

Manufacturing Systems Engineering MS Program

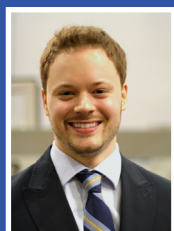
The first cohort of entirely online students (seven) was enrolled in the MFS program in Fall 2015. Three fully online courses were successfully offered for the incoming class of students and additional courses are being offered in Spring 2016.

A proposal for a Graduate Certificate in Manufacturing Systems has been approved by the college, and has been submitted to the University for final approval. Once approved, individuals will be able to complete four graduate courses, all offered online, and receive a certificate of completion.

This option will be attractive to students who desire further knowledge in manufacturing topics, but who are not willing to commit to the complete Master's degree. The courses for the certificate will apply to the course requirements for the Master's degree program.

In addition, this will also be an alternative path for students who do not have an undergraduate degree in an engineering-related field to earn a graduate certificate in Manufacturing Systems.

Meet the new ISM Staff!



Dr. Julius Schoop - Research Associate

Dorothy Ferguson - Administrative Services Assistant

Dana Harrod - Part-time Office Assistant



About the Institute for Sustainable Manufacturing

Details about our new projects, lab facilities, books, recent publications, patents, and more can be found on our website!

Contact Us

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Journals

International Journal of Sustainable Manufacturing
www.inderscience.com/ijsm

Journal of Machining Science and Technology
www.tandfonline.com/toc/lmst20/current

ISM Faculty and Staff



F. Badurdeen Y.T. Cheng L. Holloway I. S. Jawahir W. Li D. Sekulic Y. Zhang J. Schoop D. Ferguson D. Harrod

Get Your Masters in Manufacturing Systems Engineering from the University of Kentucky Entirely Online



An advanced degree in manufacturing from an institution world renowned for its manufacturing expertise can provide you the technical knowledge and capabilities necessary to succeed in your career!

There is still time to apply for Fall 2016. No GRE score required!

- Visit www.engr.uky.edu/mfs
- Contact Professor Fazleena Badurdeen, Director of Graduate Studies for Manufacturing Systems Engineering Program at badurdeen@uky.edu
- Contact Graduate Program Coordinator at (859) 218-0611 or manufacturing@uky.edu

Sustainable Manufacturing

Products, Processes, and Systems

Volume 2, Issue 2

Institute for Sustainable Manufacturing Newsletter

Fall 2015

A Message from the Director



We, at the Institute for Sustainable Manufacturing (ISM), continue to make significant progress with our overall mission of conducting academic research (basic and applied), offering educational programs by developing and delivering courses, and providing outreach to industry. With our focus on products, processes and systems, we have been actively involved in several research projects sponsored by industry groups and agencies. We are now into our fourth year of operation, and this year, once again, we have exceeded our expectations in research productivity with increased funding, research publications, graduate student productivity and industry outreach activities.

Here are some highlights of our achievements in the second half of 2015:

- Organized and hosted the 5th International Forum on Sustainable Manufacturing at the University of Kentucky in September 2015, with participants from industry, including young researchers in sustainable manufacturing from various universities nationwide, under the sponsorship of the

National Science Foundation. The theme of the Forum was Value Creation through Sustainable Manufacturing.

- As a part of the recently-funded NIST-AMTech project, PRISM, with strong support from GE Aviation, we organized and hosted a sustainable manufacturing workshop for the aerospace industry at GE-Aviation (Cincinnati, OH) in October 2015, and identified future directions for developing industry-university-state partnership for research.
- Continued to offer courses for the online Masters Degree Program in Manufacturing Systems Engineering, focusing on sustainable manufacturing, with more online courses added to the list.
- Continued to expand our international collaboration with researchers from Australia, Brazil, China, Finland, France, Germany, Italy, Lebanon, Malaysia, Norway, Portugal, Slovenia, Turkey and United Kingdom. Three researchers from Brazil joined our research group at the Institute for Sustainable Manufacturing to conduct collaborative research for a year each. Two new collaborative research projects were initiated with well-known international research universities in Germany: RWTH-Aachen University and IWF-Hannover.

I. S. Jawahir, Director, ISM

PRISM: A New NIST-Funded ISM Project Dedicated to Developing Research Consortia in Sustainable Manufacturing

PRISM is the Partnership for Research and Innovation in Sustainable Manufacturing. It is an emerging alliance of industry, government, and academia with the goal of defining and executing a pragmatic, business-driven agenda

for achieving and maintaining sustainable manufacturing. The PRISM project is funded by the National Institute of Standards and Technology (NIST) Advanced Manufacturing Technology Consortia (AMTech) program.

