

University of Dayton
School of Engineering
Scholarship
2011



UNIVERSITY OF DAYTON
SCHOOL OF ENGINEERING

SCHOLARSHIP 2011

A joyous year in the history of the University of Dayton School of Engineering – 2011. We celebrate our 100th anniversary of excellence in engineering education and research as well as our alumni who played significant roles in helping to create our world-class, professional institution.

UNIVERSITY OF DAYTON NOTABLE ALUMNI

- Carroll Hochwalt '20 - founder, Monsanto
- Charles Pedersen '26 - Nobel Laureate
- Joe Pesce '28 - developer, talking motion pictures
- Charles Wilke '40 - founder, chemical engineering, Berkeley
- Cordell Hull '56 - founder, Bechtel Enterprises
- Roman Shoenherr '56 - developer, overhead projector
- Bro. Ray Fitz '64 - president emeritus, University of Dayton
- Richard Abdo '65 - CEO, Wisconsin Energy
- Blair Barbour '86 - CEO, Photon-X
- Joe Hinrichs '89 - president, Ford, Asia Pacific and Africa
- Annette Clayton '92 - president, Saturn Corporation, GM

We invite you to discover within this booklet the national and international measure of our research through our 2011 faculty activities and our five Centers of Excellence as designated by the state of Ohio.

OHIO CENTER OF EXCELLENCE: ADVANCED ENERGY

Strategic Energy and Environmental Informatics
von Ohain Fuels and Combustion Center


OHIO CENTER OF EXCELLENCE: BIOMEDICINE AND HEALTH CARE

Tissue Regeneration and Engineering at Dayton (TREND)

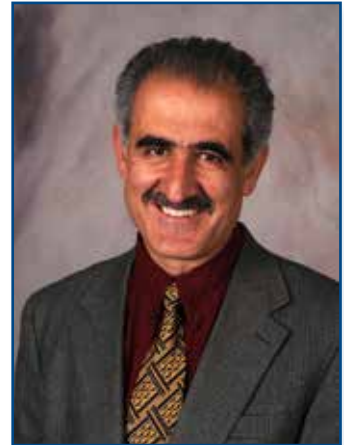
OHIO CENTER OF EXCELLENCE: ADVANCED TRANSPORTATION AND AEROSPACE

High Performance Materials
Optoelectronics and Sensors

At the School of Engineering, our faculty and staff are comprehensive engineers and researchers with a collective spirit of invention and innovation who strengthen our community with interdisciplinary initiatives and advance critical areas of research in the fields of high-performance materials, sensors and photonics, nanotechnology, fuels and energy, bioengineering, and more. Please enjoy our endeavors within this booklet.



Tony E. Saliba
Dean, School of Engineering



The University of Dayton, challenged by the Ohio Board of Regents to “strive for greatness . . . and establish Centers of Excellence,” created five innovative, forward-thinking areas of study and research.

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UNIVERSITY of



DAYTON

Karen Updyke
Editor/Designer

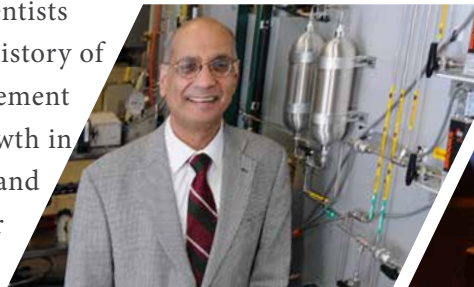
Jackie Bui
Student, Graphic Design



VON OHAIN FUELS AND COMBUSTION CENTER

During the year of the "Centennial of Powered Flight," 2003, the University of Dayton dedicated the *von Ohain Fuels and Combustion Center* and named Dr. Dilip Ballal as director. Hans von Ohain was coinventor of the jet engine and a former University of Dayton mechanical engineering professor.

An award winning academic research complex with an international reputation, the Center's engineers and scientists have a collective history of 25 years of achievement and sustained growth in the fields of fuels and combustion. Their accumulative success is shared between academic, government and business entities.



Dr. Dilip Ballal, Director

Nationally ranked by NASA and GE Aviation and currently conducting research deemed a top three priority for the U.S. Air Force, the Center's researchers are committed to the development and application of alternative and conventional fuels and fuel additives. They focus on understanding and optimizing fuel combustion processes and decreasing emissions. Currently, they are working on the development of environmentally friendly algae and bio fuels, determining fuels and materials compatibility, investigating greenhouse gas emissions, and mitigating the environmental impacts of fuel use.

Multiple funding awards enable the Center to build its programs and establish an impressive record of accomplishments, which includes strengthening Ohio's economy and maintaining strong relationships with key industries — GE Aviation, Battelle, Parker, Lubrizol, Velocys, Graftech, AFRL, and NASA GRC.

From 2003 to 2007, work was performed at the University of Dayton campus and at Wright-Patterson

Air Force Base (WPAFB). However, because of a 2.5-fold increase in sponsored research, the Center outgrew available space at WPAFB. In 2007, its new on-campus laboratory facility at the University's Shroyer Labs was inaugurated. The new lab space facilitates on-campus research in existing and new areas of fuels and combustion.

The Shroyer Lab covers 3,500 square feet for fuels and combustion research, as well as approximately



Fuels and Combustion Research

750 square feet for environmental engineering studies and another 750 square feet for bio-environmental work. In the past year, research volume increased by 33 percent, and the von Ohain Fuels and

Combustion Center has been "inundated with work."

The Center ranks in the top three in the nation for modeling and simulation, environmental engineering, and engineering services fuels and combustion research. Their customers include the Air Force Research Laboratory, NASA, U.S. Army, Federal Aviation Administration, U.S. Department of Energy, the state of Ohio, as well as industrial clients — GE Aviation, Parker, Solar Turbines, AVETeC, ExxonMobile, Lubrizol, BASF, DuPont, and Society of Plastics Industries.

As a gateway to education, research, development and application in fuels and combustion, the Center's engineers and scientists facilitate interdisciplinary educational courses and collaborate through publications and conferences for technology transfer and knowledge dissemination.

For more information about the von Ohain Fuels and Combustion Center, visit our website at http://udayton.edu/research/areas/fuels_energy.



The Center for Strategic Energy and Environmental Informatics (SEEI) was designated by the state of Ohio in 2009 as a Center of Excellence in Advanced Energy.

A collaborative and successful University of Dayton initiative, the SEEI engineers and scientists use assessments and analytics from individual homes, industrial buildings and global environmental issues to expand the energy and environmental conversation. Faculty impact the conversation through collaborative publications and activities.

In this unique endeavor, the University formed SEEI to embrace and enhance the collective resources and strengths of the School of Engineering, the Research Institute (UDRI), and the College of Arts and Sciences.

Building upon extensive capabilities, researchers develop large-scale analytic tools for energy and environmental management in geospatial information systems, as well as air and water environmental impact analyses, industrial and building energy informatics, and environmental remediation technology. Their collaborative efforts generate interdisciplinary study, and their programs intertwine research with education and application.

SEEI programs in the School of Engineering include: the Building Energy Center (BEC), the Industrial Assessment Center (IAC), the master's degree in Renewable and Clean Energy (RCL), as well as graduate programs that emphasize energy systems and undergraduate programs that feature sustainable engineering. The Department of Mechanical and Aerospace Engineering encompasses these educational

initiatives, led by Dr. Kelly Kissock as chair of the department and director of the IAC. The BEC is led by Dr. Kevin Hallinan, professor of mechanical and aerospace engineering and BEC director.

Within UDRI, there are two groups associated with SEEI that conduct air and water experiments: the Sustainable Environmental Technologies Research Group and the Environmental Engineering Research Group. Dr. Sukh Sidhu leads the sustainable team and

focuses on pollution reduction during energy generation, energy consumption reduction and alternative energy systems.

Dr. Phil Taylor leads the environmental team and concentrates on basic and applied research related broadly to clean air, clean water, and clean energy technologies.

In support of SEEI, the University's College of Arts and Sciences, developed the Sustainability, Energy and the Environment (SEE) minor program, which welcomes students from all disciplines and provides a forum for environmental study. SEE strives to increase awareness between individuals and the impact of their actions, locally and globally. SEE's director, Dr. Robert Brecha, studies environmental and energy system changes linking them with intelligent economic decisions and collaborating with colleagues at Germany's Potsdam Institute for Climate Impact Research, where he spent a year on sabbatical. He also collaborates with University faculty and students investigating building energy consumption patterns.

For more information about our Center for Strategic Energy and Environmental Informatics, visit our website at http://udayton.edu/research/areas/fuels_energy.



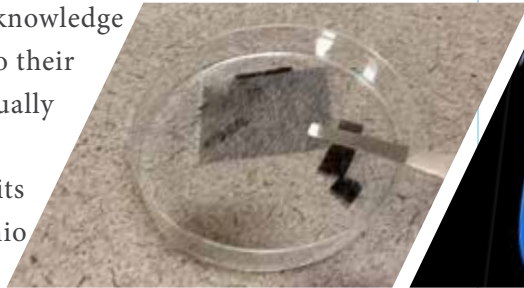
Algae as Alternative Fuel

Building Energy Assessment

TISSUE REGENERATION AND ENGINEERING AT DAYTON

Intriguing research — salamanders, fruit flies, surgical tools, tissue repair — performed at a collaborative workspace — the TREND at Dayton, Ohio.

A 2006 University of Dayton collaborative between engineers and scientists, *Tissue Regeneration and Engineering at Dayton* (TREND) faculty and staff integrate academic, industry, medical, government, and nonprofit entities. Their mission evokes dissemination of knowledge and technology, so their patents will eventually yield medical and economical benefits for the state of Ohio and others.



Carbon Materials Research

Researchers and engineers from six University departments and the Research Institute propel TREND's advanced research. TREND allies with Wright State University, Kettering Medical Center Network, Rice University, and multiple industry partnerships, including Ethicon Endosurgery and Community Blood Center and Tissue Services. Because of TREND's significant network system, their research theory is enhanced, which quickly leads to medical applications and economic advances.

Since 1990, internationally renowned TREND director, Dr. Panagiotis Tsonis, has been funded by the National Institutes of Health (NIH). Dr. Tsonis studies tissue regeneration in the salamander and is considered a leading voice in regeneration research. In 2009, he received a five-year, \$1.8 million NIH grant bringing his research funding to nearly \$7 million.

To complement TREND's distinctive research, the University developed a diverse academic program that appeals to biology, mechanical engineering, materials engineering, chemical engineering and mathematics undergraduate and graduate students. In 2010, the

University's School of Engineering and College of Arts and Sciences created a dual-track master's degree in bioengineering. With TREND experience, graduating seniors are prepared to make contributions in chemical, pharmaceutical and medical industries.

Research at TREND includes:

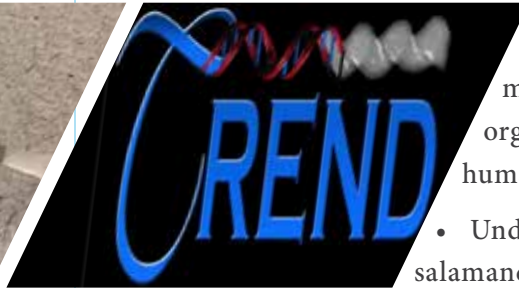
- Tissue scaffold interactions for bone repair.
- Understanding how tree frogs freeze

themselves to survive winter months — could help organ transplant in humans.

- Understanding how salamanders and newts regrow lost eyes, limbs, heart and brain. In an article in *Nature Communication*, Dr. Tsonis writes that repeated regeneration, even at old age, does not alter the capacity of newts to regenerate tissue — studying the newts regenerative powers is reversing 250 years of scientific thought.
- Everyday items — socks, sunscreen, cosmetics, surgical scalpels, tires and lithium batteries — what are the harmful effects of their nanoparticles?
- Developing surgical tools to cut and cauterize blood vessels — an interdisciplinary collaboration between chemical engineering, mechanical engineering and biology that is advancing surgical methods.

Currently, TREND has several patents pending that will ultimately materialize into medical and commercial value for all.

For more information, visit our website at <http://udayton.edu/research/areas/bioscience>.



TREND Center



HIGH PERFORMANCE MATERIALS

According to Ohio's *Centers of Excellence* website (www.ohiohighered.org/coe), "the University of Dayton is ranked second in the nation among all universities for its volume of sponsored research in materials . . . uniquely poised to grow this sector of Ohio's economy."

