Iowa State University
Department of Mechanical Engineering

Annual Report
2010-2011

October 2011

Contents

Cover Image: New ME faculty member Daniel Attinger uses a high-resolution profilometer for his blood spatter analysis research. The department purchased the profilometer within the past year, which undergraduate students will use in manufacturing classes to measure surface characteristics of various material finishes. This equipment will provide our students and researcher with state-of-the-art capabilities.

Year in Review

Another year is behind us and it's time to reflect upon the points of pride from our 2010-2011 academic year.

Fall 2010 showed record enrollment in undergraduate mechanical engineering students, only to be eclipsed by Fall 2011 enrollment. We continue to be the most popular program on campus. The past year continued to exemplify our outstanding students, faculty, staff, and alumni. Undergraduate Chloe Dedic received a 2011 Goldwater National Scholarship and graduating senior Luke Borkowski was selected by the College of Engineering to serve as the student marshal for the fall 2010 commencement ceremony. Professor Robert Brown was named one of the Top 100 People in Bioenergy by Biofuels Digest, and Assistant Professor Terry Meyer was awarded the prestigious CAREER Award from the National Science Foundation for his outstanding research and education as a junior faculty member. Academic Advisor Johna Wolfe was awarded the ISU Award for Early Achievement in Academic Advising. MSME alum and current director of the National Science Foundation, Subra Suresh, received Iowa State's Distinguished Alumni Award.

Jim Bernard retired after twenty-seven years of service at Iowa State. As an Anson Marston Distinguished Professor of Engineering, Jim served the department and college in numerous ways over the years from being ME department chair, interim director of ISU's computing center, director of the Virtual Reality Applications Center, and interim dean of the College of Engineering. One of his lasting legacies in the mechanical engineering curriculum was a course he codeveloped that is cross-listed with the Department of World Languages and Cultures called Technology, Globalization, and Culture. The course features a remarkable seminar series and teaches students the impact of globalization to prepare undergraduate and graduate students for a professional and socio-cultural setting. He will be greatly missed but not forgotten, and Professor Jim Oliver now represents ME in the course.

The successes and hard work of our students, faculty, and staff help to lead our department into another challenging and exciting year this fall. We are happy to announce the addition of four new faculty members. Associate Professor Daniel Attinger joins us from Columbia University; his research focuses on multiphase microfluidics and addresses problems in self-assembly during evaporation and blood spatter analysis. Assistant Professor Nastaran Hashemi served as a Post-Doc at the Navy Research Laboratory where her research is the area of bio-M/NEMS and sensing biological components using fluid mechanics for cell separation. Nastaran will hold the title of William March Scholar in Mechanical Engineering. Assistant Professor Reza Montazami recently completed his PhD from Virginia Tech. His research focuses on soft material electromechanical actuation with applications to nature-inspired microbotics and soft robotics. Our newest lecturer is David Asjes, a retired Navy pilot, and former Adjunct Assistant Professor in the Department of Naval Science at ISU and the Executive Officer of the ISU Naval ROTC unit. We look forward to having them as part of our mechanical engineering family.

We look forward to the new academic year and thank you for your support and continued interest in our department.

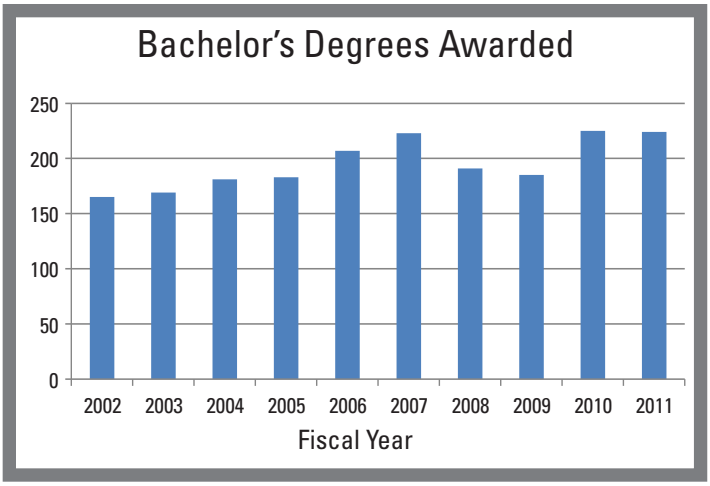
With kind regards,

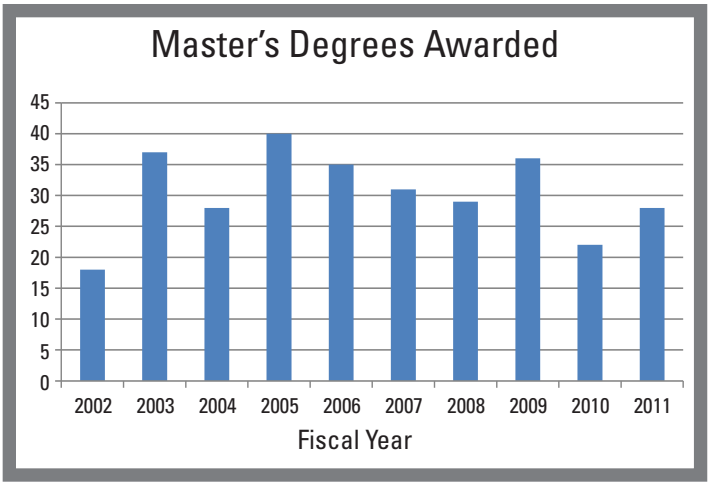
Ted Heindel

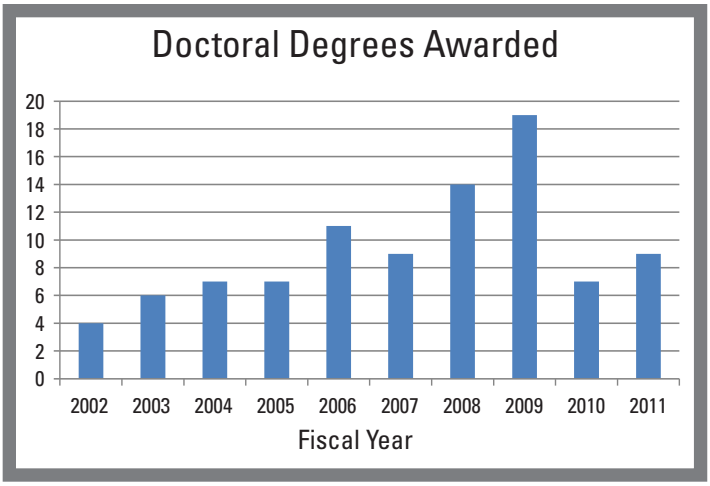
Theodore (Ted) J. Heindel
Professor and Interim Chair, Department of Mechanical Engineering
Bergles Professor of Thermal Science

