Rensselaer

ise
where i means interdisciplinary

Industrial and Systems Engineering

Welcome

John T. Wen
Head, Department of
Industrial and Systems
Engineering

IT HAS BEEN EXCITING AND EVENTFUL SINCE I BECAME THE HEAD OF THE INDUSTRIAL AND SYSTEMS ENGINEERING DEPARTMENT IN THE SUMMER OF 2013.

I want to first thank Charlie Malmborg for shepherding the department from 2006 to the summer of 2013 and for successfully leading the ABET accreditation reviews for the department, twice! The ISE undergraduate program has almost doubled from 100 students in 2006 to nearly 200 in the coming 2014-2015 academic year. In the face of this rapid growth, our faculty continues to make sure that our curriculum is relevant and challenging, preparing students well for successful careers and lifelong learning.

Prospective students and parents often ask: "What is ISE?" My background is in electrical engineering and mechanical engineering, so I had asked the same question. ISE is the study of systems — human-made and natural.

THE UNDERGRADUATE PROGRAM HAS ALMOST DOUBLED FROM 100 STUDENTS IN 2006 TO NEARLY 200 IN THE COMING 2014-2015 ACADEMIC YEAR

ise.rpi.edu

THE "I" IN ISE COULD JUST AS EASILY STAND FOR INTERDISCIPLINARY. INDEED, ISE IS UNIQUE AMONG ENGINEERING DISCIPLINES IN ITS FOCUS ON SYSTEMS INVOLVING THE INTERACTIONS BETWEEN HUMAN, MACHINE, AND NATURE.

ISE applies modeling, analysis, and design tools to understand these systems. For human-made systems, ISE makes them work efficiently and safely under many different operating conditions. For natural systems, ISE optimizes our ability to work effectively and harmoniously in our environment. I often use the example (paraphrasing Raja Chatila, president of IEEE Robotics and Automation Society) that if one were to send a single robot to explore the Moon, one would call on mechanical and materials engineers for the robot construction, electrical engineers for the control and communication of the robot, chemical engineers for propulsion, and so forth. But if one were to send 100 robots to the Moon to help astronauts build a colony on the Moon, industrial and systems engineers would spring into action to coordinate all the pieces, plan for contingencies, and make sure the system functions as a whole.

The "I" in ISE could just as easily stand for Interdisciplinary. Indeed, ISE is unique among engineering disciplines in its focus on systems involving the interactions between humans, machines, and nature. By working closely with other engineering disciplines as well as computer science, cognitive science, and management, ISE is the catalyst in addressing the grand challenges facing our society, including sustainability, security, health care, and quality of life. Our inherent interdisciplinary nature is reflected in our curriculum – with courses and dual major opportunities in management, computer science, and design innovation and society program.

Many of our faculty are actively engaged in research in high impact areas ranging from infrastructure resiliency to manufacturing, big data and healthcare. They are supported by federal agencies such as the National Science Foundation, Department of Homeland Security, Office of Naval Research, state agencies such as the New York Office of Science, Technology and Innovation and New York State Energy Research and Development Authority, as well as industrial companies, such as GlobalFoundries and Pratt and Whitney. ISE faculty actively participate in interdisciplinary research centers including Network Science and Technology Center (NeST), Center for Infrastructure, Transportation, and the Environment (CITE), Center for Automation Technologies and Systems (CATS), and Institute for Data Exploration and Applications (IDEA).

We all know ranking is a subjective evaluation that should be used with care. But it is still gratifying to see that our ISE departmental ranking in the US News and World Report improved from 25 to 18 in 2014. This does reflect how our peer departments around the country view us.

Our goals for the coming year involve expanding research opportunities for undergraduate students, increasing dialog and collaboration with industry, and renewing our faculty with passionate and outstanding scholars to help us take the department to new heights. The ISE Advisory Council, which was formed last year, consisting of alumni and friends of the department, is helping us towards our goals by providing guidance and support.

