



LOUISVILLE CARDINAL UPDATE

Department of Industrial Engineering

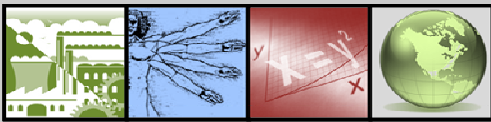
Spring 2009

Inside Stats

- *Faculty Listing*
- *2008 Research*
- *2008 Publications*
- *2008 Degrees*

Check out our new website!

louisville.edu/speed/industrial



News and Events

- *ABET Accreditation*
- *Holman Joins Faculty*
- *Big Changes for Kersey*
- *German PhD Program*
- *Tau Beta Pi Sculpture*

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.

As I look at my calendar I see that commencement is upon us once again. While the ceremony itself can be long and drawn out, as that seemingly endless list of names is read, I really do enjoy the whole process. The caps and gowns, the history of it, and the pure sense of accomplishment that each graduate feels as their name is called. I love watching their faces as they walk across that stage, with the occasional whoop and holler from a loved one in the crowd. There is nothing quite like the joy you get when you finally earn that degree. I remember it well (and I am sure you do too). Another thing that makes me proud is to see that, our IE graduates aren't just getting a piece of paper. Despite the economic downturn, we are seeing our graduates land great jobs here in the Louisville area with companies such as UPS, GE, Raytheon, and the US Postal Service. I attribute this in part to our 5-year integrated BSIE and MEngIE program which produces graduates with an ABET accredited masters degree. I also credit our requirement that every IE student complete three semesters of cooperative internship, working full-time in industry, in order to earn their BS degree. Because of this, most of our graduates have an extra year of school and a year of much needed IE industry experience.

I also want to take a moment, and welcome Dr. Tally Holman, PhD from Auburn, who joined us April 15 as an Assistant Professor. We are enthusiastic about his work in human factors and health care systems design, and his ability to position us well within the vibrant health care industry in this region. We are also very excited about a recent \$1.16 million grant from the Office of Naval Research to study Direct Digital Manufacturing. The project aims to develop a much needed database of material properties on Direct Metal Laser Sintered parts so that more consistent results can be obtained. To learn more about this project and more...check out the listing of research projects inside.

Thanks for reading this issue of the *Louisville Cardinal Update* and have a great summer!



Dr. Suraj Alexander - *Professor*

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



Dr. William Biles - *Professor and Clark Chair in Computer Aided Engineering*

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



Dr. Naira Campbell-Kyureghyan - *Assistant Professor*

Biomechanics, industrial injuries, finite element model, ergonomics, control theory and optimization.



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

Supply chain management, facility design, intelligent agent modeling, RFID technology, optimization.



Dr. G. Talley Holman - *Assistant Professor*

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



Dr. Herman Leep - *Professor*

Manufacturing, process planning, cellular manufacturing systems, and cost estimating systems.



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.



2008 FUNDED PROJECTS

19 projects totaling \$5.363 million in force:

- "A Wireless Electronic Monitoring System for Securing Milk from Farm to Processor", S.M. **Alexander**, with Fred Payne (UK), William Crist (UK), Tim Stombaugh(UK), Chris Thompson(UK), Phillip Womble (WKU), \$1,500,000.
- "Development and Field Testing of a Shopping Mall and Public Facility HVAC Explosives Monitoring System", S. M. **Alexander**, with Keynton, Walsh, Naber, Roussel, Martin, and Jackson, \$1,205,184.
- "Evaluation and Injury Prevention among Sonographers", N. **Campbell** with P. Quesada, UofL Hospital, \$17,800, May 07-Mar 08.
- "Improving Safety and Ergonomics at EON Facilities-Phase I-II", N. **Campbell**, with K. Cooper, EON-US, \$96,000, 6/08 - 12/08.
- "Ergonomics Training for Managers and Employees in Small Business foundries", N. **Campbell** with K. Cooper, Dept Labor, OSHA, \$165,000, 10/08-10/09.
- "Muscle Fatigue and Oxygen Saturation Level", N. **Campbell**, Somanetics Inc., \$25,000, 2006-2008.
- "Effect of tablet PC usage on Musculoskeletal Discomfort and Educational Outcomes", N. **Campbell**, with K. Cooper, C Sommerich, \$10,000, University of Louisville.
- "Factory Physics", S. **Heragu**, with L. **Chen**, \$50,000, Factory Physics Inc, 2008-2009.
- "Large-Scale Workforce Training Schedule for Logistics Skills-CELDi Membership", **DePuy**, G., and J **Usher**, NSWC - Crane, \$55,000, 7/06-6/07.
- "A Multiobjective Decision Support System for Workforce training and Logistics Project Scheduling", **DePuy**, G., **Evans**, G., CELDI - Center Designated Project, \$40,000, 9/07-9/08.
- "Automated Demand Characterization and Requirements Determination", **DePuy**, G., with Yongpei Guan, CELDI - Center Designated Project, \$40,000, 6/07-7/08.
- "Analysis of Trucking Strategies at GE", General Electric Appliances, **Evans**, G., and S. **Heragu**, \$50,000, 8/1/06 to 1/31/08.
- "Quantifying the Costs and Benefits of Product Variety on Key Performance Measures", **Evans**, G., and **Heragu**, S., Emcien, \$50,000, 9/07-8/08.
- "A simulation based Tool for Workforce Planning at Louisville MetroSafe", **Evans**, G., Louisville Metro Government, \$29,000, 9/07-2/08.
- "Application of Decision Analytic Methods to Project and Risk Management Functions at NASA", **Evans**, G., NASA Space Consortium Grant, \$30,000, 6/07-4/08.
- "Conceptualization Tools for Unit Load Warehouse Design Based on Autonomous Vehicle Technology", National Science Foundation, S.S. **Heragu**, with A. Krishnamurthy and Charles J. Malmborg, \$340,350, 8/05-7/08.
- "Collaborative Research: Center for Logistics and Distribution (CELDi)", National Science Foundation, S.S. **Heragu** and J.S. **Usher**, \$405,000 6/02-7/12.
- "Collaborative Supplemental Research: Studying the Impact of RFID in the Design and Analysis of Next Generation Distribution and Logistical Systems, NSF, **Heragu**, S., R. Ingalls \$149,911, Aug 08-July 2009.
- "Direct Digital Manufacturing Research", **Usher**, J.S., with Starr, T. and Gornet, T., \$1,160,000, Office of Naval Research, Jan 2009-June 2010.