ME Statistics

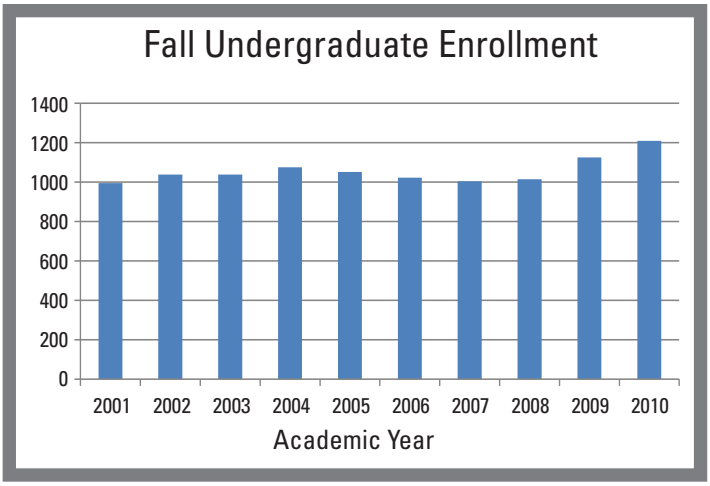
Degrees Awarded

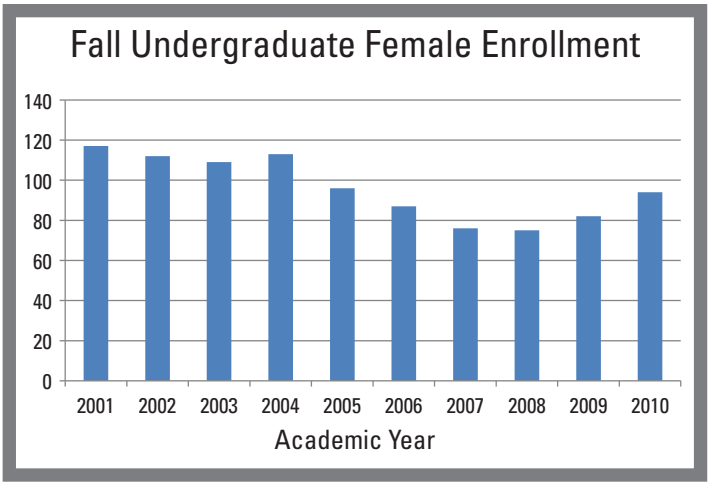


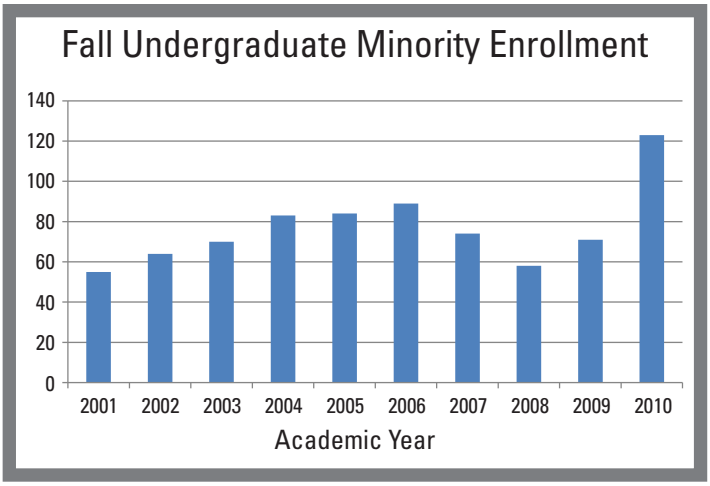




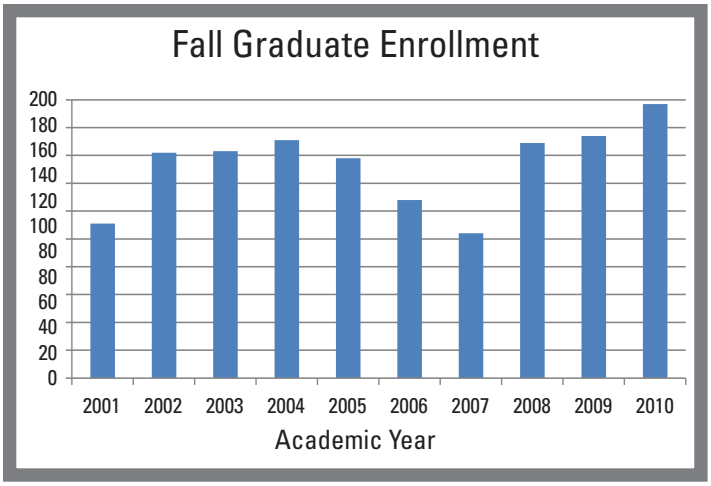
Undergraduate Enrollment

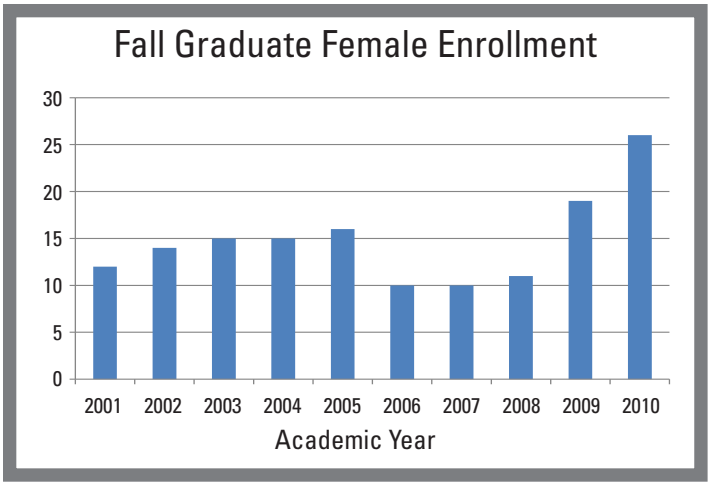


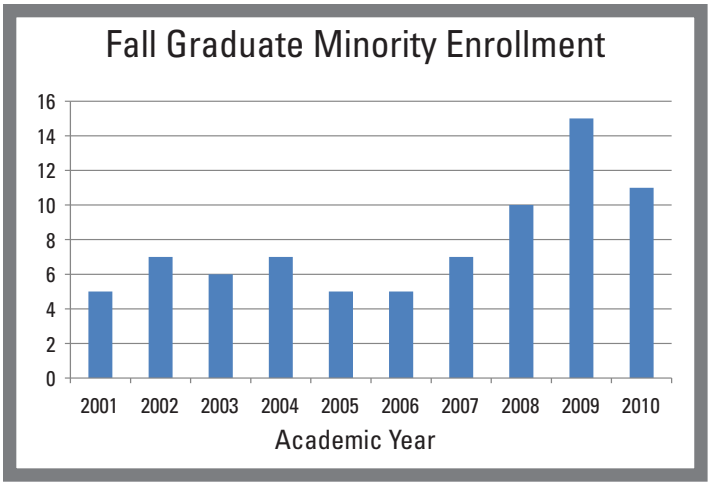




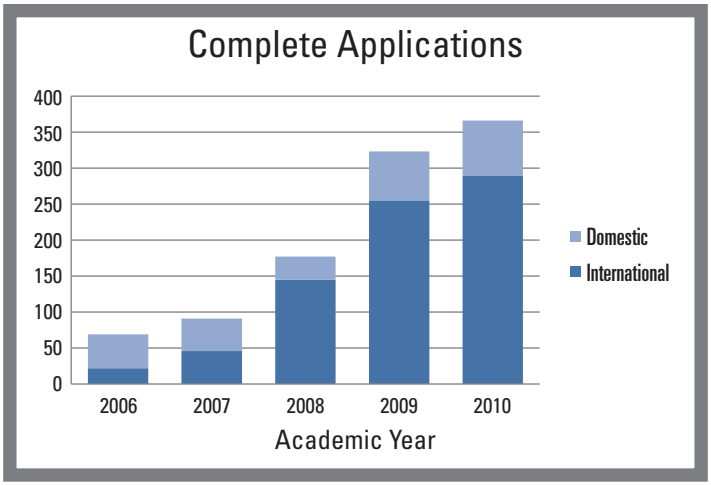
Graduate Enrollment

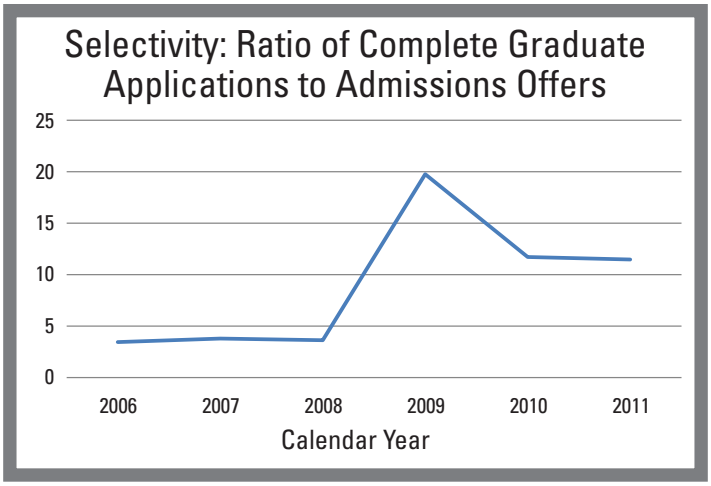


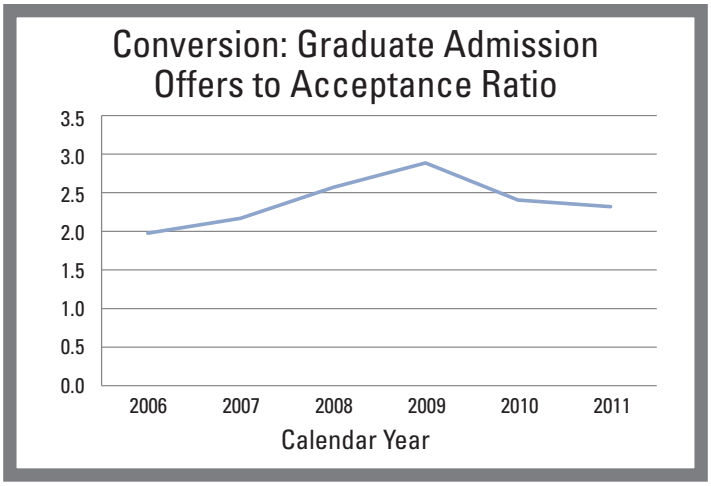




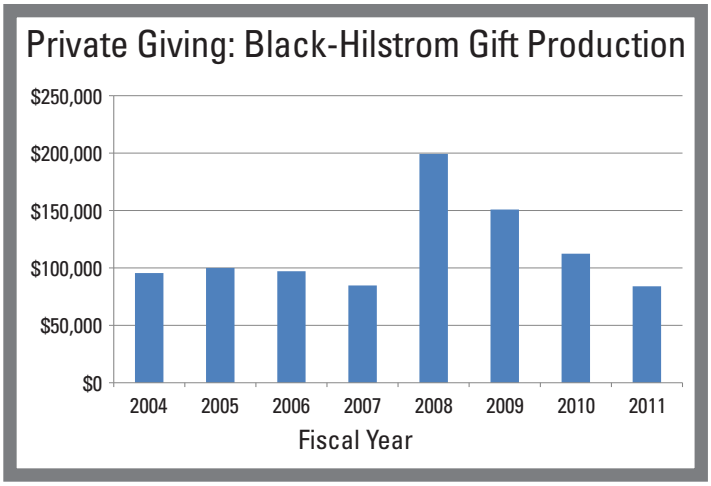
Graduate Program Recruitment

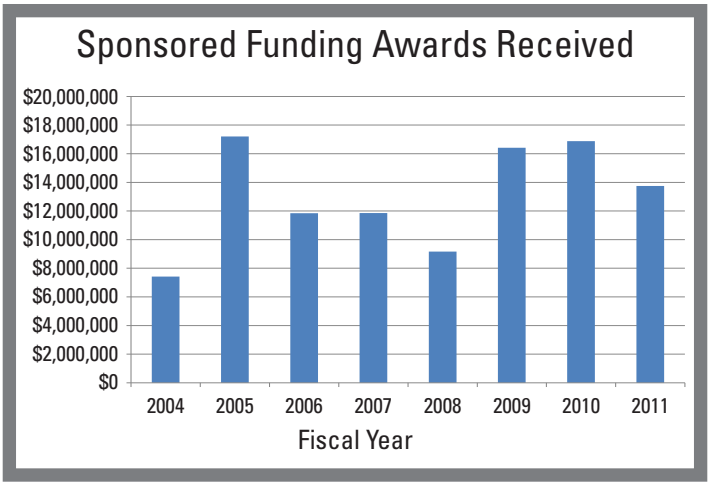


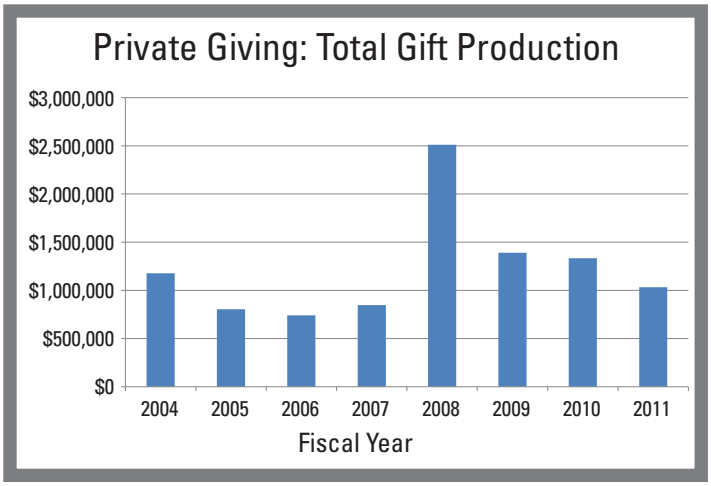


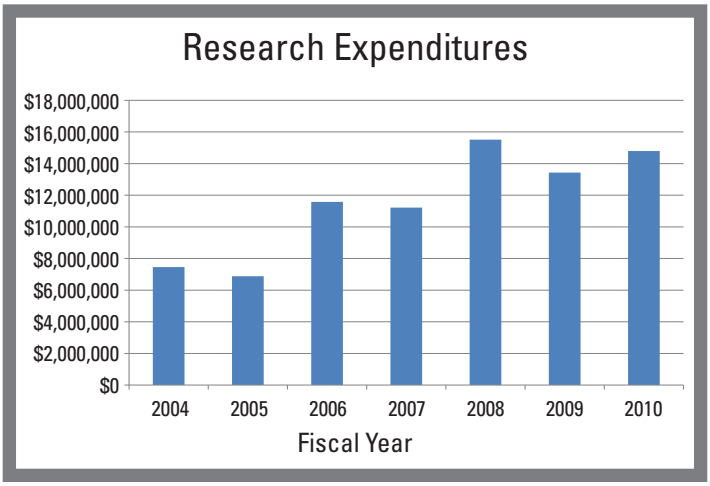


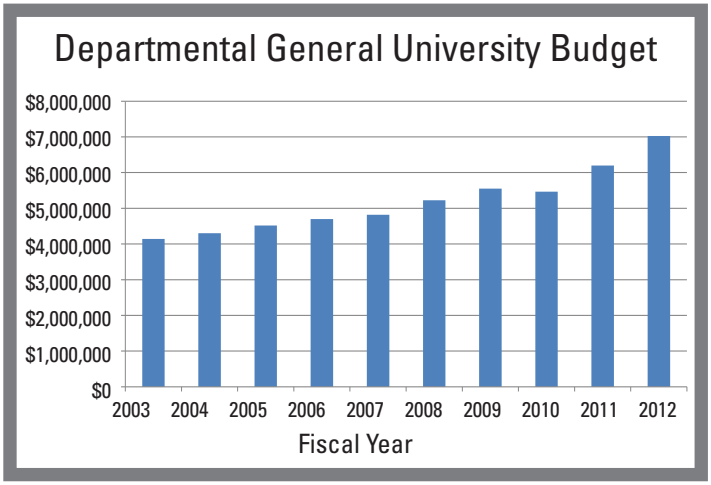
Department Operations











Research

Journal Papers Published	71
Conference Papers Published	50
Sections or Chapters in Books, Monographs, or Similar Volumes	7
Patents Awarded	1
Doctoral Dissertations	9
Master's Theses/Projects	28

Professional Society Fellows

American Society of Mechanical Engineers

Robert Brown
Abhijit Chandra
Ted Heindel
Atul Kelkar
Jim Oliver
Judy Vance
Jonathan Wickert

Personnel (Full-Time Equivalent)

Tenure and Tenure-Track Faculty	27
Non-Tenure Eligible Lecturers	6.5
P&S and Merit Staff	15.5

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

James and Katherine Melsa Professor in Engineering
Jonathan Wickert

Joseph and Elizabeth Anderlik Professor in Engineering
Judy Vance

Larry and Pam Pithan Professor of Mechanical Engineering
Jim Oliver

Michael and Denise Mack 2050 Challenge Scholar
Erin MacDonald

Schafer 2050 Challenge Professor
Valery Levitas

William and Virginia Binger Assistant Professor of Mechanical Engineering
Terry Meyer

