



# Washington State University

School of Mechanical and Materials  
Engineering

**2016 Annual  
Report**

March 2017



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## Annual report

The School of Mechanical and Materials Engineering (MME) is one of the largest and most research productive units at Washington State University. Our educational programs are shaping a new generation of mechanical and materials engineers who are being prepared to make a significant difference for the future of the state and the nation.

In the first quarter of each calendar year we prepare an annual report to measure and track various performance indicators for the School of MME. By providing this data in a concise and meaningful format we aim to better assess the scope and quality of our operations as we strive to continually improve our programs and their impact. As you'll see by looking through the data in this report, in 2016 the School of MME continued in its significant growth over the past four years in both research and education. Below are some of the highlights from 2016.



## Record number of students

- We awarded 10 PhD degrees (6 PhD ME degrees, 4 PhD MSE) in 2016.
- We awarded 24 MS degrees (12 MS MSE degrees and 12 MS ME degrees) in 2016.
- For the 2016 calendar year we awarded 213 baccalaureate degrees, including 22 BS MSE degrees and 191 BS ME degrees (141 BS ME degrees to Pullman students, 27 BS ME degrees to our Everett students, and 23 BS ME degrees to our Bremerton students).
- We continue to lead the Pacific Northwest in number of mechanical engineering degrees awarded. When mechanical engineering degrees from WSU Vancouver and WSU Tri-Cities are included, WSU ranks in the top 10 nationally (at number 9) in number of mechanical engineering degrees awarded by school (based on the most recent ASEE by the Numbers report).

## Faculty, staff, and students win personal recognition in 2016

Our faculty, staff, and students continue to be recognized for their exceptional contributions.

- Susmita Bose and Katie Zhong were elected fellows of the American Association for the Advancement of Science (AAAS).
- Qizhen (Katherine) Li was selected for the U.S. Frontiers of Engineering symposium.
- Susmita Bose was recognized with the 2016 excellence award from the International Society for Ceramics in Medicine (ISCM).
- Mike Kessler was named a Fellow of ASME.
- Yuehe Lin was again listed among the world's most cited researchers and recognized by Spokesman Review as an 'Influential Mind'.
- MME's Everett Mars Rover Team took second place in the University Rover Challenge (out of 30 semifinalists representing seven different countries), and team member Phil Engel was the only student in the competition to earn an individual science award.



- MME Graduate student Preetam Mohapatra won 1st place in the SAMPE Student Poster Contest.
- MME PhD student Cameron Hohimer received a National Science Foundation graduate research fellowship and Carl Bunge was awarded a NASA Space Technology Research Fellowship.
- Xiaopeng Bi won the Reid Miller Excellence in Teaching Award for Non-Tenured Faculty.
- Lauren Wells won the Crimson Spirit Award.
- Prashanta Dutta Received a Fulbright Scholar award.
- Gayle Landeen was recognized for her 20 years of excellent service to WSU and Priscilla Hastay was recognized for 25 years.
- Jake Leachman & Changki Mo were awarded tenure and promoted to the rank of Associate Professor. Jinwen Zhang was promoted to the rank of Professor, and Kurt Hutchinson was promoted to Senior Instructor.

## **A record number of new research grants awarded in 2016.**

Over 7 million dollars of new research grants were awarded in 2016 to School of MME faculty, including the following awards.

- Kelvin Lynn received funding from DOE EERE to develop a low cost, high-volume and scalable manufacturing technology for cadmium telluride feedstock materials.
- Susmita Bose received funding from NIH to investigate surface modified metal implants.
- Hussein Zbib and Dave Field received funding from the Qatar Natl. Res. Foundation for work involving multiscale modeling and characterization of materials for high energy and corrosive environments.
- Amit Bandyopadhyay received funding from NIH to study 3D printed coatings for load-bearing implants.
- Yuehe Lin and Annie Du received funding from the Center for Disease Control and PNNL for environmental health monitoring and exposure signatures of pesticides.
- Indranath Dutta received funding from the Missile Defense Agency to improve reliability of interconnects in 3D electronics for defense applications.
- John McCloy received funding from DOE's Office of Nuclear Energy to understand the influence of glass chemistry and history for vitrification of nuclear waste.
- Jake Leachman, Konstantin Matveev, and Dustin McLarty received funding from NREL to improve hydrogen liquefaction using a vortex approach to separate para and ortho-hydrogen.
- Scott Beckman and Soumik Banerjee received funding from ARPA-E to develop and test new low cost, safe, efficient and renewable all solid state sodium batteries for GRID scale energy storage.
- Mike Kessler received funding from the NSF for a new Research Experience for Undergraduates (REU) site affiliated with the Center for Bioplastics and Biocomposites.
- Prashanta Dutta and Yuehe Lin received funding from NIH for a project on multiscale modeling of transport through the blood brain barrier.



- Rahul Panat received funding from NSF for additive manufacturing of mechanically strong and electrochemically robust porous electrodes for ultra-high energy density batteries.
- Sinisa Mesarovic received funding from NASA to develop a computational framework for capillary flows.
- Jin Liu received funding from NSF to explore receptor-mediated endocytosis of bioparticles through multiscale modeling and simulation.
- Qizhen Li received funding from DOE Office of Science to study the low temperature cyclic deformation behavior of ultrafine-grained pure magnesium.
- Roland Chen received funding from NSF to understand dynamic behaviors of tissue welding for high quality electrosurgical tissue joints.
- Dustin McLarty received funding from NREL to work towards optimal stationary fuel cell integration and control.
- Several faculty received funding from the Joint Center for Aerospace Technology Innovation (JCATI) projects, the Commercialization Gap Fund (CGF), and industry in 2016.

## **Research Accomplishments**

With over 150 journal papers published in 2016, our faculty led advances in fields ranging from biomaterials to energy storage. Some significant accomplishments the past year include:

- A team led by Yuehe Lin and Scott Beckman developed a low cost water splitting catalyst that performs as well as or better than catalysts made from precious metals.
- Lei Li's research team has developed a low-cost portable laboratory on a smartphone that can analyze several samples at once to catch cancer biomarkers.
- Mike Kessler and Yuzhan Li developed a polymer that can bend, shape, re-shape, and heal when heat or light is applied.
- Yuehe Lin and his research team have created a handheld device to detect the food pathogen Escherichia coli (E.Coli) concept that uses biosensors to amplify the pathogen's signal so that it is easier to.
- Chuck Pezeshki's students in the Industrial Design Clinic developed a radio tracking system to monitor the survival rates of reintroduced apes in Borneo and for aerial surveys of endangered painted dogs in Zimbabwe.
- Rahul Pana and Indranath Dutta develop smart and flexible electronics.
- Bob Richards students design energy-saving walls made from trash and present their TrashWall project at the National Sustainable Design Expo.
- Dr. Kelvin Lynn and his collaborators passed a critical milestone in solar cell fabrication. Analogous to the 4-minute mile in track, they broke the one volt open-circuit voltage for cadmium telluride (CdTe) solar cells for the first time by improving both the CdTe conductivity and carrier lifetime by orders of magnitude.

## **New Hires**

We made some outstanding new hires in 2016:



- **Kuen-Ren (Roland) Chen** (PhD, 2013, Univ. of Michigan) joined the faculty in January 2016, from the University of Michigan. He works in additive manufacturing and biomedical manufacturing.
- **Dr. Gordon Taub** (PhD, 2013, Univ. of Florida) – new clinical assistant professor at WSU Everett
- **Dr. Colin Merriman** (PhD, 2015, Washington State Univ.) – new assistant research professor/laboratory manager for the MSE program
- **Derek Strong** – new laboratory instructor in Everett
- **Debi Mundell** – new academic coordinator/advisor in Pullman
- **Paul Veridian** – new academic coordinator/advisor in Pullman
- **Samantha Cooper** - new academic coordinator located in the WSU engineering programs in Bremerton
- **Linda Howell** – new academic coordinator for the Everett and Bremerton programs
- **Anika VanDeen** – new administrative assistant in the MME front office

We also said goodbye to some faculty and staff:

