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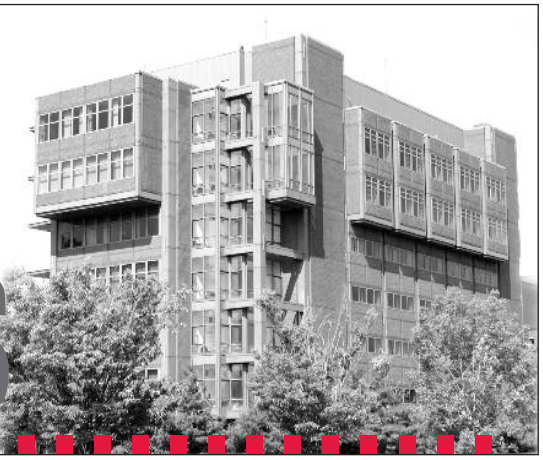
School of Engineering

ISE news



NO. 8, FALL 2009 DEPARTMENT OF INDUSTRIAL AND SYSTEMS ENGINEERING http://www.ise.rutgers.edu

Energy, Health Care Reform to Lay New Foundation

"Clean energy economy, reforming the healthcare system and laying a new foundation for the long-term strength of our economy."

Those are the challenges to build a lasting foundation for our nation's economic prosperity that President Obama has addressed to American citizens since he took office. To improve the faltering American economy, it is indeed our responsibility to act together to overcome the critical issues that Americans face day in and day out. In fact, energy, health care, manufacturing, and transportation are not new issues to Rutgers ISE. Our faculty has already integrated those issues into our education and research activities to prepare the next generation for success in college and the workforce.

New Energy: Not only do we need to come up with alternative, renewable energy, but we also need to know how to employ and deploy it intelligently. Prof. Coit is currently researching the impact of "smart grid" technologies on the electrical power grid. His group has developed mathematical models to determine optimal power grid expansion plans that minimize both operating cost and greenhouse gas emissions. Prof. Coit's work will result in new guidelines on how these new technologies can be most effectively used to achieve our nation's objectives concerning energy and the environment. Prof. Jafari and his group are working on cyber risk assessment model for power grids. Professors Elsayed and Basily have been working on increasing the efficiency of solar panels by utilizing the sheet folding theory and technology that they patented in 2008. They demonstrate that the folded solar panels can indeed improve the efficiency of the solar collectors by 20 percent above that of flat panels.

Health Care: Part of improving the broken health care system is to reduce its escalating cost. To assist the health care providers in becoming more efficient and effective, Professors Boucher and Elsayed are researching continuous quality improvement in hospital operations and the use of Radio Frequency Identification (RFID) technology for real-time monitoring in health care facilities. To bridge the gap between engineering and medicine, Prof. Chaovalitwongse is developing decision-making models to help physicians more quickly and accurately diagnose patients with epilepsy. His group is also working closely with neurologists and neurosurgeons to develop a surgical-aided tool for Deep Brain Stimulation (DBS) for patients with Parkinson's disease. Prof. Baykal-Gürsoy is investigating the effect of extreme weather events on human health, and developing algorithms to minimize this effect. Prof. Jafari and his group are developing a real time patient monitoring system, hospital staff management, scheduling during emergencies and surge capacity conditions.

Manufacturing: There has been an increasing volume of new orders for manufactured goods in the U.S. To improve the production efficiency and become more competitive, process monitoring and reliability prediction to ensure quality and reliability prediction of products are extremely vital to manufacturers. Prof. Elsayed and his group are investigating new and "equivalent" accelerated life testing to accurately predict reliabilities in a very short test time by using alternative test

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New National Security Agency Center of Academic Excellence at Rutgers

Rutgers University has been designated as a National Center of Academic Excellence in Information Assurance—Education (CAEIAE) and Research (CAEIAR) for the academic years 2009–2014. The CAEIA Program is an outreach program operated by the NSA and the Department of Homeland Security (DHS) to promote higher education in Information Assurance (IA). The CAEIAE and CAEIAR applications were submitted through Rutgers Center for Information Assurance. The center was founded by Drs. Chaovalitwongse and Pham, together with colleagues from engineering, business and political science schools. The CAEIA recognition puts Rutgers ISE at the forefront of information technology and security related research and educational programs. It will help Rutgers grow ever stronger partnerships with the information technology industry, cyber security, and homeland security. ■

CHAIRMAN'S MESSAGE

Dear alumni, colleagues, fellow ISEs and students,

Greetings from the Department of Industrial and Systems Engineering of Rutgers, The State University of New Jersey. This newsletter brings you exciting news about our department activities and highlights of some of our ISE faculty accomplishments during the fiscal year 2008–2009.

