

IOWA STATE UNIVERSITY

Department of Mechanical Engineering



2018-19 Annual Report

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Front Cover: *Members of Iowa State's chapter of Engineers Without Borders have spent the past few years traveling to the village of Ullo in Ghana, Africa to help develop a water pump systems to give residents easier access to clean drinking water.*



ISU ME Annual Report 2018-2019

Department Chair
Carolines Hayes

Associate Chair of Graduate Education
Pranav Shrotriya

Associate Chair for Undergraduate Education
Cris Schwartz

Associate Chair for Research
Baskar Ganapathysubramanian

Director of Diversity
Barbara Lograsso

The 2018-19 ISU ME Annual Report is provided by the Iowa State University Department of Mechanical Engineering. The department accepts story ideas, photos, alumni stories, comments and other inquiries
Email me-communications@iastate.edu

For the latest ISU ME news, visit our website at www.me.iastate.edu



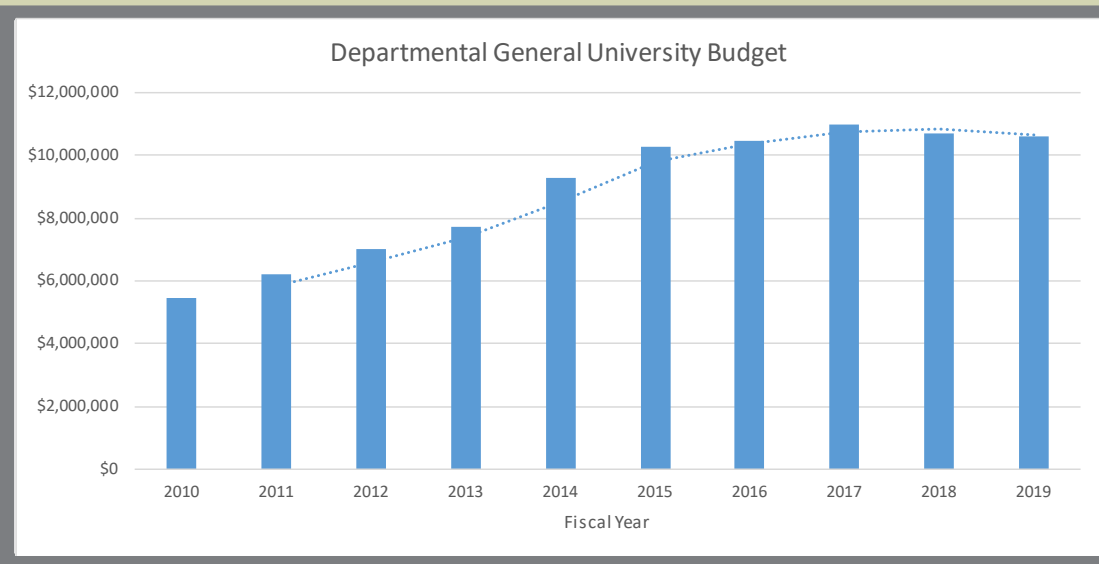
[www.facebook.com/
ISUMechanicalEngineering](https://www.facebook.com/ISUMechanicalEngineering)