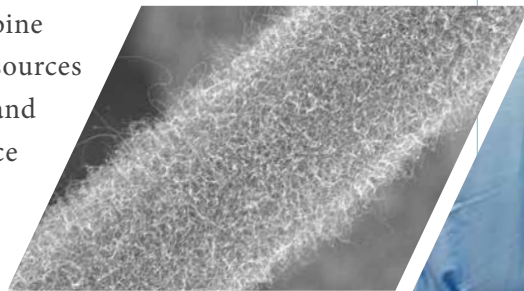
The University's Department of Chemical and Materials Engineering, the Research Institute (UDRI), and the College of Arts and Sciences combine knowledge and resources with government and industry to produce positive outcomes and quickly move materials' theory to application.

The University excels in applied research and development with cutting-edge technology in metals and ceramics, multi-scale composites and polymers, nonstructural materials, sustainment technologies, nano materials, electronic materials, thin films, solid lubricants, and optical materials.

Faculty leadership in the School of Engineering and the collective resources of UDRI and the U.S. Air Force Research Laboratory (AFRL) have developed three areas of distinction: *composite materials and processes*, led by Dr. Charles Browning, contributes significantly to technology at Wright Patterson Air Force Base (WPAFB); *titanium/metal technology*, led by Dr. Daniel Eylon, establishes the University as a world leader in airframe light structural alloys integrating activities with AFRL; and *nano-materials*, led by Dr. Khalid Lafdi, contributes significantly to the advancement of nanotechnology at the University as evidenced by his Multidisciplinary University Research Initiative (MURI), which is supported by grants from the Air Force Office of Scientific Research (AFOSR) and the

Ohio Board of Regents.

Our programs draw on the strength and presence of materials engineering accessible throughout our region. Up to 70 percent of UDRI research is materials related. At WPAFB, the AFRL is home to one of the largest and best-equipped materials research laboratories in the world. Materials science and materials engineering are well entrenched in our area as demonstrated by



"Fuzzy Fibers" Nano-materials Research



Carbon-based Scaffolds

the work performed at UDRI, AFRL's Materials and Manufacturing Directorate, AFRL's Aerospace Systems Directorate, the National Composite Center, AK Steel, GE Aviation (GEAE), and more.

In addition, the world-class Nano Engineering, Science and Technology Laboratory (NEST), housed on-campus, benefits multidisciplinary users. NEST enables nanoscale research and development, provides a collaborative workspace for technical support, facilitates teaching, serves as a resource to industry, and promotes the transfer of knowledge as well as the commercialization of product. Academic, government, and industrial investigators from diverse fields of study take advantage of NEST.

Instrumental in the start-up of materials-related companies, the Center of Excellence in High Performance Materials at the University of Dayton focuses on education and research while developing ideas with commercial potential that are essential to our region. Joint ventures between academics, government and industry will add to the Center's success and make it the premier complex for high performance materials research.

For more information, please visit our website at <http://udayton.edu/research/areas/materials>.

OPTOELECTRONICS AND SENSORS

The state of Ohio's Center of Excellence in Optoelectronics and Sensors at the University of Dayton is a collective between the School of Engineering, the University of Dayton Research Institute (UDRI) and the College of Arts and Sciences.

The School of Engineering houses the Electro-Optics (EO) Graduate Program, the Ladar and Optical Communications Institute (LOCI) and the Institute for the Development and Commercialization of Advanced Sensors Technology (IDCAST). Ohio students, engineers, researchers and businesses gain from their continuum of knowledge, development and commercialization.

One of a select group in the nation that offers a doctoral degree in specialized optics, EO's mission is to provide quality graduate education while supporting undergraduate and continuing education needs. The University's EO faculty and staff form a world-renown network that provides a wide-range of opportunities in optoelectronics and sensors technology.

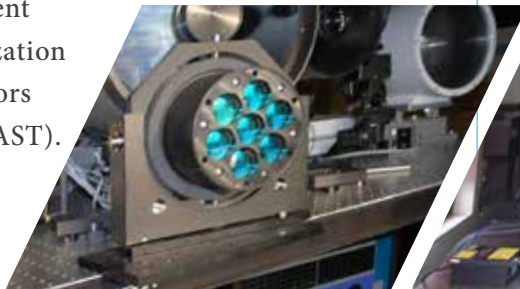
Twenty dedicated electro-optics laboratories deliver state-of-the-art facilities and equipment at the University. World-class research facilities are also available at UDRI and the Air Force Research Laboratory (AFRL).

LOCI, an extension of EO, partners with AFRL and nurtures other small businesses. LOCI's laser radar curriculum, one of the first in the nation, serves the LADAR and free space optical communications community and develops highly qualified engineers

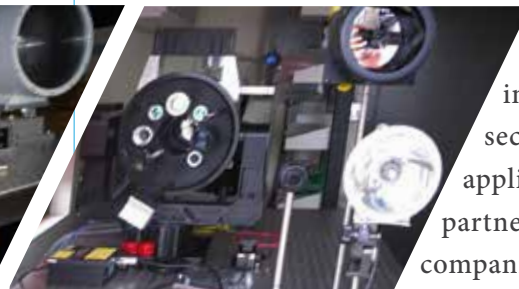
in the field of component technology. LOCI is an Air Force Center of Excellence for Laser Radar (LADAR) research and graduate study.

In 2008, at \$28 million, IDCAST was funded by the Ohio Third Frontier's Wright Center of Innovation. IDCAST faculty and staff support the studies, development and commercialization of sensor related technologies for Ohio companies. They provide the framework for concentrated efforts to develop and

integrate advanced sensor technology in defense, homeland security and commercial applications. IDCAST partners with over 30 companies and 8 universities.



Fiber Array System



VA Hospital Instruments

UDRI's Sensor Systems division, established in 2007, collaborates with the University's academic researchers and students as well as industry and government groups to focus on remote sensing. The division's overriding emphasis is layered sensing, which involves fusion of chemical and biological sensor data with remote sensor data to provide complete sensing/data acquisition solutions for universal situation awareness. Studies in chemical and biosensing applications are important to Homeland Security, the Department of Defense, drug discovery and medical research. Research in optical and electro-optical sensors result in remote sensing applications that are essential to the U.S. Air Force.

The integration of these regional activities at the University of Dayton validates the University as the ideal venue for the state of Ohio's Center of Excellence for Optoelectronics and Sensors.

For more information, visit our website at <http://udayton.edu/research/areas/sensors>.

UNIVERSITY OF DAYTON
SCHOOL OF ENGINEERING

SCHOLARSHIP 2011

Chemical and Materials Engineering

JOURNAL ARTICLES

- Cobucci-Ponzano, B., C. Zorzetti, A. Strazzulli, S. Carillo, E. Bedini, M.M. Corsaro, **D. Comfort**, R.M. Kelly, M. Rossi, and M. Moracci. 2011. A novel α -D-galactosynthase from *thermotoga maritima* converts β -D-galactopyranosyl azide to α -galacto-oligosaccharides. *Glycobiology*. 10.1093/glycob/cwq177.
- Bearden, S.D., J.P. Cannon, and **S.A. Gold**. 2011. Solvent effects on template wetting nanofabrication of MEH-PPV nanotubules. *Macromolecules* 44, no. 7: 2200-2205.
- Lafdi, K.**, and C. Yu. Forthcoming. Influence of nanomaterials in polymer composites on thermal conductivity.
- Li, L., and **K. Lafdi**. 2011. Composite films prepared by immersion deposition of manganese oxide in carbon nanotubes grown on graphite for supercapacitors. *J. Mater. Sci.* 46: 7328-7734.
- Lafdi, K.** 2011. Assessment of carbon foam geometry during copper coating process.
- Lafdi, K.** 2011. C/C composite, carbon nanotube and paraffin wax hybrid systems for the thermal control of pulsed power in electronics.
- Lafdi, K.** 2011. Functionalization of carbon nanofibers through electron beam irradiation.
- Lafdi, K.** 2011. Mechanical properties of copper-coated carbon foams.
- Lafdi, K.** 2011. Multifunctional hybrid carbon foams: Integrating processing and performance.
- Fasano, Julian, Eric E. Janz, and **Kevin J. Myers**. Forthcoming. Design mixers to minimize effects of erosion and corrosion-erosion. *International Chemical Engineering*.
- Myers, Kevin J.**, Jonathan P. Herr, and Eric E. Janz. Forthcoming. Solids suspension with angle-mounted agitators in unbaffled vessels. *The Canadian Journal of Chemical Engineering*.
- Fasano, Julian B., **Kevin J. Myers**, and Eric E. Janz. 2011. Effect of geometric variations on the performance of gas dispersion impellers with semicircular blades. *The Canadian Journal of Chemical Engineering* 89: 961-968.
- Myers, Kevin J.**, Jonathan P. Herr, and Eric E. Janz. 2011. Solids suspension with angle mounted agitators in unbaffled vessels. *The Canadian Journal of Chemical Engineering* 89: 940-947.
- Krane, C.M., M.F. Pinnell, C. Gardner, M. Thompson, J.T. Coleman, and **R.J. Wilkens**. 2011. Mechanical test methods for assessing porcine carotid and uterine artery burst pressure following ex vivo ultrasonic ligature seal and transection. *Journal of Testing and Evaluation*.
- Sarica, C., H.Q. Zhang, and **R.J. Wilkens**. 2011. Sensitivity of slug flow mechanistic models on slug length. *Journal of Energy Resources Technology* 133: 043-001-1-043001-6.
- and paraffin wax hybrid systems for the thermal control of pulsed power in electronics. Carbon Conference, July 11-16, in Clemson, South Carolina.
- Lafdi, K.** 2011. Comparison of novel carbon-based scaffolds to graft jacket in tendon repair applications. Carbon Conference, July 11-16, in Clemson, South Carolina.
- Lafdi, K.** 2011. Designing hybrid foam as heat exchanger for thermoelectric cooler in cooling vest. Carbon Conference, July 11-16, in Clemson, South Carolina.
- Lafdi, K.** 2011. Development of a fuzzy fiber sensor for real time structural health monitoring. Carbon Conference, July 11-16, in Clemson, South Carolina.
- Lafdi, K.** 2011. Effect of copper coating on thermo-mechanical properties of carbon foam. Carbon Conference, July 11-16, in Clemson, South Carolina.
- Lafdi, K.** 2011. Exfoliated Graphite as a filler to enhance the EMI shielding of polymers. Carbon Conference, July 11-16, in Clemson, South Carolina.
- Lafdi, K.** 2011. Friction of carbons part 1: Friction and wear transitions. Carbon Conference, July 11-16, in Clemson, South Carolina.
- Lafdi, K.** 2011. Metalized carbon nanofiber based nanocomposites for electrochemical sensing. Carbon Conference, July 11-16, in Clemson, South Carolina.
- Lafdi, K.** 2011. Novel carbon foam/polycaprolactone scaffolds for tissue engineering applications. Carbon Conference, July 11-16, in Clemson, South Carolina.
- Lafdi, K.** 2011. PCM/hybrid foam system in temperature control application. Carbon Conference, July 11-16, in Clemson, South Carolina.

PAPERS PUBLISHED AT CONFERENCE PROCEEDINGS

- Brubaker, J., E.N. Broaddus, and **S.A. Gold**. 2011. Electrochemical characterizable array electrode structure made via template nanofabrication. 2011 AIChE Annual Meeting, in Minneapolis, Minnesota.
- Lafdi, K.** 2011. Aligned nanotube as thermal interface. Carbon Conference, July 11-16, in Clemson, South Carolina.
- Lafdi, K.** 2011. C/C composite, carbon nanotube

Janz, E.E., **K.J. Myers**, J.K. Jones, and J.B. Fasano. 2011. Effective single-impeller blending in tall vessels. 2011 AIChE Annual Meeting, paper 239a, October 16-21, in Minneapolis, Minnesota.

Myers, K.J., T. Bao, E.E. Janz, and J.B. Fasano. 2011. Suspension of solid mixtures by mechanical agitation. 2011 AIChE Annual Meeting, paper 36b, October 16-21, in Minneapolis, Minnesota.

INVITED LECTURES

Browning, C.E. 2011. History of advanced composites. American Society of Composites Annual Meeting, ASC, in Dayton, Ohio.

