



LOUISVILLE CARDINAL UPDATE

Department of Industrial Engineering

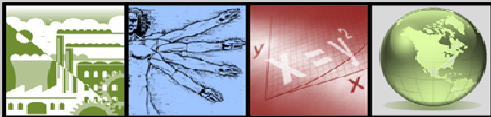
Spring 2011

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A word from the chair...

John S. Usher, PhD, PE



It is with great pleasure that I write to keep you posted on what's happening here at the University of Louisville's Department of Industrial Engineering.

I am very proud to announce that in Summer 2010 we learned that our school is the first in the country to receive dual-level accreditation by the EAC of ABET for our baccalaureate and masters of engineering degree programs. To learn more, see the full article on the last page.

Our five-year integrated program, with three full semesters of required cooperative internship, provides students the opportunity to earn the BSIE and the MEngIE degrees, plus accumulate a year of paid engineering experience working at great companies such as UPS, Ford, GE, Disney, and many more. As a result our graduates are finding outstanding job opportunities, even in these difficult times, and after all, that's what we are here for.

I am also proud of the hard work of the IE faculty over the past year. While not large in number, this group is certainly productive. The department's research funding level is at an all-time high with nearly \$8 million of funding in force with an IE serving as a PI or Co-PI. Grants from the Office of Naval Research (\$2.2 million), Defense Logistics Agency (\$1.7 million), the Department of Homeland Security (\$3.3 million) and the National Science Foundation (\$260K), are providing countless opportunities for our faculty and graduate students.

We have also been extremely proactive in attracting students to our programs. Our undergraduate student numbers have grown by 22% over the past two years. Our graduate student base has nearly doubled in that same time frame. The solid core of on-campus graduate students in our MSIE, PhD, and MEng in Engineering Management programs has been supplemented by a large influx of students to our two international programs, (MEngEM in Panama, and a PhD in Germany). In 2010 we granted 101 degrees; our largest number since 2006.

It is an exciting time to be here at U of L and I am happy to be a part of it!





Dr. Suraj Alexander - *Professor*

Quality assurance, monitoring, diagnosis and control, production systems, decision support systems.



Dr. Lihui Bai - *Assistant Professor—Term*

Computational Optimization, Congestion Pricing, Transportation Science, Modeling in Supply Chain Mgmt.



Dr. William Biles - *Professor*

Experimentation and optimization in simulation, advanced polymer composites, rapid prototyping



Dr. Lijian Chen - *Assistant Professor*

Operations research, stochastic programming, pricing models, logistics and transportation.



Dr. Gail DePuy - *Professor*

Production planning, applied operations research, healthcare systems, logistics and distribution.



Dr. Gerald Evans - *Professor*

Simulation modeling, optimization, multi-objective decision analysis, logistics and project management.



Dr. C. Tim Hardin - *Assistant Professor-Term*

Artificial Intelligence, swarm theory, computer simulation



Dr. Sunderesh Heragu - *Professor and Duthie Chair for Engineering Logistics*

Healthcare/defense logistics, facilities design, intelligent agent modeling, decision support systems, optimization.



Dr. G. Talley Holman - *Assistant Professor, Director, Center for Ergonomics*

Healthcare systems design, biomechanics, ergonomics, human factors and safety.



Dr. Brent Stucker - *Professor and Clark Chair of Computer Aided Engineering*

Additive manufacturing, new materials development, ultrasonic consolidation, laser based metal deposition.



Dr. John Usher - *Professor and Chair*

Reliability and maintainability, quality control, facility layout, and material handling systems.



Dr. Mickey R. Wilhelm - *Professor and Dean of Engineering*

Facility location and layout, materials handling, applied operations research, fuzzy sets.