As the world around us becomes increasingly complex, systems-level/interdisciplinary thinking is needed more than ever. Let us work together to tackle these challenges!
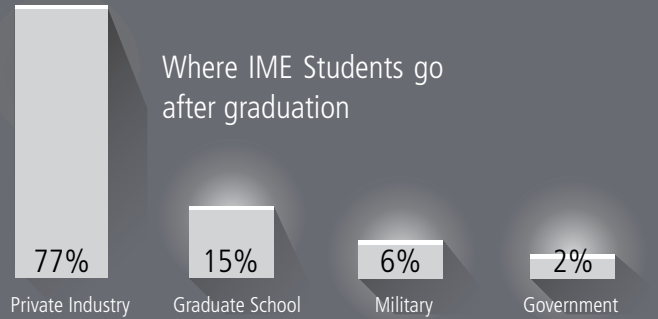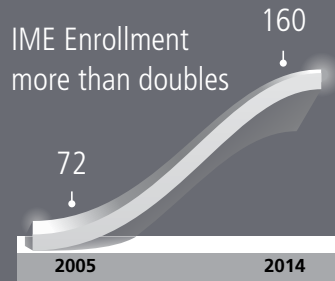
John Wen

John T. Wen, Professor, Department Head

US News and World Report Ranking improves from 25 to 18

ISE in TOP
20

Dual Major Opportunities: IME and Design, Innovation and Society (DIS), also possible with Electrical Engineering, Mechanical Engineering, Civil Engineering and Management.

IME Enrollment more than doubles

160

72

2005   2014

Where IME Students go after graduation

77% — Private Industry
15% — Graduate School
6% — Military
2% — Government

Current ISE Research Projects:

- Linking Team Fluidity to Organizational Performance in Team-Centric Organizations (Mendonca, Grabowski: NSF)
- Spare Parts Inventory Management (Ryan: NSF)
- Dynamic Resource Allocation for Law Enforcement (Sharkey: NSF)
- Network Improvisation in Emergency Response (Mendonca: NSF)
- Community Response to the Lisbon Earthquake (Mendonca: NSF)
- Scheduling Models for Supply Chain Restoration (Sharkey: NSF CAREER)
- Interdependencies of Restoration Efforts (Sharkey: NSF)
- Transition of Simulation Tools (Wallace: Sandia)
- Resiliency to Extreme Events (Wallace: DHS)
- Dynamic Modeling for Arctic Resource Allocation (Garrett, Sharkey, Grabowski, Wallace, DHS)
- Social Media and Emergency Information (Wallace: Army)
- Sustainable Buildings (Wen: NSF)
- Thermal Management under High Transient Heat Flux (Wen: ONR)
- Circadian Rhythm Modeling & Control (Wen: NSF and ARO)
- Material Evolution Modeling & Control (Wen: NSF)
- Compliant Robot Control (Wen: NASA Goddard)

ISE Research Theme: Network Analysis and Optimization Application Areas:

- Infrastructure sustainability and resiliency (social network, human-centric decision making, adaptive supply chain)
- Advanced manufacturing enterprise (inventory management, distributed control)
- Data-driven decision science (modeling and simulation, data analytics)

IME Welcomes New Faculty Wei Xie

Wei Xie, who completed her Ph.D. in April 2014 in the Industrial Engineering and Management Sciences, Northwestern University (advisors: Barry Nelson and Russell Barton), is joining the ISE department as an Assistant Professor in August. Wei received her B.S. in Mechanical Engineering from Yangtze University, M.S. in Mechanical Engineering from University of Nebraska, and M.S. and Ph.D. from Northwestern. She worked at Chengdu Construction Machinery and interned at GM and San Diego Supercomputer Center. Wei's doctoral research investigates the impact of input uncertainty on stochastic system performance. Her broader research interest and experience spans applied statistics, operation research, and data analytics.

Jamster helps Quadriplegic Individual to Gain Independence

ISE Head John Wen is taking an industrial robot designed to work alongside human – the Baxter by Rethink Robotics – to the assistive and healthcare domain. At the behest of a quadriplegic lawyer, David Whalen, who co-invented the Jamboxx, a harmonica-like device to play electronic music, Wen's group, in collaboration with Prof. Jonas Braasch in Architecture, combined the Baxter with a retrofitted wheel chair, and allowed the whole system to be commanded by the Jamboxx. This innovative system, called the Jamster, allows David to pick up items from shelves and floor and bring them to himself – something he could only dream of before.

Three undergraduate/co-terminal students, Andrew Cunningham, Will Keddy-Hector, and Utkarsh Sinha, participated in the undergraduate research program for this project and have now started a company, Cobotics, LLC.

ISE Researchers Address Decision Making in Supply Chain and Infrastructure Restoration

Thomas C. Sharkey
Assistant Professor

After a disruptive event impacts an area, like Hurricane Sandy in New Jersey and New York in late 2012, decision-makers in supply chain and infrastructure networks need to plan their restoration efforts with limited information about the other impacted systems' restoration efforts. For example, after Hurricane Sandy, these decision-makers had to address questions such as:

- Should a fuel supply chain attempt to dispatch supply trucks from out of the area to replenish reserves at gas stations or wait until the ports in the impacted area reopen?