Fried, J. 2011. Synthetic nanochannels: Self-assembly and ion transport. Department of Biology, University of Dayton, November 17, in Dayton, Ohio.

Gold, S.A. 2011. Direct digital manufacturing: Challenges and potential. University of Dayton Spotlight on Technology, Arts, Research and Scholarship, November 30, in Dayton, Ohio.

PRESENTATIONS

Circ, A., and R.J. Wilkens. 2011. Chemical engineering at the University of Dayton: 2011 ABET visit. AIChE, in Minneapolis, Minnesota.

Lafdi, K. 2011. PCM/hybrid foam system in temperature control application. Carbon Conference, July 11-16, in Clemson, South Carolina.

Gaieb, Z., E. Marcum, A. Topp, J. Cao, and **D. Comfort**. 2011. Biochemical characterization of hyperthermophilic enzymes involved in cellulose processing. Stander Symposium, University of Dayton, April 13, in Dayton, Ohio.

Hisey, C., S.N. Kim, **D. Comfort**, R. Naik, and H. Issa. 2011. Single wall carbon nanotube chirality enrichment using DNA, Stander Symposium, University of Dayton, April 13, in Dayton, Ohio.

Wang, H., P. Shah, T. Gorey, **D. Comfort**, A.M. Sarangan, and J.J. Rowe. 2011. A new method of generating electricity using pseudomonas

aeruginosa in a microbial fuel cell. Stander Symposium, University of Dayton, April 13, in Dayton, Ohio.

Gold, S.A. 2011. Research methods. University of Dayton Materials Engineering Seminar Series, March 17, in Dayton, Ohio.

Lafdi, K., and J. Czarniecki, 2011. Carbon engineered scaffolds may provide an optimum balance of biologic and mechanical properties for use in tendon repair surgery. 69th Annual ACFAS Scientific Conference, The American College of Foot and Ankle Surgeons, in Fort Lauderdale, Florida.

Lafdi, K., and O. Ochoa. 2011. Fracture toughness study of fuzzy fabric interface. IMECE 2011-ASME, in Colorado.

Henry, A.C., C.M. Krane, and **R.J. Wilkens**. 2011. Morphological examination of isolated vascular smooth muscle cells cultured under shear stress using a novel bioreactor system. 2011 Stander Symposium, University of Dayton, April 13, in Dayton, Ohio.

PANELS

Henry, A.C., C.M. Krane, and **R.J. Wilkens**. 2011. Morphological examination of isolated vascular smooth muscle cells cultured under shear stress using a novel bioreactor system. Honors Student Symposium, University of Dayton, March 11, in Dayton, Ohio.

POSTERS

Elsass, M. and R.J. Wilkens. 2011. Simulating heat exchanger fouling for unit operations laboratory experiments. ASEE 2011 National Conference, American Association of Engineering Education, July, in Vancouver, Canada.

Narvaez, J., and **R.J. Wilkens**. 2011. Heat transfer and drag reduction for water/NaSal/Ethoquad in a mock aviation loop. AIChE, in Minneapolis, Minnesota.

Nathaniel, H.N., E. Okodiko, and **R.J. Wilkens**. 2011. Effects of diameter and orientation on multiphase flow patterns. AIChE, in Minneapolis, Minnesota.

TECHNICAL REPORTS

Bouchard, M.P., **K. Lafdi**, N.D. Schehl, J.R. Sebastian, and Y. Yoons. 2011. Evaluation of "Fuzzy Fiber" sensor for structural health monitoring. Air Force Research Laboratory, in Dayton, Ohio.

WORKSHOPS

Lee, C.W. 2011. Characterization of thicker high temperature resin panels using sensors. High Temple Workshop, February 7, in Santa Fe, New Mexico.

CONTRACTS, GRANTS AND SPONSORED RESEARCH

Browning, C.E. (Principal). Ohio research scholar in materials. State of Ohio, \$4.5M.

Browning, C.E. (Principal). Minority leaders. Clarkson Aerospace, \$1.5M. (September 2006-Present).

Browning, C.E. (Principal). Center of Excellence in STEM and STEM education. Central State University, \$342,497. (June 3, 2011-June 2, 2016).

Browning, C.E. (Principal). Aligned carbon nanotubes for efficient energy generation and storage devices. AFOSR, \$75K. (August 2009-Present).

Browning, C.E. (Coprincipal). Separation of nanotubes. AFRL, \$30K. (January 2010-Present).

Comfort, D. (Principal). Electrochemical characterization of electron-donor utilization by pseudomonas aeruginosa in a microbial fuel cell. UDRI RCGS, University of Dayton, \$5,600. (October 22, 2010-August 15, 2011).

Comfort, D. (Principal), and E. Untener. Bio-effects of gold nanorods as a function of aspect ratio and surface chemistry. Dayton Area Graduate Studies Institute, \$65K. (May 15, 2011-May 14, 2012).

Eylon, D. (Principal). NDE titanium KF9. Fraunhofer, \$143K. (August 1, 2011-July 31, 2013).

- Eylon, D.** (Principal). NDE titanium KDT. Q-Net, \$60K. (June 21, 2011-July 31, 2013).
- Eylon, D.** (Principal). NDE titanium KCP, Fraunhofer, \$112K. (April 26, 2011-April 25, 2013).
- Fried, J.** (Principal). Nanopatterning catalyst particles using block copolymer pyrolysis: Mesoscopic simulation of block copolymer self-assembly. Air Force Office of Scientific Research, \$19,200. (May 1, 2011-July 15, 2011).
- Lafdi, Khalid.** Evaluation of 'Fuzzy Fiber' sensors for structural health monitoring. AFRL, \$350K. (November 1, 2010 - March 1, 2011).
- Lafdi, Khalid.** Carbon research and characterization. Goodrich Corp., \$100K. (January 1 - December 30, 2011).
- Lafdi, Khalid.** Industrial res. project. UES, Inc., \$400. (November 11, 2010 - January 31, 2011).
- Lafdi, Khalid.** Industrial res. project. Nanospense, \$1200. (March 1 - June 30, 2011).
- Lafdi, Khalid.** Functionalization of carbons. Nanospense, \$1000. (March 1 - July 20, 2011).
- Lafdi, Khalid.** Graphitization of carbon foams. North Carolina State University, \$1500. (March 1 - 31, 2011).
- Lafdi, Khalid.** Cytotoxic and genotoxic effects of nanoparticles on stem cells. National Institute of Health, \$350,327. (October 1, 2011 - October 1, 2014).
- Lafdi, Khalid.** Hybrid fabrics for multifunctional composites. Ohio Dept. of Development, \$3M. (July 19, 2010 - July 19, 2014).
- Lafdi, Khalid.** Growth of carbon nanotubes of fabrics. Raytheon, \$30,500. (October 14 - December 1, 2011).
- Lafdi, Khalid.** Thermal test design. Raytheon, \$30K. (November 2, 2011 - May 30, 2012).
- Lafdi, Khalid.** Processing of various carbon skins. Siera Lobo, Inc., \$12K. (November 1, 2011 - March 1, 2012).
- Lee, C.W.** (Co-Principal). Composite, hybrid, and thermally engineered materials. AFRL (August 15, 2010-August 15, 2015).
- Lee, C.W.** (Co-Principal). Manufacturing and design of 100-plus-meter self-supporting composite beam. ApATeCh, Russia. (August 15, 2011-March 31, 2012).
- Myers, K.** Collaborative mixing research program effort with Chemineer, Inc. (January 2011-December 2011).
- Wilkens, R.J.**, and E. Okodiko, (Supporting). Transient multiphase heat transfer modeling. WPAFB AFRL/RZPS, \$80,500. (May 2010-May 2011).
- Wilkens, R.J.** (Principal), and J. Narvaez, (Supporting). Performance of drag reducing agents in heat transfer applications. DAGSI, \$150K. (May 2010-May 2013).
- Wilkens, R.J.** (Supporting). Coolants, AFRL. (2009-Present).
- Eustace, D.**, and V.K. Indupuru. 2011. A simplified method for analyzing factors contributing to motorcyclists' fatal injuries in Ohio. *Advances in Transportation Studies: An International Journal* 24 Section B: 85-96.
- Eustace, D.**, V.K. Indupuru, and P.W. Hovey. 2011. Identification of risk factors associated with motorcycle related fatalities in Ohio. *ASCE Journal of Transportation Engineering* 137, no. 7: 437-480.
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- Bilgin, Ö.**, and M.K. Papke. 2011. Studying consolidation characteristics of Ohio clays using GIS. GeoFrontiers 2011-ASCE, in Reston, Virginia.
- We, H.**, Q. Ai, **D. Eustace**, and B. Coifman. 2011. Length-based vehicle classification models using dual-loop data against stop-and-go traffic flow. 90th TRB Annual Meeting, Transportation Research Board (TRB), January 26, in Washington, D.C.
- larve, E.V.**, E.G. Zhou, G.P. Tandon, **T.J. Whitney**, T. Breitzman, D. Mollenhauer, V. Bechel, and K. Pochiraju. 2011. Oxidation and cracking modeling in hybrid composites. SAMPE, in Long Beach, California.

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- Bilgin, Ö.** Forthcoming. Lateral earth pressure coefficients for anchored sheet pile walls. *International Journal of Geomechanics, ASCE*.
- Donaldson, S.L.**, and S. Avalon. 2011. Strength of composite angle brackets with multiple geometries and nanofiber-enhanced resins. *Journal of Composite Materials* 45, no. 9: 1017-1030.
- Kim, R.Y.**, and **S.L. Donaldson**. 2011. Experimental and analytical studies on the damage initiation in composite laminates at cryogenic temperatures. *Composite Structures*

INVITED LECTURES

- Taylor, D.G.** 2011. New views of biocontrol: Engineering bioprocesses in wastewater treatment. Spotlight on Technology, Arts, Research and Scholarship, University of Dayton Office for Research, November 30, in Dayton, Ohio.
- Taylor, D.G.** 2011. Influence of gas composition on biofiltration of 1,2-dichloroethane. Center for Sustainable Urban Environments, University of Cincinnati, February 18, in Cincinnati, Ohio.

PRESENTATIONS

- Bilgin, Ö.** 2011. Serviceability considerations in the design of sheet pile walls for risk management. Geotechnical Risk Assessment and Management, ASCE, June, in Atlanta, Georgia.
- Bilgin, Ö.** 2011. Studying consolidation characteristics of Ohio clays using GIS. Geo-Frontiers 2011: Advances in Geotechnical Engineering, ASCE, March, in Texas.
- Bilgin, Ö.** 2011. Viscoelastic contact characteristics of soil-geomembrane interfaces. Geo-Frontiers 2011: Advances in Geotechnical Engineering, ASCE, March, in Texas.
- Donaldson, S.L.,** T.J. Stonecash, and S. Sih. 2011. Ply drops in wind blade laminates with nano enhanced resins. Windpower 2011, American Wind Energy Association, May 24, in Anaheim, California.
- Donaldson, S.L.,** and V.K. Thummalapalli. 2011. Co-cured biomimetic composite t-joints. 26th Annual Technical Conference, American Society for Composites, September 26, in Montreal, Canada.

Thummalapalli, V.K., and **S.L. Donaldson.** 2011. Biomimetic composite t-joint. International Bionic Engineering Conference 2011, September 20, in Boston, Massachusetts.

Taylor, D.G. 2011. Environmental engineering issues (Japan Earthquake, Tsunami and Our Choices). Sustainability, Energy, Environment Teach-In, SEE Initiative and SEE LLC, University

of Dayton, August 31, in Dayton, Ohio.

Taylor, D.G. 2011. Self-help for prerequisite course review. 2011 National Civil Engineering Department Heads Conference, American Society of Civil Engineers, University of Wisconsin, May 23, in Madison, Wisconsin.

Taylor, D.G., L. Staley, and Y. Li. 2011. Beyond indicators: Alternative methods for phage detection in activated sludge. 84th Annual WEFTEC, Water Environment Federation, October 19, in Los Angeles, California.

Whitney, T.J. 2011. RIDHM test and evaluation (overview and basic properties). RIDHM Workshop, AFRL/RXBC, Wright-Patterson AFB, August 11, in Dayton, Ohio.

