Iowa State University

Department of Mechanical Engineering

Annual Report

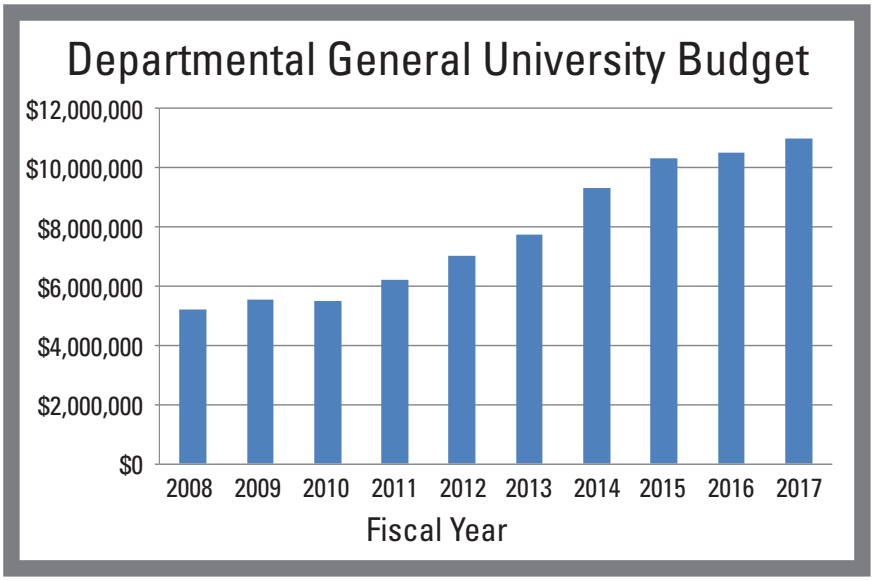
2015-2016

November 2016

Department Operations

Contents

Cover Image: Students operate a coordinate measurement machine (CMM) in one of the ME labs. Photo by Dan McClanahan.

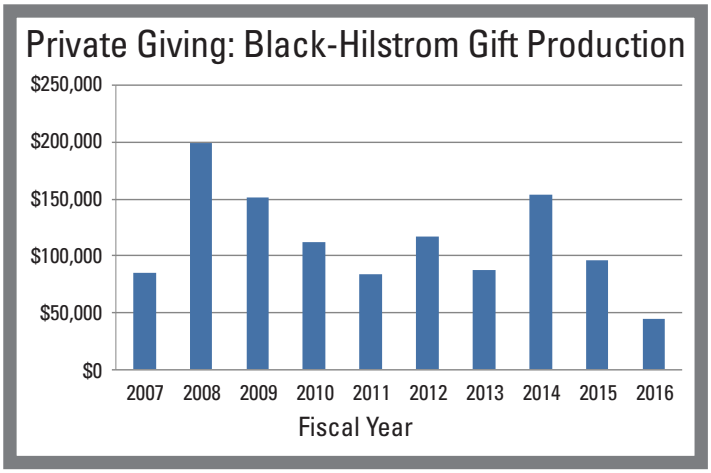


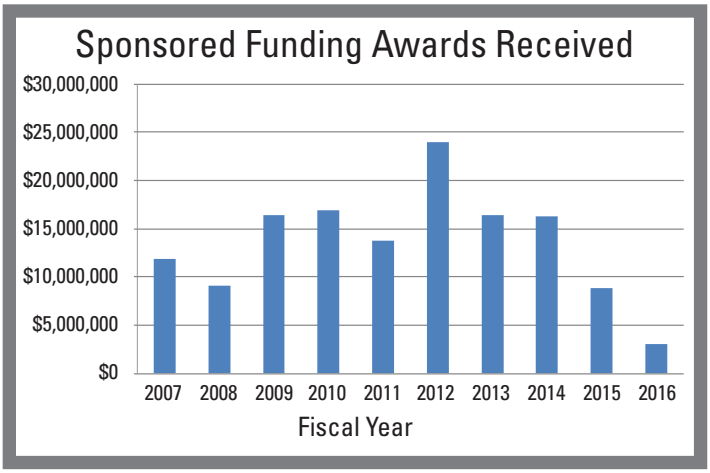
Personnel (Full-Time Equivalent)

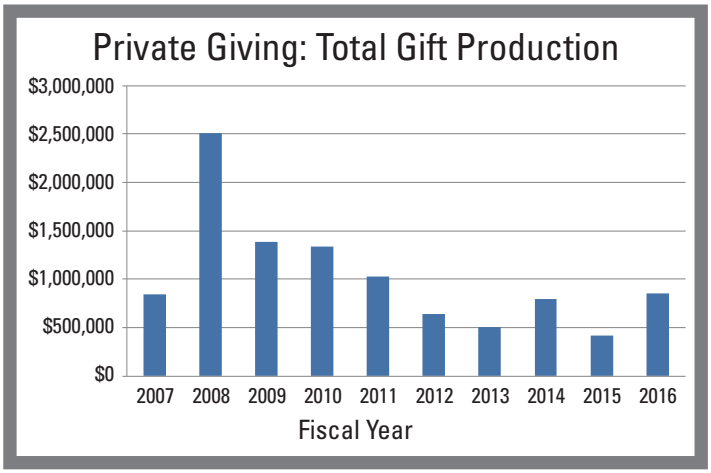
Tenure and Tenure-Track Faculty	41.50
Non-Tenure Eligible Lecturers	13.33
P&S and Merit Staff	26.80

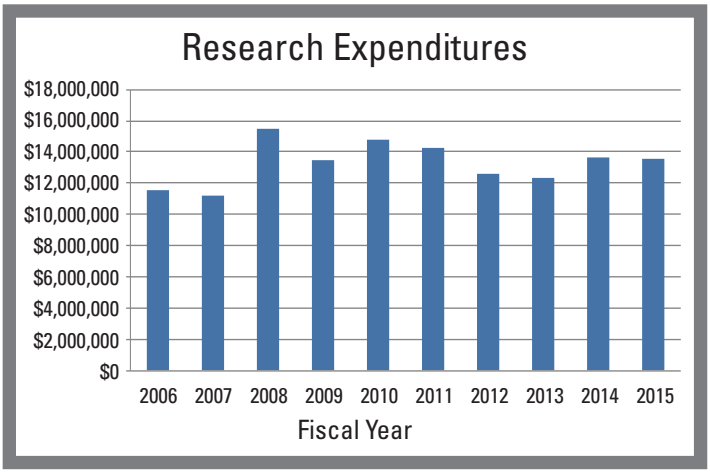
Research Sponsors (partial list)

American Chemical Society Petroleum Research Fund
American Society of Heating Refrigerating and Air Conditioning Engineering Inc.
Carbon Solutions Inc.
Columbia University
Cornell University
Deere & Company
Department of Agriculture
Department of Defense
Department of Energy
Department of Justice
Iowa Energy Center
Molecular Express Inc. - DBA Aptalogic Inc.
NASA
National Science Foundation
Sabic Petrochemicals BV
Sandia Corporation-Sandia National Laboratories
University of California-San Diego
University of Texas-Austin









Named Faculty Positions

Anson Marston Distinguished Professor of Engineering
Robert Brown

Bergles Professor of Thermal Science
Ted Heindel

Gary and Donna Hoover Chair in Mechanical Engineering
Robert Brown

Joseph and Elizabeth Anderlik Professor in Engineering
Judy Vance

Larry and Pam Pithan Professor of Mechanical Engineering
Jim Oliver

Lynn Gleason Professor of Interdisciplinary Engineering
Caroline Hayes

Schafer 2050 Challenge Professor
Valery Levitas

William March Scholar in Mechanical Engineering
Sarah Bentil

Research

Journal Papers Published	165
Conference Papers Published	205
Sections/Chapters in Books	10
Patents	8
Doctoral Dissertations	15
Master's Theses/Projects	19

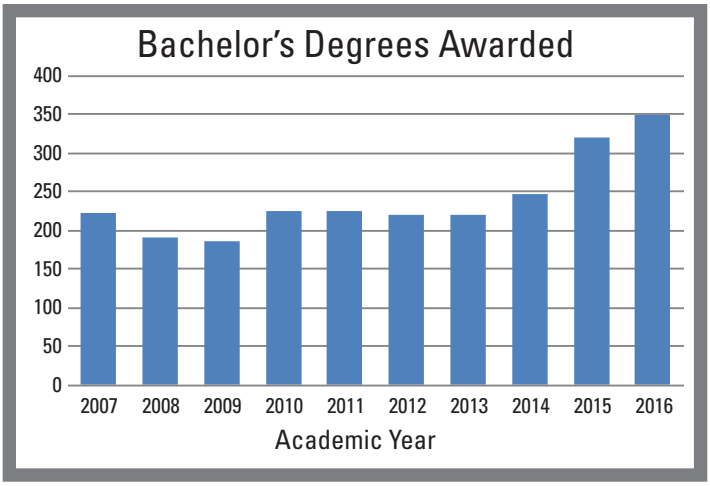
Professional Society Fellows

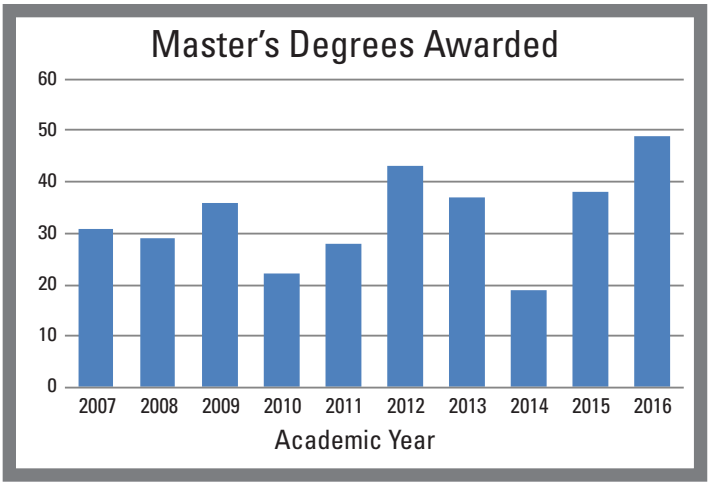
American Society of Mechanical Engineers

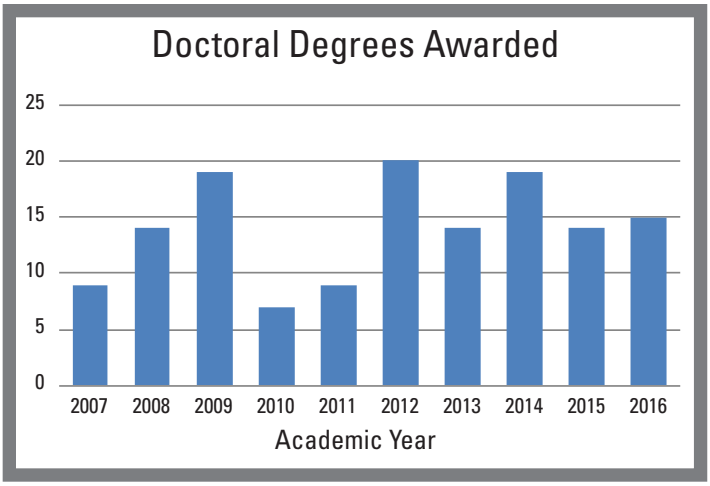
Robert Brown
Abhijit Chandra
Caroline Hayes
Ted Heindel
Atul Kelkar
Jim Oliver
Sriram Sundararajan
Judy Vance
Xinwei Wang
Jonathan Wickert

ME Statistics

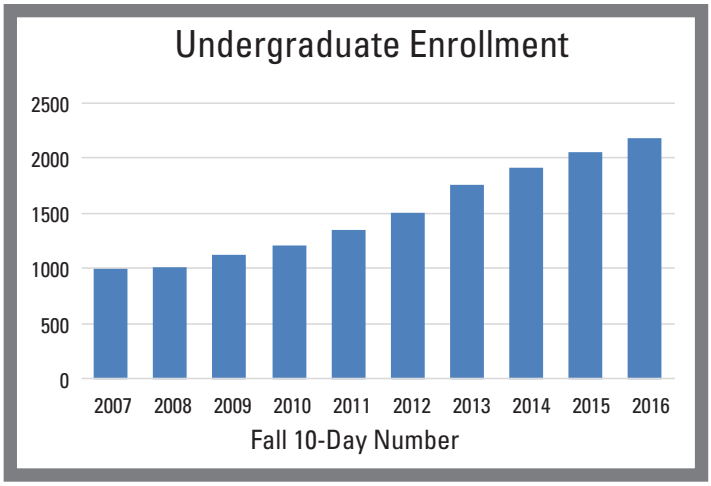
Degrees Awarded

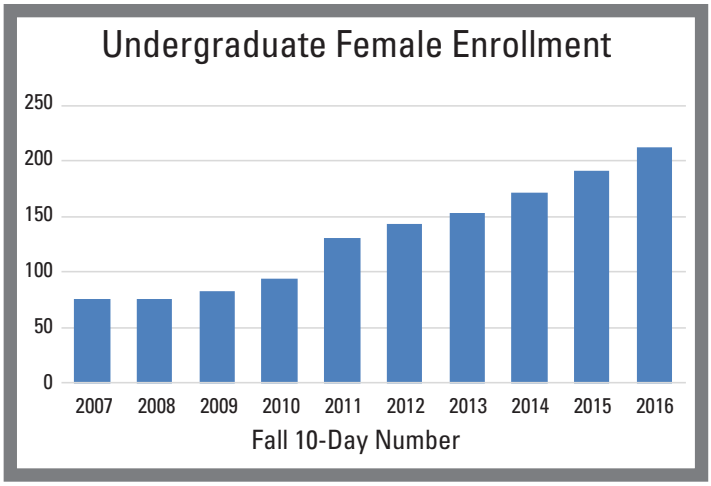


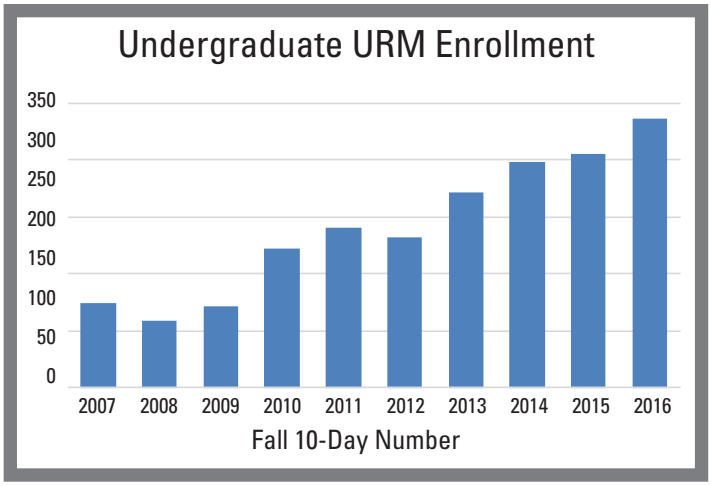




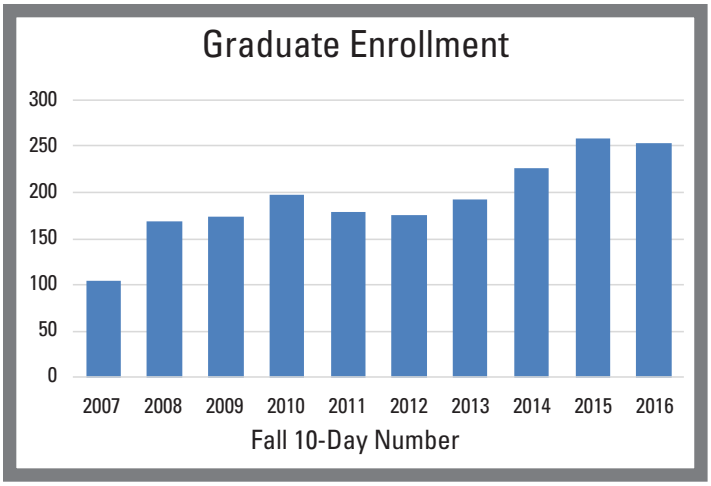
Undergraduate Enrollment

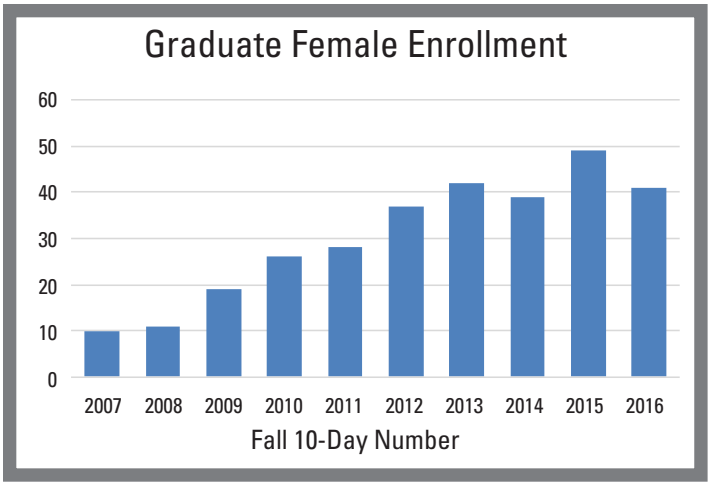


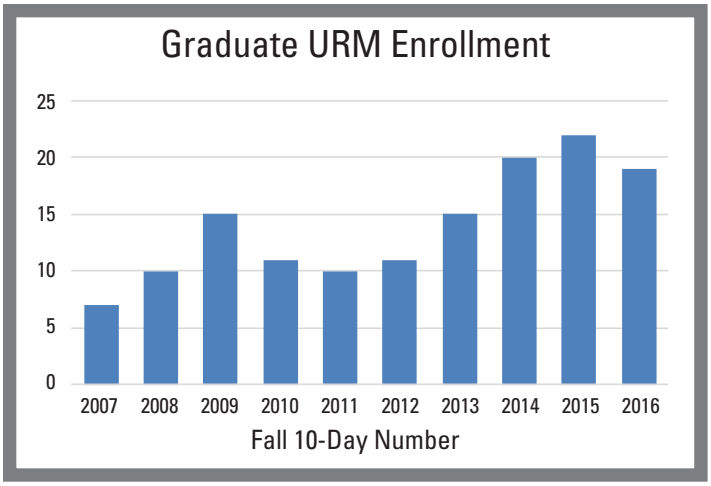




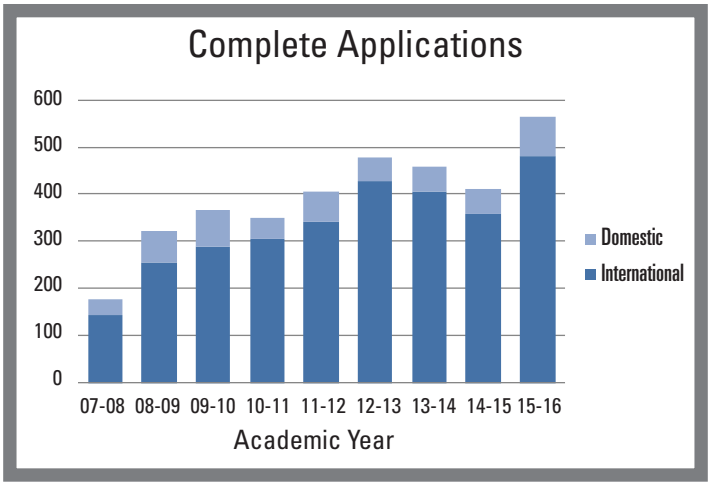
Graduate Enrollment

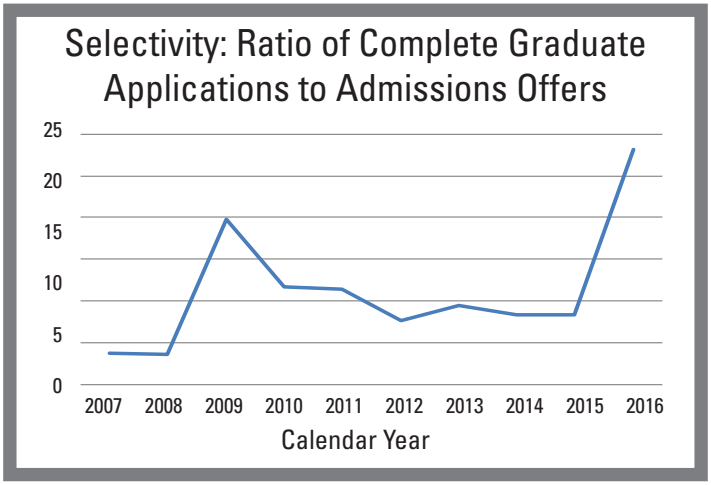


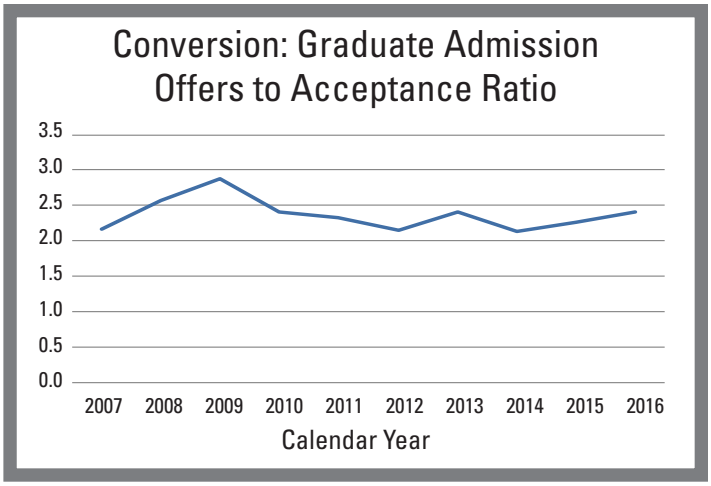




Graduate Program Recruitment







Undergraduate Program Highlights

Program Updates
Mechanical Engineering has reached a milestone – we are now the largest ME program in the US in terms of number of undergraduate students, with a fall enrollment of nearly 2200 students. As has been the case in recent years, our growth continues to be fueled by a very strong job market for ME students, as well as our Department's regional reputation as a leader in engineering education. ME students also make up a very significant portion of the overall enrollment at ISU. In fact, the growth of ME accounted for nearly 20% of the enrollment growth of the entire University over the past year. However, the true indicator of our success has been the ability of our program to add teaching, laboratory and student advising capacity to keep up with our tremendous growth.

Cris Schwartz
Associate Chair
for Undergraduate
Studies

Recent Developments
We have had the great fortune to hire three new undergraduate program staff members in the past year. Matt Dikeman and Aliza MacKenzie joined our Kiewit Student Services staff as Academic Advisers. Matt has a background in university admissions, while Aliza comes to us with experience in residence life. Like all of our excellent advising staff, they have a rich diversity of background and expertise which our students benefit from. We are also very fortunate to have welcomed Kristin Clemens into her new position as Undergraduate Program Assistant this year. She did an outstanding job in our Graduate Program office, and she draws on a rich background in administrative positions at academic institutions before joining ISU. With Kristin, Aliza and Matt and all of our wonderful staff, the outlook for our undergraduate program is very bright.