2008 PUBLICATIONS – Refereed Journals

- Zhang, J. and Alexander, S.M. "Fault Diagnosis in Injection Molding via Cavity Pressure Signals", *International Journal of Production Research*, Vol. 46, No. 22. pp 6499 - 6512 (2008)
- Kohli, A.S., Alexander, S.M., Gupta, M.C., "A Dynamic Simulation Study to Assess the Impact of Collaboration on the Performance of a Supply Chain Subject to a Variety of Demand Environments", *The Journal of Management and Engineering Integration*, Vol.1, No. 1, pp. 73-87 (2008)
- Leijnse, J., Campbell-Kyureghyan, N., Spektor, D., Quesada, P. "Assessment of Individual Finger Muscle Activity in the Extensor Digitorum Communis by Surface EMG", *Journal of Neurophysiology*, v.100: pp 3225-3235, 2008
- Hepdogan, S., R. Moraga, G.W. DePuy, and G.E. Whitehouse, 2008. "Nonparametric Comparison of Two Dynamic Parameter Setting Methods in a Meta-Heuristic Approach," *Journal of Systemics, Cybernetics and Informatics*, Vol. 5, No. 5, pp. 46-52, 2008.
- F. Du and G.W. Evans, "A Bi-Objective Reverse Logistics Network Analysis for Post-Sales Service," *Computers and Operations Research* 35:8, pp. 2617-2634, August 2008.
- I.H. Garbie, H.R. Parsaei, & H. R. Leep, "Measurement of Needed Reconfiguration Level for Manufacturing Firms," *International Journal of Agile Systems and Management*, Vol. 3, Nos. 1 and 2, pp. 78-92, 2008.
- I.H. Garbie, H.R. Parsaei, & H. R. Leep, "Machine Cell Formation Based on a New Similarity Coefficient," *Journal of Industrial and Systems Engineering*, Vol. 1, No. 4, pp. 318-344, Winter 2008.
- Campbell-Kyureghyan, N., Marras, W. "Combined Experimental and Analytical Model of the Lumbar Spine Subjected to Large Displacement Cyclic Loads. Part I. Model Development, to appear *Intl. J. for Comp. Vision and Biomechanics*".
- Campbell-Kyureghyan, N., Marras, W. "Combined Experimental and Analytical Model of the Lumbar Spine Subjected to Large Displacement Cyclic Loads. Part II. Model Validation, to appear *Intl. J. for Comp. Vision and Biomechanics*".
- L. Chen and S. Sondhi, "Revenue Management in Extra Space Storage", to appear *Intl Journal of Revenue Management*.
- A. Gupta and G.W. Evans, "A Goal Programming Model for the Operation of Closed Loop Supply Chains," accepted for publication in *Engineering Optimization*.
- L. Zhang, A. Krishnamurthy, C. J. Malmborg, and S.S. Heragu "Variance-Based Approximations of Transaction Waiting Times in Autonomous Vehicle Storage and Retrieval Systems", *European Journal of Ind. Eng.*, Vol. 3, No. 2, pp. 146-169, 2009.
- G. Meng*, S.S. Heragu and H. Zijm, "Two-level Analysis of Manufacturing Systems with Cells or Departments," *Intl Journal of Production Research*. Published online, see digital object identifier (DOI) 10.1080/00207540701670529, 2008.
- J. Jia* and S.S. Heragu, "Analysis of Semi-Open Queuing Networks via Analytical Matrix Geometric Methods," to appear in *Operations Research*.
- I.H. Garbie, H.R. Parsaei, & H.R. Leep "A Novel Approach for Measuring Agility in Manufacturing Firms," to appear *Intl. Journal of Manufacturing Technology and Management*.
- G. Jeon & H.R. Leep "A Vehicle Routing Problem Solved by Using a Hybrid Genetic Algorithm," to appear *Journal of Computers & Industrial Engineering*.



