



Wichita State University

## Senior Design Studio Opened Spring 2006

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**Seniors in front Jason Medenci ( IE), John Wolf, (IE) Mitch Rausch (IE) and at workstations Kevin Lai (MfgE), and Denise Jones (IE) in the new Senior Design Studio**

A dedicated 450 sq. ft. Senior Design Studio was completed during the Christmas break and students enrolled in the Spring 2006 were the first students to have such a facility in the college. The studio is housed in remodeled office area on the second floor of the Engineering Building in room 203 EB and includes six new modular office cubicles and chairs, six new computer systems, a color laser printer, white board, and a meeting table with seating.

Each student in Senior Design is assigned a key to the room and the area is monitored by a remote camera for security. Each cubicle becomes the "office" of the team performing a project with a specific company. Projects this semester are with Via Christi Hospital (admissions process from ER), Cessna (XL- tailcone assembly), Bombardier LearJet (panel wiring), Boeing (modular aircraft assembly scaffolding).

This semester's students are enjoying the new facility. Graduating Senior Sarah Rongesh commented, "The lab is wonderful. It's nice not to have to fight over computers in the general lab! I really enjoy the meeting area and whiteboard; it's a good way to brainstorm!" John Wolf says, "The lab is a nice addition to the department. We do not have to share space with other students in the department, and we have a color printer for submitting reports to our sponsors. The environment is less disruptive, which allows us to study at our round table, and the room temperature is not 100 degrees plus!" Mitch Rausch, a graduating senior, stated "The senior design lab provides a valuable resource for students to work and collaborate on projects as a team. The computers and equipment in the lab provide adequate tools to aid in solving problems and relaying solutions in a professional manner. The lab is an asset for students working to complete the course work for senior design!"

## IMfgE Chair Dr. Hossein Cheraghi Summarizes Year's Accomplishments

Welcome to the 2006 issue of the Industrial and Manufacturing Engineering (IMfgE) newsletter. Through this newsletter we hope to share with the friends and graduates of our program some of the department's achievements during year 2005 and report on some of our plans for the future.

It has been a very productive year for our department. Together with the faculty, staff, students, members of the advisory board, and our alumni we have been hard at work to advance the objectives of the department. During this year, the faculty established a set of strategic goals for the department. Expanding the PhD program, increasing the research funding, maintaining high quality undergraduate programs, and increasing the UG enrollment have been defined as some of these goals. In this regard and through an aggressive campaign, we have increased the size of our PhD program by 70%. The research expenditure for the IMfgE department for 2005 totaled over \$1.00M, a 20% increase over 2004.

Our undergraduate students continue to perform well nationally and regionally in the IIE paper competition. Janise Hamilton received the third place IIE national paper competition award in 2005. Janise Hamilton and Kelly Zens also received the first and third place IIE regional paper competition awards. Historically our undergraduate students have performed very well in the IIE paper competition. In 2004 they received the first place national IIE paper competition award. In the past three years they have received, three consecutive times, first place IIE paper competition award for the Midwest region. Senior IE student, Larry Randle, Jr., received the first place region V APICS Donald Fogarty undergraduate paper award. Many of our graduate students have also been recognized for their academic excellence. You can read about their achievements in this newsletter. Our students continue to be highly sought for by industry; most of our students receive offers before the completion of their degrees.

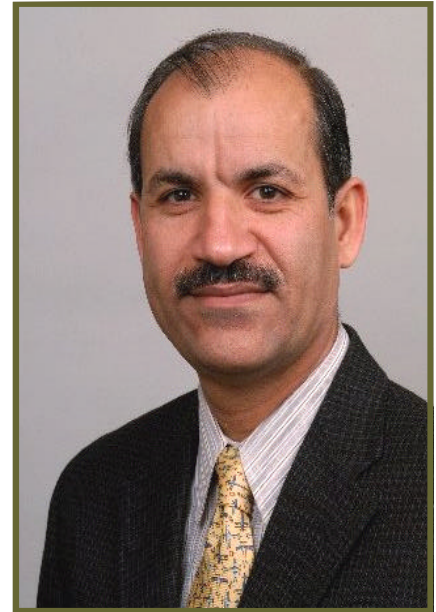
To respond to the needs of industry and our constituents, we continually review and revise our curriculum. In this regard, starting with Spring 2006, we are using CATIA as a medium for teaching engineering graphics. In line with a new initiative in the college of engineering to become a center of excellence in research and education on composites and with a strong support from local aircraft manufacturing companies, in Fall 2006 we will offer a new course on composites manufacturing. To support this course the department is in the process of establishing a state of the art laboratory. The 500 sq. ft. composites laboratory will be housed in the Cessna manufacturing lab. Moreover, an effort is underway to develop a new course in aircraft assembly to be offered in Spring 2007.