- Should a power company wait until the Department of Public Works (DPW) clears a blocked road or have its own work crews clear the road so that it can begin repairing downed power lines in the area?

- Should a grocery store without power, and not knowing when it will be restored, send refrigerated products back to a warehouse to keep them from going bad?

These situations may imply that the decision-maker simply cannot assess the trade-off between taking action and waiting for the other system's response because the timing of the other's systems response is not known to the decision-maker. Professor Thomas Sharkey is considering new classes of optimization models and algorithms that can provide insights into forming supply chain and infrastructure restoration efforts with limited information in order to help address these types of questions. He is particularly interested in modeling problems where the restoration efforts of multiple supply chain and infrastructure networks are linked, similar to the situation when the power company needs a road cleared prior to repairing a downed line.

His research, with Sarah Nurre, PhD '13, has addressed how to formulate the restoration efforts of a single infrastructure when there is limited information about the 'release dates' of the other systems' restoration efforts. For example, the release date of a road clearance task would be when the DPW plans to finish this task and the power company may not have any information about this time. Their research has provided an analytic assessment of different strategies on when to use work crews to process tasks in their infrastructure and when to use them to shift the release date of tasks dependent on other infrastructures (for example, use a power work crew to clear a road).

In addition, Professor Sharkey is addressing the value of information-sharing across supply chains and infrastructure networks in restoration efforts of an extreme event. This information-sharing becomes increasingly important for situations in which restoration efforts are linked across these networks, like those examples described above. He is collaborating on this research with undergraduate students Jonathan Holman and Huy Nguyen, Burak Cavdaroglu, PhD '12, and fellow professors John Mitchell and Al Wallace. Their research has found that if supply chains and infrastructures simply announce their planned restoration efforts then there is a substantial improvement in terms of the restoration of services across systems from the baseline of completely independent decision-making with no information about the other systems' efforts.

Photo courtesy of Robert Sciarrino, The Star-Ledger. An example of when the power and road infrastructures' restoration efforts are linked.

Photo courtesy of John O'Boyle, The Star-Ledger. Should the fuel supply chain dispatch supply trucks from distant locations or wait until ports in the area are reopen?

New NSF Grants Awarded for Teamwork in Large Scale Disaster Response

David Mendonça
Associate Professor

ISE Associate Professor David Mendonça, in collaboration with Martha Grabowski of ISE, was recently awarded a three-year $337k grant from the National Science Foundation to investigate teamwork in organizations following large-scale disasters.

Using data from debris clearance operations following a series of calamitous tornado storms that struck Alabama in 2011, this work will investigate how team-level processes contribute to overall performance of the debris removal mission. In collaboration with the US Army Corps of Engineers and NY State's Department of Homeland Security and Emergency Management, Mendonça and Grabowski expect to develop analytic and computational methods that will expand understanding of teamwork in disasters and contribute to performance improvements in the multi-billion dollar enterprise of debris removal. Mendonça's research builds on a collaboration with James Brooks (ISE Ph.D. 2014) and his prior experience with Hurricanes Katrina, and Sandy. Mendonça gave an ENGtalk entitled "Network Improvisation in Emergency Response: An Application to Debris Removal Operations," which may be found at http://eng.rpi.edu/engtalk.

ENGTALK
little lectures on big ideas from Rensselaer engineers

eng.rpi.edu/engtalk

Learn more about Professor Mendonça's research by watching his ENGtalk: Network Improvisation in Emergency Response:
An Application to Debris Removal Operations

## Scheduling in a Semiconductor Fab with Queue-time Constraints

ISE professors Jennifer Ryan and Thomas Sharkey, along with ISE PhD student Michelle Park, have been working with Global Foundries on the development of new tools to improve production scheduling within a semiconductor wafer fab. Global Foundries is a global manufacturer of integrated circuits, with a 300mm fabrication plant located in Malta, NY.

Production scheduling in a wafer fab is among the most challenging scheduling problems found in practice, in part due to the extremely long and complex set of steps that must be completed to manufacture a single wafer. In addition, there are many places in the manufacturing process where a set of consecutive steps must be performed within a limited time period in order to avoid quality problems, including rework and scrap. These restrictions are referred to as queue-time constraints. While compliance with these constraints is critical, these constraints also make the production scheduling problem significantly more challenging to solve. Therefore, the ISE researchers has been working to develop practical and implementable methods to assist GLOBALFOUNDRIES in the management of these queue-time constraints. The ISE team has developed several alternative approaches to modeling the scheduling problem with queue-time constraints, along with appropriate solution methods. The researchers are now conducting numerical experiments to better understand which approach will perform best in large scale settings, such as a wafer fab.