Senior Design Projects

ME 415 - Fall 2015

Small Industry Projects

AME Company - *Shank/Face Plate Mating*
- Tam Deo, Timothy Pikul, Mahmaud Parto, Joshua Andringa

D&B Agro – *3-Blade Fan Design Optimization*
- Rasheed Ashussami, Mike Libbey, Jonathan Siefkes; Kevin Smetana; Kaleb Tenhaken*
- James Andresen, Michael Becker*, Carter Gibson, Austin Hillinger, James Slagle

Eaton Corporation – *Implementation of Flex Dies at Roll-Straighten Operation*
- Rasheed Ashussami, Mike Libbey, Jonathan Siefkes, Kevin Smetana, Kaleb Tanhaken*
- James Andresen, Michael Becker*, Carter Gibson, Austin Hillinger, James Slagle
- Rashed Almarzouqi, Zach Masters, Jake Stafford, Calvin Vernon

Hach Company – *Safe Lift System for Material Storage*
- Thomas Bezdichek Pfahning, Kyle Granat, Tom Harmet, Kenny Luse, Matthew Minnick*, Timothy Morgan

Jacobs Corporation - *Roll Shell Assembly Press Load/Unload System*
- Lindsay Beery, Cody Carlentine, Lauren Foxwell, Eric Johnson, Derek Kieidler, Kyle Pals, Collin Schmidt, Doug Schmidt, Andrew Walag, Jay Young

PMW Equipment Company - *Vision System for Evaluating Performance of Enclosed Commercial Parts Washers*
- Yiwei Gao, Mark Mendick*, Erik Quinn, Dan Wolf
- Kyle Brewington, Daniel Clements, Brady Dingeldein, Trevor Ryba*, Jacob Vos

Large Industry Projects

Caterpillar Corporation - *Coupon Polishing Machine*
- Ella Grarup, Gabriel J. McCoy, Christopher Schmidt, Carlton Stripe

Caterpillar Corporation - *Redesign of Surface Rock Drills Rod/Bit Carousel Mechanism*
- Jesse Moellers, Michael Romero, Kevin Thompson, Brett Vanderwiel
- Joshua Adam, Alex Grant, Brandon Klosterman, Luke Whisler

John Deere - *Wrap Feeder*
- Jacob Davis, Nicholas Merical, Nicholas Chua, Xiaoming Chen
- Alex Anderson, Rong Gao, Brandon Loree, Zachary Maule

Pella Corporation - *Active Noise Cancelling Window*
- Ryan Kinsella, Shaochen Luan, Jonathan Morgan, Matthew Sindelar,
- Kevin Groth, Jordan King, Erik Palmquist, Qiuteng Zheng

Pella Corporation - *Secondary Lock*
- Austin McVey, Jack Miller, Sin Yong Tan, Benjamin Trebesch
- Keith Padgett, Mitchell Reecher, Pengming Sun

** Denotes Team Leader*

Senior Design Projects

Pella Corporation - *Ultimate Handle*
- Madison Currie, Austin Rudolph, Patrick Thull, Minh Vu
- Kai Buhse, Thaddeus Steinberger, Ryan Zielinski, Brendan Shin Hau Yeah

Vermeer - *MatLab Ground Condition Simulation Model and Test Rig*
- Colton Kennelly, Colton Langwell, Rachael Oien, Marta Sucur
- Bolin Chen, Christopher Hildreth, Samuel J. Manternact, Mitchell Parr, Grant Warner

Outreach Project
Courage League Sports – *All-in-One Sports Player*
- Max Bramer, Austin Houser*, Alex Reed, Connor Swearinger

Student Club Projects
Cyclone Space Mining Club - *Autonomous Rover Localization and Bin Docking System*
- Tyler Broich, Malcolm Kelly, Phillip Molnar*, Joseph Ridenour, Nathan Stanerson

SAE Formula - *Formula SAE Drag Reduction System*
- Brian Fischer, Michael Hauptmann, Jacob Mazanec, Kevin Silver, Roger Steinforth

Department Projects
Agronomy Department – *Agronomy Autonomous Rover Chassis*
- Noel Aguirre, Ben Cigan, Taylor Gibney*, Huoxiung Qin

Department of Industrial Design – *Bike Share Dock*
- Erik Carlson, Ted Choudek, Tyler Clemens, Anthony Miller, Patrick Schommer*

ENGR 466 - Fall 2015

Small Industry
Cross Over LLC – *SafeHelmet*
- Muhammad 'Afi f Adnan, Daniel Harter, Ryan Vanderhoff-Yarbrough, Yuqing Wang
- Willian Becker, Laura Hocraffer, Benjamin Trieu, Jonathan Vasquez

Large Industry Projects
Boeing - *Cabin Baggage Management*
- Noah Bergman, Payton Goodrich, Zachary Heathman, Michael Strawn, Wei Tay, Samuel Tran-Lam, Clayton Wright

Department Projects
INDD (with Shock Doctor) – *Injury Recovery Sports Apparel*
- Austin Jesz, Andrew Kitahara

ME 415 - Spring 2016

Small Industry Projects
Aluma Trailers - *Aluma Process Improvements*
- Josh Fullenkamp, Alex Hershey, William Rockman, Chase Wallace
- Ryan Eilers, Sebastion Garcia-Pena, Richard Meyer, Levi Moser, Erin Robinson

American Professional Quilting Systems - *Head Frame Assembly Redesign*
- Ben Deininger, Jennifer Koeger, Jessica Koeger, Connar Ramstead
- Arthur Dahlquist, Christopher Guetzlaff, Yu Hui Lui, Yuan Ma, Yeongjin Park

D&B Agro – *Fan Design Part 3*
- Tyler Carter, Yujin Park, Casey Schwichtenberg*, Taylor Tuel, Blake Wuorenma
- Nathan Eick, Yehia Elnwehy, Sam Johnson*, Patrick Kalgren, Conner Olson

Eaton Corporation – *Implementation of Flex Dies at Roll-Starighten Operation 2*
- James Adolfino, John Freund, Tyler Hoovestol, James Mardock
- Paul Kaufmann, Nathen Lestina, Derek Rose, Itaru Wakabayashi

Image Fist Signs - *Illuminated Sign Redesign*
- Adam Bracken, Dalton Brady, Jason Huper, Dillon Huss, Denny Kramer, Robert D. Sylvester
- Sean Dowd, Elvin John, Tyler Nicholson, Tim Nolan, Tanner Reed

Mount Vernon Drivers Education - *Secondary Brake Pedal System*
- Evan Hammer, Grady Jensen, Micah Rook, James Wernimont, Matthew Wilson
- Daniel Clemens, James M. Peters, Kyle Peters, Ryan Singletary, Nicholas Winter

Roeslein Alternative Energy – *Anaerobic Digestion of Prairie Grasses*
- Theodros Asrat, Daniel Carlson, Aric Hanson, Jajun Ryu
- Peter Batdorf, Andrew Hansen, Eric Mach, Nathaniel Steele

Seabee Corporation – *Large Cylinder Finish Material Handler and Fixtures*
- Jacob Crowe, Lauren Dias, Kyle Haugen, Morgan McCarthy, Daniel Stone
- Klaeton Bubb, Nathan Ihrig, Micah Rambo, Grant Roepsch, Weier Zheng

Summit Products – *Deployable Utility Vehicle Roof Rack*
- Mike Bednarz, Ryan DeVos, Zachary Klonne, David Mellang, Megan Winchell
- Zach D. Cooper, Brandon Heath, Guangyu Lu, Steven Neylon,

Underwriters Laboratories – *Goniophotometer Drive System*
- Matthew Foreman, Daniel A. Nielsen, Timothy Onstot, Renee Rathjen
- Luke W. Conner, Chris Lee, Taylor Royer, Jordan Vaughan, Kaleb Watson

Valent BioSciences Corporation – *Multi-head Diet Filling System*
- Arthur Adams IV, Maria Blanek, Christina Brammer, Katherine Neil, Tyler Quint
- Kasper Arduser, Nicholas Boudreaux, Conner Converse, Meng Pah, Pahalawattage Perera, Robert Rojina

** Denotes Team Leader*

Senior Design Projects

ME 466 - Spring 2016

Large Industry Projects

Caterpillar Corporation - *Development of High Speed Mechanical Ratio Device*
- Conor Condon, Scott Hansen, Robert Nichols, Alex Reiner
- Keegan Driggs, Ryan Henderson, Sanvisna Kogrlen

John Deere– *Anaerobic Wrap Feed Improvement-Cotton Bale Wrap Feeder Design*
- Guadalupe Diaz, Ashlee Fredericksen, Kelli Peyronet, Michael Pircon, Alex Sobotka
- Dalton Jacobs, Jacob Noonan, Anthony Pribble, Jevin Rosburg

Pella Corporation - *Power Sliding Glass Door*
- Taylor Becker, Hunter Follen, Anthony Herrera, Kory Oldfield, Nick Rael,
- Benjamin Crawford, Keaton Leisinger, Sam Taylor, Trevor Volz, Deane Wichelt

Pella Corporation - *Easy-Open Double Hung Window*
- Corey Anderson, Abby Brown, Jackson Miller, Jared Schmidgall, Zach Wignall
- Lucas Hall, Justin Jones, Alan Klekner, Alex Plyler, Dylan L. Rankin, Emory Traicoff

Vermeer – *MatLab Ground Condition Simulation Model and Test Rig (Part 2)*
- Nick Chamberlin, Raul Hernandez, Ryan Um, Parker Uphoff, Jon Verhoef
- Daniel Burton, Estifanos Fairchild, Matt Klein, Cameron Pomeroy, William Style

Outreach Project

Courage League Sports – *All-in-One Sports Player*
- Jesse Holtschlag, John Numrich, Ahmand Othman, Matthew Reeves

Department Projects

Department of Agronomy – *MGV/AGV for agriculture research*
- Alex Johnson, Ben Menges, Gabe Neiederlander, Trever Tolliver, Adam Woelber
- Bobby Bromberek, Todd Heidrich, Travis Heidrich, Zheng Yi Liew, Ryan Tweedt*

Department of Civil Engineering – *Campanile/Carillon Model*
- Isaac Droessler, Aaron Hett, Kevin Hoolihan*, Deniel (DJ) Obren, Mackenzie Sissel
- Michael Bondi, Yilong Liu, Madison Lucz, Jose Martinez, Rongcheng Xu*

Student Club Projects

SAE Baja – *Two Stage Transmission*
- Nick Dugan, Erin Konicek, Randy Lenarz, Jacob McCrea, Zachary Verbeck

Small Industry Projects

Cross Over – *Safe Helmet*
- Emmanuel Eluobaju, Melynda Hoover, Alex Lester, Preston Norville, Amir Afif Jamaluddin
- Tanner Hamelau, Trinh Huynh, Zach Murrell, Trang Ngu, Devin Pflum

WheelzEZ LLC – *Smart Electric Wheel for Wheelchairs*
- Jack Alexander, Mark Berquist, Tzer Shyang Chin, Lim, Eric Sellers, Josh Whitney
- Alexander Edgerton, Davis Lau, Toan Nguyen, Taylor Schweizer, Ryan Yen, Zulhilmi Zulkifli

Large Industry Projects

Pella Corporation – *Active Noise Canceling Window*
- Austin Darnell, Abhijit Patwa, Lukang Shang, Avinash Sooriyarachchi, Nick Vogel
- Katherine Gresback-Bock, Nour Kerolos, Mohammad Md-Yusof, Angadbir Sabherwal, Jake Thies

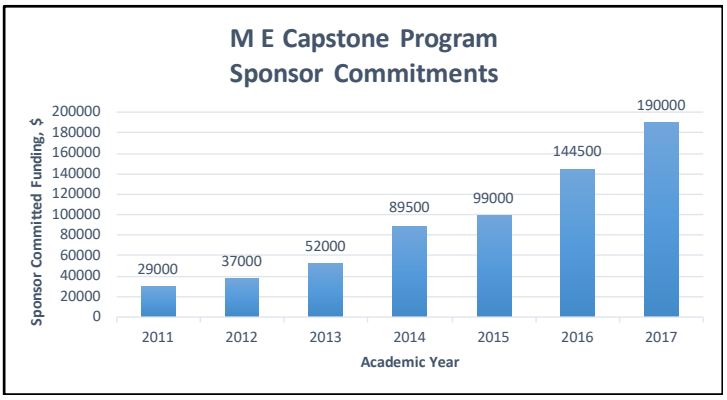
Outreach Projects

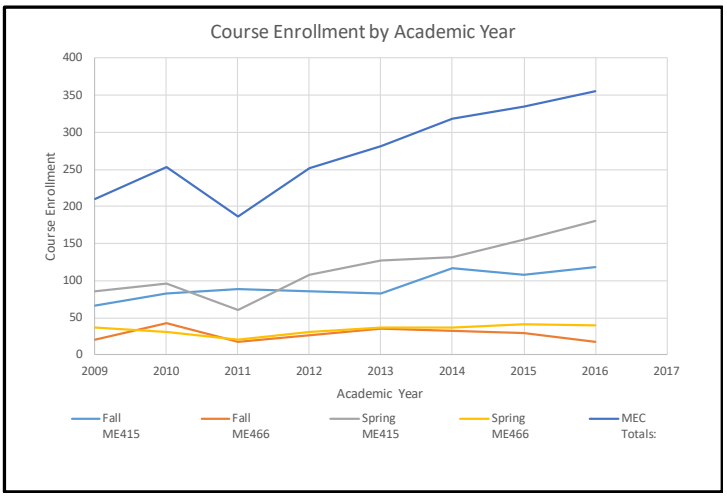
Mary Staudt – *Feeding device for patients with Dysphagia*
- Stephen Ainger, Zachary Brown, Kelly Choo, Chien Thong Koe

Student Club Projects

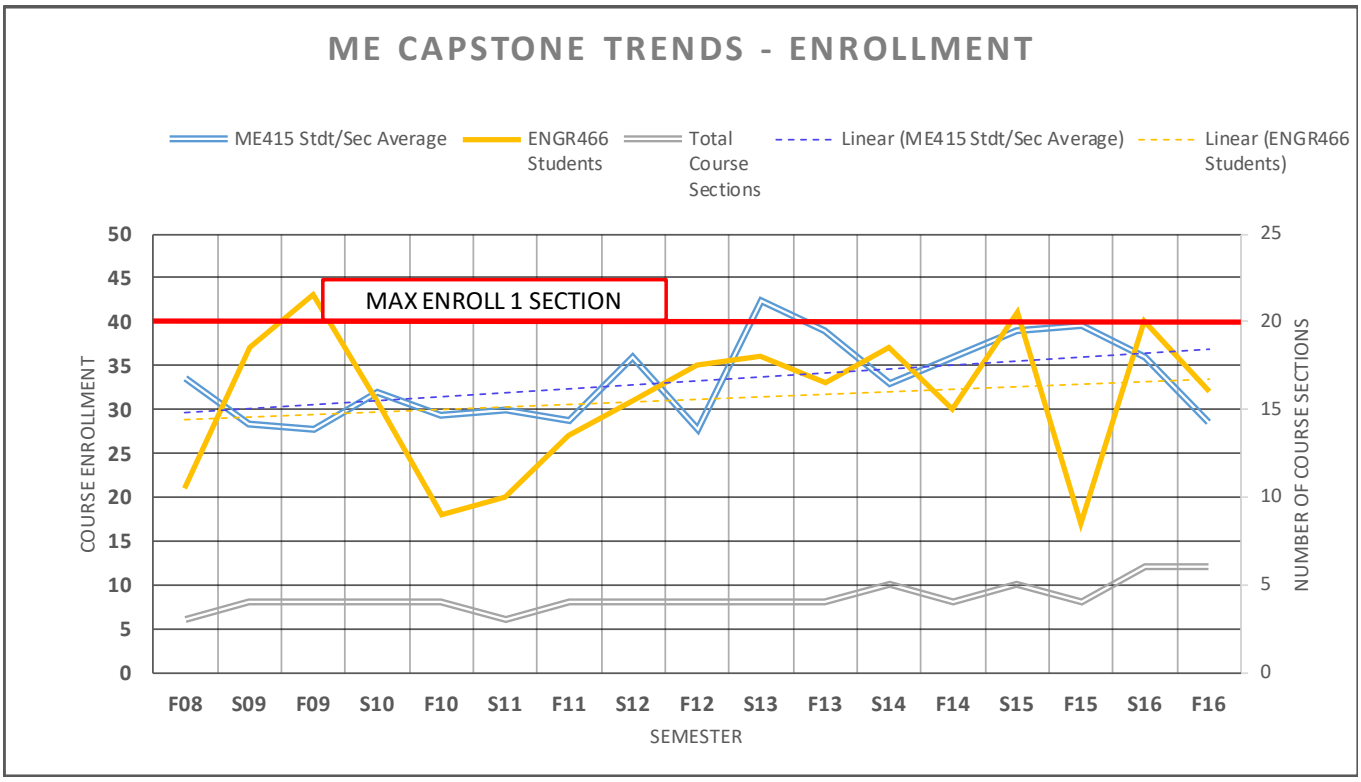
DEBUT – *Bone Plates with Non-linear Stiffness*
- Logan Boehm, Jordan Krug, Jordan Ritland, Adam Weber

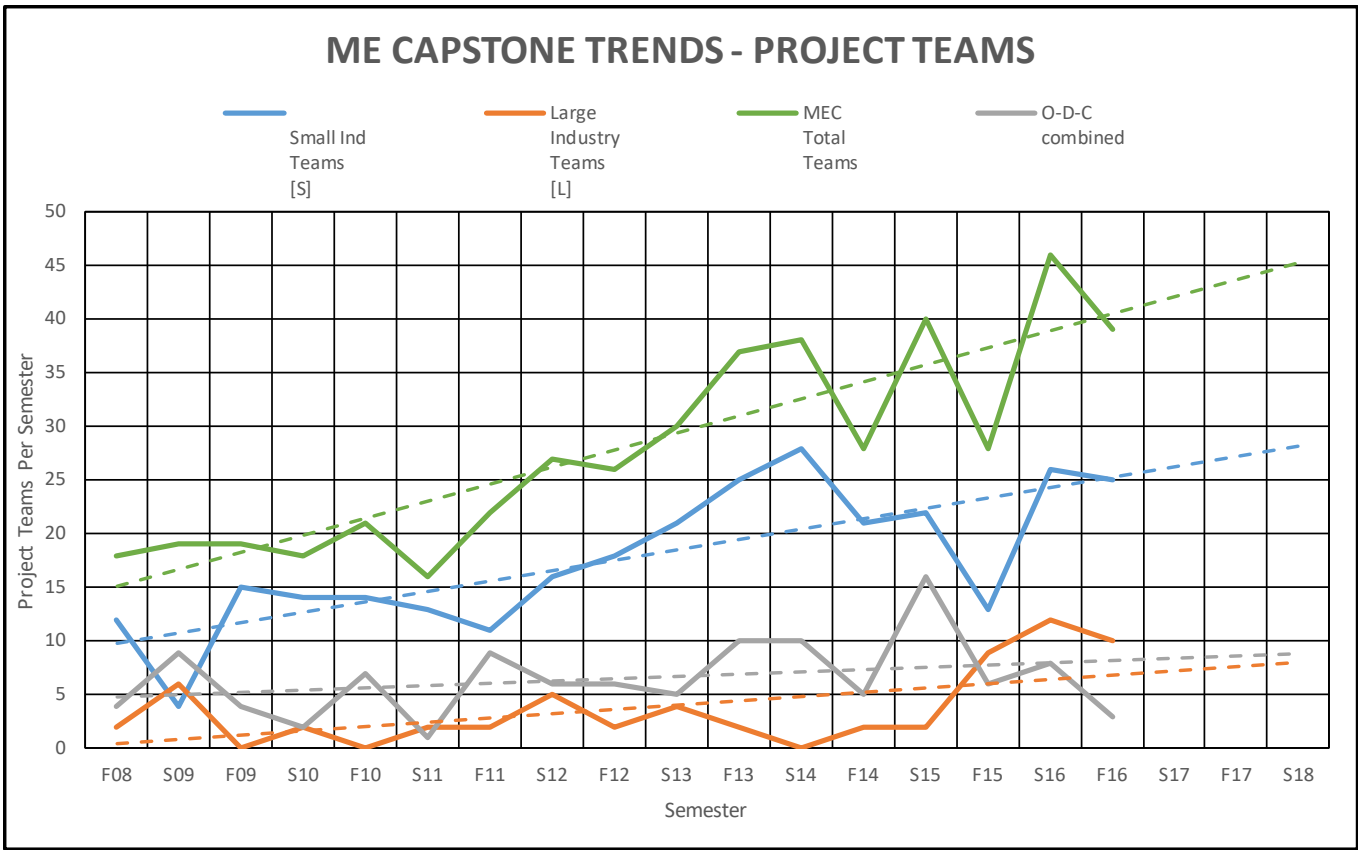
** Denotes Team Leader*





Senior Design Projects





Graduate Program

Highlights

Abhijit Chandra
Associate Chair
for Graduate Studies
Director of Graduate Education

Enrollment: By the end of the 2015-2016 academic year, Mechanical Engineering had 228 student enrolled.

Degrees: The department granted 18 Master's of Engineering degrees, 25 Master's of Science degrees, and 6 Doctorate degrees during the fall and spring semesters.

Recent developments

Dr. Abhijit Chandra, Professor, was appointed as Associate Chair for Graduate Studies and Director of Graduate Education in December 2015.

Six PhD students were awarded Research Excellence Awards and 2 MS and 4 PhD students were awarded the Teaching Excellence Award from the Graduate College.

The department has continued to offer resources to enhance the technical writing of graduate students and post-doctoral researchers. The department supports two discipline writing consultants, who are seasoned ME doctoral students trained in technical writing, to help graduate students with the organization, overview, and style of the manuscripts. After a manuscript is finished, the students will meet with English writing consultants, who are experienced editors and can help improve the English writing pattern and recurring mistakes in a manuscript. The ME Graduate Student Organization (MEGSO) is helping new graduate students adapt to the life on campus through their learning community. MEGSO hosts workshops in for the new graduate students on topics surrounding campus resources, setting up the program of study, qualifier and preliminary exams.

Doctoral Dissertations

Summer 2015

Leif Peder Berg
Immersive technology as a decision making tool for product design
Faculty mentor: Judy Vance

Patrick Eric Carlson
Engaging developers in open source software projects: harnessing social and technical data mining to improve software development
Faculty mentor: Judy Vance

Juan Sebastián Casallas
Prediction of user action in moving-target selection tasks
Faculty mentor: Jim Oliver

Bernardo Gusman del Campo
Production of activated carbon from fast pyrolysis biochar and the detoxification of pyrolytic sugars for ethanol fermentation
Faculty mentor: Robert Brown

Chong Li
Material phase change under extreme domain confinement in laser material interaction
Faculty mentor: Xinwei Wang

Ammar Abdulghani Melaibari
Lasers processing of ultra-hard materials
Faculty mentor: Pranav Shrotriya

Zhuoru Wu
The mechanism governing cutting of hard materials with hybrid Laser/Waterjet system through controlled fracture
Faculty mentor: Pranav Shrotriya

Shen Xu
Optical based thermal probing and characterization
Faculty mentor: Xinwei Wang

Zaoli Xu
Thermal transport in DNA
Faculty mentor: Xinwei Wang

Fall 2015

Cheng Deng
Shock wave induced freeform technique (SWIFT) for manufacturing of diamond microtools
Faculty mentor: Xinwei Wang

Nordica Ann MacCarty
Development and validation of virtual interactive tasks for an aviation English assessment
Faculty mentor: Mark Bryden

Spring 2016

Ping Du
Investigating effects of product visual designs on consumer judgments with the aid of eye-tracking
Faculty mentor: Judy Vance

Minhua Long
Consideration behavior and design decision making
Faculty mentor: Baskar Ganapathysubramanian

Mohammad Mehrabadi
Analysis of gas-solid flow using particle-resolved direct numerical simulation: flow physics and modeling
Faculty mentor: Shankar Subramaniam

Sunil Suram
Strategies for including cloud-computing into an engineering modeling workflow
Faculty mentor: Mark Bryden

Masters Theses

Summer 2015

Ryan McCleish
Examination of the effects of external load, velocity, and center of gravity on weight estimation using a lifting linkage
Faculty mentor: Judy Vance

Yixian Wang
Crack separation mechanism applied in CO2 laser machining of thick Polycrystalline Cubic Nitride (PCBN) tool blanks
Faculty mentor: Pranav Shrotriya

Thomas Joseph Wilde
Parametric investigation of the mechanics of soft-body contact with parallel-ridge textured surfaces to understand tactile friction
Faculty mentor: Cris Schwartz

Fall 2015

Gabriel Fernando Bravo Palacios
Design and simulation of a distortion masking control algorithm for a pneumatic cylinder
Faculty Mentor: Greg Lucke

Boyan Li
Techno-economic and uncertainty analysis of fast pyrolysis and gasification for biofuel production
Faculty mentor: Mark Mba-Wright

Peng Li
Molecular dynamics simulation of Chlorotoxin
Faculty mentor: Ganesh Balasubramanian

Breanna Lynn Marmur
The effects of scale on granular mixing in a double screw pyrolyzer
Faculty mentor: Ted Heidel

Ryan Michael Ogren
Development and applications of various optimization algorithms for diesel engine combustion and emissions optimization
Faculty mentor: Song-Charng Kong

Christopher G. Reilly
Thermal behavior of the STM tip under laser irradiation
Faculty mentor: Xinwei Wang

Lucinda Jeanette Smart
Review of materials property data for nondestructive characterization of pipeline materials
Faculty mentor: Leonard Bond

Spring 2016

Mitchell J. Amundson
An economic comparison of high moisture feedstock biofuel production
Faculty mentor: Mark Mba-Wright

Jeremy D. Caplin
Utilizing microfluidic technology to replicate placental functions in a drug testing model
Faculty mentor: Nastaran Hashemi

Eric Kok Hsien Chon
Optically accessible bench-scale fast pyrolysis reactor for in-situ analysis using Fourier transform infrared spectroscopy
Faculty mentor: Xianglan Bai

Nicholas Ryan Creager
Gasification of liquid sprays in an entrained flow gasifier
Faculty mentor: Robert C. Brown

Daniel Michael Kassen
Header height control of combine harvester via robust feedback linearization
Faculty mentor: Atul Kelkar

Miao Liu
Small punch test simulation of laminated magnesium alloy composite with aluminum/silicon carbide pattern-reinforcement
Faculty mentor: Gap-Yong Kim

Rajeendra Lakruwan Pemathilaka
Analysis of trans-epithelial electrical resistance (TEER) in organ-on-chips to study the functions of human placenta,
Faculty mentor: Nastaran Hashemi

Kahntinetta Monique Pr'Out
Analyzing present and future climatic trends on the thermal energy performance of attic structures
Faculty mentor: Baskar Ganapathysubramanian

Zhichen Zhu
Micro-cantilever based biosensor for electrical actuation and detecting molecular interactions
Faculty mentor: Pranav Shrotriya

Department Organization

Faculty

Emmanuel Agba
Senior Lecturer

PhD, Mechanical Engineering, Florida Atlantic University
M Eng, Mechanical Engineering, University of Benin, Nigeria
B Eng, Mechanical Engineering, University of Benin, Nigeria

Dr. Agba studies product realization, product lifecycle management, virtual manufacturing engineering, computer-aided engineering

Daniel Attinger
Associate Professor

Sc D, Technical Sciences, Eidgenoessische Technische Hochschule (ETH) Zurich, Switzerland, 2001
BE and MS, Mechanical Engineering, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland, 1997

Dr. Attinger's research interests include micro and nanofluidics, convective heat transfer, single droplet/bubble dynamics, visualization, engineering and simulation of multiphase flow, and multiscale transport phenomena for energy and forensics applications.

Xianglan Bai
Assistant Professor

PhD, Mechanical Engineering, The University of Tokyo, Japan
MS, Aerospace Engineering, Beijing Univesity of Aero. & Astro., China
BS, Aerospace Engineering, Beijing Univesity of Aero. & Astro., China

Dr. Bai's research interests include bio-fuels and bio-based products, thermochemical conversion of biomass and other waste streams and fast pyrolysis and solvent liquefaction.

Ganesh Balasubramanian
Assistant Professor

PhD, Engineering Mechanics, Virginia Polytechnic Institute and State University, 2011
BS, Mechanical Engineering, Jadavpur University, Kolkata, West Bengal, India, 2007

Dr. Balasubramanian studies nanoscale transport phenomena, surface modifications through photoswitchable polymers, development and implementation of multiscale computation techniques, and predicting mechanical properties of soft matter and synthetic (bio)materials.

Jackie Baughman
Senior Lecturer

Ph.D. Industrial & Agricultural Technology and Biorenewable Resources & Technology, Iowa State University, 2012
MBA Business Administration. Keller Graduate School of Management, 1997
B.S. Metallurgical Engineering. Iowa State University, 1989

Sarah Bentil
Assistant Professor

PhD, Mechanical Engineering, The Ohio State University, 2013
MS, Mechanical Engineering, University of Hawai'i at Manoa, 2006
BS, Mechanical Engineering, University of Vermont, 2003
BS, Mathematics, University of Vermont, 2003

Dr. Bentil studies soft tissue biomechanics, biomaterials, traumatic brain injuries, blast impact injury mechanisms, high-speed imaging, brain-machine interfaces, and blunt impact injury mechanism.

Sourabh Bhattacharya
Assistant Professor

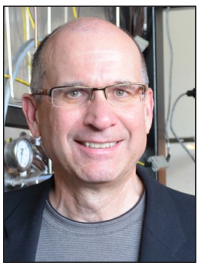
PhD, Electrical and Computer Engineering, University of Illinois, Urbana-Champaign, 2010
MS, Applied Mathematics, University of Illinois, Urbana-Champaign, 2009
MSEE, University of Illinois, Urbana-Champaign, 2005
BTech, Indian Institute of Technology, Bombay, 2002

Dr. Bhattacharya's research interests include optimal control theory, game theory, robotics, compressed sensing, large data storage and inference, security for cyber-physical systems, networked control systems, and machine vision.

Timothy Bigelow
Associate Professor, Mechanical Engineering and Electrical and Computer Engineering

PhD, Electrical Engineering, University of Illinois at Urbana-Champaign, 2004
MS, Electrical Engineering, University of Illinois at Urbana-Champaign, 2001
BS, Electrical Engineering, Colorado State University, 1998

Dr. Bigelow researches systems that use ultrasound in treating cancer, quantifying physical properties of tissue using back-scattered ultrasound signals, applying ultrasound to treat infections, and exploring ultrasound-induced bioeffects for ultrasound safety and therapy applications.