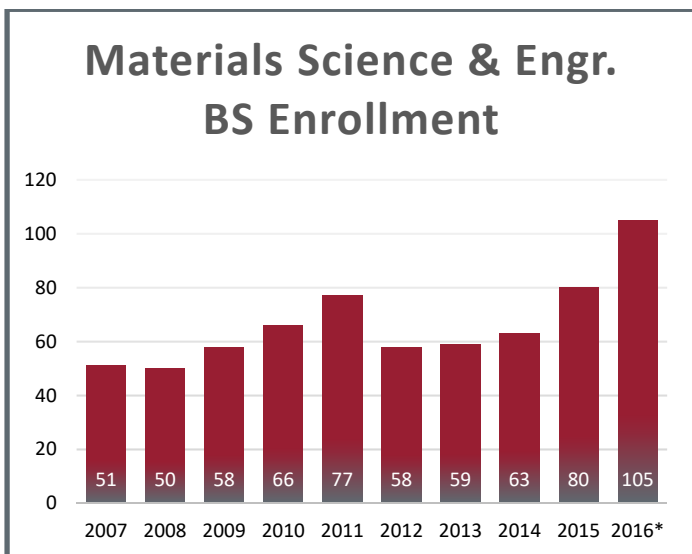
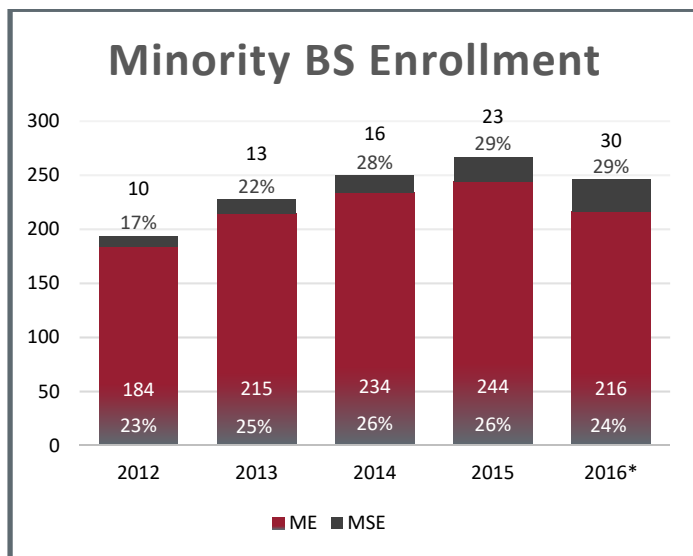
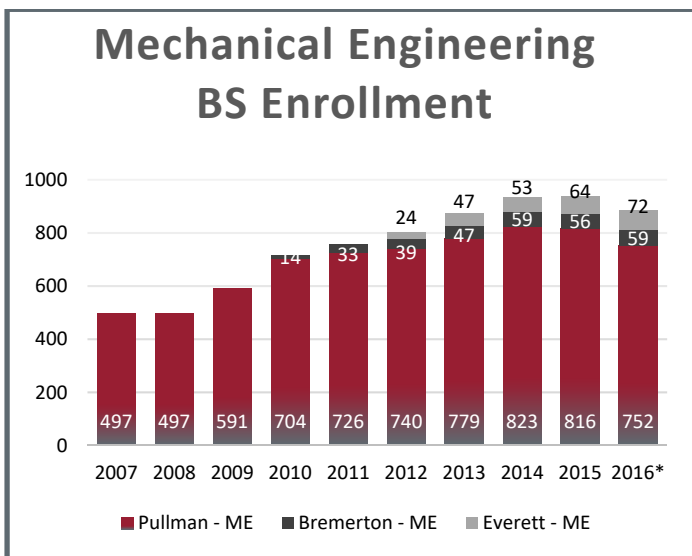
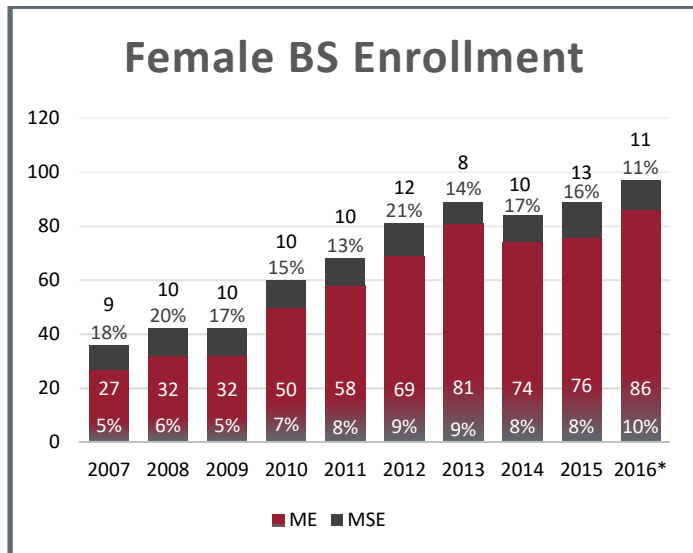
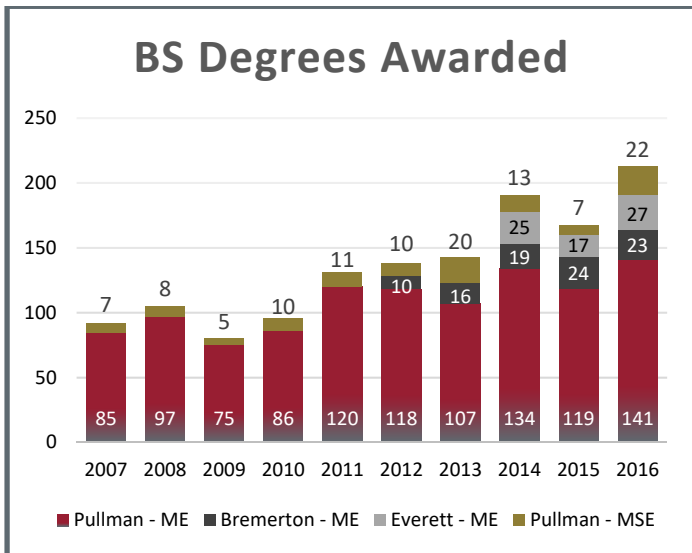
- Dr. Amy Wo resigned and moved to Australia
- Dr. Sophia Guo resigned and returned to China to be near her family
- Dr. Dana Ray Nilsson resigned as a clinical associate professor in Everett
- Priscilla Hastay retired as academic coordinator/advisor
- Marissa Naylor moved to a new position in the School of EECS
- Monika Jones moved to the VCEA business center

I hope from reading these pages, you will sense the exciting growth and opportunity in the School of MME as we strive to continue to improve in educating and inspiring the next generation of mechanical and materials engineers filled with curiosity and discovery. I welcome engaging with you about your thoughts for the School's future. Please feel free to contact me by phone at 509-335-8654 or by email at [MichaelR.Kessler@wsu.edu](mailto:MichaelR.Kessler@wsu.edu).

Mike Kessler  
Berry Family Director and Professor



## Undergraduate Education



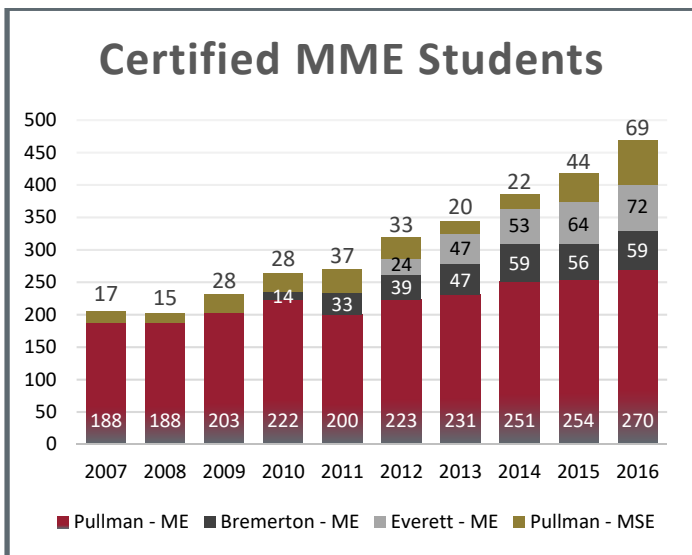
### Undergraduate Diversity

- Percent Female Enrollment - ME: 9.7%
- Percent Female Enrollment - MSE: 10.5%
- Percent Minority Enrollment - ME: 24.5%
- Percent Minority Enrollment - MSE: 28.6%

\*Starting in 2016, students at the pre-pre-calculus level are considered in pre-engineering and are no longer counted in ME or MSE enrollment. For 2016 there were 146 students in VCEA classified as pre-engineering.



## Undergraduate Certification

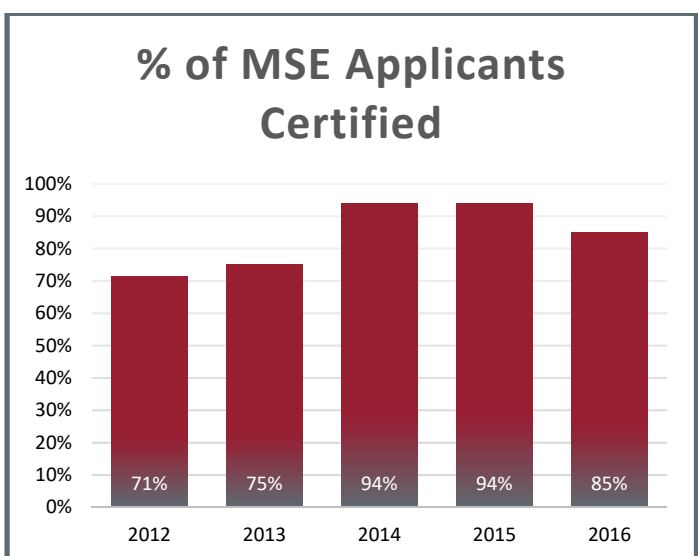
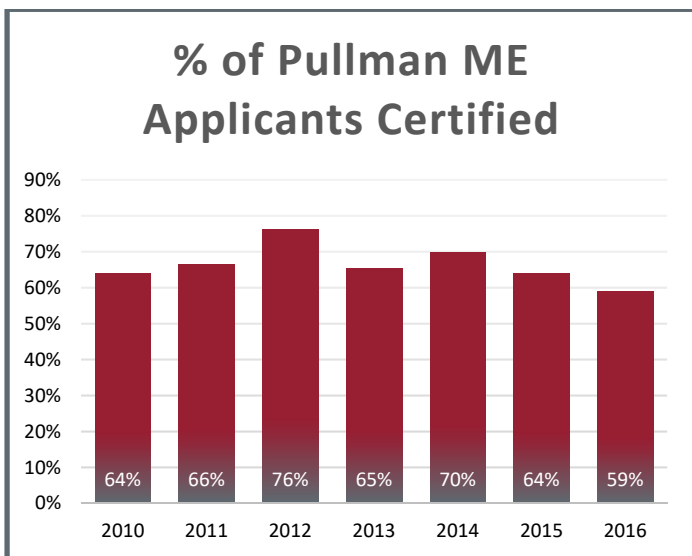
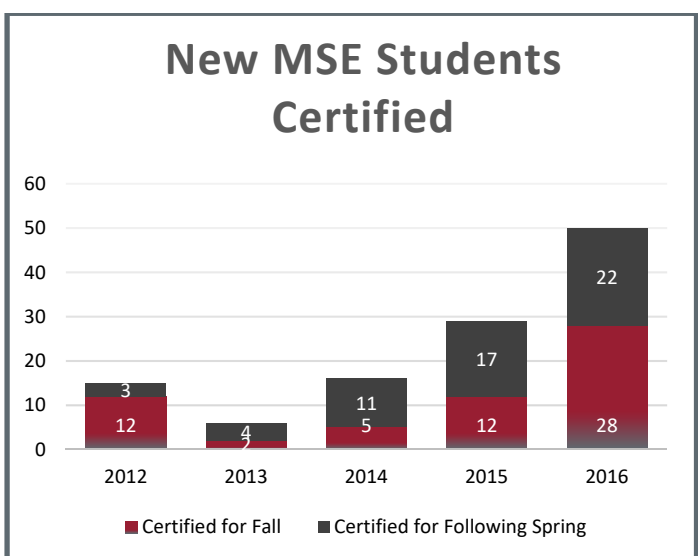
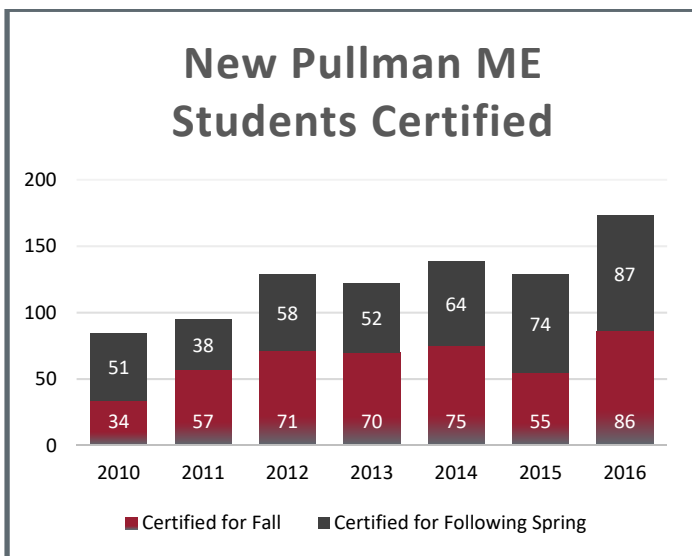


### Certification Requirements

Students apply for certification after completing Math 171, Math 172, Chem 105, Chem 106 (for MSE only), Phys 201, and CE 211 (for ME only).