Big Data Analytics in ISYE
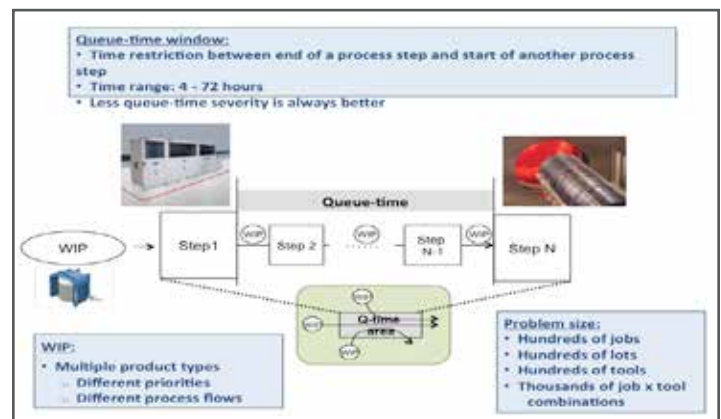
Mark J. Embrechts
Professor

The phenomena of Big Data and Analytics brings new life to the discipline of data mining. The newly minted ISYE course, Introduction to Big Data Analytics, taught by Professor Embrechts, will define and trace the origin of big data; answering the where, when, and why of Big Data Analytics.

Big Data is more than data mining on steroids. The vast amount of data mandates novel algorithmic approaches to Big Data Analytics. But there is more to come: Big Data often has a significant crowd-sourcing aspect and now places a heavy emphasis on data cleansing and outlier detection. Because of the nature of the data (often text and images) the first emphasis for Big Data Analytics is now on structuring the data.

This course will highlight the differences between data mining and Big Data Analytics and demonstrate some of the engineering approaches that are necessary for data-driven science and engineering applications of Big Data Analytics. Applications of Big Data Analytics range from algo-trading to real-time health monitoring. The figure shows past DARPA funded research performed by Christopher Gatti, an ISE Ph.D. student, under guidance of Prof. Mark Embrechts and Prof. Kristin Bennett from the Department of Mathematical Sciences at RPI on the recovery characteristics of microglia cells to assess the reliability of brain implant devices for controlling artificial limbs.

Visualizing and characterizing nature of microglia cells.

National Academy Report on Arctic Oil Spill Response led by Martha Grabowski

Martha Grabowski
Senior Research Scientist

As the oil industry prepares to exploit the Arctic's vast resources, the United States is inadequate in its preparedness for an oil spill in the region, according to a report released on April 23 by the National Research Council (NRC). ISE Senior Research Scientist Dr. Martha Grabowski is the chair of this report.

The 183-page report marks the first time in more than ten years that the NRC, an arm of the National Academy of Sciences, has taken a comprehensive look at the impact of oil and gas exploration in the Arctic. In the intervening decade, sea ice cover hit a record low, shipping traffic increased dramatically, and the price of oil rose sharply, prompting such companies as Shell, ExxonMobil, and ConocoPhillips to acquire new leases for oil and gas. Dr. Grabowski briefed Senator Begich and Senator Murkowski's staff, the State Department, the Senate and House Energy and Transportation subcommittees, and the 8 study sponsors —American Petroleum Institute, Bureau of Safety and Environmental Enforcement, Bureau of Ocean Energy Management, Coast Guard, NOAA, Prince William Sound Oil Spill Recovery Institute, and World Wildlife Foundation.