Robert Brown
Anson Marston Distinguished Professor
Gary and Donna Hoover Chair in Mechanical Engineering
Director, Bioeconomy Institute
Director, Center for Sustainable Environmental Technologies

PhD, Mechanical Engineering, Michigan State University, 1980
MS, Mechanical Engineering, Michigan State University, 1977
BS, Physics, University of Missouri, 1976
BA, Mathematics, University of Missouri, 1976

Dr. Brown studies the conversion of biorenewable resources into bioenergy and biobased products, combustion, gasification, fast pyrolysis, hydrogen energy, hydrodynamics, and heat transfer in fluidized beds.

Faculty Highlights

Emmanuel Agba and Team PrISUm brought home the gold with a 1st place victory at the 2015 Formula Sun Grand Prix, the best finish in Team PrISUm's 25-year racing history. Phaëton, the team's 12th solar car, dominated the competition with a commanding lead of 106 miles.

Daniel Attinger discovered a novel manufacturing process to modify the wettability of metallic surfaces, with applications to phase change heat transfer. Attinger proposed a new graduate class on Multiphase Microfluidics, and was elected faculty representative in the ME Department leadership committee. He also gave four invited scientific talks in the Shanghai area.

Xianglan Bai received two new research grants and renewed two grants. She published five journal papers, seven conference presentations, and filed two Intellectual Property disclousures.

In addition to publishing papers, introducing new graduate course in the ME curriculum and constructing a research program on computational nanoscience and materials modeling, **Ganesh Balasubramanian** was awarded an NSF grant as the PI to organize a conference on thermodynamics and statistical mechanics.

Jackie Baughman participated in the Presidential Flipped Classroom Initiative through a successful grant proposal to develop and implement a successful clipped classroom in ME 270 in fall 2015. She also led the Collaborative Learning Network Team which aims to develop a roadmap for multidisciplinary senior capstone experiences.

Sourabh Bhattacharya published seven peer-reviewed conference publications. Additionally, he published four journal papers and one book chapter. Bhattacharya also organized the Rise-of-Machines 2 competition for undergraduate ME students in ME 421. He also organized the Workshop in Robotics Excursion for K-12 students and served as Associate Editor for the IEEE International Conference on Robotics and Automation.

Timothy Bigelow co-authored six journal papers and one conference paper. He has also expanded his research expertise into the area of non-destructive evaluation.

Robert Brown served as director of the Bioeconomy Institute at ISU, which conducted over $12 million in research in 2015. He also received the Don Klass Award for Excellence in Thermochemical Conversion Science and co-authored 25 peer-reviewed journal articles. In its 2015 Laboratory Performance Report Card the U.S. Department of Energy's (DOE) Office of Science rated highly the Ames Laboratory's Simulation, Modeling and Decision Science program led by Professor **Mark Bryden** for being at the "forefront" of the data management, information sciences, and materials programs fields. The Simulation, Modeling, Decision Science Program received an overall grade of A (4.0), the highest grade of any of the Ames Laboratory's scientific programs. He also published five journal articles and seven peer-reviewed conference proceedings.

Mark Bryden
Professor

PhD, Mechanical Engineering, University of Wisconsin, Madison, 1998
MS, Mechanical Engineering, University of Wisconsin, Madison, 1993
BS, General Engineering, Idaho State University, 1977

Dr. Bryden researches the virtual engineering of fluids and heat transfer systems within collaborative, immersive, and synthetic environments.

Abhijit Chandra
Professor

PhD, Cornell University, 1983
MS, University of New Brunswick, Canada, 1980
BTech, IIT, Kharagpur, India, 1978

Dr. Chandra's research interests include mechanics of manufacturing processes, nanoscale surface modification, multiscale and multiphysics modeling, renewable energy, and the boundary element method.

Jonathan Claussen
Assistant Professor

PhD, Biological Engineering, Purdue University, 2011
MS, Mechanical Engineering, Purdue University, 2008
BS, Mechanical Engineering, University of Minnesota, 2006
BA, Spanish and Portuguese Studies, University of Minnesota, 2006

Dr. Claussen's research interests include biosensors (electrochemical and optical, bio-integrated electronics, BioMEMS and BioNEMS, micro/nanoscale propulsion, carbon nanomaterial growth)graphene and carbon nanotubes, nanomanufacturing / materials printing, quantum dots / carbon dots, and mass transport / fluid dynamics.

Mirka Deza
Lecturer

PhD, Mechanical Engineering, Virginia Tech, 2012
MS, Mechanical Engineering and Bionewable Resources & Technology, Iowa State University, 2006
BS, Mechanical Engineering, Pontificia Universidad Catolica del Peru, 1997

Dr. Deza's research interests include computational fluid dynamics and heat transfer, multiphase flow modeling, natural ventilation simulation and modeling, energy usage and energy efficiency as well as engineering education.

Faculty Highlights

Abhijit Chandra published two papers generalizing mechanistic approaches to the broad field of Data Science and Data Driven Prognosis in Proc. Royal. Soc. London. A mixed strategy control system that obviates trade-off between material removal rate and planarization efficiency for Chemical Mechanical Polishing was developed. A plasma system facilitating buffing of ultra-hard materials (e.g., sapphire) was also developed.

The research laboratory of Prof. **Jonathan Claussen**, with the assistance of collaborators from Brigham Young University (BYU), published a research article in the high impact journal ACS Nano and featured in an American Chemical Society (ACS) podcast that introduced a method to use carbon nanotubes as catalyst for hydrogen peroxide fueled micro underwater vehicles (MUVS). Prof. Claussen obtain funding support from the Roy J. Carver Charitable Trust, the USDA, 360 Yield Center (industry partner), and the Catron Center for Solar Energy Research to develop an oral cancer diagnostics biosensor, in-field pesticide biosensor, in-field fertilizer sensor, and a flexible solar energy harvester with nanomaterials respectively in 2015. Prof. Claussen initiated outreach activities with the Des Moines Hoover High School where he visited with high school students and shared with them what motivated him to pursue higher education in a STEM field and pursue a career as a professor.

Sebastien Feve was an active member of the ME 270 Flipped Instructional Development Team (2015 President's Flipped Classroom Initiative). ME 270 was offered as a flipped course for the first-time during Fall 2015 and he taught one section. He also taught and coordinated both ME 170 and ME 270 courses in Spring 2015. Lastly,

Sebastien Feve
Senior Lecturer

MS, Mechanical Engineering, Ecole Nationale d'Ingenieurs de Metz, France, 1998

Lecturer Feve's interests include tire research, fundamentals of thermodynamics, engineering education, international & study abroad.

Baskar Ganapathysubramanian
Associate Professor

BTech, Indian Institute of Technology, Madras, Mechanical Engineering, 2003
MS, Cornell University, Mechanical and Aerospace Engineering, 2006
PhD, Cornell University, Mechanical and Aerospace Engineering, 2008

Dr. Ganapathysubramanian researches computational physics, computational mechanics (fluid mechanics and heat transfer), stochastic analysis, uncertainty quantification and propagation, multiscale modeling, control and optimization of complex systems, materials-by-design, and parallel computing and inverse problems.

Matt Hagge
Senior Lecturer

PhD, Mechanical Engineering, Iowa State University, 2005
MS, Mechanical Engineering, Iowa State University, 2002
BS, Mechanical Engineering, Iowa State University, 1998

Dr. Hagge's research involves computational modeling, wood, combustion, pyrolysis, thermodynamics, and visualization of bloodstain pattern analysis.

Nastaran Hashemi
Assistant Professor

PhD, Mechanical Engineering, Virginia Tech, 2008
MS, Mechanical Engineering, West Virginia University, 2004
BS, Mechanical Engineering, Tehran Polytechnic, 1999

Dr. Hashemi's research areas of interest include microfluidics, biosensors, optofluidics, Bio-N/MEMS: design, modeling, and fabrication, diagnostics and therapeutics, physics of micro/nanoscale phenomena, and nonlinear dynamics.

ME 170 students are now exposed to reverse engineering (of a ball valve) by using 3D scanners in a new ME 170 course project, replacing the coffeemaker dissection project, while attempting to serve better ME's current enrollment and lab space availability.

Baskar Ganapathysubramanian was selected as a PSI faculty Fellow. He also led a PIIR Big Data group. Throughout the year he published 12 journal papers and presented 15 conference talks.

Matthew Hagge was voted "Professor of the Year" by ME seniors demonstrating that ME students appreciate instructors with high standards, and instructors who attempt to prepare students for the real world, by teaching ME students to take responsibility for their own learning, and by teaching students how to work in a collaborative environment to turn in correct answers to their boss. Dr Hagge has developed an innovative teaching method called 'Decision Based Learning' where students learn to solve unfamiliar problems by connecting all their pieces of understanding through a set of instructor decisions. Dr Hagge also developed a tutor activity than has shown a statistically large amount of learning in every group of thermodynamic students ever tested, with more than 500 participants, through an NSF funded proposal with John Jackman, Stephen Gilbert, Gloria Starns, and LeAnn Faidley.

Nastaran Hashemi published nine manuscripts in high impact factor journals and I have delivered an invited seminar internationally. Her work was highlighted by news agencies such as the *Ames Tribune* and *ChemistryViews*. She and her graduate students received various fellowships and awards such as NSF EAPSI, LUSH Young Researcher Prize, Big 12 Faculty Fellowship, ISU Research/Teaching Excellence Award, Goldwater Scholarship, and ASME Best Poster Award.

Faculty Highlights

Jim Heise organized 38 sponsored projects for the ME Capstone Senior Design Program to support 68 teams; 18 of these projects were in direct support of Iowa manufacturers. The Iowa economic impact of these projects is estimated by CIRAS to potentially be in the millions of dollars. Heise also worked with the College of Engineering to host the first industry crowd sourcing design event sponsor by Caterpillar Corporation. Seven student club teams participated with Team PrISUm receiving $2000 support for having the best design solution. As faculty advisor to the ISU Lunabotics Club (now Cyclone Space Mining Club) he guided the team had another successful year at NASA's 6th Annual Robotic Mining Competition at the Kennedy Space Center placing 7th overall (out of 49 teams participating). The team took first place in Best Use of Social Media and Engineer It! Awards, and third in Outreach Project Award, the fourth year in a row that ISU has placed in that category.

Ming-Chen Hsu's research group focused on developing a novel and transformative Fluid–Structure Interaction Analysis Framework for Engineering Designs. The framework has been applied to applications such as wind turbines, artificial heart valves, gas turbines, hydraulic arresting gears, and turbulent flow over complex geometries. He also published ten journal papers and gave 12 invited lectures.

Chao Hu co-authored a book entitled "Probabilistic Engineering Analysis and Design" to be published by Springer which provides an up-to-date, fully illustrated reference for students, researchers and professional engineers who are interested in exploring the fundamentals, implementation and applications of probabilistic analysis and design methods. Topics covered in the book include statistical data analysis, reliability analysis under time-independent and time dependent uncertainties, and system health diagnostics and prognostics.

Shan Hu said that major lab capability development for Nanomanufacturing and Renewable Energy Lab (NSEL) has been completed. Research results produced by members of NSEL have been disseminated through two published peer-review conference proceedings and two journal papers submitted. NSEL hosted four undergraduate students and one high school student for research experiences in renewable energy technology.

Jaime Juárez has built his laboratory since joining the ISU faculty in August 2015. He also recruited two graduate students and several undergraduates to conduct research in his lab. He has also worked to identify possible collaborations through the Microelectronics Research Center, the Center for Multiphase Flow Research, and with individual faculty members. Dr. Juárez also served on the Curriculum Development Committee for energy related courses.

Atul Kelkar is working on the forefronts of research on improving energy efficiencies in buildings and technologies for renewable energy. He is also impacting K-12 STEM education by developing innovative educational video games based on his years of experience in aerospace research. His contributions were featured in AIAA's newsletter which is read worldwide. Dr. Kelkar published a NASA Paper jointly with NASA Senior Scientist on the control of asteroid capture spacecraft. His entrepreneurial efforts have not only led to positive economic impact and job creation for the state but have also benefited engineering faculty at Iowa State through research subcontracts through DoD STTR grants. He assumes a new position in ME as the Associate Chair for Research and Technology Transfer. He also held leadership position in organization of key conference of Dynamic Systems and Control Division of ASME. He is a Fellow of ASME and Associate Fellow of AIAA.

Caroline Hayes

Department Chair
Lynn Gleason Professor of Interdisciplinary Engineering

PhD, Robotics, School of Computer Science, Carnegie Mellon University, 1990
MS, Knowledge-Based Systems, Mellon College of Science, Carnegie Mellon University. Interdisciplinary degree between Psychology, Computer Science and Mechanical Engineering, 1987
BS Computer Science, Carnegie Mellon University, 1983

Dr. Hayes's recent focus is on understanding the sociotechnical factors impacting collaboration in globally distributed design teams, and in developing processes and tools to make such teams more effective. Her research has crossed disciplinary boundaries between engineering, psychology, computer science and management.

Ted Heindel

Bergles Professor of Thermal Science

PhD, Mechanical Engineering, Purdue University, 1994
MS, Mechanical Engineering, Purdue University, 1990
BS, Mechanical Engineering, University of Wisconsin, Madison, 1988

Dr. Heindel works with x-ray flow visualization, fluid mechanics, multiphase flow hydrodynamics, and gas-liquid mass transfer.

Jim Heise
Senior Lecturer

MS, Mechanical Engineering, Iowa State University
BS, Mechanical Engineering, Iowa State University
AS, Mechanical Engineering Technology, Hawkeye Community College

Lecturer Heise's specialties include product design engineering, project management, design for Lean Sigma®/Six Sigma®

Ming-Chen Hsu
Assistant Professor

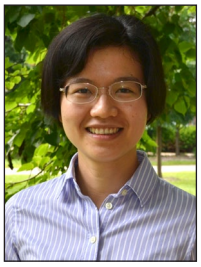
PhD, Structural Engineering, University of California, San Diego, 2012
MSE, Aerospace Engineering and Engineering Mechanics, The University of Texas at Austin, 2008
MS, Engineering Science and Ocean Engineering, National Taiwan University, 2005
BS, Engineering Science and Ocean Engineering, National Taiwan University, 2003

Dr. Hsu's research interests lie in the field of Computational Mechanics, Isogeometric Analysis and Fluid–Structure Interaction (FSI) with an emphasis on contemporary engineering problems such as wind energy and biomedical applications.

Chao Hu
Assistant Professor

PhD, Mechanical Engineering, University of Maryland-College Park, 2011
BE, Engineering Physics, Tsinghua University, China, 2007

The goal of Dr. Hu's research is to develop innovative engineering design and failure prognostics methodologies that lead to design of resilient and sustainable systems.



Shan Hu
Assistant Professor

PhD, University of Minnesota, Minneapolis, MN, 2014
MS, University of Minnesota, Duluth, MN, 2009
BS, Harbin Institute of Technology, Harbin, China, 2007

Dr. Hu's research interests include nanomaterials for energy storage and energy harvesting; scalable manufacturing of nanomaterials-based devices; sensors, actuators, and controls.

Jaime Juarez
Assistant Professor

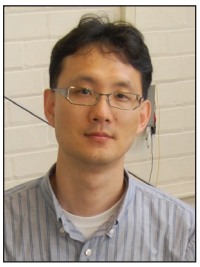
PhD, Chemical and Biomolecular Engineering, Johns Hopkins University, 2011
MS, Mechanical Engineering, University of Texas at San Antonio, 2006
BS, Mechanical Engineering, Stanford University, 2004

Dr. Juarez's interests include microfabrication, microscopy, microfluidics, flow cytometry, soft matter physics, self assembly of materials, physics of micro- and nanoscale forces, simulation of colloidal materials.

Atul Kelkar
Professor

PhD, Mechanical Engineering, Old Dominion University, 1993
MS, Mechanical Engineering, Old Dominion University, 1990
BS Mechanical Engineering, University of Poona, Pune, India, 1984

Dr. Kelkar researches control theory, robust and nonlinear control, acoustic noise control, vibration control, flexible multibody dynamics, integrated design via multiobjective optimization, robotics, and neural networks.



Gap-Yong Kim
Associate Professor

PhD, Mechanical Engineering, University of Michigan, 2005
MS, Mechanical Engineering, University of Michigan, 2003
BS, Mechanical Engineering, Yonsei University, 1997

Dr. Kim works with manufacturing science at the microscale, microscale deformation processes, semisolid forming, modeling and fabricating microreactors, and energy conversion devices.

Owen Kolstad
Senior Lecturer

MS, Agricultural Engineering, University of Minnesota, 1981
MS, Mechanical Engineering, University of Minnesota, 1978
BS, Agricultural Engineering, North Dakota State University, 1991

Song-Charng Kong
Professor

PhD, Mechanical Engineering, University of Wisconsin, Madison, 1994
MS, Mechanical Engineering, University of Wisconsin, Madison, 1992
BS, Power Mechanical Engineering, National Tsing-Hua University, Taiwan, 1987

Dr. Kong researches experimental engine combustion and emissions studies, biorenewable energy utilization in internal combustion engines, and numerical combustion study and model development using detailed chemical kinetics with computational fluid dynamics.

Adarsh Krishnamurthy
Assistant Professor

PhD, Mechanical Engineering, University of California-Berkeley, 2010
MTech, Mechanical Engineering Indian Institute of Technology-Madras, 2005
BTech, Mechanical Engineering, Indian Institute of Technology-Madras, 2005

Dr. Krishnamurthy research involves Biomechanics, finite element analysis, patient-specific modeling, computational mechanics, geometric modeling, computer aided design and manufacturing, computer graphics.

Faculty Highlights

Gap-Yong Kim published three journal papers and two conference papers. Dr. Kim also reviewed 19 journal and conference articles. He also served on various boards and committees including as Chair of the Technical Committee for Textile & Composite Engineering of Manufacturing Engineering Division of the American Society of Mechanical Engineers (ASME).

Song-Charng Kong conducts innovative research in multiphase flows and renewable energy systems. His group has developed high-fidelity computational framework for simulating biomass thermochemical conversion for biofuel production. He has developed highly-efficient optimization algorithms for diesel engine performance optimization. He is an associate editor for ASME Journal of Engineering for Gas Turbine and Power, associate editor for Frontiers in Mechanical Engineering, and a member in the editorial board of Internal Journal of Engine Research. He is currently the Program Director of the Combustion and Fire Systems Program (ENG/CBET) at the National Science Foundation.

Part of **Adarsh Krishnamurthy**'s research in 2015 focused on computational modeling of heart failure, where identifying patients who will best respond to a particular therapeutic intervention is difficult. Computational models, developed from patient-specific clinical data, can help refine the diagnosis and personalize heart failure intervention therapies. His research has recently been used to ascertain a possible mechanism for improvement due to cardiac resynchronization therapy, which uses implantable pacemakers to synchronize ventricular function, for the first time. This preliminary investigation suggests the possibility of extracting important diagnostic information from clinical measurements using computational models.

Valery Levitas developed new phase field approaches for dislocations and interaction of phase transformation and dislocation evolution; solid-solid

Valery I. Levitas

Schafer 2050 Challenge Professor
Department of Mechanical Engineering and of Aerospace Engineering

DrIng habil, Continuum Mechanics, University of Hannover, 1995
ScD, Continuum Mechanics, Institute of Electronic Machinebuilding (Moscow), 1988
PhD, Materials Science, Institute for Superhard Materials (Kiev), 1981
MS, Mechanical Engineering (Honors), Kiev Polytechnic Institute, 1978

Dr. Levitas's research includes stress- and strain-induced phase transformations, high pressure mechanics and mechanochemistry, structural changes in materials via virtual melting, multiscale modeling, strain-induced chemical reactions, and large inelastic deformation of solids.

Barbara Lograsso

Senior Lecturer

PhD Metallurgical and Materials Engineering 1991
MS Metallurgical and Materials Engineering 1982
BS Metallurgical and Materials Engineering 1980

Meng Lu

Assistant Professor

PhD, Electrical Engineering, University of Illinois, 2008
MS, Electrical Engineering, University of Illinois, 2006
BS, University of Science and Technology of China, 2002

Dr. Lu's research interests include optical sensors, biomedical engineering, sensors for molecular diagnostics and photonic devices.

Greg Luecke

Associate Professor

PhD, Mechanical Engineering, Pennsylvania State University, 1992
MS, Engineering and Applied Science, Yale University, 1987
BS, Mechanical Engineering, University of Missouri-Columbia, 1979

Dr. Luecke's research interests include robotics and control, multibody dynamics and simulation, and artificial neural networks for control.

transformations via nanoscale intermediate interfacial phase through critical nucleus with revealing new mechanics effects; nanoscale melting of aluminum nanolayer irradiated by picosecond laser; multiphase temperature- and stress-induced phase transformations, and phase transformations with anisotropic interface energies and stresses. His research also found new results on improving reactivity of Al micron scale particles by pre-stressing.

Barbara Lograsso collaborated with several faculty members and graduate students for the creation of a prototype trial project component on 3D scanning for the Reverse Engineering Project in ME170. He also collaborated as a Co-PI with A. Bastawros of Aerospace Engineering, W. Meeker, and R. Maitra of Statistics along with Indiana State Police Forensic Scientist, J. Vanderkolk to propose a study selected for a two-year award by National Institutes of Justice.

Meng Lu authored or co-authored 12 journal articles and seven conference papers. He was also granted new research funding from 3M Company and continued to work on a research project funded by ISU's Leopold Center for Sustainable Agriculture.

Greg Luecke was instrumental in developing and commercializing new technology related to visualization and controls. Supported Iowa-based companies, Deere and Co. and Winegard Company, and Vermeer Corp. with research projects on new technology development. Based on research with ISU, Deere and Co is now selling the S-Series *GoHarvest™Premium Combine Simulator*. Using development work from ISU, Winegard has multiple tracking antenna products available for consumer purchase, including the *Pathway X1*.

Faculty Highlights

Margaret Mathison assisted in the implementation of a flipped classroom for ME 270 and learn about the methods that Greg Maxwell has found effective for ME 441. She continued her involvement in the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) at the national level by serving as a speaker at the society's winter conference, chairing a standard development committee, and serving as a vice-chair for a technical committee. At the local level, she has established connections to the Iowa ASHRAE Chapter leadership.

Greg Maxwell continued to lead the Industrial Assessment Center and also worked with the Iowa Energy Center on one existing project and proposed an additional project. Dr. Maxwell also served as co-chair for the International Conference on Nuclear Criticality Safety and continued to lead the Nuclear Engineering Minor program at ISU.

Mark Mba Wright and his research team was recognized by Black & Veatch for their efforts with a "Building a World of Difference" Faculty Fellowship. He also started the U.S. Agency for International Development project in Uganda and published eight journal publications.

Scott Merkle taught ME Capstone Senior Design (ME415 and ME466) involving 112 students, 24 project teams, and 12 sponsors ranging from global corporations to newly formed LLCs and to other departments within ISU. He also taught Machine Design (ME325) involving 174 students, and mentored an independent study student in a research and design application of RFID technology for positioning and navigation. He also assisted hosting the Caterpillar Corporation Saturday Design Challenge where seven student club teams competed for a total prize purse of $5,000.

James Michael along with ME assistant professor Travis Sippel received a DURIP award from the Air Force Office of Scientific Research to develop instrumentation for the study of multiphase combustion enhancement through pulsed microwave plasma interactions.

Reza Montazami and his research team published five journal articles. He also presented his research at the MRS spring meeting, received Big 12 Faculty Fellowship, and established external academic and industry collaborations. His research was highlighted in the news for the second consecutive year and he taught two new courses at the graduate and undergraduate levels.

James Oliver leads ISU's Virtual Reality Applications Center and its graduate program in Human Computer Interaction. His research, teaching, and economic development activities focus on human computer interaction technologies, encompassing computer graphics, geometric modeling, virtual reality, and collaborative networks for applications in product development and complex system operation. His research is supported by a variety of industry partners and federal agencies, and the VRAC supports a broad interdisciplinary constituency that spans the entire university.

Michael Olsen published five papers in archival journals. He was also invited to give the keynote lecture to the 2016 International Symposium

Margaret Mathison

Lecturer

PhD, Mechanical Engineering, Purdue University, 2011
BS, Mechanical Engineering, Iowa State University, 2006

Dr. Mathison's research and teaching interests include positive displacement compressors, HVAC&R equipment, and modeling and analysis of thermal systems.

Greg Maxwell

Associate Professor
Director, Industrial Assessment Center

BS, Physics, Purdue University, 1973
MS, Nuclear Engineering, Purdue University, 1977
PhD, Mechanical Engineering, Purdue University, 1984

Dr. Maxwell's research interests include energy usage in buildings and HVAC systems, industrial energy efficiency, and nuclear energy.

Mark Mba Wright

Assistant Professor

PhD, Mechanical Engineering & Chemical Engineering, Iowa State University, 2010
MS, Biorenewable Resources & Technology, Iowa State University, 2008
BS, Mechanical Engineering, Iowa State University, 2007

Dr. Wright investigates the cost and performance of energy systems, researching techno-economics, process modeling, and energy conversion. Recent projects investigated the costs and emissions of biomass conversion to gasoline and diesel. He also researches novel ways of converting biomass into fuels. Current research includes low-temperature thermochemical conversion (torrefaction and pyrolysis) of lignocellulosic biomass into platform chemicals and fuels.

Scott Merkle
Senior Lecturer

MBA, University of Iowa, 2004
BS, Mechanical Engineering, Iowa State University, 1982

Michael Messman
Senior Lecturer

MS, Mechanical Engineering, University of Nebraska-Lincoln, 1986
BS, Mechanical Engineering, University of Nebraska-Lincoln, 1984

Lecturer Messman's teaching interests include Mechanics of materials, fatigue and durability Machine dynamics and vibrations Engineering measurements Digital data acquisition Multiaxial force transducer design Correlation of experimental measurements to computer simulation results

James Michael
Assistant Professor

PhD, Princeton University, Mechanical and Aerospace Engineering, 2012
MA, Mechanical and Aerospace Engineering, Princeton University, 2009
BS, Aerospace Engineering, University of Maryland-College Park, 2007

Dr. Michael's areas of interest include optical and spectroscopic diagnostics of reacting, multiphase, and non-equilibrium flows; plasma-assisted combustion; and combustion ignition and control.

Reza Montazami
Assistant Professor

PhD, Materials Science and Engineering, Virginia Tech, 2011
MS, Materials Science and Engineering, Virginia Tech, 2009
BS, Physics and Astronomy, Virginia Tech, 2007

Dr. Montazami's researches smart materials and structures, biomimetic materials and devices, nature-inspired soft microrobotics, mems and nems, functional thin-films, polymeric sensors and actuators, and biomaterials for biomedical applications and devices.

Jim Oliver
University Professor
Larry and Pam Pithan Professor of Mechanical Engineering
Director, CyberInnovation Institute
Director, Virtual Reality Application Center

PhD, Mechanical Engineering, Michigan State University, 1986
MS, Mechanical Engineering, Michigan State University, 1981
BS, Mechanical Engineering, Union College, 1979

Dr. Oliver's areas of interest include design and manufacturing process automation using geometric modeling, computer graphics, visualization, simulation, optimization, virtual reality, and human-computer interaction.