Project Objectives

- Develop multi-partner consortia to create technology infrastructure and promote US excellence in sustainable manufacturing
- Identify and priority research projects supporting long-term strategic industrial needs in sustainable manufacturing
- Develop shared-vision roadmaps for technologies that enable transformational innovations for next-generation manufacturing

Project Team

University of Kentucky
I.S. Jawahir (PI)
F. Badurdeen (Co-PI)
K.E. Rouch (Co-PI)
W. Li (Co-PI)
C. Smith (Project Manager)
B. Hogan (Graduate Student)

Richard Neal
Integrated Manufacturing Technology Initiative

Tom Goldsby
Gold 1 Enterprise

Industry Partners and Collaborators



NIST-UK Workshop on Sustainable Manufacturing for the Aerospace Industry Cincinnati, OH October 20-21, 2015

ISM, in conjunction with GE-Aviation, organized and hosted a sustainable manufacturing workshop. This workshop was second in a series of three specific workshops developed under the sponsorship of NIST-AMTech PRISM (Partnership for Research and Innovation in Sustainable Manufacturing) project, and was held at the GE Aviation Learning Center, Cincinnati, OH on October 20-21, 2015.

The major objectives of this workshop were to:

1. Review the Technology Roadmap and identify potential projects of interest to the aerospace industry;
2. Identify companies that might want to work on these projects with universities and national laboratories; and
3. Explore potential funding sources.

The agenda for this second workshop included four keynote presentations:

- Mathy Stanislaus (US EPA): Global and Domestic Sustainable Materials Management, Issues and Opportunities
- David Madden (Air Force Research Laboratory): Industrial Process Energy Benchmarking
- Joseph Fiksel (Ohio State University): Sustainable Manufacturing - Is it Resilient?



A Breakout Session



Dr. Todd Rockstroff



Panel Discussion



Charlie Smith

- Brian Dods (General Electric Power & Water): GE - Celebrating 10 Years of Sustainability

Richard Neal (IMTI, Inc.) presented a summary of Roadmapping Workshop results, including the 12 Business Imperatives. Then, a panel discussion took place with all four keynote speakers. Professor Fazleena Badurdeen served as the panel moderator.

Four breakout sessions were held in three focus areas:

- Tools Across the Life-cycle for Value Creation (Moderator: John Sutherland)
- Supply Chain Risk Management (Moderator: Steve Hellem)
- End-of-Life Value Management (Moderator: Nabil Nasr)

A total of 35 participants, including several top decision makers in the aerospace and defense industry, attended the workshop. A comprehensive workshop report has been developed.

Our website has posted several documents including all presentations from this workshop:

<http://www.ism.uky.edu/events/aviation-sustainable-manufacturing-workshop/>

Awards and Honors



Dr. YuMing Zhang was introduced as a new SME fellow at the annual SME banquet on Nov. 8, 2015 in Chicago

Yan Shao, a former PhD student in the ISM and ECE, and **Dr. YuMing Zhang** received the A. F. Davis Silver Medal Award for Machine Design from the American Welding Society on Nov. 10, 2016 during FabTech in Chicago.



Professor I.S. Jawahir served as Co-Chairman of the 15th CIRP Conference on Modeling of Machining Operations (CMMO), in Karlstruhe, Germany, on June 11-12, 2015. (Prof. Jawahir founded this conference series, with the first conference he organized and hosted in Atlanta, GA, USA in May 1998).

Professor I.S. Jawahir was appointed as the Regional Editor – North America, for the International Journal of Advances in Materials and Processing Technologies (IJAMPT) – published by Taylor & Francis Publishers (United Kingdom).

Dr. Dusan Sekulic was appointed as a visiting professor at the Beijing University of Technology, from October 2015 to October 2017. He delivered a series of 6 lectures at the College of Materials and Engineering, Beijing, 100124, October 20-24.



Dr. Sekulic was also re-appointed as a "Secat J.G. Morris Aluminum Professor" (endowed professorship), December 30, 2015.

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Invited Keynote Papers and Presentations

- **Professor I.S. Jawahir** delivered a Plenary Keynote Paper at the 13th Global Conf. on Sustainable Manufacturing (GCSM), in Ho-Chi-Minh City, Vietnam on September 16-18, 2015 (Paper Title: Technological Elements of Circular Economy and the Principles of 6R-Based Closed-loop Material Flow in Sustainable Manufacturing).
- **Professor I.S. Jawahir** delivered a Plenary Keynote Paper at the International Conference on Advanced Manufacturing Technology (ICAMT 2015) in Johor Bahru, Malaysia on September 19-22, 2015 (Paper Title: Cryogenic Processing of Materials: Producing Engineered Surfaces for Enhanced Product Quality, Performance and Sustainability).
- **Dr. Dusan Sekulic** presented the keynote lecture at the Sixth Symposium on Materials Science and Technology of the Chinese Materials Research Society, Chongqing on October 16-19, 2015. The keynote lecture topic was Phase Field Modeling of Surface Tension Driven Metallic Melts: Aluminum Brazing Case Study.
- **Dr. YuMing Zhang** gave a plenary talk entitled "Advanced sensing and Control of Welding Processes" at the Annual American Welding Society Conference in conjunction with the FabTech on November 11, 2016 in Chicago, IL.
- **Dr. YuMing Zhang** gave a plenary talk entitled "Advanced sensing and Control of Welding Processes" at the Annual Chinese Welding Society Conference in Lanzhou, China on October 13, 2015.