Whitney, T.J., and S.C. Mitchell. 2011. Integrated composite design tools for processing and manufacturing composites. Composites Manufacturing, Society of Manufacturing Engineers (SME), April 14, Dayton, Ohio.

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Hovey, P.W., **D. Eustace,** V. Griffin, and M. Chowdhury. 2011. Empirical Bayes estimation of roadway improvements. Joint Statistics Meetings, American Statistical Association, August 3, in Miami Beach, Florida.

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Frank, G.J., S. Miller, and **T.J. Whitney.** 2011. Aerospace organic matrix composite materials.

CONTRACTS, GRANTS AND SPONSORED RESEARCH

Bilgin, Ö. (Principal). Contact surface characteristics of viscoelastic materials. University of Dayton, \$6K. (October 1, 2011-Present).

Bilgin, Ö. (Principal). Effect of material type on the reinforcement length of mechanically stabilized earth walls. University of Dayton, \$6K. (October 1, 2010-September 30, 2011).

Chase, D.V. (Supporting). Real-time system optimization for sustainable water transmission and distribution. Great Lakes Protection Fund, \$293,745. (September 8, 2008-Present).

Chase, D.V. (Supporting). Developing water distribution system analysis modules. National Science Foundation, \$35K. (July 1, 2011-June 30, 2014).

Crosson, K.M. Efficacy of oxidation treatment for the removal of a bittering agent potentially released to water supplies. Ohio Water Development Authority, \$113,143. (January 2011-December 2012).

Hallinan, K.P. (Principal), M.F. Pinnell, (Co-Principal), D.G. Taylor, (Supporting), and **K.M. Crosson,** (Supporting). ETHOS sustainable engineering scholars. National Science Foundation, \$650K. (February 2009-February 2013).

Eustace, D. (Principal). Developing a GIS-based tool for traffic crash analysis and modeling accident occurrences. Ohio Transportation Consortium (OTC), \$28K. (October 26, 2011-Present).

Eustace, D. (Principal). Location and design manual turn lane length storage validation/update. Ohio Department of Transportation, \$18,476. (February 15, 2011-Present).

Taylor, D.G., Research Fellows Grant-In-Aid, LTC, University of Dayton, \$1,500.

Taylor, D.G. (Principal). Bacteriophage selective against filamentous bacteria. Ohio Water Development Authority, \$103,232. (January 2009-January 2012).

Toubia, E. (Principal). Advanced structural development of naval hovercraft ramps. WebCore-U.S. Navy, \$25K. (December 13, 2011 - Present).

Toubia, E. (Principal). Technical support for the advanced composite personnel transport module. WebCore-U.S. Navy, \$24K. (August 22, 2011 - Present).

Whitney, T.J. (Supporting), and A.B. Morgan (Principal). Rapid development of hypersonic materials (RIDHM), AFRL/RXBC, \$50K. (January 1, 2011-August 15, 2012).

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Chatterjee, M.R. 2011. Rabindranath Tagore: Enduring founder of a culture. In *Rabindranath Tagore: A Timeless Mind*, A. Biswas, ed. C. Marsh, and K. Kundu, 49-56. London: Tagore Centre, UK and Indian Council for Cultural Relations.

Subramanyam, G. 2011. DNA-surfactant thin film processing and characterization. In *Materials Science of DNA*, ed. J.-I. Jin, and J. Grote. New York: CRC Press.

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Islam, M.N., **V.K. Asari**, M.A. Karim, and M.S. Alam. 2011. Distortion-invariant pattern recognition using synthetic discriminant function based multiple phase-shifted-reference fringe-adjusted joint transform correlation. *Optics Communications*, Elsevier 284, no. 6: 1532-1539.

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Aspiras, T., and **V.K. Asari**. 2011. Wavelet domain analysis of EEG data for emotion recognition: Evaluation of recourcing energy efficiency. SPIE Conference on Defense, Security, and Sensing: Independent Component Analyses, Wavelets, Neural Networks, Biosystems, and Nanoengineering IX 8058, 805818: 1-8, in Orlando, Florida.

Diskin, Y., R.C. Tompkins, M. Youssef, and **V.K. Asari**. 2011. UAS exploitation by 3D reconstruction using monocular vision. 24th International Technical Meeting of the Satellite Division of the Institute of Navigation, in Portland, Oregon.

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- Powar, N., J.D. Foytik, and **V.K. Asari**. 2011. Facial expression analysis using 2D and 3D features. National Aerospace Electronics Conference (Cognitive Signal Processing and Visualization), in Fairborn, Ohio.
- Santhaseelan, V., and **V.K. Asari**. 2011. Phase congruency based technique for the removal of rain from video. Proceedings of the 8th International Conference on Image Analysis and Recognition, ed. K.R. Venugopal and L.M. Patnaik 6753/2011: 30-39, in Burnaby, British Columbia.
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- Balster, E.**, B.T. Fortener, A.M. Kordik, and T.A. Marrara. 2011. Sub-optimal truncation in JPEG2000 imagery for rate control and high compression throughput. IEEE National Aerospace and Electronics Conference, in Dayton, Ohio.
- Hoffman, M.P., **E. Balster**, F.A. Scarpino, and K. Hill. 2011. An efficient software implementation of the CAVLC encoder for H.264/AVC. IEEE National Aerospace and Electronics Conference, in Dayton, Ohio.
- Chatterjee, M.R.**, and A. Kundur. Forthcoming. Information encryption and retrieval in mid-RF range using acousto-optic chaos. SPIE Defense, Security, and Sensing Conference, in Baltimore, Maryland.
- Chatterjee, M.R.**, and M.A. Al-Saedi. 2011. Chaotic bandgaps in hybrid acousto-optic feedback and their implications. Proceedings SPIE, ed. A.K. Majumdar and C.C. Davis, 8162: 81620J-17, in Bellingham, Washington.
- Hardie, R.C.**, D. Droege, and K. Hardin. 2011. Real-time atmospheric turbulence correction for moving objects. Proceedings of Military Sensing Symposium 2011, in Orlando, Florida.
- Barber, C., M. Gates, R. Selmic, H. Al Issa, **R.E. Ordóñez**, and A. Mitra. 2011. PADF RF localization experiments with multi-agent caged-MAV platforms. SPIE DSS.
- Gates, M., C. Barber, R. Selmic, H. Al Issa, **R.E. Ordóñez**, and A. Mitra. 2011. PADF RF localization criteria for multi-model scattering environments. SPIE DSS.
- Jennings, A., and **R.E. Ordóñez**. 2011. Memory-based motion optimization for unbounded resolution. International Conference on Computational Intelligence and Bioinformatics, in Pittsburgh, Pennsylvania.
- Jennings, A., and **R.E. Ordóñez**. 2011. Population based optimization for variable operating points. IEEE Congress on Evolutionary Computation, in New Orleans.
- Subramanyam, G.** 2011. Miniaturized and reconfigurable CPW square ring slot antenna. Proceedings of IEEE MTT-S International Microwave Symposium Digest, in New York City.
- Shin, E., C. Yakopcic, C. T.M. Taha, **G. Subramanyam**, P.T. Murray, and S. Rogers. 2011. Fabrication and testing of memristive devices. IEEE Computational Intelligence Society: 1929-1932.

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- Subramanyam, G.** 2011. Advances in integrated BST varactor technology. Invited Plenary Speaker, International Symposium on Integrated Functionalities 2011, ISIF, Taylor & Francis, Cambridge University, August 1, in England.

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- Asari, Vijayan.** 2011. Log power representation of EEG spectral bands for the recognition of emotional states of mind. International Conference on Information, Communications and Signal Processing, December 13-16, in Singapore.

Asari, Vijayan. 2011. Vessel position tracking. On the Horizon Vessel Tracking: Research Project Coordination Meeting, Virginia's Center for Innovative Technology, November 3, in Herndon, Virginia.

Asari, Vijayan. 2011. Modified local binary pattern for robust face recognition. International Conference on Neural Computation Theory and Applications, October 24-26, in Paris, France.

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Asari, Vijayan. 2011. A linear manifold representation for color correction in digital images. International Conference on Information Processing, August 5-7, in Bangalore, India.

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Asari, Vijayan. 2011. Phase congruency based technique for the removal of rain from video. International Conference on Image Analysis and Recognition, June 23-24, in Burnaby BC, Canada.

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Balster, E. 2011. Reconfigurable computing laboratory overview. AFRL H.264 working group,

WPAFB, May 24, in Dayton, Ohio.

Chatterjee, M.R., and M.A. Al-Saedi. 2011. Chaotic bandgaps in hybrid acousto-optic feedback and their implications. SPIE Annual Meeting, SPIE, August 24, in San Diego, California.

Ordóñez, R.E. 2011. Cooperative sensing using reconfigurable sensor networks. Theoretical Layered Sensing Seminar, AFRL, WPAFB, in Dayton, Ohio.

PATENTS AND PATENT DISCLOSURES

Subramanyam, G. Resonant sensor capable of wireless interrogation (U.S. 7,922,975 B2).

Subramanyam, G. 2011. Characterization technique for dielectric properties of polymers (U.S. 8,008,930).

CONTRACTS, GRANTS AND SPONSORED RESEARCH

Asari, V.K. (Co-Principal). Whale migration statistics. National Oceanic and Atmospheric Administration (NOAA), \$95K. (August 16, 2011-March 31, 2012).

Asari, V.K. (Co-Principal). Localization of human spatial processing using dense-array electroencephalography. Naval Medical Research Unit (NAMRU), \$50K. (May 16, 2011-March 31, 2012).

Asari, V.K. (Principal). Face recognition for human identification. Department of Defense Telemedicine and Advanced Technology Research Center, \$249,500. (August 2, 2010-September 30, 2012).

Asari, V.K. (Supporting). Unmanned aerial systems. Air Force Research Lab, \$3M (January 1, 2011-March 31, 2011).

Balster, E. (Principal). Ohio Third Frontier Sensor's Program. Ohio Third Frontier, \$260K. (July 1, 2010-Present).

Balster, E. (Principal). Academic Layered Sensing Program. Task 13, Research and Development of Sensor Processing Systems, AFRL, University

of Dayton, \$950K. (February 1, 2011-January 31, 2013).

Balster, E. (Principal). UDRI PETAD. AFRL/Rydi, University of Dayton, \$887,603.70. (June 1, 2009-March 25, 2011).

Pinnell, M.F. (Co-Principal), R.P. Blust (Co-Principal), **E. Balster**, K.E. Bigelow, K.M. Crosson, S.J. Schneider, and K.A. Kinnucan-Welsch. EEC-1009607-Engineering innovation and design for STEM teachers, NSF, \$499,101. (July 12, 2010-Present).

Hardie, R.C. (Principal). Application of super-resolution techniques to wide area surveillance and polarimetric imaging. AFRL, \$49,997. (July 13, 2010-May 13, 2011).

Hardie, R.C. Open skies image enhancement study. IDCAST, \$20K. (December 2010-May 2011).

Hirakawa, K. (Principal). Signal-adaptive joint demosaicking-denoising. Sony, \$77,166. (April 1, 2011-March 31, 2012).

Hirakawa, K. (Principal). Advanced joint demosaicking-denoising with improved color fidelity. Sony, \$70K. (April 1, 2010-March 31, 2011).

Hirakawa, K. (Principal). OSDACI. Air Force Research Institute, \$39,982. (November 1, 2010-October 31, 2011).

Ordóñez, R.E. (Principal). Position-adaptive control of mobile radar networks-add on. AFRL, \$55K. (January 2011-May 2012).

Ordóñez R.E. (Supporting). Small unmanned air vehicles navigation. AFRL, \$3.5M. (December 15, 2010-April 29, 2012).

Penno, R.P. (Principal). Development of systems of the simulation and evaluation of radio frequency countermeasures techniques. AFRL (WPAFB) USAF, \$28,258. (January 1, 2011-December 31, 2011).

Subramanyam, G. BioSense2. AFRL Sensors Directorate, \$50K. (September 1, 2011-August 31, 2012).

