

SCHOLARLY AND UNIQUE ACTIVITIES OF THE FACULTY AND STAFF OF THE ENGINEERING AND TECHNOLOGY DEPARTMENT

OCTOBER 12, 2011

Manufacturing Engineering Capstone I/Mechanical Design Practicum combined class

Mr. Linards Stardins, Dr. Scott Springer, and students are working with Stratetek, Incorporated, Brooklyn Park MN. The project is an unmanned aerial vehicle propulsion system in response to DARPA's solicitation for *Innovative Systems for Military Missions*. Scope-of-work for class includes analysis of the proposed propulsion system, including predictions of durability and reliability; development of the proof-of-concept test assembly; development of an Engineering Technical Data Package; recommended manufacturing approach for each item in bill-of-materials; production cost analysis.

Journal of Materials Engineering and Performance

Dr. Rajiv Asthana was named editor for the journal effective January 2012. Rajiv has been an associate editor for JMEP since 2005.

Plastics Engineering Capstone I class

Dr. Adam Kramschuster is working with Scientific Molding Corporation to perform material composition tests and Acist, Inc. to perform medical device product development.

Equipment donations

Wittmann-Battenfeld installed a 2011 injection molding machine in the plastics laboratory on loan. Scientific Molding Corporation donated to UW-Stout a 2002 Arburg injection molding machine.

American Society of Engineering Educators

Midwest sectional meeting October 14-15, 2011 Duluth, MN topics and speakers include:

Alternative Formative Assessments to Enhance Conceptual Knowledge Transfer in the Topic of Buoyancy: a Pilot Study, Dr. Derek Wissmiller

What is Involved in Establishing a New Engineering Program? An Update on the New Computer Engineering Program at UW-Stout, Dr. Robert Nelson

Fourier Workbench, Dr. Ahmet Turkmen

Wausau campus for Bachelor of Science Engineering Technology program Mechanical Design Practicum class

Mr. Ron Thomas and students are working with Greenheck Fan Corporation to design a variable velocity nozzle to install on the Vektor MD-15, a Greenheck Lab Exhaust fan for the mechanical design practicum course. Scope of work includes verify final design, analysis of the mechanical components, material selection, cost analysis of the design, design control simulation for the nozzle, create documentation of the mechanism for prototype.

Packaging Program outreach marketing efforts

Faculty and staff of the program to produce program video and conduct hands-on demonstrations to Northwest Wisconsin Manufacturing Outreach Center project managers regarding outreach capabilities.

Activities list continued.

November 28, 2011

Publications:

Turkmen, A. and Pantiskas, C. (2011). Management of Electrocardiography Cables and Lead wires. *Biomedical Instrumentation & Technology*, 45 (2), 130-133.

Singh, M., Tatsuki, O., Asthana, R., Mathur, S. (Eds.) (2011). *Ceramic Integration and Joining Technologies*. Hoboken, NJ: John Wiley and Sons, Inc.

Turkmen, A., (2011). A Reference Book for Technology Specialists [Review of the book *Clinical Procedures for Medical Technology Specialists*, by L. J. Street]. *Biomedical Instrumentation & Technology*. 45 (6), 492.

Shin, J., Harte, B., Harte, J., and Dolan, K. (2011) The Effect of Low-dose X-ray Irradiation on the quality of fresh-cut asparagus in Microwaveable Vacuum Skin Packs. *HortScience*. 46:64-69.

Manufacturing Engineering Capstone II

Mr. Mike Lorenzen and Mr. Lin Stradins are supervising students who are fabricating and implementing a high-speed collating machine that works in conjunction with an existing high-speed horizontal wrapper and vertical bagging apparatus. This will be in use in the packaging program.

A group of students is designing and fabricating a foundry demonstration unit for die-casting with automated pouring and engineered thermal management. The unit will be utilized in the foundry of Fryklund Hall.

Material donations

Remmele Engineering, Incorporated donated aluminum for machining purposes to UW-Stout valued at \$4,000 through negotiations by Mr. Glenn Bushendorf.

Program Development

Scott Springer, Rich Rothaupt, Ron Thomas, and Jerry Johnson are serving on a committee with partners from the UW-Colleges and the Wisconsin Tech College System to deliver the Bachelor of Science in Engineering Technology degree at remote locations. The program is the result of a funded University of Wisconsin-System Committee on Baccalaureate Expansion (COBE) Grant, written by Scott Springer and Rich Rothaupt.