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FACTS AND FIGURES

FINANCIAL



Top 20 Research Sponsors

Ordered alphabetically

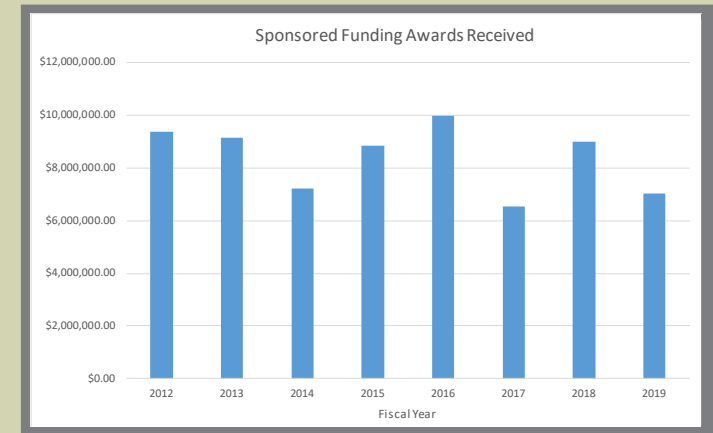
- American Institute Of Chemical Engineers
- Boeing Company
- Conocophillips Company
- Cornell University
- Department of Agriculture - National Institute of Food & Agriculture (NIFA)
- Department of Defense - Air Force Office Of Scientific Research (AFOSR)
- Department of Defense - Army Research Office (ARO)
- Department of Defense - Defense Threat Reduction Agency (DTRA)
- Department of Defense - Office Of Naval Research (ONR)
- Department of Energy
- Department of Justice - National Institute Of Justice (NIJ)
- Deere & Company
- Exxonmobil Research And Engineering Company
- Iowa Economic Development Authority
- Molecular Express Inc. DBA Aptaligo Inc.
- National Science Foundation
- Phillips 66 Company
- Winegard Company
- UI Labs
- University of Florida

Department Full-Time Equivalent (FTE) Data
Calendar Year 2018

Position Classification	FTE
Faculty	55.33
Graduate Assistant	74.00
Merit	3.00
Professional & Scientific (P&S)	25.00
Pre/Post Doc	5.00

