The Department of Mechanical and Aerospace Engineering
Dear Colleagues and Friends:

It is with great pleasure that I provide you with our 2012 Annual Scholarly Activities Report for the Department of Mechanical and Aerospace Engineering. You will see our faculty contributing in many different ways, but their efforts are all critical to the vitality of our department and campus. The continued strong undergraduate enrollment in both mechanical and aerospace engineering has been complemented by significant growth in our doctoral program. This comes as a result of a concerted effort on the part of the faculty to strengthen our research and scholarly production. I commend our faculty for redoubling their efforts to provide our graduate students with new funding and educational opportunities in this time of growth. Within the strong undergraduate student enrollments and growing campus commitments, our faculty have continued to develop their nationally and internationally recognized research programs through their scholarly activity. I am pleased to note their many accomplishments in this report.

As last year, our scholarly activities are been reinforced by the growing research program of our junior faculty. The Department of Mechanical and Aerospace Engineering has added three new faculty this year. Dr. Ed Kinzel started in the department as an assistant professor of Mechanical Engineering in August of 2012. Ed further strengthens our expertise in laser-based nano/micro fabrication as well as bringing new talent to heat transfer and photon management with applications in sensing and energy harvesting. Dr. Kirk Christensen joined us as assistant teaching professor in August effectively addressing courses across a wide range of applications by drawing from his over 30 years of industrial, consulting and academic experience. He is a true asset to the department and the students appreciate Kirk sharing his practical understanding of engineering. Dr. Kyle DeMars joined the department in January as assistant professor of aerospace engineering, adding to our depth in control, navigation and guidance in aerospace applications. Before joining the Mechanical and Aerospace Engineering Department, he held a prestigious National Research Council Postdoctoral fellowship at the Air Force Research Lab. We are pleased with the great vitality they bring to their teaching along with the significant potential for collaborative prospects with the other faculty in the department and on campus. Fitting with the growth of the department, we have just finished another successful faculty recruiting season and look forward to several new faculty joining us in the fall. As you review our 2012 Annual Scholarly Activities Report, you will see that the faculty, along with our outstanding staff, form a department of significant strength and potential focused on bringing excellence to the education of our students.

Dr. Jim Drallmeier
Curators’ Teaching Professor and Chair of Mechanical and Aerospace Engineering
Missouri University of Science and Technology
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2012 MAE: by the numbers

**UNDERGRADUATE**

1. Undergraduate student enrollment
   - Aerospace Engineering: 815
   - Mechanical Engineering: 183
   - Manufacturing Engineering: 632

2. B.S. degrees awarded per full-time TT faculty: 7.10

3. Starting salary
   - Aerospace Engineering: $60,140
   - Mechanical Engineering: $60,838

**GRADUATE**

1. Graduate student enrollment
   - Aerospace Engineering: 211
   - Mechanical Engineering: 42
   - Manufacturing Engineering: 136

   Thesis
   - Aerospace Engineering M.S.: 18
   - Aerospace Engineering Ph.D.: 18
   - Mechanical Engineering M.S.: 41
   - Mechanical Engineering Ph.D.: 41
   - Manufacturing Engineering M.S.: 15

   Non-Thesis
   - Aerospace Engineering M.S.: 6
   - Mechanical Engineering M.S.: 54
   - Manufacturing Engineering M.E.: 18

2. Quantitative GRE of graduate students: 711/155

3. Percentage of supported graduate students: 75%

4. GRA/GTA ratio based on FTE: 1.41

5. M.S. degrees (thesis) awarded per full-time TT faculty: 1.09

6. M.S. degrees (non-thesis) awarded per full-time TT faculty: 0.97

7. Ph.D. degrees awarded per full-time TT faculty: 0.1

**GENERAL**

1. Full time TT/NTT faculty: 32/3

2. Undergraduate to graduate student ratio: 4.94

3. Undergraduate student to full-time TT faculty ratio: 25.5

4. Journal articles per full-time TT faculty: 2.25

5. Expenditures per full-time TT faculty: $132,920

6. Professional society fellows: 15

7. Minority and Female Faculty: 2

* Fall 2012 enrollment records
Each semester the Mechanical and Aerospace Engineering department organizes seminars under the sponsorship of the Graduate Seminar Series and the Missouri S&T Academy of Mechanical and Aerospace Engineers (AMAE). One of the purposes of the seminar series is to broaden our students academically and to aid in their professional development by providing another connection with the world of industry, business and research. These seminars consist of exceptional speakers whose research spans the range of the Mechanical and Aerospace Engineering disciplines. Through these seminars we seek to expose our faculty and graduate students to a scale of topics in areas both related to and complementary of those areas investigated in the department.

