Dear Colleagues:

I am pleased to present the 2006 annual report for the Department of Industrial and Systems Engineering at Texas A&M University. It provides a glimpse of the many activities and accomplishments of our faculty, staff and students over the past year.

These continue to be exciting times at Texas A&M and in the department. The university is continuing an unprecedented faculty hiring program, and our department has benefited immensely from that. We have a strong faculty and an excellent group of junior faculty, which makes our future even brighter; and we will continue to add faculty over the next few years.

I hope you enjoy seeing an overview of the department's activities. We continue to move forward on many fronts and work to solidify our status as a highly ranked industrial and systems engineering program. We are excited about the future as we continue to build a culture of excellence.

Brett A. Peters
Department Head
**Amarnath Banerjee**

Tenneco Meritorious Teaching Award, Dwight Look College of Engineering, for significant teaching contributions

Winner (with his team of graduate students), Binary Time Series Prediction Contest, Artificial Neural Networks in Engineering Conference. The proposed method had an accuracy of 98.1 percent.

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**Eric Bickel**

Decision Analysis Practice Award, INFORMS Decision Analysis Society, with his colleagues, for research for WesternGeco that extended value of information concepts to seismic valuation

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**Yu Ding**

TEES Select Young Faculty, Texas Engineering Experiment Station, for outstanding performance as a young professional

Best Paper Award, IIE Transactions on Quality and Reliability in Engineering, with Jionghua Jin, for “Online Automatic Process Control Using Observable Noise Factors for Discrete Part Manufacturing”

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**Sila Çetinkaya**

E.D. Brockett Professorship, Dwight Look College of Engineering, for continued excellence in teaching and research

TEES Fellow, Texas Engineering Experiment Station, for continued outstanding performance in all aspects of teaching, research and service

Dwight Look College of Engineering Fellow, Dwight Look College of Engineering, for contributions to the Engineering Program including classroom instruction, scholarly activities and professional service

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**Natarajan Gautam**

Outstanding Young Industrial Engineer, Institute of Industrial Engineers, for engineering contributions in application, design, research or development of industrial engineering methodologies

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**Guy Curry**

Albert G. Holtzman Distinguished Educator Award, Institute of Industrial Engineers, for significant contributions to the industrial engineering profession through teaching, research, extension, innovation and/or administration in an academic environment

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Dr. Amarnath Banerjee, Associate Professor

Dr. Eric Bickel, Assistant Professor

Dr. Yu Ding, Assistant Professor

Dr. Sila Çetinkaya, Associate Professor

Dr. Natarajan Gautam, Associate Professor

Dr. Guy Curry, Professor and Director of Graduate Programs

Dr. J. Eric Bickel, Assistant Professor

Dr. Guy L. Curry, Professor and Director of Graduate Programs

Dr. Natarajan Gautam, Associate Professor
Department honors Homeyer and Milstead as Outstanding Former Students 2006

Howard C. Homeyer '55 and Charles F. Milstead '60 were honored for their distinguished careers in the Department of Industrial and Systems Engineering at its 2006 Honors and Awards Banquet, an annual event sponsored by Parsons Corp.

Homeyer retired in 1988 from Texas Eastern Corp. after 22 years in various management positions, including president of Texas Eastern Gas Pipeline Co. and Algonquin Energy Co. Earlier in his career he was employed by Hughes Tool Co. and Southern Union Gas Co. During his retirement, he has been a management consultant and served on several corporate, church and civic boards.

Homeyer received his bachelor’s degree in industrial engineering and a U.S. Army commission from Texas A&M in 1955. During his time at Texas A&M, he was a member of Phi Delta Theta. In 1961, he qualified for the 1961 bowl game and was the Texas A&M Football Player of the year. He served on active military duty in 1957 and was discharged with the rank of captain. In 1963 he received an MBA degree in finance from Northwestern University in Evanston, Ill. Howard and his wife, Dorothy, are parents of three sons—all A&M graduates—Michael ’76 (BSIE), Paul ’85 and Jonathan ’90.

Milstead quarterbacked his Tyler, Texas, high school football team to the state finals in 1955 and continued to play in that position throughout his college career at Texas A&M. He graduated in 1961 with a BS in industrial engineering. Having been awarded All-Southwest Conference honors in 1958-59, All-America Quarterback in 1959 and Academic All-America in 1959, he was inducted into the Texas A&M Athletic Hall of Fame in 1974. He was drafted in 1959 by the Houston Oilers and began working for Toole and Co. at the same time. He left the Oilers in 1962 and in 1967 formed his own company, Environmental Improvements Inc. In the early 1960s, Milstead helped form the first local chapter of the Fellowship of Christian Athletes (FCA) in Houston. In addition to serving on the FCA board, he has served on the boards of The Good Samaritan Foundation and the Jail Chaplaincy Ministry. He is past president of the Texas Golf Association and The 100 Club of Houston. In 1997 he was the Greater Houston Senior Amateur Champion and was the Senior Match Play Champion for the state of Texas in 2000. In 1998 Milstead was inducted into the Texas High School Hall of Fame in Waco. He and his wife, Jill, have three sons (all Aggies) and daughters-in-law.