William March Scholar in Mechanical Engineering
Nastaran Hashemi

Research Sponsors

- Ames Laboratory
- Architecture Research Office
- Boeing
- Braun-Aesculap AG, Germany
- California Energy Commission
- Columbia University
- ConocoPhillips
- Defense Advanced Research Projects Agency
- Defense Threat Reduction Agency
- Department of Agriculture
- Department of Energy
- DuctSox Corporation
- Embry-Riddle Aeronautical University
- Honeywell Federal Manufacturing & Technologies, Kansas City Plant
- I-Cube
- Iowa Department of Administrative Services
- Iowa Energy Center
- Iowa Office of Energy Independence
- Iowa Power Fund
- Innovating Lighting
- Institute for Physical Research and Technology, ISU
- Internal Research Support Program-University of Illinois Chicago College of Nursing
- Los Alamos National Laboratory
- John Deere & Co.
- Mechdyne
- Midwest Forensic Resources Center
- National Collegiate Inventors and Innovators Association
- National Institute of Health
- National Institute of Justice
- National Science Foundation
- Omaha Public Power District
- Office of Naval Research
- Rockwell Collins
- Toyota Motor Company
- US Air Force
- US Army

Undergraduate Program Highlights

Sriram Sundararajan
Associate Chair for
Undergraduate Studies

Key Program Indicators
Mechanical Engineering continues to be the most popular major on campus with a record enrollment of 1210 students during the 2010-2011 academic year. The student body profile was 58% Iowans, 34% out-of-state and 8 % international. Of this number, 8% were women and 7% were minorities. During the 2010-2011 academic year, 231 BSME degrees were awarded. About 80% of our graduates had coop, intern, or summer work experience and about 20% of our students had international study experiences, highlighting real world learning opportunities within our program. The growing Nuclear Engineering minor currently has 34 students and graduated ten students last year.

Industrial/Academic Partnerships through Design Experiences
The senior capstone design course continues to build connections with industrial partners and charitable organizations thereby emphasizing student interaction with professional engineers and clients. Each semester about 15 companies work with student groups on projects. Recent design project have involved collaborations with Iowa companies such as Paragon International, Hy-Capacity Inc., Mobile Track Solutions and Delta Sports Products as well as non-profit organizations including Camp Courageous and Harmony House, and in national design competitions, such as the NASA Lunar Mining Competition. Last year saw the launch of the ME Design Expo, organized by the design faculty. Occurring in the Fall and Spring semesters, ME students showcase their design projects (sophomore design and senior capstone design) through poster presentations and demonstrations to the University community and general public. This forum provides students with an opportunity to develop invaluable communication skills and fosters awareness amongst the public of the impact of Mechanical Engineering in society.

Women in Mechanical Engineering (WiME)
In its fourth year, the WiME program continues to provide scholarship opportunities, social events and networking opportunities with faculty and industry to the women in the program. Its success is underscored by the fact that other departments in the college are creating similar programs to foster a sense of community and build connections for their women students.

Recent Developments and Recognition
The Kiewit Undergraduate Student Services Center welcomed two new academic advisors this past year. John Wagner, who brings 13 years of advising experience at ISU took over the role of lead advisor, a position that was vacated by Doug Beck while Jessica Van Winkle also joined as an academic advisor. Adviser Johna Wolfe was recognized for our outstanding efforts by being awarded the 2011 ISU award for Early Achievement in Advising. Our student excellence was exemplified by several University and National Awards including the Wallace E. Barron All University Award for Leadership (Carl Kirpes, Senior) and 2011 Goldwater National Scholarship (Chloe Dedic, Junior). The department is leading efforts to develop a minor in energy system.

Senior Design Projects

Fall 2010

CIRAS Sponsored Projects

Brown Medical Industries, Spirit Lake, Iowa
Packaging Automation Project
- Logan Jaynes, Katie Lonergan, Andrew Hathaway, Alec Hagberg, Leah Smith
- Amy Selvik, Ben Potter*, Micah Lange, Jason Rohe, Jake Randall

Dodgen Industries, Humboldt, Iowa
Motor Coach Weight Reduction
- Alex Reimers, Jordan Haugland*, Alex Miltenberger, Tom Irwin, Kaleb Hahn
- Brennan Gruhn*, Sean De Vitry, Andrew Larson, Adam Sisko, James Albrecht, Eric Jensen

Fisher Controls – Emerson Process Management, Marshalltown, Iowa
Elevated Temperature Test Chamber
- Garrett Koenigsfeld, Mike Lynch, Sam Voigt, Steve Westerkamp
- Jason Slama, Troy Anderson, Alex Neumann, Zach Thome, Kyle Redfern

Fisher Controls – Emerson Process Management, Marshalltown, Iowa
Series 4500 High Pressure Valve Design
- Fernando Sanchez, David Lund, Kyle Silvey*, Antonio Garcia

Fisher Controls – Emerson Process Management, Marshalltown, Iowa
Axial Flow Valve Design
- Jacob Bell, Darren Blum*, Dumindu Prathapasinghe
- Sean Newton*, Phil Jackman, Justin Miller, Shane Johnson, Chris Bouwman, Brian Corey

ESCP Corporation, Davenport, Iowa
Concrete Power Tool Design
- Danjin Zulic*, Cody Sobotka, Brett Wulf, Mich Slobidsky, Perry Nichols, Jared D. Peterson
- Wade Nasheim, Eric Larson, Brice Pollock, Bryce Matsuo, Tyler Ownby, Joseph Huston

Power Engineering and Manufacturing, Ltd, Waterloo, Iowa
Transmission Test Stand Design
- Nate Lincoln*, Clint Van Steenis, Nick Langer, Mitchell Van Erdewyk, Andrew Dostal

Power Engineering and Manufacturing, Ltd, Waterloo, Iowa
Transmission Black Box Design
- Dave Michels (IE), Andrew Morse (ME)

Service Outreach Project

Harmony House of Iowa, Waterloo, Iowa
Bicycle Chariot Design
- Eric Weflen, Tim Morgan*, Kevin Thelen, Jackson Philby, Colby Wilson

Student Projects

NASA Lunabotics Mining Competition
Track Design for Lunar Mining Robot
- Steven Lischer, Zach Laws*, Mark Wiemer, Laura Miller, Craig Bjorseth, Bethany Juhnke, Joanna Peddicord

SAE Student Branch: *Mini-Baja CVT Design Optimization*
- Chase Schuett, Luke Johnson, Joseph Clausen

SAE Student Branch: *SAE Formula Fuel System Delivery Design*
- James Rasmussen

ISU ME Department: *Controlled Air Fluid Ejection System*
- Kayce Rich, Jamie Doser, Alex Kalitzki, Eric Havran, Tyler Lesthaeghe, Alex Everett
- Ross Routledge, Jacob Willett, Emilio Pinion, Eric Bishop, Chris Hyatt, Vincent Kaliwata

Spring 2011

CIRAS Sponsored Projects

American Professional Quilting Systems, Carroll, Iowa
Quilting Machine Vibration Reduction
- Thomas Carstensen, John Reuvers*, Michael Jenkins, Jipur Jipur
- Josh Appleby, Kale Brockman, Chadd McCaw, Billy Whitford*

Conductix-Wampfler Inc., Omaha, NE
Wind Generator Slip Ring Design
- Joshua Toman*, Tyler Knapp, Derek Ebel, Abigail Roberts
- Stephen Gerbracht, Nicholas Pfeiffer*, Bradley Kuxhausen, Alex Moraniec, William Cameron

Fisher Controls – Emerson Process Management, Marshalltown, Iowa
Butterfly Valve Stress Reduction
- Jeff Brabec, Jeff Peterson*, Derek Joseph, Alex Fitzsimmons, Jerome Kaess
- Ben Shatto, Jeff Hanson, Jason Eastvold*, Gordon Mueller