Michael Olsen
Professor

PhD, Mechanical Engineering, University of Illinois-Urbana-Champaign, 1999
MS, Mechanical Engineering, University of Illinois-Urbana-Champaign, 1995
BS, Mechanical Engineering, University of Illinois-Urbana-Champaign, 1992

Dr. Olsen is active in experimental fluid mechanics and microelectromechanical systems.

Sonal Padalkar
Assistant Professor

PhD, Materials Engineering, Purdue University,
MS, Physical Metallurgy, Government College of Engineering, Pune University, India
BS, Metallurgy, Government College of Engineering, Pune University, India

Dr. Padalkar's research areas include synthesis, characterization and simulation of hybrid nanostructures for energy related application, synthesis and characterization of nanomaterials for biosensing, utilizing advanced characterization techniques like TEM, HRTEM, EELS, and Atom Probe to obtain solutions for complex research problems.

Alberto Passalacqua
Assistant Professor

PhD, Chemical Engineering, Politecnico di Torino, 2008
MS, Chemical Engineering, Politecnico di Torino, 2004

Dr. Passalacqua's research interests include multiphase fluid dynamics, fluid particle flows, quadrature-based moment methods, uncertainty quantification, computational fluid dynamics and numerical methods for computational fluid dynamics, open-source tools for computational fluid dynamics.

Paola Pittoni
Lecturer

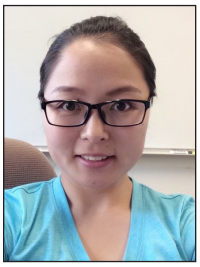
PhD, Chemical Engineering, National Taiwan University of Science and Technology, Taipei
BS, Energy Engineering, Politecnico di Milano

Dr. Pittoni's areas of interest include wettability, drop triple line dynamics at low and high temperatures, drop impact, drop evaporation, and multi-phase thermal-fluid dynamics: heat transfer; pressure drop; and flow patterns.

Rafael Radkowski
Assistant Professor

Doctor in Engineering, product design with evolutionary algorithm, Graduate School Automatic Configuration in Open System, Heinz Nixdorf Institute, Paderborn, Germany, 2006
Dipl.-Ing. (equal to BS+MS degree), Mechanical Engineering, University of Paderborn, 2003

Dr. Radkowski's research interests include Iterative Closest Points for object identification and tracking; view-dependent rendering and depth cue simulation for CAD workstations; probabilistic search methods for large-scale feature databases.



Juan Ren
Assistant Professor

PhD, Mechanical Engineering, Rutgers University, 2015
BS, Process Equipment and Control, Xi'an Jiaotong University (China), 2009

Dr. Ren's research interests include nanoscale probe-based broadband biomechanics characterization and high-speed imaging and broad-band viscoelasticity

Soumik Sarkar
Assistant Professor

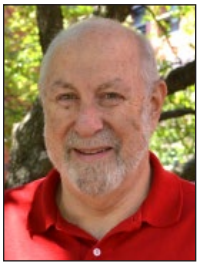
PhD, Mechanical Engineering, Penn State University, 2011
MS, Mechanical Engineering, Penn State University, 2009
MS, Mathematics, Penn State University, 2009
BE, Mechanical Engineering, Jadavpur University, 2006

Dr. Sarkar's research interests include diagnostics, prognostics & supervisory control of complex cyber-physical systems; multi-agent systems and analysis of critical phenomena; human-machine interaction; data mining and visualization, machine learning, probabilistic graphical models; and stochastic time series analysis.

Cris Schwartz
Associate Professor
Associate Chair for
Undergraduate Education

PhD, Mechanical Engineering, Iowa State University, 2006
MS, Mechanical Engineering, Iowa State University, 1998
BS, Mechanical Engineering, Iowa State University, 1996

Dr. Schwartz's research interests include biotribology, polymer tribology, wear of biomaterials and the effects of wear debris in vivo, biomedical implant design, and incorporating naturally derived and biodegradable polymers in design.



Howard Shapiro
Lecturer

PhD, Mechanical Engineering, The Ohio State University, 1975
MS, Mechanical Engineering, The Ohio State University, 1971
BS, Mathematics, The Ohio State University, 1969

"Give us your mind and enthusiasm now, and we will give it back to you, sharp, trained, and ready to help in making wise decisions."

~Henry Black, ME Department Chair 1946-72

Faculty Highlights

of Flow Visualization, which took place during the summer of 2016.

Sonal Padalkar has one research publication under review and two manuscripts under preparation. She also taught ME 231 for three semesters and recruited and retained female researchers in her lab.

Alberto Passalacqua published the first release of OpenQBMM, the first open-source implementation of quadrature-based moment methods to solve population balance equations for nucleation, aggregation, breakup, growth of nanoparticles.

Paola Pittoni taught five different courses taught, for a total of 314 students and ten sections, with a mean overall teaching effectiveness of 4.53. She also led an ISU power plant visit included as a curriculum activity for ME 231 and served as first author on a paper entitled "Experimental Thermal and Fluid Science."

Rafael Radkowski investigated a maximum likelihood (ML) solution for the iterative closest point method incorporating a mixture of Gaussians to distinguish multiple rigid objects in a 3D point cloud data set. The outcome poses a milestone in his tracking research: the ML estimation increases the robustness of the entire tracking approach to a point that practical applications under real-world conditions are possible. Thus, the tracking method will allow application developers to use marker-less object tracking in AR applications. Other researchers, from the field of Human Computer Interaction for instance, can rely on a robust tracking solution for their own research.

Juan Ren set-up the Nano-/bio-mechanical study and control research lab, and recruited PhD students for research projects focusing on biological and nanoscale sciences. She also helped to develop the teaching lab for ME410.

Soumik Sarkar and his research group have developed hierarchical spatiotemporal feature extraction algorithms with an emphasis on Deep Learning tools for complex system modeling, understanding scientific patterns from data and design with significant success on various application areas including combustion processes, microfluidic channels, building and wind turbine systems and plant disease detection. They have also developed Generalized Gossip based policies for distributed optimization with an application focus on agent-based supervisory control of building HVAC systems for energy efficiency. The research was supported by NSF, Rockwell Collins and Iowa Energy Center.

In 2015, **Cris Schwartz** spent a significant amount of my time identifying and addressing capacity limitations in our curriculum and how those could be addressed in order to serve our growing enrollment while maintaining program quality. Last year he worked with the Curriculum Development Committees to identify space and equipment needs that were most vital to this mission. As a result, the department was able to invest substantially in some of our upper-level teaching labs which will not only help to address our rising enrollments, but also improve the student experience in ME's curriculum.

Howard Shapiro's most notable contribution to the department is to provide leadership and impetus for faculty development in teaching and learning. ME LEARNS! is bringing together new faculty and established faculty to learning and grow together and is stimulating curriculum discussion and enhancing interdepartmental communication about teaching and curriculum.
He was also appointed chair of the Edward F. Obert Award Committee, in which he will oversee the annual selection of the society-wide award for best paper in Thermodynamics.

Faculty Highlights

Pranav Shrotriya received three new research grants , presented invited seminars at Oklahoma State University and Lund University, Sweden. He served as the Associate Chair for Graduate Studies and Research till Fall 2015 and worked with department faculty to: increase graduate enrollment to 256 students making ME the fourth largest graduate and PhD program in the university.

In 2015, **Travis Sippel**'s research group achieved advancements to our detonation-speed heating apparatus, enabling reproduction of the thermal loads within energetic applications from combustion to detonation within a small, benchtop device. We demonstrated this year the world's first microwave-seeded plasma throttleable solid rocket propellant using a novel propellant doping technique combined with microwave-flame application (collaboration with JB Michael). The technique can enable the active control of the burning rate of solid propellant and has potential to improve combustion in other propulsion systems.

Nine students, Mark Mba-Wright, and **Gloria Starns** traveled to San Isidro, Nicaragua to design and fabricate sustainable systems as an outcome of ME 402X, Human Centered Design; the experience of co-designing products with the Nicaraguan community was transformative for everyone involved in the class.

Shankar Subramaniam was awarded the College of Engineering's Accelerating Collaborative Research Initiative (ACRI) grant for developing a strategic research thrust in multiphase flows through the Center for Multiphase Flow Research. He delivered invited seminars at Chemeca 2014 in Perth, Australia, and at the Enabling Process Innovation through Computation (EPIC) Seminar Series in LSU. He delivered the Lindbergh Lecture at University of Wisconsin, Madison, and also participated in the Stanford Center for Turbulence Research's 2014 Summer Program.

Sriram Sundararajan is the College of Engineering Equity Advisor. Through this role, he works with college leadership to enhance the diversity of the faculty body. He assumed leadership of the Broader Impacts Platform of the Iowa NSF EPSCoR project and helps build research infrastructure across the state.

Judy Vance co-edited a book entitled "Advances in Computers and Information in Engineering Research" published by ASME Press. This is the first volume in a series covering current research in Advanced Modeling and Simulation; Computer-Aided Product and Process Development; Systems Engineering, Information and Knowledge Management; and Virtual Environments and Systems.

Xinwei Wang has 15 papers published or accepted for publication in highly visible journals, and one book chapter accepted for publication. He received the Iowa State University Award for Mid-Career Achievement in Research, and was elected to Fellow Grade of ASME. In 2014, he has been advising 10 Ph.D. students, two M.S. students, and one visiting scholar to do research in his lab on various frontier thermal transport areas.

Research in **Eliot Winer**'s lab continued on using Augmented Reality in manufacturing during training and daily work. Dr. Winer also researched the fusion of sensor and self-reported data during human subject testing in a manufacturing task. Lastly, researchers in Dr. Winer's group studied the effects of stereopsis on spatial tasks in a medical context. Results showed that for medical training, diagnosis and treatment, the effect is significant.

Pranav Shrotriya
Professor

PhD, Theoretical and Applied Mathematics, University of Illinois-Urbana-Champaign, 2001
MS, Theoretical and Applied Mathematics, University of Illinois-Urbana-Champaign, 1997
BT, Mechanical Engineering, Indian Institute of Technology, 1995

Dr. Shrotriya researches the mechanical response of micro- and nanoscale structures, experimental and computational mechanics at small-length scales, mechanics of surface stress sensors and molecular adsorption, stress-assisted dissolution and damage of biomedical implants, and mechanics of manufacturing processes.

Travis Sippel
Assistant Professor

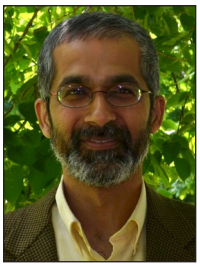
PhD, Mechanical Engineering, Purdue University, 2013
MS, Mechanical Engineering, Purdue University, 2009
ME, Mechanical Engineering, Purdue University, 2009
BS, Mechanical Engineering, University of Kansas, 2006

Dr. Sippel's research areas of interest include multiphase combustion, paticularly of propellants, explosives, and pyrotechnics, nanostructured energetic materials and novel applications of

Gloria Starns
Senior Lecturer

PhD, Mechanical Engineering, Iowa State University
MS, Mechanical Engineering, Iowa State University
BS, Mechanical Engineering, University of Kentucky

Lecturer Starns's past experience includes private consulting and serving as a project engineer for a commercial refrigeration manufacturer.



Shankar Subramaniam
Professor

PhD, Mechanical and Aerospace Engineering, Cornell University, 1997
MS, Aerospace Engineering, University of Notre Dame, 1990
BT, Aeronautical Engineering, Indian Institute of Technology, 1988

Dr. Subramaniam's research interests include spray modeling, modeling and simulation of gas-particle flows and granular flows, combustion, turbulent reactive flows, mixing, stochastic models, particle methods, and computational fluid dynamics.

Sriram Sundararajan
Associate Dean for Academic Affairs
Professor

PhD, Mechanical Engineering, The Ohio State University, 2001
MS, Mechanical Engineering, The Ohio State University, 1997
BE, Mechanical Engineering, Birla Institute of Technology and Science, 1995

Dr. Sundararajan's research areas of interest are surface engineering, micro- and nanoscale tribology, multiscale mechanical behavior of materials, scanning probe microscopy, and thin film characterization using three dimensional atom probe microscopy.

Judy Vance
Joseph and Elizabeth Anderlik
Professor of Engineering

PhD, Mechanical Engineering, Iowa State University, 1992
MS, Mechanical Engineering, Iowa State University, 1987
BS, Mechanical Engineering, Iowa State University, 1980

Dr. Vance works with virtual reality applications in mechanical engineering including virtual assembly, virtual manufacturing and mechanism synthesis, optimization, and the fundamentals of engineering design including ideation and concept generation.

Xinwei Wang
Professor

PhD, Mechanical Engineering, Purdue University, 2001
MS, Thermal Science and Energy Engineering, University of Science and Technology of China, 1996
BS, Thermal Science and Energy Engineering, University of Science and Technology of China, 1994

Dr. Wang's areas of interests include laser-assisted bio-imaging, thermal transport in nanoscale and nanostructured materials, novel technique developments for thermal conductivity measurement of films, coatings and micro- and nanoscale wires/rubes, and laser-assisted nanostructuring.

Jonathan Wickert
Senior Vice President and Provost, Iowa State University
Professor, Department of Mechanical Engineering

PhD, Mechanical Engineering, Univ. of California at Berkeley, 1989
MS, Mechanical Engineering, Univ. of California at Berkeley, 1987
BS, Mechanical Engineering, Univ. of California at Berkeley, 1985

Dr. Wickert's research interests include mechanical vibration and noise control, continuous and multibody systems dynamics, applied mechanics, and applications in computer data storage.

Eliot Winer
Professor

PhD, Mechanical Engineering, State Univ. of NY at Buffalo, 1999
MS, Mechanical Engineering, State Univ. of NY at Buffalo, 1994
BS, Aeronautical and Astronautical Engineering, The Ohio State Univ., 1992

Dr. Winer is active in internet technology for large-scale collaborative design; medical imaging, analysis and visualization, multidisciplinary design synthesis, computer aided design and graphics, application in optimal design, and scientific visualization and virtual reality for large-scale design.

Adjunct and Courtesy Appointments

Ashraf Bastawros
Adjunct Associate Professor
Aerospace Engineering

PhD, Engineering, Brown University, 1997
MS, Applied Mathematics, Brown University, 1995
MS, Mechanical Engineering, Cairo University, 1991
BS, Mechanical Engineering, Cairo University, 1988

Dr. Bastawros' research interests include micro and nano surface machining, experimental methods to study structure-property relationships, and thermo-mechanical characteristics of porous solids and biological materials.

Leonard Bond
Courtesy Professor
Aerospace Engineering

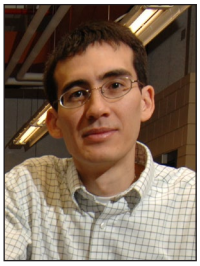
PhD., City University - London

Dr Bond's reserach focused on ultrasonics applied to nondestructive evaluation (NDE) as well as advanced diagnostics and prognostics, to estimate safe service life, applied to aerospace and energy systems.

Wei Hong
Courtesy Assistant Professor
Aerospace Engineering

PhD, Engineering Sciences, Harvard University, 2006
MS, Engineering Mechanics, Tsinghua University, Beijing, China, 2002
BS, Engineering Mechanics, Tsinghua University, Beijing, China, 2000

Dr. Hong's research interests include solid mechanics, soft materials, smart materials and structures, fracture and microstructure evolution, and multiphysics modeling and simulation.



Terry Meyer
Collaborator Professor
Purdue University

PhD, Mechanical Engineering, University of Illinois-Urbana-Champaign, 2001
MS, Mechanical Engineering, University of Illinois-Urbana-Champaign, 1997
BS, Mechanical Engineering, University of Minnesota, 1993

Dr. Meyer's areas of interests are laser imaging and spectroscopy for reacting fluid flow and sprays, biorenewable fuels, combustion, power and propulsion, gas-turbines, scramjets, hypersonic vehicles, and internal combustion engines.

Richard T. Stone
Courtesy Assistant Professor
Industrial and Manufacturing

PhD, Industrial and Systems Engineering, The University of Buffalo, SUNY, 2008
MS, IT with concentration in Robotics and W/M programing, The Rochester Institute of Technology, 2001
Adv. Cert, Environmental Managment Science, 2002, Robotics and CAM, 2001, The Rochester Institute of Technology
BS, MIS, The Rochester Instituite of Technology, 1999

Dr. Stone's research interests include human performance enhancement in both physical and mental domains. He employs multiple approaches toward this goal, including cognitive and physiological engineering, classical and experimental ergonomics, augmented reality, and the incorporation and application of new technologies.

Emeritus Faculty

Shyam Bahadur
Bill Bathie
Joseph Baumgarten
Jim Bernard
Jerry Colver
Bill Cook
Richard Danofsky
Paul DeJong
Arvid Eide
Jerry Hall
Alexander Henkin
Alfred Joensen
George Junkhan
Pat Kavanagh
Ron Nelson
Ted Okiishi
Mike Pate
Don Roberts
Howard Shapiro
Bernard Spinrad

Industry Advisory Council members pose in front of the new ME signage during their fall 2016 meeting. From left: Caroline Hayes, Joe Wright, Diane Fischer, Robin O'Callaghan, Cynthia Lord, Greg Garrison, Brett Anderson, David O'Brien, Jeremy Berg, Jason Olberding, and Mike Jensen.

Industry Advisory Council

Brett Anderson
Boeing
Brett is an Iowa State BSAE alum and has been with The Boeing Company since 1989. He coordinates with internal and external technology experts to identify short and long term roadmaps to match business unit needs with strategic direction for both technology development and business opportunities.

Jeremy Berg
Cargill
Jeremy is a BSCE alum of Iowa State and has been at Cargill since 2004. He provides Automation, Electrical and Instrumentation (AEI) support to more than 30 oilseeds (soybean, canola, flax, corn germ) processing plats and refineries across North America.

Diane Fischer
Black & Veatch
Diane is a BSME alum of Iowa State and has worked for Black & Veatch since 1992. She currently serves as the Associate Vice President and Regional Area Director - Central Region for Power Generation Services and is responsible for client satisfaction, project execution, and business capture for power generation services projects in the central region of the United States.

Mike Hilby
John Deere
An alum of the department, Mike leads the Operations organization at John Deere Product Engineering Center. He is responsible for the efficient planning and growth of all Global Tractor Platform PV&V facilities.

Greg Garrison
Union Pacific

Mike Jensen
Caterpillar
Mike is a BSME graduate of Iowa State and serves as a Senior Engineering Tech Team Leader at Caterpillar. His activities encompass working enterprise-wide new product development program challenges related to updating the Caterpillar machine product line to meet upcoming diesel engine emissions regulations.

Cynthia Lord
Alliant Energy
Cynthia is a BSME alum of Iowa State and has spent over 27 years in the energy industry. She is a manager in the Generation Engineering department for Alliant Energy, and is responsible for supporting the engineering needs of 15 power plants across Iowa, Wisconsin, and Minnesota.

David O'Brien
Lyondellbasell
Dave is a BSME alum and started at Lyondellbasell as a co-op engineering in 1990. He is currently the Machinery Group Lead and helps perform troubleshooting, executes upgrades, and provides technical support for the operation and maintenance of rotating equipment such as steam turbines, centrifugal compressors, and pumps.

Robin O'Callaghan
Kiewit Power, Inc.
Robin graduated from the ISU ME program and is employed as an operational mechanical engineering at Kiewit Power in Lenexa, KS. Robin has been active in Iowa State recruitment and is a licensed engineer in three states.

Jason Olberding, IAC Vice Chair
Emerson Process Management
Jason is an ISU ME graduate and serves as the Special Products Group Manager at Emerson Process Management in Waterloo, IA.

Nancy Stewart
3M
Nancy graduated from ISU with a BS in mechanical engineering and joined 3M shortly afterwards. She has worked in a variety of positions at 3M and is currently serving on an assignment in the Lean Six Sigma Organization in the Skin & Wound Care Division.

Kyle Wehring
Rockwell Collins
Kyle is an ISU BSME graduate and serves as a design engineer at Rockwell Collins. He is responsible for mechanical design and packaging of electronics for fixed site, ground vehicle, and airborne applications.

Joe Wright
Sauer Danfoss
Joe is an Iowa State BSME alum and has been with Danfoss Power Solutions since 2004. He leads a team of engineers in Europe and North America focused on simulation, development, and testing of hydrostatic transmissions for off-highway equipment.

Staff

Kiewit Undergraduate Student Services Center

Matt Dikeman
Academic Adviser

Fred Lloyd
Academic Adviser

Aliza Mackenzie
Academic Adviser

Alyssa Mittleider
Academic Adviser

Jessica Van Winkle
Academic Adviser

Jessie Vosseller
Academic Adviser

John Wagner
Academic Adviser, Advising Center Coordinator

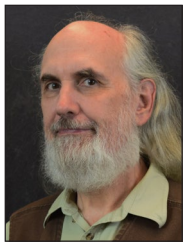
Johna Wolfe
Academic Adviser

Hazel Peterson
Advising Secretary

Laboratory and Information Technology

Sandy Bremer
Teaching Laboratory Coordinator

Joel Buehler
Systems Support Specialist



Jim Dautremont
Laboratory Mechanical Technologist

Josh DeLarm
Teaching Laboratory Coordinator

Derek Dickson
Systems Support Specialist

John Howell
Teaching Laboratory Coordinator

Nate Jensen
Systems Support Specialist

Wyman Martinek
Teaching Laboratory Coordinator

Taylor Schweizer
Teaching Laboratory Coordinator

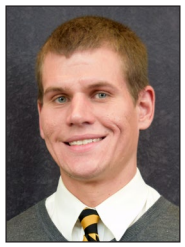
Craig Severson
Teaching Laboratory Coordinator

Jim Shelledy
Teaching Laboratory Coordinator

Business Office

Cindy Bartleson
Administrative Specialist, Assistant to the Chair

Kristin Clemens
Undergraduate Program Assistant



Nick Fetty
Communications Specialist

Hallie Golay
Graduate Program Assitant

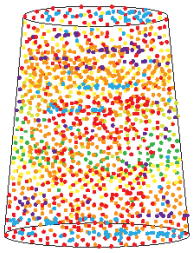
Rachael Gross
Fiscal Officer

Neely Lehman
Administrative Specialist

Deb Schroeder
Secretary

Patti Thrasher
Grant Program Coordinator

Research Portfolio

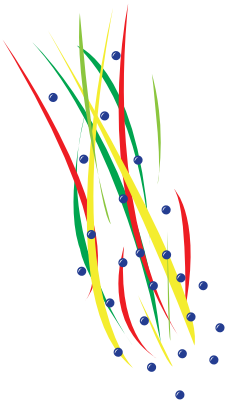


Bioengineering and Translational Health

Faculty researchers: Tim Bigelow, Nastaran Hashemi, Ming-Chen Hsu, Jaime Juarez, Adarsh Krishnamurthy, Ming Lu, Juan Ren, Cris Schwartz, Pranav Shrotriya, and Eliot Winer.

Nanoscale Sciences

Faculty researchers: Ganesh Balsubramanian, Nastaran Hashemi, Shan Hu, Jaime Juarez, Ming Lu, Sonal Padalkar, Juan Ren, Pranav Shrotriya, Travis Sippel, and Sriram Sundararajan.

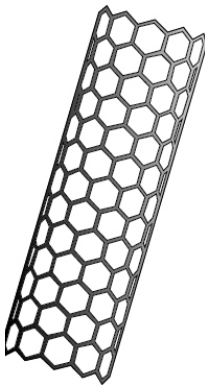


Energy Sciences and Sustainability

Faculty researchers: Xianglan Bai, Ganesh Balsubramanian, Robert Brown, Mark Bryden, Baskar Ganapathysubramanian, Ted Heindel, Shan Hu, Atul Kelkar, Song-Charn Kong, James Michael, Sonal Padalkar, Travis Sippel, and Mark Wright.

Multiphase Flow and Complex Fluids

Faculty researchers: Nastaran Hasemi, Ted Heindel, Jaime Juarez, Song-Charng Kong, James Michael, Alberto Passalacqua, and Travis Sippel.

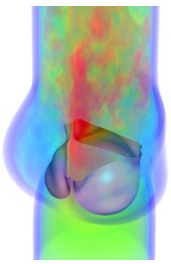


Design and Manufacturing

Faculty researchers: Emmanuel Agba, Tim Bigelow, Caroline Hayes, Ming-Chen Hsu, Chao Hu, Gap-Yong Kim, Adarsh Krishnamurthy, Cris Schwartz, Pranav Shrotriya, Sriram Sundararajan, and Eliot Winer.

Dyanamic Systems, Sensors, and Controls

Faculty researchers: Sourabh Bhattacharya, Shan Hu, Atul Kelkar, Greg Lucke, Juan Ren and Soumik Sarkar.



Computational Sciences and Visualization

Faculty researchers: Sourabh Bhattacharya, Mark Bryden, Baskar Ganapathysubramanian, Ming-Chen Hsu, Chao Hu, Atul Kelkar, Song-Charng Kong, Adarsh Krishnamurthy, Soumik Sarkar, Cris Schwartz, and Eliot Winer.

Publications

Peer-Reviewed Journal Publications

D. Attinger, Y. Takata, "Selected papers from the 12th International Conference on Nanochannels, Microchannels and Minichannels," Heat Transfer Engineering, vol. 36, pp. 1-5, 2015.

C. Hurth, R. Bhardwaj, S. Andalib, C. Frankiewicz, A. Dobos, **D. Attinger**, and F. Zenhausern, "Biomolecular interactions control the shape of stains from drying droplets of complex fluids," Chemical Engineering Science, vol. 137, pp. 398-403, 2015.

Xue, Y., Kelkar, A., **Bai, X.**, (2016), Catalytic co-pyrolysis of biomass and polyethylene in a tandem micropyrolyzer, Fuel, 166, 227-236. (Published online)

Ghosh, A., Brown, R. C., **Bai, X.** (2016) Production of solubilized carbohydrate from cellulose using non-catalytic, supercritical depolymerization in polar aprotic solvents, Green Chemistry, DOI: 10.1039/C5GC02071A. (Pulished online)

Zhou, S., Brown, R. C., **Bai, X.**, (2015) The use of calcium hydroxide pretreatment to overcome agglomeration of technical lignin during fast pyrolysis, Green Chemistry, 17, 4748-4759.

Kim, K., **Bai, X.**, Cady, S., Gable, P., Brown, R. C., (2015) Quantitative Investigation of Free Radicals in Bio-Oil and their Potential Role in Condensed-Phase Polymerization, ChemSusChem, 8 (5), 894-900.

Xue, Y., Zhou, S., Brown, R. C., Kelkar, A., **Bai, X.** (2015), Fast pyrolysis of biomass and waste plastics in fluidized bed reactor, Fuel, 156, 40-46.

Y. S. Choi, R. Singh, J. Zhang, **G. Balasubramanian**, M. R. Sturgeon, R. Katahira, G. Chupka, G. T. Beckham and B. H. Shanks, "Pyrolysis reaction networks for lignin model compounds: Unraveling thermal deconstruction of [Beta]-O-4 and [Alpha]-O-4 compounds", Green Chemistry, DOI: 10.1039/C5GC02268A (in press), 2015.