2012 Spring Semester


February 2, 2012 - “Anisotropic Behavior of Concentrated Aqueous Colloidal Gels of AL₂O₃ and Relation to Shape Evolution in Solid Freeform Fabrication of Lattice Structures” by Dr. Jim Smay, R.N. Maddox Associate Professor, School of Chemical Engineering, Oklahoma State University, Stillwater, OK

March 22, 2012 - “Micromechanics of Smart Composite Structures” by Dr. Alexander L. Kalamkarov, Department of Mechanical Engineering, Dalhousie University, Halifax, Nova Scotia, Canada

April 5, 2012 - “Contextualizing Assessment for Learning to Prepare Students for Success in the 21st Century Global Economy” by Dr. Ashley Ater Kranov, Managing Director of Professional Services, ABET, Inc., Baltimore, MD

2012 Fall Semester

November 8, 2012 - “New Instructional Tools for Undergraduate Mechanics: More than Just Technology” by Dr. Charles Krousgriff, Professor of Mechanical Engineering, Purdue University, West Lafayette, IN
STUDENT TEAMS AND PROFESSIONAL ORGANIZATIONS

**Advanced Aero Vehicle Group**
*Dr. W. Eversman*

**FSAE**
*Dr. H. Pernicka*

**Formula Electric**
*Dr. R. Hutcheson*

**Human Powered Vehicle**
*Dr. D. Stutts*

**Miners in Space**
*Dr. H. Pernicka*

**M-SAT**
*Dr. H. Pernicka*

**Robotics Team**
*Dr. D. Bristow*

**Pi Tau Sigma**
*Dr. K. Homan*

**Sigma Gamma Tau**
*Dr. S. N. Balakrishnan*

**Society of Automotive Engineers**
*Dr. H. Pernicka*

**Society of Flight Test Engineers**
*Dr. F. Finaish*

**American Institute of Aeronautics and Astronautics**
*Dr. J. Rovey*

**American Society of Mechanical Engineers**
*Dr. K. Homan*

SCHOLARSHIP AWARDS

**Undergraduate Scholarships**

- Academy of Mechanical and Aerospace Engineers Scholarships
- AE Alumni Endowed Scholarship
- Bassem and Gery Aramaly Scholarship
- William M. Byrne Endowed Scholars
- Chevron Scholarship
- Clark Family Scholarship
- Clark W. Collier Scholarship
- Charles Copeland Scholarship
- Robert F. Davidson Scholarship
- Desloge-Watlow Manufacturing Engineering Scholarship
- Donnell and Ruth Dutton Scholarship
- Thomas Faucett Endowed Scholarship
- Norman E. Hart Scholarship
- Alan Finley Endowed Scholarship
- Kaiser Aluminum Endowed Scholarship
- Leslie R. and Barbara R. Koval Scholarship
- Tsen-Lu and Yuen-Ray Lee Scholars and Fellows
- Don and Alvilda Mathews Scholarship
- Don and Mary McGovern Endowed Scholarship
- Robert and Linda Mueller Manufacturing Engineering Scholarship
- James J. Murphy Scholarship
- Fred Nelson Memorial Scholarship
- C. Remington Endowed Scholarship
- John Wm. and Camille Ricketts Scholarship
- Rayferd D. Routh Scholarship
- Patricia Ann and Harry J. Sauer, Jr. Endowed Scholarship
- Robert Schoenthaler Scholars
- Robert L. Seaman Memorial Scholarship
- US Steel Scholarship
- Amy L. Weir Scholarship
- Daniel K. and Linda K. Wright Endowed Scholarship
- Wickey Family Scholarship
- Wyatt Endowed Scholarship

**Scholarship Funds Awarded**

- 2008: $120,000
- 2009: $100,000
- 2010: $80,000
- 2011: $60,000
- 2012: $40,000