2010 Refereed Journal Articles In Print

- Bai, L., Hearn, D.W., & Lawphongpanich, S. A heuristic method for the minimum toll booth problem. *Journal of Global Optimization*, 48(4): 533-548. (2010).
- C. Ozgur and L. Bai, "Hierarchical Composition Heuristic for Asymmetric Sequence Dependent Scheduling Problems," *Operations Management Research*, 3(1-2), pp. 98-106, 2010.
- Zhang, J., Bai, L., & He, Y. Fill Rate of General Periodic Review Two-stage Inventory. *International Journal of Operational Research*, 8(1): 62-84.; (2010).
- Chen, L., & Alexander, S. Revenue Management in Special Service Industries. *Journal of Revenue and Pricing Management*, 9(3): 260-275. (2010).
- Kuruvilla, A. and Alexander, S.M., Predicting Ambulance Diversion, *International Journal of Information Systems in the Service Sector*, Vol. 2., No. 1; pp. 1-10, (2010).
- Chen, L. and Alexander, S.M., Capacity Driven Pricing Mechanism in Special Service Industries, *The Journal of Revenue and Pricing Management: Special Issue on Pricing and Revenue Models in the New Service Economy*, Vol. 9., No. 3, pp. 260-275, (2010).
- Pfenndt, A., Boyoglu, S., Chen, L., Singh, S., & Willing, G. Adhesive and Mechanical Properties of RSV Infected Human Epithelial Cells. *Journal of Adhesion Science and Technology*, 25, 521-535.
- Sharma, D.K., Cui, Q., & Chen, L. Balancing Public and Private Interests in PPP Contracts through Capital Structure Optimization. *Journal of Transportation Research Board, Construction 2010*, 1, 60-66. (2010).
- Ekren, B., & Heragu, S.S. Approximate Analysis of Load Dependent Generally Distributed Queuing Networks with Low Service Time Variability. *European Journal of Operational Research*, 205(2): 381-289. (2010).
- Ekren, B., Heragu, S.S., Krishnamurthy, A., & Malmberg, C.J. Simulation Based Experimental Design to Identify Factors Affecting Performance of AVS/RS. *Computers and Industrial Engineering*, 58(1): 175-185. (2010).
- Ekren, B., & Heragu, S.S. Simulation Based Regression Analysis for Rack Configuration of Autonomous Vehicle Storage/Retrieval Systems. *International Journal of Production Research*, 48(21): 6257-6274. (2010).
- Yang, X., Heragu, S.S., & Evans, G.W. Integrated Production-Inventory-Distribution Optimization in a Multi-echelon, Multi-product, Multi-carrier, Multi-period System. *International Journal of Value Chain Management*, 4(3): 267-287. (2010).
- Zhang, L., Krishnamurthy, A., Malmberg, C.J., & Heragu, S.S. Performance Modeling of Autonomous Vehicle Storage and Retrieval Systems with Generally Distributed Service Times. *European Journal of Industrial Engineering*, 5(4): (2010).
- Holman, Blackburn, & Maghsoodloo. The Effects of Restricted Space on Patient Handling. *Professional Safety*. 6/2010, 38-46. (2010).
- Holman, Ellison, Maghsoodloo, & Thomas. Nurses' perceptions of how job environment and culture influence patient handling. *Journal of Orthopaedic and Trauma Nursing*. 14(1), 18-29, (2010)
- Moghaddam, K., & Usher, J. Optimal Preventive Maintenance and Replacement Schedules with Variable Improvement Factor. *Journal of Quality in Maintenance Engineering*, 16(3): 271-287.; (2010).
- Obielodan, J.O., Janaki Ram, G.D., & Stucker, B. Minimizing Defects between Adjacent Foils in Ultrasonically Consolidate Parts. *Journal of Engineering Materials and Technology*, 132(1), (2010).
- Obielodan, J.O., Ceylan, A., Murr, L.E., & Stucker, B. Multi-Material bonding in Ultrasonic Consolidation. *Rapid Prototyping Journal*, 16(3): (2010).
- Rao, P., Janaki Ram, G.D., & Stucker, B. Effect of Friction Stir Processing on Corrosion Resistance of Aluminum-Copper Alloy Gas Tungsten Arc Welds. *Materials and Design*, 31(3): 1576-1580.; (2010).
- Yang, Y., Janaki Ram, G.D., & Stucker, B. An Analytical Energy Model for Metal Foil Deposition in Ultrasonic Consolidation. *Rapid Prototyping Journal*, 16(1): 20-28. (2010).
- Yang, Y., Janaki Ram, G.D., & Stucker, B. Mechanical Properties & Microstructures of SiC Fiber-reinforced Metal Matrix Composites Made Using Ultrasonic Consolidation. *Journal of Composite Materials*, 44(26): (2010).