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- Nehmetallah, G., and **P.P. Banerjee**. 2011. Digital holographic interferometry and microscopy for 3-D object visualization. *OSA Frontiers in Optics*: 3.
- Nehmetallah, G., **P.P. Banerjee**, and S. Praharaj. 2011. Digital holographic tomography for 3-D visualization. *OSA Digital Holography Topical Meeting Proc*: 3.
- Banerjee, P.P.**, R. Aylo, H. Li, and G. Nehmetallah. 2011. Transfer matrix approach to propagation of angular plane wave spectra through metamaterial multilayer structures. *Proceedings of SPIE* 8093: 80930P-1-7.
- Katte, N., **J.W. Haus**, P.E. Powers, A.M. Sarangan, J. Gao, and M. Scalora. 2011. Z-scan simulations on metallodielectric stacks with nonlinear absorption. *Metamaterials: Fundamentals and Applications IV*, SPIE, August 21, in San Diego, California.

Katte, N., **J.W. Haus**, P.E. Powers, A.M. Sarangan, J. Gao, and M. Scalora. 2011. Nonlinear response of metallodielectric stacks. *Nonlinear Optics*, Optical Society of America, July 17, in Kauai, Hawaii.

Zhou, R., **J.W. Haus**, B. Ibarra-Escamilla, Q. Zhan, and P.E. Powers. 2011. Phase locking multiple fiber lasers using Talbot self-imaging effect, *Photonics West*, SPIE, January 26, in San Francisco, California.

Katte, N., **J.W. Haus**, P.E. Powers, A.M. Sarangan, J. Gao, and M. Scalora. 2011. Z-scan simulations on metallodielectric stacks with nonlinear absorption. *Proceedings of SPIE 8093*: 8, in Bellingham, Washington.

Katte, N., J.W. Haus, P.E. Powers, **A.M. Sarangan**, J. Gao, and M. Scalora. 2011. Z-scan simulations on metallodielectric stacks with nonlinear absorption. *Proceedings of SPIE 8093*: 8, in Bellingham, Washington.

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Banerjee, P.P., and G. Nehmetallah. 2011. Collinear acousto-optics and its application to tunable filters. *Proceedings of SPIE 8093*: 80931O1-7.

Nehmetallah, G., **P.P. Banerjee**, R. Aylo, and S. Rogers. 2011. Nanoparticle-dispersed metamaterial sensors for adaptive coded aperture imaging applications. *Proceedings of SPIE 8165*: 1-8.

Banerjee, P.P. 2011. Fabrication and testing of metamaterials from nanoparticles. IIT Gandhinagar, December, in Ahmedabad, Gujarat, India.

Banerjee, P.P. 2011. Digital holography and its applications. *International Conference on Lasers*, December, in Burdwan, India.

Banerjee, P.P. 2011. Metamaterials and their applications. Delhi Technological University, December, in New Delhi, India.

Banerjee, P.P. 2011. The future of digital holography. *OSA Annual Meeting*, October 16-20, in San Jose, California.

Sarangan, A.M. 2011. Progress in imaging detector technologies. *AFRL/RXPJ Seminar*, Air Force Research Lab, WPAFB, July 27, in Dayton, Ohio.

Sarangan, A.M. 2011. Next generation infrared imaging sensors. *Application of Lasers for Sensing & Free Space Communication (LSC)*, Optical Society of America, July 14, in Toronto, Canada.

Sarangan, A.M. 2011. Nanofabrication technology for image sensors. *MAT Seminar Series*, University of Dayton Materials Engineering Graduate Program, Kennedy Union, March 24, in Dayton, Ohio.

Zhan, Q. 2011. Plasmonics with spatially engineered polarization. *IEEE Photonics Society Annual Meeting*, October, in Arlington, Virginia.

Zhan, Q. 2011. New perspective of nanofocusing with plasmonic antenna. *5th International Conference on Nanophotonics*, OSA, May, in Shanghai, China.

Zhan, Q. 2011. Antenna radiation and optimal plasmonic nanofocusing. *Applied Physics Seminar*, Wright State University, February 18, in Dayton, Ohio.

Zhan, Q., W. Chen, D.C. Abeysinghe, and R.L. Nelson. 2011. Design and construction of an electro-optics of metamaterial array. *SPIE Photonics West Conference*, SPIE, January 23, in San Francisco, California.

PRESENTATIONS

Carns, J., **B.D. Duncan**, and M.P. Dierking. 2011. Short pulse synthetic aperture ladar. *Defense, Security and Sensing Conference*, SPIE, April 22, in Orlando, Florida.

Sarangan, A.M. 2011. IR optical materials and thin films. 2011. *AFRL/RXPJ IR Materials Annual Meeting*, Air Force Research Lab, WPAFB, July 28, in Dayton, Ohio.

Sarangan, A.M., and J. Duran. 2011. Ion implantation study of Be in InSb for the fabrication of IR detectors. *Defense and Security Symposium*, SPIE, April, in Orlando, Florida.

Sarangan, A.M., and J. Marciante. 2011. Impact of draw inhomogeneities on the loss and mode content of large-mode-area fibers. *Specialty Optical Fibers (SOF) 2011*, OSA, June 12, in Toronto, Canada.

Sarangan, A.M., and P. Shah. 2011. Lithographic processing of nanostructured thin films grown using oblique angle deposition method. *AVS 58th International Symposium and Exhibition*, American Vacuum Society, November 1, in Nashville, Tennessee.

Sarangan, A.M., and P. Shah. 2011. Anisotropic electrical properties of nanostructured metallic thin films. *APS Meeting*, March, in Dallas, Texas.

Sarangan, A.M., and A. Watson. 2011. Fabrication of wiregrid micropolarizers for imaging from visible to infrared wavelengths. *IEEE Photonics Meeting*, IEEE, October 9, in Arlington, Virginia.

Sarangan, A.M., C. Yakopcic, J. Gao, T. Taha, G. Subramanyam, and S. Rogers. 2011. TiO₂ memristor devices. *IEEE National Aerospace and Electronics Conference*, IEEE, July 20, in Dayton, Ohio.

Shah, P., **A.M. Sarangan**, and H. Knachel. 2011. Lithographic processing of nanorods thin films grown using oblique angle deposition technique – preliminary results. *Dayton Engineering Sciences Symposium (DESS)*, Wright State University, October 24, in Dayton, Ohio.

Shah, P., **A.M. Sarangan**, and X. Niu. 2011. Growth of nanorod thin films from low melting temperature elements (Cu, Ag) on single crystalline substrates (Si). *Dayton Engineering Sciences Symposium (DESS)*, Wright State University, October 24, in Dayton, Ohio.

Zhan, Q., J. Gao, and **A.M. Sarangan**. 2011. Experimental confirmation of fluorescence enhancement using one-dimensional GaP/SiO₂ photonic band gap structure. *SPIE Optics+Photonics*, SPIE, August, in San Diego, California.

Shah, P.J., **A.M. Sarangan**, and E.A. Guliants. 2011. Electrical characterization and towards lithographic processing. *Midwest SAMPE*, University of Dayton River Campus, February 15, in Dayton, Ohio.

Zhan, Q. 2011. What's hot in optics design, fabrication and instrumentation. *Frontiers in Optics*, OSA, October, in San Jose, California.

Zhan, Q., W. Cheng, and W. Han. 2011. Generation of flat top focusing with second order full Poincaré beams. *SPIE Optics+Photonics*, SPIE, August, in San Diego, California.

Zhan, Q., L. Zhou, and D.H. Ouyang. 2011. 3D optical field mapping of a focused cylindrical vector beam using Rayleigh nanoparticles. *American Physics Society (APS)*, March, in Dallas, Texas.

POSTERS

Zhan, Q., Z. Wu, and **A.M. Sarangan**. 2011. Experimental demonstration of long range surface plasmon devices based on metallic subwavelength gratings. *SPIE Optics+Photonics*, SPIE, August, in San Diego, California.

Zhan, Q., W. Chen, J. Wang, Q. Liu, and Y. Liu. 2011. Discrete complex amplitude filter for ultra long optical tube. *SPIE Optics+Photonics*, SPIE, August, in San Diego, California.

WORKSHOPS

Sarangan, A.M. Q. Zhan, and **J.W. Haus**, 2011. Nanophotonics short course. *OSA Annual Meeting*, Optical Society of America, October 17, in San Jose, California.

CONTRACTS, GRANTS AND SPONSORED RESEARCH

Banerjee, P.P. (Principal). Metamaterials lens phase II. *DARPA/DMS*, \$350K. (November 13, 2009-February 29, 2012).

Banerjee, P.P. (Principal). Droplet characterization phase II. *Army/DMS*, \$330K. (November 1, 2009-February 29, 2012).

Banerjee, P.P. High speed surface measurement device (option). *Army/DMS*, \$13K. (December 7, 2010-January 31, 2011).

Banerjee, P.P., and G. Nehmetallah. High speed surface measurement device phase II. *Army/DMS*, \$320K. (March 1, 2011-February 28, 2013).

Duncan, B.D. (Principal). Sub-aperture based EO imaging systems. *RNET, Inc.*, \$50K. (October 1, 2008-Present).

Haus, J.W. Sense and avoid LADAR for unmanned aircraft systems (UAS). *Utopia Compression (AFRL Phase II)*, \$75K. (January 19, 2011-March 19, 2013).

Haus, J.W. (Principal). LADAR and Optical Communications Institute. *AFRL*, \$5,015,000. (October 2006-August 2012).

Haus, J.W. (Principal). Imaging through an extended atmosphere: Effects on the received field at pupil plane. *Lockheed-Martin, Raytheon, Textron Systems and Northrop-Grumman*. \$200K. (August 13, 2009-August 13, 2011).

Haus, J.W. (Principal). Sense and avoid LADAR for unmanned aircraft systems. *Utopia Compression (AFRL)*, \$12K. (March 19, 2010-January 19, 2011).

Powers, P.E. (Principal), and **J.W. Haus** (Co-Principal). Sub-task for thermal protection system. *AFRL*, \$105K. (February 24, 2011-June 30, 2012).

Powers, P.E. (Co-Principal), and **J.W. Haus** (Co-Principal). Single mode THz crystal fiber as efficient THz parametric converter. *USAF SBIR through NP Photonics*. \$50K. (December 8, 2009-December 8, 2011).

Powers, P.E. (Principal), and **J.W. Haus** (Co-Principal). Compact and ultra-high resolution terahertz spectroscopic/fingerprint system. *NP Photonics (US Army STTR Program)*, \$30K. (October 15, 2010-April 25, 2011).

Sarangan, A.M. (Co-Principal), and **J.W. Haus** (Co-Principal). Optical super-resolution in metal-dielectric stacks. *AFRL*, \$14K. (September 2010-February 2011).

Zhan, Q. (Co-Principal), **J.W. Haus** (Principal), and M. Vorontsov. Imaging through deep turbulence. *Collaborative Research*, \$300K. (January 1,

2010-December 31, 2012).

Sarangan, A.M. (Principal). Infrared coatings for laser effects on materials, structures and sensors. *AFRL (through UES)*, \$15K. (April 1, 2011-December 31, 2011).

Sarangan, A.M. (Supporting). Ohio academic research cluster for layered sensing. *Ohio Third Frontier Project*, \$24,348,718. (August 18, 2008-November 18, 2013).

Sarangan, A.M. (Principal). Midwave infrared sensing technology advancement. *AFRL*, \$100K. (October 2010-September 2012).

Sarangan, A.M. (Principal). Investigation of Ge/InSb heterojunction properties. *L3 Cincinnati Electronics*, \$20K. (November 2010-April 2011).

Sarangan, A.M. (Co-Principal). MEMS thermoelectric devices for energy harvesting. *Air Force Research Laboratory*, \$200K. (April 2009-March 2011).

Subramanyam, G. (Principal), and **A.M. Sarangan** (Co-Principal). *BioSense*. *AFRL Sensors Directorate and IDCAST*, \$385,312. (October 1, 2010-December 31, 2013).

Vorontsov, M. (Principal). Cooperative Agreement #W911NF-09-02-0040. *ARL*, \$1.2M. (September 1, 2009-August 31, 2012).

Zhan, Q. (Principal). Modeling, fabrication and characterization of thermal metamaterials. *AFRL*, \$200K. (October 1, 2011-October 31, 2013).

Zhan, Q. (Principal). Metamaterials structures and devices for RF photonics. *AFRL*, \$178,785. (July 15, 2010-August 31, 2011).

Zhan, Q. (Principal). Feasibility study of diffractive optical elements simulator using spatial light modulator. *Alcon Research Ltd.*, \$35K. (August 15, 2010-May 15, 2011).