The School of MME establishes the total number of students certified into the ME and MSE programs

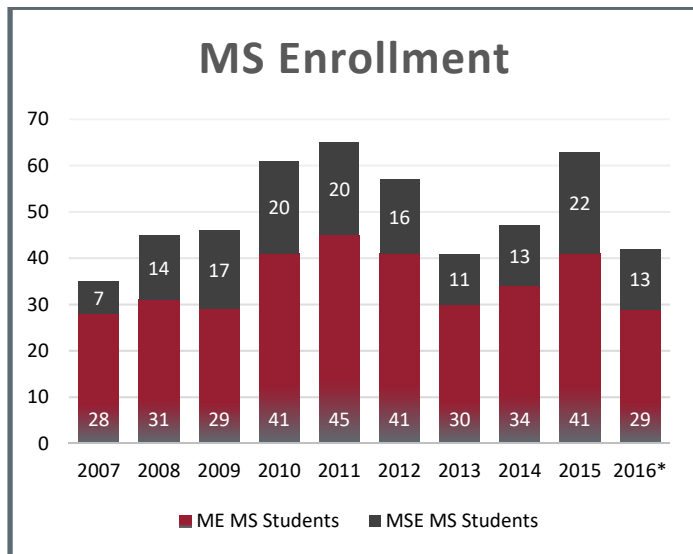
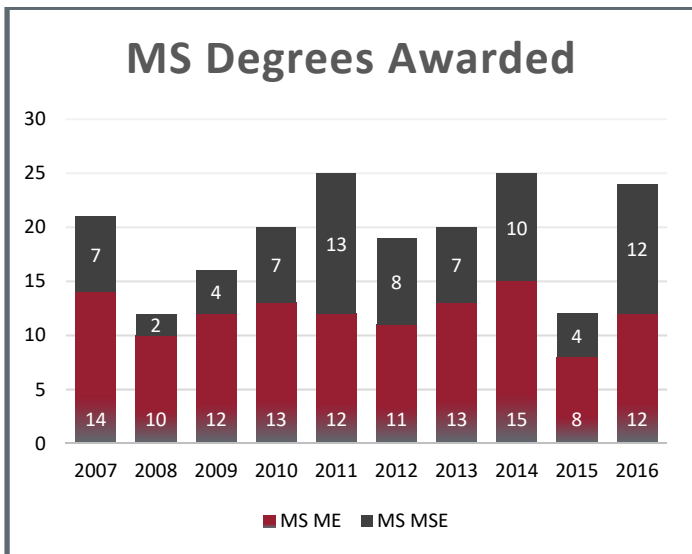
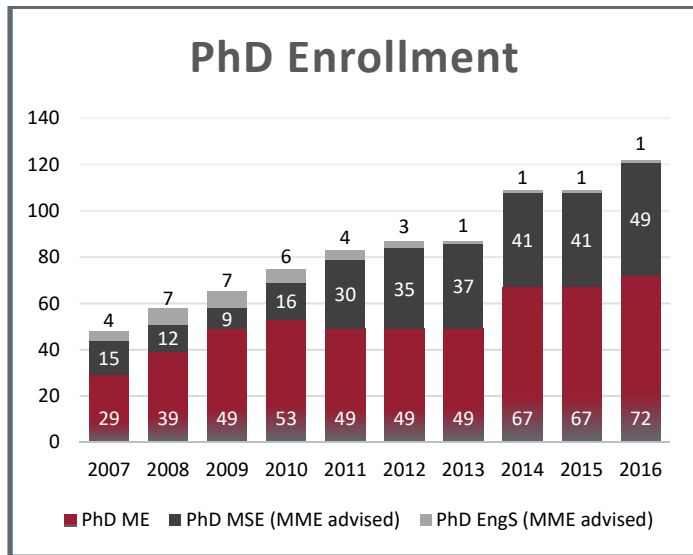
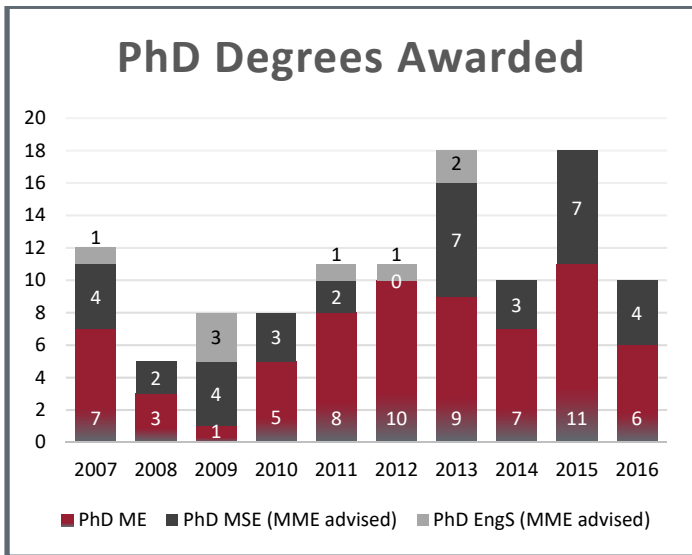
Applicants are ranked based on the average GPA of math, science, and engineering courses taken at WSU.







## Graduate Education



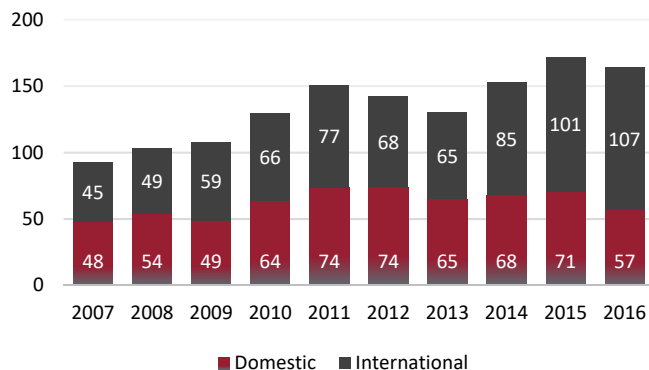
### Graduate Student Support (Fall Semester)

Graduate Teaching Assistants	32 MME 2 VCEA 1 Chem 2 Tri-Cities
Graduate Research Assistants	56 Pullman
Graduate Fellowships	4
Self-Supported (includes students sponsored by foreign governments)	54 Pullman 11 Tri-Cities

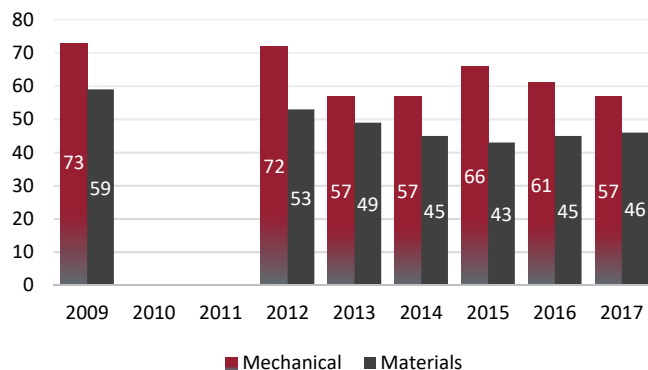
\*Starting in 2016, the MS ME students at the Tri-Cities campus were no longer included since that program split off from the School of MME in summer 2016.



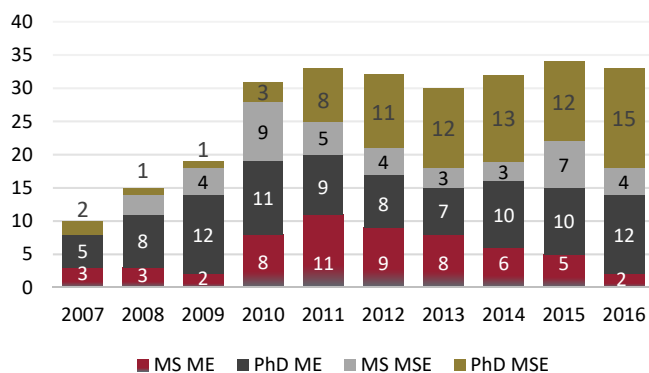
## Domestic/International Graduate Enrollment



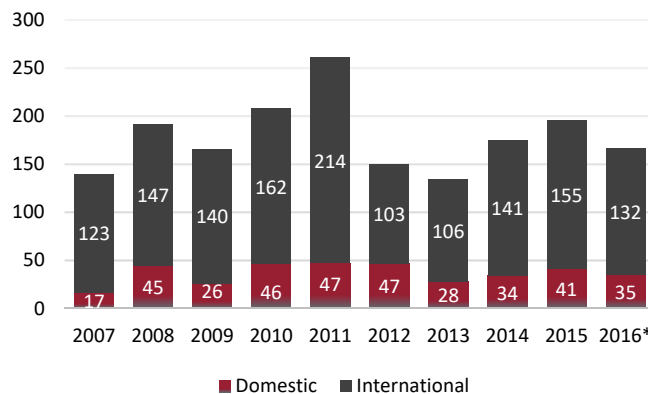
## US News & World Report Graduate School Ranking



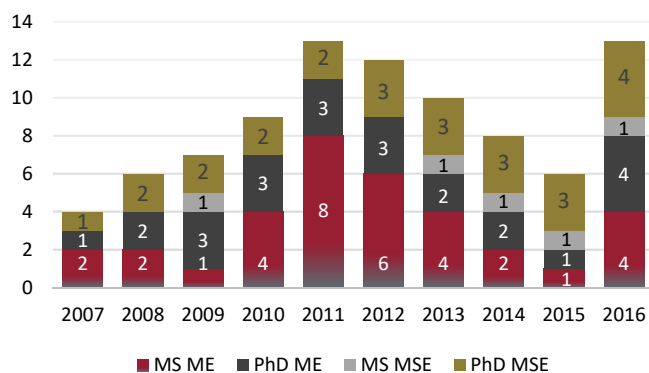
## Female Graduate Enrollment



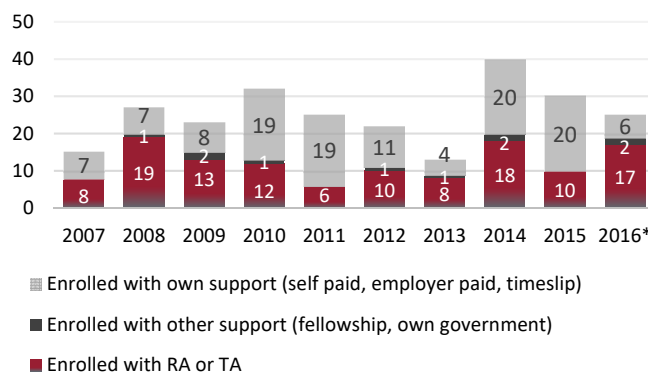
## Grad. Applications (MS ME, MS MSE, PhD ME)