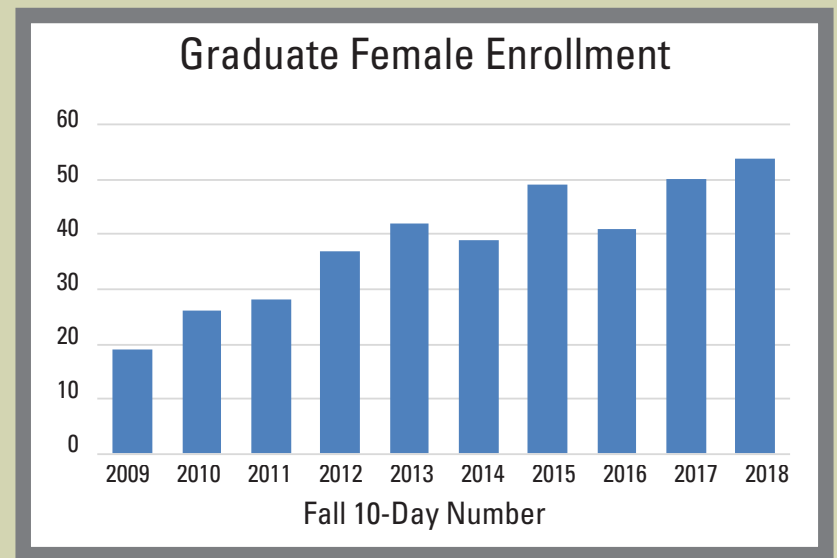
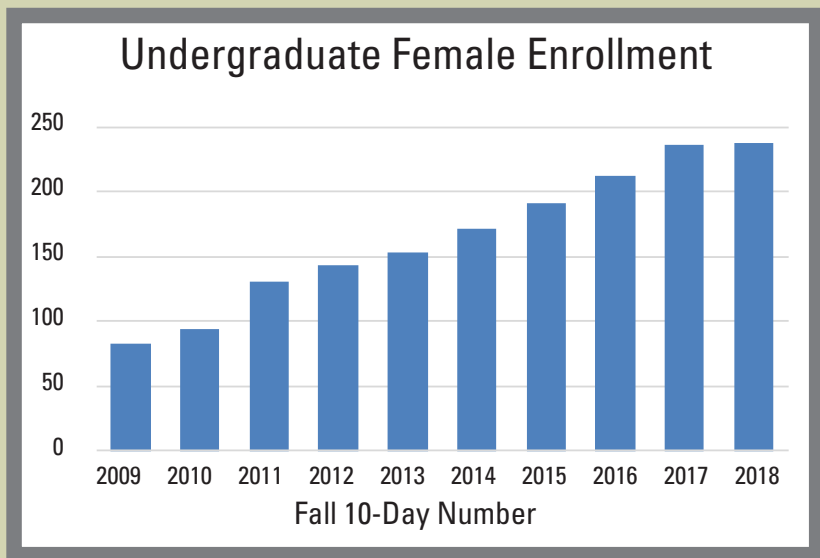
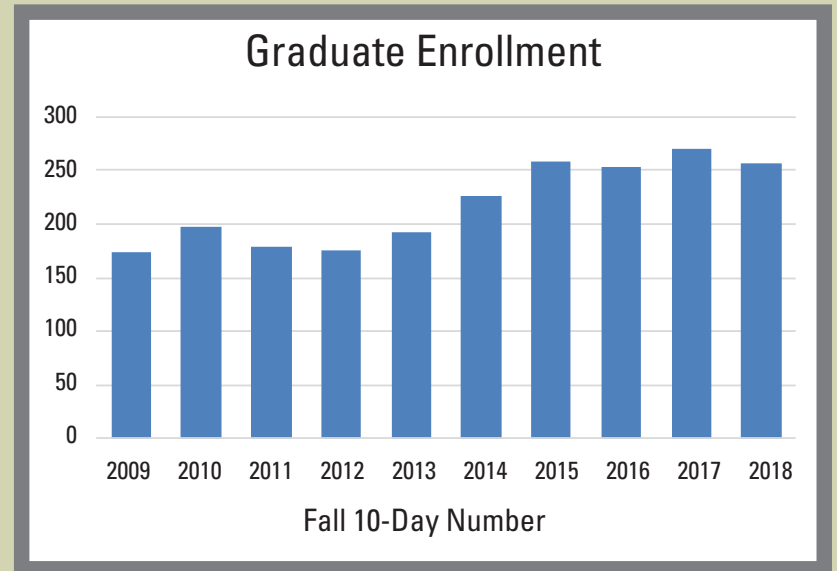
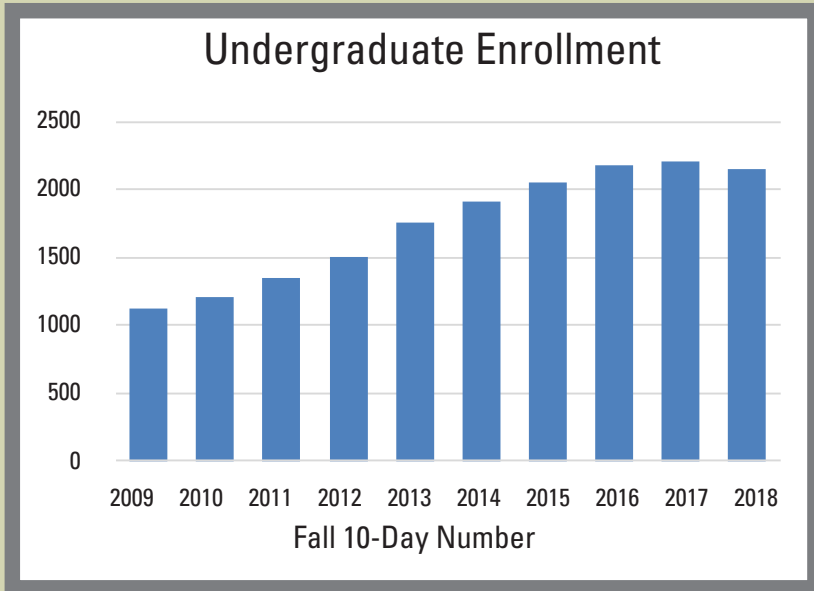
Faculty Appointment (FTE) Data
Calendar Year 2018

Position Classification	FTE
Professor (Tenured)	16.50
Associate Professor (Tenured)	9.17
Assitant Professor (Tenure-Eligible)	17.00
Assitant Professor (Non-Tenured)	0.33
Instructor (Non-Tenured)	13.33