The IMfgE curriculum provides an opportunity for students to gain a taste of the real world problems through two industry-based senior projects in two consecutive semesters. Students have identified this experience as the most valuable part of the curriculum. To strengthen the effectiveness of these courses, we have established a new senior design studio. The studio provides senior students with a modern facility that foments group activities. Moreover, the systems/CAD laboratory has been equipped with a 3-D visualization system. The purchase of this system is in line with the implementation of virtual reality application in Industrial Engineering curriculum.



**South Elevation of New Engineering Research Building**

becoming one of the best Industrial and Manufacturing engineering programs in the nation. This would only be possible through the generous support of our alumni and friends. To this end, I encourage you to visit our website at [imfge.wichita.edu](http://imfge.wichita.edu) to learn first hand the achievements and activities in our department and if you are in the Wichita area anytime, please stop by the department to visit us.



**IMfgE Chair, Hossein Cheraghi**

A new Engineering Research building is currently in construction in the space between the Engineering Building and the NIAR. The Industrial and Manufacturing Engineering department has been allocated 17,000 sq. ft. of laboratory space in the facility.

Despite all the advancements in our department, we still face major challenges to achieve our vision of

## New Dean of College of Engineering is an Industrial Engineer

Effective Aug. 1, 2005 Dr. Zulma Toro-Ramos became the dean of the College of Engineering at Wichita State University (WSU). Dean Toro-Ramos became the first woman to head the college, as well as the first Hispanic. She was one of the first women to earn a doctorate in industrial engineering at Georgia Tech, and was the first female chancellor at the University of Puerto Rico at Mayagüez. Dean Toro-Ramos strengths come from her extensive administrative and faculty experience. Before coming to WSU she served as dean of the School of Engineering and Applied Sciences at the University of New Haven in Connecticut.

Dean Toro-Ramos received her bachelor's degree in industrial engineering from the University of Puerto Rico, master's in industrial and operations engineering from the University of Michigan, and doctorate in industrial and systems engineering from the Georgia Institute of Technology.

After completing her doctorate, Dean Toro-Ramos served as assistant professor, associate professor, professor, department chairperson, director of graduate students, acting dean of engineering, and eventually chancellor at the University of Puerto Rico at Mayagüez. She has held visiting positions at universities in Mexico and Peru.

In addition to her academic work, Dean Toro-Ramos has served as a reviewer panelist, and member of the committee of visitors for the Office of International Science and Engineering for the National Science Foundation. She also serves on the President's Advisory Board for Georgia Institute of Technology. She is a member of the Technology/Commercialization Board to the Connecticut Governor's Council on Economic Competitiveness and Technology.

Since coming to WSU, Dean Toro-Ramos has started a number of initiatives. One initiative is aimed at strengthening the college's capacity for experienced based education. Another aims to focus and increase the college's research capabilities to meet local industrial, regional, and national needs.



**Dean Zulma Toro-Ramos**

## Interview with Alumni Robert J. Marley, Ph.D., CPE Dean, College of Engineering Montana State University

Robert Marley was born and raised in Wichita, KS, save for a brief stint in Kansas City. He attended Wichita West High School graduating in 1977 and subsequently enrolled at Wichita State. An illness forced him to withdraw from his freshman year at WSU, but this created time to ponder career choices. Upon returning, Robert intended to pursue a career as an attorney but became dissatisfied with the pre-law curriculum with the exception of a survey of psychology course. He subsequently became interested in experimental psychology methodologies and in particular, a field of inquiry known as "human factors." He went on to complete his bachelors degree in general studies with an emphasis in psychology in 1983. In "the day," the Bachelors of General Studies was a path towards the BA degree without a foreign language normally required.

During his senior year, Marley worked part-time for the Rehabilitation Engineering Center in WSU's College of Engineering. "This experience helped reinforce much of the academic course material I was exposed to," Marley said. The REC was part of a multi-million dollar project which focused on creating not only socio-economic opportunities, but everyday equipment and tools needed by severely disabled adults with the goal of facilitating these individuals to live with limited assistance. During this period, Marley became even more interested with the concept of designing for usability and efficiency and, most of all, observed that it was the engineer who really possessed the ability to integrate the needed social and natural sciences, design and analytical skills to make all this possible.



**IEN Alum, Dean Robert Marley**

So, after more than a few conversations with Dr. Don Malzahn, "I decided to take the plunge and study engineering, specifically industrial engineering, as it seemed to me to be the broadest and most applicable for what I wanted to do," Marley recalls. He continued, "I wanted to do what they were doing (speaking of the engineers) ... it was very exciting."

