



# ie.

Department of Industrial Engineering

## New! Six Sigma Training

Clemson's IE Department takes great pride in announcing the debut of its Six Sigma Training and Certification Program, which provides the state of South Carolina with the first university-driven program of this type. Six Sigma is a business philosophy for executing and sustaining ideal business performance by going beyond simply the application of statistics and quality improvement tools to achieve significant financial results. The Six Sigma methodology pinpoints and removes inconsistencies in the manufacture and delivery of products and services, resulting in fewer defects.

The IE Department would like to extend an invitation to all of its alumni interested in obtaining the training necessary to support your company's Six Sigma initiative to participate in Clemson's new Six Sigma Training and Certification Program. Our course offerings include:

Six Sigma Green Belt: Fall 2005

Design for Six Sigma: Fall 2005

Six Sigma Black Belt: Coming in 2006

For more information about our program offerings or to enroll, please visit our web site at [www.ces.clemson.edu/ie/sixsigma](http://www.ces.clemson.edu/ie/sixsigma) or give us a call at

864-650-QUAL (7825)

We look forward to working with you and your organization in the future!

## Supply Chain Initiatives



Many companies today are discovering that integrated control over larger segments of their supply chain can both increase profits and improve competitiveness. *Business Wire* reports, for example, that a Deloitte survey of 600 companies in 22 countries revealed that only 7% effectively managed their supply chain, but these 7% had 73% greater profit margins. Two initiatives have been undertaken within the Department to provide companies with products and services that allow them to better manage their supply chains and realize these bottom line benefits.

The Clemson Institute for Supply Chain Optimization and Logistics (CISCOL) is an interdisciplinary institute consisting of faculty and students from the colleges of Engineering and Science, Business and Behavioral Science, and Agricultural, Forestry and Life Sciences. CISCOL will promote research and educational activities on production planning, inventory control, scheduling, distribution, and logistics within the supply chain with a focus on providing tangible products and services to our industrial partners. The Institute's inaugural event was a seminar in April by Michael Jones, Vice President for Global Integrated Operations, Supply Chain Networks, and Lucent Technologies. The real "coming out" party, however, will occur in the fall with a one-day seminar that will feature workshops and seminars from supply chain leaders.

Clemson is also in the process of becoming a research site of the Center for Engineering Logistics and Distribution (CELDi). CELDi is a multi-university, National Science Foundation sponsored Industry/University Cooperative Research Center that was created to develop integrated solutions to logistics problems through research related to modeling, analysis, and intelligent-systems technologies. Clemson will join current university members Arkansas, Oklahoma, Oklahoma State, Louisville, Florida, and Lehigh as well as many top corporations and federal agencies who are industry members like Air Force Research Laboratories, ConocoPhillips, Burlington Northern/Santa Fe Railway, ConAgra Foods, E & J Gallo Winery, FAA, General Motors, Halliburton, Raytheon, Tyson Foods, UPS, Wal-Mart Stores, and Yellow Freight System. CELDi has been successful, in part, because of its straightforward value proposition. In exchange for an annual membership fee, companies work with a faculty member and graduate student on a company-specific problem and they gain access to the fundamental research results from all projects being performed by all CELDi universities. Last year, for example, these research expenditures exceeded \$2M so while all projects are not applicable to all companies, the vast majority report that it is this leveraging of R&D dollars that keep them renewing their memberships every year.



Picture obtained: [www.esri.com](http://www.esri.com), July 13, 2005

More information can be obtained by contacting William G. Ferrell at 864-656-2724 or [fwillia@ces.clemson.edu](mailto:fwillia@ces.clemson.edu).

## Message from the Chair

The past semester has brought about a number of positive changes in the department, ranging from renovations to the departmental ergonomics laboratory to the creation of the Clemson Institute of Supply Chain Optimization and Logistics (CISCOL) and the initiation of a new Six Sigma training and certification program. In addition, we have added three new courses to our on-line offerings, Supply Chain, Engineering Economic Analysis, and Industrial Safety; not only do these classes address student requirements but they also provide continuing education opportunities for our industry partners. In this issue we highlight these improvements and focus on various outstanding players within our IE community.

Our undergraduate and graduate student enrollments continue to rise as does the number of students participating in the joint undergraduate-masters degree program. As this growth continues, I would like to emphasize how important your support is to its success. Without you, such innovative programs would not be possible.

As always, I welcome the opportunity to visit with you, whether you are a student, alumni, collaborator, or you simply wish to learn more about what our department can do for you. So, please, come by when you are on campus. I look forward to seeing you.



## IE Welcomes Dr. Shappell

It is our pleasure to announce that Dr. Scott Shappell has joined the Industrial Engineering faculty at Clemson University.