Strengths in research and scholarships have always been the defining marks of the ISE faculty at Rutgers. This year, the ISE faculty has received about $3.5 million in new grants; served as editor-in-chief of three international journals including the IIE Transactions; editors, associate editors or on editorial board of more than 40 international journals; published 42 journal articles, edited three books, and delivered eight conference keynotes and plenary speeches, just to name a few. With a 12 faculty-size, such awe-inspiring accomplishments and activities are truly exceptional. The ISE Graduate Program is currently ranked 19th in the nation by the *U.S. News & World Report,* an improvement from last year's 21st place.

ISE students are continuously thriving and have received several academic awards including the IIE Regional Technical Paper Competition, the IIEs' Benjamin Willard Niebel Scholarship, the National FAA Design Competition for Universities, the Material Handling Education Foundation Scholarship, and the Material Handling Society of New Jersey Scholarship award. We are very delighted that our alumni, Mark D. Lutchen (BSIE'73) and Major Frank P. Conway (BSIE'89) have been selected as the recipients of the 2009 School of Engineering Medal of Excellence Alumni Lifetime Achievement Award and the Rutgers Engineering Society Distinguished Engineer Award, respectively. ISE is very proud of their accomplishments.

Dr. Hoang Pham

With sorrow we had to say the last goodbye to one of our very best and long time friends, Anthony Joseph Denning, the founding Chair of ISE Department at Rutgers, as he passed away on February 22, 2009, at the age of 88. Prof. Denning will be remembered for a lot of things, but mostly for his tireless involvement and contributions to the department over the years with a great heart. On behalf of the entire faculty, staff, and students of the ISE, we would like to express our sincere condolences to the Denning family.

I am very proud of the alumni, students, faculty and staff of our department for your praiseworthy dedication, commitment, and achievements. Individually and together, we have accomplished much and I am very excited as we are heading to another exciting and productive year. Thank you all for your support of the Department of Industrial and Systems Engineering!

Hoang Pham

New Foundation

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designs. Prof. Albin is working on process monitoring and quality control in large scale manufacturing through the use of data mining tools. Such tools can be used to identify patterns in vast sensor data and improve the product quality and production efficiency. Prof. Jeong is also working on data modeling methodology to predict the quality of manufactured products. Prof. Pham is working on reliability computing of complex systems including shared-load systems, safety inspection and maintenance, and mortality modeling. Prof. Jafari is working on green and sustainable manufacturing over consumer product lifecycle and supply chains. Prof. Özel has been investigating micro-mechanical machining using micro size cutting tools and laser-assisted micro-machining of difficult-to-process advanced materials and developed computational micro-machining models for process planning and optimization.

Transportation: Global economic growth is creating increased demand on ground, air, and marine transportation. Prof. Luxhøj is developing a new system safety framework for analyzing hazards and causal factors associated with the introduction of new aircraft technologies, such as advanced aircraft systems (e.g., unmanned aircraft systems) and the Next Generation (NextGen) Air Transportation System. This work will result in a better understanding of aviation safety risks posed by new technologies and procedures. Prof. Elsayed is investigating the bias in altitude measurements of aircraft to ensure the accuracy of the aircraft altitude and increase the safety margin. Prof. Altiok is working on modeling risks in maritime traffic in critical ports and waterways. Risk mitigation measures he is developing will significantly improve the safety and security of our strategic ports and waterways such as Port Philadelphia, Delaware River and others around the world. Congestion on our roadways increase travel times, thus, cause pollution and energy waste. Prof. Baykal-Gürsoy is developing new stochastic models for traffic flow interrupted by randomly occurring incidents in order to estimate the travel time so that informed routing decisions could be made. Prof. Jafari and his group are developing a decision support system for traffic safety and information system and sampling methodologies to support long term bridge performance.

We believe that our department has built foundational support for real technological solutions as well as educational training in the areas that are challenging our nation's growth and prosperity. These new thrusts are being integrated into our instructional programs as we educate the 21st century engineers. ■

RESEARCH NEWS

Virtual Metrology for Quality Improvement of Manufacturing Processes

Professor Myong K. (MK) Jeong, along with his research group, has been conducting research in sensor-based process monitoring and improvement using advanced data mining techniques. Today, with the advances in sensor technology, sensor signals are increasingly used in order to assess the quality of products or processes in many industries, including the automotive, electronics, semiconductor, bio-energy, and transportation. However, because sensor data are usually massive and high-dimensional, their analysis and manipulation becomes more complicated and resource intensive. A major obstacle is the lack of software and diagnostic tools capable of exploiting the massive sensor data for monitoring purposes generated in the course of the manufacturing process.