So, back to school for calculus and science to pick up the quantitative background needed, Marley went on to complete his MS in industrial engineering. He studied industrial ergonomics under Dr. Fernandez. Marley relates, "I began to focus on the 'able-bodied' human worker and found that most of the same principles apply, just to a much larger group." "Furthermore," he said, "the design objectives in industrial ergonomics were to increase efficiency and reduce injuries which were just the logical extension from working with severely disabled adults where they simply desired to become more self-sufficient."

Marley said he would have probably been content to apply his skills to these kinds of problems for many years to come. But an opportunity came up just as he was completing his MS degree to teach a work measurement. "I wasn't really interested in teaching per se, but certainly thought this would be a good experience and I eagerly jumped in," relates Marley. What he didn't realize was just how satisfying it would be to help others understand current problems and how to go about solving them. "Many times I felt I had to study and concentrate on most subjects more than my friends did, but now I had the chance to share insights and ways of seeing problems that were helpful for me, and I simply couldn't have predicted how satisfying it was to share how my own research fit into the big picture as well," Marley recalls. Thus, when given an opportunity to participate in the College's doctoral fellowship program, Marley jumped at the chance.

Shortly after defending his research, now Dr. Robert Marley joined the faculty of the Mechanical and Industrial Engineering Department at Montana State University in Bozeman, Montana, in 1990. "I saw an opportunity at MSU to build a solid human factors and ergonomics program where it did not exist at the time," Marley recalls of his interview early in 1990. "They had a good program overall, but I knew I could add to the breadth and, likewise, they were eager to expand into the area." He continued, "so it just seemed like a good match." Marley also recalls his initial impressions of the Montana State campus and its culture as being very similar to that of Kansas State, where he had visited on several occasions for IIE functions as a student. This would be natural as both are the land-grant schools for their respective states. "It's just a different feeling on a campus which is dominated by engineering, agriculture and the sciences," Marley said. "But the good news is that, unlike the urban environment at Wichita State, which has many of its own advantages, parking and the fear of being run over by a frantic commuter is not the kind of problem we face in Bozeman," Marley quipped.

Marley's career at Montana State has not been traditional in most respects. Though enjoying his teaching and research ventures, he was given an opportunity in late 1995 to serve as the associate dean of engineering at MSU. Initially this was to be a 9-month, interim appointment while a national search was conducted. As things turned out, Marley was asked to stay on as Associate Dean while maintaining teaching duties in the IE program. In this role, Marley found satisfaction in now working directly with students and faculty from many other engineering disciplines, not to mention a new role as a campus representative for engineering. "Ironically, coming initially as I did from outside of engineering into the field, it gives me a unique perspective that I can share with others on campus." "I think I had been very successful in convincing a number of 'lost souls' (much like I was at the same point in my life) that engineering provides tremendous opportunities ... more than any other field," Marley boasts.

But before he might get too comfortable in a combined administrative and faculty role, Marley's world would change again when his dean announced he would retire, somewhat unexpectedly. Appointed as the interim dean while a national search took place, Marley initiated several projects that he knew were needed and desired by the faculty, but that just had not been completed in recent years. "I knew that most interim appointments should 'manage the ship' and not make any significant changes while waiting for a new administrator," Marley said. "But I also knew that if a new dean didn't like what we were doing, then maybe they weren't the right person for the job," he continued. In retrospect, Marley concedes that such a view seems a little bold, but "we were all very confident that we were moving in the right direction." In the meantime, the search did not seem to be going well and at one point the Provost approached Marley to see if he would be interested in continuing as dean? "It was déjà vu all over again," said Marley. "Once again the faculty had looked at what I was doing and asked that I stay on. Needless to say I was honored and humbled." Thus, since January of 2001, Marley has been serving as dean of the College of Engineering at MSU.

As dean, he oversees the largest array of engineering, engineering technology, and computer science programs in a five state region. He also directs the Montana Engineering Experiment Station which provides basic and applied research to support technical development of Montana's economy according to the land-grant mission of the University. Many of the initiatives that he began as interim dean have begun to yield results. Among these was the increase in tenure-track women faculty members, now tripled over the last 4 years. In addition, MSU is now emerging as one of the nation's leading institutions for Native Americans in engineering and computer science. Significant growth in private support through named professorships, laboratories, and scholarships has also been realized in recent years. Significant growth in faculty scholarship has also been accomplished with the MSU College of Engineering now ranking amongst the institutional leaders in external funding on a "per capita" basis. Marley says, "I'm very proud of what we've accomplished and excited about the future."