R. Singh, O. Sanchez, S. Ghosh, N. Kadimcherla@, S. Sen and **G. Balasubramanian**, "Viscosity of magnetitetoluene nanofluids: Dependence on temperature and nanoparticle concentration", Physics Letters A, 379 (40-41), 2641-2644, 2015.

R. Singh, M.C. Böhm and **G. Balasubramanian**, "Energetic and structural properties of different conformations of merocyanine and its protonated forms", Chemical Physics Letters, 633, 287-291, 2015.

G. Warnell, **S. Bhattacharya**, R. Chellappa and T. Basar. Adaptive-Rate Compressive Sensing Using Side Information, In IEEE Transactions on Image Processing, 24(11):3846-3857, November, 2015.

R. Zou, V. Kalivarapu, E. Winer, J.Oliver and **S. Bhattacharya**, Particle Swarm Optimization Based Source Seeking. IEEE Transactions on Automation Science and Engineering, 2(3): 865-875, 2015.

B.L. McFarlin , V. Kumar, **T.A. Bigelow**, D.G. Simpson, R.C. White-Traut, J.S. Abramowicz, and W.D. O'Brien Jr, "Beyond Cervical Length: A Pilot Study of Ultrasonic Attenuation for Early Detection of Preterm Birth Risk", Ultrasound Med. & Biol., 41, 3023-3029 (2015)

B.L. McFarlin , J. Balash, V. Kumar, **T.A. Bigelow**, X. Pombar, J.S. Abramowicz, and W.D. O'Brien Jr, "Development of an ultrasonic method to detect cervical remodeling in vivo in full term pregnant women", Ultrasound Med. & Biol., 41, 2533-2539 (2015)

V. Kumar, **T.A. Bigelow**, K. Mullin, D.S. Sakaguchi, "Correlation of hemorrhage near developing opossum skull to pulsed ultrasound exposure parameters", Journal of Ultrasound in Medicine, 34, 1351-1361 (2015)

J. Xu, **T.A. Bigelow**, G.Davis, A. Avendano, P. Shrotriya, K. Bergler, and Z. Hu "Dependence of ablative ability of high-intensity focused ultrasound cavitation-based histotripsy on mechanical properties of agar," J. Acoust. Soc. Am., 136, 3018-3027 (2014)

G. Riesberg, **T.A. Bigelow**, D.J. Stessman, M.H. Spalding, L. Yao, T. Wang, and J. Xu, "Flow rate and duty cycle effects in lysis of Chlamydomonas reinhardtii using high-energy pulsed focused ultrasound," J. Acoust. Soc. Am., 135, 3632-3638 (2014)

T.A. Bigelow, J. Xu, D.J. Stessman, L. Yao, M.H. Spalding, and T. Wang, "Lysis of Chlamydomonas Reinhardtii by high-intensity focused ultrasound as a function of exposure time," Ultrasonics Sonochemistry, 21, 1258-1264 (2014)

Haverly, M. R., Whitmer, L. E., **Brown, R. C.** (2015) Evaluation of polymer compatibility with bio-oil produced from thermochemical conversion of biomass, Energy & Fuels 29, 7993-7997.

Zhao, X., Davis, K., **Brown, R. C.**, Jarboe, L., Wen, Z. (2015) Alkaline treatment for detoxification of acetic acid-rich pyrolytic bio-oil for microalgae fermentation: effects of alkaline species and the detoxification mechanisms, Biomass and Bioenergy 80, 203-212.

Zhou, S., **Brown, R. C.**, and Bai, X. (2015) The use of calcium hydroxide pretreatment to overcome agglomeration of technical lignin during fast pyrolysis, Green Chemistry 17, 4748-4759.

Kolakaluri, R., Murphy, E., Subramaniam, S., **Brown, R. C.**, Fox, R. O., (2015) Filtration model for polydisperse aerosols in gas-solid flow using granule-resolved direct numerical simulation, AIChE J. 61, 3594-3606.

Gable, P., **Brown, R. C.** (2015) Effect of biomass heating time on bio-oil yields in a free fall fast pyrolysis reactor, Fuel 166, 361-366.

Choi, Y. S., Lee, K. H., Zhang, J., **Brown, R. C.**, Shanks, B. (2015) Manipulation of chemical species in bio-oil using in situ catalytic fast pyrolysis in both a bench-scale fluidized bed pyrolyzer and micropyrolyzer, Biomass and Bioenergy 81, 256-264.

Li, B., Ou, L., Dang, Q., Meyer, P., Jones, S., **Brown, R.**, and Wright, M., Techno-economic and uncertainty analysis of in situ and ex situ fast pyrolysis for biofuel production, Bioresource Technology 196, 49-56.

Broer, K.M., Johnston, P. A., Haag, A., **Brown, R.C.** (2015) Resolving inconsistencies in measurements of hydrogen cyanide in syngas, Fuel 140, 97-101.

Kolakaluri, R., Murphy, E., Subramaniam, S., **Brown, R. C.**, Fox, R. O. (2015) Filtration model for polydisperse aerosols in gas-solid flow using granule-resolved direct numerical simulation, AIChE J 61, 3594-3606.

Li, B., Ou, L., Dang, Q., Meyer, P., Jones, S., **Brown, R. C.**, Wright, M., Techno-economic and uncertainty analysis of in situ and ex situ fast pyrolysis for biofuel production, Bioresource Technology 196, 49-56.

del Campo, B. G., Morris, M. D., Laird, D. A., Kieffer, M. M., **Brown, R. C.** (2015) Optimizing production of activated carbon from fast pyrolysis char, Technology 3, 104-113.

Wang, K., Zhang, J., Shanks, B.H., **Brown, R.C.** (2015) The deleterious effect of inorganic salts on hydrocarbon yields from catalytic pyrolysis of lignocellulosic biomass and its mitigation, Applied Energy 148, 115-120.

Elliott, D. C., Wang, H., Whitmer, L., Rover, M., Smith, R., and **Brown, R. C.** (2015) Hydrocarbon liquid production via catalytic hydroprocessing of phenolic oligomers fractionated from fast pyrolysis of red oak and corn stover, ACS Sustainable Chemistry and Engineering 3, 892-902.

S. Aramideh, Q. Xiong, **Brown, R. C.**, Kong, S.-K. (2015) Numerical simulation of biomass fast pyrolysis in an auger reactor, Fuel 156, 234-242.

Wang, K., Ou, L., Brown, T., and **Brown, R. C.** (2015) Beyond ethanol: a techno-economic analysis of an integrated corn biorefinery for the production of hydrocarbon fuels and chemicals, BioFPR 9, 190-200.

Zhang J., Choi Y., Yoo C., Kim T., **Brown R.C.**, Shanks B. (2015) Cellulose–hemicellulose and cellulose–lignin interactions during fast pyrolysis, ACS Sustainable Chemistry & Engineering 3, 293–301.

Xue, Y., Zhou, S., Kelkar, A., **Brown, R. C.**, Bai, X. (2015) Fast pyrolysis of biomass and waste plastic in a fluidized bed reactor, Fuel 156, 40-46.

Woolcock, P., Koziel, J., **Brown, R.**, Johnston, P., Brown, R. C., Broer, K. (2015) Analysis of trace contaminants in hot gas streams using time-weighted average solid-phase microextraction: Pilot-scale validation, Fuel 153, 552-558.

Rover, M.R., Hall, P.H., Johnston, P.A., Smith, R.G., **Brown, R.C.** Stabilization of bio-oils using low temperature, low pressure hydrogenation (2015) Fuel 153, 224-230.

Kim, K. H., Bai, X. Cady, S., Gable, P., **Brown, R. C.** (2015) A quantitative investigation of free radicals in bio-oil and their potential role in condensed phase polymerization of cellulose- and lignin-derived pyrolysates, ChemSusChem 8, 894–900.

Ou, L., Thilakaratne, R., **Brown, R. C.** and Wright, M. M. (2015) Techno-economic analysis of transportation fuels from defatted microalgae via hydrothermal liquefaction and hydroprocessing, Biomass and Bioenergy 72, 45-54.

Daugaard, T., Mutti, L. A., Wright, M. W., **Brown, R. C.**, Componation, P. (2015) Learning rates and their impacts on the optimal capacities and production costs of biorefineries, BioFPR 9, 82-94, DOI: 10.1002/bbb.1513.

Wang, W., Zhang, J., Shanks, B. H., **Brown, R. C.** (2015) Catalytic conversion of carbohydrate-derived oxygenates over HZSM-5 in a tandem micro-reactor system, Green Chemistry 17, 557-564, DOI: 10.1039/C4GC01784F.

Liu, G., Wright, M. W., Zhao, Q., **Brown, R. C.** (2015) Catalytic fast pyrolysis of duckweed: Effects of pyrolysis parameters and optimization of aromatic production, Journal of Analytical and Applied Pyrolysis 112, 29-36.

Shen, Y., Jarboe, L., **Brown, R.**, Wen, Z. (2015) A thermochemical-biochemical hybrid processing of lignocellulosic biomass for producing fuels and chemicals, Biotechnology Advances 33, 1799-1813.

S. Suram+ and K. M. Bryden, "Integrating a Reduced-Order Model Server into the Engineering Design Process," Advances in Engineering Software, 90:169–182 (2015).

N. A. MacCarty+ and **K. M. Bryden**, "A Unified Set of Experimental Data for Cylindrical, Natural Draft, Shielded, Single Pot, Wood-Fired Cookstoves," Energy for Sustainable Development, 26:62–71 (2015).

N. A. MacCarty+ and **K. M. Bryden**, "Modeling of Household Biomass Cookstoves: A Review," Energy for Sustainable Development, 26:1–13 (2015).

N. G. Johnson+ and **K. M. Bryden**, "Field-based Safety Guidelines for Solid Fuel Household Cookstoves in Developing Countries," Energy for Sustainable Development, 25:56–66 (2015).

A. C. Velivelli* and **K. M. Bryden**, "Domain Decomposition Based Coupling Between the Lattice Boltzmann Method and Traditional CFD Methods - Part II: Numerical Solution to the Backward Facing Step Flow," Advances in Engineering Software, 82:65–74 (2015).

Bastawros, A. F., **Chandra, A**. and Poosarla, P. A., 2015, Atmospheric Pressure Plasma Enabled Polishing of Single Crystal Sapphire, Annals of CIRP, vol. 64, no. 1, pp.515-518.

Chandra A, Kar O., 2015, Data-driven prognosis: a multi-physics approach verified via balloon burst experiment. Proc. R. Soc. A 471: 20140525.

Chandra, A., Kar, O., Wu, K-C., Hall, M., and Gillette, J., 2015, Prognosis of anterior cruciate ligament reconstruction: a data-driven approach. Proc. R. Soc. A 471: 20140526.

Chandra, A., Bastawros, A. F., Wu, K-C. and Karra, P., 2015, Mixed Strategy Combination of Pressure and Velocity Control for Chemical Mechanical Planarization of Patterned Wafers, ECS J.

Solid State Science & Technology, The Electrochemical Soc., vol. 4, no.11, P5105-P5111

K. M. Marr, B. Chen, E.J. Mootz, J. Geder, M. Pruessner, B.J. Melde, R.R. Vanfleet, I.L. Medintz, B.D. Iverson, and **J.C. Claussen**, High Aspect Ratio Carbon Nanotube Membranes Decorated with Pt Nanoparticle Urchins for Micro Underwater Vehicle Propulsion via H2O2 Decomposition, ACS Nano, 9, 8, 2015. 2014.

S. Ding, A.A. Cargill, I.L. Medintz, **J.C. Claussen**, Increasing the Activity of Immobilized Enzymes with Nanoparticle Conjugation, Curr. Opin. Biotechnol., 34, 2015. 2014.

S. Ding, A.A. Cargill, I.L. Medintz, **J.C. Claussen**, Biosensing with Förster Resonance Energy Transfer Coupling between Fluorophores and Nanocarbon Allotropes, Sensors, 15, 6 2015 2014.

J.C. Claussen, A. Malanoski, J.C. Breger, E. Oh, S.A. Walper, K. Susumu, R. Goswami, J.R. Deschamps, I.L. Medintz, Probing the Enzymatic Activity of Alkaline Phosphatase within Quantum Dot Bioconjugates, The J. Phys. Chem. C., 9, 8, 2015, 2014.

AD Fontanini, U Vaidya, **B Ganapathysubramanian**, "Constructing Markov matrices for real-time transient contaminant transport analysis for indoor environments", Building and Environment 94, 68-81, 2015

A Singh, **B Ganapathysubramanian**, AK Singh, S Sarkar, "Machine Learning for High-Throughput Stress Phenotyping in Plants", Trends in plant science, 2015

RS Gebhardt, P Du, A Peer, M Rock, MR Kessler, R Biswas, **B. Ganapathysubramanian**, S. Chaudhary, "Utilizing Wide Band Gap, High Dielectric Constant Nanoparticles as Additives in Organic Solar Cells", The Journal of Physical Chemistry C 119 (42), 23883-23889, 2015

A Aboulhassan, D Baum, O Wodo, **B Ganapathysubramanian**, A Amassian, M Hadwiger, "A Novel Framework for Visual Detection and Exploration of Performance Bottlenecks in Organic Photovoltaic Solar Cell Materials", Computer Graphics Forum 34 (3), 401-410, 2015

KG Lore, D Stoecklein, M Davies, **B Ganapathysubramanian**, S Sarkar, "Hierarchical Feature Extraction for Efficient Design of Microfluidic Flow Patterns", Journal of Machine Learning Research, 44 (2015).

D Stoecklein, CY Wu, D Kim, D Di Carlo, **B Ganapathysubramanian**, "Optimization of micropillar sequences for fluid flow sculpting", Physics of Fluids, in press, 2015

Kui Zhao, Olga Wodo, Dingding Ren, Hadayat Ullah Khan, Muhammad Rizwan Niazi, Hanlin Hu, Maged Abdelsamie, Ruipeng Li, Erqiang Li, Liyang Yu, Buyi Yan, Marcia M. Payne, Jeremy Smith, John E. Anthony, Thomas D. Anthopoulos, Sigurdur Thoroddsen, **Baskar Ganapathysubramanian**, and Aram Amassian, "Vertical Phase Separation in Small Molecule:Polymer Blend Organic Thin Film Transistors Can Be Dynamically Controlled", Advanced Functional materials, in press, 2015

A. D. Fontanini, Umesh Vaidya, **Baskar Ganapathysubramanian**, "A methodology for optimal placement of sensors in enclosed environments: A dynamical systems approach", Building and Environment, in press, 2015.

A.D. Fontanini, J. Kosny, N. Shukla, A. Fallahi, **B. Ganapathysubramanian**, "Development and verification of the Fraunhofer Attic Thermal Model (FATM)", Journal of Building Performance Simulation, in press, 2015.

J. Kosny, A.D. Fontanini, N. Shukla, A. Fallahi, M. Kehrer, A. Watts, **B. Ganapathysubramanian**, J. Atchley, R. Trifu, "Thermal Performance Analysis of Residential Attic Containing High Performance, Aerogel-Based Radiant Barrier," Energy and Buildings, 2015, accepted for publication.

Y. Xie, O. Wodo, **B. Ganapathysubramanian**, "A diffuse interface model for incompressible two-phase flow: stabilized finite element method for large density ratios, grid resolution study, and 3D patterned substrate wetting problem", Computers and Fluids, Accepted for publication (2016)

O. Wodo, J. Zola, B. S.S. Pokuri, P. Du, **B. Ganapathysubramanian**, "Automated, high throughput exploration of process–structure–property relationships using the MapReduce paradigm", Materials Discovery, in press, 2015

Tony Fast; Olga Wodo; **Baskar Ganapathysubramanian**; Surya R Kalidindi, "Microstructure Taxonomy based on Spatial Correlations: Application to Microstructure Coarsening", Acta Materialia, accepted for publication, 2016

J. Pace, C. Gardner, C. Romay, **B. Ganapathsubramanian**, T. Lübberstedt, "Genome-wide association analysis of seedling root development in maize (Zea mays L.)", BMC Genetics, accepted for publication (2015)

D. Kipp, O. Wodo, **B. Ganapathysubramanian**, V. Ganesan, "Achieving Bicontinuous Microemulsion Like Morphologies in Organic Photovoltaics", ACS Macro Letters, accepted for publication (2015)

C. Meis, R. Montazami, and **N. Hashemi**, "Ionic Electroactive Polymer Actuators as Active Microfluidic Mixers", Analytical Methods, DOI: 10.1039/C5AY01061F (2015)

S. Cinar, R. Jamshidi, Y. Chen, **N. Hashemi**, and R. Montazami, "Study of Mechanics of Physically Transient Electronics: A Step Toward Controlled Transiency", Journal of Polymer Science, Part B: Polymer Physics, DOI: 10.1002/polb.23941 (2015)

R. Jamshidi, S. Cinar, Y. Chen, **N. Hashemi**, and R. Montazami, "Transient Bioelectronics: Electronic Properties of Silver Microparticle-based Circuits on Polymeric Substrates Subjected to Mechanical Load", Journal of Polymer Science, Part B: Polymer Physics, 53, 1603-1610 (2015)

F. Sharifi, S. Ghobadian, F. Cavalcanti, and **N. Hashemi**, "Paper-Based Devices for Energy Applications", Renewable & Sustainable Energy Reviews, 52, 1453-1472 (2015) (Impact Factor 5.9)

P.J. Goodrich, F. Sharifi, and **N. Hashemi**, "Rapid Prototyping of Microchannels with Surface Patterns for Fabrication of Polymer

Fibers", RSC Advances, 5, 71203-71209 (2015)

J.D. Caplin, N.G. Granados, M.R. James, R. Montazami, and **N. Hashemi**, "Microfluidic Organ-on-a-Chip Technology for Advancement of Drug Development and Toxicology", Advanced Healthcare Materials, 4, 1426-1450 (2015) (Impact Factor 5.8)

P. Asrar, M. Sucur, and **N. Hashemi**, "Multi-Pixel Photon Counters for Optofluidic Characterization of Particles and Microalgae", Biosensors, 5, 308-318 (2015)

Y. Xie, Z. Xu, S. Xu, Z. Cheng, **N. Hashemi**, C. Deng, and X. Wang, "Defect level and ideal thermal conductivity of graphene uncovered by residual thermal reffusivity at 0 K limit", Nanoscale, 7, 10101-10110 (2015)

F. Sharifi and **N. Hashemi**, "An Analysis of Current and Future Wind Energy Gain Potential for Central Iowa", Journal of Thermal Engineering, 1, 245-250 (2015)

M.-C. Hsu*, D. Kamensky+, F. Xu+, J. Kiendl, C. Wang+, M.C.H. Wu+, J. Mineroff+, A. Reali, Y. Bazilevs, M.S. Sacks, Dynamic and fluid–structure interaction simulations of bioprosthetic heart valves using parametric design with T-splines and Fung-type material models, Computational Mechanics, 55 (2015) 1211-1225.

D. Kamensky+, J.A. Evans, **M.-C. Hsu***, Stability and conservation properties of collocated constraints in immersogeometric fluid–thin structure interaction analysis, Communications in Computational Physics, 18 (2015) 1147-1180.

J. Kiendl*, **M.-C. Hsu**, M.C.H. Wu+, A. Reali, Isogeometric Kirchhoff–Love shell formulations for general hyperelastic materials, Computer Methods in Applied Mechanics and Engineering, 291 (2015) 280-303.

M.-C. Hsu*, C. Wang+, A.J. Herrema+, D. Schillinger, A. Ghoshal, Y. Bazilevs, An interactive geometry modeling and parametric design platform for isogeometric analysis, Computers & Mathematics with Applications, 70 (2015) 1481-1500.

D. Kamensky+, **M.-C. Hsu***, D. Schillinger, J.A. Evans, A. Aggarwal, Y. Bazilevs, M.S. Sacks, T.J.R. Hughes, An immersogeometric variational framework for fluid–structure interaction: application to bioprosthetic heart valves, Computer Methods in Applied Mechanics and Engineering, 284 (2015) 1005-1053. (Highly Cited Paper§)

D. Schillinger*, J.A. Evans, F. Frischmann, R.R. Hiemstra , **M.-C. Hsu**, T.J.R. Hughes, A Collocated C0 Finite Element Method: Reduced quadrature perspective, cost comparison with standard finite elements, and explicit structural dynamics, International Journal for Numerical Methods in Engineering, 102 (2015) 576-631.

Hu C., Jain G., Schmidt C., Strief C., and Sullivan M., "Online Estimation of Lithium-Ion Battery Capacity Using Sparse Bayesian Learning," Journal of Power Sources, v289, p105–113, 2015.

Hu C., Youn B.D., Kim T., and Wang P., "A Co-Training-Based Approach for Prediction of Remaining Useful Life Utilizing both Failure and Suspension Data," Mechanical Systems and Signal Processing, v62–63, p75–90, 2015.

Youn B.D., Park K.M., **Hu C.**, Yoon, J.T., and Bae Y.C., "Statistical Health Reasoning of Power Generator Stator Windings against Moisture Absorption," Accepted, IEEE Transactions on Energy Conversion, 2015.

Bai G., Wang P., and **Hu C.**, "A Self-Cognizant Dynamic System Approach for Prognostics and Health Management," Journal of Power Sources, v278, p163–174, 2015.

Xue, Y., Zhou, S., Brown, R. C., **Kelkar, A.**, & Bai, X. (2015). Fast pyrolysis of biomass and waste plastic in a fluidized bed reactor. Fuel, 156, 40-46.

Xue, Y., **Kelkar, A.**, & Bai, X. (2015). Catalytic co-pyrolysis of biomass and polyethylene in a tandem micropyrolyzer. Fuel

David Asjes, Amit Diwadkar, Umesh Vaidya, and **Atul Kelkar**, Development and System Analysis of a Two-Dimensional Rotational Freeplay Nonlinearity Model, doi: 10.2514/1.C033275, AIAA Journal of Aircraft, 2015.

Wu, Y.+ and **Kim, G.Y.***, "Compaction behavior of Al6061 and SiC binary powder mixture in the mushy state," Journal of Materials Processing Technology, vol. 216, pp. 484-491, 2015.

Mousa, S.+ and **Kim, G.Y.***, "Experimental study on warm roll bonding of metal/polymer/metal multilayer composite," Journal of Materials Processing Technology, vol. 222, pp. 84-90, 2015

Bastwros, M.+ and **Kim, G.Y.***, "Fabrication of aluminum-SiC laminate nanocomposite by ultrasonic spray deposited sheet bonding," ASME Journal of Micro and Nano-Manufacturing, vol. 3(3), 031005, 2015.

Aramideh^, S., Xiong^, Q., **Kong, S.-C.**, Brown, R.C. "Numerical Simulation of Biomass Fast Pyrolysis in an Auger Reactors," Fuel, 156, pp. 234–242 (2015)

Banerjee^, S., Tiarks^, J.A., **Kong, S.-C.** "Modeling Biomass Gasification System using Multistep Kinetics under Various Oxygen-Steam Conditions" Environmental Progress & Sustainable Energy, 34, pp. 1148–1155 (2015)

Xiong^, Q., Aramideh^, S., Passalacqua, A., **Kong, S.-C.**, "Characterizing Effects of the Shape of Screw Conveyors in Gas-Solid Fluidized Beds Using Advanced Numerical Models," ASME Journal of Heat Transfer, Vol. 137, 061008:1 – 7 (2015)

Meoli Alessio, Elena Cutrì, **Adarsh Krishnamurthy**, Gabriele Dubini, Francesco Migliavacca, Tain-Yen Hsia, Giancarlo Pennati, *"A Multiscale Model for the Study of Cardiac Biomechanics in the Single-Ventricle Surgeries: A Clinical Case,"* Interface Focus, Vol. 5, No. 2, 2015.

Hwang Y.S. and **Levitas V.I.** Coupled phase field, heat conduction, and elastodynamic simulations of kinetic superheating and nanoscale melting of aluminum nanolayer irradiated by picosecond laser. Physical Chemistry Chemical Physics, 2015, Vol. 17, 31758-31768. Impact Factor (IF): 4.493

Levitas V.I. and Warren J. A. Thermodynamically consistent

phase field theory of phase transformations with anisotropic interface energies and stresses. Physical Review B, 2015, Vol. 92, No. 14, 144106, 16 pages. IF: 3.736

Levitas V.I. and Javabakht M. Interaction between phase transformations and dislocations at the nanoscale. Part 1. General phase field approach. Journal of the Mechanics and Physics of Solids, 2015, Vol. 82, 287-319. IF: 3.598

Javabakht M. and **Levitas V.I.** Interaction between phase transformations and dislocations at the nanoscale. Part 2. Phase field simulation examples. Journal of the Mechanics and Physics of Solids, 2015, Vol. 82, 164–185. IF: 3.598

Momeni K and **Levitas V.I.** A Phase-Field Approach to Solid-Solid Phase Transformations via Intermediate Interfacial Phases under Stress Tensor. International Journal of Solids and Structures, 2015, Vol. 71, 39-56. IF: 2.214

Levitas, V.I., McCollum, J., Pantoya, M., and Tamura N. Internal Stresses in Pre-Stressed Micron-Scale Aluminum Core-Shell Particles and Their Improved Reactivity. Journal of Applied Physics, 2015, Vol. 118, No. 9, 094305. IF: 2.183

Levitas V.I. and Javabakht M. Thermodynamically consistent phase field approach to dislocation evolution at small and large strains. Journal of the Mechanics and Physics of Solids, 2015, Vol. 82, 345-366. IF: 3.598

Levitas V.I. and Roy A.M. Multiphase phase field theory for temperature- and stress-induced phase transformations. Physical Review B, 2015, Vol. 91, No.17, 174109. IF: 3.736

Momeni K, **Levitas V.I.**, and Warren, J.A. The strong influence of internal stresses on the nucleation of a nanosized, deeply undercooled melt at a solid-solid interface. Nano Letters, 2015, Vol. 15, No. 4, 2298-2303. IF: 13.592

Levitas, V.I., McCollum, J. and Pantoya, M. Pre-Stressing Micron-Scale Aluminum Core-Shell Particles to Improve Reactivity. Scientific Reports, 2015, Vol. 5, 7879, 6 pages. IF: 5.578

Levitas V.I. and Javanbakht M. Interaction of phase transformations and plasticity at the nanoscale: phase field approach. Materials Today: Proceedings 2S, 2015, S493-S498.

Novikov N.V., Shvedov L.K., Krivosheya Yu. N., **Levitas, V.I.** New Automated Shear Cell with Diamond Anvils for in situ Studies of Materials Using X-ray Diffraction. Journal of Superhard Materials, 2015, Vol. 37, No. 1, 1-7.

Tarey, P. and **Levitas, V.** I. Prediction of the Mechanical Erosion Rate Decrement for Carbon-Composite Nozzle by using the Nano-Size Additive Aluminum Particle. Journal of the Korean Society of Propulsion Engineers, 2015, Vol. 19, No. 6, 42-53.