## Minority Graduate Enrollment



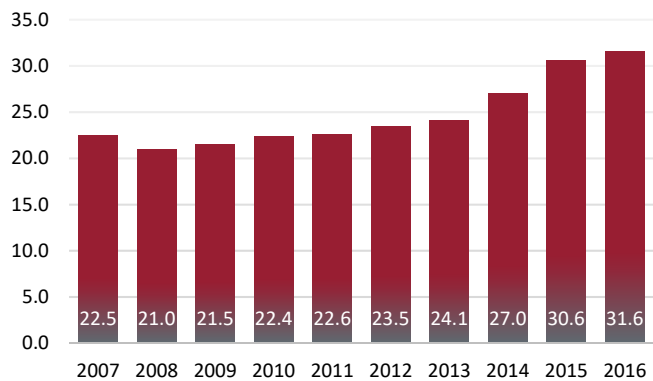
## Number of New Grad Students Enrolled



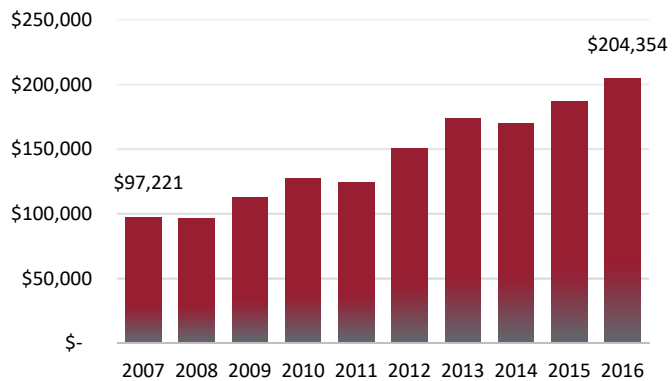


## Departmental Operations

### Tenure & Tenure-Track Faculty (FTE)



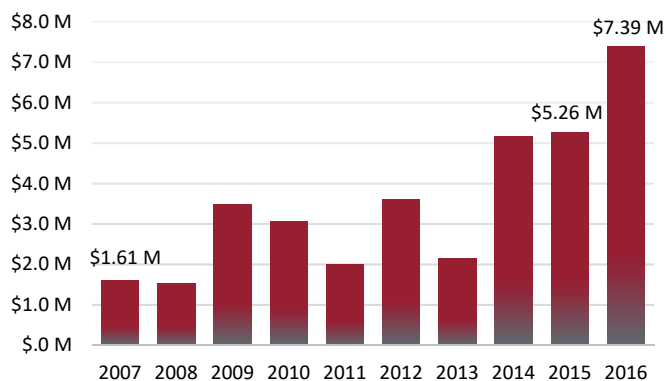
### Research Expenditures per TTF



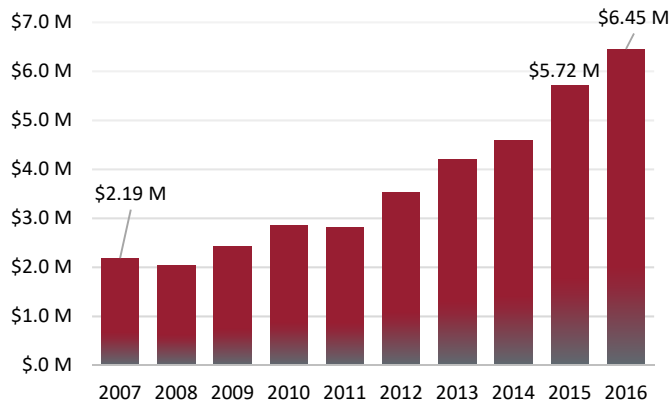
### Personnel (Headcount)

Tenure and Tenure-Track Faculty (Pullman)	34
Non-Tenure Teaching Faculty (Pullman, Bremerton, & Everett)	12
Non-Tenure Research Faculty and Post-Docs	15
AP and Classified Staff	15

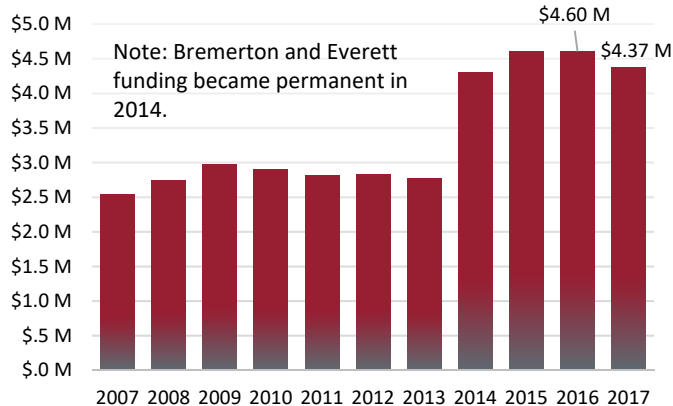
### New Research Grants Awarded



### Research Expenditures (including SSL)

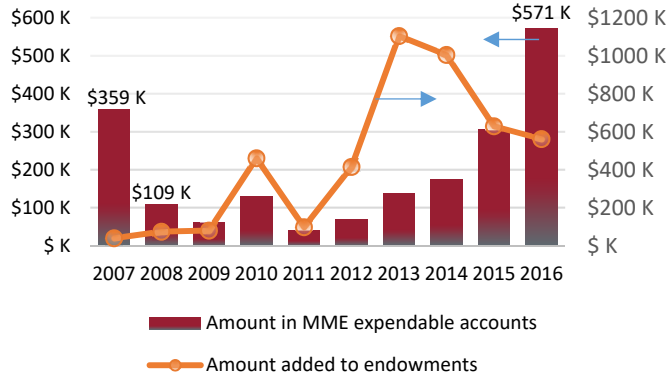


### Permanent Budget Line (by Fiscal Year)

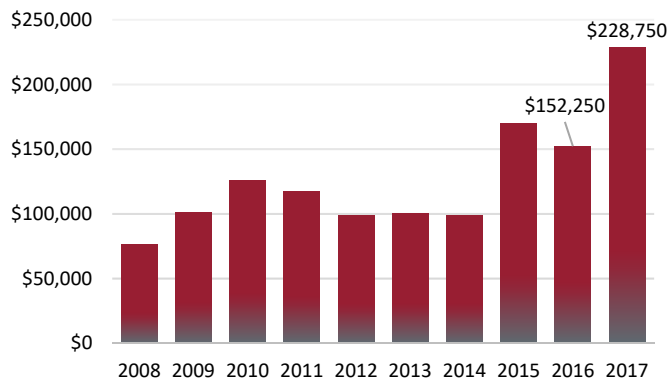




## Total Gift Productions & Scholarships



## MME Scholarship Awards (by Fiscal Year)



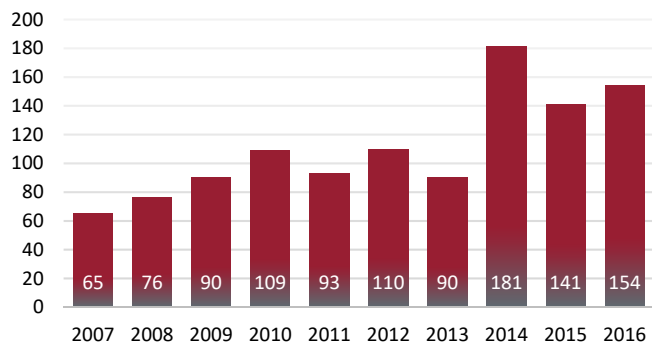
## Research Sponsors

- AETOS Systems Inc.
- Amateur Softball Association
- Battelle - INL
- Battelle - NREL
- Battelle - PNNL
- Bioenno (DOD - Navy)
- Brigham Young University
- CA Inst of Technology - Jet Propulsion Lab
- Department of Defense - MDA
- Department of Defense - NAVSEA
- Department of Energy - EERE
- Department of Energy - Office of Science
- Department of Energy - ORP
- Department of Energy - NEUP
- Department of Energy - NREL
- Department of Energy - Off of Nuclear Engr.
- Department of Transportation - FAA
- Hyundai
- Insitu, Inc.
- Iowa St. University - CB2
- Iowa St. University - DOE-ARPA-E
- Life Science Discovery Fund
- NASA
- NASA - NSTRF
- National Institutes of Health
- NIH - Center for Disease Control
- National Science Foundation
- Odysseus Technologies
- Rutgers University (DOE project)
- Sandia National Laboratories
- Space X
- Texas A&M - Qatar Foundation
- The Boeing Company
- University of Washington - JCATI
- US Department of Agriculture
- Washington Research Foundation (Murdock)
- WA Tree Fruit Research Comm.



## Journal Publications with MME School Affiliation

(from ISI Web of Science)



## Faculty Research

Journal Papers Published	154
Conference Papers Published	46
Sections/Chapters in Books	23
Books Authored or Edited	9
Doctoral Dissertations	10
Master's Theses	14

## Named Faculty Positions

*Berry Family Director*

Dr. Michael Kessler

*Herman and Brita Lindholm Endowed Chair in Metallurgy*

Dr. Amit Bandyopadhyay

*Herman and Brita Lindholm Endowed Chair in Metallurgy*

Dr. Susmita Bose

*Westinghouse Distinguished Professorship in Materials Science and Engineering*

Dr. Weihong (Katie) Zhong

## Professional Society Fellows

*American Association for the Advancement of Science*

Dr. Amit Bandyopadhyay

Dr. Susmita Bose

Dr. Yuehe Lin

Dr. Kelvin Lynn

Dr. Hussein M. Zbib

Dr. Weihong Zong

*American Ceramic Society*

Dr. Amit Bandyopadhyay

Dr. Susmita Bose

*American Institute for Medical and Biological Engineering (AIMBE)*

Dr. Amit Bandyopadhyay

Dr. Susmita Bose

Dr. Yuehe Lin

*The American Physical Society*

Dr. Kelvin Lynn

*American Society for Materials (ASM International)*

Dr. Amit Bandyopadhyay

Dr. David P. Field

*American Society of Mechanical Engineers*

Dr. Jow-Lian Ding

Dr. Prashanta Dutta

Dr. Michael Kessler

Dr. Cill Richards

Dr. Hussein M. Zbib

*National Academy of Inventors*

Dr. Amit Bandyopadhyay

*North American Thermal Analysis Society*

Dr. Michael Kessler

*Royal Society of Chemistry*

Dr. Yuehe Lin



## Spring 2016 – Pullman

### **UAV Redesign – Painted Dog Research Trust**

Alex Malesis, Ashley Vu, Edward Lie, Hailey Warren, Jake Steinman, Kevin Marroquin, Mark Allen (EE), Paul Flerchinger, Ryan Brooks (EE), Malcolm Wynn