Certainly the "Big Sky" country has been appealing for Robert and his wife Margaret Maben, also a WSU alum and Goddard, KS, native. "We still have many friends and family in the Kansas and Oklahoma area, but we've grown very fond of the mountains and wide-open spaces of Montana," claims Marley. "It's a real kick to host national leaders of industry and academia on our campus, then treat them for an afternoon of skiing, fly fishing, or even rock climbing," he exudes." At the end of the day, though, he sees himself just a "city-kid" from the mid-west and remembering the days of toiling away in a cramped office on the 2<sup>nd</sup> floor of the Engineering Building at WSU. "These are all great memories ... I wouldn't trade a minute."

## IMfgE Students Win Top Regional Awards in the Institute of Industrial Engineering 47<sup>th</sup> Annual Region V Technical Paper Conference

The Institute of Industrial Engineering (IIE) Region V Conference Student Paper Competition was held at Kansas State University on February 24<sup>th</sup> and 24<sup>th</sup>, 2005. In addition to Wichita State University (WSU), region V includes Kansas State University, Texas Tech University, University of Arkansas, University of Oklahoma, Oklahoma State University, University of Missouri at Rolla, University of Missouri at Columbia, Texas A&M University, Texas A&M Commerce University, Lamar University, University of Houston, St. Mary's University, and the University of Texas at Arlington.

WSU's Industrial and Manufacturing Engineering (IMFGE) Department was represented by two undergraduate students (Janise Hamilton and Kelly Zens) who presented their senior design projects in this competition. **Janise Hamilton** presented "*Vornado Air Circulating Systems, Inc: Electric Motor Line Process Improvement*" and received the **first place award**. Her teammates were Abdullah Bin Abdulwahab and Amber Herr. **Kelly Zens'** presentation on "*Is There Cost Justification for AGCO to Bring Steel Hydraulic Production In-house?*" received the **second place award** and her team included Gilbert Nye and Jason Rouse.

Janise is currently working as an IE with L3 in Salt Lake City, Utah and Kelly is an IE at Cessna in Wichita.

**Janise Hamilton** represented Region V in the National IIE student paper competition held during the IIE Annual Research Conference in Atlanta, GA, May 14-18, 2006. There she received a third place award. WSU's IMfgE undergraduate students have an excellent track record in both Regional and National paper competitions. In the last six years, IMfgE students have received three national level awards, five regional first place awards, and a number of second and third place awards.

**WSU IMfgE student have a history of dominating the IIE Regional Paper Competition and done extremely well at the National IIE Competition**

Name	IIE Regional Paper Place	IIE National Paper Award
Mitchell Rausch	2006 (First)	?
Rebekah Drake	2006 (Second)	
<b>Janise Hamilton</b>	<b>2005 (First)</b>	<b>2005 (Third)</b>
Kelly Zens	2005 (Third)	
<b>Samantha (Vitt) Corcoran</b>	<b>2004 (First)</b>	<b>2004 (First)</b>
Marki (Farris) Huston	2004 (Second)	
<b>Virginia Youse</b>	<b>2003 (First)</b>	
<b>Jennifer Sutherland</b>	<b>2001 (First)</b>	<b>2001 (First)</b>
Charity Kennedy	2001 (Second)	
Vigneshara Sambasivan	2000 (Third)	



**IE Graduate, Janise Hamilton, won first at IIE Regional and third at National**



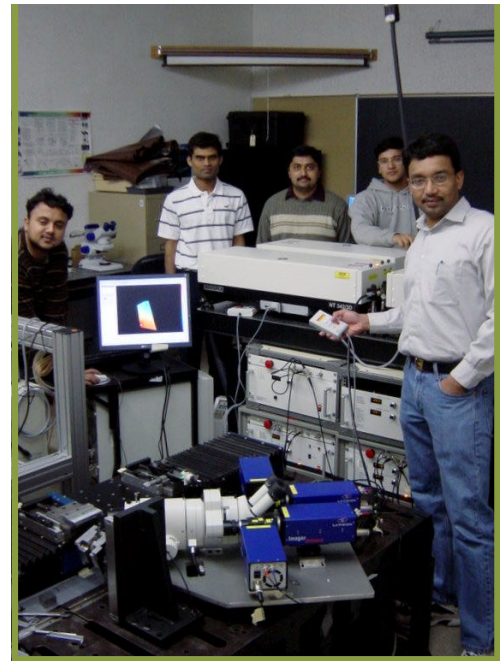
**IE Graduate, Kelly Zens, won second place at IIE Regional**

## Focus on Vis Madhavan's Research, a really fast camera looks at metal cutting

Vis Madhavan has been on the faculty of IMfgE since August 1996. His research interests lie in the mechanics and metallurgy of machining, sheet metal forming, and forging. He is also involved in the use of virtual reality in the design of manufacturing processes and lines, and in engineering education. His work in these areas has been funded by NSF, ARO, NIST, AFRL, NRL, Boeing Co., Cessna Aircraft Co. and Raytheon Aircraft Co.

