



**2008**

**Research and Creative Activity  
Department of Industrial Engineering  
Lamar University**

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Associate Dean of College of Engineering**

**Brian Craig, Ph.D., P.E., CPE, Associate Professor**

**Ryan Underdown, Ph.D., P.E., Associate Professor**

**James Curry, Ph.D., Assistant Professor**

**Xinyu Liu, Ph.D., Assistant Professor**

**Alberto Marquez, Ph.D., Assistant Professor**

**Weihang Zhu, Ph.D., Assistant Professor**

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**This report is published yearly by the Lamar University Department of Industrial Engineering to highlight the research and creative accomplishments of the faculty and students of the department. Listings are in alphabetical order.**

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## Publications

1. McSweeney, K., Pray, J., and **Brian Craig**, Integration of Human Factors Engineering into Design – An Applied Approach. *Royal Institution of Naval Architects (RINA) Human Factors Conference Proceedings*, London, Publication Accepted, November 2009
2. **Xinyu Liu**, and Jun, M. B. G., “Effects of process parameters on surface location errors in micro-endmilling”, *Transactions of the North American Manufacturing Research Institution of SME*, v 36, 2008, p 277-284.
3. M. Caserta and **Alberto Márquez**, Tabu search based metaheuristic algorithm for software system reliability problems, *Computers and Operations Research*, Vol 36 (2008). Pages 811-822.
4. M. Caserta, E. Quiñonez and **Alberto Márquez**, A Cross Entropy Algorithm for the Knapsack Problem with Setups, *Computers and Operations Research*, Vol 35, Issue 1, January 2008, Pages 241-252
5. Anindyo, R., **Alberto Marquez** and **Ryan Underdown**, Optimization of Facility Layout Design Using Heuristic Techniques, *Industrial Engineering Research Conference*, Miami, FL, 2009
6. **Victor Zaloom**, Vinit Subhedar and Hsing-wei Chu, An Analysis of Correlation of Expert Opinions in Security Risk Assessment, Proceedings of the 14th ISSAT Conference on Reliability and Quality in Design, Orlando, Florida August 7-9, 2008.
7. **Weihang Zhu**, **James Curry**, Multi-walk Parallel Pattern Search Approach on a GPU Computing Platform, accepted by IEEE International Conference on Computational Science, 2009, Baton Rouge, LA, USA
8. **Weihang Zhu**, **James Curry**, Particle Swarm with Graphics Hardware Acceleration and Local Pattern Search on Bound Constrained Optimization Problems, accepted by IEEE Symposium Series on Computational Intelligence, 2009, Nashville, TN, USA
9. **Weihang Zhu**, **James Curry**, **Alberto Marquez**, GPU-accelerated SIMT Tabu Search for the Quadratic Assignment Problem, accepted by *Transactions of SME/NAMRC 2009*
10. **Weihang Zhu**, Kendrick Aung, Bhavan Parikh, Jiang Zhou, Malur Srinivasan, Thomas Matthews, A Study of Impact of Haptic-augmented Learning Tools on Dynamics Course, ASME IMECE 2008-66339, Boston, MA, USA
11. Yongfu Ren, **Weihang Zhu**, Yuan-Shin Lee, Feature Conservation Conversion of Tri-dexel Volume Models to Polyhedral Surface Models for Product Prototyping, *Computer-Aided Design and Application*, 2008
12. Yongfu Ren, **Weihang Zhu** and Yuan-Shin Lee, Tri-dexel Modeling and Analysis for Virtual Prototyping, *Transactions of SME/NAMRC 2008*

13. Wei Li, H. Peng, **Weihang Zhu**, D. Sheng, J. Chen, An Immune-Tabu Hybrid Algorithm for Thermal Unit Commitment Problem in Power Plant Optimization, accepted by *Journal of Zhejiang University-Science A*, 2008
14. **Weihang Zhu**, **James Curry**, **Alberto Marquez**, SIMD Tabu Search for Quadratic Assignment Problem with Graphics Hardware Acceleration, accepted by *International Journal of Production Research*, 2008
15. **Weihang Zhu**, A Methodology for Building up an Infrastructure for Haptically Enhanced Computer-Aided Design Systems, *Transaction of the ASME: Journal of Computing and Information Science in Engineering*, Volume 8, Issue 4, 2008
16. Sameer Pallavkar, **Tae-Hoon Kim**, Dan Rutman, Jerry Lin, Thomas Ho, Active Regeneration of Diesel Particulate Filter Employing Microwave Heating, *Industrial Engineering Chemistry Research*, 2009, 48, 69-79

## Theses and Field Studies Published

### Doctoral Dissertations/Field Studies

1. Carol Schulte (Spring 2008). A Heuristic Algorithm for Scheduling Hazardous Waste Incinerators, Drs. Curry, Zaloom, Marquez, Ho, and Chu.