2010 Funded Projects

- Real-time Decision Support System for Use in Healthcare and Public Health", Department of Homeland Security, PI: S.S. Heragu, various co-PI's, \$3,314,000, Jan. 2010—Dec 2012
- RFID Technologies - Tech Center at the University of Louisville", Department of the Navy, Defense Logistics Agency, PI - Heragu, various co-PI's, \$1,720,000. Sep 2010—Feb 2012.
- Collaborative Proposal: EARly-concept Grants for Exploratory Research (EAGER): Design Principles for Warehouses with Autonomous Vehicles (WAVE)", National Science Foundation, PI's: S.S. Heragu (University of Louisville) and A. Krishnamurthy (University of Wisconsin-Madison), \$260,000, Oct 2009—Sep 2011.
- Direct Digital Manufacturing Phase I , Office of Naval Research, PI: Usher, Co-PI, Starr, Gornet, \$1.2 million, Dec 2008—Jun 2011.
- Direct Digital Manufacturing Phase II , Office of Naval Research, PI- Starr, Co-PI: Usher, Gornet, Stucker. \$1.35 million, Jul 2010—Sep 2012.



Graduate Spotlight

Dr. Kamran Moghaddam, is a Post-Doctoral Associate in the Logistics and Distribution Institute (LoDI) at the University of Louisville. He received his Ph.D. degree in Industrial Engineering from the University of Louisville in 2010, his B.S. degree in Applied Mathematics from the University of Tehran and M.S. degree in Industrial Engineering from Tehran Polytechnic. Dr. Moghaddam was an industrial engineer, and later a project manager at the Tehran Comprehensive Transportation and Traffic Studies Company (TCTTS) during 2002-2006. Over the past 10 years, he has conducted work and research in the field of industrial and systems engineering in a variety of environments. His previous research and projects relied on simulation and optimization of multi-reservoir system operation and development of mathematical and computer models for logistics systems. His Ph.D. dissertation dealt with development of mathematical models for maintenance and replacement scheduling in multi-component systems. He is currently working on development of real-time decision support system for healthcare and public health protection sponsored by Department of Homeland Security. Dr. Moghaddam is a Certified Quality Engineer and is serving American Society for Quality (ASQ) in Louisville as the Voice of the Customer Chair. He hopes to find a permanent faculty position as an Assistant Professor in Industrial Engineering, Operations Research, or Business Management.



Contact him at: ksmogh01@louisville.edu

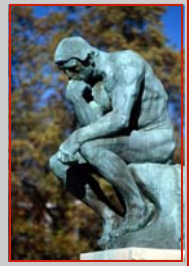


IE Degrees Awarded in 2010

Bachelor of Science in Industrial Engineering (BSIE): 16
Master of Engineering in Industrial Engineering (MEngIE): 10
Master of Engineering in Engineering Management (MEngEM): 40
Master of Science in Industrial Engineering (MSIE): 31
PhD in Industrial Engineering (PhD): 4 **TOTAL=101**

Students:

113 undergrad
152 graduate
265 TOTAL



IE Student Simulation Helps Needy Families

IE graduate student, Russell Harpring, placed third in the 2010 IIE Great Lakes Valley Region, Technical Paper competition for his simulation model to improve the process flow at the Family Support Division at the



Kentucky Cabinet for Health and Family Services (CHFS) which provides benefits (KTAP - Kentucky Temporary Assistance Program) to needy families. Russ has been working under the direction of IE professor, Dr. Gerald Evans, and Dr. Rod Barber and Dr. Stacy Deck of the Kent School of Social Work. Russ plans to complete the work as part of his masters thesis.

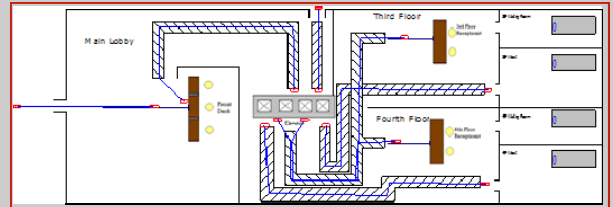


Photo: IE Students, Juan Martinez, Russ Harpring, Andy Eastes, and David Aizpurua

iPhone Barcode App

The real-time decision support systems (RTDSS) lab in the IE department has developed a simple iPhone application that serves as a barcode scanner. This simple tool has significant application potential in two of the projects being pursued in the lab. Using an iPhone, a hospital employee (e.g., a nurse or support staff) is able to upload the status and location of key resources such as ventilators, intensive care unit (ICU) beds, pediatric beds and so on, to a remote database via the internet or the cellular data network connection available on the iPhone. While hospitals currently entered this data into a hospital database, there is often a significant time lag between when the equipment status changes and this information is updated and made available to others who need the information. Testing with the application and incorporation of new features are currently underway. For more information contact Dr. Sunderesh Heragu, s.heragu@louisville.edu