Dr. Madhavan's latest effort focuses on the analysis of the mechanics and physics of machining. The equipment and capabilities located in the Manufacturing Processes Research Lab are aimed at direct observation of the primary and secondary shear zones, from the side as well as through transparent cutting tools. Digital image correlation of high speed photographic images and infrared thermography are used to obtain the velocity and temperature fields, which serve as inputs for developing high strain rate constitutive models and for comparison with finite element simulations. These in turn are used to refine analytical models of machining, thereby furthering our understanding of machining. This may lead to benefits such as tool and process design for improved productivity, tool life and part quality. Support for this research comes from NSF and Army Office of Research.

The picture shows Vis Madhavan (far right) with his research team of graduate students, and a post-doctoral fellow. The team is posed around the new (patent-pending) ultra high speed camera (200 pictures per second) developed through NSF funds. A critical aspect of the system is the eight lasers (located behind Vis) and the beam-combining optics used to illuminate the process.



Dr. Madhavan and Research Team

## The Department Welcomes New Faculty Member Haitao T. Liao, PhD

Haitao T. Liao joined the Department as a new Assistant Professor in August of 2005. Dr. Liao received his Ph.D. from the Department of Industrial and Systems Engineering at Rutgers University in 2004. He also received his M.S. degree in Statistics from Rutgers University, and B.S. degree in Electrical Engineering from Beijing Institute of Technology. His research interests are Applied Statistics, Reliability and Maintenance Engineering, Optimization and Artificial Intelligence. Dr. Liao was an electrical engineer in the Beijing Control Company, where he designed an automatic forecast station for railroad truck tread-wear detection.

Since 1999, he has been involved in modeling accelerated testing and optimum testing plans. He developed and validated his reliability modeling approaches using test data obtained from the accelerated testing facility he developed in the Quality and Reliability Engineering Laboratory at Rutgers University. He also introduced the customer-oriented optimum design methodology for improving product reliability under uncertain operating conditions. During the past few years, he has been working on reliability prediction and improvement, accelerated degradation testing, maintenance scheduling, and intelligent maintenance through advanced technology.

In his current projects, he is developing diagnostic and prognostic tools for remaining useful life prediction of critical products. The tools have been applied in many applications such as condition monitoring of bearings and machine tools.

Dr. Liao is the author and co-author of work published in European Journal of Operational Research, IIE Transactions, Naval Research Logistics, International Journal of Materials and Product Technology, and Proceedings of IEEE Annual Reliability and Maintainability Symposium. He also served as a referee for many research journals including Naval Research Logistics, Computers and Industrial Engineering, IIE Transactions on Quality and Reliability, IIE Transactions on Design and Manufacturing, and IEEE Transactions on Reliability.