Murugesan, R. and **Levitas, V**. I. Molecular Level Understanding of Chemical Erosion on Graphite Surface using Molecular Dynamics Simulations. Journal of the Korean Society of Propulsion Engineers, 2015, Vol. 19, No. 6, 54-63.

B. Lograsso, "Physical Matching of Metals: Grain Orientation Association at Fracture Edge", Journal of Forensic Sciences, 2015, Vol. 60 pp.S66-S75

Q. Wang, L. Liu+, Y. Wang+, P. Liu, H. Jiang, Z. Xu, Z. Ma, **M. Lu**, and L. Dong, "Tunable optical nanoantennas incorporating bowtie nanoantenna arrays with stimuli-responsive polymer," Scientific Reports, 5,18567 (2015)

Y. Wang+, Y. Huang+. J. Xun, S. Pandey, and **M. Lu***, "Guided-mode-resonance-enhanced measurement of thin-film absorption," Optics Express, 23, 28567-28573 (2015).

Z. Mu, X. Zhao, Y. Huang+, **M. Lu***, and Z. Gu, "Detection of multiple proteins by plasmonic nanoparticle staining in ordered porous hydrogels," Small, 11, 6036-6043 (2015).

X. Zhao, J. Xue, Z. Mu, Y. Huang+, **M. Lu***, and Z. Gu,"Gold nanoparticle incorporated inverse opal photonic crystal capillaries for optofluidic surface enhanced Raman Spectroscopy," Bioelectronics and Biosensors 72, 268-274 (2015).

Z. Chen, L. Liu+, S. Xu, **M. Lu**, and X. Wang, "Temperature dependence of electrical and thermal conduction in single silver nanowire," Scientific Reports 5, 10718 (2015).

M. R. Gartia, S. Seo, J. Kim, T.W. Chang, G. Bahl, **M. Lu***, G. L. Liu, and J. G. Eden, "Injection-seeded optoplasmonic amplifier in the visible," Scientific Reports 4, 6168 (2014).

J. Ding, B. Arigong, H. Ren, M. Zhou, J. Shao, **M. Lu**, Y. Chai, Y. Lin, H. Zhang, "Tuneable complementary metamaterial structures based on graphene for single and multiple transparency windows," Scientific Reports 4, 6128 (2014)

M. Zhang, **M. Lu**, G. Chun, and B. T. Cunningham, "Plasmonic external cavity laser refractometric Sensor," Optics Express 22, 20347-20357 (2014).

Y. Zhao+, K. Liu+, J. McClelland, and **M. Lu***, "Enhanced photoacoustic detection using pho- tonic crystal substrate," Applied Physics Letters 104, 161110 (2014).

A. Pokhriyal, **M. Lu**, C. Ge, and B. T. Cunningham, "Coupled external cavity photonic crystal enhanced fluorescence," Journal of Biophotonics 7, 332-340 (2014).

L. Liu+, Z. Xu, L. Dong, and **M. Lu***, "An angular spectrum detection instrument for label-free photonic crystal sensors," Optics Letters 39, 2751- 2754 (2014).

Y. Zhuo, H. Hu, W. Chen, **M. Lu**, L. Tian, H. Yu, K. D. Long, E. Chow, W. P. King, S. Singamaneni, and B. T. Cunningham, "Single nanoparticle detection using photonic crystal enhanced microscopy," Analyst 139, 1007-1015 (2014).

Y Li, G Hu, **MM Wright**, An optimization model for sequential fast pyrolysis facility location-allocation under renewable fuel standard, Energy 93, 1165-1172 2015

W Hu, Q Dang, M Rover, RC Brown, **MM Wright***, Comparative techno-economic analysis of advanced biofuels, biochemicals, and hydrocarbon chemicals via the fast pyrolysis platform, Biofuels, 1-17 2015

B Li, L Ou, Q Dang, P Meyer, S Jones, R Brown, **MM Wright***,, Techno-economic and uncertainty analysis of in situ and ex situ fast pyrolysis for biofuel production, Bioresource technology 196, 49-56 2015

Q Dang, **MM Wright***, RC Brown, Ultra-Low Carbon Emissions from Coal-Fired Power Plants through Bio-Oil Co-Firing and Biochar Sequestration, Environmental science & technology 49 (24), 14688-14695 2015

M Mba Wright, N Seifkar, WH Green, Y Roman-Leshkov, Natural Gas and Cellulosic Biomass: a Clean Fuel Combination? Determining the Natural Gas Blending Wall in Biofuel Production, Environmental science & technology 2015

G Liu, **MM Wright***, Q Zhao, RC Brown, Catalytic fast pyrolysis of duckweed: Effects of pyrolysis parameters and optimization of aromatic production, Journal of Analytical and Applied Pyrolysis 112, 29-3622015

L Ou, R Thilakaratne, RC Brown, **MM Wright***, Techno-economic analysis of transportation fuels from defatted microalgae via hydrothermal liquefaction and hydroprocessing, Biomass and Bioenergy 72, 45-5442015

DSA Simakov, **MM Wright**, S Ahmed, EMA Mokheimer, Y Román-Leshkov, Solar thermal catalytic reforming of natural gas: a review on chemistry, catalysis and system design, Catalysis Science & Technology 5 (4), 1991-20163 2015

Miles, R and **J Michael**, C Limbach, S McGuire, TL Chng, M Edwards, N DeLuca, M Shneider, and A Dogariu, "New Diagnostic Methods for Laser-induced Plasmas and Microwave-Enhanced Combustion," Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences, Vol 373, (2015).

Michael J, P Venkateswaran, C Shaddix, and T Meyer, "Effects of repetitive pulsing on multi-kHz planar laser-induced incandescence imaging in laminar and turbulent flames," Applied Optics, Vol 54, 3331-3344 (2015).

C. Meis, **R. Montazami**, and N. Hashemi, "Ionic Electroactive Polymer Actuators as Active Microfluidic Mixers", Analytical Methods, DOI: 10.1039/C5AY01061F (2015)

S. Çinar, R. Jamshidi, Y. Chen, N. Hashemi, **R. Montazami**, "Study of Mechanics of Physically Transient Electronics: A Step Toward Controlled Transiency", Journal of Polymer Science, Part B: Polymer Physics, DOI: 10.1002/polb.23941 (2015)

R. Jamshidi, S. Cinar, Y. Chen, N. Hashemi, **R. Montazami**, "Transient bioelectronics: Electronic properties of silver microparticle-based circuits on polymeric substrates subjected to mechanical load", Journal of Polymer Science Part B: Polymer Physics, 53 (22), 1603-1610 (2015)

R. Zhang, Y. Chen, **R. Montazami**, "Ionic Liquid-Doped Gel Polymer Electrolyte for Flexible Lithium-ion Polymer Batteries", Materials, 8 (5), 2735-2748 (2015)

J. Caplin, N.G. Granados+, M. James, **R. Montazami**, N. Hashemi, "Microfluidic Organ-on-a-Chip Technology for Advancement of Drug Development and Toxicology", Advanced Healthcare Materials, 4 (10), 1426-1450 (2015)

R. Radkowski, J. Herrema and **J.H. Oliver**, "Evaluation of Augmented Reality Visual Annotations Based on Task Difficulty," International Journal of Human-Computer Interaction, Vol. 31, No. 5, pp. 337-349, May 2015

R. Zou, V. Kalivarapu, E. Winer, **J. Oliver** and S. Bhattacharya, "Particle Swarm Optimization Based Source Seeking," IEEE Transactions on Automation Science and Engineering, Vol. 12, No. 3, pp. 865-875, July 2015

Z. Liu, R.O. Fox, J.C. Hill, **M.G. Olsen**, "A Batchelor vortex model for mean velocity of turbulent swirling flow in a macroscale multi-inlet vortex reactor," Journal of Fluids Engineering, 137, 041204 (2015)

Z. Liu, M. Ramezani, R.O. Fox, J.C. Hill, **M.G. Olsen**, "Flow characteristics in a scaled-up multi-inlet vortex nanoprecipitation reactor," Industrial and Engineering Chemistry Research, 54, 4512-4525 (2015)

K. Jansen, B. Kong, R.O. Fox, J.C. Hill, **M.G. Olsen**, "Large eddy simulation of passive scalar transport in a high Schmidt number turbulent incompressible wake with experimental validation," Chemical Engineering Science, 137, 862-874 (2015)

X. Gao, B. Kong, M. Ramezani, **M.G. Olsen**, R.D. Vigil, "An adaptive model for gas-liquid mass transfer in a Taylor vortex reactor," International Journal of Heat and Mass Transfer, 91, 433-445 (2015)

M. Ramezani, B. Kong, X. Gao, **M.G. Olsen**, R.D. Vigil, "Experimental measurement of oxygen mass transfer and bubble size distribution in an air-water multiphase Taylor-Couette vortex bioreactor," Chemical Engineering Journal, 279, 286-296 (2015)

E. Madadi-Kandjani, **A. Passalacqua**, An extended quadrature-based moment method with log-normal kernel density functions, Chemical Engineering Science. 131 (2015) 323–339. doi:10.1016/j.ces.2015.04.005.

Q. Xiong, S. Aramideh, **A. Passalacqua**, S.-C. Kong, Characterizing Effects of the Shape of Screw Conveyors in Gas–Solid Fluidized Beds Using Advanced Numerical Models, J. Heat Transfer. 137 (2015) 061008–061008. doi:10.1115/1.4029864.

P. Berg, C. Roloff, O. Beuing, S. Voss, S.-I. Sugiyama, N. Aristokleous, A. S. Anayiotos, N. Ashton, A. Revell, N. W. Bressloff, A. G. Brown, B. Jae Chung, J. R. Cebral, G. Copelli, W. Fu, A. Qiao, A. J. Geers, S. Hodis, D. Dragomir-Daescu, E. Nordahl, Y. Bora Suzen, M. Owais Khan, K. Valen-Sendstad, K. Kono, P. G. Menon, P. G. Albal, O. Mierka, R. Münster, H. G. Morales, O. Bonnefous, J. Osman, L. Goubergrits, J. Pallares, S. Cito, **A. Passalacqua**, S. Piskin, K. Pekkan, S. Ramalho, N. Marques, S. Sanchi, K. R. Schumacher, J. Sturgeon, H. Švihlová, J. Hron, G. Usera, M. Mendina, J. Xiang, H. Meng, D. A. Steinman, and G. Janiga, The Computational Fluid Dynamics Rupture Challenge 2013—Phase II: Variability of Hemodynamic Simulations in Two Intracra-

nial Aneurysms, Journal of Biomechanical Engineering, 137:12 (2015) 121008.

Paola G. Pittoni, Ya-Chi Lin, Ren-Jing Wang, Teng-Shiang Yu, and Shi-Yow Lin. "Bubbles Entrapment for Drops Impinging on Polymer Surfaces: the Roughness Effect." Experimental Thermal and Fluid Science 62, 2015, pp. 183–191 (IF= 2.080, Q1)

Ren, J., Huang, H., Zheng, X., and Zou, Q. , "Study of the Effects of Anticancer Drugs on the Rate-dependent Elastic Modulus of Human Prostate Cancer Cell using Atomic Force Microscope", PLOS ONE, 10(5): e0126107.

K. G. Lore, D. Stoecklein, M. Davies, B. Ganapathysubramanian and **S. Sarkar**, "Hierarchical Feature Extraction for Efficient Design of Microfluidic Flow Patterns", Journal of Machine Learning Research, December 2015 [NIPS 2015 workshop on Feature Extraction: Modern Questions and Challenges]

A. Singh, B. Ganapathysubramanian, A. K. Singh and **S. Sarkar,** "Machine learning for high throughput stress phenotyping in plants, Trends in Plant Sciences (TIPS), 2015

D. K. Jha, P. Chattopadhyay, **S. Sarkar** and A. Ray, "Path Planning in GPS-denied Environments via Collective Intelligence of Distributed Sensor Networks", International Journal of Control, 2015

S. Bengea, P. Li, **S. Sarkar**, S. Vichik, V. Adetola, K. Kang, F. Leonardi, T. Lovett, A. Kelman, "Fault-Tolerant Optimal Control of a Building Heating, Ventilation and Air Conditioning System, ASHRAE Journal of Science and Technology for the Built Environment (formerly HVAC&R Research)", July, 2015

*Chimata, G.P. and **Schwartz, C.J**.: "Investigation of friction mechanisms in finger pad sliding against surfaces of varying roughness," *Biotribology*, 3 (2015), 11-19. doi:10.1016/j.biotri.2015.09.002

*Darden, M.A. And **Schwartz, C.J**.: "Skin Tribology phenomena associated with reading braille print: the influence of cell patterns and skin behavior on coefficient of friction," *Wear*, 332-333 (2015), 734-741. doi:10.1016/j.wear.2014.12.053

*Chimata, G.P. and **Schwartz, C.J.**: "Investigation Of the effect of the normal load on the incidence of friction blisters in a skin simulant model," *Proc. IMechE, Part J: Journal of Engineering Tribology*, 229 (2015), 266-272. doi: 10.1177/1350650114535569.

*Melaibari, A. A.^; Zhao, J. N.^; Molian, P.; Bushlya, V.; Zhou, J. M.; Stahl, J. E.; Petrusha, I.; **Shrotriya, P.**, Ultrahard boron nitride material through a hybrid laser/waterjet based surface treatment. Acta Mater 2016, 102, 315-322

*Wu, Z.R.^, A.A. Melaibari^, P. Molian, and **P. Shrotriya**, Hybrid CO2 laser/waterjet (CO2-LWJ) cutting of Polycrystalline Cubic Boron Nitride (PCBN) blanks with phase transformation induced fracture. Optics and Laser Technology, 2015. 70: p. 39-44.

*Ryu, J.J^. and **P. Shrotriya**, Mechanical load assisted dissolution response of biomedical cobalt-chromium and titanium metallic alloys: Influence of in-plane stress and chemical environment. Wear, 2015. 332: p. 662-668.

*Ma, X.^ and **P. Shrotriya**, Molecular Dynamics Simulation of Conformational Transition and Frictional Performance Modulation of Densely Packed Self-Assembled Mono layers Based on Electrostatic Stimulation. Langmuir, 2015. 31(24): p. 6729-6741.

*Capraz, O.O^., **P. Shrotriya**, P. Skeldon, G.E. Thompson, and K.R. Hebert, Factors Controlling Stress Generation during the Initial Growth of Porous Anodic Aluminum Oxide. Electrochimica Acta, 2015. 159: p. 16-22.

*Capraz, O.O.^, **P. Shrotriya**, P. Skeldon, G.E. Thompson, and K.R. Hebert, Role of Oxide Stress in the Initial Growth of Self-Organized Porous Aluminum Oxide. Electrochimica Acta, 2015. 167: p. 404-411.

*R. Kolakaluri, E. Murphy, **S. Subramaniam**, R. C. Brown and R. O. Fox, "Filtration Model for Polydisperse Aerosols in Gas-Solid Flow Using Granule-Resolved Direct Numerical Simulation," AIChE Journal, 61(11), 3594-3606, (2015)

*B. Sun, S. Tenneti and **S. Subramaniam**, "Modeling average gas–solid heat transfer using particle-resolved direct numerical simulation," International Journal of Heat and Mass Transfer, 86, 898–913 (2015)

*E. Murphy and **S. Subramaniam**, "Freely cooling granular gases with short-ranged attractive potentials," Physics of Fluids, 27, 043301, (2015)

*M. Mehrabadi, S. Tenneti, R. Garg and **S. Subramaniam**, "Pseudo-turbulent gas-phase velocity fluctuations in homogeneous gas–solid flow: fixed particle assemblies and freely evolving suspensions," Journal of Fluid Mechanics, 770, 210-246 (2015)

X. Hu, **S. Sundararajan** and A. Martini, "The effects of adhesive strength and load on material transfer in nanoscale wear," Computational Materials Science 95, 464 (2015).

Berg, L. P., Behdad, S., **Vance, J. M.**, Thurston, D. "Disassembly Sequence Evaluation: A User Study Leveraging Immersive Computing Technologies", ASME Journal of Computing and Information Science in Engineering, 15(1), 011002 (Mar 01, 2015) (7 pages) Paper No: JCISE-14-1112; doi: 10.1115/1.4028857.

Carlson, P., Peters, A., Gilbert, S. P., **Vance, J. M.**, Luse, A., "Virtual Training: Learning Transfer of Assembly Tasks", IEEE Transactions on Visualization and Computer Graphics, 21(6), June 2015, pp. 770-782; doi: 10.1109/TVCG.2015.2393871.

Pavlik, R. A., **Vance, J. M.** "Interacting with Grasped Objects in Expanded Haptic Workspaces using the Bubble Technique", ASME Journal of Computing and Information Science in Engineering, 2015, doi: 10.1115/1.4031826.

Chong Li, Lijun Zhang, Yan Li, and **Xinwei Wang**, 2015, "Material Behavior under Extreme Domain Constraint in Laser-assisted Surface Nanostructuring," Physics Letters A, DOI: 10.1016/j.physleta.2015.12.001.

Tianyu Wang, Shen Xu, David H. Hurley, Yanan Yue, and **Xinwei Wang**, 2015, "Frequency-resolved Raman for Transient Thermal Probing and Thermal Diffusivity Measurement," Optics Letters, Vol. 41, 80-83, DOI: 10.1364/OL.41.000080.

Jing Liu, Zaoli Xu, Zhe Cheng, Shen Xu, and **Xinwei Wang**, 2015, "Thermal Conductivity of Ultra-high Molecular Weight Polyethylene Crystal: Defect-effect Uncovered by 0 K limit Phonon Diffusion," ACS Applied Materials and Interfaces, DOI: 10.1021/acsami.5b08578.

Haiyu Fang, Je-Hyeong Bahk, Tianli Feng, Zhe Cheng, Amr M. S. Mohammed, **Xinwei Wang**, Xiulin Ruan, Ali Shakouri, and Yue Wu, 2015, "Thermoelectric properties of solution-synthesized n-type Bi2Te3 nanocomposites modulated by Se: An experimental and theoretical study," Nano Research, DOI 10.1007/s12274-015-0892-x.

Wei Xiong, Yunsheng Zhou, W.J. Hou, Thomas Guillemet, jean-françois silvain, Yang Gao, Michel Lahaye, Eric Lebraud, Shen Xu, **Xinwei Wang**, David A. Cullen, Karren L More, Lan Jiang and Yong-Feng Lu, 2015, "Solid-state graphene formation via nickel carbide intermediate phase" RSC Advances, 5, 99037, DOI: 10.1039/c5ra18682j.

Yangsu Xie, Shen Xu, Zaoli Xu, Hongchao Wu, Cheng Deng, **Xinwei Wang**, 2015, "Interface-mediated extremely low thermal conductivity of graphene aerogel," Carbon, 98, 381-390. DOI: 10.1016/j.carbon.2015.11.033.

Ze Liu, Yibo Gao, Fei Liang, Benxin Wu, Jihua Gou, Martin Detrois, Sammy Tin, Ming Yin, Philip Nash, Xiaoduan Tang and **Xinwei Wang**, 2015, "Fabrication of Carbon Nanotube - Chromium Carbide Composite through Laser Sintering," Lasers in Manufacturing and Materials Processing, DOI: 10.1007/s40516-015-0019-y.

Yanming Su, Haiyu Fang, Lujun Pan, Meng Han, Shen Xu, **Xinwei Wang**, Biao Xu, Yue Wu, 2015, "Impact of Surface-Bound Small Molecules on the Thermoelectric Property of Self-Assembled Ag2Te Nanocrystal Thin Films," Nano Letters, 15, 3748–3756.

Yangsu Xie, Zaoli Xu, Shen Xu, Zhe Cheng, Nastaran Hashemi, Cheng Deng, and **Xinwei Wang**, 2015, "Defect level and ideal thermal conductivity of graphene uncovered by residual thermal reffusivity at 0 K limit," Nanoscale, 7, 10101 - 10110, DOI: 10.1039/c5nr02012c.

Zhe Cheng, Longju Liu, Shen Xu, Meng Lu, **Xinwei Wang**, 2015, "Temperature Dependence of Electrical and Thermal Conduction in Single Silver Nanowire," Scientific Reports, 5:10718 | DOI: 10.1038/srep10718.

Shen Xu, Tianyu Wang, David Hurley, Yanan Yue, and **Xinwei Wang**, 2015, "Development of time-domain differential Raman for transient thermal probing of materials," Optics Express, Vol. 23, No. 8 | DOI:10.1364/OE.23.010040, 10040.

Jing Liu, **Xinwei Wang**, 2015, "Characterization of Thermal Transport in One-Dimensional Microstructures Using Johnson Noise Electro-Thermal Technique," Applied Physics A, 119, 871-879, DOI 10.1007/s00339-015-9056-9.

Martinez-Escobar, M., Juhnke, B., Holub, J., Hisley, K., Eliot, D., and **Winer, E.**, "Evaluation of Monoscopic and Stereoscopic Displays for Visual-Spatial Tasks in Medical Contexts," Computers in Biology and Medicine, 61(1), 138-143 (2015)

Sections or Chapters in Books, Monographs, or Similar Volumes

Brown, R. C., del Campo, B., Boateng, A. A., Garcia-Perez, M., Mašek, O. (2015) Fundamentals of Biochar Production, in Biochar for Environmental Management: Science and Technology, Second Edition, Lehmann, J. and Joseph, S., Eds.

Boateng, A. A., Garcia-Perez, M., Mašek, O., **Brown, R. C.**, del Campo (2015) Biochar Production Technology, in Biochar for Environmental Management: Science and Technology, Second Edition, Lehmann, J. and Joseph, S., Eds.

Wright, M. M. and **Brown, R. C.** (2015) Chapter 39. Biomass Properties and Resources, in Handbook of Energy Efficiency and Renewable Energy, Second Edition, Goswami, D. Y. and Kreith, F., Eds., CRC Press, Taylor & Francis Group, Boca Raton, FL, pp. 1093-1104.

Wright, M. M. and **Brown, R. C.** (2015) Chapter 49. Biomass Conversion to Heat and Power, in Handbook of Energy Efficiency and Renewable Energy, Second Edition, Goswami, D. Y. and Kreith, F., Eds., CRC Press, Taylor & Francis Group, Boca Raton, FL, pp. 1581-1596.

Wright, M. M. and **Brown, R. C.** (2015) Chapter 50. Biomass Conversion to Fuels, in Handbook of Energy Efficiency and Renewable Energy, Second Edition, Goswami, D. Y. and Kreith, F., Eds., CRC Press, Taylor & Francis Group, Boca Raton, FL, pp. 1597-1614.

M. Daniele, S. Campuzano, F. Kirilay, E.S. McLamore, A.A. Cargill, S. Ding, **J.C. Claussen**, "Hybrid metallic nanoparticles: enhanced bioanalysis and biosensing via carbon nanotubes, graphene, and organic conjugation,", Nanobiosensors and Nanobioanalyses. Springer, 2015, ISBN: 978-4-431-55189-8

Ganapathysubramanian, Baskar. "Revolutionizing science through simulation: A junior researcher's perspective on research challenges in uncertain times", Merrill Advanced Studies Center series on "Planning for Future Research in Public Universities in Uncertain Times", 2015

Hu C., Wang P., and Youn B.D., "Advances in System Reliability Analysis under Uncertainty," Chapter 9 in Numerical Methods for Reliability and Safety Assessment, Edited by Seifedine K., and Abdelkhalak, E.H., Springer, 2015.

Adarsh Krishnamurthy, Benjamin Coppola, Jared Tangney, Roy Kerckhoffs, Jeffrey Omens, Andrew McCulloch, *"A Microstruc-*

turally-Based Multi-Scale Constitutive Model of Active Myocardial Mechanics," Structure-Based Mechanics of Tissues and Organs, Chapter 22, pp 439-460, 2015.

Shen Xu, Lijun Zhang, Yanan Yue, **Xinwei Wang**, "Physics in Laser Near-field Nanomanufacturing: Fundamental Understanding and Novel Probing", Encyclopedia of Nanotechnology, edited by Bharat Bhushan, pp. 1-20.

Patents Awarded

D. Attinger, C. Frankiewicz, Modification of Wettability Properties of Copper for Heat Transfer Applications, technology license ISURF #4235, technology available for licensing.

Williams, R. C., Raouf, M. A., Metwally, M., **Brown, R. C.**, Bio-oil formulation as an asphalt substitute, U.S. Patent No. 9,200,161 B2, December 1, 2015.

Rover, M., **Brown, R. C.**, Hall, P. H., and Smith, G., Low Temperature, Low Pressure Upgrading and Stabilization of Bio-oil or Bio-oil Fractions, U.S. Patent No. 2015/0291892 A1, October 15, 2015.

Kuzhiyil, N. M., **Brown, R. C.**, and Dalluge, D. L., Method for Pretreating Lignocellulosic Biomass, U.S. Patent No. 9,109,049 B2, August 18, 2015.

Daugaard, D. E., Jones, S. T., Dalluge, D. L., **Brown, R. C.**, Selective temperature quench and electrostatic recovery of bio-oil fractions, U. S. Patent No. 8,992,736 B2, March 31, 2015.

J. Wang, S. C. Esener, D. Kagan, M. Benchimol, **J. Claussen**, "Acoustically triggered nano/micro-scale propulsion devices," U.S. Patent 20150013304, ISSUED, Jan. 15, 2015.

Hu C., and Jain G., "Method for Predicting Useful Life of a Rechargeable Battery," US Patent 2015/0349385 A1, 2015.

Owen Kolstad, Anti-bounce control system for a machine (US 20150008006 A1) identifies machine bounce in motor graders and controls the machine to reduce the magnitude. **This work was completed while he worked for Caterpillar**

Conference Proceedings

D. Attinger and C. Frankiewicz, Coating-Free Superhydrophobic Copper Surfaces for Phase Change Heat Transfer, accepted to 9th International Conference on Boiling and Condensation Heat Transfer, April 26-30, 2015 – Boulder, Colorado.

D. Attinger, C. Frankiewicz, A. R. Betz, T. M. Schutzius, R. Ganguly, A. Das, C.-J. Kim, and C. M. Megaridis, Surface texture and wettability engineering for phase change heat transfer: a Review, accepted to 9th International Conference on Boiling and Condensation Heat Transfer, April 26-30, 2015 – Boulder, Colorado.

Xue, Y., **Bai, X.**, Enhancing hydrocarbon production through catalytic co-pyrolysis of biomass and plastics, AICHE Annual Meeting, Salt Lake City, UT, November 8-13th, 2015.

Ghosh, A., Brown, R. C., **Bai, X.**, Acid-catalyzed depolymerization of cellulose in aprotic solvent for production of precursor chemicals, AICHE Annual Meeting, Salt Lake City, UT, November 8-13th, 2015.

Bai, X., Li, W., Understanding hydrogen transfer effect during lignin pyrolysis for stabilized pyrolysis oil using deuterated sodium formate, TCBiomass 2015, Chicago, IL, November 2-5th, 2015.

Xue, Y., Kelkar, A., **Bai, X.**, Catalytic co-pyrolysis of red oak and polyethylene for valuable hydrocarbons, TCBiomass 2015, Chicago, IL, November 2-5th, 2015.