Dr. Grabowski has a number of active research projects related to disaster preparedness. The project Dynamic Modeling for Arctic Resource Allocation (DMARA) (with DSES doctoral student Richard Garrett and Professors T. Sharkey and W.A. Wallace), supported by the U.S. Department of Homeland Security Center of Excellence in Command, Control and Interoperability Center for Advanced Data Analysis (CCICADA) and U.S. Coast Guard is analyzing the role of dynamic networks, scheduling and resource allocation in support of Coast Guard Arctic missions for oil spill response, search and rescue, marine transportation and resource deployment in large-scale, mission critical systems. Dr. Grabowski journeyed to Alaska in May, June and November 2013 and in February, May and July 2014 to meet with Coast Guard, industry and oil and gas regulatory personnel in Anchorage, Juneau and Fairbanks, Alaska. In addition to these projects, Dr. Grabowski is also working with the Florida Department of Emergency Management (FDEM) to examine lessons learned and technology usage in disaster management preparation activities.
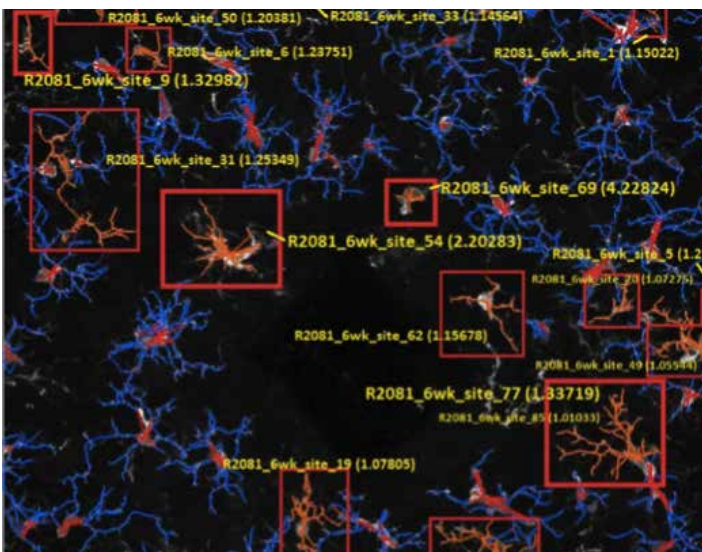
Smart Inventory Management in Aircraft Engines Maintenance

Jennifer K Ryan
Associate Professor

ISE professor Jennifer Ryan is developing methods for incorporating real-time sensor information into maintenance decisions, including decisions regarding when to perform machine repair or replacement and how to best manage maintenance and repair resources, such as workers, equipment and spare parts. This research is currently being supported by a National Science Foundation GOALI (Grant Opportunities for Academic Liaisons with Industry) grant in conjunction with industrial partner Pratt & Whitney, along with academic partners from the University of Massachusetts and the University of Connecticut.

The researchers are working to develop decision support tools to transform sensor readings (which can include temperature, pressure or vibration) from functioning machines into forecasts of demand for maintenance resources (particularly spare parts), as well as policies for more effectively managing those resources. For that purpose, the condition information collected by the sensors needs to be converted into decisions regarding when to service a particular machine, as well as predictions regarding what types of parts will be required to perform the maintenance. In addition, since machine deterioration is often driven by usage, the condition information must be combined with other relevant information, including planned usage of the machine (e.g., number of hours in operation) and operating conditions (e.g., stress, load, etc.).

The tools developed in this research will be useful for manufacturers who use complex equipment in their manufacturing processes, including semiconductor and pharmaceutical manufacturers. The advanced manufacturing processes employed in these industries make use of expensive, technologically complex and highly sensitive equipment. In addition, firms in these industries face intense pressure to reduce production costs, while guaranteeing consistent and high levels of quality. Thus, reducing unexpected downtime and maintaining high levels of utilization of this equipment is critical for the reduction of production costs. In addition, regularly and properly maintaining this sensitive equipment is critical to ensuring high levels of product quality.

This research is also of importance for the manufacturers who produce complex equipment that is sold to and used by customers, including aerospace and telecommunications equipment manufacturers. Firms in these industries are increasingly reliant on after-market revenues, i.e., revenues from maintenance contracts and the sale of spare parts, to maintain profitability. For example, the major aircraft engine manufacturers offer engine overhaul, maintenance and repair services to their customers through a variety of programs. Improved maintenance planning capabilities can lead to increased profits from these after-sales service programs. However, maintenance planning in this context is particularly challenging due to the fact the manufacturer may be monitoring and maintaining a large number of machines, being used by different customers under different operating conditions and in different locations.