Previously recognized former students:

2002
Ross E. George
Joe Barton
W. Michael Barnes

2004
Franklin A. Mikell
John A. Scott

2005
Jack T. Allison
G. Allen Flynt
Joseph B.Michels
ISE Faculty Working to Secure Ports and Waterways

Increased security in American ports and waterways is the goal of Gilbert E. Wilhelm, Mike and Sugar Barnes Professor, and assistant professor Yu Ding. They have received a $331,111 grant from the National Science Foundation for their project, “Strategic design and tactical operation of surveillance sensor systems for ports and waterway security.” The researchers aim to design surveillance sensor systems to assure robust security in ports and waterways, especially to deal with unauthorized small boats that can easily gain access to sensitive targets.

The Texas A&M researchers are using the Houston Ship Channel as a trial case. The 50-mile-long channel is an especially sensitive case because of the transport of hazardous and flammable materials to the surrounding city — for example, if poisonous gas is released from a damaged storage container.

“Many people do not realize how vulnerable our ports are to a variety of threats,” Wilhelm said, “and how devastating an attack could be to a surrounding city — for example, if a ship in open water as well as in a ship channel or waterway.

In the first part of the project, strategic design, Wilhelm is determining where to locate sensors to provide adequate surveillance. Types of sensors include television cameras; infrared cameras; radar; and sound, motion or heat detectors, and Wilhelm said he is designing a heterogeneous sensor system so as not to rely on a single type of sensor. "We’re looking at interdiction," Wilhelm said, "so we have to look at various types of threats. For instance, a large ship or tanker has certain characteristics, such as traveling at a certain speed or maneuvering in certain ways. Each type of threat travels at a different speed.”

Wilhelm said the researchers have to understand which points to observe in order to interdict these threats. Then the information is fed into a sensor location model to optimize the cost of buying, installing and maintaining the sensors.

“The challenge is to develop algorithms to solve problems as large as what might be found in actual applications,” Wilhelm said.

The researchers also have to deal with uncertainty so that, in case a sensor fails, a threat can still be observed. That’s known as fault tolerance capability and is the tactical part of the project.

“Fault tolerance analysis,” Ding said, “is ‘What if there is a failure due to harsh environmental conditions or intentional tampering? What kinds of redundancy are needed and at what cost level?’”

Ding said that with different sensors come different types of information and different uncertainties. By integrating the information in an intelligent way, a heterogeneous surveillance system could potentially be able to detect anomalies, distinguishing between “normal” and abnormal operation and behavior of a ship.

Phillips Coordinates Security Research

The Engineering Program at Texas A&M is on the cutting edge of training and research in support of homeland security efforts. Both research and applications focused on protecting the United States and its people have become a major part of the engineering programs at Texas A&M. Texas A&M Engineering has the resources and capabilities to address a variety of homeland security issues and to deliver solutions to emergency first responders, management agencies and the state of Texas.

Don Phillips, Chevron Distinguished Professor in the Department of Industrial and Systems Engineering, is currently serving as coordinator of homeland security research initiatives for the Engineering Program. Phillips has previous experience in forming interdisciplinary research teams through his work with the Program for Automation in Manufacturing (a consortium of companies), the Sematech Manufacturing Center of Excellence at Texas A&M and the Sustainability Program for Rotary Wing Aircraft for Corpus Christi Army Depot.

Phillips served as co-principal investigator and technical adviser to the Department of Homeland Security Systems Assessment and Validation for Emergency Responders (SAVER), a test and evaluation program for emergency and first responder equipment and operational systems. He was instrumental in forming the Southwest Border Security Coalition and the Texas State Security Group, both chartered among multiple universities to address homeland security, state security and border security issues. Phillips is the point of contact for Texas A&M’s membership in the America’s Border Security Group, a coalition of companies and universities chartered by Ericsson Inc. to address America’s border security issues.

"Additionally, ships of certain sizes go to certain locations in a port or waterway, so if we find a tanker upstream from where it’s supposed to be, that’s anomalous.”

Another need is to reduce the number of false alarms, Ding said. “With too many false positives, the sensor network becomes a nuisance rather than a safeguard, so how can we keep the probability of a false positive in check?”