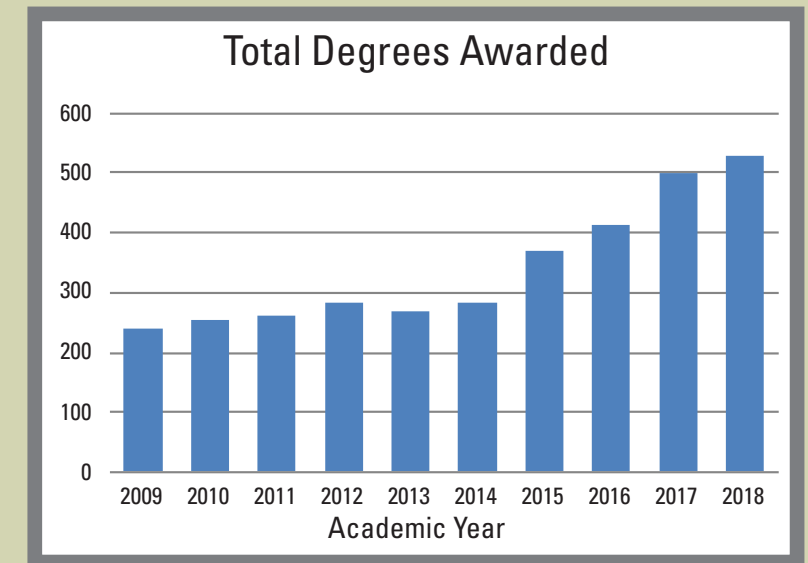
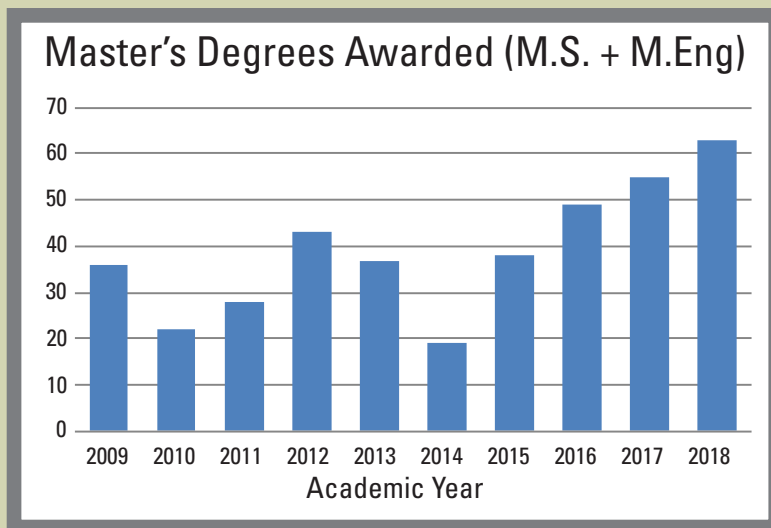
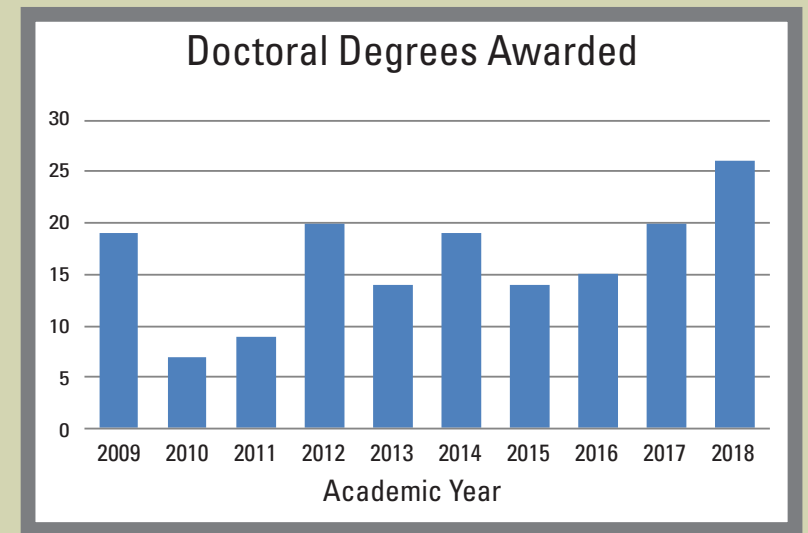
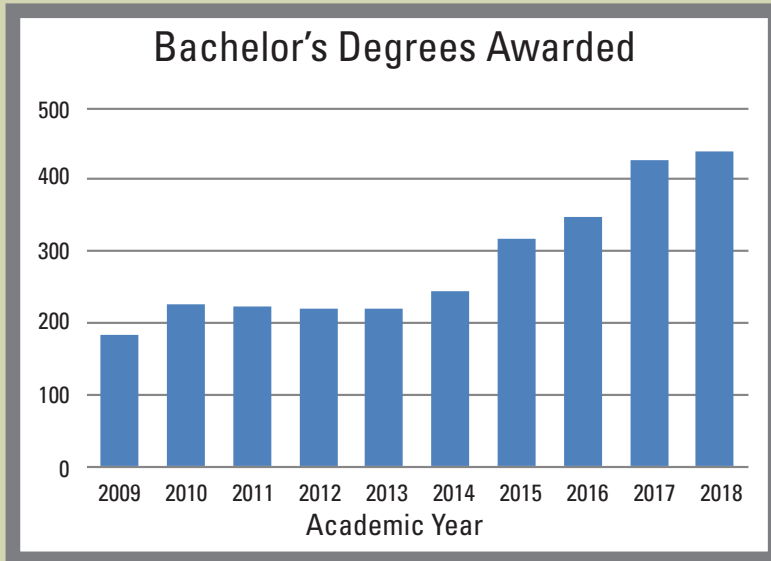
FACTS AND FIGURES