Jancy Engineering, Inc., Davenport, Iowa
Magnetic Base Drill Power Accessory Drive Design
- Eric Nelson, Andrew Olney, Nathaniel Kaiser*, Greg Anderson, Zachary Rose
- Bennett Noreen*, Matt Anson, Nick Ninneman, Bryan Langfeldt

Montezuma Manufacturing, Inc., Montezuma, Iowa
Multistage Press Material Handling System Design
- Chase Bracy*, Andrew Gardini, Robert Kasper, Matthew Stephenson, Justin Allen
- Kurtis Ferguson, Kris Kolaas*, Trevor Richardson, Bradley Mann, Nicholas Anspach

Thombert, Inc., Newton, Iowa
Ergo-Design of Forklift Tire Finishing Workstation
- Sean Middleton, Taylor Halstead*, Clint Brown, Robert Eschbach
- Schuyler Vreeman, Casey Harding*, Troy Mangrich, Yeonho Jo, Sangwoo Ryu

Corporate Projects

ROUND2 Inc., Austin, Texas
Computer Printer Recycling Process Design
- Jeff Colton*, Ian Moore, Aaron Roberts, Scott Simmons
- Brian Borer, Creed Herold, Aaron Kandt*, Corey Nicholls, Terry Wills

** Denotes Team Leader*

Graduate Program Highlights

Pranav Shrotriya
Associate Chair for Graduate Studies and Research
Director of Graduate Education

Enrollment
In the 2010 academic year, the Mechanical Engineering Department had 197 graduate students enrolled. These consisted of 99 PhD, 69 Master of Science and 29 Master of Engineering students. Of these 26 students were women and 11 were minority students.

Degrees
The department granted 28 Master's degrees and 9 Doctorate degrees in fiscal year 2011. Upon graduation, 1 PhD student received graduate research excellence award and 1 PhD student received graduate teaching excellence award.

Recruitment and Support
288 students applied to our graduate program for admission in fall 2010. Of these applicants, 61 students were admitted and 38 students enrolled. Overall the department supported 27 students through teaching assistantships and 95 students through research assistantships. In addition, seven students were awarded fellowships, including two winners of the prestigious National Science Foundation Graduate Fellowship.

BS/MS program
The concurrent BS/MS program continues to provide students with the opportunity to earn both a B.S.M.E. and an M.S.M.E. following five years of study as well as exposure to research as early as their junior year. In fall 2010 spring 2011, the department enrolled 5 new students to the program.

Career paths
Our graduates enjoy tremendous visibility amongst industry and academia. A large fraction of our graduates pursue positions in industry with such renowned companies like John Deere, Caterpillar, 3M, Intel and Garmin, to name a few. Graduates have also found faculty and post-doctoral opportunities with institutions such as Massachusetts Institute of Technology (MIT), Australian National University, Oak Ridge National Lab and Trine University.

Recent developments
The department launched its new coursework-only professional Master's degree program (Master of Engineering) in Fall 2009 with 19 enrollees. Two of these completed the degree in 2 semesters and graduated in Spring 2010. Working with engineering online learning, we anticipate strong growth in this program in upcoming years with the development of graduate minors in strategic areas of interest to our industrial stakeholders. Our aggressive recruiting continues to yield rich dividends. Our application count is the highest in the last 5 years, including a marked increase in the number of domestic applicants. Our efforts at increasing the student diversity has also resulted in the program currently having the highest level of women and minority students in the last decade. We have also established a National Science Foundation supported REU site on microscale sensing, imaging and actuation (MoSAIc) to aid our efforts for recruiting students. The first cohort of MoSAIc students finished their research experience in summer 2010. Graduate program staff have successfully pursued University grants to enhance regional recruitment efforts and increase fellowship monies to attract the best prospects for our program.

Doctoral Dissertations

Ronald Bremner
Dissertation: Rapid optimization of interior permanent magnet (IPM) machines using the response surface method and dimensionless parameters
Major Professor: Ron Nelson

***† †* Denis Vitalievich Dorozhkin**
Dissertation: Constraint-based synthesis of shape-morphing compliant structures in virtual reality
Major Professor: Judy Vance

***§* Kyungho Kang**
Dissertation: MicroCantilever (MC) based nanomechanical sensor for detection of molecular interactions
Major Professor: Pranav Shrotriya

Bo Kong
Dissertation: Experimental and computational study of turbulent mixing in a confined rectangular reactor
Major Professor: Michael Olsen

Julius Vogel
Dissertation: Sealing and cutting of PLA bioplastic
Major Professor: Sriram Sundararajan

Thomas C. Waite
Dissertation: Frequency domain active noise control with ultrasonic tracking
Major Professor: Atul Kelkar

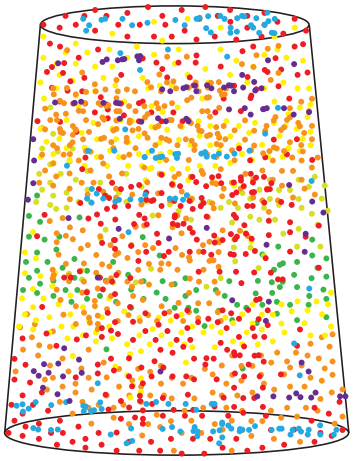
Mark Mba Wright
Dissertation: Techno-economic, location, and carbon emission analysis of thermochemical biomass to transportation fuels
Major Professor: Robert Brown and W. Ross Morrow

Ruqin Zhang
Dissertation: 3D mesh metamorphosis from spherical parameterization for conceptual design
Major Professor: Eliot Winer and James Oliver

Xiaohui Zhou
Dissertation: A plug and play framework for an HVAC air handling unit and temperature sensor auto-recognition technique
Major Professor: Ron Nelson

§ Research Excellence Award
† † Teaching Excellence Award

Research Portfolio



Biological and Nanoscale Sciences

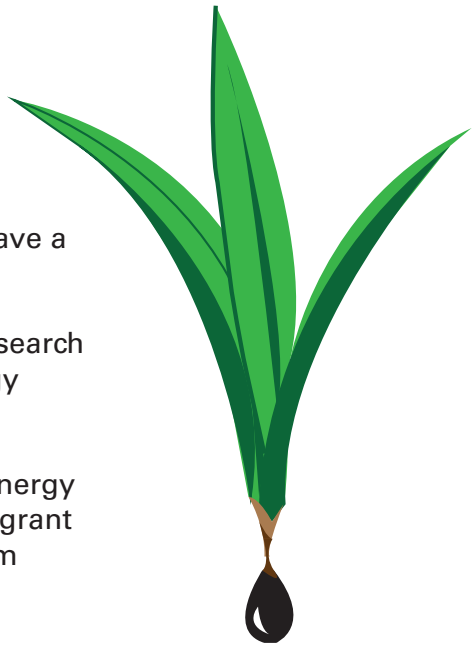
Pranav Shrotriya, Program Director

The biological and nanoscale sciences program investigates problems at the interface of engineering, biology, and nanotechnology, enabling faculty to apply the fundamental principles of mechanical engineering to expand opportunities for new science and engineering breakthroughs.

BNS faculty had an extremely productive year for research with numerous journal publications and invited presentations. Valery Levitas's and his graduate students published their research results in Nature Communications and Physical Review Letters (Both high impact journals). In the summer, National Science Foundation supported Microscale Sensing, Imaging and Actuation (MoSAIc) Research Experience for Undergraduates (REU) site hosted the second cohort of eleven highly talented undergraduate students from all over the country.

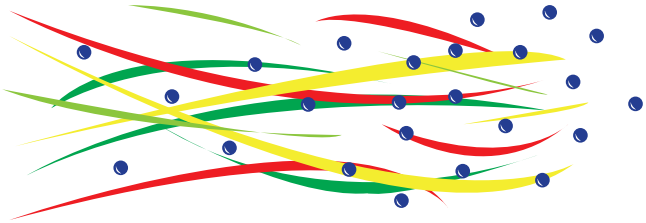
Clean Energy Technologies

Terry Meyer, Program Director



The clean energy technologies program investigates alternative energy and energy efficiency methods that have a positive effect on the environment.