Dr. Haitao Liao

## Faculty Scholarly Activity

### Journal Publications

- Cheraghi, S. H.**, Manjunath Thirta\*, and **K. Krishnan**, "An Optimization-Based System for Adaptive Planning in a Discrete Part Manufacturing Environment," *International Journal of Computer Integrated Manufacturing*, July 2005.
- Krishnaiyer, K\*, **Cheraghi, S. H.**, "Ant Algorithms: Web-Based Implementation and Applications to Manufacturing System Problems," *International Journal of Computer Integrated Manufacturing*, July 2005.
- Cheraghi, S. H.**, Wei Liu\*, **Gamal Weheba** "An examination of the effect of variations in datum target on part Acceptance," *International Journal of Machine Tools and Manufacture*, July 2005, 1037-1046.
- Jorgensen, M.J.**, Davis, K.G., Kotowski, S., Aedla, P. & Dunning, K. (2005). Characteristics of job rotation in the Midwest U.S. manufacturing sector. *Ergonomics*, 48, 1721-1733.
- Jorgensen, M.J.**, Handa, A\*., Veluswamy, P. & Bhatt, M. \*(2005). The effect of pallet distance on torso kinematics and low back disorder risk. *Ergonomics*, 48, 949-963.
- Davis, K.G. & **Jorgensen, M.J.** (2005). Biomechanical modeling for understanding of low back injuries: A systematic review. *Occupational Ergonomics*, 5, 57-76.
- Kyureghyan, N., **Jorgensen, M.J.**, Burr, D. & Marras, W.S. (2005). Prediction of lumbar spine geometry: Method development and validation. *Clinical Biomechanics*, 20, 455-464.
- Jorgensen, M.J.**, Marras, W.S., Smith, F.W. & Pope, M.H. (2005). Sagittal plane moment arms of the female lumbar region rectus abdominis in an upright neutral torso posture. *Clinical Biomechanics*, 20, 242-246.
- Davis, K.G. & **Jorgensen, M.J.** (2005). Pros and cons of job rotation as a means of reducing injury costs. *Journal of Occupational and Environmental Hygiene*, 2, D1-D3.
- Liao, H.T.** (2005). Book review - case studies in reliability and maintenance, Blischke R.W. and Murthy, D.N., (Eds.). IIE Transactions on Quality and Reliability, 37, 585.
- Yildirim, M. B.** and Hearn, D. W., A First Best Toll Pricing Framework for Variable Demand Traffic Assignment Problems, Transportation Research-B, Vol. 39, 659-678, 2005.
- Cakar, T., **Yildirim, M. B.**, and Barut, M., A neuro-genetic approach to design and planning of a manufacturing cell, Journal of Intelligent Manufacturing, Vol. 16, No. 4-5, 453-462, 2005.
- Duman E. and **Yildirim, M. B.**, Workload Balancing in Printed Circuit Board Assembly Shops, Dogus University Journal, 6/1, 67-78, 2005.
- You, Kumar\***, Young\*, Veluswamy\*, and **Malzahn**, "An ergonomic evaluation of manual Cleco pliers design: Effects of rubber grip, spring recoil, and work surface angle," Applied Ergonomics, 36, 575-583, 2005.
- Whitman, Malzahn**, Chaparro, Russell\*, Langrall, Mohler, "A Comparison of Group Process4es, Performance, and Satisfaction in a Face-to-Face Versus Computer-Mediated Engineering Student Design Teams," Journal of Engineering Education, 327-333, July 2005.
- Madhavan, V.** and Adibi-Sedeh\*, A.H., "Understanding of finite element analysis results under the framework of Oxley's machining model," Machining Science and Technology, 9 (3), 345-368, 2005
- Viswanathan, M\*., Kittusamy, K., & **Jorgensen, M.J.** (2005). Postural assessment of cab design of various earthmoving construction equipment. American Industrial Hygiene Conference and Exposition, San Diego, CA, May 21-25.
- Khalidi, S.,\* **Weheba, G.** & **Jorgensen, M.** (2005). Quality and ergonomics: An interactive relationship. Proceedings of the 11<sup>th</sup> Annual International Conference on Industry, Engineering and Management Systems, Cocoa Beach, FL, March 14-16, 2005.
- Liao, H.T.**, Lin, D.M., Qiu, H., Banjevic, D., Jardine, A. and Lee, J. (2005). A predictive tool for remaining useful life estimation of rotating machinery components. Proceedings of ASME International 20<sup>th</sup> Biennial Conference on Mechanical Vibration and Noise, Long Beach, CA, Sep. 24-28.
- Qiu, H., **Liao, H.T.** and Lee, J. (2005). Degradation assessment for machinery prognostics using hidden markov models. Proceedings of ASME International 20<sup>th</sup> Biennial Conference on Mechanical Vibration and Noise, Long Beach, CA, Sep. 24-28.
- Liao, H.T.** and Elsayed, E.A. (2005). Optimization of system reliability robustness using accelerated degradation testing. *Proceedings of the 51<sup>st</sup> Annual Reliability and Maintainability Symposium*, Alexandria, VA, January 24-27.
- Liao, H.T.** (2005). Predicting remaining useful life using proportional hazards model and logistic regression model. *INFORMS Conference*, San Francisco, CA, November 13-16 (invited).
- Liao, H.T.** and Elsayed, E.A. (2005). Accelerated life testing under cyclic stress loadings. *13<sup>th</sup> Industrial Engineering Research Conference*, Atlanta, GA, May 14-18 (Invited).

\* IMfgE student

### Book Chapters

- Jorgensen, M.J.**, Marras, W.S., Allread, W.G. & Stuart-Buttle, C. (2005). Intervention Strategies for Musculoskeletal Disorders in Grocery Distribution Centers, *Occupational Ergonomics Handbook*, 2<sup>nd</sup> edition, edited by WS Marras and W Karwowski, CRC Press.