Degrees Awarded in 2008

- Bachelor of Science in Industrial Engineering (BSIE): 19
- Master of Engineering in Industrial Engineering (MEngIE): 6
- Master of Engineering in Engineering Management (MEngEM): 30
- Master of Science in Industrial Engineering (MSIE): 13
- PhD in Industrial Engineering (PhD): 5



Total IE Students = 171

- 92 undergraduate
- 79 graduate



Degree	2007	2008
BSIE	12	19
MEngIE	14	6
MEngEM	43	30
MSIE	9	13
PhD	3	5
	81	73

New Speed School statue reminds students of importance of true integrity

By Kevin Hyde - The new sculpture at the J.B. Speed School of Engineering makes a striking first impression on those entering the school. But Bernie Dahlem, the engineering alumnus who was a driving force behind the sleek, polished-black statue, wants it to have a lasting impression on those leaving. Mounted on a pedestal directly in front of the J.B. Speed Building on Eastern Parkway, the 6-by 8-foot sculpture is a fabrication of the "bent," the official symbol of the national honor society Tau Beta Pi. The society is the engineering equivalent of the liberal arts' Phi Beta Kappa.

According to Dahlem, who earned his bachelor's (1951) and master's degrees (1972) in civil engineering from Speed School and received an honorary doctorate in 1996, the new bent is meant to show Speed School's pride in having a chapter in the prestigious society. But it also serves as a daily reminder to students about the importance of personal integrity. "In today's world, integrity is sorely lacking," he said.

"Almost daily we read where someone whom we would expect to have strength of character is going to jail. We hope this quotation will have an impact on our students as they prepare themselves for their life's work."

Engraved on the back of the sculpture, which is titled "Integrity," is a statement from the "Eligibility Code of Tau Beta Pi," adopted in 1926. It "essentially says that if an engineer does not have integrity, he has nothing," Dahlem said paraphrasing it.

The statement's placement on the back of the statue is symbolic, Dahlem continued. As each graduate walks down the front steps of Speed School one final time, it will be the last thing he or she sees and takes from academic life into professional life.

Read more at <http://louisville.edu/speed/news-1/IntegritySculptureDedication>



IE NEWS and EVENTS

Dr. Holman Joins IE Faculty

Dr. Grady T. (Talley) Holman joined the Department of Industrial Engineering faculty as an Assistant Professor on April 15, 2009. Dr. Holman earned his PhD in Industrial Engineering from Auburn University in 2007. Since then he has worked as a post-doc researcher at the University of Wisconsin-Madison. His research interests lie in the areas of human factors, ergonomics and health care systems.



ABET Accreditation Update

Due to a recent change in ABET policy regarding dual level accreditation, the J.B. Speed School of Engineering will now seek accreditation of its BS programs. The school has historically maintained accreditation at the advanced level for all of its 5-year MEng programs. The policy change will now allow for accreditation of both BS and MEng programs. The ABET evaluation team will be on campus in Fall 2009 to conduct the assessment of the BSIE program.

Big Changes For Kersey Library

As the new year begins, so will the renovation of our 34,000 square foot former Kersey Library building. The space will offer state of the art teaching and research labs, a dynamic career center and student commons. A welcome part of the construction will be research laboratories including Datamining, Knowledge Discovery and Web Mining, Network and Information Security, Bioinformatics and Biomedical Computing, Multimedia, Digital Forensics, Video, Graphics and Animation (VGA), Database, and Mobile Information Networks and Distributed Software Systems (MINDS). One-half of the \$7 million project cost has been raised and fundraising continues. Naming opportunities for labs and other areas are available. The renovation should complete before Fall 2009.



German PhD Program

The Department of Industrial Engineering has begun a new and innovative PhD program in conjunction with two German Universities: Fern-Hochschule in Hamburg and Wuerth Akademie in Bad Mergentheim. The program has attracted over 60 IE PhD students, 32 of whom will arrive in Summer 2009 to begin taking coursework. Courses will be taught in Louisville and in Germany by both US and German professors. PhDs will be awarded by the University of Louisville. The first intake of the program runs through 2013. For more info, contact Dr. William Biles, 502-852-0086.

For more information about Industrial Engineering, go to:

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