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The three reviewers identified strengths such as strategic vision, good laboratory facilities, a strong curriculum and a high degree of diversity. The next doctoral program review for the department will be in 2014.
New Wildfire Research Ablaze at Texas A&M

New software being developed at Texas A&M University may give firefighters an edge when they go out to fight wildfires.

Dr. Lewis Ntaimo, assistant professor of industrial and systems engineering, is working with Dr. Xiaolin Hu, assistant professor of computer science at Georgia State University, to design and refine software to predict in what direction and how fast forest fires are moving. This information will be used in mathematical models that will help firefighters allocate fire-fighting resources effectively in the face of the uncertainties of how fires spread.

The software that Ntaimo and Hu are developing can model mathematical equations for fire spread that use wind speed and direction, slope conditions, ambient temperature and the nature of the forest. The software then creates a simulation of the fire’s spread over several hours, which can predict in which direction the fire will spread. This will assist fire managers in making effective decisions to control and suppress fires.

The simulation tool is designed to be used in real time or in “as-fast-as-can” tactical decision-making.

The experimental software uses standard fuel models to predict fire spread in both uniform and non-uniform environmental conditions, such as forest terrain and wind speed and direction. Eventually, the software will be linked to a geographical information system or GIS, that will run with local weather stations to give more accurate predictions. To this end, Ntaimo is collaborating with Dr. Jianbang Gan, associate professor of forest science and Dr. Popescu Sorin, assistant professor of remote sensing spatial sciences laboratory in the department of forest science, and his MS student Muge Mutlu.

Ntaimo’s other collaborators include Dr. Bernard P. Zeigler and Ph.D. student Bithika Kharagaria from the University of Arizona and Dr. Maria Vasconcelos from the Tropical Research Institute in Portugal. Their initial research was published in the October 2004 issue of the Simulation Journal, Vol. 80, Issue 10.

Ntaimo became interested in the research as a Ph.D. student at the University of Arizona after seeing the Arizona fires first hand in 2003. “It’s more like a hobby than work—it’s very real and practical, and less abstract. It’s invigorating to see people envisioning this when we show them the research,” Ntaimo said.

The software prototype is intended for both commercial use worldwide and for educational purposes. The current work is being funded by a grant from the directorate of computer and information science and engineering (CISE) division of the National Science Foundation under the dynamic data-drive application (DDDAS) program. Ntaimo is the principal investigator on the project, and Hu is the co-PI.

Written by Bonnie Shortner, Texas A&M Engineering Communications, with Lewis Ntaimo
J. Eric Bickel
Assistant Professor
Ph.D., Stanford University
ebickel@tamu.edu

Dr. Bickel's research interests include decision analysis, modeling probabilistic dependence, value of information and applications of decision analysis to enhance oil recovery. He teaches engineering economy, decision analysis and senior design. Prior to joining Texas A&M, Bickel was a senior engineering manager for Strategic Decisions Group (SDG) in Houston, where he applied decision analysis to develop strategy for Fortune 500 companies.

Research


Publications


Presentations
Guy L. Curry
Professor and Director of Graduate Program
Ph.D., University of Arkansas
gcurry@tamu.edu

Dr. Curry specializes in the application of operations research techniques to the design and analysis of manufacturing systems. He teaches courses in optimization and production systems.

Publications

Eun Young Cho
Assistant Professor
Ph.D., University of Michigan
yding@email.tamu.edu

Dr. Ding's research interests are in quality and reliability engineering, with emphases on data-mining methods for analysis and design of complex systems. His recent projects are funded by the National Science Foundation, the State of Texas and industry. He teaches courses on quality control, change and anomaly detection, prediction methods, and design of experiments.

Research

Presentations
Natarajan Gautam
Associate Professor
Ph.D., University of North Carolina at Chapel Hill
gautam@tamu.edu

Dr. Gautam’s areas of interest include optimal design, control and performance evaluation of stochastic systems, with special emphasis on service engineering, using techniques in queuing theory, applied probability and optimization. His specific research topics include telecommunication network design and traffic engineering for providing quality of service, computer-communication networks including web servers and mobile ad hoc networks, transportation systems modeling for traffic operations and performance analysis, and information technology including survivability of multi-agent systems and peer-to-peer networks.

Publications

Presentations

Professional Activities
Member, Technical Program Committee, International Conference on Sensor Networks, Tahiti, French Polynesia, November 2006
Member, Conference Organizing Committee, IE Annual Research Conference, Orlando, Fla., May 2006
Tenured faculty mentor for MentorNet, The E Monitoring Network for Diversity in Engineering and Science
Director and board member, IE Computer and Information Systems Division
Central North America regional director, Omega Rho (Operations Research International Honor Society)
Northwest North America regional director, Omega Rho (Operations Research International Honor Society)
Member-of-council, INFORMS Telecommunication Section

Iylla V. Hicks
Associate Professor
Ph.D., Rice University ihicks@tamu.edu

Dr. Hicks’ research interests include graph optimization, graph theory and integer programming. Some applications of interest are network design, manufacturing and logistics. His current research is focused on multi-agent graph decompositions to solve NP-complete problems. He teaches courses in discrete optimization.