**Book Chapters**

**Jorgensen, M.J.**, Marras, W.S., Allread, W.G. & Stuart-Buttle, C. (2005). Intervention Strategies for Musculoskeletal Disorders in Grocery Distribution Centers, *Occupational Ergonomics Handbook*, 2<sup>nd</sup> edition, edited by WS Marras and W Karwowski, CRC Press.

**Books**

Marras, W.S., Allread, W.G., **Jorgensen, M.J.** & Stuart-Buttle, C. (2005). A Best Practices Guide for the Reduction of Musculoskeletal Disorders in Food Distribution Centers.

**Research Projects:**

Cheraghi, S. Hossein, "Development of de facto standards for tool calibration programs," FAA, 1/15/2004-12/31/2007, \$500,000.

Sheikh Ahmad and S. Hossein Cheraghi, "Comparative Analysis of Diamond Abrasive Cutters for Machining CFRP," Bell Helicopter, 10/1/2004 – 10/1/2005, \$45,000.

Cheraghi, S. Hossein, and K. Krishnan "Tolerancing Overview of Application to Support Aircraft Final Assembly," NIS, 7/1/2004-6/31/2006, \$145,000.

Cheraghi, S. Hossein, Jorgensen, MJ, and Roy Myose, "Detection and Prevention of Carbon Monoxide Exposure in General Aviation Aircraft," FAA, 2005-2008, \$650,000.

Jorgensen MJ and Krishnan K. "Deck Winch Ergonomic Modeling", National Institute for Occupational Safety and Health, Spokane Research Laboratory, 8/2005 – 2/2006, \$8,000.

Jorgensen MJ. "Evaluating the Effect of Posture and Height on Landing Forces", National Institute for Occupational Safety and Health, Spokane Research Laboratory, 8/2005 – 7/2006, \$10,000.

Jorgensen MJ. "Ergonomic Assessment of Rivet Guns and Bucking Bars During Riveting Tasks, Raytheon Aircraft Company and Johnston Tools, LLC, 8/2005 – 12/2005, \$5,280.

Jorgensen MJ. "Ergonomic Risk Factor Assessment for Musculoskeletal Disorder Risk Factor Exposure, Case New Holland, 6/2005 – 8/2005, \$5,625.

Jorgensen MJ. "Low Back Pain Intervention Effectiveness Evaluation for Mobile Equipment Operators – EMG Assessment", National Institute for Occupational Safety and Health, Spokane Research Laboratory, 6/2005 – 8/2005, \$3,582.

Jorgensen MJ. "Posture and Ground Force Reaction Forces during Decent from Large Mobile Construction Equipment," National Institute for Occupational Safety and Health, Spokane Research Laboratory, 1/2005 – 5/2005, \$2,753.

Jorgensen MJ. "Validation of a Mobile Construction Cab Design Checklist," National Institute for Occupational Safety and Health, Spokane Research Laboratory, 1/2005 – 8/2005, \$6,253.

Jorgensen MJ. "Ergonomic Assessment of Bucking Bars for Riveting Tasks", Raytheon Aircraft Company, 9/2004 – 4/2005, \$2,430.

Madhavan, V., "Wear tests on Falex pins," DoD/NRL, 03/23/05 – 9/30/06, \$100,000.

Madhavan, V., "Optimal Design of Materials Processes," MILTEC/AFRL, 10/01/05–12/31/06, \$122,000.

Krishnan, K. and S. Hossein Cheraghi, "Virtual Reality Systems for Aircraft Manufacturing," ADMRC, 1/1/2005 – 12/31/2005, \$50,000.

Gamal Weheba, Bert Smith, Rapid Fabrication of Composite Lay-up Tools Aircraft Design and Manufacturing Research Center (ADMRC) Jan-Dec \$45,455

## Ph.D. Graduate Research Assistants Move Into Remodeled Offices

The IMfgE department has always had a large number of graduate students, averaging approximately 100 students. The majority of those students have historically been comprised of MS level students.

This past year the department declared as one of its strategic goals is to increase the number of PhD students. Through the relentless efforts of the department's faculty, the number of PhD students has increased by 70%. With this increase came the planning and design for the remodeling of office space pictured right.

The space is 600 sq. ft. with 16 new work stations and is located in room 203A EB. Students moved in at the start of the Spring Semester.