### Master of Engineering Science Theses

1. Jovan Hill (Spring 2008). Currency Impact on Vendor Selection in a Bid Environment. Drs. Curry, Marquez, and Underdown.
2. Bhavan Parikh (Summer 2008). A Study on Impact of 3D Haptic-augmented Learning Tools on a Dynamics Course, Drs. Zhu, Aung and X. Li
3. Maheshwaran Ramalingam (Fall 2008). *Standardization and Flexible Work Cells for High Variety, Low Volume Manufacturing*, Drs. Liu, Zhu and Zaloom
4. Prashant Mehta (Fall 2008). Calculating the Internal Rate of Return of Mortgages. Drs. Curry, Zaloom, and Marquez.
5. Pavan Masvekar (Fall 2008). Vehicle Routing Problems with the Dual Objectives of Days and Miles. Drs. Curry, Marquez, and Zhu.

## Presentations

1. Marquez, Alberto. Risk analysis and Monte Carlo Simulation for Decision Making Using Spreadsheets *Congreso Internacional de Ingeniería Industrial y Sistemas Computacionales C9*. Puerto de Veracruz, México. April 2008.

- This was a seminar on the use of spreadsheets for decision analysis, Monte Carlo simulation and sensitivity analysis using off-the shelf software, shortcutting the programming time for sampling scenarios by exploiting the built-in capabilities of the software.
2. Liu X. and Jun, M. B. G., “Predictive Modeling of Micro-endmilling Considering Ploughing and Elastic Recovery” 1<sup>st</sup> *Manufacturing Leadership Symposium*, University of Illinois at Urbana-Champaign, Illinois, October 2008.
  3. Underdown, R., “Go W.E.S.T. Academy,” *Texas Higher Education Coordinating Board Best Practices Conference*, Austin, TX, August 2008.
  4. Jiang Zhou, Paul Corder, Weihang Zhu, Kendrick Aung, Direct Assessment of Course Outcomes Part II: Results and Continuous Improvement for Mechanical Engineering Courses, ASME IMECE 2008-67421, Boston, MA, USA, oral presentation only

## Current and Pending Funding

1. Online Education Initiative: Course Development Grant for INEN 3300, Introduction to Industrial Engineering, Lamar University, PI: Brian Craig, \$1,000, January 2009 – December 2009.
2. Leading Safety Indicators and Safety Culture Audit in the Maritime Industry, American Bureau of Shipping, Houston, Texas, PI: Brian Craig, \$135,000, Spring 2008 – Fall 2009
  - Safety performance has traditionally been measured by ‘after the loss’ type of measurements such as injury/illness rates, incidents, and associated costs. These measurements are measured after an undesirable event occurs and therefore are referred to as lagging indicators. On the other hand, identifying leading safety indicators (conditions in existence before an undesirable event occurs that are associated with undesirable outcomes) offer the ability of taking proactive actions to rectify conditions associated with these safety performance measures (undesirable outcomes). This research is attempting to identify significant leading indicators for shipping operators with oil tanker and container ship operations by collecting and analyzing shipboard, shoreside, business unit, and organizational safety factor data as well as vessel performance data. Also, an offshoot of this research is to perform a safety culture analysis with the collected shipboard and shoreside data.
3. The Implementation of Human Factors Engineering in to the Design of Offshore Installations, American Bureau of Shipping, Houston, Texas, PI: Brian Craig, \$4,429, Spring 2008
  - Technical support and editing of the draft document entitled “Guidance Note for the Implementation of Human Factors Engineering in to the Design of Offshore Installations”. This Guidance Note will assist in the enhancement of human performance and safety of personnel working on fixed and floating installations, offshore supply vessels (OSVs),

offshore terminals, or any other offshore facility created for exploration, production, distribution and/or transportation of natural gas and oil anywhere in the world. The final document will also be applicable to any level of project design from new facility design and construction to existing facility expansion, modernization, or upgrading.