Advanced Degree

Wendy Stary completed her preliminary oral examination at the University of Minnesota and is now a candidate for the Doctor of Philosophy Degree in Work and Human Resource Education.

Activities list continued.

January 30, 2012

Publications

Shin, Yangjai , Shin, Joongmin, and Lee, Youn Suk (2011). Preparation and Characterization of Multilayer Film Incorporating Oxygen Scavenger. *Macromolecular Research*. 19 (9), 869-875.

Ortiz-Vazquez, H., Shin, J., Soto-Valdez, H., Auras, R. (2011). Release of butylated hydroxytoluene (BHT) from Poly(lactic acid) film. *Polymer Testing*. 30, 463-471.

Shin, J., Harte, B., Selke, S., and Lee, Y. (2011). Use of a Controlled Chlorine Dioxide (ClO₂) Release System in Combination with Modified Atmosphere Packaging (MAP) to Control the Growth of Pathogens. *Journal of Food Quality*. 34, 220-228.

Bae, W. and Liu, C. (2012). A Mobile Data Analysis Framework for Environmental Health Decision Support. *Proceedings of the 9th International Conference on Information Technology: New Generations (ITNG 2012)*.

Bae, W. and Liu, C. (2012). Health Monitoring Systems using Patient Trajectory Analysis and Environmental Factors, *Proceedings of the 4th International Conference on Advanced Geographic Information Systems, Applications, and Services (Geo-Processing 2012)*.

N. Sobczak, J. Sobczak, R. Asthana, R. Purgert, (2010). The mystery of molten metal, *China Foundry*, Nov 2010, pp 425-437. (Winner of the 13th FOSECO Cup Gold Award for best paper, Foundry Institution of Chinese Mechanical Engineering Society, 2011).

J. J. Sobczak, L. Drenchev, R. Asthana, (2012). Effect of Pressure on Solidification of Metallic Materials, *International Journal of Cast Metals Research*, 25(1), 2012, pp 1-14.

K.-L. Lin, M. Singh, R. Asthana, (2012) TEM Characterization of Au-based Alloys to Join YSZ to Steel for SOFC Applications', *Materials Characterization*, 63 2012, 105-111.

K.-L. Lin, M. Singh, R. Asthana, (2011). Interfacial Characterization of YSZ-to-Steel Joints with Ag-Cu-Pd Interlayers for Solid Oxide Fuel Cell Applications, *Ceramics International* (proofs available online, Nov 2011).

M. Singh, J. Martínez Fernández, R. Asthana, J. Ramirez Rico, (2011). Interfacial Characterization of Silicon Nitride/Silicon Nitride Joints Brazed Using Cu-base Active Metal Interlayers, *Ceramics International* (proofs available online, Nov 2011).

M. Singh, R. Asthana, A.L. Gyekenyesi, C. E. Smith, (2011). Active metal brazing of titanium to graphitic foams for thermal management applications, *International Journal of Applied Ceramic Technology* (in the press, 2011).

T. Matsunaga, H.T. Lin, T. Ishikawa, S. Kajii, R. Asthana, M. Singh, (2011). Microstructure and mechanical properties of joints in sintered SiC fiber-bonded ceramics, *Key Engineering Materials*, vol 484, pp 9-14.

Boorady, L., Hawley, J., Schofield, N. (2011). Using Animated Graphics as a Teaching Tool in Patternmaking: A comparison of Methods. *International Journal of Information and Communication Technology Education*. 7 (4), 11-23.

Book Chapters

R. Asthana and M. Singh, "Active metal brazing of advanced ceramic composites to metallic systems", in Advances in Brazing, D. Sekulic (ed.), Woodhead Publishing, Cambridge (UK) (in the press, 2011).

M. Singh and R. Asthana, "Integration of C/C composite to metallic systems for thermal management applications", in Ceramic Integration and Joining Technologies: From Macro- to Nanoscales, Eds. M. Singh, T. Ohji, R. Asthana and S. Mathur, John Wiley & Sons, 2011, pp 163-191.

M. Singh, T. Ohji, R. Asthana, S. Mathur, "Ceramic integration across length scales: Technical issues, challenges and opportunities," in Ceramic Integration and Joining Technologies: From Macro- to Nanoscales, Eds. M. Singh, T. Ohji, R. Asthana and S. Mathur, John Wiley & Sons, 2011, pp 3-14.