### **Mouse Treadmill – Allen Brain Science Institute**

Al-harith Alharthy, Derek Sorenson, Joe Rockseth, Mark Rangel, Scott Douglas

### **Pulp/OSB Spreader Assist Table – WSU CMEC**

Kevin Wiese, Matt Brown, Zach Lind

### **Superheat Controller – Colmac Coil**

Cody Sweat, Jonathan Gilvey, Malique Perera, Mario Reillo, Yan Zhen, Yiwen Lu

### **Trashwall – EPA (Robert Richards' project)**

Ahmed Alsaidi, Esteban Mena, Jodi Bowe, Lauren Summers, David Lopez-Nava

### **Fat Thickness Measuring System – JB Tech**

Carson Schlect, Casey Harrison, Chad Castro, Jay Pittenger, Jim Sturtevant, Rick Scholz

### **H2 Refuel System – Jake Leachman's Hydrogen Refueling Station**

Carl Mayer, Derek Johnson, Greg Wallace, Joseph Dufresne, Kevin Moseley, Nathan Clarke, Nathaniel Jones, Scott Bredberg, Steven Bell, Taylor Bryant, Ty Morton, William Wilber

### **Screw Replacement Packaging Project – Intel**

Adel Al-Bishari, Daniel Barnes, Jonathan Ward, Neil Baldwin, Ryan Fish, Tim Pizzino

### **Polio Orthotics – Mobility Outreach Int'l**

Connor Pearl, Drew Christian, Scott Schmitz, Zainab Albalushi

### **Design of Crash Spheres Project – Origin Engineering**

Braden Gregor, Brett Love, Cody Doiron, Dominick Desimone, Jakob Hibbard

### **Robo-Vac Chip Head Redesign – PACCAR**

Christopher Caddey, Ibrahim Alazri, Sean Oh, Steve Moore, William Rabey

### **Equipment for Nonproliferation Detection Mission – PNNL**

Alex Morgan, Delaney Ferrell, Drew Gourlie, Grant Rule, Katlyn Struxness, Matt McDaniel, Michael Kaiwi, Nate Williams, Nathan Conklin, RC Leonard, Ryan Mather-Haaland, Sam Sundell, Sulev Vercaemer

### **Adjustable Arm – Team Gleason**

Kyle Hodge, Ryan Brown

### **UAV Development – Boeing AerosPACE Program Multi-University Collaborative Project**

Jon Farrell, Scott Cragerud, Toan Luu, Erik Clay, Ben Williamson, Carl Bunge

## Fall 2016 – Pullman

### **Trellis Analysis Project – Washington State Fruit Commission**

Kyle Andrews, Max Graham, Jeff Bauer, Joe Kramer, Cheuk Hei Chiu

### **Pulp/OSB Spreader Assist Table – WSU CMEC**

Jake Burstein, Austin Bonnes, Ryan Thompson, Michael Towne

### **HPG-e Detector – PNNL**

Gunnar Lehnertz, John Montgomery, Cody Anderson, Juan Diaz, Allison Osmanson

### **Automated Window System – Solar Decathlon**

Chris Marrinan, Haines Giseburt, Cameron Stone, Maxwell Goss, Taras Yaremchuk

### **Cryogenic Test Chamber – Blue Origin**

Benjamin Rising, Saul Moran, Kevin Cavender, Dean Hoover, Casey Evans

### **Rolling Stand Cart Powering – Nucor Steel**

Nolan Beal, Jordan DeGroot, Daniel Pollastro, Changsong Ding, Shaoyang Sun, Matt Olson, Jun Liu

### **UAV Afternoon Group – Painted Dog Research Trust**

Ahmed Alyahyaai, Hassan Almakhamil, Nick Brockmeyer, Bashir Hussein, Amanuel Moges, Amanuel Moges

### **UAV Morning Group – Painted Dog Research Trust**



# Senior Design Projects

Zac Thomas, Usama Al Ramadhani, Kirsten Hirzel, Emmet Patton, Tony Sousa, Tyrone Zhou

## *Eddy Current Stage* - **PNNL**

Colter Swords, Austin Utt, Dylan Fitzgerald

## *Low Background Well Detector* - **PNNL**

Ben Schuessler, Michael Kindle, Travis LeFave

## *PSA Adhesion Characterization* - **Microsoft**

Hamed Alshamakhi, Charles Nickels Carver, Amjad Alsulaimi, Ian Davis, Kyle Hayes, Alonzo Rodriguez, Jenny Vu, Patrick Olcott

## *Titan Submarine Sea Simulation Device* - **NASA Glenn Research Center**

Lachlan Sinclair, Rafael Avila, Gerardo Perez, Zijue Wang, Alex Kuehl

## *Shipping Rack Calculation Tool* - **PACCAR**

Wyatt Linville, Avery Scott, Aaron Paul Pinkoske, Tucker Stone, Zainab Al Balushi

## Spring 2016 - Bremerton

### *Marine Propulsion Optimization* - **Keyport Underwater Naval Warfare Research Center**

John Ball, Thomas Rook, Chase Huntley, James Huntsman

### *Tuuq - Personnel Transfer System* - **Foss Maritime Company**

Cody Barich, Clifford Pepper, Mark Pitcher, Joshua Talavera

### *Bulk Mean Density Testing* - **Forest Concepts**

Blake Barber, Bryan Huddleston, Kelsey Kane, and Jared Sell

### *Burn Pot Skirt* - **BURN Design**

Brenon LaPorte Salina Richardson, Evan Stewart, Breiannan Way

### *System and Method for Aerosol Overspray Control* - **Clarovia**

Sal Castruita, Brittany Duff, Taylor Lindbom, Joshua Wood

*Multi-purpose Blender with Programmable Motor and Interchangeable Rotary Element* - **Clarovia**  
Sal Castruita, Brittany Duff, Taylor Lindbom, Joshua Wood

## Spring 2016 - Everett

### *Electromechanical Latch* - **Boeing**

Mark Meister, Oleksandr Pankovets, Tsolmon Dashdorj, Brigitta Nethery

### *Lift Assist Mechanism* - **Boeing**

Vaughn Woodfield, Pedro Nunez, Richy Tan, Sean Maloy

### *Industrial Hydrographics* - **Boeing**

Roger Pettersson, Tyler Baker, Gamaliel Herrera Jimenez

### *Galley Cart Latch* - **Boeing**

Robert Blosser, Brian Hoang, Christopher Lee, Jaimie Nguyen

### *Cabin Projection* - **Boeing**

Brody Lund, Bikramjit Singh, Raksmeey Sun

### *New Joinery Method for Honeycomb Panels* - **Boeing**

Devon Mallory, John Boone, Joseph Russell, Wilson Tanuwijaya

### *UAV DRGNFLY (Direct Response Ground Navigation Fire Location System)* - **Boeing** AerosPACE Program Multi-University Collaborative Project

Amy Felt, Jonathan Bell, Emily Andrew

### *UAV VIPR (Versatile Inspection for Pipeline Reconnaissance)* - **Boeing** AerosPACE Program Multi-University Collaborative Project

Andrew Preston, Nick Rush

### *UAV WheatHawk (The next-Gen Agriculture Drone)* - **Boeing** AerosPACE Program Multi-University Collaborative Project

Andrew Crain, Blaine Liukko



## Spring 2016

### **Vaughn Hack**

*Faculty Advisor: Susmita Bose*

Senior Thesis: Bone growth effects of phytoestrogen/curcuminoid-treated calcium phosphate coating on Ti implants

### **Delaney Ferrell**

*Faculty Advisor: Michael Kessler*

Senior Thesis: Poly-dicyclopentadiene with Halloysite Nanoparticle Reinforcement For Optically Transparent Composites

### **Jonatham Ward**

*Faculty Advisor: Michael Kessler*

Senior Thesis: Shear Alignment of Multi-Walled Carbon Nanotubes Buckypapers for Use in Poly-dicyclopentadiene Composites

### **Kyle Shane Johnson**

*Faculty Advisor: Katie Zhong*

Senior Thesis: Soy Protein Based Electrospun Nanofabrics for High Efficiency Multi-functional Air Filtration Applications

### **Craig Horne**

*Faculty Advisor: David Field*

Senior Thesis: Mechanical Properties of Dual Phase Steel with a Grain Size Gradient

### **Keshava Bhamidipaty**

*Faculty Advisor: Katie Zhong*

Senior Thesis: Water Resistance of Electrospun Soy Protein Based Nanocomposite Air Filtration Materials

### **Jose Avila**

*Faculty Advisor: Amit Bandyopadhyay*

Senior Thesis: Characterization of niobium carbide reinforced Ti6Al4V matrix composite coatings

### **Ian Davis**

*Faculty Advisor: Vikram Yadama*

Senior Thesis: Enhanced pretreated biomass loaded with nanoclay to achieve an advanced growing media

### **Curtis Treiber**

*Faculty Advisor: David Field*

Twin Grain Boundaries in Cobalt Alloy S-816

## Fall 2016

### **Nathan Clarke**

*Faculty Advisor: Jacob Leachman*

Senior Thesis: Quantum Tunneling Phenomena in Polymers at Cryogenic Temperatures and Properties to Prevent Resultant Permeation

### **Kyle Andrews**

*Faculty Advisor: David Field*

Senior Thesis: Validating Confidence Index in Electron Backscatter Diffraction

### **Zumurda AlRawahi**

*Faculty Advisor: Amit Bandyopadhyay*

Senior Thesis: Characterization of Silicon Reinforced Ti64 Coating

### **Kyle Hayes**

*Faculty Advisor: David Field*

Senior Thesis: Metallurgical Analysis of Stainless Steel Fibers

### **Nathan Clarke**

*Faculty Advisor: Michael Kessler*

Senior Thesis: Metallurgical Analysis of Stainless Steel Fibers

### **Jenny Vu**

*Faculty Advisor: Weihong Zhong*

Senior Thesis: Antimicrobial and Water Resistant Properties on Protein-Based Air Filtering Materials

### **Alonzo Rodriguez**

*Faculty Advisor: Amy Wo, Hussein Zbib*

Senior Thesis: A Study of Oxidation Effects on Sub-Micron Level Mechanical Properties of Indium through Nanoindentation

### **Rafael Avila**

*Faculty Advisor: Amy Wo, Hussein Zbib*

Senior Thesis: Temperature Influence on Pop-in Behavior on (111) Copper Crystals Using Nanoindentation Technique

### **Travis LaFave**

*Faculty Advisor: Weihong Zhong*

Senior Thesis: A PEO-Modified PAA Binder for Silicon Anodes in Lithium-ion Batteries