Predicting Time until Maintenance Using Real-Time Sensor Readings
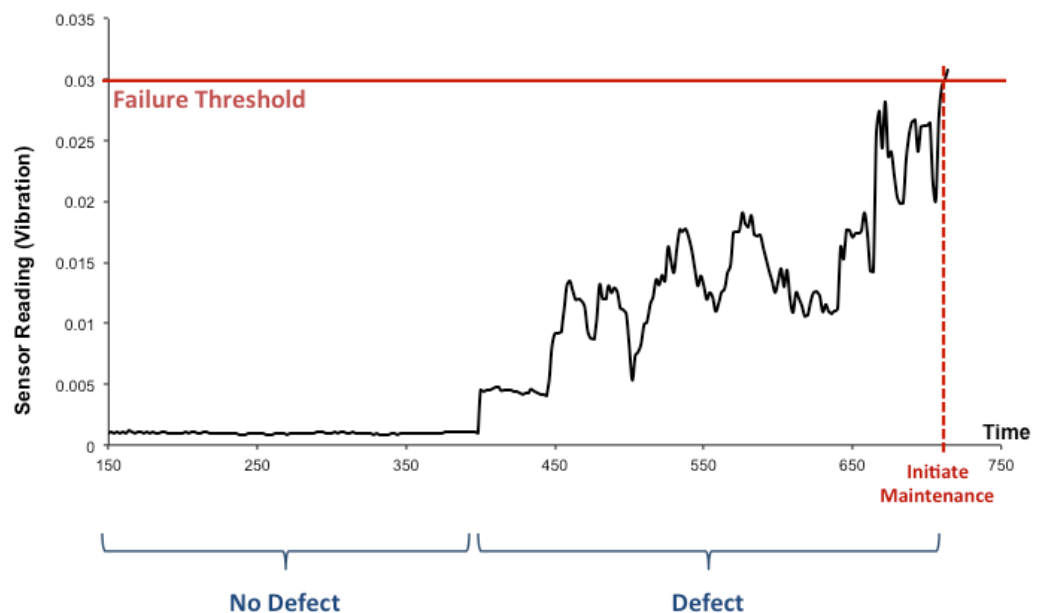
# ISE Faculty and Students Recognized Through Major Awards

ISE Student Awarded DHS Fellowship

Richard Garrett, a doctoral student in ISE, was awarded a Department of Homeland Security (DHS) Fellowship via the Command, Control, and Interoperability Center for Advanced Data Analysis (CCICADA) at Rutgers University. As a DHS Fellow, Richard will receive research support from DHS and tuition from RPI for up to three years in order to pursue research interests that are applicable to decision making and data analysis for homeland security.

CCICADA is a DHS Center of Excellence focusing on algorithmic methods for challenging problems in data analysis that address present and merging homeland security threats.

Richard's research is on providing decision support for optimizing oil spill response resource allocation in the Alaskan Arctic, in partnership with the United States Coast Guard. Richard is conducting this research with his advisors, Professors Thomas Sharkey, William A. Wallace, and Martha Grabowski.

Cheng Hsu Textbook a "Best Seller"
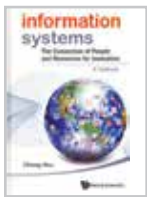
Cheng Hsu's textbook "Information Systems", published by World Scientific in Spring 2013 is currently listed as a "best seller" by the publisher.

Cheng Hsu Elected as 2013 Outstanding Alumnus by Tunghai

Professor Cheng Hsu has been elected an Outstanding Alumnus of Year 2013 by his alma mater, Tunghai University. He will receive the Award at the university's 58th anniversary ceremony on November 3rd, 2013 in Taichung, Taiwan. Tunghai University, founded by the United Board for Christian Higher Education in Asia in 1955, is the top-ranked private university in Taiwan and a leader among dozens of sister universities also founded by the United Board in Japan, Korea, and a number of other Asian countries.

ISE Faculty Awarded Patents

ISE Faculty Mark Embrechts is awarded US Patent # 8,744,557 on June 3, 2014 for his co-invention "Use of Machine Learning for Magetocariograms." This patent resulted from a collaboration between Prof. Embrechts and CardioMag Imaging in Latham, NY. ISE Faculty John Wen is awarded US Patent # 8.746,310 on June 10, 2014 for his co-invention "System and method for probe-based high precision spatial orientation control and assembly of parts for microassembly using computer vision." This patent resulted from a collaboration with the National Institute of Standards and Technology (NIST).

Mark Embrechts and Team Won Best Paper Award

ISE Professor Mark Embrechts' paper "The neural support vector machine," won the Best Paper Award in the highly selective 25th Benelux Conference on Artificial Intelligence (BNAIC 2013) held in Delft, The Netherlands, November 7-8, 2013. The co-authors are: M. A. Wiering, M. H. van der Ree, M. J. Embrechts, M. F. Stollenga, A. Meijster, A. Nolte, L. R. B. Schomaker,

Dan Berg Honored with the Siwei Prize

ISE Emeritus Professor Daniel Berg was honored with the Siwei Cheng Award at the International Academy of Information Technology and Quantitative Management (ITQM) held on June 3-5 in Moscow, Russia. The award was named after Dr. Siwei Cheng, a renowned economist in China. Dr. Cheng personally presented the award to Dr. Dan Berg at ITQM 2014. The citation of the award states: "The award, in honor of Siwei Cheng, is presented to Daniel Berg for his genius efforts in applying quantitative methods and information technology to solve management problems".