After receiving his B.S. (1983) in psychology Wright State University, Dr. Shappell went on to receive his Ph.D. in neuroscience at the University of Texas Medical Branch (1990). Dr. Shappell was most recently the Human Factors Research Branch Manager at the Civil Aerospace Medical Institute of the Federal Aviation Administration in Oklahoma City, OK. There he managed research programs on

advanced Air Traffic Control systems, behavioral stressors, and aircrew performance. In addition, he conducted studies of both civil and military aviation accidents.

Before joining the Civil Aeromedical Institute, then Lieutenant Commander Shappell served as the Human Factors Branch Chief at the U.S. Naval Safety Center and as a human factors accident investigation consultant for the Joint Service Safety Chiefs. Prior to the Naval Safety Center, he served as the Force Aerospace Psychologist for the Commander, Naval Air Forces, U.S. Atlantic Fleet. His adventures in the U.S. Navy and the civilian sector have given him a well-rounded past in aviation psychology and aeromedical safety. Consequently, he has published over 60 papers and one book in the fields of aviation accident investigation, spatial disorientation, sustained operations, flight deck injuries, and aircrew fatigue.

### Seeking Nominations - 2006 Clemson IE Alumni of the year

Clemson's Department of Industrial Engineering will recognize alumni who have had a notable impact on the IE profession. The recipient will be invited to the department's Honors and Awards Banquet in April to accept the award. **The nomination deadline is March 2, 2006.** Please take the time to nominate a worthy candidate by going on-line to [www.ces.clemson.edu/ie/people/alumni.htm](http://www.ces.clemson.edu/ie/people/alumni.htm)

## Focus on Faculty

### Prized Professor



Mary Beth Kurz, assistant professor of Industrial Engineering, has recently been awarded several prestigious awards for her teaching. Kurz received the Byar's Prize for Teaching Excellence on April 9, 2005 at the College of Engineering and Science Honors and Awards Day Ceremony. The Byar's Prize is awarded to a faculty member teaching undergraduate engineering fundamentals. One of her students stated, "I had the pleasure of being in Dr. Kurz's Operations Research I class in the spring of 2003. Dr. Kurz's class... gave me direction for what I wanted to do with the rest of my life. Currently, I am in my first year of graduate school at N.C. State University where I hope to obtain a Master of Science in Operations Research degree in the spring of 2006."

Dr. Kurz also received the Award for Excellence in Teaching from the Operations Research Division of the Institute of Industrial Engineers. The award was presented at the OR Division Town Meeting at the Annual IIE Meeting in Atlanta in May 2005.

Dr. Kurz and her graduate students conduct research in the design, development and application of heuristics and metaheuristics, especially genetic algorithms, to scheduling problems in manufacturing and transportation industries. Dr. Kurz received her bachelor's and master's degrees in Systems Engineering and her doctoral degree in Systems and Industrial Engineering from the University of Arizona.

## IE Recognition

IE faculty member **Kevin Taaffe** and IE graduate **Prashant Joshi** were award recipients at this year's annual IIE Regional Conference. Dr. Taaffe received the Best Paper Award in the Logistics and Inventory track for his paper entitled "Selected Newsvendor Problems with All-or-Nothing Order Requests," while Prashant Joshi received the Best Paper Award in the Human Factors track for his paper entitled "Effect of Per-Item, Per-Lot Pacing with Task Complexity on Inspection."

# IE Undergraduate Student Research Initiative

This academic year, Provost Doris Helms initiated a campus-wide effort to increase undergraduate student exposure to research. The Department of Industrial Engineering is playing a key role in accomplishing this goal by involving several undergraduates in research. Here are some activities that were ongoing in Spring 2005.

Sarah Canterbury, a senior in IE, completed her honors thesis work this spring. Her research allowed her to work with faculty member Mary Beth Kurz on various aspects of genetic algorithms for scheduling applications. The primary investigations were in the use of an additional genetic structure used to determine how much of a chromosome should be decoded, mimicking gene expression. Sarah's thesis work resulted in two joint authored conference proceedings publications: "Gene Expression for Improved Solution Representation" in the 2005 IERC Proceedings, and "Minimizing Total Flowtime and Maximum Earliness on a Single Machine Using Multiple Measures of Fitness" in the 2005 Proceedings of the Genetic and Evolutionary Computation Conference.



Amy Hsu, a junior in IE, is working with Dr. Joel Greenstein and graduate student Rachana Rele on research to improve the design of search engine interfaces. With the proliferation of personal and e-commerce websites, and the number of pages indexed by Google alone reaching 8 billion, finding the most relevant information on the web has become challenging. Amy and her colleagues are attempting to develop guidelines for the design of search engine interfaces. These guidelines should enable users to submit more effective queries and should allow them to more quickly identify the most promising sites among the search results.