Accepted for Publication

Shi, W. V. and Zhou, M. C. (2012) Optimal Single-Pulse for Pacemakers Based on a Sinoatrial Model *IEEE/ASME Transactions on Mechatronics*.

Shi, W. V. and Zhou, M. C. (2012). Body Sensors Applied in Pacemakers: A Survey. *IEEE Sensors Journal*.

Presentations

Gyekenyesi, A., Singh, M., Singh, D., Kusunoki, M., Nagoya, M., Asthana, R. Roy, A., Krenkel, W., Ohji, T. (2012) Organizing Committee, Thermal Management Materials and Technologies. *36th International Conference & Exposition on Advanced Ceramics & Composites*. Daytona Beach, FL

Halbig, M., Coddington, B., Asthana, R., Singh, M. (2012). Bonding of Silicon Carbide Ceramics to Metals using Particulate Reinforced Ag-Cu-Ti Alloys. *36th International Conference & Exposition on Advanced Ceramics & Composites*. 22-27 Jan, 2012, Daytona Beach, FL.

Asthana R. , Singh, M., Smith C., Gyekenyesi, A. (2012). Bonding High Conductivity Graphite Foams to Metals for Thermal Management Applications. *36th International Conference & Exposition on Advanced Ceramics & Composites*. 22-27 Jan, 2012, Daytona Beach, FL.

Computer Engineering Capstone

Dr. Ahmet Turkmen and computer engineering students completed a design for Vibetech, Incorporated to develop a touchscreen interface for a vibration therapy device. These devices provide noninvasive therapy to rebuild bone and increase muscle strength to older adults. Development of the interface will occur in Capstone II spring 2012.

Dr. Cheng Liu and three computer engineering students are working with Realityworks Inc., Eau Claire, WI. The capstone I project, scheduled for spring 2012, is to design a wireless communication using WiFi and Bluetooth technology for the Embedded hardware in the Reality's Real Care Baby products.

Advanced Degree

Dr. Wei Shi successfully defended her Doctor of Philosophy dissertation titled *Advanced Intelligent Control and Optimization for Cardiac Pacemaker Systems* at the New Jersey Institute of Technology.

Packaging

A team comprised of four packaging majors, received a third place award in the WorldStar Student 2011 International Packaging Design Competition, sponsored by the World Packaging Organization. The contest drew 156 entries from 15 countries. *Contact Stack* was designed in the Packaging Development class taught by Assistant Professor Robert Meisner.

Mr. Robert Meisner was named a certified packaging laboratory professional by the International Safe Transit Association, which conducts packaged-product testing.

Donations

Dr. Cheng Liu received an embedded hardware donation from the Realityworks Inc., Eau Claire, WI valued at \$108,000.

Mechanical design practicum/manufacturing engineering capstone I

Mr. Lin Stradins, Dr. Scott Springer and students completed initial designs for manufacturability for a Stand-Up, Paddling Rowing Rig, a Stud Welding Cell, a Barrel Cam Rotating Cylinder Engine, and a plastic processed ball-point pen.

Reviewer

Dr. Ahmet Turkmen was named to a panel of reviewers for biomedical engineering proposals at the National Science Foundation, Arlington, VA.

Dr. Wei Shi was named as a journal paper reviewer for the following:
Institute of Electrical and Electronics Engineers (IEEE) Transactions on Mechatronics;
Journal of Control Theory and Applications.

Dr. Rajiv Asthana was named to the following evaluation boards:
Proposal Evaluator: Government of Romania, Executive Agency for Higher Education, Research, Development and Innovation (2011-12);
Evaluation Panel, European COST Action MP0602: Advanced Solders for High-Temperature Applications (a 5-year, 17 European-nation Action with a budget of 24 million Euros);
Nominating Committee, Engineering Ceramics Division, American Ceramic Soc. (2011-12);
International Scientific Committee, 4th International Conference on Recent Advances in Composite Materials, Goa, India (2013).

International course delivery

Wendy Stary delivered MFGT 341 Injection Molding Technology to students at Hochschule Darmstadt University of Applied Science, Darmstadt, Germany over Winterm. John Schultz escorted 10 University of Wisconsin-Stout students on manufacturing tours throughout Germany prior to the course and assisted Wendy with delivery of the class.