International Collaboration

New International Research Collaborations Established with Two Major German Universities

ISM researchers, Prof. Dr. I. S. Jawahir and Dr. Julius Schoop recently established a new collaboration with Prof. Dr.-Ing. Dr.-Ing. E.h. Dr. h.c. Dr. h.c. Fritz Klocke and Dr.-Ing. Stefan Buchkremer at the RWTH Aachen University, Germany. This project is on developing a mechanics-based predictive model for chip breaking in metal machining and its validation.

ISM researchers, Prof. Dr. I. S. Jawahir and Dr. Julius Schoop also recently established a new collaboration with Prof. Dr.-Ing. Berend Denkena and Dipl.-Ing. Benjamin Bergmann at the Institute for Production Engineering and Machine Tools, IFW, Hannover, Germany. This project is on studying the influence of size effects on surface integrity in finish machining of high strength materials.

Visiting Scholars



Amauri Hassui: Assistant Professor in the Department of Manufacturing and Materials Engineering, Faculty of Mechanical Engineering, State University of Campinas – UNICAMP (SP - Brazil) is visiting ISM/UK for a year to conduct research on surface integrity in machining of Inconel 625.



Wisley Falco Sales: Assistant Professor in the Department of Mechanical Engineering at the Federal University of Uberlândia, Uberlândia, MG, Brazil is visiting ISM/UK for a year to conduct research on surface integrity when turning of titanium alloys with PCD tools using cryogenic and synthetic cutting fluids.



Rodrigo Henriques Lopes da Silva: Assistant Professor at the Federal Technological University of Paraná, Brazil, and a doctoral student at University of Campinas (UNICAMP), Brazil is visiting ISM/UK for a year. His research is on side-milling of superalloys and bimetal alloys for improved surface integrity.

Dr. Jawahir Awarded the William Johnson International Gold Medal

Professor I.S. Jawahir was awarded 2015 W. Johnson International Gold Medal, Advances in Materials and Processing Technologies (AMPT 2015), Madrid, Spain, December 2015. He is the first U.S. recipient of this prestigious award. This award was established in the United Kingdom under the signature international conference series on Advances in Materials and Processing Technologies (AMPT) established over 20 years ago, and later was named after the founder of this conference series, Professor William Johnson, DSc., FRS, FEng, formerly



of UMIST and Cambridge University (United Kingdom), whose pioneering work on materials processing and process modeling is well-recognized worldwide. This International Gold Medal is awarded to a most distinguished academic in materials processing research and teaching for his/her lifelong contributions to this field. Past recipients of this medal include prominent researchers from the United Kingdom, Japan, Korea, Australia, France, Germany, Singapore, Taiwan, Turkey and Poland.



5th International Forum on Sustainable Manufacturing Lexington, KY September 24-25, 2015

The 5th International Forum on Sustainable Manufacturing was held on September 24-25, 2015 at the Spindletop Hall at the University of Kentucky. The event, which was held over one and a half days for the first time, was by far the most successful of the series that was started in 2010. Professors Fazleena Badurdeen and Jeffrey Seay were co-chairs for this event.

Special features of the event in 2015 included:

- Presentations by industry leaders on sustainable manufacturing practices as well as challenges to be addressed in order to make the business case for sustainable manufacturing
- Leading researchers sharing their most recent advances in sustainable manufacturing related fields
- Representatives from national funding agencies who shared federal opportunities available to support further research in sustainable manufacturing related topics
- A panel discussion on 'Making the Business Case for Sustainable Manufacturing', which focused on issues faced

by industry when implementing sustainable manufacturing initiatives in the product, process and systems areas.

- An emerging researcher showcase which brought together young researchers engaged in cutting-edge research in sustainable manufacturing-related areas
- A poster session to showcase research projects primarily by University of Kentucky graduate and undergraduate students

The 5th International Forum on Sustainable Manufacturing was very successful in bringing together individuals from industry, academia, federal, and state agencies to discuss opportunities to increase manufacturing productivity and sustainability as well as the imperatives that must be addressed to make sustainable manufacturing practices the norm rather than the exception.

The event was sponsored by a National Science Foundation grant and also supported through the generous contributions of several other organizations.



Panel Discussion



Winners of the Student Poster Competition



NSF Sponsored Young Researchers