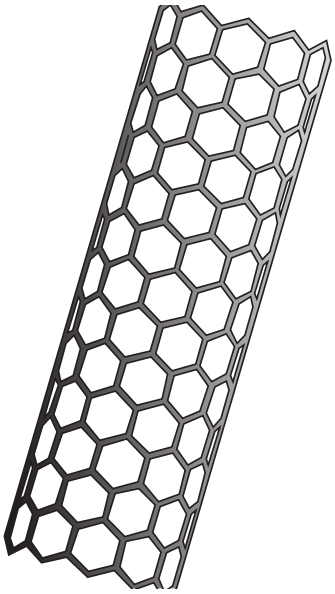
Faculty members have been busy with many areas of research such as waste-to-energy technologies, wind speed energy conversion, and new burner technologies for ethanol processing. Terry Meyer has been developing advanced laser-analytical methods of studying reacting flows for energy applications and was recently awarded an NSF CAREER grant to study energy transfer in high-pressure non-equilibrium reactions.



Complex Fluid Systems

Shankar Subramaniam, Program Director

The complex fluid systems program investigates non-Newtonian, multiphase, turbulent, and/or chemically reacting flows over multiple length and time scales. Faculty members develop unique experimental and computational techniques that advance our understanding of fluid flow phenomena and enable engineering applications, including fuel and chemical production; biomass transport; particle dispersion; and heat exchangers in evaporators, boilers, and condensers. The efforts of this program pioneer new theories and models of complex fluid processes and validate these processes through novel experimental techniques and exploration tools.



Design and Manufacturing Innovation

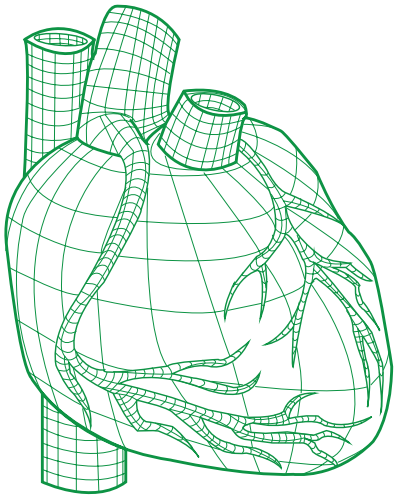
Abhijit Chandra, Program Co-Director
Gap-Yong Kim, Program Co-Director

The design and manufacturing innovations (DMI) program centers on transforming resources into useful and desirable products cutting across all phases of the design and manufacturing cycle. Novel experimental, computational, and analytical techniques are developed to advance our understanding of these transformation processes, as well as to study practical applications, which include chemical mechanical planarization, laser processing, tribology at the micro/nanoscale, surface engineering, and characterization for biomedical applications.

The DMI program continues to expand: more than 35 graduate students supported on assistantship with 6 new hires; supported 3rd annual Excellence of Graduate Research Conference; and improved undergraduate manufacturing experience by newly adding a rapid prototyping machine and Zygo surface profilometer.

Simulation and Visualization

Song-Charng Kong, Program Director



Faculty members of the simulation and visualization program develop advanced computational and experimental techniques to understand and predict physical phenomena. Faculty also create unique image rendering methods to enhance the interpretation of complex systems.

VRAC hosted its annual Deere Day which brings scores of representatives from Deere & Co to share ideas and review progress on research projects. VRAC also hosted a workshop on Live Virtual Constructive training that was attended by industry partners, federal agencies and other Universities to explore opportunities for partnerships on large contracts.

The faculty will continue to develop innovative simulation and visualization technologies that can be used to explore various science frontiers as well as use in daily life. One goal is to enable scenarios for products or processes to be altered and tested in a virtual environment before any prototypes are created. Such capability in virtual engineering will significantly reduce the time and cost associated with product development and process optimization.

Department Organization

Industrial Advisory Council (IAC)

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.

Scott Bowman, IAC Chair
KJWW
Scott is an alum of the ME department and has worked at KJWW Engineering in Des Moines since 1989. His specialties include project delivery, project management, contracts, direct digital controls, energy efficiency, sustainable design, LEED, and commissioning.

Greg Brown
Orthopedic Surgery, Park Nicollet Clinic
Greg received his BSME at Iowa State and went on to get graduate degrees at MIT and was accepted into Harvard Medical School. Dr. Brown currently serves as the Associate Chief of Surgery for Outcomes for Park Nicollet Services in St. Louis Park, MN. His current orthopedic practice includes adult reconstruction (joint replacements), trauma (fracture care), and sports medicine.

Craig Connell
Black & Veatch
Craig is a BSME graduate of Iowa State University. Upon graduation, he joined the global engineering and construction company, Black & Veatch. He is currently a Vice President and the director of the Corporate Project Management Office, responsible for establishing policies, practices, systems and tools for management and project controls globally.

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.

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.

Al Johnson
Cargill
Al is an alum of the department after receiving his BS degree. He joined Cargill in 1987 and has had many positions within the company. He currently serves as Process Improvement Lead for the Tartan program.

Mike Kugel
Pella
Mike is an ISU alum has been employed at Pella since 1997 where he is the engineering manager, leading a team of product design and manufacturing engineers with sustaining engineering and new product development responsibilities.

Cynthia Lord, IAC Vice Chair
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
Emerson Process Management

Jeff Rea
Sauer-Danfoss
Jeff received his BSME from Iowa State and has been at Sauer-Danfoss in Ames, IA for the past 6 years. He has held various positions in engineering, quality, manufacturing operations, and program management in the agricultural and construction equipment industries, and the automotive industry over the last 25 years. He is currently the global director within the Propel Division at Sauer-Danfoss.

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.

Staff

Kiewit Undergraduate Student Services Center

Denise Birney
Advising Secretary

Kevin Osgerby
Academic Adviser

Jessica Van Winkle
Academic Adviser

John Wagner
Academic Adviser, Advising Center Coordinator

Johna Wolfe
Academic Adviser

Business Office

Mary Bilstad
Program Coordinator

Carol Knutson
Account Clerk

Clare Polking
Program Assistant

Alex Rausch
Communications Specialist

Deb Schroeder
Secretary

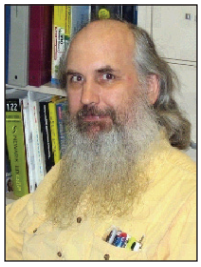
Denise Wright
Administrative Specialist, Assistant to the Chair

Laboratory and Information Technology

Sandy Bremer
Teaching Laboratory Coordinator

Joel Buehler
Systems Support Specialist

Larry Couture
Teaching Laboratory Coordinator



Jim Dautremont
Laboratory Mechanical Technologist

Nate Jensen
Systems Support Specialist

Hap Steed
Manager, Technical Services

Graduate Program Office

Amy Carver
Program Assistant for Graduate Education

Staff Highlights

Amy Carver received the College of Engineering Dean's Staff Excellence Award for her outstanding work as graduate programs assistant in the ME Department.

Jim Dautremont became a member of the ISU 25 Year Club for his loyal service to Iowa State.

Jessica Van Winkle was elected to the ISU Professional & Scientific Council as an Academic & Research representative.

Johna Wolfe was selected as a 2011 recipient of the ISU Award for Early Achievement in Academic Advising.

Professors

Daniel Attinger
Associate Professor

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

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.

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

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

Professor 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

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

Professor 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.

Mark Bryden
Associate Professor

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

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

Faculty Highlights

Robert Brown was named one the "Top 100 People in Bioenergy" in 2010 by Biofuels Digest (http://news.engineering.iastate.edu/2010/10/21/brown-included-in-top-100-people-in-bioenergy-list/). He chaired the first Symposium on Thermal and Catalytic Sciences for Biofuels and Biobased Products this past fall, which attracted almost 300 biofuels researchers from around the world to ISU.

In 2010 **Mark Bryden** and his research team won an R&D 100 award for his work in developing the software package OSG – Bullet. This is the third R&D 100 award received by Professor Bryden and his research team in the past five years. The goal of this research is to enable the creation of integrated computational environments that support interactive real-time engineering decision making and design. Referred to as the "Oscars of Invention" the R&D 100 awards recognize the 100 most technologically significant products introduced into the marketplace over the past year.