Zhan, Q. (Principal). Metamaterials—design, fabrication, testing. *AFRL*, \$250K. (January 1, 2009-January 31, 2011).

Zhan, Q. (Co-Principal), D. Ou-Yang (Principal), V. Dierolf, and I. Biaggio (Co-Principal). MRI: Development of a spectroscopic imaging optical bottle for nanoparticle analysis. *NSF*, \$420K. (October 1, 2009-September 30, 2012).

Engineering Management and Systems

PAPERS PUBLISHED IN CONFERENCE PROCEEDINGS

- Doty, J.** 2011. Metastable equilibrium of a dynamic electrical system in terms of entropy generation rate. American Institute of Aeronautics and Astronautics: 10, in Reston, Virginia.
- Doty, J.** 2011. Multi-variate designed experiments for development of a wing weight surrogate model. American Institute of Aeronautics and Astronautics: 10, in Reston, Virginia.
- Szaruga, S.L., and **J. Doty.** 2011. Impact of designed experiments on efficiency, accuracy, and hypothetical test costs using a light aircraft wing model. American Institute of Aeronautics and Astronautics: 10, in Reston, Virginia.

PRESENTATIONS

- Doty, J.** 2011. Metastable equilibrium of a dynamic electrical system in terms of entropy generation rate. 49th AIAA Aerospace Sciences Meeting, American Institute of Aeronautics and Astronautics, January 4, in Orlando, Florida.
- Doty, J.** 2011. Multi-variate designed experiments for surrogate model development of a wing weight model. 49th AIAA Aerospace Sciences Meeting, American Institute of Aeronautics and Astronautics, January 4, in Orlando, Florida.
- Szaruga, S.L., and **J. Doty.** 2011. Impact of designed experiments on efficiency, accuracy, and hypothetical test costs using a light aircraft wing model. 49th AIAA Aerospace Sciences Meeting, American Institute of Aeronautics and Astronautics, January 4, in Orlando, Florida.

CONTRACTS, GRANTS AND SPONSORED RESEARCH

- Doty, J.** Advanced mathematical techniques for new systems-level analysis and optimization.

Air Force Office of Scientific Research, \$600K. (October 1, 2010-September 30, 2013).

Engineering Technology

BOOKS

Mott, R.L., and **J. Untener.** 2011. *Applied fluid mechanics*. 7th ed. New Jersey: Prentice-Hall.

JOURNAL ARTICLES

- Untener, J.** 2011. Highlighting pump life on pump curves. *Flow Control* XVII, no. 7.
- Untener, J.** 2011. Don't get lost in translation. Washington D.C.: *ASEE Prism*.

PAPERS PUBLISHED IN CONFERENCE PROCEEDINGS

- Pinnell, M.F., **R.P. Blust**, R. Beach, and S. Franco. 2011. Reflections from an NSF RET program: Engineering innovation and design for STEM teacher. 7th Annual Dayton Engineering Sciences Symposium, American Society of Mechanical Engineers, Wright State University, October 24, in Dayton, Ohio.
- Kozak, M.** 2011. The creation and assessment of a gage repeatability and reproducibility study exercise in a metrology class. ASEE 2011 National Conference Proceedings, June 24, in Vancouver, Canada.
- Shamsudin, S.A., A.P. Murray, **D.H. Myszka**, and J.P. Schmiedeler. 2011. Kinematic synthesis of planar, shape-changing rigid body. ASME International Design Engineering Technical Conference, in Washington, D.C.

INVITED LECTURES

- Falkowski, S.A.** 2011. Faculty intercultural experience. University of Dayton, Faculty Exchange Series, October 18, in Dayton, Ohio.

Falkowski, S.A. 2011. Automotive culture in the United States. Nanjing Institute of Technology, May 24, in Nanjing, China.

PRESENTATIONS

- Blust, R.P.** 2011. You never know how far you can go unless you run. Miami Valley Women's Leadership Network, Montgomery County Education Service Center, 5th Annual Conference for Female Teacher Leaders, in Dayton, Ohio.
- Schneider, S.J.** 2011. Developing an application to manage and view ABET course material. ASEE Annual Conference, American Society of Engineering Education, June 22, in Vancouver, Canada.
- Untener, J.** 2011. Wisdom from our Founders applied today. Marianist Founders' Dinner, University of Dayton, in Dayton, Ohio.

PANELS

- Blust, R.P.**, W.S. Diestelkamp, P.G. Donnelly, S.M. Hughes, L.R. Hassell. 2011. Making UD's faculty maternity leave policy work for everyone. University of Dayton Faculty Development Committee, LTC, October 19, in Dayton, Ohio.

POSTERS

- Pinnell, M.F., and **R.P. Blust.** 2011. Engineering innovation and design for STEM teachers. NSF Engineering Education Awardees Conference, NSF, March 13, in Reston, Virginia.

TECHNICAL REPORTS

- Myszka, D.H.** 2011. Novel power handling concept development in motor vehicles that utilize springs and tensile bands. General Motors R&D: Internal Report.
- Myszka, D.H.** 2011. Modeling the discharge line temperature of scroll compressors AM4252. Emerson Climate Technologies: Internal Publication.

Myszka, D.H. 2011. State of the art in methods of mechanical energy storage in motor vehicles that utilize springs and tensile bands. General Motors R&D: Internal Report.

CONTRACTS, GRANTS AND SPONSORED RESEARCH

Blust, R.P. (Co-Principal). Helping Hands Dense Network, Kern Family Foundation, \$1,195,000. (November 2011-December 2014).

Blust, R.P. (Supporting). Promoting women through LEADER (Launching Equity in the Academy across the Dayton Entrepreneurial Region). National Science Foundation, \$2,860,000. (September 2008-August 2013).

Blust, R.P. (Co-Principal). Engineering innovation and design for STEM teachers. National Science Foundation, \$500K. (June 2010-June 2012).

Blust, R.P. (Supporting). Kern Entrepreneurship Education Network (KEEN). Kern Family Foundation, \$150K. (May 2010-June 2012).

Blust, R.P. (Co-Principal). Engineering innovation and design for STEM, National Science Foundation. \$164,081. (July 1, 2010-December 30, 2011).

Edmonson, C.P. (Principal). Simio software. Simio LLC, \$79,200. (July 7, 2011-Present).

Falkowski, S.A. (Supporting). National Center for Manufacturing Education, National Science Foundation, \$1.6M. (April 2011-Present).

Falkowski, S.A. (Supporting). National Center for Manufacturing Education, National Science Foundation, \$1.6M. (June 2007-Present).

Falkowski, S.A. Faculty global and intercultural study travel program. University of Dayton. (August 2010-June 2011).

Schneider, S.J. ECETDH mini-grant—Development of a low-cost amplifier and signal conditioning module. Electronic and Computer Engineering Technology Department Heads Association. (February 2009-Present).

Wolff, R.L. (Supporting). National Center for Manufacturing Education, SME Educ Fdn.; ASEE Mfrg Div.; ASME; IEEE; Ohio Project the Way. (January 1, 2011-December 31, 2011).

Wolff, R.L. (Co-Principal). Enhancing the

resource center role of the National Center for Manufacturing Education. National Science Foundation. \$1.8M. (2003 - Present).

Mechanical and Aerospace Engineering

BOOK CHAPTERS

Hallinan, K.P., and M.F. Pinnell. 2011. A catholic and Marianist engineering education. In *Engineering education and practice: Embracing a catholic vision*, ed. J. Heft, and K. Hallinan, 59-89. Notre Dame, Indiana: University of Notre Dame Press.

Pinnell, M.F. 2011. In search of something more: My path towards international service-learning in engineering education. In *What is global engineering education for?: The making of international educators: Synthesis lectures on global engineering*, ed. G.L. Downey, and K. Beddoes, 105-125. Morgan & Claypool Publishers.

Hallinan, K.P., and **M.F. Pinnell**. 2011. A Catholic and Marianist engineering education. In *Engineering education and practice: Embracing a catholic vision*, ed. J. Heft, and K. Hallinan, 59-89. Notre Dame, Indiana: University of Notre Dame Press.

JOURNAL ARTICLES

Ross, Ian, and **Aaron Altman**. 2011. Wind tunnel blockage corrections: Review and application to Savonius vertical axis wind turbines. *Journal of Wind Engineering and Industrial Aerodynamics* 99, no. 5 (May): 523-538.

Reich, Greg, Frank Eastep, **Aaron Altman**, and Roberto Albertani. 2011. Transient post-stall aerodynamic modeling for extreme maneuvers in MAVs. *Journal of Aircraft* 48, no. 2 (March-April).

Bigelow, K.E., and N. Berme. 2011. Development of a protocol for improving the clinical utility of posturography as a fall-risk screening tool. *Journal of Gerontology A: Biological and Medical Sciences*, 66A, no. 2: 228-233.

Briones, A.M., **J.S. Ervin**, L. Byrd, S. Putnam, and J. Jones. Forthcoming. Effect of accommodation coefficient and curvature on the thermal resistance of evaporating pinned water microdroplets. *AIAA Journal of Thermophysics and Heat Transfer*.

Briones, A.M., **J.S. Ervin**, L. Byrd, S. Putnam, and J. Jones. Forthcoming. Evaporation characteristics of pinned water microdroplets. *AIAA Journal of Thermophysics and Heat Transfer*.

Hanchak, M., L. Byrd, A.M. Briones, **J.S. Ervin**, and P. Shawn. Forthcoming. Model of droplet impingement based on least-squares solution of proper orthogonal decomposition basis matrices. *ASME Journal of Fluids Engineering*.

Jiang, H., **J.S. Ervin**, S.S. Zabarnick, and Z.J. West. Forthcoming. Influence of passage contraction or expansion on surface deposition. *AIAA Journal of Propulsion and Power* 30.

Hallinan, K.P., A. Mitchell, R.J. Brecha, J.K. Kissock, and O. Murphy. 2011. Targeting residential energy reduction for city utilities using historical electrical utility data and readily available building data. *ASHRAE Transactions* 117, part 2.

Brecha, R.J., A. Mitchell, **K.P. Hallinan**, and J.K. Kissock. 2011. Prioritizing investment in residential energy efficiency and renewable energy - A case study for the U.S. Midwest. *Energy Policy* 39, no. 5: 2982-2992.

Hallinan, K.P., P. Brodrick, J. Northridge, R.J. Brecha, and J.K. Kissock. 2011. Establishing building recommissioning priorities and potential energy savings from utility energy data. *ASHRAE Transactions* 117, part 2.

Jain, V.K. 2011. Effect of shot-peening on fretting fatigue crack growth behavior in Ti-6Al-4V. *Strain* 47: 305-318.

Hallinan, K.P., A. Mitchell, R.J. Brecha, **J.K. Kissock**, and O. Murphy. 2011. Targeting residential energy reduction for city utilities using historical electrical utility data and readily available building data. *ASHRAE Transactions* 117, part 2.

Abels, B., and **K. Kissock**. 2011. Optimizing compressed air storage for energy efficiency. *SAE International Journal of Materials and Manufacturing* (June).