ENROLLMENT DATA



FACTS AND FIGURES

GRADUATION DATA



AWARDS AND HONORS

Undergraduate Students

Courtney Beringer, Outstanding Senior for Spring 2019 commencement

Elizabeth Olsen, 2019 Student Community Advocate of the Year

Nemeer Jaleel Padiyath, Outstanding Senior for Fall 2018 commencement

Thomas Polzin, 2019 ISU Student Employee of the Year Award

ME 324L Undergraduate Teaching Assistant Citation Award *Fall 2018* *Spring 2019*

Arianna Anderson

Scott Garrett

Dustin Hagemann

Preston Hoye

Jace Holton

Nathan Perk

Jacob Smidt

Dillon Waugh

Ryan Bedford

Joe Broberg

Jack Herstowski

Colin Morabito

Max Newman

Elizabeth Olson

Kaleb Troyer

Andrew Yadlosky

Nermin Zec

Faculty and Staff

Jonathan Claussen, Assistant Professor

Early Career Engineering Faculty Research Award

Baskar Ganapathysubramanian, Professor

Marvin A. Pomerantz Award

Jim Heise, Senior Lecturer

Outstanding Engineering Faculty of the Year

Chao Hu, Assistant Professor

American Society of Mechanical Engineers (ASME)
Teacher Design Automation Young Investigator Award

Owen Kolstad, Senior Lecturer

Student Organization Adviser of the Year

Graduate Students

Austin Downey, Patent awarded for "Apparatus, method and system for high capacity band brake type variable friction damping of movement of structures"

Anthony LoCurto, 2018 Edmund Optics Education Award

Vignesh Suresh, Best Student Paper Award" in the Optoelectronics, Photonic Materials and Devices category at the SPIE Photonics West 2019 Conference