Professor Myong K. Jeong

Dr. Jeong and his group have developed the methodology and software tools for acquiring and exploiting high-dimensional sensor signals for manufacturing process monitoring, identification, and diagnosis so as to produce higher quality manufactured products. His research has been supported by the National Science Foundation (NSF) CAREER award, National Transpor-tation Research Center, United States Department of Agriculture, Electronics and Telecommunications Research Institute, and various industries. His research is applicable to various industries such as semiconductor, transportation, bio-energy, computing, electronics, and automobile.

One of his working problems is the virtual metrology (VM) for semiconductor manufacturing process which is the collaborative work with Samsung Electronics and Intel Corporation. The idea of virtual metrology is to construct models that can predict the electrical and physical parameters of wafers, based on sensor signals collected from the relevant processing tools in order to minimize or eliminate the direct measurements from the process. Challenges include the selection of the appropriate modeling method, the pre-treatment of the raw data, and the deployment of a VM that can track an aging manufacturing process. His group has been focusing on developing the kernel-based process model for the on-line prediction of etch rate and uniformity in plasma etch process based on in-situ Optical Emission Spectroscopy (OES) data.

Dr. Jeong's research has been published in several research journals including *Technometrics, IEEE Transactions on Semiconductor Manufacturing, IEEE Trans-actions on Systems, Man, Cybernetics, Pattern Recognition Letters, Annals of Operations Research,* and *IIE Transaction on Quality and Reliability.*

Visit www.rci.rutgers.edu/~mjeong for more information on Dr. Jeong's research. ■

DEPARTMENT NEWS

Dr. Susan L. Albin has been named the editor-in-chief of *IIE Transactions.*

Dr. Susan L. Albin has been elected President-Elect 2009 of the Institute for Operations Research and the Management Sciences (INFORMS).

Dr. Susan L. Albin gave the keynote address, "Exploring the Baseline," 1st International Conference on the Interface between Statistics and Engineering, Beijing, China (July 2009).

Dr. Melike Baykal-Gürsoy has been appointed member of the editorial board, *International Journal of Operations Research and Information Systems*.

Dr. Melike Baykal-Gürsoy has been appointed member of the editorial board, The Institute of Computer Sciences, Social-Informatics and Telecommunications Engineering (ICST): *Transactions on Network Optimization and Control.*

Dr. Thomas O. Boucher served as guest editor of the special issue on Energy Economics of *The Engineering Economist* (Vol. 53, No. 4, Oct.–Dec. 2008).

Dr. W. Art Chaovalitwongse gave the plenary presentation, "Medical Diagnosis Decision-Support System: Optimizing Pattern Recognition of Medical Data," IEEE Educational Activities Board Annual Meeting (Nov. 2008).

Dr. Elsayed A. Elsayed has been appointed member of the editorial board, *Advanced Operations Management.*

Dr. Elsayed A. Elsayed gave the keynote address, "Economics and Impact of Reliability Engineering," 8th International Conference on Reliability, Maintainability and Safety, Chengdu, China (July 2009).

Dr. Elsayed A. Elsayed gave the keynote address, "Quality and Reliability in the Global Economy," 3rd Symposium on Maintenance, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia (April 2009).

Dr. Elsayed A. Elsayed gave the keynote address, "Industrial Engineering and Challenges in the Global Economy," 2008 Industrial Engineering and Engineering Management Conference, Singapore (Dec. 2008).

Dr. Myong K. Jeong has been appointed member of the editorial board, *International Journal of Operations Research and Information Systems.*

Dr. Myong K. Jeong has been appointed associate editor, *IEEE Transactions on Automation Science and Engineering.*

Dr. Myong K. Jeong has published the article, "Bayesian Parallel Multi-Stage Model for Uniformity Modeling" (with J. S. Fenner, Y. Jeong, J. C. Lu) featured in *IIE* magazine 2009 and the article, "Enhanced Discrimination and Calibration of Biomass NIR Data Using Nonlinear Kernel Methods" (with N. Labbe, H. Cho, N. Andre) featured in *Chemometrics & Informatics* 2008.