4. Exploratory Study of Cost-Effective Hybrid Micromanufacturing Processes for Bipolar Plates of Miniature Fuel Cell, Lamar University Research Enhancement Grant, PI: Xinyu Liu, \$5000, 09/01/2007~08/31/2008.
5. Intelligent Maintenance System: Application to the Health Condition Monitoring of Verson 3000 Ton Press, Trinity Industrial Corp., PI: Xinyu Liu, Co-PI: Weihang Zhu, \$65,868, pending since December 2008.
6. Development of a Non-Contact Metrology System for Dimension Measurement and Surface Characterization of Deep-Holes, Schlumberger Research Center, PI: Xinyu Liu, \$134,661, December 2007~May 2009
7. Wood Procurement Optimization for MeadWestvaco, PI: James Curry, Co-PI: Weihang Zhu, Alberto Marquez, \$10,000, June 2008 - November 2008;
8. Exxonmobil Bernard Harris Summer Science Camp, ExxonMobil, \$80,000, PI: O. Urbine, Co-PI: Ryan Underdown, summer 2008.
  - The Exxonmobil Bernard Harris Summer Science Camp was held at Lamar University June 9-20, 2008. This ten day “residential camp” exposed campers to careers in engineering, science and technology. The camp included prestigious guest speakers, engaging hands-on activities and field trips. Fifty under represented males and females in grades 6th through 8th were recruited from area school districts.
9. Exxonmobil Bernard Harris Summer Science Camp, ExxonMobil, \$80,000, PI: O. Urbine, Co-PI: Ryan Underdown, summer 2009
  - The Exxonmobil Bernard Harris Summer Science Camp will be held for a third consecutive year at Lamar University in June 2009.
10. Go W.E.S.T. Summer Science Camp, Texas Higher Education Coordinating Board, \$20,000, PI: O. Urbine, Co-PI: Ryan Underdown, summer 2008
  - The Go W.E.S.T. Academy Summer camp was held at Lamar University July 7-11, 2008. This five day “day camp” exposed campers to careers in engineering and to successful females engineering role models. The camp included prestigious guest speakers, engaging hands-on activities and stimulating research. Fifty under represented females in grades 9th through 12th were recruited from six area school districts. At the conclusion of the camp, 75% of campers said they wanted to pursue a career in engineering.

11. DUE-0737173: A Study of the Impact of Haptic-augmented Learning Tools on Dynamics Course, National Science Foundation, PI: Dr. Weihang Zhu, Co-PI: Dr. J. Zhou, Dr. K. Aung and Dr. M. Srinivasan, \$88,323, 04/01/2008 ~ 03/31/2010.
  - The research objective of this project is to perform research and prototyping work to create innovative learning materials and tools for the ‘*Dynamics*’ course using a 3D haptic-augmented virtual environment. We have recruited 58 undergraduate engineering students and finished 43 student experiments about using advanced multi-modal haptics-augmented human-computer interface to complement the teaching of Dynamics, a fundamental engineering course in College of Engineering. The research has resulted in a Master Thesis and a conference paper in the American Society of Mechanical Engineers (ASME) annual congress 2008.
12. Agent-based Modeling and Simulation for Hazardous Waste Reverse Logistics, Texas Hazardous Waste Research Center, PI: Weihang Zhu, Co-PI: James Curry and Helen Lou, \$5,000, Sept 2008 - August 2009.
13. GPU accelerated meta-heuristics for engineering optimization, National Science Foundation - CCF core program, PI: Weihang Zhu, Co-PI: James Curry and Helen Lou, pending since December 2008.
14. Acquisition of a 3D Selective Laser Sintering Rapid Prototyping System, submitted to NSF-Major Research Instrumentation on January 2009, PI: Weihang Zhu, Co-PI: Kendrick Aung, Xinyu Liu, Jiang Zhou and Xianchang Li.
15. Microwave Technology for NO<sub>x</sub> Control from Diesel Exhaust, Texas Environmental Research Consortium(TERC) and Houston Advanced Research Center(HARC), RFGA-17, pending \$167,315.00, May 2009 – April 2010, PI: Thomas Ho, Tae-Hoon Kim, Co-PI: Jerry Lin and Hsing-wei Chu.
16. Online Education Initiative: Course Development Grant for INEN 4357, Supply Chain Management, Lamar University, PI: Alberto Marquez, \$1,000, January 2008 – December 2008
17. Ports and Waterways Risk Analysis, Lamar University Center for Transportation/Ports and Waterways, PI: Victor Zaloom, \$5000, September 1, 2008 – August 31, 2009, Texas Transportation Institute

## Panels

1. Xinyu Liu, Panel Review for National Science Foundation, Division of Civil, Mechanical and Manufacturing Innovation, April 2008.
2. Weihang Zhu, Panel Review for National Science Foundation, Division of Civil, Mechanical and Manufacturing Innovation, April 2008.

3. Weihang Zhu, Panel Review for National Science Foundation, Division of Industrial Innovation and Partnerships, August 2008.

## **IE Student Papers**

1. Victor Zaloom, **Vinit Subhedar** and Hsing-wei Chu, An Analysis of Correlation of Expert Opinions in Security Risk Assessment, Proceedings of the 14th ISSAT Conference on Reliability and Quality in Design, Orlando, Florida August 7-9, 2008
2. Weihang Zhu, Kendrick Aung, **Bhavan Parikh**, Jiang Zhou, Malur Srinivasan, Thomas Matthews, A Study of Impact of Haptic-augmented Learning Tools on Dynamics Course, ASME IMECE 2008-66339, Boston, MA, USA