**Benjamin Rising**

*Faculty Advisor: Arda Gozen*

Senior Thesis: Electronic Characterization of 3D Printed Battery Components

**Sze Chung Ng**

*Faculty Advisor: Qizhen Li*

Senior Thesis: Analyzing the Magnesium Alloy AZ 61 of Their Mechanical Property from Different Processing

**Bryan Heer**

*Faculty Advisor: Amit Bandyopadhyay*

Senior Thesis: Multi-Materials Additive Manufacturing

**Denise Blohowiak**

*Faculty Advisor: Lloyd Smith*

Senior Thesis: Non-Destructive Analysis of Composite and Metal Softball Bats

**Sam Karcher**

*Faculty Advisor: David Field*

Senior Thesis: Martensite Gradient in DP980 Dual Phase Steel

**Michael Kindle**

*Faculty Advisor: Min-Kyu Song*

Senior Thesis: Hydrothermal Synthesis of Carbon Nanofiber Aerogel for High Sulfur Loading

**Charles Carver**

*Faculty Advisor: Michael Kessler*

Senior Thesis: Shape Memory Polymer Foams, Based on Liquid Crystalline Epoxy Networks

**Allison Osmanson**

*Faculty Advisor: Lei Li*

Senior Thesis: Using Optosensing Technology to Detect Potassium Levels in Plasma and Serum

**Joseph R. Davidson, PhD ME**

*Faculty Advisor: C. Mo*

Mechanical design and field evaluation of a robotic apple harvester

**Anirban Mandal, PhD ME**

*Faculty Advisor: Y. Gupta*

Elastic-plastic deformation of molybdenum single crystals shocked to 12.5 GPa

**S.M. Golam Mortuza, PhD ME**

*Faculty Advisor: S. Banerjee*

Modeling agglomeration and deposition of organic nanoparticles during solution processing of thin films

**Himanshu Sahasrabudhe, PhD ME**

*Faculty Advisor: A. Bandyopadhyay*

Characterization of Ti and Co based biomaterials processed via laser based additive manufacturing

**Nasrin Taheri-Nassaj, PhD ME**

*Faculty Advisor: H. Zbib*

A dislocation-based multiscale modeling of plasticity and controlling mechanisms

**Sahar Vahabzadeh, PhD ME**

*Faculty Advisor: S. Bose*

Effects of dopants on physical, mechanical, in vitro and in vivo osteoblastogenic and osteoclastogenic properties of calcium phosphate ceramics for bone tissue engineering and vitamin C delivery

**Peter Dickens, PhD MSE**

*Faculty Advisor: K. Lynn*

Atomic defects of czochralski grown cerium and calcium co-doped yttrium aluminum garnet, cerium and lithium co-doped yttrium aluminum garnet, and doped lithium aluminate

**Hao Lyu, PhD MSE**

*Faculty Advisor: H. Zbib*

Dislocation-based multi-scale modeling for size-dependent plasticity of heterogeneous materials

**Huiru Xu, PhD MSE**

*Faculty Advisor: Q. Li*

Mechanical and corrosion behavior of CNF reinforced porous magnesium

**Fan Zhang, PhD MSE**

*Faculty Advisor: D. Field*

Multi-scale investigation of the relationship between the microstructure and mechanical properties in dual phase steels



## Thesis Masters

### **Thomas Blackham, MS ME**

*Faculty Advisor: J. Leachman*

A generalized Helmholtz energy functional form for thermodynamic properties of binary mixtures containing hydrogen, neon, and helium

### **Jian Geng, MS ME**

*Faculty Advisor: L. Li*

Study of wrinkle structures formed on PDMS fibers

### **Thomas P. Gualtieri, MS ME**

*Faculty Advisor: A. Bandyopadhyay*

Direct laser deposition of porous structures and gradient metal-ceramic composite coatings

### **David Lemme, MS ME**

*Faculty Advisor: L. Smith*

A time dependent nonlinear model of bulk adhesive under static and cyclic stress

### **Bin Lyu, MS ME**

*Faculty Advisor: L. Smith*

Wireless bat swing sensor evaluation study with high speed video system

### **Brandt Pedrow, MS ME**

*Faculty Advisor: J. Leachman*

Parahydrogen-orthohydrogen conversion on catalyst loaded scrim for vapor cooled shielding of cryogenic storage vessels

### **Allen W. Eyler, MS MSE**

*Faculty Advisor: W. Zhong*

Control of soy protein structures and interactions in biocomposites enabling the fabrication of bio-based solid polymer electrolytes

### **Shuo Feng, MS MSE**

*Faculty Advisor: M.K. Song*

Ionic polymer-modified carbon as effective sulfur immobilizers in lithium/sulfur batteries

### **Xiaoyu Li, MS MSE**

*Faculty Advisor: Y. Lin*

Bismuth oxychloride based nanomaterials for highly efficient photocatalytic applications

### **Wenxue Lin, MS MSE**

*Faculty Advisor: Q. Li*

Corrosion behavior and mechanical property of Az 31 magnesium alloy in simulated body fluid

### **Wangcheng Liu, MS MSE**

*Faculty Advisor: J. Zhang*

Grafting modification of polylactic acid and its application for compatibilization of polymer blends

### **Junghune Nam, MS MSE**

*Faculty Advisor: J. McCloy*

Aqueous synthesis of iodide sodalite for the immobilization of I-129

### **Xiaolin Wang, MS MSE**

*Faculty Advisor: W. Zhong*

Proteins as functional bio-fillers for enhancing performance of an adhesive composite electrolyte

### **Hui Xu, MS MSE**

*Faculty Advisor: J. Zhang*

Preparation and characterizations of a novel lignin based hydrogel



## Non-Thesis Masters

**Biniyam F. Bati, MS ME**

*Faculty Advisor: C. Richards*

Non-thesis

**Kelly A. Nansen, MS ME**

*Faculty Advisor: Q. Li, R. Catena*

Non-thesis

**Bonny Onuike, MS ME**

*Faculty Advisor: A. Bandyopadhyay*

Non-thesis

**A. James Saucedo, MS ME**

*Faculty Advisor: C. Mo*

Non-thesis

**Victor P. Small, MS ME**

*Faculty Advisor: A. Vasavada*

Non-thesis

**Wade Wilcox, MS ME**

*Faculty Advisor: C. Mo*

Non-thesis

**Batholomew Kimani, MS MSE**

*Faculty Advisor: D. Field*

Non-thesis

**David Mackay, MS MSE**

*Faculty Advisor: M.G. Norton*

Non-thesis

**Peter McClure, MS MSE**

*Faculty Advisor: Y. Gupta*

Non-thesis

**Craig Owen, MS MSE**

*Faculty Advisor: M.G. Norton*

Non-thesis



## Seminar Speakers

**Min-Kyu Song; MME**

*Materials Design for Next-Generation Batteries: Beyond Lithium-Ion*  
January 14<sup>th</sup>, 2016

**David Steinberg; Aeortech Inc.**

*Motion Control 101*  
January 21<sup>st</sup>, 2016

**John Henshaw; University of Tulsa**

*Confessions From an Engineer Who Loves Words as Much as Numbers*  
January 28<sup>th</sup>, 2016

**Steven Zemke; Gonzaga**

*Studies in Teaching Engineering Design: Informing our Classroom Practices*  
February 4<sup>th</sup>, 2016

**Ann Majewicz; UT Dallas**

*Designing Human-in-the-Loop Systems for Surgical Training and Intervention*  
February 11<sup>th</sup>, 2016

**Alex Greaney; UC Riverside**

*De Novo Design of Kinetically Active Metal-Organic-Framework Materials*  
February 18<sup>th</sup>, 2016

**Yu (Will) Wang; MME**

*Gum-Like Nanocomposites for Energy Storage Applications*  
February 25<sup>th</sup>, 2016

**Soumik Sarkar; Iowa State University**

*Solving Hard Engineering Problems with Deep Learning*  
March 3<sup>rd</sup>, 2016

**Haluk Beyenal; WSU**

*Biofilm Engineering and Applications*  
March 10<sup>th</sup>, 2016

**Yitung Chen; UNLV**

*Corrosion and Oxide Layer Growth Modeling Using Deterministic and Stochastic Methods*  
March 24<sup>th</sup>, 2016

**Per Reinhall; University of Washington**

*A New Football Helmet to Improve Safety*  
March 31<sup>st</sup>, 2016

**Wangliang Shan; University of Nevada, Reno**

*Rigidity Tunable Multifunctional Composites for Soft Robotics*  
April 7<sup>th</sup>, 2016

**Josh Tarbutton; USC**

*Revisiting Subtractive Manufacturing and Exploiting Additive Manufacturing to Create Sensors and Actuators*  
April 14<sup>th</sup>, 2016

**Inanc Senocak; Boise State**

*A Massively Parallel Computational Framework for Grid Integration of Wind Energy over Complex Terrain*  
April 21<sup>st</sup>, 2016

**Jake Abbott; University of Utah**

*Magnetic Manipulation for Biomedical Robotics*  
April 28<sup>th</sup>, 2016

**Soumik Banerjee; MME**

*Modeling Based Design of Electrolytes for Next-Generation Batteries*  
August 25<sup>th</sup>, 2016

**Kamal Kumar; University of Idaho**

*Fundamental Combustion Studies on Conventional and Alternative Fuels*  
September 1<sup>st</sup>, 2016

**Dr. Roland Chen; MME**

*How does manufacturing research intertwine with better health care?*  
September 8<sup>th</sup>, 2016

**Dr. Reinhold Dauskardt; Stanford University**

*From Hybrid Films to Human Skin: Understanding Relationships between Structure, Processing and Function of Hybrid Materials*  
September 15<sup>th</sup>, 2016



**Dr. Gary Messing; Pennsylvania State University**

*Creating a Culture of Safety in Academic Laboratories*  
September 22<sup>nd</sup>, 2016

**Dr. Jack Skinner; Montana Tech**  
*Nanofabrication for Plasmonics, Electronics, Photovoltaics, and Drug Delivery*  
September 29<sup>th</sup>, 2016

**Dr. Hesam Ghorabi; Mercedes-Benz in Stuttgart, Germany**  
*From a creative idea to its successful market entry*  
October 6<sup>th</sup>, 2016

**Dr. Rachelle N. Ornan-Stone; Boeing**  
*Rocket Science*  
October 13<sup>th</sup>, 2016

**Dr. Kshitij Jerath; MME**  
*Complex systems: First steps in modeling, sensing and control for traffic and robotic applications*  
October 20<sup>th</sup>, 2016

**Dr. Venkat Subramanian; University of Washington**  
*Analyzing and Minimizing Capacity Fade through Model Predictive Control-Theory and Experimental Validation*  
October 27<sup>th</sup>, 2016