Dr. James T. Luxhøj has been appointed as a member of NSF/AUVSI/FAA/DHS Research Advisory Group to the FAA's Unmanned Aircraft Program Office.

Dr. Tugrul Özel gave the plenary lecture, "Computational Modeling of Machining Processes," 4th International Industrial and Manufacturing Engineering and Welding Technology Congress and Meeting, Saltillo, Mexico (Nov. 2008).

Dr. Hoang Pham gave keynote address, "Research Challenges in Reliability Computing," The 8th International Conference on Reliability, Maintainability and Safety, Chengdu, China (July 2009).

Dr. Hoang Pham gave keynote address, "RFID Privacy and Security and Its Applications," 2009 International RFID Privacy Forum, Taipei, Taiwan (Jan. 2009).

Dr. Hoang Pham delivered remarks at the Vietnam National University—International University's Convocation, Vietnam (Oct. 2008).

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ALUMNI CORNER

From left: Mark Lutchen, Hoang Pham and Frank Conway

Alumni Lifetime Achievement

Mark D. Lutchen (Bachelor of Science in Industrial Engineering 1973 and Master of Business Administration from the Rutgers Business School – Newark 1974) is currently Senior Partner and Leader of IT Effectiveness Practice for PricewaterhouseCoopers. Prior to that he was the Global Chief Information Officer for Price Waterhouse and then for PricewaterhouseCoopers which resulted from the merger of Price Waterhouse and Coopers & Lybrand. In that role he managed an IT group of 2,500 people in 150 countries in successfully driving a massive strategic global IT transformation through standardization and integration of all technology platforms to support 150,000 people as a result of the merger. He is the author of the bestselling book Managing IT as a Business and currently leads PricewaterhouseCoopers' Business Risk Management Initiative, which provides senior executives practical strategies to manage IT risks and optimize IT investment and resources.

Distinguished Engineer Award

Major Frank P. Conway, United States Marine Corps (Bachelor of Science in Industrial Engineering 1989) is Director of Safety and Standardization for the United States Marine Corps Air Station in New River, NC. Through Major Conway's leadership and awareness of the operational need for the MV-22B Osprey and its value to national security, he made major contributions to operational deployments and testing which have advanced the tactical employment of the MV-22 for the Marine Air Ground Force and Joint Warfighter. He was involved in every facet of the program from return to flight efforts through the eventual Full Rate Production decision.

GRADUATING INDUSTRIAL ENGINEERS

B.S.

Andrew Bufalo
Joseph Butewicz
Yi-Hsuan Chen
Jay Chu
Joseph Cusick
Brian Dawson
Kelly Delpome
Akira Hada
Diane Ielmini
Clair Johnson
Nathalia Londono
Sean O'Brien
Michael Pandolfo
Carl Pankok
Anand Patel
Komal Patel
Omar Pena
Thomas Ramos
Delia Rios
Wilfredo Rodriguez
Vanessa Sanchez-Dominguez
Dennis Sheehan
Pooja Singh
Rafael Soto
Andrew Tang
Qi Wen
Thomas Yen
Carolyn Youssef

M.S.

Michael Brown
Ayberk Gokseven
Suhail Gupta
Diana Mathew
Elie Track
Wanbin Wang
Xiaodao Ye

In Memoriam

Anthony Joseph Denning
1920–2009

Anthony Joseph Denning, retired Rutgers University professor, died Sunday, Feb. 22, 2009. He was 88. Professor Denning was the founding Chair of the Department of Industrial and Systems Engineering at Rutgers University. He was one of the first few faculty members in the field of industrial engineering and helped the department shape its mission at Rutgers. During his 19 years at the school, he led the effort in enlarging the department by hiring a number of today's faculty, introduced many new courses and mentored academics from many countries before retiring in 1987. He and his wife Irene continued their involvement with the department by communicating with faculty and students over the years.

A U.S. Navy veteran, and long-time participant in the political and administrative life of Franklin Township, he volunteered for the Township Zoning Board of Adjustment for almost two decades and was frequently the Board's chair. At the same time, Mr. Denning was a long-time member and twice president of the Franklin Township Republican Club.