Zhou, S., Xue, Y., Brown, R. C., **Bai, X.**, Fast pyrolysis of technical lignin in a continuous fluidized bed reactor, TCBiomass 2015, Chicago, IL, November 2-5th, 2015.

Ghosh, A., Brown, R. C., **Bai, X.**, Selective depolymerization of cellulose for soluble crbohydrate precursors in aprotic solvent systems, TCBiomass 2015, Chicago, IL, November 2-5th, 2015.

Li, W., Zhou, S., **Bai, X.**, Lignin pyrolysis with sodium formate for stabilization of pyrolysis products, AICHE Spring Meeting, Xianglan Bai Austin, TX, April 26-30th, 2015.

M.S. Diallo, B. Chang, S. Srinivasan and **G. Balasubramanian**, "Engineering thermal properties of porous materials with nanoparticles", SACNAS National Conference, October 29-31, 2015, Washington D.C., USA.

R. Singh, D. Banerjee, P. Phelan and **G. Balasubramanian**, "Investigating latent heat of vaporization in aqueous nanofluids by molecular dynamics", ASME Mechanics of Materials Conference, June 29-July 1, 2015, Seattle, WA, USA.

A. Sharma, R. Singh and **G. Balasubramanian**, "A novel design strategy for multi- component alloys", ASME Mechanics of Materials Conference, June 29-July 1, 2015, Seattle, WA, USA.

A. Gosai, **G. Balasubramanian** and P. Shrotriya, "Umbrella sampling simulation for calculating free energy of binding for human thrombin-aptamer complex", Midwest Thermodynamics and Statistical Mechanics Conference, May 28-29, 2015, Ames, IA, USA.

P. Li and **G. Balasubramanian**, "The impact of the fourth disulfide bridge on the function of chlorotoxin: Investigation by molecular dynamics", Midwest Thermodynamics and Statistical Mechanics Conference, May 28-29, 2015, Ames, IA, USA.

S. Srinivasan and **G. Balasubramanian**, "Thermal transport across graphene-MoS2 hybrid 2-dimensional structures", Midwest Thermodynamics and Statistical Mechanics Conference, May 28-29, 2015, Ames, IA, USA.

A. Gosai, **G. Balasubramanian** and P. Shrotriya, "Characterizing the interaction be- tween human thrombin and its aptamer in presence of external stimulus: A computational study", 2015 ASME Global Conference on Nanoengineering for Medicine and Biology, April 19-22, 2015, Minneapolis, MN, USA.

P. Li, R. Singh and **G. Balasubramanian**, "Molecular dynamics

investigation of the stability of chlorotoxin at different temperatures and ion concentrations", Spring Meeting, Materials Research Society, April 6-10, 2015, San Francisco, CA, USA.

S. Srinivasan and **G. Balasubramanian**, "Thermal transport across graphene-MoS2 hybrid 2-dimensional structures from molecular dynamics simulations", (Poster) Spring Meeting, Materials Research Society, April 6-10, 2015, San Francisco, CA, USA.

M. Zhang and **S. Bhattacharya** (2015). Logistics Scheduling and Motion Planning for Agricultural Vehicles. In International Conference on Robotics and Automation, pp 3422-3427, 2015.

R. Zou, Y. Tian and **S. Bhattacharya**, Path Planning Algorithms for Source Seeking Agents, The 27th Control and Decision Conference, pp 4865-4870, 2015.

M. Zhang and **S. Bhattacharya**. Optimal Motion Planning for Agricultural Vehicles. Conference on Autonomous and Robotic Construction of Infrastructure, June, 2015.

M. Zhang and **S. Bhattacharya**. Logistics Motion Planning for Agricultural Vehicles. In IEEE Asian Control Conference, 2015.

M. Zhang and **S. Bhattacharya**. Unloading Motion Planning for Agricultural Vehicles. In IFAC Multi-Vehicle Symposium, 2015.

R. Zou, M. Zhang and **S. Bhattacharya**, Decentralized Task Allocation for Multi-agent Visibility Based Target Tracking Game. In AAAI Spring Symposium on Applied Computational Game Theory, 2015.

R. Zou, M. Zhang and **S. Bhattacharya**, Visibility based multi-agent surveillance strategies in decentralized network. In Ground/Air Multisensor Interoperability, Integration, and Networking for Persistent ISR VI Conference, SPIE Defense + Security, 2015, pp 1-6, 2015.

V. Kumar, **T.A. Bigelow**, and B.L. McFarlin, "Cervical Attenuation As a Measure of Preterm Delivery: Impact of Different Region of Interest Sizes", Proc. 36th IEEE EMBS Conf., Chicago, IL, August 26-30, 2014, pp. 234-237.

I. Pardeshi, T. I-P. Shih, **K. M. Bryden**, R. Ames, and R. A. Dennis, "Flow and Heat Transfer in a Rotating and Non-rotating Wedge-Shaped Cooling Passage with Ribs and Pin Fins," Proceedings of the 53d AIAA Aerospace Sciences Meeting, AIAA 2015-1444, (2015).

P. Finzell+ and **K. Bryden**, "Evaluation of a Stigmergic Controller on a Physical System," Proceedings of the 58th Annual ISA POWID Symposium, ISA-POWID15-236 (2015).

P. Pezzini+, **K. M. Bryden**, L. Banta, and D. Tucker, "Multi-Coordination Control Strategy Performance in an Advanced Power System," Proceedings of the 58th Annual ISA POWID Symposium, ISA-POWID2015-243 (2015).

C.-S. Lee, T. I-P Shih, and **K. M. Bryden**, "Estimating Over Temperature and its Duration in a Flat Plate with Sudden Changes in Heating and Cooling," Proceedings of the ASME Turbo Expo 2015, GT2015-43526 (2015).

T. I-P Shih, C.-S. Lee, and **K. M. Bryden**, "Effects of Averaging the Heat-Transfer Coefficient on the Predicted Material Temperature Distribution," Proceedings of the ASME Turbo Expo 2015, GT2015-43552 (2015).

P. Pezzini*, **K. M. Bryden**, D. Tucker, and L. Banta, "Multi-Coordination of Actuators in Advanced Power Systems," Proceedings of the ASME Turbo Expo 2015, GT2015-42993 (2015).

N. McCarty and **K. M. Bryden**, "Modeling Technology Strategies for Thermal Energy Services in Rural Developing Communities," Proceedings of the ASME 2015 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference, DETC2015-46808 (2015).

R. LeSar and **K. M. Bryden**, "Multiscale design of materials: Implementing a Basic Model Interface to Support the Rapid Use of Materials Models in Design," Proceedings of the 2015 NETL Crosscutting Research Review Meeting, May 2015, Pittsburgh.

K. A. Bryden and **K. M. Bryden**, "Engineered Complex Systems: Development of a Cloud-Based Modeling Framework for Complex Advanced Power Systems," Proceedings of the 2015 NETL Crosscutting Research Review Meeting, April 2015, Pittsburgh.

P. Pezzini* and **K. M. Bryden**, "Merged Environments for Simulation and Analysis (MESA): Building an Extensible Framework for Testing New Engineering Concepts," Proceedings of the 2015 NETL Crosscutting Research Review Meeting, May 2015, Pittsburgh.

Poosarla, P. A., Bastawros, A. F., and **Chandra, A**., 2015, Atmospheric Pressure Plasma Enhanced Reduction in Hardness of Single Crystal Sapphire for Precision Polishing, Material Research Soc. (MRS) Spring Meeting, April 2015, San Francisco, CA.

Yu, T., Bastawros, A. F., **Chandra, A**., 2015, Modeling Of Electroplated CBN Grinding Wheel Wear, Proc. 2015 ASME Int. Mfg. Sc. Eng. MSEC 2015-9319, MSEC, June 8-12, 2015, Charlotte, NC.

Roy, S., Wu, K-C., **Chandra, A**., 2015, Uncovering the "Will of the People": Heterogeneity and Polarization within Electorates, World Congress of Econometric Soc., Montreal, Canada, Aug 17-21, 2015.

S. A. Díaz, J. C. Breger, A. Malanoski, **J C. Claussen**, S. A. Walper, M. G. Ancona, C. W. Brown, M. H. Stewart, E. Oh, K. Susumu, I. L. Medintz, Modified kinetics of enzymes interacting with nanoparticles, SPIE Conference Proceedings, Vol. 9550, Session, Biosensing and Nanomedicine VIII, 2015.

S. R. Das, J. Kwon, **J. C. Claussen**, S. Hu, and D. B. Janes, 1/F Noise in MoS2 Field Effect Transistors with Channel Length Variation, Electrochemical Chemical Society Conference Proceedings, Graphene and Beyond: 2D Materials: Structures II, 2015.

S. R. Das, A. Cargill, S. Ding, J. Hondred and **J. C. Claussen**, Printing and annealing graphene-based inks on flexible, degradable substrates for electrochemical biosensing, NanoTechnology for Defense Conference, Nanostructured Materials, 2015 – Invited Lecture

A. Cargill, S. Das, S. Ding, J. Hondred and **J. C. Claussen**, Monitoring Warfighter Performance with Printed Graphene Sweat Biosensors, NanoTechnology for Defense Conference, Nano/Biotechnology: Advanced Materials and Detection Capabilities – Poster Session, 2015 – Poster Presentation

J.C. Claussen, "Graphene-based Biosensors and Bioelectronics", Canadian Laboratory Medicine Congress (CLMC), Montreal, CA., 2015 – Invited Lecture

B. Chen, E. Mootz, G. Vokshi, J. Davis, A. Leners, W. Burns, A. A. Cargill, S. Ding, **J. C. Claussen**, Printing graphene-based inks on flexible substrates for biosensor applications, SPIE DDS: Smart Biomedical and Physiological Sensor Technology XII, Baltimore, MD, 2015 – Invited Lecture

J.C. Claussen, "Prospects and challenges of graphene-based biosensors and bioelectronics", Institute of Biological Engineering (IBE) - Nanotechnology & Biosensors, St. Louis, MO, 2015 – Invited Lecture

J.C. Claussen, "Ink-jet printed graphene-paper for disposable electrochemical biosensors that monitor meat spoilage on-site", IFT Annual Meeting & Food Expo, Chicago, IL, 2015 – Invited Lecture

S. Buckhout-White, M. Stewart, M. G. Ancona, K. Susumu, I.L. Medintz, **J.C. Claussen**, "Biophotonic Logic Devices Based on Quantum Dot Bioconjugates and Multi-Arm DNA Switches" Chemical & Biological Defense Science and Technology Conference, St. Louis, MO, 2015 – Invited Lecture

I.L. Medintz & **J.C. Claussen**, Improving enzyme activity via immobilization on nanoparticles for pesticide biosensing, Gordons Research Conference - Nanoscale Science & Engineering for Agriculture & Food Systems, Bentley, MA, 2015 – Poster Presentation

A. Fontanini, A. Passalaqua, U. Vaidya, **B. Ganapathysubramanian**, "Large scale CFD analysis of large green buildings", ASHRAE winter meeting, Jan 2015.

BS Pokuri, **B Ganapathysubramanian**, "Tailoring the morphology of polymer blend particles: 3D simulations and linear stabi analysis", American Physical Society,2015

D Stoecklein, **B Ganapathysubramanian**, CY Wu, D Di Carlo, "Micropillar sequence design for inertial fluid flow sculptin American Physical Society, 2015

D Kipp, O Wodo, **B Ganapathysubramanian**, V Ganesan, "Polymer/solvent bicontinuous microemulsions for use as organic so cell active layers", American Physical Society 2015

O Wodo, J Zola, **B Ganapathysubramanian**, "Morphology optimization for enhanced performance in organic photovoltaic American Physical Society 2015

D Ackerman, **B Ganapathysubramanian**, "Parallel framework for wormlike chains using self-consistent field theory", Americ Physical Society 2015

S Pfeifer, **B Ganapathysubramanian**, "Quantifying the Effects of Noise on Diffuse Interface Models: Cahn-Hilliard-Co equations", American Physical Society 2015

O Wodo, **B Ganapathysubramanian**, "Using graphs to interrogate the atomic structure of polymer blends", American Physi Society 2015

O Wodo, **B Ganapathysubramanian**, "Heterogenous Morphology By Design - Harnessing Cloud to Quantify and Optim Morphology", AICHE Annual meeting, 2015

O Wodo, **B Ganapathysubramanian**, "Graph Based Technique to Quantify Charge Transport Characteristics of Heterogeno Morphologies", AICHE Annual meeting, 2015

S. Pfeifer, V. Calo, **B. Ganapathysubramanian**, "Quantifying the Effects of Noise on Spinodal Decomposition: Massively Para Framework and a Variational Multiscale Treatment", USNCCM, July 2015

Joshua Mineroff, Chenglong Wang, **Baskar Ganapathysubramanian**, Ming-Chen Hsu, "Optimization of the Parametric Design a Bioprosthetic Heart Valve Based on Isogeometric Analysis", USNCCM, July 2015

Songzhe Xu, Chenglong Wang, Ming-Chen Hsu, **Baskar Ganapathysubramanian**, "A Variational Multiscale Framework Buoyancy Driven Natural Convection", USNCCM, July 2015

Baskar Ganapathysubramanian, Olga Wodo, "Organic Thin Films: Evaporation, Phase-Separation and Substrate-Patterning Us Diffuse Interface Models", USNCCM, July 2015

Olga Wodo, **Baskar Ganapathysubramanian**, "Modeling Topological Effects on Multi-Phase Fluids: Self-Lubricating, Self-Heal and Self-Cleaning Surfaces", USNCCM, July 2015

K. G. Lore, D. Stoecklein, M. Davies, **B. Ganapathysubramanian** and S. Sarkar, "Hierarchical Feature Extraction for Efficient Des of Microfluidic Flow Patterns", NIPS, Montreal 2015.

Hagge, Mathew. Decision Based Learning, ASEE Annual Conference, Seattle 2015.

P.J. Goodrich, F. Sharifi, and **N. Hashemi**. "Fast and Affordable Fabrication of Microfluidic Mold Templates with Complex Multilayer Geometry", Honors Poster Presentation, Iowa State University, Ames, IA, December 9, 2015

C. Meis, J.D. Caplin, R.L. Pemathilaka, N.G. Granados, M. Sucur, **N. Hashemi**, and R. Montazami, "Placenta-on-a-chip: Developing an in-vitro platform to mimic substance transport", Honors Poster Presentation, Iowa State University, Ames, IA, December 9, 2015

A.K. Dziulko, D. Stroud, F. Sharifi, **N. Hashemi**, D.S. Sakaguchi, "Determining microfiber size for 3-Dimensional cell culture", SULI Symposium, DOE Ames Laboratory, Ames, IA, December 8, 2015

J.D. Caplin, R.L. Pemathilaka, M. Sucur, N.G. Granados, C. Meis, **N. Hashemi**, "Placenta-on-a-Chip - Replicating Organ Functions in a Microfluidic Chip" Lush Prize Conference, London, UK, November 20, 2015

J.D. Caplin, R.L. Pemathilaka, M. Sucur, N.G. Granados, C. Meis, L. Matheney, and **N. Hashemi**, "Investigation of Endothelial and Epithelial Cell Lines Concerning a 3D Microfluidic Drug Testing Model for the Placenta", Vaccines Against Antigenically Variable Viruses Symposium, Ames, IA, November 5-8, 2015

R.L. Pemathilaka, J.D. Caplin, N.G. Granados, L. Matheney, and **N. Hashemi**, "Utilizing Organ-on-Chip Method to Build a Drug Testing Model on Human Placenta", Vaccines Against Antigenically Variable Viruses Symposium, Ames, IA, November 5-8, 2015

F. Sharifi and **N. Hashemi**, "Growth and Differentiation of Neural Stem Cells on Poly Microfibrous Scaffolds", Annual Neuroscience Research Day, Ames, IA, September 19, 2015

L. Matheney, R.L. Pemathilaka, N.G. Granados, J.D. Caplin, M. Sucur, and **N. Hashemi**, "Placenta-on-a-Chip", SULI Symposium, DOE Ames Laboratory, Ames, IA, July 31, 2015

P.J. Goodrich, F. Sharifi, and **N. Hashemi**, "Microfluidic Channels for Fabricating Biocompatible Polycaprolactone Microfibers", SULI Symposium, DOE Ames Laboratory, Ames, IA, July 31, 2015

E. Zorrilla, F. Sharifi, M. Lu, and **N. Hashemi**, "Fabrication of polymer microfibers for future drug delivery and cell encapsulation", REU Poster Session, Iowa State University, Ames, IA, July 31, 2015

J. Powell and **N. Hashemi**, "Tattoo-Based Noninvasive Glucose Monitoring", REU Poster Session, Iowa State University, Ames, IA, July 31, 2015

K. Johnston, F. Sharifi, and **N. Hashemi**, "Using Diffusion Reactions to Sense and Record Information", REU Poster Session, Iowa State University, Ames, IA, July 31, 2015

N. Granados, R. Pemathilaka, L. Matheney, J. Caplin, M. Sucur, and **N. Hashemi**, "Microfluidic Drug Testing Placenta-on-a-chip Device", IINSPIRE-LSAMP Undergraduate Research Symposium, Iowa State University, Ames, IA, July 30, 2015

K. Rudolph and **N. Hashemi**, "Biosensors: Using Diffusion-Reactions to Record Information", Honors Poster Presentation, Iowa State University, Ames, IA, April 29, 2015

R. McDonnell and **N. Hashemi**, "Biosensors: Tattoo Based Noninvasive Glucose Monitoring", Honors Poster Presentation, Iowa State University, Ames, IA, April 29, 2015

E. Grefsheim and **N. Hashemi**, "Micro Flow Cytometer Data Analysis", Honors Poster Presentation, Iowa State University, Ames, IA, April 29, 2015

N. Hashemi, Z. Bai, and R. Montazami, "Synthesis of Mn2+ Based Nanostructures with Single-Band Red Upconversion Luminescenc", ASME Global Congress on NanoEngineering for Medicine and Biology, Minneapolis, MN, April 19-22, 2015

N. Hashemi and Z. Bai, "Controlled Processing of Polymeric Microfibers using 3D Hydrodynamic Focusing", ASME Global Congress on NanoEngineering for Medicine and Biology, Minneapolis, MN, April 19-22, 2015

F. Sharifi, Z. Bai, and **N. Hashemi**, "Complete Control on Fiber Porosity and Cell Attachment Using Microfluidic Fiber Fabrication", ASME Global Congress on NanoEngineering for Medicine and Biology, Minneapolis, MN, April 19-22, 2015

F. Sharifi, D. Kurteshi, and **N. Hashemi**, "Microfluidic Fiber Fabrication: An Effective Platform in Tissue Engineering and Drug Delivery", ASME Global Congress on NanoEngineering for Medicine and Biology, Minneapolis, MN, April 19-22, 2015

Q. He and **N. Hashemi**, "Minimized Flow Cytometer for Optical Analysis of Microalgae with Imaging Technique", ASME Global Congress on NanoEngineering for Medicine and Biology, Minneapolis, MN, April 19-22, 2015

Q. He, P. Asrar, and **N. Hashemi**, "3D Focusing Microflow Cytometer with Multi-Pixel Photon Counters for Algae Analysis", ASME Global Congress on NanoEngineering for Medicine and Biology, Minneapolis, MN, April 19-22, 2015

P.J. Goodrich, F. Sharifi, and **N. Hashemi**, "Fast and Affordable Fabrication of Microfluidic Mold Templates With Complex Multilayer Geometry", ASME Global Congress on NanoEngineering for Medicine and Biology, Minneapolis, MN, April 19-22, 2015

P.J. Goodrich, **N. Hashemi**, M. Winchell, J. Lackore, F. Sharifi, and N. Hashemi, "A Continuous Flow Paper-Based Microfluidic Microbial Fuel Cell", ASME Global Congress on NanoEngineering for Medicine and Biology, Minneapolis, MN, April 19-22, 2015

C. Meis, **N. Hashemi**, and R. Montazami, "Evaluating Performance of Silver Microparticle Electrodes For Ionic Electroactive Polymer Actuators", ASME Global Congress on NanoEngineering for Medicine and Biology, Minneapolis, MN, April 19-22, 2015

C. Meis, R. Montazami, and **N. Hashemi**, "A Novel Active Microfluidic Mixer Employing Ionic Electroactive Polymer Actuators", ASME Global Congress on NanoEngineering for Medicine and Biology, Minneapolis, MN, April 19-22, 2015

R.L. Pemathilaka, J.D. Caplin, and **N. Hashemi**, "Studying th Behavior in Placenta-on-a-Chip with a Barrier Function of Epithelial and Endothelial Cell Monolayers", ASME Global Congress on NanoEngineering for Medicine and Biology, Minneapolis, MN, April 19-22, 2015

J.D. Caplin, C. Meis, and **N. Hashemi**, "Utilizing Microfluidic Technology to Replicate Placental Functions in a Drug Testing Model", ASME Global Congress on NanoEngineering for Medicine and Biology, Minneapolis, MN, April 19-22, 2015

D. Kamensky*,+, **M.-C. Hsu**, M.S. Sacks, T.J.R. Hughes, Immersogeometric fluid–structure interaction analysis of bioprosthetic heart valves: Realistic material modeling and experimental validation, in Proceedings of the 2015 Summer Biomechanics, Bioengineering and Biotransport Conference, pp. SB3C2015-1150 (2 pages), Snowbird, Utah, June 17-20, 2015.

C. Wang*,+, A.J. Herrema, **M.-C. Hsu**, A. Ghoshal, Y. Bazilevs, Isogeometric analysis for vertical flight applications, in Pro-

ceedings of the 71st American Helicopter Society International Annual Forum (AHS Forum 71), pp. 2151-2168, Virginia Beach, Virginia, May 5-7, 2015.

M.-C. Hsu*, F. Xu+, D. Kamensky+, J. Kiendl, Immersogeometric fluid–structure interaction analysis of aortic valves, 2nd International Conference on Biomedical Technology (ICBT 2015), Hannover, Germany, October 28-30, 2015.

M.-C. Hsu*, M.C.H. Wu+, A.J. Herrema+, Y. Bazilevs, Advanced fluid–structure interaction simulation of modern wind turbines, 3rd International Workshops on Advances in Computational Mechanics (IWACOM-III), Tokyo, Japan, October 12-14, 2015.

M.-C. Hsu*, M.C.H. Wu+, F. Xu+, J. Kiendl, D. Kamensky+, Immersogeometric analysis with application to fluid–structure interaction of heart valves, 13th US National Congress on Computational Mechanics (USNCCM13), San Diego, California, July 26-30, 2015.

D. Kamensky*,+, **M.-C. Hsu**, J.A. Evans, M.S. Sacks, T.J.R. Hughes, Immersogeometric fluid–thin structure interaction analysis: enhanced conservation and application to heart valve simulation, 13th US National Congress on Computational Mechanics (USNCCM13), San Diego, California, July 26-30, 2015.

D. Schillinger*, V. Varduhn, L. Nguyen, N. Sundholm, **M.-C. Hsu**, F. Xu+, Immersogeometric analysis: the role of geometric fidelity in immersed domain finite element methods, 13th US National Congress on Computational Mechanics (USNCCM13), San Diego, California, July 26-30, 2015.

F. Xu*,+, V. Varduhn, D. Kamensky+, C. Wang+, S.A. Wasion‡, B. Sotomayor-Rinaldi‡, D. Schillinger, **M.-C. Hsu**, Immersogeometric analysis of turbulent flow over complex geometries, 13th US National Congress on Computational Mechanics (USNCCM13), San Diego, California, July 26-30, 2015.

M.C.H. Wu*,+, C.N. Darling‡, C. Wang+, D. Schillinger, **M.-C. Hsu**, Advanced FSI simulation of wind turbine rotor–tower interaction, 13th US National Congress on Computational Mechanics (USNCCM13), San Diego, California, July 26-30, 2015.

A. Herrema*,+, C. Wang+, **M.-C. Hsu**, Interactive design through parametric modeling and isogeometric analysis of wind turbine blades, 13th US National Congress on Computational Mechanics (USNCCM13), San Diego, California, July 26-30, 2015.

S. Xu*,+, C. Wang+, **M.-C. Hsu**, B. Ganapathysubramanian, A variational multi-scale framework for buoyancy driven natural convection, 13th US National Congress on Computational Mechanics (USNCCM13), San Diego, California, July 26-30, 2015.

J. Mineroff*,+, C. Wang+, B. Ganapathysubramanian, **M.-C. Hsu**, Optimization of the parametric design of a bioprosthetic heart valve based on isogeometric analysis, 13th US National Congress on Computational Mechanics (USNCCM13), San Diego, California, July 26-30, 2015.

C. Wang*,+, **M.-C. Hsu**, Y. Bazilevs, Isogeometric fluid–structure interaction analysis of hydraulic energy absorbers, 13th US National Congress on Computational Mechanics (USNCCM13), San Diego, California, July 26-30, 2015.

J. Kiendl*, **M.-C. Hsu**, A. Reali, Isogeometric thin shell analysis with hyperelastic materials and application to aortic heart valve simulations, 9th European Solid Mechanics Conference (ESMC 2015), Madrid, Spain, July 6-10, 2015.

M.-C. Hsu*, D. Kamensky+, M.C.H. Wu+, F. Xu+, V. Varduhn, D. Schillinger, An immersogeometric variational framework for CFD and FSI with application to aortic valves, Engineering Mechanics Institute Conference (EMI 2015), Stanford University, June 16-19, 2015.

M.-C. Hsu*, D. Kamensky+, C. Wang+, A.J. Herrema+, F. Xu+, M.C.H. Wu+, J. Mineroff+, D. Schillinger, Y. Bazilevs, Parametric design-through-analysis platform and immersogeometric FSI, III International Conference on Isogeometric Analysis (IGA 2015), Trondheim, Norway, June 1-3, 2015.

J. Kiendl*, **M.-C. Hsu**, A. Reali, Isogeometric Kirchhoff–Love shell formulations for general hyperelastic materials, III International Conference on Isogeometric Analysis (IGA 2015), Trondheim, Norway, June 1-3, 2015.

D. Kamensky*,+, **M.-C. Hsu**, J.A. Evans, M.S. Sacks, T.J.R. Hughes, Immersogeometric fluid-structure interaction analysis of bioprosthetic heart valves: stability and mass conservation, VI International Conference on Coupled Problems in Science and Engineering (Coupled Problems 2015), Venice, Italy, May 18-20, 2015.

M.-C. Hsu*, Immersogeometric methods for CFD and FSI, Advances in Computational Fluid–Structure Interaction and Flow Simulation (AFSI 2015), Istanbul, Turkey, May 11-13, 2015.

M.-C. Hsu*, C.N. Darling‡, M.C.H. Wu+, Computational simulation of wind turbine rotor–tower–wake interaction, The 18th International Conference on Finite Elements in Flow Problems (FEF 2015), Taipei, Taiwan, March 16-18, 2015.