Bowei Zhang, 2019 ISU Graduate and Professional Student Senate Research Award

Research Excellence Awards

Fall 2018

Jake Lindstrom

Mohammadkazem Sadoughi

Srilok Srinivasan

Cheng-Hao Wu

Research Excellence Awards

Spring 2019

Onur Bingol

Ridong Wang

Bowei Zhang

Teaching Excellence Awards

Fall 2018

Sayani Maity

Heather Muchowski

Ryan Ogren

Teaching Excellence Awards

Spring 2019

Meghana Akella

Makrand Khanwale

Marilyn McNamara

Alyssa Mittleider, Academic Adviser

Outstanding Academic Adviser of the Year

Paola Pittoni, Lecturer

Superior Engineering Teacher Award

Jessica Van Winkle, Former Academic Adviser

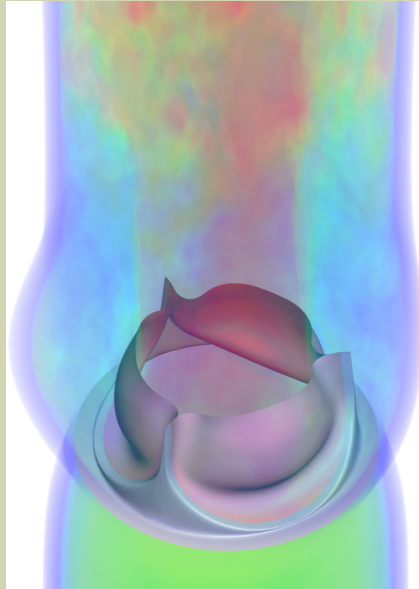
Superior Engineering Adviser Award

RESEARCH FOCUS AREA – COMPUTATIONAL SCIENCES

BIG DATA

VISUALIZATION

The simulation and visualization program investigates advanced computational and hardware techniques to understand and predict physical phenomena, as well as unique image rendering methods to enhance the interpretation of complex systems and data sets. There has been a special emphasis on leveraging the data deluge (big data) coming from cheap sensor technology and computing resources. This program develops and advances simulation and visualization capabilities and applies them in a societal context. One goal is to develop enabling technologies for products or processes to be altered and tested in a virtual environment before any physical models are created. Such capability will significantly reduce the time and cost associated with product development, while improving the accuracy, efficiency, and robustness of a product or manufacturing process. In addition to foundational research activities involving graphics, computing, vision and intelligence and data analytics, specific applications of this thrust include designing and optimizing novel manufacturing processes, energy efficient processes and systems as well as understanding biomedical data.



RESEARCH FOCUS AREA – ENERGY

ENERGY SCIENCES

SUSTAINABILITY

Research in these areas insures a healthy future for our planet. It includes more efficient and smart use of limited fossil fuels; production of biofuels from renewable and sustainable sources, and harvesting of energy from the sun, wind, earth and water.



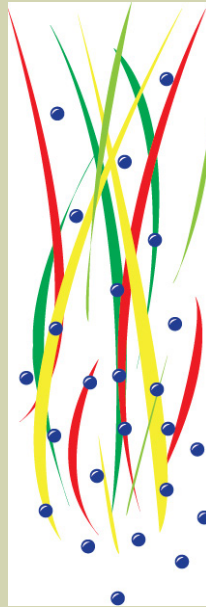
Image courtesy of Sandia Labs via Flickr

RESEARCH FOCUS AREA - FLUIDS

MULTIPHASE

COMPLEX

The multiphase flow and complex fluid systems program investigates non-Newtonian, multiphase, turbulent, and/or chemically reacting flows over multiple length and time scales. We 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 multiphase flow and complex fluid processes and validate these processes through novel experimental techniques and exploration tools. Faculty working in these areas have a wide range of research interests including flow visualization and mixing; direct numerical simulation and modeling; uncertainty quantification and multiscale modeling; device-scale multiphase simulations; multi-scale microfluidics; lab-on-a-chip, diagnostics and therapeutics; fluid-structure interaction; scientific visualization and GPU computing; self-assembly of complex fluids; biomass and energy systems analysis; laser/optical diagnostics; microscale sensing; and combustion of fuels and energetic materials.

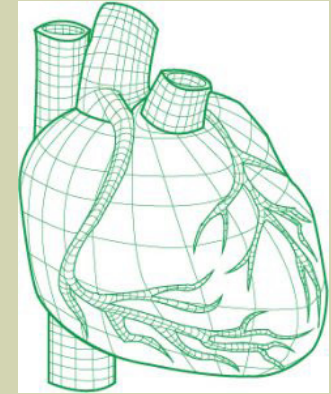


RESEARCH FOCUS AREA - HEALTH

BIOENGINEERING

TRANSLATIONAL HEALTH

The biological and translational health program investigates problems at the interface of engineering, biology, and medicine, allowing us to apply the fundamental principles of mechanical engineering to expand opportunities for new science and engineering breakthroughs and translating these breakthroughs into clinical implementation. By merging the engineering fields of design, manufacturing, dynamics, materials, mechanics, fluid flow, and heat transfer with the scientific fields of chemistry, materials science, biology, we pursue experimental and computational strategies to understand the physical principles of phenomena impacting human health. This enabling research uses physical and data-enabled understanding of unique issues at the biotic/abiotic interface to make significant and lasting impact on challenges in cancer, infectious diseases, neurosciences, age-related diseases and global health.