A native of Newark, Mr. Denning graduated from Weequahic High School in 1938 and the Newark College of Engineering in 1942. He enlisted as a lieutenant in the Navy during World War II, serving as Chief Engineer on refitting projects until the war's end. Mr. Denning earned a Masters Degree in Industrial Engineering from Columbia University, graduating in 1953. He was a member of the Keyport Yacht Club and a talented photographer. He is survived by Irene, his wife of 48 years; his children, Catherine, James, Sharon, and Suzanne; his sons-in-law, Chris, Seth, and Greg; and four grandchildren, Declan, Lila, Owen and Liam. ■

FACULTY NEWS

RESEARCH

Dr. Susan L. Albin, "Multivariate Statistical Process Control," Corning, $7,500

Dr. Tayfur Altiok, Laboratory for Port Security and NJ Office of Homeland Security and Preparedness (NJOHSP) started a training program for the first responders in the Delaware Region, funded by the NJOHSP

Dr. Melike Baykal-Gürsoy, "Emergency Shelter Location and Resource Allocation," Department of the Army through University Center for Disaster Preparedness and Emergency Response (UCDPER), $90,066 (with Co-PIs N. Fefferman and E. Boros)

Drs. Thomas O. Boucher, Elsayed A. Elsayed and R. Martin, "Continuous Quality Improvement and Its Application in Healthcare," Robert Wood Johnson Foundation, $62,000

Dr. David W. Coit, "Development of Reliability Models to Support the Recovery Gear Service Life Analysis Program," awarded from the U.S. Navy (Naval Air Engineering Station) to a team of Rutgers and Alion Science & Technology ($261,000 to Rutgers)

Dr. W. Art Chaovalitwongse, "REU Supplement: Novel Optimization Methods for Cooperative Data Mining with Healthcare and Biotechnology Applications," NSF, $12,000

Dr. Elsayed A. Elsayed, "Design and Implementation of an Innovative Manufacturing Process for Aerial and Land Supply Needs," Office of Naval Research, $566,303

Dr. Elsayed A. Elsayed, "Optimization and Design of Low-Cost, Low-Altitude (LCLA) Arial Drop Cushioning System," Battelle Pacific Northwest, $323,121 (Co-PI with B. Basily)

Dr. Elsayed A. Elsayed, "Investigation and Monitoring of Aircraft Data Link Communication and Aircraft Data Link Communication and Aircraft Altimetry and Altitude Measurement Systems," FAA, $268,742

Dr. Elsayed A. Elsayed, "Collaborative Research: Design of Equivalent Accelerated Life Testing Plans Involving Single or Multiple Stresses," NSF, $53,795

Dr. Elsayed A. Elsayed, "Investigation of Aircraft Separation Standards and Navigational Equipment on the Oceanic Airspace Capacity and Safety," FAA, $84,990

Drs. Elsayed A. Elsayed (PI of Rutgers University) and **Myong K. Jeong** (Co-PI), "Optimization and Advanced Process Control of LNG Operations," Qatar National Research Fund, $927,375 (K. N. Al-Khalifa, Lead PI of Qatar University and Co-PI A. S. Hamouda)

Dr. Mohsen A. Jafari, "Roadside Inspection and safety for Commercial Vehicles—Development of a Decision Support System," FHWA, $125,000

Dr. Mohsen A. Jafari, "Patient Flow Control and Analysis during Emergency," UMDNJ, $90,000

Dr. Myong K. Jeong, "An Analysis of the Mobile Communications Industry Regula-tions of U.S.," Electronics and Telecommunications Research Institute, $21,277

Dr. Myong K. Jeong, "Research Experience with International Undergraduate Students 2007," Ministry of Education, Korea, $20,240

Dr. James T. Luxhøj, "Development of UAS System Hazard Descriptions and Methodologies for Safety Risk Uncertainty Modeling—Phase 2," FAA, $204,348

Dr. James T. Luxhøj, "Development of UAS System Hazard Descriptions and Methodologies for Safety Risk Uncertainty Modeling, Phase 1," FAA, $461,954

Drs. Hoang Pham and **W. Art Chaovalitwongse,** "School Development Cost Analysis," NJ School Development Authority, $49,000

Dr. Tugrul Özel, "REU Supplement: Improving Machinability of Titanium Alloys using Physics-based Simulation Modeling," NSF, $12,000

BOOKS

Dr. W. Art Chaovalitwongse (coauthors: K.C. Furman, and P.M. Pardalos) edited *Optimization and Logistics Challenges in the Enterprise* (Springer 2009)

Dr. W. Art Chaovalitwongse (coauthors: S. Butenko and P.M. Pardalos) edited *Clustering Challenges in Biological Networks* (World Scientific 2009)

Dr. Tugrul Özel (coauthor: J. P. Davim) edited *Intelligent Machining* (Wiley, 2009)

PATENTS

Dr. W. Art Chaovalitwongse, "Optimization of Spatio-Temporal Patterns Processing for Seizure Warning and Prediction," United States Patent: US 7,461,045

AWARDS

FACULTY AWARDS

Dr. Melike Baykal-Gürsoy is the recipient of **2009 School of Engineering Teaching Excellence Award** awarded by the Rutgers Engineering Governing Council.