Professor Tom Willemain Retires

The entire ISE community expresses its profound gratitude to Professor Tom Willemain as he retires from full-time teaching and research to become an Emeritus Professor. Professor Willemain enjoyed a distinguished 27-year career at Rensselaer, first as an Associate Professor from 1986-1999 and as a Full Professor from 1999-2013. He has supervised 14 Ph.D. students and 4 Masters students. He is an excellent teacher, anchoring courses related to statistics and operation research. His statistics analysis course ISE 4140 is known among ISE students as the touchstone course and sets the standard. Tom is well known and respected in the forecast community. He serves on the editorial board of Foresight, the International Journal on Applied Forecasting. He has published two books, eighty-one archival journal papers and twelve book chapters.

John Wen Recognized by IEEE Control Systems Society

John T. Wen, head of ISE, received the 2013 Transition to Practice Award from the IEEE Control Systems Society. This prize is awarded "to recognize outstanding university-industry collaboration that enables the transition of control and systems theory to practical industrial or commercial systems." Wen's award was to honor his development of the Adaptive Scanning Optical Microscope (ASOM) and a high-precision laser scanning system for the electronic manufacturing industry.

AMP 2.0 Meeting Held at RPI

The Advanced Manufacturing Partnership (AMP) 2.0 is a national effort launched by President Obama to secure U.S. leadership in emerging technologies that will create high-quality manufacturing jobs and enhance America's global competitiveness. Rensselaer Polytechnic Institute and GLOBALFOUNDRIES co-hosted the AMP 2.0 Regional Meeting on April 24, 2014. This regional meeting, among several held around the country, engaged the manufacturing community in New York and surrounding states on key issues that include transformative technologies, workforce development and government policies. Attendees assessed the region's strengths and challenges in bringing advanced manufacturing innovation to small- and medium-sized businesses. The information generated at this regional meeting will help to inform the AMP 2.0 Steering Committee to develop specific policy recommendations for President Obama later this year. ISE Head, Dr. John Wen, is the overall organizer of this event.

ISE Suite Renovation

The ISE departmental office on 5th floor of the Center for Industrial Innovation went through a long overdue make-over with new carpet, fresh paint, coffee machine and a "Collaboration Room" with a 6-foot beautiful whiteboard. This room is designed to create an environment for informal discussion and exchange.

Growth and changes in IME program

The IME program blasted through its 2013 enrollment target of 150 IME undergraduate majors during this past academic year and is rapidly approaching its stretch goal of 200 undergraduates. At the current rate of growth, the program will triple its enrollment over the ten year period from 2005 through 2015.

To deal with this rapid growth, the ISE department will begin offering sections of its most highly enrolled required courses every semester as opposed to once per year starting in the 2014-2015 academic year. This change will also expand opportunities for the many IME majors who elect to pursue co-op's and study abroad programs.

Following on the recent strengthening of the computer science requirements in the IME curriculum, a new mathematics elective was added that can be satisfied either through a course in multi-variable calculus or a course in discrete structures. Just as the heightened computer science requirements strengthened the implementation skills on IME graduates, the strengthened mathematics requirements will enhance their basic technical skills.

IME students getting ready for the day-long conference (L-R): Jason Chang, Daniel Souza, Ron Nipay

IIE Chapter Honored

The IME Student's Chapter of IIE has won the Gold Award for the fifth time within the past six years. The chapter held numerous events this year, including monthly general meetings, Halloween professor meet-and-greet, student-faculty volleyball game and the Green Belt Certification clinic. Green Belt training is a three-day program. Participants learn about data collection and the interpretation of the data, specifically as it relates to the processes. 40 participants successfully completed the examination to receive the IIE Green Belt Certificate. For more information please contact professor Aboul-Seoud aboulm@rpi.edu

ISE Successfully completes 2013 ABET Re-accreditation for IME Program

The Industrial and Management Engineering (IME) program underwent a successful re-accreditation visit and has since been granted a full six-year renewal from the Accreditation Board for Engineering and Technology (ABET). Planning and preparation of the department's self-study report had been underway for over two years when the ABET team visited campus in November 2013. The department provided extensive documentation of the IME program including full course documentation, specimens of student work, information on faculty credentials and learning assessment results based on information collected from Industrial and Management Engineering senior portfolios which had been a graduation requirement for IME majors since 2009. The three-day visit involved participation of all ISE faculty and staff members, many current students and members of the ISE Advisory Board. Subsequent to the visit, the ISE faculty voted to approve a revised system for educational assessment based on twelve previously established learning outcomes for the IME program. The revised system will reduce the reporting and paper handling burden on current students and departmental staff while shifting increased responsibility for coordination and reporting to the ISE undergraduate committee.

