earn scholarships

Scholarships awarded to ISE students for the 05-06 academic year total approximately $125,000. Congratulations to:

Kathleen Abercrombie
Taylor Beasley
Ryan Briley
James Christakos
Emily Curtis
Robert Daugherty
Jessica Davis
Andrew Dillon
Megan Disbrow
Lindsey English
Jamie Floyd
John Frost
Mary Graham
Allison Haack
Jamison Hicks
Patrick Johnson

Samuel Kerr
Kristen Kozlowski
Brian Krogsgard
Heather Layne
Sara Mason
McKenzie Mayo
Robert Meador
Charles Mitchell
Richie Nagel
Andrew Phelps
Michael Porter
Matthew Preston
Jane Spinks
Bradley Townson
Amy Zeh

We are grateful to their donors:

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Hutchinson
IIE
Material Handling Education Foundation
Payne Family
Raymond and Eleanor Loyd
Samuel Ginn College of Engineering
Thomley/AL Power
Camp sparks youth’s interest in engineering

In July, the Department of Industrial and Systems Engineering participated in Teams and Individuals Guided by Engineering Resources (TIGERs) camp, hosted by all departments in the Samuel Ginn College of Engineering.

ISE’s program encouraged middle school students to look at fundamental concepts that affect engineering as well as applications that occur within ISE. They participated in a rotation lab in which groups of four students visited eight stations that focused on properties of metals through the exploration of conductivity, solubility and malleability; research being performed in the Center for Advanced Vehicle Electronics (CAVE); and aspects of ergonomics. They also learned to sweat copper pipes and solder on a basic electronic kit.

In the CAVE lab, students were introduced to thermal cycles, participated in testing for failed circuits, and were shown how circuit boards are created and analyzed by CAVE. Finally, two stations on ergonomics allowed the campers to learn how balance and hand grips or triggers are researched, and to interact with the research mechanisms.

ISE hosted a day of the weeklong TIGERs camp held on the Auburn campus in July. This camp aims to give seventh and eighth graders a jump start in the field of engineering.
Carnahan endowment for scholarships established

The Dr. Brian J. Carnahan Memorial Endowment for Scholarships in Industrial and Systems Engineering has been founded to honor the late Brian Carnahan, ISE associate professor who died earlier this year. A tribute to his dedication and excellence as educator and mentor, the endowment has been established by leadership gifts from Mr. and Mrs. David Carnahan and family, Dr. and Mrs. Robert Thomas, Dr. and Mrs. Jerry Davis, and Dr. and Mrs. Nathan Dorris.

Carnahan was born February 18, 1966 in McKeesport, Pa., the second of three sons born to David and Mary Jane Carnahan. At the time of his death on February 22, he was married to the former Paula Rendulic, also of McKeesport, and is the father of three children, daughter Megan Jean, three, and identical twin boys William David and Nathaniel James, 1 1/2.

Carnahan is a 1984 honors graduate of Elizabeth Forward High School in Elizabeth, Pa. who went on to undergraduate work at Penn State University, graduating in 1988 with a Bachelor of Science with honors. While attending the university, he was a member of Sigma Phi fraternity and received his first technical publishing honors as an undergraduate student.

In fall 1988 he was accepted into the graduate studies program at the University of Massachusetts, from which he graduated in spring 1991 with a master’s degree in industrial engineering and operations research with an emphasis on ergonomics. He then accepted a position as industrial engineer and ergonomist with the U.S. Department of Labor in Washington, D.C., which he left in 1995 to pursue a doctorate in industrial engineering at the University of Pittsburgh. In 1999 he accepted a faculty appointment in the Department of Industrial and Systems Engineering at Auburn, and this year was granted tenure and promoted to associate professor.

We encourage you as alumni and friends of the department to contribute to this endowment. Not only will you be honoring the memory of a fine young professor who died too soon, but you will also be benefiting current and future deserving ISE students who are chosen as Carnahan Scholars.