- Lammers, N., **K. Kissock**, B. Abels, and F. Sever. 2011. Measuring progress with normalized energy intensity. *SAE International Journal of Materials and Manufacturing* (June).
- Sever, F., **J.K. Kissock**, D. Brown, and S. Mulqueen. 2011. Estimating industrial building energy savings using inverse simulation. *ASHRAE Transactions*, ASHRAE 2011-86073.
- Brecha, R.J., A. Mitchell, K.P. Hallinan, and **J.K. Kissock**. 2011. Prioritizing investment in residential energy efficiency and renewable energy: A case study for the U.S. Midwest. *Energy Policy*, 39, no. 5: 2982–2992.
- Hallinan, K.P., P. Brodrick, J. Northridge, R.J. Brecha, and **J.K. Kissock**. 2011. Establishing building recommissioning priorities and potential energy savings from utility energy data. *ASHRAE Transactions* 117, part 2.
- Cotton, S., M. Vanoncini, P. Fraisse, N. Ramdani, E. Demircan, **A.P. Murray**, and T. Keller. 2011. Estimation of the centre of mass from motion capture and force plate recordings: A study on the elderly. *Applied Bionics and Biomechanics* 8: 67-84.
- Krane, C.M., **M.F. Pinnell**, C. Gardner, M. Thompson, J.T. Coleman, and R.J. Wilkens. 2011. Mechanical test methods for assessing porcine carotid and uterine artery burst pressure following ex vivo ultrasonic ligature seal and transection. *Journal of Testing and Evaluation* 39, no. 4: 514-521.
- Diestelkamp, W.S., C.M. Krane, and **M.F. Pinnell**. 2011. Design of a factorial experiment with randomization restrictions to assess medical device performance on vascular tissue. *BMC Medical Research Methodology* 11, no. 75: 1-6.
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- Geyman, M., and **A. Altman**. 2011. Wing/wall aerodynamic interactions in free flying, maneuvering MAVs. 29th AIAA Applied Aerodynamics Conference, June, in Honolulu, Hawaii.
- Hammer, P., **A. Altman**, and F. Eastep. 2011. Application of a discrete vortex method to high angle of attack maneuvers. 29th AIAA Applied Aerodynamics Conference, June, in Honolulu, Hawaii.
- Puttmann, J., and **A. Altman**. 2011. Transient force on a rotating AR 2 semi-span flat plate. 49th AIAA Aerospace Sciences Meeting and Exhibit, January, in Orlando, Florida.
- Hagen, B., and **A. Altman**. 2011. PIV on simple mechanical flapping wings for hover-like kinematics. 49th AIAA Aerospace Sciences Meeting and Exhibit, January, in Orlando, Florida.
- Hammer, P., **A. Altman**, and F. Eastep. 2011. A discrete vortex method investigation of canonical pitch ramp-hold case. 49th AIAA Aerospace Sciences Meeting and Exhibit, January, in Orlando, Florida.
- Byrd, L., A.N. Cole, B. Cranston, S.M. Emo, **J.S. Ervin**, and T. Michalak. 2011. Two phase thermal energy management system. SAE 2011 Aero Tech Congress & Exhibition, October 18-21, in Toulouse, France.
- Johnson, D.J., **J.S. Ervin**, X. Hu, and S. Patnaiks. 2011. Carbon foam infused with pentaglycerine for thermal energy storage applications. AIAA 42nd Thermophysics and Heat Transfer Conference, in Honolulu, Hawaii.
- Briones, A.M., **J.S. Ervin**, L. Byrd, S. Putnam, A. White, and J. Jones. 2011. Effect of accommodation coefficient, curvature and three-dimensional flow on the evaporation characteristics of pinned water microdroplets. 42nd AIAA Thermophysics Conference, in Honolulu, Hawaii.
- Jochum, M., G. Murugesan, **K. Kissock**, and K. Hallinan. 2011. Low exergy heating and cooling in residential buildings. Proceedings of ASME Energy Sustainability Conference, ESFuelCell2011-54671, August 7-10, in Washington, D.C.
- Alkadi, N., and **K. Kissock**. 2011. Improving compressed air energy efficiency in automotive plants. SAE 2011 World Congress, April 12-14, in Detroit, Michigan.
- Abels, B., and **J.K. Kissock**. 2011. Optimizing compressed air storage for energy efficiency. SAE 2011 World Congress.
- Abels, B., F. Sever, **J.K. Kissock**, and D. Ayele. 2011. Understanding industrial energy use through lean energy analysis. SAE 2011 World Congress.
- Alkadi, N., and **J.K. Kissock**. 2011. Improving compressed air energy efficiency in automotive plants. SAE 2011 World Congress.
- Lammers, N., **J.K. Kissock**, B. Abels, and F. Sever. 2011. Measuring progress with normalized energy intensity. SAE 2011 World Congress.
- Perkins, D., and **A.P. Murray**. 2011. Synthesis of coupler-drivers for four position planar synthesis tasks. ASME International Design Engineering Technical Conference, in Washington, D.C.
- Shamsudin, S.A., **A.P. Murray**, D.H. Myszka, and J.P. Schmiedeler. 2011. Kinematic synthesis of planar, shape-changing rigid body mechanisms for design profiles with significant differences in arc length. ASME International Design Engineering Technical Conference, in Washington, D.C.
- Zhao, K., J.P. Schmiedeler, and **A.P. Murray**. 2011. Kinematic synthesis of planar, shape-changing rigid body mechanisms with prismatic joints. ASME International Design Engineering Technical Conference, in Washington, D.C.
- Petrykowski, J.C.** 2011. Analysis of electromagnetically induced degassing in an induction furnace. 8th PAMIR International Conference on Fundamental and Applied MHD, September 5-9, in Borgo, France.
- Shi, Y., and **J.C. Petrykowski**. 2011. Electromagnetically driven degassing of molten metallics in an induction furnace. ASME, in Denver, Colorado.
- Pinnell, M.F.** 2011. Vocational engineering. Perspectives on Faith and Life Series, Campus Ministry, University of Dayton, February 8, in Dayton, Ohio.
- Lockwood, B., **M. Rumpfkeil**, W. Yamazaki, and D. Mavriplis. 2011. Uncertainty quantification in viscous hypersonic flows using gradient information. AIAA 2011: 885.
- Rumpfkeil, M.**, W. Yamazaki, and D. Mavriplis. 2011. A dynamic sampling method for kriging and cokriging surrogate models. AIAA 2011: 883.

PRESENTATIONS

- Hagen, B., and **A. Altman**. 2011. PIV on simple mechanical flapping wings for hover-like kinematics. 36th Dayton-Cincinnati Aerospace Sciences Symposium, March, in Dayton, Ohio.
- Geyman, M., and **A. Altman**. 2011. Wing/wall aerodynamic interactions in free flying maneuvering MAVs. 36th Dayton-Cincinnati Aerospace Sciences Symposium, March, in Dayton, Ohio.
- Bigelow, K.E.** 2011. Student perspectives in an all-female first-year engineering innovation course. Mudd Design Workshop VIII: Design Education: Innovation and Entrepreneurship, Harvey Mudd College, May 26, in Claremont, California.
- Denzinger, C., E. Sutton, D. Kinor, A. Jules, and **K.E. Bigelow**. 2011. Variations in posturography testing methods: Effect of talking, visual fixation, and time on plate on sway measurements. Dayton Engineering Science Symposium, American Society of Mechanical Engineers—Dayton Chapter, October 24, in Dayton, Ohio.
- Petit, D.J., and **K.E. Bigelow**. 2011. Static posturography as a quantitative assessment tool for multiple sclerosis. Dayton Engineering Science Symposium, American Society of Mechanical Engineers—Dayton Chapter, October 23, in Dayton, Ohio.
- Byrd, L., A. Briones, M. Hanchak, **J.S. Ervin**, S. Putnam, and J. Jones. 2011. Understanding heat and mass transport at liquid/vapor interfaces and interfaces with programmable surface properties. Air Force Office of Scientific Research Grantees Meeting, September, in Arlington, Virginia.
- White, A., **J.S. Ervin**, S. Putnam, L. Byrd, and J. Jones. 2011. Studies of droplets evaporating from a micro-patterned surface. Material Research Society Fall Meeting 2011, Materials Research Society, November, in Boston, Massachusetts.
- Hallinan, K.P.**, and P. Brodrick. 2011. Algorithm for weather normalization of energy data. Dayton Engineering Sciences Symposium, ASME, October 26, in Dayton Ohio.
- Hallinan, K.P.**, P. Brodrick, R.J. Brecha, J.K. Kissock, and J. Northridge. 2011. Establishing building recommissioning priorities and potential energy savings from utility energy data. ASHRAE Annual Conference, June 25, in Montreal, Canada.
- Hallinan, K.P.**, and J. Minor. 2011. Renewable energy design and performance of LEED EB Platinum Building for zero energy performance. ASHRAE Annual Conference, June 25, in Montreal, Canada.
- Hallinan, K.P.**, A. Mitchell, R.J. Brecha, and J.K. Kissock. 2011. Targeting residential energy reduction for city utilities using historical electrical utility data and readily available building data. ASHRAE Annual Conference, June 25, in Montreal, Canada.
- Hallinan, K.P.**, R. Villoria, S. Ritchey, and P. Brodrick. 2011. Residential energy reduction given spectrum of energy effectiveness. Dayton Engineering Sciences Symposium, ASME, October 26, in Dayton, Ohio.
- Kashani, A.R.** 2011. Distributed parameter acoustic modeling of a perforation with bias flow. International Gas Turbine Institute Conference and Exhibit, ASME/AIAA, June, in Vancouver, Canada.
- Kashani, A.R.** 2011. Low-frequency thermoacoustic instability mitigation using adaptive-passive acoustic radiators. International Gas Turbine Institute Conference and Exhibit, ASME/AIAA, June, in Vancouver, Canada.
- Petrykowski, J.C.** 2011. Normal-mode and lumped mass assessment of acoustic degassing of liquid metals in an inductively heated cylindrical furnace. International Mechanical Engineering Conference and Exposition, American Society of Engineers, November 13, in Denver, Colorado.
- Petrykowski, J.C.** 2011. Electromagnetically driven degassing of molten metallics in an induction furnace. AIAA Cincinnati Dayton Aerospace Symposium, March 1, in Dayton, Ohio.
- Beach, R., S. Preiss, **M. Pinnell**, R. Blust, and S. Franco. Reflections from an NSF RET program: Engineering innovation and design for STEM teachers. Dayton Engineering and Science Symposium, Wright State University, October 24-25, in Dayton, Ohio.
- Pinnell, M.F.** 2011. Vocational engineering. Perspectives on Faith and Life Series, University of Dayton Campus Ministry, February 8, in Dayton, Ohio.
- Rumpfkeil, M.** 2011. Countering the curse of dimensionality using higher-order derivatives. SIAM Activity Group on Computational Science and Engineering, February 28, in Reno, Nevada.

INVITED LECTURES

- Altman, A.** 2011. Aerodynamic Force Estimation of Photorestrictive Flapping Wings. AFRL Materials Directorate, AFRL, WPAFB, in Dayton, Ohio.
- Bigelow, K.E.** 2011. Innovations and information toolkit: Falls prevention at the University of Dayton. Addressing the Burden of Falls in Ohio: A Leadership Summit and A Call to Action, Ohio Injury Prevention Partnership: Older Adults Falls Prevention Coalition, September 23, in Cincinnati, Ohio.
- Bigelow, K.E.** 2011. Embarking in a new research direction: Challenges and opportunities. U.S. Bone and Joint Decade Young Investigators Initiative Workshop, April 15, in Rosemont, Illinois.
- Ervin, J.S., **A.D. Chiasson**, M. Elsass, and S.S. Zabarnick. 2011. Impact of Jet A freeze point on B-1, B-52, F-15E, and KC-135 operations for flights departing CONUS. Air Force Petroleum Agency, November, in Ft. Belvoir, Virginia.
- Kissock, J.K.** 2011. Energy environment economy. Oakwood High School, January, in Dayton, Ohio.
- Kissock, J.K.** 2011. Improving industrial energy efficiency. Halfmoon Seminars, January 14, in Columbus, Ohio.
- Kissock, J.K.** 2011. University of Dayton Industrial Assessment Center: Tools to quantify energy savings. Ohio Energy Management Conference, February 22, in Columbus, Ohio.
- Kissock, J.K.** 2011. Three-day compressed air energy saving assessments. U.S.-Brazil Industrial Energy Efficiency Workshop, August 8-11, in Rio de Janeiro, Brazil.
- Kissock, J.K.** 2011. Industrial Assessment Center one-day assessments. U.S.-Brazil Industrial Energy Efficiency Workshop, August 8-11, in Rio de Janeiro, Brazil.

Kissock, J.K. 2011. The role of energy efficiency: Roadmap to sustainable manufacturing. National University of Singapore, Meeting Our Future Energy Needs: What Role Will Renewables and Energy Efficiency Play? November 24, in Singapore.

Kissock, J.K. 2011. The role of energy efficiency: Roadmap to sustainable manufacturing. University of Dayton Spotlight on Technology, Arts, Research and Scholarship, November 30, in Dayton, Ohio.

Murray, A.P., and J.P. Schmiedeler. 2011. Adaptive structures research using planar rigid-body mechanisms. Boeing Research and Technology, June, in Saint Louis, Missouri.

Murray, A.P. 2011. Morphing between shapes the old-fashioned way. Ignite Innovation: Dayton Regional Science Festival, September, in Dayton, Ohio.