Abhijit Chandra
Professor

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

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

Baskar Ganapathysubramanian
Assistant 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

Professor 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.

Nastaran Hashemi
William March Scholar in Mechanical Engineering
Assistant Professor

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

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.

Ted Heindel
Interim Chair
Bergles Professor of Thermal Science

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

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

Abhijit Chandra's research focused on multi-physics modeling of Chemical Mechanical Planarization. It was also applied to biomedical research such as life prediction of orthopedic implants.

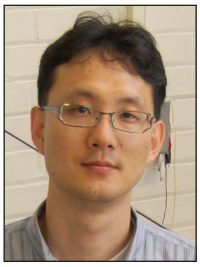
Baskar Ganapathysubramanian developed a mathematical framework for interrogating and designing photovoltaic devices and SETDiR (Scalable Extensible Toolkit for Dimensionality Reduction), a computational framework for non-linear dimensionality and model reduction, which is funded by a prestigious NSF grant.

Ted Heindel was PI on a grant to create energy education initiatives for the college of engineering. He also mentored undergraduate student Tim Morgan who won the ASME Fluids Engineering Division 2010 Young Engineering Paper Contest, beating out graduate students from Purdue and Virginia Tech.

Atul Kelkar
Professor

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

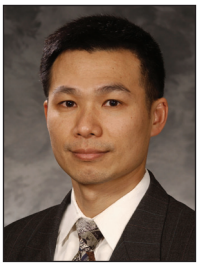
Professor Kelkar researches control theory, robust and nonlinear control, acoustic noise control, vibration control, flexible multibody dynamics, integrated design via multiobjective optimization, robotics, and neural networks.



Gap-Yong Kim
Assistant Professor

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

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



Song-Charng Kong
Associate Professor

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

Professor Kong researches experimental engine combustion and emissions studies, biorenewable energy utilization in internal combustion engines, numerical combustion study and model development using detailed chemical kinetics with computational fluid dynamics, and optimization of engine performance via experiments and numerical models.

Valery I. Levitas
Schafer 2050 Challenge Professor
Department of Mechanical Engineering and of Aerospace Engineering

Kiev Polytechnic Institute, Kiev, USSR, MS (Honors) in Mechanical Engineering, 1978
Institute for Superhard Materials, Kiev, USSR, Candidate of Sciences in Materials Science, 1981
Institute of Electronic Machinebuilding, Moscow, USSR, Dr. of Sciences in Continuum Mechanics, 1988
University of Hannover, Germany, Doctor-Engineer habil. in Continuum Mechanics, 1995

Professor Levitas studies stress- and strain-induced phase transformations, high pressure mechanics and mechanochemistry, structural changes in materials via virtual melting, multiscale modeling, strain-induced chemical reactions, large inelastic deformation of solids, continuum thermodynamics and kinetics, instabilities in materials and structures, micromechanics and nanomechanics, energetic and nanoenergetic materials, superhard materials, and smart materials.

Greg Luecke
Associate Professor

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

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

Erin MacDonald
Assistant Professor of Mechanical Engineering and of Art & Design
Michael and Denise Mack 2050 Challenge Scholar

BS, Materials Science and Engineering, Brown University, 1998
MS Mechanical Engineering, University of Michigan, 2004
PhD, Mechanical Engineering, University of Michigan, 2008

Professor MacDonald researches product design; sustainable design; design optimization; behavioral psychology; construction of consumer preferences; judgment and decision-making regarding products; and cognitive and learning styles.

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

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

Faculty Highlights

Atul Kelkar is working with an Ames, Iowa startup company on the development of new processes and equipment which can be used to recover energy from waste streams such as waste plastics, used oil, and used tires in the form of useful fuels. Dr. Kelkar is also a member of a NASA team engaged in developing methods and tools for early-stage control-relevant design of next generation of Hypersonic vehicles. His entrepreneurial efforts are engaging ISU faculty from other engineering departments in new research projects through an STTR grant.

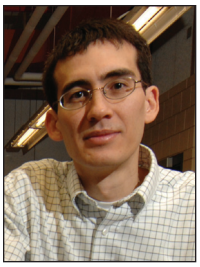
Gap-Yong Kim received a grant from the National Science Foundation titled, "Novel Manufacturing of Bio-inspired Metal Matrix Composites by Semisolid Forming-Joining." His research group will establish a novel metal composite manufacturing process that can create a hierarchical structure, bio-inspired by an abalone seashell.

Song-Charng Kong performed innovative research in exploring alternative engine fuels such as ammonia, mixtures of biodiesel and waste plastics, and mixtures of bio-oil and ethanol. His research also included the combustion of synthesis gas produced from biomass gasification.

Greg Luecke recently began research and development for mobile satellite TV antenna and two-way Internet antenna that involves the use of a six-degree-of-freedom vehicle simulation motion base.

Erin MacDonald co-organized the first ever Mechanical Engineering Design Expo, featuring over 50 student design projects. She received a patent for a compliant umbrella frame. She presented her research in conferences in the Engineering Design and Marketing. She gave one talk on Sustainable Design at 3M and two at John Deere, including one to their Enterprise Technology Council.

The Nuclear Engineering Minor continued to grow under the leadership of **Greg Maxwell**. This year had seen the development of two new nuclear engineering courses - NUC E 441 (Probabilistic Risk Assessment) taught by Dr. Heising (IMSE) and NUC E 461 (Radiation Detection, Measurement and Simulation) taught by Dr. Maxwell (ME). The nuclear engineering minor is attracting students from EE, AeroE, MatE, ChemE as well as ME.



Terry Meyer
William and Virginia Binger Assistant Professor of Mechanical Engineering

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

Professor 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.

Pal Molian
Professor

BE, Indian Institute of Science, 1975
ME, Indian Institute of Science, 1977
PhD, Oregon Graduate Institute of Science and Technology, 1982

Professor Molian works with materials and manufacturing with a focus on laser processing, nanotechnology, microelectromechanical systems, and solid freeform fabrication.

Reza Montazami
Assistant Professor

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

Dr. Montazami's research interests include 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.

W. Ross Morrow
Assistant Professor

BS, Mechanical Engineering, University of Michigan Ann Arbor, 2001
MS, Applied Interdisciplinary Mathematics, University of Michigan Ann Arbor, 2008
MS, Mechanical Engineering, University of Michigan Ann Arbor, 2008
PhD, Mechanical Engineering, University of Michigan Ann Arbor, 2008

Professor Morrow works with engineering design; environmentally benign engineering; environmental regulatory policy and engineering design; numerical methods for nonlinear problems; optimization and equilibrium problems; and models of consumer choice.

Faculty Highlights

Terry Meyer's work in laser diagnostics for combustion and alternative fuels received new awards from the Department of Energy, Air Force Office of Scientific Research, and Iowa Power Fund. A proposal he wrote in 2010 for a National Science Foundation CAREER award was also selected for funding starting in 2011. Dr. Meyer accepted the Young Researcher Award and a position as Guest Professor at Friedrich-Alexander University in Erlangen, Germany, visiting for a month in the Summer of 2010. He served as Chair of two conferences for the Optical Society of America, and in addition to publishing a book chapter in the Handbook of Combustion, he worked as guest co-editor for a special issue of Applied Optics, a peer-reviewed journal of the Optical Society of America.

Pal Molian had one of the top 10 articles in 2010 by ASME Journal of Medical Devices.

A report on transportation policy co-authored by **W. Ross Morrow** was covered by several major media sources including the New York Times, Bloomberg News, and Iowa Public Radio. Dr. Morrow also continued development of models, numerical methods, and software for simulating large-scale complex engineering-economic systems with the next generation of system models based on economic equilibrium principles.

Ron Nelson
Professor

BS, Mechanical Engineering, Iowa State University, 1970
MS, Mechanical Engineering, Iowa State University, 1972
PhD, Mechanical Engineering, Stanford University, 1981

Professor Nelson's interests include energy conversion and utilization, environmental control, thermal system optimization, and applied artificial intelligence.