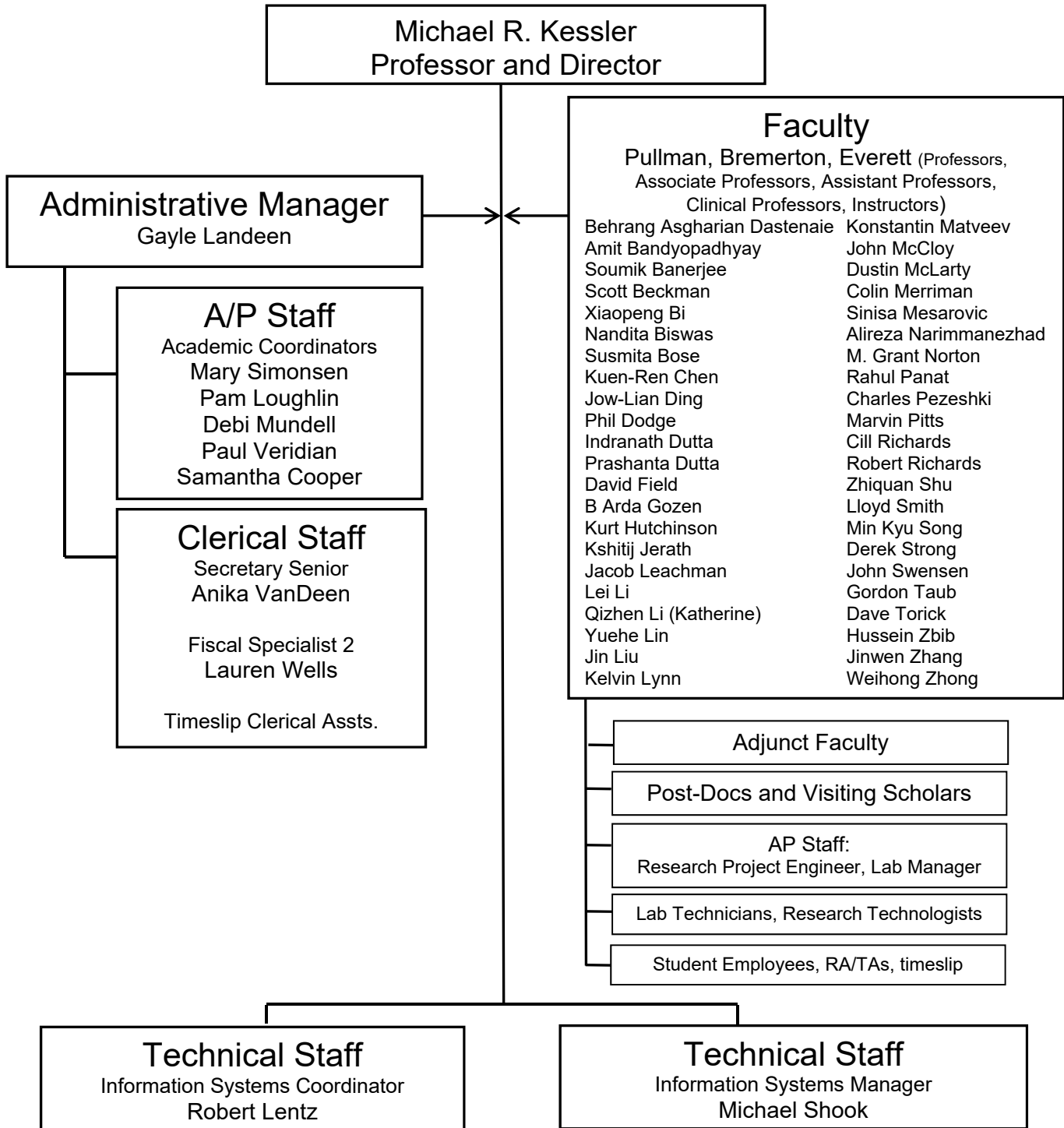
**Junlan Wang; University of Washington**  
*Mechanical Reliability of Nanoporous Zeolite Thin Films for Low-k and Anti-wear Applications*  
November 3<sup>rd</sup>, 2016

**Dr. Di Wu; Washington State University**  
*Probing the Energetics of Molecule- Material Interactions at Interfaces and in Nanopores*  
November 10<sup>th</sup>, 2016

**Dr. Xiaolin Li; PNNL**  
*A Glance into the Challenges of Building Better Batteries*  
November 17<sup>th</sup>, 2016

**Dr. Jie Bao; PNNL/WSU**  
*Numerical Simulations for Multi-Phase Fluid Systems*  
December 1<sup>st</sup>, 2016

**Eric Brown; Los Alamos National Laboratory**  
*Shock Compression and Strain Rate Effect in Semi-crystalline Polymers*  
December 8<sup>th</sup>, 2016







## MME Faculty



### School Director



**Michael R. Kessler** – Berry Family Director and Professor

Joined MME in 2013  
Ph.D. in Theoretical and Applied Mechanics from University of Illinois at Urbana-Champaign in 2002

Dr. Kessler’s research interests include processing and characterization of polymer composites, bio-based polymers, multifunctional- and nano-composites, materials with self-healing functionality, and thermal analysis of polymers.

### Regents Professor



**Kelvin G. Lynn** - Regents Professor

Joined MME in 1996  
Ph.D. in Materials Science and Engineering from University of Utah in 1974

Dr. Lynn’s research interests include solid state and surface physics, defects in semiconductors and metals, photovoltaic materials, room temperature radiation detectors, thermal stimulated spectroscopies, positron interactions in solids, micro-electrical and mechanical systems, growth of semiconductors and oxide crystals, and energy harvesting.

### Pullman Campus: Professors



**Amit Bandyopadhyay** - Herman and Brita Lindholm Endowed Chair Professor

Joined MME in 1997  
Ph.D. in Materials Science and Engineering from University of Texas at Arlington in 1995

Dr. Bandyopadhyay’s research interests include processing of ceramics, metals and composites using rapid prototyping; load bearing and non-load bearing implants; patient specific implants; laser processing of materials; microwave sintering of ceramics; and piezoelectric micromachined ultrasonic transducers (pMUTs) for medical imaging and therapeutics.



**Susmita Bose** - Herman and Brita Lindholm Endowed Chair Professor

Joined MME in 1998  
Ph.D. in Physical-Organic Chemistry from Rutgers University in 1998

Dr. Bose’s research interests include nanoscale surface modification of medical devices, and nanoparticles in protein/drug delivery; resorbable ceramics and composited in bone tissue engineering using 3-D printing technology; microwave and plasma processing of materials; in vitro bone cell material interactions; and piezoelectric micromachined ultrasonic transducers.





**Jow-Lian Ding** - Professor and Associate Director

Joined MME in 1983  
Ph.D. in Engineering from Brown University in 1983

Dr. Ding's research interests include dynamic response of materials and structures (experimental characterization, modeling, and simulation), shock dynamics, thermo-mechanics, electrodynamics, stress-induced phase transformation.



**David P. Field** - Professor and Dean

Joined MME in 2000  
Ph.D. in Mechanical Engineering from Yale University in 1991

Dr. Field's research interests include physical and mechanical metallurgy, metal deformation and recrystallization, crystallographic texture, grain boundary structure, thin film and IC interconnect structure/properties relationships, and advanced experimental techniques.



**Indranath Dutta** - Professor

Joined MME in 2008  
Ph.D. in Materials Science and Engineering from the University of Texas at Austin, in 1988.

Dr. Dutta's research interests include multi-physics phenomena in materials Science; near-interface effects in multi-component materials, with emphasis on materials for microelectronics; materials reliability in micro-systems and composites; and electrically-activated manufacturing at nano to meso scales.



**Yuehe Lin** - Professor

Joined MME in 2013  
Ph.D. in Environmental Chemistry from University of Idaho, Moscow, ID in 1997

Dr. Lin's research interests include synthesis and characterization of functional nanomaterials; materials and devices for sensing, bioimaging, and drug delivery; materials and systems for water monitoring and treatment; nanomaterials for fuel cells, batteries, and supercapacitors; electrochemistry, electrocatalysis and photoelectrocatalysis; and immunosensors, paper and microfluidic biosensors for biomarker detection.



**Prashanta Dutta** - Professor

Joined MME in 2001  
Ph.D. in Mechanical Engineering from Texas A&M University in 2001

Dr. Dutta's research interests include microfluidics; ion mobility spectrometry; multiscale modeling and simulation of biological flow; electrokinetic flow, mixing, separation and concentration; and micro fuel cell and battery for energy conversion.



**Sinisa Mesarovic** - Professor

Joined MME in 2001  
Ph.D. in Engineering Sciences from Harvard University in 1996

Dr. Mesarovic's research interests include plasticity of crystals and interfaces; micromechanics of granular materials; computational methods for coupled moving boundaries problems (phase transformations, wetting); collective behavior of carbon nanotubes; multiscale/multiphysics modeling; contact and adhesion mechanics.



**M. Grant Norton** - Professor and Dean Honors College

Joined MME in 1991  
Ph.D. in Materials from Imperial College, London in 1989.

Dr. Norton's research interests include ceramic materials, nanotechnology; and clean technology.



**Lloyd V. Smith** - Professor

Joined MME in 1996  
Ph.D. in Mechanical Engineering from University of Utah in 1994

Dr. Smith's research interests include composite materials (multi-axial characterization, damage and failure modeling, environmental degradation) and sports science (experimental bat and ball performance, numeric modeling of sport ball impacts, protective equipment and head injury).



**Charles Pezeshki** - Professor

Joined MME in 1988  
Ph.D. in Mechanical Engineering from Duke University in 1987

Dr. Pezeshki's research interests include global engineering and design of high-performance work environments; development strategies for transcultural understanding for innovation communities; and understanding the relationships between design structure, knowledge structure, and organizational social structure in innovation communities.



**Hussein M. Zbib** - Professor

Joined MME in 1988  
Ph.D. in Mechanical Engineering and Engineering Mechanics from Michigan Technical University in 1987

Dr. Zbib's research interests include mechanics (multiscale modeling, numerical analysis, plasticity, composites, materials instabilities, damage and fracture) and materials (dislocation theory, dislocation dynamics, crystal plasticity, defects, radiation effects, nanomaterials).



**Cecilia D. Richards** - Professor

Joined MME in 1992  
Ph.D. in Mechanical Engineering from University of California at Irvine in 1990

Dr. Richard's research interests include MEMS power, advanced energy systems, spray combustion, two-phase flows, and air breathing engines.



**Jinwen Zhang** - Professor

Joined MME in 2012, with WSU from 2004  
Ph.D. in Polymer Science from the University of Massachusetts, 1997

Dr. Zhang's research interests include synthesis, processing and application development of biobased polymer materials; structure and properties of polymer blends and composites; polymer foaming and fiber spinning technologies; polymer stabilization and flame retardancy; and polymer hydrogels and controlled release.