Rumpfkeil, M. 2011. Uncertainty quantification and optimization under uncertainty using derivatives and surrogate models. AFRL Research Seminar, November 21, in Dayton, Ohio.

Pinnell, M.F. 2011. Engineering faculty engagement in learning through service. EFELTS Summit and Distillery, September 22-24, in Boulder, Colorado.

Pinnell, M.F. 2011. Vocational engineering. Perspectives on Faith and Life Series, University of Dayton Campus Ministry, February 8, in Dayton, Ohio.

PANELS

Altman, Aaron. 2011. Adapting curricula: Project updates and open forum in design education. Aerospace Sciences Meeting, January, in Orlando, Florida.

Downey, G., K. Beddoes, **M.F. Pinnell**, J. Mihelcic, and P. McKnight. 2011. What is global engineering for? The making of international educators. 41st ASEE/IEEE Frontiers in Engineering Education, October 12-15, in Rapid City, South Dakota.

Pinnell, M.F., R. Blust, S. Franco, S. Preiss, and R. Beach. 2011. Engineering innovation and design for STEM teachers. NSF Engineering Education Awardees Conference, March 13-15, in Reston, Virginia.

POSTERS

Jackson, K., **K.E. Bigelow**, C. Bowshire, M. Weston, and E. Grant. 2011. Feasibility and effects of a group kickboxing program for individuals with multiple sclerosis: A pilot report. Ohio Physical Therapy Association Annual Conference, April 8, in Dublin, Ohio.

Jackson, K., **K.E. Bigelow**, C. Cooper, and H. Merriman. 2011. Effectiveness of group kickboxing as a means to improve gait and balance in individuals with MS. 1st International Symposium on Gait and Balance in Multiple Sclerosis, Oregon Health & Science University, October 1, in Portland, Oregon.

Sutton, E., D. Kinor, C. Denzinger, A. Jules, and **K.E. Bigelow.** 2011. Variations in posturography testing methods: Effect of talking, visual fixation, and time on plate on sway measurements. 35th Annual Meeting of the American Society of Biomechanics, August 11, in Long Beach, California.

White, A., **J.S. Ervin**, S. Putnam, L. Byrd, A.M. Briones, M. Hanchak, and J. Jones. 2011. Micro-pillar effects on micro-droplet evaporation. Air Force Office of Scientific Research Grantees Meeting, September, in Arlington, Virginia.

TECHNICAL REPORTS

Ervin, J.S., S.S. Zabarnick, L.M. Shafer, M.D. Vangsness, K. Binns, T.F. Williams, G.L. Dieterle, D.G. Davis, R.J. Strong, M.J. DeWitt, D.K. Phelps, C. Obringer, D.K. Atkins, and W.E. Harrison, III. 2011. Development of an advanced jet fuel with improved low temperature flow performance. The JP-8+100LT Program: 290, Air Force Research Laboratory, Wright Patterson Air Force Base.

Zabarnick, S.S., D. Ballal, **J.S. Ervin**, A.M. Briones, J.L. Graham, M.J. DeWitt, R.K. Adams, Z.J. West, S.D. Stouffer, P.H. Taylor, L.M. Shafer, T.F. Williams, E.A. Gulians, R.C. Striebich, and L.M. Balster. 2011. Versatile affordable advanced fuels and combustion technologies. The JP-8+100LT Program: 446, Air Force Research Laboratory, Wright Patterson Air Force Base.

Kissock, J.K., et al. 2011. Energy efficiency assessment. Werner Tecidos, Petropolis, Brazil.

U.S. Department of Energy, August 8-11.

Kissock, J.K., et al. 2011. Energy efficiency assessment. Whirlpool Latin America, Manaus, Brazil. Global Sustainable Electricity Partnership, August 1-5.

Kissock, J.K. 2011. Sixteen energy assessment reports. University of Dayton Industrial Assessment Center.

CONTRACTS, GRANTS AND SPONSORED RESEARCH

Altman, Aaron (Principal). USAF AFRL RBAX, \$180K. (October 2011 - October 2012).

Altman, Aaron (Principal). USAF AFRL RBAX, \$175K. (October 2010 - October 2011).

Altman, A. (Principal). Perching MAV aerodynamics. AFRL/RBSA, \$225K. (September 2008 - Present).

Altman, A. (Supporting), and R. Scudder (Principal). Center for UAV exploitation wind tunnel upgrades. State of Ohio, \$190K. (October 2009 - Present).

Altman, A. Merlin engineering flight simulator. Industrial, \$200K. (November 2010 - Present).

Bigelow, K.E. (Principal). The effects of fatigue on balance and gait measures in persons with multiple sclerosis. University of Dayton Research Council, \$8,595. (December 1, 2010 - September 30, 2011).

Bigelow, K.E. (Principal). Changes in complexity of physiological signals due to flight and flight simulation. Ohio Space Grant Consortium, \$10K. (January 2010 - September 2011).

Bigelow, K.E. (Principal), W.S. Diestelkamp, C.M. Krane, and M.F. Pinnell. Multi-disciplinary STEM grant preparation support in bioengineering. NSF Advance, LEADER Consortium Mini-Grant, \$5K. (December 2010 - December 2011).

Bigelow, K.E., D.M. Kinor (Co-Principal), A.P. Jules (Co-Principal), M.S. Piskiewicz (Co-Principal), J.M. Schaeffer (Co-Principal), E.E. Sutton (Principal), and M.R. Taylor (Co-Principal). Learn Lead Serve: Balance education for Dayton's elderly adults. University of Dayton School of Engineering Learn, Lead, Serve Grant Program, \$1,800. (December 2010 - December 2011).

Bigelow, K.E. (Co-Principal), M. Pinnell (Co-Principal), A. Ciric (Co-Principal), and L. Bistrek (Co-Principal). Engage: Engaging students in engineering, NSF ENGAGE Mini-Grant, \$10K. (August 2011 - January 2013).

Bigelow, K.E., and S. Smoot (Principal). Graduate Student Fellowship, National Science Foundation, \$121,500. (August 2011 - August 2014).

Bloemer, K.F. (Principal). Kern Entrepreneurship Education Network. Kern Family Foundation, \$576K. (October 2011 - October 2014).

Chiasson, A.D. (Co-Principal), C. Yavuzturk (Co-Principal), J. Kelley (Supporting), and D. Langille (Supporting). Development of a software design tool for hybrid solar-geothermal heat pump systems in heating-and cooling-dominated buildings. U.S. Department of Energy, \$180K. (February 1, 2010 - February 1, 2011).

Ervin, J.S. (Co-Principal), **A.D. Chiasson** (Supporting), M. Elsass (Supporting), and S.S. Zabarnick (Co-Principal). Simulations of aircraft fuel tank heat transfer, Air Force, \$1.5M. (October 2010 - June 2012).

Ervin, J.S. (Principal), and A.R. Kashani (Co-Principal). Control of vapor compression refrigeration cycle for aircraft thermal management. Air Force Research Laboratory/RZPS, \$50K. (August 2010 - December 2011).

Ervin, J.S. (Principal), and A.R. Kashani (Co-Principal). Control of vapor compression refrigeration cycle for aircraft thermal management. Air Force Research Laboratory/RZPS, \$50K. (August 2010 - August 2011).

Kashani, A.R. (Co-Principal), and **J.S. Ervin** (Principal). Control of vapor compression refrigeration cycle for aircraft thermal management. Air Force, \$50K. (August 15, 2009 - August 15, 2011).

Ervin, J.S. (Supporting), L. Byrd (Co-Principal), J. Jones (Co-Principal), A.M. Briones (Supporting), M. Hanchak (Supporting), and S. Putnam (Supporting). Understanding evaporation mechanisms. Air Force of Scientific Research, \$600K. (September 2011 - October 2014).

Ervin, J.S. (Other), and R.J. Wilkens (Co-Principal). Visualization of two phase flow, Air Force Research Laboratory/RZPS, \$65K. (2010 - 2011).

Hallinan, K.P. (Principal). Effective R-value calculator development for high mass walls. Performance Concrete, \$40K. (January 2010 - Present).

Hallinan, K.P. Clean energy education initiative. Department of Energy, \$486K. (December 2010 - December 2011).

Hallinan, K.P. (Principal), and R.J. Brecha (Co-Principal). Commercial building recommissioning program. Vectren, University of Dayton, \$175K. (August 2009 - December 2013).

Hallinan, K.P. (Principal). Commercial and residential energy informatics. Department of Energy, \$10K. (March 1, 2011 - August 30, 2011).

Kissock, J.K. (Principal). University of Dayton Industrial Assessment Center. U.S. Department of Energy, \$140K. (October 2010 - September 2011).

Kissock, J.K. (Principal). University of Dayton Industrial Assessment Center. U.S. Department of Energy, \$108K. (October 2010 - September 2011).

Kissock, J.K. (Principal). University of Dayton Industrial Assessment Center. U.S. Department of Energy, \$68K. (January 2010 - May 2011).

Kissock, J.K. (Principal). University of Dayton Industrial Assessment. U.S. Department of Energy, \$1.3M. (October 2011 - September 2017).

Murray, A.P., and D.H. Myszka. Novel concepts for spring-based mechanical energy storage in motor vehicles. General Motors Global Research and Development, \$140K. (August 2010 - August 2012).

Pinnell, M.F. (Co-Principal), C.M. Krane (Co-Principal), W.S. Diestelkamp (Supporting), and D.L. Allen (Supporting). R-18988: Tissue welding assessment. Ethicon Endosurgery, \$53,889. (April 1, 2011 - December 31, 2011).

Bigelow, K.E. (Principal), W.S. Diestelkamp, C.M. Krane, and **M.F. Pinnell**. Multi-disciplinary STEM grant preparation support in bioengineering. NSF Advance, LEADER Consortium Mini-Grant, \$5K. (December 2010 - December 2011).

Hallinan, K.P. (Principal), **M.F. Pinnell**, (Co-Principal), D.G. Taylor (Supporting), K.M. Crosson (Supporting). ETHOS sustainable engineering scholars. National Science Foundation, \$650K. (February 2009 - February

2013).

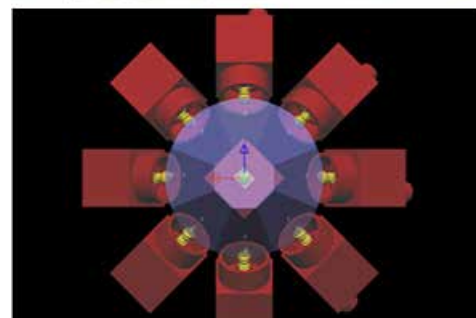
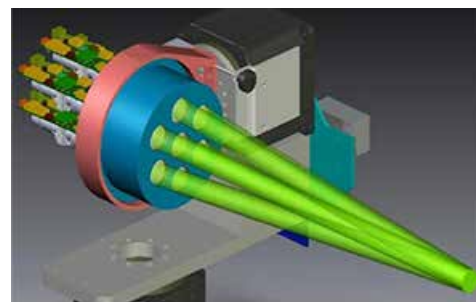
Pinnell, M.F. (Co-Principal), R.P. Blust (Co-Principal), E. Balster (Supporting), K.E. Bigelow (Supporting), K.M. Crosson (Supporting), S.J. Schneider (Supporting), K.A. Kinnucan-Welsch (Supporting). Engineering innovation and design for STEM teachers. NSF, \$499,101. (July 12, 2010 - Present).

Pinnell, M.F. (Principal), C.M. Krane (Principal), and W.S. Diestelkamp (Principal). Assessing the viscoelastic properties of porcine arteries: An integrated approach—LEADER Consortium. NSF Advance Program, \$5K. (January 1, 2010 - June 30, 2012).

Pinnell, M.F. (Principal), C.M. Krane (Principal), and W.S. Diestelkamp (Other). Assessing the effect of device geometry and load. Ethicon Endosurgery, \$91,656. (December 15, 2009 - June 1, 2011).

Rumpfkeil, M. (Principal). Aerospace propulsion outreach program. AFRL/RZ, \$15,784. (July 1, 2011 - May 31, 2012).

Rumpfkeil, M. (Principal). Research Council Seed Grant. University of Dayton, \$5,700. (May 1, 2011 - July 31, 2011).



Top: Apple Project, Intelligent Optics Lab
Bottom: Darpa Pan Camera Project

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