Students pictured from left to right: Jose Ceciliano, Chandan Nayak, Ali Ahmadi, Sajjad Shams, Reya Sajjadi, and Mortenza Assadi



## IMfgE Students Continue to Distinguish Themselves in Local, Regional, and National Competitions

- IMfgE Ph.D. student Chandan Nayak has received John S. W. Fargher Scholarship for the 2006 academic year.
- Vasant Pednekar won the 2005 Dora Wallace Hodgson Outstanding Masters' Thesis award from the WSU Graduate College. The thesis, *Investigation of the Transition from Plane Strain to Plane Stress in Orthogonal Metal Cutting*, will be submitted to the Midwestern Assoc. of Graduate Schools Distinguished Masters Thesis Award Competition in Spring 2006.
- Saugat Roy, an IE graduate student, received the 2005 Dora Wallace Hodgson Outstanding Master's Non-Thesis Award.
- Larry Randle, Jr. received the first place region V APICS Donald Fogarty Undergraduate Paper Award for "*Creating a culture of Kaizen in a manufacturing environment*".
- Amit Deshpande, "*Lean Sigma*," and Dhananjay Chandurkar, "*Implementation of Just in Time in Indian Industry (Demag Cranes and Components)*," received first and second place, respectively, Region V APICS Donald Fogarty Graduate Paper Awards.



**Chandan Nayak**



**Larry Randle, Jr.**

● IMfgE Graduate student Amit Deshpande received a Certificate of achievement for achieving 1 million CPU Minutes in one year from WSU's High Performance Computing Center.

● Mitchell Rausch presented "*Lean Initiative at Advanced Industries' Machining Cell*" and received the first place award from the Institute of Industrial Engineering (IIE) Region V Conference Student Paper Competition. Dennis Schmidt was also a team member. Mitch will represent Region V in the National IIE student paper competition to be held during the IIE Annual Research Conference in Orlando, FL, May 20-24, 2006.

● Rebekah Drake's presentation on "*Application of Sustainable Improvements at the Wichita Eagle*" at the IIE Region V Conference Student Paper Competition received the second place award. Larry Randle, Jr. was also on the design team

● Mitch Rausch received the IIE Council of Fellows Scholarship for the 2005-2006 academic year.

● Narayanan Balasubramanian achieved CPIM Certification. He now is CPIM and CQIA.

● WSU APICS Student Chapter took home third place out of 20 participating chapters in the Region 14 Student Case Competition. The competition is judged by an industry panel.

● Congratulations to the newly ASQ certified quality professionals. There are nine new Certified Quality Improvement Associates including Kamalesh Yegneswaran, Jayakumar Perumal, Hareash Vontivilu, Azaden Adibi, Narayanan Balasubramanian, Gaurav Vig, and Admanathan Ganesan.

● Newly minted Certified Quality Engineers are Denise Jordan and Aldolfo Sanchez-Marsa.



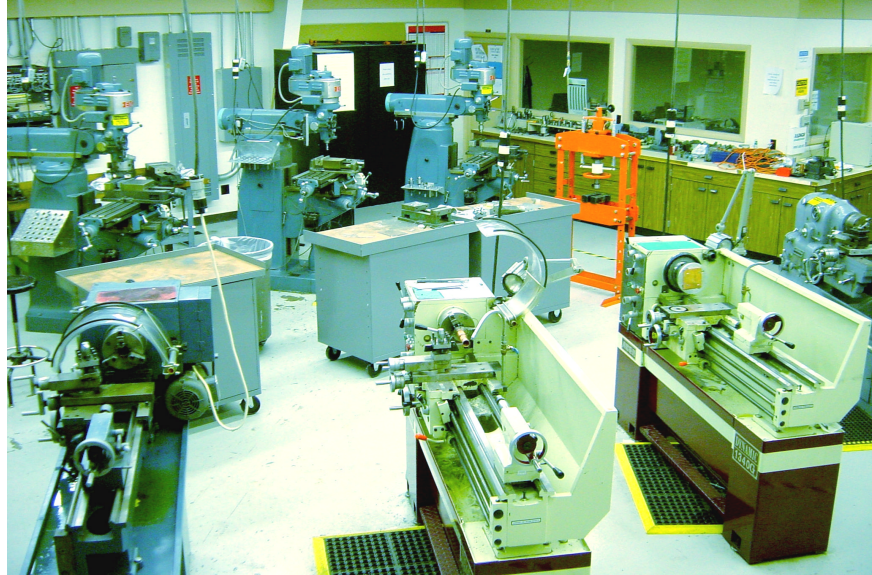
**Mitchell Rausch**



**Vasant Pednekar**

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### **Cessna Manufacturing Laboratory Overhauled**

<http://imfge.wichita.edu>

The Cessna Manufacturing Engineering Laboratory has undergone a rejuvenation under the direction of Dr. Gamal Weheba. The 1,700 sq. ft. laboratory now has interlocks on the equipment to ensure that only qualified personnel can operate equipment and is monitored by a remote camera system. The new management system has significantly improved the equipment up-time for class laboratories and student projects.

## IMfgE at Wichita State University

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