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

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

Professor 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
Associate Professor

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

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

Pranav Shrotriya
Associate Professor
Associate Chair for Graduate Studies and Research
Director of Graduate Education

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

Professor 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.

Jim Oliver continued to lead 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's archival journal papers were cited 143 times in 2010 according to Web of Science.

Pranav Shrotriya served as Technical Program Chair for BIOENGINEERING MATERIALS, MECHANICS AND STRUCTURES and Student Symposia track at 47th Annual Technical Meeting of Society of Engineering Science at Ames, Iowa October 2010. In collaboration with Prof. Sundararajan, he has established a NSF REU site on microscale sensing, imaging and actuation (MoSAIc) in the department.

Faculty Highlights

Shankar Subramaniam conducted research at the University of Florida, Gainesville as part of his FPDA (sabbatical) to develop a new mathematical formulation for multi-phase flows that relaxes the assumption of separation of scales by accounting for fluctuations in the number and associated volume fraction of particles. He delivered lectures on this topic at the National Energy Technology Laboratory in Morgantown, WV to developers of the popular MFIX code for multiphase flow simulation. Results were presented at the 2010 International Conference on Multiphase Flow at Tampa, FL, and Professor Subramaniam's paper was selected from 400 other papers for the Best Paper Award. He is the recipient of a National Science Foundation award in collaboration with Professor M. G. Olsen (ME, ISU) to develop better multiphase models for CO2 cleanup through studying heat and mass transfer in fluid-particle suspensions through direct numerical simulation and laser-based measurements.

Sriram Sundararajan, together with Prof. Shrotriya established an NSF-sponsored summer research program no Microscale Sensing, Actuation and Imaging (MoSAIc). Dr. Sundararajan, in working with the Undergraduate Education Committee, has developed a sustainable assessment model to support the department's continuous improvement and accreditation efforts. He was appointed as Assistant Editor to the Wear Special Issue with articles from the 2011 International Conference on Wear of Materials.

Judy Vance has been appointed the Joseph C. and Elizabeth A. Anderlik Professor of Engineering. Her research involves international collaborations with universities in The Netherlands and France on the use of virtual reality for product design and manufacturing. Research focuses on methods to support human interaction with CAD models in an immersive virtual environment.

In 2010, **Xinwei Wang** had 7 journal papers published or accepted for publication in highly visible technical journals, like Journal of Physical Chemistry, Carbon, and Acta Materialia. He gave 5 invited talks at conferences or universities, and two other normal conference presentations. Two new grants were awarded from the National Science Foundation and the Army Research Office.

Shankar Subramaniam
Associate Professor

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

Professor 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 Professor
Associate Chair for Undergraduate Studies

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

Professor 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

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

Professor 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
Associate Professor

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

Professor Wang's areas of interests are 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
Dean, College of Engineering
James and Katherine Melsa Professor in Engineering
Professor, Department of Mechanical Engineering

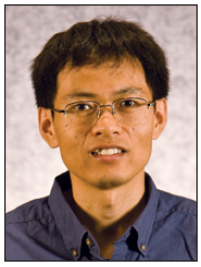
BS, Mechanical Engineering, University of California at Berkeley, 1985
MS, Mechanical Engineering, University of California at Berkeley, 1987
PhD, Mechanical Engineering, University of California at Berkeley, 1989

Professor Wickert's research interests include mechanical vibration and noise control, continuous and multibody systems dynamics, applied mechanics, applications in computer data storage, flexible web material manufacturing, and friction-vibration interaction.

Eliot Winer
Associate Professor

BS, Aeronautical and Astronautical Engineering, The Ohio State University, 1992
MS, Mechanical Engineering, State University of New York at Buffalo, 1994
PhD, Mechanical Engineering, State University of New York at Buffalo, 1999

Professor 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.



Song Zhang
Assistant Professor

BS, Precision Machinery & Precision Instrumentations, University of Science & Technology of China, China, 2000
MS, Mechanical Engineering, Stony Brook University, 2003
PhD, Mechanical Engineering, Stony Brook University, 2005

Professor Zhang researches three-dimensional optical metrology, machine and computer vision, virtual reality, human-computer interaction, nondestructive evaluation, and biometrics.

Faculty Highlights

Research in **Eliot Winer**'s lab focusing on allowing enhanced exploration of digital medical data has been transitioned into a commercial product. It is currently being used at a major US hospital for planning radiation oncology treatments and organ transplant procedures. Dr. Winer was on research teams that attracted more than $1.5M in new funding to ISU.

Song Zhang received research grants totalling nearly $500k, delivered 5 invited talks at universities and conferences, and published 7 journal papers including two being featured on the journal covers. He was invited by CRC Press, Taylor and Francis Group LLC, to edit a book entitled "Handbook of 3-D machine vision: optical metrology and imaging", which is anticipated to be release in May 2012. His research was covered by public media and press releases many times.

Faculty Highlights

Emmanuel Agba provided notable leadership in design and manufacturing course improvements and delivery. He led effort in upgrading manufacturing laboratory equipment for both teaching and research.

The ME Capstone Design Program under the direction of **Jim Heise** arranged for 23 projects for senior design courses. Sponsorship 17 industrial projects were acquired for ME415 and ENGR466 students. Of those projects, 16 were co-sponsored by ISU Extension CIRAS and one was sponsored by a national corporation; the CIRAS sponsored projects provide service outreach to Iowa industry. 4 additional projects were sponsored by student club organizations. An additional project was worked by a team of ME seniors as a service outreach project for an extended care patient in northeast Iowa. Two ME senior designs were submitted for patent disclosure by the sponsoring company.

Gloria Starns studied how linguists, psychologists, physicists and engineers are working together to better understand how students go through the process of setting up and solving problems; the ultimate objective of this work is to develop systems that will help students successfully complete complex problems.

Senior Lecturers

Emmanuel Agba

Gloria Starns

Lecturers

David Asjes

Sebastien Feve

Matt Hagge

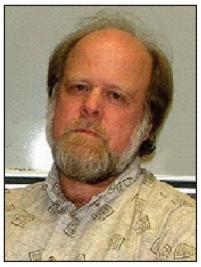
Jim Heise

Emeritus Faculty

Shyam Bahadur
Bill Bathie
Joseph Baumgarten
Jim Bernard
Jerry Colver
Bill Cook
Richard Danofsky
Paul DeJong
Arvid Eide
Max Gassman
Jerry Hall
Alexander Henkin
Alfred Joensen
George Junkhan
Pat Kavanagh
Charles Mischke
Ted Okiishi
Mike Pate
Leo Peters
Dick Pletcher
Don Roberts
George Serovy
Howard Shapiro
Bernard Spinrad

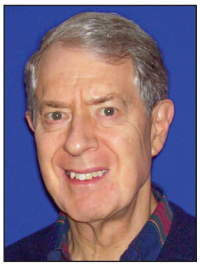
Adjunct and Courtesy Appointments

Ashraf Bastawros
Adjunct Associate Professor
Aerospace Engineering



Joseph N. Gray
Adjunct Associate Professor
Physicist, Center for Nondestructive Evaluation

Michael Kessler
Courtesy Associate Professor
Materials Science and Engineering



John McClelland
Adjunct Associate Professor
Senior Physicist, Ames Laboratory

Richard Stone
Courtesy Assistant Professor
Industrial and Manufacturing Systems Engineering

Publications

Peer-Reviewed Journal Publications

Patwardhan, P., J. Satrio, **R. Brown**, and B. Shanks. 2010. Influence of inorganic salts on the primary pyrolysis products of cellulose. *Bioresource Technology* 101:4646-4655.

Wright, M. M., D.E. Daugaard, J.A. Satrio, and **R.C. Brown**. 2010. Techno-economic analysis of biomass fast pyrolysis to transportation fuels. *Fuel 89* (Supplement 1): S2-S10.

Swanson, R., A. Platon, J. Satrio, and **R.C. Brown**. 2010. Technoeconomic analysis of biomass-to-liquids production based on gasification. *Fuel 89* (Supplement 1): S11-S19.

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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

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