ISE Graduates Embark on Careers in the Circus

Chris Gatti

Chris Gatti and Cindy Hui share a passion for gymnastics and acrobatics

Chris Gatti, an ISE doctoral student, has just completed his Ph.D. requirement in July under the mentorship of Professor Mark Embrechts. His dissertation, "Design of Experiments for Reinforcement Learning," was awarded the Springer Thesis Prize, and will be published by Springer as part of the new Dissertation Series. Chris is also an outstanding gymnast. Right after graduation, he was offered a position with Cirque du Soleil and is now training in Montreal with the first assignment in South America. Started at age 4, Chris trained and competed nationally through high school. He went on to compete for the University of Michigan, during which he was a three-time captain of the men's gymnastics team. He graduated in 2005 with a BSE in mechanical engineering and then obtained an MSE in biomedical engineering in 2007. He stayed at the University of Michigan and worked in research doing computational biomechanics and orthopaedics until 2010 at which point he began further graduate work in the department of Industrial and Systems Engineering at Rensselaer.

Cindy Hui received her doctorate from DSES in 2011. She worked as a post-doctoral research associate at the Rutgers University Homeland Security Center of Excellence in Command, Control and Interoperability Center for Advanced Data Analysis (CCICADA) from 2011-2013 and joined ISE as a Lecturer in 2013. Cindy discovered her passion in acrobatics in 2012 after graduate school. She is now training to be an aerial acrobat in Chicago.

Cindy Hui

ISE TODAY :: FACULTY & RESEARCH AREAS

Mohamed Aboul-Seoud: Project Management, Reliability Engineering

Victor Chan: Discrete Event Simulation, Simulation Based Optimization

Mark Embrechts: Computational Intelligence, Big Data, neural networks

William Foley: Engineering Design, Classical IE Methods, Health Systems

Martha Grabowski: Safety-critical Systems, Risk Analysis/Mitigation

Cheng Hsu: Service Systems Engineering, Discrete Event Simulation

Charles Malmborg: Material Flow Logistics, Facility Layout and Design

David Mendonca: Human Factors in Disaster Planning/Response, Group Decision

Jennifer Ryan: Bayesian Statistics, Stochastic Modeling of Supply Chains

Thomas Sharkey: Network Optimization, Math Programming

William A. Wallace: Decision Technologies for Dynamic Social Systems

John T. Wen: Distributed Control, Dynamical Systems, Robotics

Wei Xie: Applied Statistics, Data Analytics, Stochastic Simulation

ISE Class of 2014 Commencement Awards Winners

Dr. Sara Nurre

Kaori Bigler

Amy Seiler

Shoshanna Gabrielle Rubenstein

The Del and Ruth Karger Dissertation Prize is awarded to a DSES doctoral degree graduate in ISE whose doctoral dissertation is deemed outstanding.

Winner: Dr. Sara Nurre (Sandia Lab) Dissertation Title: Integrated Network Design and Scheduling Problems: Optimization Algorithms and Applications (Advisor: Tom Sharkey)

The Ray Palmer Baker Prize (1937) is established by bequest of Vjera C. Ricketts, widow of President Ricketts. It is awarded at Commencement to a senior in management engineering who has demonstrated outstanding ability in academic work and gives promise of outstanding professional success.

Co-Winners: Kaori Bigler and Amy Seiler.

Charles D. Dyce Prize (1975) was established by friends in memory of Charles D. Dyce, Class of 1972. It is awarded to a student in the School of Engineering who, at the conclusion of the freshman or sophomore year, has demonstrated high scholastic ability and involvement in extracurricular activities and indicates potential for constructive leadership.

Winner: Shoshanna Gabrielle Rubenstein

ISE welcomes new PhD students

Nail Baycik

Prasanna Date

Huy Nguyen

Hongtan Sun

Yuan Yi

Xin Zhang

Below: Some of the Class of 2014 with Class Advisor Professor Cheng Hsu

ise.rpi.edu

IME Graduates Enjoy Outstanding Placements in 2014

Graduates of the IME program enjoyed another year of outstanding industry placements during 2014. Marquee corporate names appear on this year's placement list including Exxon, Deloitte, Credit Suisse, General Electric, UTC, Goldman Sachs, W.L. Gore, Nestle, Schlumberger, Disney, L'Oreal, Bloomberg and many other recruiters representing an impressively broad range of industries and economic sectors. .