Research
Publications

Presentations

Andrew Johnson
Assistant Professor
Ph.D., Georgia Institute of Technology ajohnson@tamu.edu

Dr. Johnson’s research interests are in productivity measurement, warehouse operations and design, web applications to support decision making, modeling and analysis of revenue management applied to logistics, reference model (Johnson, cont’d)

Development for industrial systems, and enterprise transformation.

Research
Publications
Johnson, A. L., “Methods in Productivity and Efficiency Analysis with Applications to Warehousing,” The H. Milton Stewart School of Industrial and Systems Engineering, Georgia Institute of Technology, Atlanta, 2006 (Doctor of Philosophy)

Presentations

Professional Activities
Member, CEADH ERIC Committee
Member, Committee of Visitors, National Science Foundation Division of Design and Manufacturing Innovation
Panel review member, National Science Foundation

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Georgia-Ann Klutke
Professor
Ph.D., Virginia Polytechnic Institute and State University klutke@tamu.edu

Dr. Klutke’s research interests are in applied stochastic and dynamic processes, with particular emphasis on problems that arise in production and service systems. Her work has examined queuing behavior, inspection and maintenance scheduling, product flow control, degradation processes, influencing decision models, and layout of retail facilities. She teaches courses in operations research, queueing theory, stochastic processes, engineering systems design, production operations, reliability and maintenance science.

Research

Publications

Professional Activities
Member, Non-Profit Organization, “Benchmarking Warehouse Performance,” 2006-2009, Department of Education, $110,000

Research

Publications

Presentations
Leon V.J., "Continuous Improvement Plan for Manufacturing and Mechanical ET", A Capstone
Dr. Ntaimo’s research interests are stochastic programming, discrete event modeling and simulation, and systems modeling. His research focuses on decomposition algorithms for large-scale optimization problems characterized by uncertainty in the problem data. Applications include wildfire management, healthcare, facility location and supply chain planning. He teaches courses in stochastic programming, systems thinking and analysis, facilities planning and material handling, and operations research.

Research


Publications


Brett A. Peters

Professor and Department Head
Ph.D., Georgia Institute of Technology
bpeters@tamu.edu

Dr. Peters’ research interests include design, analysis, operation and control of manufacturing, distribution and service systems. He concentrates on facilities design, manufacturing and service system design, distribution and service system design. He teaches courses in facilities design, material handling, and systems planning and simulation.

Publications


Professional Activities

Research advisor for operations research, Arizona Center for Research and Development, Republic of Panama.

Brett A. Peters

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Ph.D., Georgia Institute of Technology
bpeters@tamu.edu

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Publications


Professional Activities

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Publications

Scholarship
Soondo Hong, awarded the Education Foundation of America. Hong, whose adviser is from the Material Handling Institute.

At the 2006 INFORMS Annual Meeting, Burcu Keskin was honored with the Judith Liebman Award for being a “moving spirit” in the Texas A&M University chapter. Keskin has been a leader in helping organize the student INFORMS chapter at Texas A&M. Her advisers are Halit Uster and Sila Cetinkaya.

Abdullah Cercici, Bikram Sharda, and Sumantra Dasgupta attended the Artificial Neural Networks in Engineering Conference, where they won the Binary Time Series Prediction Contest. Their algorithm performed with an accuracy of 8.1 percent. The team was advised by Brett Peters, is developing a distributed control procedure for designing order picking systems.

Balabhaskar “Baski” Balasundaram was presented with a Senator Phil Gramm Doctoral Fellowship. This fellowship was established to reward outstanding teaching and research by doctoral students whose command of their respective disciplines exemplifies the meaning of scholar/mentor in the highest sense. Balasundaram is a student of Sergiy Butenko.

Soondo Hong has been awarded the Education Foundation Scholarship from the Material Handling Institute of America. Hong, whose adviser is Soondo Hong, has demonstrated good citizenship.

Bahadir Aral, a student of Georgia Ann Klutke, and Baski Balasundaram are recipients of the prestigious Association of Former Students Distinguished Graduate Student Award for Excellence in Teaching.

Sumantra Dasgupta won first place during the university-wide Student Research Week for his presentation “Binary Time Series Prediction Using Recurrent Neural Networks.” Dasgupta is a student of Amarnath Banerjee.

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