M.C.H. Wu*,+, C. Wang+, D. Schillinger, **M.-C. Hsu**, Effect of the wind turbine fluid–structure interaction on the tower design, The 18th International Conference on Finite Elements in Flow Problems (FEF 2015), Taipei, Taiwan, March 16-18, 2015.

A.J. Herrema*,+, C. Wang+, **M.-C. Hsu**, Wind turbine blade design through parametric modeling and isogeometric analysis, The third NREL Wind Energy Systems Engineering Workshop, Boulder, Colorado, January 14-15, 2015.

Hu C., Jain G., Schmidt C., Strief C., and Sullivan M., "Online Estimation of Lithium-Ion Battery Capacity Using Sparse Bayes-

ian Learning," ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE), Aug 2-5 2015, Boston, MA.

Kim H., Kim S., Kim T., **Hu C.**, and Youn B.D., "Online Thermal State Estimation of High Power Lithium-ion Battery," 2015 IEEE International Conference on Prognostics and Health Management (PHM), Jun 22-25 2015, Austin, TX.

Seong S., Soobum L., and **Hu C.**, "Reliability-Based Design Optimization for Nonlinear Energy Harvesters." Proc. SPIE 9439, Smart Materials and Nondestructive Evaluation for Energy Systems 2015, Mar 8-12 2015, San Diego, CA.

Monshat H+ and **S Hu***, "Functionalized Carbon Nanotube Supported By Nickel Nanowire Array with Improved Rate Capability for High Power Electrochemical Capacitors", 228th Electrochemical Society Meeting, Phoenix, AZ, 2015.

Das S+, S Logsdon+, D Caneff +, R Kinser +, and **S Hu***, "Dye-Sensitized Solar Cell with Electrophoretic Deposited Photocatalytic Carbon Nanotube Counter Electrode: Nanotube Density and Cell Performance", 228th Electrochemical Society Meeting, Phoenix, AZ, 2015.

Taylor J, **S Hu**, R Rajamani, X Zhu, Y Zhang, W Chen, "Non-metal Electrodes for Local Field Potential Recordings in Magnetic Resonance Scanners", 23rd Annual Meeting of International Society for Magnetic Resonance in Medicine, Toronto, Canada, 2015.

Xue, Y., **Kelkar, A.**, & Bai, X. (2015). Catalytic co-pyrolysis of red oak and polyethylene to valuable hydrocarbons; Poster Presentation; 2015 IAS, Iowa City, Iowa.

Xue, Y., **Kelkar, A.**, & Bai, X. (2015). Catalytic co-pyrolysis of red oak and polyethylene to valuable hydrocarbons; Poster Presentation; 2015 TCBiomass, Chicago, Illinois.

Xue, Y., **Kelkar, A.**, & Bai, X. (2015). Enhancing Hydrocarbon Production through Catalytic Co-pyrolysis of Biomass and Plastics; Oral Presentation: 2015 AIChE, Salt Lake City, Utah

Venkatesh Chinde, Jeffrey Heylmun, Adam Kohl, Zhanhong Jiang, Soumik Sarkar, **Atul Kelkar**, Comparative Evaluation of Control-Oriented Zone Temperature Prediction Modeling Strategies in Buildings." 8th ASME Dynamic Systems and Control Conference, Ohio, Oct, 2015.

Daniel M. Kassen, Hui Zhou, Punit Tulpule, and **A. G. Kelkar**: Application of Integrated Control Structure Design Using BMI Theory And Robust Feedback Linearization to Excavator Bucket Level Control, in Proceedings of the ASME 2015 Dynamic Systems and Control Conference, October 28-30, 2015, Columbus, USA.

Mousa, S. +, and **Kim, G.Y.**, "Direct adhesion of warm roll-bonded Al1100/polyurethane/ Al1100 sandwich composite," ASME 2015 International Manufacturing Science and Engineering Conference, MSEC2015-9467, Charlotte, NC, Jun. 8-12, 2015

Bastwros, M. +, Liu, M. +, Orlowsky, N. ++, and **Kim, G.Y.**, "Effects of reinforcement particle size on cold roll bonded (CRB) Al1100 laminate composites," ASME 2015 International Manufacturing Science and Engineering Conference, MSEC2015-9469, Charlotte, NC, Jun. 8-12, 2015

Sukumaran, S., **Kong, S.-C.** "Biofuel Spray Combustion Modeling Using Multi-component Vaporization Model and Detailed Chemistry," Proceeding ICLASS, Tainan, Taiwan (2015)

Xiong, Q., **Kong, S.-C.** "Direct Numerical Simulation of Biomass Fast Pyrolysis," AICHE Annual Conference, Salt Lake City, UT, November 2015.

Sukriti Dewan, **Adarsh Krishnamurthy**, Roy Kerckhoffs, Heather Sun, Jeffrey Omens, Vishal Nigam, Andrew McCulloch, *"Human Fetal Growth Model of Hypoplastic Left Heart Syndrome: Reduced Ventricular Growth Due to Decreased Preload,"* Proceedings of the Biomedical Engineering Society Annual Meeting, 2015.

Sara McMains, **Adarsh Krishnamurthy**, Iddo Hanniel, *"GPU Approaches to Distance Calculations for Freeforms,"* SIAM Conference on Geometric and Physical Modeling, 2015.

Adarsh Krishnamurthy, Christopher Villongco, Jeffrey Omens, Andrew McCulloch, *"Work Heterogeneity Predicts Patient Response in Cardiac Resynchronization Therapy,"* U.S. National Congress on Computational Mechanics, 2015.

Adarsh Krishnamurthy, Baskar Ganapathysubramnaian, *"Scalable Manufacturing of Shaped Polymers,"* NVIDIA GPU Technology Conference, 2015.

Adarsh Krishnamurthy, Sukriti Dewan, Roy Kerckhoffs, Jeffrey Omens, Vishal Nigam, Andrew McCulloch, *"Human Fetal Growth Model of Hypoplastic Left Heart Syndrome,"* SIAM Conference on Computational Science and Engineering, 2015.

Kevin Vincent, Andrew McCulloch, Christopher Villongco, **Adarsh Krishnamurthy**, David Krummen, *"Multi-Scale Modeling of the Failing Heart: from Molecule to Patient,"* SIAM Conference on Computational Science and Engineering, 2015.

V. I. Levitas, M. Javanbakht. Interaction between phase transformations and dislocations at the nanoscale: Phase field approach. Plasticity'15 International Symposium, Montego Bay, Jamaica (Keynote lecture), 3/1/16-9/1/15.

W.A. Goddard, **V.I. Levitas**, Ma Y. Multiscale Theory and Experiment in Search for and Synthesis of Novel Nanostructured Phases in BCN Systems. NSF DMREF Grantee Meeting, Bethesda, MD, January 12-13, 2015.

V. I. Levitas. Melt dispersion mechanism for oxidation of aluminum nano- and microscale particles. conference on 3D and Ma-

terials Research (CC3DMR) in Busan, South Korea, June 15-19, 2015 (Invited lecture).

V.I. Levitas and A. Roy, Multiphase Phase Field Approach with Elastic and Interface Stresses. European Solid Mechanics Conference, Madrid, Spain, July 6-10, 2015.

V. I. Levitas. Effect of two nanoscale size parameters on the macroscopic transformation behavior within phase field approach. 52nd Annual Meeting Society of Engineering Science, College Station, TX, 10/25/15-10/28/15.

B. Feng and **V. I. Levitas**. Large deformation model with coupled plasticity and strain-induced phase transformation in a diamond anvil cell. 52nd Annual Meeting Society of Engineering Science, College Station, TX, 10/25/15-10/28/15.

K. Momeni and **V. I. Levitas**. Phase-Field Approach to Non-equilibrium Phase Transformation with Moving Interfacial Phases and Interfacial Tension. 52nd Annual Meeting Society of Engineering Science, College Station, TX, 10/25/15-10/28/15.

A. Roy and **V. I. Levitas**. Generalized multiphase phase field theory for temperature- and stress-induced phase transformation. 52nd Annual Meeting Society of Engineering Science, College Station, TX, 10/25/15-10/28/15.

Y. S. Hwang and **V. I. Levitas**. Coupled phase field, heat conduction, and elastodynamic simulation of kinetic superheating and melting of aluminum nanolayer irradiated by picosecond laser. 52nd Annual Meeting Society of Engineering Science, College Station, TX, 10/25/15-10/28/15.

Y. Wang, L. Liu, Q. Wang, W. Han, **M. Lu**, and L. Dong, "Strain-tunable two-dimensional plasmonic crystals," IEEE Photonics Society Conference, Reston, VA, October 2015.

Y. Huang, L. Liu, B. Ch'ng, and **M. Lu**, "Sol-gel imprint lithography for guided mode resonance structures," IEEE Photonics Society Conference, Reston, VA, October 2015.

Y. Zhao, Y. Huang, J. McClelland, and **M. Lu**, "Photoacoustic immunoassay using plasmonic nanoparticles," IEEE Photonics Society Conference, Reston, VA, October, 2015.

J. Ding, L. Liu, B. Arigong, Y. Lin, **M. Lu**, and H. Zhang, "Asymmetrical stepped-junction nanoantennas," IEEE Photonics Society Conference, Reston, VA, October 2015.

M. R. Gartia, S. Seo, J. Kim, T.W. Chang, G. Bahl, **M. Lu**, J. G. Eden, and G. L. Liu, "Injection-seeded optoplasmonic amplifier in the visible," Conference on Lasers and Electro Optics (CLEO), San Jose, CA, June 2014.

Y. Zhuo, H. Hu, W. Chen, **M. Lu**, L. Tian, H. Yu, K. D. Long, E. Chow, W. P. King, S. Singamaneni, B. T. Cunningham, "Detection of single nanoparticles using photonic crystal enhanced microscopy," Conference on Lasers and Electro Optics (CLEO), San Jose, CA, June 2014.

Y. Zhao, K. Liu, J. McClelland, and **M. Lu**, "Photonic crystal enhanced photoacoustic detection," Conference on Lasers and Electro Optics (CLEO), San Jose, CA, June 2014.

C Dedic, **J Michael**, R Brown, and T Meyer, "Optical diagnostic techniques for investigation of biomass fast pyrolysis," TC Biomass, Chicago, IL (2015).

C. Dedic, **J. B. Michael**, and T.R. Meyer, "Hybrid fs/ps coherent anti-Stokes Raman scattering in a non-equilibrium environment initiated by a ns laser spark," AIAA Aviation Meeting, Dallas, TX (2015).

N. Moehring, R. Jamshidi, **R. Montazami**, "Printable Soft Electronics: Exploring 3-Dimensional Conductive Paths on Elastomeric Substrate", NSF-REU presentation, Ames, IA, (2015)

K. Parcells, R. Jamshidi, **R. Montazami**, "Thermally Triggered Transient Electronics", NSF-REU presentation, Ames, IA, (2015)

C. Meis, **R. Montazami**, N. Hashemi, "A Novel Active Microfluidic Mixer Employing Ionic Electroactive Polymer Actuators", ASME Global Congress on NanoEngineering for Medicine and Biology, Minneapolis, MN, (2015)

C. Meis, N. Hashemi, and **R. Montazami**, "Evaluating Performance of Silver Microparticle Electrodes For Ionic Electroactive Polymer Actuators", ASME Global Congress on NanoEngineering for Medicine and Biology, Minneapolis, MN, (2015)

N. Hashemi, Z. Bai, **R. Montazami**, "Synthesis of Mn2+ Based Nanostructures with Single-Band Red Upconversion Luminescenc", ASME Global Congress on NanoEngineering for Medicine and Biology, Minneapolis, MN, (2015)

C. Meis, J.D. Caplin, R.L. Pemathilaka, N.G. Granados, M. Sucur, N. Hashemi, **R. Montazami**, "Placenta-on-a-chip: Developing an in-vitro platform to mimic substance transport", Honors Poster Presentation, Iowa State University, Ames, IA, (2015)

K. White, R. Jamshidi, **R. Montazami**, "Thermomechanical properties of soft transient polymer composites", DOE, Ames Laboratory, Ames, IA, (2015)

A. Renner, F. Thompson, V. Kalivarapu, **J.H. Oliver** and E. Winer, "An Application of Conceptual Design and Multidisciplinary Analysis Transitioning to Detailed Design Stages," 16th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, Dallas, TX, June 2015

V. Kalivarapu, A. MacAllister, M. Hoover, S. Sridhar, J. Schlueter, A. Civitate, P. Thomkins, J. Smith, J. Hoyle, **J.H. Oliver** and E. Winer, "Game-day Football Visualization Experience on Dissimilar

Virtual Reality Platforms," Proc. IS&T/SPIE Electronic Imaging Conference, San Francisco, CA, February 2015

R. Zou, V. Kalivarapu, E. Winer, **J. Oliver** and S. Bhattacharya, "Standard Particle Swarm Optimization on Source Seeking Using Mobile Robots," Proc. AIAA Modeling and Simulation Technologies Conference, Kissimmee, FL, January 2015

J.C. Hill, Z. Liu, R.O. Fox, A. Passalacqua, **M.G. Olsen**, "Numerical modeling of turbulent swirling flow in a multi-inlet vortex nanopreciptation reactor using dynamic DDES," 68th Annual Meeting of the American Physical Society Division of Fluid Dynamics, Boston, MA, November 22-24, 2015.

M.G. Olsen, Z. Liu, E. Hitimana, R.O. Fox, J.C. Hill, **M.G. Olsen**, "Turbulent velocity and concentration measurements in a multi-inlet vortex nanoprecipitation reactor," 68th Annual Meeting of the American Physical Society Division of Fluid Dynamics, Boston, MA, November 22-24, 2015

X. Gao, B. Kong, M. Ramezani, **M.G. Olsen**, R.D. Vigil, "CFD investigation of gas-liquid mass transfer in a multiphase Taylor-Couette reactor," 2015 Annual Meeting of the American Institute for Chemical Engineers, Salt Lake City, UT, Nov. 8-13, 2015

E. Madadi-Kandjani, **A. Passalacqua**, Solution of the Fokker-Planck equation using the extended quadrature method of moments, AIChE Annual Meeting, Salt Lake City, UT, November 8th – 13th, 2015.

X. Hu, **A. Passalacqua**, CFD Simulations of a stirred tank reactor for liquid and gas-liquid systems using OpenFOAM, AIChE Annual Meeting, Salt Lake City, UT, November 8th – 13th, 2015.

D. N. Williams, E. Madadi-Kandjani, **A. Passalacqua**, R. O. Fox, A quadrature-based CFD model for single-phase turbulent reacting flows, AIChE Annual Meeting, Salt Lake City, UT, November 8th – 13th, 2015.

J. C. Hill, L. Zhenping, R. O. Fox, **A. Passalacqua**, M. G. Olsen, Numerical modeling of turbulent swirling flow in a multi-inlet vortex nanoprecipitation reactor using dynamic DDES, 68th Annual Meeting of the APS Division of Fluid Dynamics, Boston, MA, November 22nd – 24th, 2015.

Radkowski, Rafael, "A Point cloud-based Method for Object Alignment Verification for Augmented Reality Applications," Proceedings of the ASME 2014 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2015, August 2-5, 2015, Boston, MN

Radkowski, Rafael, Wehr, David, Gregory, Elizabeth, and Holland, Stephen D., "Object Motion Tracking in the NDE Laboratory by Random Sample Iterative Closest Point," Quantitative Nondestructive Evaluation, QNDE 2015, July 26-31, 2015, Minnesota, MN

Radkowski, Rafael, "Investigation of Visual Features for Augmented Reality Assembly Assistance," Human Computer Interaction (HCI) International 2015, 2-7 August 2015, Los Angeles, USA

S. Sarkar, K. G. Lore and S. Sarkar, Early Detection of Combustion Instability by Neural-Symbolic Analysis of Hi-speed Video, NIPS 2015 workshop on Cognitive Computation: Integrating Neural and Symbolic Approaches, Montreal, Canada, 2015

Z. Jiang, **S. Sarkar** and K. Mukherjee, On Distributed Optimization using Generalized Gossip, Proceedings of Conference on Decision and Control, (Osaka, Japan), 2015

S. Sarkar, K. G. Lore, S. Sarkar, V. Ramanan, S. Chakravarthy and A. Ray, Early Detection of Combustion Instability from Hi-speed Flame Images via Deep Learning and Symbolic Time Series Analysis, Proceedings of Annual Conference of the Prognostics and Health Management Society, (San Diego, CA), 2015

Z. Jiang and **S. Sarkar**, Understanding Wind Turbine interactions using Spatiotemporal Pattern Network Proceedings of ASME Dynamical Systems and Control Conference, (Columbus, OH), 2015

V. Chinde, J. Heylmun, A. Kohl, Z. Jiang and **S. Sarkar**, Comparative evaluation of Control-oriented zone temperature prediction modeling strategies in Buildings, Proceedings of ASME Dynamical Systems and Control Conference, (Columbus, OH), 2015

S. Sarkar, V. Venugopalan, K. Reddy, J. Rayde, M. Giering and N. Jaitly, Using Deep Convolutional Networks for Occlusion Edge Detection in RGB-D Frames, IEEE High Performance Extreme Computing Conference (HPEC), (Waltham, MA), 2015

Akintayo, **S. Sarkar**, A Symbolic Dynamic Filtering Approach to Unsupervised Hierarchical Feature Extraction from Time-Series Data, Proceedings of American Control Conference, (Chicago, IL), 2015

P. Chattopadhyay, D. K. Jha, **S. Sarkar** and A. Ray, Path Planning in GPS-denied Environments: A Collective Intelligence Approach, Proceedings of American Control Conference, (Chicago, IL), 2015

K. G. Lore, M. Davies, D. Stoecklein, B. Ganapathysubra-

manian and **S. Sarkar**, "Deep Learning for flow sculpting in microfluidic platforms", NVIDIA GPU Technical Conference, (Silicon Valley, CA), March 2015

R. Georgescu, K. Reddy, N. Trcka, M. Chen, P. Quimby, P. O'Neill, T. Khawaja, D. Hestand, L. Bertuccelli, **S. Sarkar**, O. Erdinc and M. Giering, "Scalable Human-in-the-loop Decision Support", IEEE Aerospace Conference, (Big Sky, MT), March 2015

*Placette, M. And **Schwartz, C.J.**: "Comparison of fundamental friction mechanisms of Greenwood-Williamson Versus fractal surface types using computational methods," presentation, 2015 STLE Annual Meeting, Dallas, Texas, May 17-21, 2015.

*Darden, M.A. and **Schwartz, C.J.**: "Skin tribology phenomena associated with reading braille print: the influence of cell patterns and skin behavior on coefficient of friction," presentation, 2015 STLE Annual Meeting, Dallas, Texas, May 17-21, 2015.

*Wilde, T. and **Schwartz, C.J.**: "Parametric Investigation of the mechanics of soft-body contact with parallel-ridge textured surfaces to understand tactile friction," presentation, 2015 STLE Annual Meeting, Dallas, Texas, May 17-21, 2015.

Darden, M.A. and **Schwartz, C.J.**: "Skin tribology phenomena associated with reading braille print: the influence of cell patterns and skin behavior on coefficient of friction," paper and presentation, 20th International Conference On Wear of Materials (WOM), Toronto, Ontario, Canada, April 12-16, 2015.

Capraz, O.; Ide, S.; **Shrotriya, P.**; Hebert, K., Coupled Tensile Stress Increases and Topography Evolution during Aluminum Corrosion. Meeting Abstracts 2015, (14), 688-688;

Hebert, K.; Capraz, O. O.; **Shrotriya, P.**; Skeldon, P.; Thompson, G., Role of Oxide Stress in the Initial Growth of Self-Organized Porous Aluminum Oxide. Meeting Abstracts 2015, (15), 747-747.

M. Mehrabadi, and **S. Subramaniam**, "Dynamics of kinetic energy transfer in homogeneous bidisperse gas-solid flow using particle-resolved direct numerical simulation," 68th Annual Meeting of the American Physical Society's Division of Fluid Dynamics, Boston, MA (2015)

S. Subramaniam and B. Sun, "Transport of temperature-velocity covariance in gas-solid flow and its relation to the axial dispersion coefficient," 68th Annual Meeting of the American Physical Society's Division of Fluid Dynamics, Boston, MA (2015)

E. Murphy, M. Mehrabadi and **S. Subramaniam**, "Modeling Two-point Particle Dynamics of Homogeneous Gas-Solid Flows to describe Clustering and Stability," 68th Annual Meeting of the American Physical Society's Division of Fluid Dynamics, Boston, MA (2015)

B. Sun, S. Tenneti and **S. Subramaniam**, "Mass transfer in a flow past a non-porous catalyst sphere," 68th Annual Meeting of the American Physical Society's Division of Fluid Dynamics, Boston, MA (2015)

E. Murphy, **S. Subramaniam**, "A Kinetic Theory Based Solid-Solid Drag Model," 67th Annual Meeting of the American Physical Society's Division of Fluid Dynamics, San Francisco, CA (2015)

E. Murphy, G. Lomboy, K. Wang, S. Sundararajan, **S. Subramaniam**, "Homogeneous Shear Simulations of Liquid-Solid Suspensions of Microparticles," 2015 AIChE Annual Meeting, Atlanta, GA (2015)

S. Subramaniam, B. Sun, S. Tenneti, R. O. Fox, "Heat Transfer in Gas-Solid Flow: Model Development Using Particle-Resolved Direct Numerical Simulation," 2015 AIChE Annual Meeting, Atlanta, GA (2015)

B. Sun, S. Tenneti, R. O. Fox and **S. Subramaniam**, "Probability Density Function Model for Scalar Transport and Mixing In Gas-solid Flow," ASME 2015 Fluids Engineering Summer Meeting, Chicago, IL, (2015)

M. Mehrabadi, S. Tenneti, J. Horwitz, A. Mani, **S. Subramaniam**, "Developing Improved Lagrangian Point Particle Models of Gas-Solid Flow from Particle-Resolved Direct Numerical Simulation," ASME 2015 Fluids Engineering Summer Meeting, Chicago, IL, (2015)

S. Subramaniam, M. Mehrabadi, J. Horwitz, A. Mani, "Developing improved Lagrangian point particle models of gas-solid flow from particle-resolved direct numerical simulation", Proceedings of the Center for Turbulence Research 2015 Summer Program, Stanford, CA (2015).

E. Lonergan, M. Chidister, M. Damhorst, L. Larson, C. Logue, H. Seo, **S. Sundararajan** and D. Zhu, 'The Equity Advisor Program at Iowa State University,' AWIS 2015 NSF ADVANCE/GSE Annual Meeting, Baltimore, May 2015.

Jing Liu, **Xinwei Wang**, 2015, "Characterization of Thermal Transport in One-Dimensional Microstructures using Johnson Noise Electro-Thermal Technique," 19th Symposium on Thermophysical Properties, Boulder, Colorado, June 21 - 26, 2015.

Shen Xu, Tianyu Wang, David H. Hurley, Yanan Yue, and **Xinwei Wang**, 2015, "Time Domain Differential Raman for Thermal Diffusivity Measurement," 19th Symposium on Thermophysical Properties, Boulder, Colorado, June 21 - 26, 2015.

Zaoliu Xu, **Xinwei Wang**, 2015, "Promoted Electron Transport and Sustained Phonon Transport by DNA down to 10," 19th Symposium on Thermophysical Properties, Boulder, Colorado, June 21 - 26, 2015.

Yangsu Xie, Zaoli Xu, Zhe Cheng, Nastaran Hashemi, **Xinwei Wang**, 2015, "Static Phonon Scattering in Graphene Foam: Uncovered by Residual Thermal Diffusivity at 0 K Limit," 19th

Symposium on Thermophysical Properties, Boulder, Colorado, June 21 - 26, 2015.

Holub, J., and **Winer, E.**, "Visualizing fMRI Data Using Volume Rendering in Virtual Reality", The Interservice/Industry Training, Simulation & Education Conference (I/ITSEC), Orlando, FL, November 30 - December 3, Paper no. 15253, Acceptance Rate 39% (2015)

Walton, J., Gilbert, S., and **Winer, E.**, "The Team Multiple Errands Test: A Platform to Evaluate Distributed Teams", The Interservice/Industry Training, Simulation & Education Conference (I/ITSEC), Orlando, FL, November 30 - December 3, Paper no. 15264, Acceptance Rate 39% (2015)

Renner, A., Holub, J., Evans, G., Sridhar, S., and **Winer, E.**, "A Virtual Reality Application for Additive Manufacturing Process Training,", ASME 2015 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE 2015), Boston, MA, August 2-5, DETC2015-47807, Acceptance Rate 81%, accepted for publication (2015)

Renner, A., Thompson, F., Kalivarapu, V., Oliver, J., and **Winer, E.**, "An Application of Conceptual Design and Multidisciplinary Analysis Transitioning to Detailed Design Stages," 16th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, Dallas, TX, June 22-26, Acceptance Rate 82% (2015)

Richardson T., and **Winer E.**, "Increasing Feasibility of the Self-Organizing Map as a Design Tool for a Novel Convergence Heuristic," 16th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, Dallas, TX, June 22-26, Acceptance Rate 82% (2015)

Zou, R., Kalivarapu, V., Bhattacharya, S., **Winer, E.**, and Oliver, J., "Standard Particle Swarm Optimization on Source Seeking Using Mobile Robots," AIAA Science and Technology Forum and Exposition 2015 (SCITECH 2015), Kissimmee, FL, January 5-9, AIAA-2015-0897, Acceptance Rate 87% (2015)

Kalivarapu, V., MacAllister, A., Hoover, M. (^), Sridhar, S., Schlueter, J., Civitate, A., Thompkins, P., Smith, J., Hoyle, J., Oliver, J., **Winer, E.**, and Chernoff, G., "Game-day Football Visualization Experience on Dissimilar Virtual Reality Platforms," IS&T/SPIE Electronic Imaging, San Francisco, CA, February 9-12, Acceptance Rate 86% (2015)

ME faculty pose at the 2016-17 ME Faculty Retreat on Aug. 18 at the Scheman Building.

Responsibilities

The Department of Mechanical Engineering at Iowa State University is a community of faculty, staff, students, and alumni—and industrial and governmental partners—working together to improve the state of Iowa and society in the broadest terms through mechanical engineering research, education, and service.

Vision

Through the excellence of its people, the Department of Mechanical Engineering will be recognized as a leader of its discipline in a manner that exemplifies the land-grant traditions of learning, discovery, and engagement. The department will be a desirable place to study and work, with its community comprising the best and brightest, and with research and educational programs grounded in the mechanical engineering sciences and set within the context of meeting important societal needs.

Mission

The mission of the Department of Mechanical Engineering has three tenets centered on the principle of improving lives and livelihoods: to create knowledge through research in the science and technology of mechanical engineering; to share knowledge through educational programs and the dissemination of new discoveries; and to develop the professional potential of faculty, staff, and students.

Priorities

We will pursue the following priorities to reinforce our recognized strengths and advance our vision for 2025.

- Extend our pillars of research excellence
- Strengthen our graduate program
- Enrich our undergraduate program
- Develop our people
- Build our community

www.me.iastate.edu