Dr. W. Art Chaovalitwongse, Ya-Ju Fan (ISE Ph.D. student), and Rajesh C. Sachdeo are the recipient of **2008 Pierskalla Award.** The award was based on the paper titled "Novel Optimization Models for Abnormal Brain Activity Classification."

Dr. David W. Coit is the recipient of the **Alan O. Plait Tutorial Excellence Award.** This award is for his tutorial entitled "Probabilistic Models and Statistical Methods in Reliability."

STUDENT AWARDS

The Outstanding Senior, Junior and Sophomore Awards are given to students who have demonstrated exceptional performance. This year the department presents the Outstanding Senior Award jointly to **Omar Pena** and **Qi Wen,** the Outstanding Junior Award to **Anthony Rosa,** and the Outstanding Sophomore Award to **Kevin Tang**.

The **Alfred A. Kuebler Award** was established in memory of Prof. Kuebler, who provided the inspirational force for the establishment of industrial engineering at Rutgers. **Zack Shands** was the recipient this year.

The 2009 **Roy Chen Award** is given jointly to **Vanessa Sanchez-Dominguez** and **Aminah Irizarry.**

The **Outstanding Teaching Assistant Award** is given to a graduate student who is a teaching assistant and has demonstrated exceptional performance. **Yaping Wang** was the recipient of the award this year.

The **Benjamin Willard Niebel Scholarship** is given to an outstanding student who is pursuing a course of study in industrial engineering with interest in methods, standards, and work design. The trustees awarded the 2009–10 scholarship to **Chris Krieger** (ISE junior).

The **Material Handling Society of New Jersey (MHSNJ) Award of Excellence** is presented to a group project that has used theoretical knowledge in the design and construction of a successful working model. This year's award is presented to **Anthony Rosa, Adarsh K. Dasika, Marc S. Fridson, Alyssa J. Gentz,**

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Awards

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Jayson A. Kolb, Chris W. Krieger, Joel Lora, Ramey P. Packer, Kashyap Purohit, Haithum A. Salem, and **Suni P. Sanghani.**

The Federal Aviation Administration (FAA) annually sponsors a national **FAA Design Competition** for Universities that engages students in addressing issues relating to airports. **Kelly Delpome** (ISE senior) is the runner-up in the Runway Safety/Runway Incursions Challenge.

Qi Wen (ISE senior) won the **IIE Regional Student Technical Paper Competition.** His technical paper is based on the senior design project "Automated Tennis Ball Collector."

The **Robert and Carole Michna Award** for undergraduate students based on performance and need will be awarded jointly to **Richard Lou, Jeet Dattani** and **Ramone Barnes** (ISE sophomores).

The Material Handling Education Foundation Scholarship Program promotes the study of material handling and to expose students to the material handling industry. **Jayson Kolb** (ISE junior) is the recipient of the **Frazier Industrial Honor Scholarship** and **Daniel Jeng** (ISE junior) is a recipient of the **Hanel Storage Systems Scholarship.**

Kevin Tang (ISE sophomore) has been selected as a **Rutgers Energy Discovery Summer Fellow** to work on the project "Using Linear Programming to Solve the Single Period Multi-objective Power Generation Expansion Planning Problem."

Kevin Tang (ISE sophomore) teamed up with Jessica Kretch, Rebecca Cohen, Kajal Patel, Arjun, under supervision of **Prof. Luxhøj,** to work on "Smart Power Strips—A Simple Idea to Combat a Complex Problem." Their project was tied for the first place in **Rutgers Energy Contest.**

Zhe Duan (ISE graduate student) received the 2009 TCC/FTA Fellowship Award to work under Dr. Baykal-Gürsoy's supervision on his project entitled "Man-Made Emergency Risk Measures in Transit Infrastructure."

Department News

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Dr. Hoang Pham gave plenary address, "The Reliability Challenges of Integrating Laboratory and Operating Environments," The 2nd International Conference on Modelling, Computation and Optimization in Information Systems and Management Sciences, Metz, France (Sept. 2008).

This newsletter is published for alumni, faculty, staff, and friends, by the Department of Industrial and Systems Engineering of Rutgers, The State University of New Jersey, Piscataway, NJ 08854

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