Lindsay Becker, Michelle Hatcher, Megan Stires, and Trey Strom, all IE undergraduates, participated in a research initiative led by new faculty member Kevin Taaffe. The students evaluated two potential research areas: 1) airport terminal and security processing; and 2) emergency evacuation of hospitals. In the process, the team learned the basics of conducting research, which included a data collection effort at Greenville-Spartanburg International Airport. In the fall, the team will narrow its focus to developing a methodology for evaluating and formulating hospital evacuation plans. Initially, the team will concentrate on hurricane evacuation planning.



## Industrial Engineering Awards

The Clemson Industrial Engineering Department recognized its best at the 2005 Annual Awards Banquet. The awardees are listed below.

**The Jim Chisman Outstanding Senior Award**  
*Jill Anne Howard*

**Senior Academic Achievement**  
*Sarah Alice Canterbury*

**Junior Academic Achievement**  
*Ashely Nicole Potts*

**Sophomore Academic Achievement**  
*Sarah Jane Grigg*  
*Laura Rayfield Young*

**Outstanding Graduate Research**  
*Funda Samanliogla*

**Outstanding Graduate Teaching Assistant**  
*Jami Kovach*

**Professor of the Year**  
*Dr. Mary Elizabeth Kurz*



## IE Student Receives NASA Award



Senior Kerry McGuire received the NASA Co-op Special Achievement Award as the best co-op student at NASA Johnson Space Center in her second co-op term there. After receiving the awards, she was invited to present her

work at an American Society of Safety Engineers professional development conference. While at Johnson, Kerry has worked with astronauts, scientists and engineers, as well as visiting faculty and students from other schools. Thanks to her preparation at Clemson and her own excellent efforts, she has now accomplished things few students have the opportunity to try. In addition to her ASSE conference participation and department honors, her work on Space Station medical packages will lead to improved astronaut access to first aid medical supplies and processes.

## Clemson IE and Aviation Safety



With the predicted increase in air transportation and the probability that this increase will stimulate a rise in accident rates, the FAA is focusing on methods to control factors directly affecting aircraft safety. In this area, the Clemson IE Department is currently working on several projects funded by the FAA and NSF to

reduce the air transport accident rate by monitoring aircraft maintenance. The first of these projects is a computer-based training system used to improve defect detection called GAITS (General Aviation Inspection Training System). GAITS allows for both parameterization of inspection environments in individualized training, as well as the evaluation of maintenance inspectors' performance. It is hoped that GAITS will instigate an industry-wide general aviation maintenance standardization initiative within the FAA. The second project is WebSAT, a Web-based Surveillance and Auditing Tool which collects data related to maintenance checks and corresponding audits on a common fleet of aircraft. This half million dollar research grant from the FAA unites efforts from a Clemson IE team, led by Dr. Joel Greenstein, and industry partners, such as FedEx Air Cargo and NWA to name a few. WebSAT is designed to be a practical guide for the development and implementation of a safety management system within flight and maintenance operations, and its outcome will help to reduce the number of maintenance-related accidents.



Find out more at [www.ces.clemson.edu/ie/sixsigma](http://www.ces.clemson.edu/ie/sixsigma)

## IE Student Receives College-wide Leadership Award



Liam Cahalane was recently presented with the 2004-2005 Clemson University J. Wesley Davis Award. This award is presented annually to a senior in engineering for outstanding academic achievement, student leadership, and high potential for success in the engineering profession. Liam served as president of both the student chapter of the IIE and the industrial engineering honor society, Alpha Pi Mu. Liam is currently enrolled in the IE graduate program with an emphasis in production and service systems and will be writing his thesis on supply chain integration. With plans to graduate in the spring of 2006, he spends his spare time coaching a Dixie League baseball team called "The Gators." Originally from Boston, MA, Liam is a sports enthusiast and serves as the local die-hard Red Sox fan.

## Where are they now?

*Highlighting Clemson IE Alumni Cara Cornelius*



Mrs. Cara Cornelius, a 1998 Industrial Engineering major, has been employed at Milliken and Company for the last six years. Her roles have included that of Industrial Engineer at the Humphrey and Gerrish locations and Corporate Supply Chain Specialist at the headquarters in Spartanburg. Cara has worked with over 40 businesses in the U.S. and European locations to design, model and implement planning and scheduling systems. Her work in supply chain has also included improving the visibility and accuracy of inventory as well as inventory reduction. Cara leads Milliken's recruiting team for Clemson Industrial Engineers. She lives in Greenville, SC with her husband, Marcus, and their child, Jacob.

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