**Robert F. Richards** - Professor

Joined MME in 1992  
Ph.D. in Mechanical Engineering from University of California at Irvine in 1990

Dr. Richard's research interests include heat transfer, thermodynamics, and micro-electro-mechanical systems (MEMS).



**Weihong (Katie) Zhong** - Professor  
Joined MME in 2007  
Ph.D. in Materials Science from Beijing University of Aeronautics and Astronautics in 1994

Dr. Zhong's research interests include polymers and composite manufacturing technology; battery materials and renewable energy materials; nanocomposites and multifunctional materials; and biomaterials and environmental polymeric materials.



**Qizhen (Katherine) Li** - Associate Professor  
Joined MME in 2014  
Ph.D. in Materials Science and Engineering from The Ohio State University in 2004

Dr. Li's research interests include advanced materials (e.g., light-weight materials and structures, nanoporous materials, nanocomposites, nanostructured multilayered thin films, lattice block structures) for structural, energy, and bio-applications; nano and micro fabrication/manufacturing, and materials synthesis/processing; mechanical behavior of materials, nano/micro-mechanics, fatigue and fracture; relationship among processing, structure and property of advanced materials; biomaterials and biomechanics, bone/dental implant materials, biomedical applications of shape memory alloys, magnesium alloys, and titanium alloys.

## Pullman Campus: Associate Professors



**Scott P. Beckman** - Associate Professor  
Joined MME in 2015  
Ph.D. in Materials Science and Engineering from University of California at Berkley in 2005

Dr. Beckman's research interests include theoretical and computational methods; thermal properties of materials; multi-functional materials; and materials for energy applications.



**Konstantin Matveev** - Associate Professor  
Joined MME in 2006  
PhD in Mechanical Engineering from the California Institute of Technology, in 2003

Dr. Matveev's research interests include high-performance marine craft, ground-effect aerodynamics, free-surface hydrodynamics, unmanned aerial and marine vehicles, and thermoacoustics.



**Jacob Leachman** - Associate Professor  
Joined MME in 2010  
PhD in Mechanical Engineering from the University of Wisconsin-Madison, in 2010

Dr. Leachman's research interests include hydrogen, deuterium, tritium and mixtures; small, modular hydrogen liquefier design; thermophysical property modelling and measurement; rocket and space stage vehicle design; cryogenics; liquid hydrogen fueling of unmanned aerial systems/vehicles (UAS/UAV).



**John McCloy** - Associate Professor  
Joined MME in 2013  
Ph.D. in Material Science and Engineering from the University of Arizona in 2008

Dr. McCloy's research interests include nuclear waste forms, radiation effects on materials, magnetic materials and properties, optical ceramics and glasses, electronic transport, sensors.



**Rahul Panat** - Associate Professor  
Joined MME in 2014  
Ph.D. in Theoretical and Applied Mechanics from the University of Illinois at Urbana-Champaign, 2004

Dr. Panat's research interests include manufacturing, microelectronics/flexible electronics, Li-ion batteries, thermal barrier coatings, and thermodynamics.



**Kshitij Jerath** - Assistant Professor  
Joined MME in 2015  
Ph.D. in Mechanical Engineering from Pennsylvania State University, 2012

Dr. Jerath's research interests include self-organized dynamics in complex systems, multi-agent systems, connected and autonomous vehicles, system reliability and prognostics, and robotic ensembles.

## Pullman Campus: Assistant Professors



**Soumik Banerjee** - Assistant Professor  
Joined MME in 2011  
Ph.D. in Engineering Mechanics from Virginia Tech, 2008

Dr. Banerjee's research interests include nanoscale transport phenomena, molecular modeling of materials, organic photovoltaic solar cells, modeling electrolytes in Li batteries, and synthesis and properties of carbon nanostructures.



**Lei Li** - Assistant Professor  
Joined MME in 2013  
Ph.D. in Industrial and Systems Engineering from The Ohio State University in 2009

Dr. Li's research interests include precision engineering optical manufacturing, micro/nano manufacturing, micro-electro-mechanical systems (MEMS).



**Kuen-Ren (Roland) Chen** - Assistant Professor  
Joined MME in 2016  
Ph.D. in Mechanical Engineering from University of Michigan, 2013

Dr. Chen's research interests include biomedical manufacturing, additive manufacturing, surgical thermal management, design of medical assistive devices, and tissue engineering.



**Jin Liu** - Assistant Professor  
Joined MME in 2012  
Ph.D. in Mechanical Engineering from Johns Hopkins University, 2008

Dr. Liu's research interests include multiscale modeling and simulation; fluid mechanics, turbulent flow and computational fluid dynamics; micro/nano-fluidic and bio-fluidics; electrokinetic transport and electrowetting; modeling of mesoscale molecule adhesion and targeted drug delivery.



**Arda Gozen** - Assistant Professor  
Joined MME in 2014  
Ph.D. in Mechanical Engineering from Carnegie Mellon University, 2012

Dr. Gozen's research interests include manufacturing processes and equipment, micro-nano manufacturing, manufacturing with soft-matter (e.g. elastomers, functional liquids etc.), and flexible-stretchable electronic devices.



**Dustin McLarty** - Assistant Professor  
Joined MME in 2015  
Ph.D. in Mechanical Engineering from University of California at Irvine in 2013

Dr. McLarty's research interests include high temperature fuel cells, distributed generation systems, and energy storage dynamics and integration with renewable sources.





**Min Kyu Song** - Assistant Professor  
Joined MME in 2015  
Ph.D. in Materials Science and Engineering from Georgia Tech in 2011

Dr. Song's research interests include rational design of materials/interfaces and manufacturing technologies; energy technologies (batteries, fuel cells, supercapacitors and smart windows); environmental technologies (electrochemical synthesis of fuels and electrochemical desalination/deionization of water); bio-inspired materials and processes for energy and the environment; and structure-property relations in materials and solid-state electrochemistry.



**John P. Swensen** - Assistant Professor  
Joined MME in 2015  
Ph.D. in Mechanical Engineering from Johns Hopkins University in 2012

Dr. Swensen's research interests include medical robotics (steerable needles, compliant devices); tunably compliant mechanisms; and modular robotics (compliant ensembles, smart materials in robotics).

## Tri-Cities Campus: ME Faculty (not including clinical or adjunct faculty)



**Amir Ameli** - Assistant Professor  
Joined MME in 2015  
Ph.D. in Mechanical Engineering from University of Toronto, Canada, 2011

Dr. Ameli's research interests include multifunctional polymer composites; nano/micro-structured materials for fuel cells, batteries, and supercapacitors; smart materials and devices for sensors and actuators; green composites; advanced cellular composites; and modeling and simulation of manufacturing processes.



**Changki Mo** - Assistant Professor  
Joined MME in 2010  
Ph.D. in Mechanical Engineering from University of Oklahoma in 1996

Dr. Mo's research interests include vehicular and structural vibration control; energy harvesting; shape memory polymers for morphing systems; micro transducers including actuators, sensors, and energy harvesters; fruit picking robot

## Pullman Instructional Faculty



**Nandita Biswas** - Clinical Assistant Professor  
Joined MME in 2014  
Ph. D. in Mechanical Engineering from Washington State University, 2013



**Robert (Kurt) Hutchinson** - Instructor  
Joined MME in 2012, Joined CEA in 1987



**Dave Torick** - Instructor  
Joined MME in 2015  
M.S. in Civil Engineering from the University of Pittsburgh in 2009  
M.Ed. in Secondary Science Education from the Ohio State University in 2000.

## Bremerton Campus Faculty



**Behrang Asgharian** - Clinical Assistant Professor  
Joined MME in 2013  
PhD in Mechanical Engineering from Washington State University in 2013



**Philip Dodge** - Lab Instructor

Joined MME in 2016  
B.S. in Mechanical Engineering,  
Washington State University, 2011.



**Marvin J Pitts** - Clinical Professor and  
Program Coordinator

Joined MME in 2010  
Ph.D., Agricultural Engineering

## Everett Campus Faculty



**Xiaopeng Bi** - Clinical Associate Professor  
and Program Coordinator

Joined MME in 2012  
Ph. D. in Aerospace Engineering from  
University of Illinois at Urbana-Champaign  
in 2003



**Zhiquan (Andy) Shu** - Clinical Assistant  
Professor

Joined MME in 2015  
Ph.D., in Mechanical Engineering from the  
University of Washington in 2013



**Derek Strong** - Lab Instructor

Joined MME in 2016  
B.S. in Mechanical Engineering,  
Washington State University, 2014



**Gordon Taub** - Clinical Assistant  
Professor

Joined MME in 2016  
Ph.D. in Mechanical Engineering,  
University of Florida, 2013.

## Pullman Research Faculty



**Annie D. Du** - Research Professor

Joined MME in 2013  
PhD in Chemistry from Nanjing  
University, China in 2005



**Yuzhan Li** - Staff Scientist

Joined MME in 2014  
PhD in Materials Science and Engineering  
from Iowa State University, 2014

**Colin Merriman** - Staff Scientist

Joined MME in 2013  
Ph.D. in Polymer Chemistry from National  
Institute of Technology, India in 2009



**Alireza Narimannezhad** - Adjunct  
Faculty

Joined MME in 2015  
PhD in Materials Science and Engineering  
from Washington State University, 2015



**Yu (Will) Wang** - Assistant Research  
Professor

Joined MME in 2015  
PhD in Materials Science and Engineering  
from Washington State University, 2015



**Jason Lonergan** - Research Associate

Joined MME in 2016  
PhD in Materials Science and Engineering  
from Missouri University of Science and  
Technology



## Emeritus Faculty

**Stephen D. Antolovich** - Emeritus Professor  
Joined MME in 1992; Ph.D. in Materials Science from University of California, 1966

**Walter J. Grantham** - Emeritus Professor  
Joined MME in 1978; Ph.D. in Aerospace Engineering from University of Arizona in 1973

**John P. Hirth** - Emeritus Professor  
Joined MME in 1988; Ph.D. in Metallurgical Engineering from Carnegie-Mellon University in 1958

**Richard G. Hoagland** - Emeritus Professor  
Joined MME in 1987; Ph.D. in Metallurgical Engineering from The Ohio State University in 1973

**David V. Hutton** - Emeritus Professor  
Joined MME in 1981; Ph.D. in Engineering Science and Mechanics from Virginia Polytechnic Institute and State University in 1974

**William E. Johns** - Emeritus Associate Professor  
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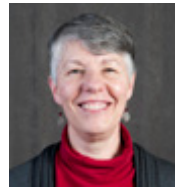
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## Peer-Reviewed Journal Publications<sup>1</sup>

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