Contributions of any amount can be made by check, payable to Auburn Foundation for the Brian Carnahan Memorial Endowment for Scholarships Fund and sent to Carrie Leland, 107 Ramsay Hall, Auburn University, AL, 36849.
ISE captures exit data

Each graduating ISE student is asked to complete a survey and participate in an exit interview with the department chair. Following is the data (not formally validated) based on 45 baccalaureate, master’s, and doctoral graduates of spring 04 to spring 05:

**Undergraduate (B.I.S.E.)**

- Male/female graduates: 27/18 (ratio 3/2)
- Average cumulative GPA: 2.91; average major GPA: 3.00
- Student entered ISE as (percent): freshman (38); sophomore (31); junior (18); senior (7); no response (6)
- Student home state (percent): Alabama (73); Georgia (13); other southeastern state (9); other (5)
- Former majors of the 22 students who transferred to ISE (percent): computer engineering, software engineering, wireless engineering (27); mechanical engineering (23); electrical engineering (18); chemical engineering (14); other (18)
- How student was introduced to ISE (percent): friend/classmate (24); relative (20); personal research (14); advisor (11); CWE/E-Day (11); intro course ENGR 1100/1110 (11); colleague (7); professor (2)
- Of those who responded, 18 percent participated in Auburn’s cooperative education program and 58 percent had interned.
- Of those who responded, do they anticipate furthering their education? (percent): within three years (44); within five years (28); within one year (18); other (10)
- Average number of job interviews (5.0); average number of offers (1.9); average number of months spent interviewing (4.1)
- Starting salaries: average ($48,817); minimum ($40,000); maximum ($77,000)
- Signing bonuses: average ($5,444); minimum ($0); maximum ($20,000)

**Graduate (M.I.S.E., M.S., Ph.D.)**

- Male/female graduates: 16/3
- Average cumulative GPA: 3.56
- Studies (percent): on campus (79); through video-based education (16); no response (5)
- Previous degrees (percent): industrial and/or systems engineering (42); mechanical engineering (26); other (21); no response (11)
- Previous institutions (percent): in-state (21); out-of-state (42); international (32); no response (5)
How student became aware of Auburn’s ISE graduate program (percent): friend (5); family (11); research (63); undergrad at Auburn (11); other (10)

Country of citizenship (percent): U.S. (58); other (42)

Submitted technical writings for publication (percent): yes (63); no (37)

Assistantships (including GTA, RA, TA) (percent): yes (74); no (26)

Further plans (percent): full-time with current employer (21); new full-time employment (42); further graduate school (32); undecided (5)

Current employers of graduate students: Electro Scientific Industries, EMI CMG (music company), Auburn Technical Assistance Center, UPS

Average number of job interviews (of five responses): 3.6

Average number of job offers (of six responses): 1.5

Average number of months spent interviewing (of six responses): 6.8

Companies who hired our graduates: Protective Life, Hubbell Power Systems, University of San Diego, Milliken, Accenture, family business

Starting salaries: average ($58,400); minimum ($51,500); maximum ($75,000)

May inductees to the Auburn chapter of the national industrial engineering honor society Alpha Pi Mu, advised by Rob Thomas, ISE professor, include 10 undergraduates and four graduate students:

First row from left: McKenzie Mayo, Jessica Davis, Emily Curtis, Pinar Kaymaz and Henry Lamberth
Second row from left: Ryan Briley, Josh Jones and Jamison Hicks
Third row from left: Haluk Yapicioglu, Harish-Krishna Ramaswamy and Paul Crane
Inductees not shown: James Benton, Heather Layne and Victoria Jordan
Jeremy Estes, a senior in industrial and systems engineering from Birmingham, was one of 15 students, alumni and faculty members who participated in a golf tournament in April to support the Dr. Brian Carnahan Family Fund. Hosted by the Auburn student chapter of the Institute of Industrial Engineers, the event raised $350. The first place team was Chan Park, Patrick Seay and Talley Holman; second place Jeff Smith, Elliot McBride and Charles Mitchell. Prizes awarded to all participants were donated by the Central Alabama IIE Chapter, Southern Company, J&M Bookstore, and Cub Cuts. Given the success of the first, another tournament is scheduled for the current academic year.

Alumni listserv

Join the IM/IE/ISE alumni e-mail listserv by visiting:
www.eng.auburn.edu/ie/alum.html

The ISE Newsletter is published twice yearly by the Department of Industrial and Systems Engineering. Mailing and e-mail address changes, news items, and suggestions should be sent to 207 Dunstan Hall, Auburn University, AL, 36849-5346 or aesmith@eng.auburn.edu.

www.eng.auburn.edu/ise