RESEARCH FOCUS AREA - MULTI-SCALE ENGINEERING

DESIGN, MANUFACTURING

NANOSCALE SCIENCES



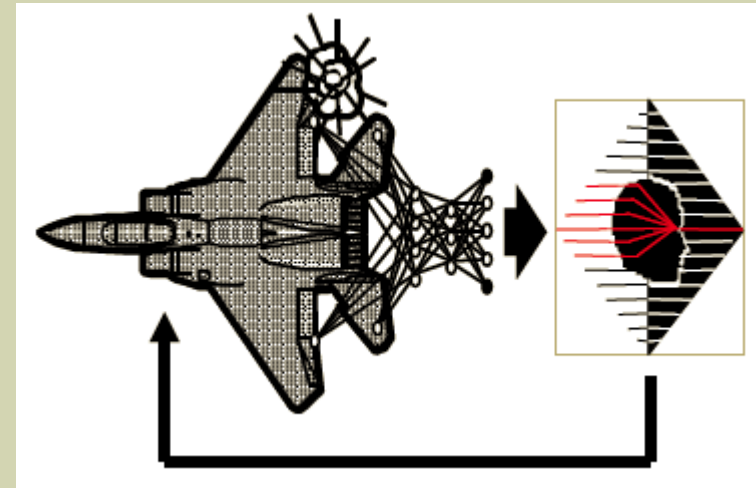
RESEARCH FOCUS AREA - SYSTEMS

DYNAMICS

SENSORS

CONTROLS

Dynamics, sensors and controls are how electromechanical systems interact with people and their surroundings. Sensors, actuators and intelligent computer software work together to enable us to build smart systems such as windows that sense and cancel noise, energy efficient buildings that predict and adjust to our needs, robots that can work alongside humans as teammates, and vehicles (cars, planes, spaceships and undersea craft) that can guide themselves.



SENIOR CAPSTONE

Right: ME Senior Lecturer Mike Messman leads a section of ME 415: Mechanical System Design, also known as ME Senior Capstone.



Fall 2018 Project Sponsors *Ordered alphabetically*

ESAPCO
EZ Way
GOMACO
Hadar Athletics
Iowa State University Department of Music
Iowa State University Department of Mechanical Engineering*
Iowa State University SAE Formula*
Iowa State University Space Mining Club*
Kreg Tools
Life Line - Folience
Maurer-Demco
Pella Windows (two projects)
PMW
Power Lift
Veridian
Seneca Foundry
Silent Drive
Simco Drill
Smithfield Foods (two projects)
United Equipment Accessories
Woodruff Construction*
** denotes M E 466: Multidisciplinary Engineering Design project*

Spring 2019 Project Sponsors *Ordered alphabetically*

ADM
BeStill Enterprises, LLC
Collins Aerospace
DeeZee Manufacturing
GOMACO
Iowa State University Department of Mechanical Engineering*
Iowa State University Department of Music
Iowa State University Environmental Health and Safety
John Deere Ottumwa Works
Kreg Tools
Life Line - Folience*
Musco Lighting*
Pella Windows (two projects)
United Equipment Accessories
Vanmark Equipment
Windsor Windows
Winegard
** denotes M E 466: Multidisciplinary Engineering Design project*

INDUSTRY ADVISORY COUNCIL

Robin O’Callaghan, Chair	Kiewit Power, Inc.
Kyle Wehring, Vice Chair	Rockwell Collins
Brett L. Anderson, PE	The Boeing Company
Kristi Christensen	John Deere Paton
Diane Fischer	Black & Veatch Corporation
Mike Jensen	Caterpillar, Inc.
Cynthia Lord	Alliant Energy
Dave O’Brien	LyondellBasell
Jason Olberding	Emerson Process Management
Nancy Stewart	3M
Joe Wright	Danfoss

Members of the Industry Advisory Council (IAC) pose members from ME student groups during the spring 2018 IAC meeting.