Dr. Tim Hardin Joins IE Faculty

Dr. C. Tim Hardin joins the IE faculty as an Assistant Professor-Term. Dr. Hardin specializes in artificial intelligence, swarm theory, and computer simulation. He is currently teaching courses in Engineering Economics, and Computer Application in Industrial Engineering. With degrees in Industrial Engineering and Computer Engineering/Computer Science, he is the resident hacker/gizmo/gadget guy on the IE faculty, having been recently featured on the cover of *Leo Weekly*. His love of radio controlled airplanes is serving us well, as he is the faculty mentor to a team of IE students competing in the Speed School "Solar Flight Competition". We want to welcome him to the faculty and wish him well.



IE NEWS and EVENTS

Dr. Mickey Wilhelm To Return to IE Faculty

Dr. Mickey Wilhelm, is stepping down as Dean of Engineering in June of 2011. At the conclusion of his term, he plans to complete a one-year sabbatical, and then will return to his position as Professor of Industrial Engineering. He was appointed the seventh dean of the J. B. Speed School of Engineering in May 2004. A member of U of L's engineering faculty since 1975, Wilhelm served as acting dean from October 2003 until May 2004, associate dean of engineering from 1994 to 2003, Director of U of L's Logistics and Distribution Institute from 2002 to 2004, and Industrial Engineering Department chairman from 1986 to 1993. A licensed professional engineer, Wilhelm is also a researcher and consultant in facilities planning and design, materials handling, systems analysis and industrial engineering. In the early 1970s he taught at The University of Alabama in Huntsville, AL where he earned his bachelor's, master's and doctoral degrees and where, in March 2004, he received the Alumni Achievement Award. Wilhelm was a visiting faculty fellow at the Center for Economic Research at Tilburg University in the Netherlands during his 2001 sabbatical, and was a summer research faculty fellow at the George C. Marshall Space Flight Center in Huntsville. He is a fellow of both the Institute of Industrial Engineers and the World Academy of Productivity Sciences.



Wilhelm serves on the Kentucky State Board Licensure for Professional Engineers and Land Surveyors, and on the board of the Greater Louisville Inc. Logistics Network. Dr. Wilhelm has been instrumental in countless projects to improve the engineering school, most notably the complete renovation of the Duthie Center for Engineering, the formation of two new departments (Bioengineering and Engineering Fundamentals), and the formation of the Conn Center for Renewable Energy Research and Environmental Stewardship. The school is completing the search for a new Dean, with an announcement expected soon.

The Department of Industrial Engineering would like to thank Mickey for his outstanding leadership!

Speed Programs Receive Dual-Level Accreditation

University of Louisville J.B. Speed School of Engineering Bachelor's degree programs in bioengineering, chemical engineering, civil engineering, computer science and computer engineering, electrical engineering, *industrial engineering*, and mechanical engineering have been accredited by the Engineering Accreditation Commission (EAC) of ABET, Inc., the recognized accreditor of college and university programs in applied science, computing, engineering, and technology. EAC of ABET accredited Master of Engineering degrees have been offered for over 20 years in all of the disciplines listed above (except bioengineering, which underwent an initial M.Eng. accreditation evaluation in Fall 2010.)

Speed School Dean, Dr. M. R. Wilhelm, said that "The school is very proud to be the first engineering school to achieve dual-level accreditation by EAC of ABET for its baccalaureate and master of engineering programs." ABET is a not-for-profit organization, owned and operated by its more than 25 professional and technical member societies. An internationally respected organization with some 1,500 volunteers, ABET has set the higher-educational standards in its fields for nearly 75 years. More information about ABET, its member societies, and the evaluation criteria used to accredit programs can be found at:

www.abet.org

For more information about Industrial Engineering, go to:

<http://louisville.edu/speed/industrial>