**Scholarships Awarded**

- 2008: 140
- 2009: 120
- 2010: 100
- 2011: 80
- 2012: 60
**Dr. Kirk Christensen** joined the department as an Assistant Teaching Professor in the Fall of 2012. He received his B.S. and M.S. degrees in mechanical engineering from Brigham Young University in Provo, Utah. He received his Ph.D. degree in aerospace engineering from the Missouri University of Science & Technology (formerly the University of Missouri – Rolla) in 1997. Dr. Christensen has more than 36 years of experience in both academia and industry. He taught as an adjunct faculty member in the Department of Mechanical and Aerospace Engineering at Missouri S&T from 1997 through 2008. He also operated K C Consulting Engineering from 1992 to 2008, during which time he was awarded more than 30 consulting contracts, with clients including CFD Research Corporation, MSE, Innovative Energy, Watson Cogen, SAIC, Rocketplane-Kistler, Bigelow Aerospace, ATK, and Jackson & Tull. These consulting contracts included development of liquid rocket and advanced air breathing propulsion system models, design of advanced turbine concepts for energy generation, assessment of state of the art low thrust, liquid rocket control system thrusters, and others. His specific activities were primarily vehicle/trajecotory/mission analyses, development of vehicle aerodynamic characterization, vehicle/subsystem mass prediction, and vehicle-based evaluation/comparison of propulsion systems. Dr. Christensen also worked in the aerospace industry as a full-time employee from 1977 through 1992 at Aerojet and TRW in California and later (2008 through 2011) at ATK in Elkton, Maryland.

**Dr. Kyle DeMars** joined the department as an Assistant Professor in the Spring of 2013. He received his Ph.D., M.S.E. and B.S. degree in aerospace engineering from The University of Texas at Austin in 2010, 2007, and 2004, respectively. Prior to joining Missouri S&T, Dr. DeMars was a National Research Council Postdoctoral Research Fellow at the Air Force Research Laboratory, Space Vehicles Directorate. His research interests include stochastic estimation and control theory, information theoretic learning, autonomous navigation, guidance, and control of aerospace vehicles, and probabilistic orbit determination. Dr. DeMars has authored/coauthored more than 30 refereed journal/conference presentations. His honors and awards include a National Research Council Postdoctoral Research Associateship and multiple Texas Space Grant Consortium Fellowships.

**Dr. Edward Kinzel** joined the department as an Assistant Professor in Fall 2012. He received his B.S., M.S. and Ph.D. in mechanical engineering from Purdue University 2003, 2005, and 2010, respectively, working on the development of direct-write systems for microelectronics and near-field nanolithography. At Purdue he was awarded the Lozar Assistantship 2003-2005 and the Winkelman Fellowship 2005-2007. Before joining Missouri S&T Dr. Kinzel was a postdoctoral research in the IR Systems Laboratory at the College of Optics and Photonics at University of Central Florida. During this time, he studied near-field infrared optics, antennas and surfaces. He has authored/coauthored more than 30 refereed journal/conference publications. His research interests are optical/infrared antennas for nanofabrication, sensing and energy harvesting as well as laser-based microfabrication, infrared imaging/signature control, and engineering surface radiative properties for heat-transfer/photon management.
DR. S. N. BALAKRISHNAN  
CURATORS’ PROFESSOR OF AEROSPACE ENGINEERING  
Education: Ph.D., University of Texas at Austin  
Research Interests: Guidance, stability, control and estimation, pattern recognition, stochastic processes, optimization, neural network applications to control, numerical methods, design

DR. ARINDAM BANERJEE  
ASSISTANT PROFESSOR OF MECHANICAL ENGINEERING  
Education: Ph.D., Texas A&M University  
Research Interests: Buoyancy driven flows, turbulence, low reynolds number hydrodynamics, nano-fluidics, optical and laser based diagnostics in thermal-fluid sciences, bio-heat transfer

DR. VICTOR BIRMAN  
PROFESSOR OF MECHANICAL ENGINEERING  
DIRECTOR OF ENGINEERING EDUCATION CENTER  
Fellow, ASME, 1996  
Education: Ph.D., Technion (Israel)  
Research Interests: Composite material structures, biomechanics, smart structures and materials, structural dynamics and vibration, buckling and dynamic stability

DR. DOUGLAS A. BRISTOW  
ASSISTANT PROFESSOR OF MECHANICAL ENGINEERING  
Education: Ph.D., University of Illinois at Urbana-Champaign  
Research Interests: Dynamic modeling and control of micro- and nano-positioning systems, atomic force microscopes and additive manufacturing systems; volumetric error compensation; iterative learning control, multi-dimensional control and signal processing.

DR. K. CHANDRASHEKHARA  
CURATORS’ PROFESSOR OF MECHANICAL AND AEROSPACE ENGINEERING  
Fellow, ASME, 2002  
Education: Ph.D., Virginia Polytechnic Institute and State University  
Research Interests: Composite materials, smart structures, nanocomposites, biocomposites, structural dynamics, finite element analysis, damage monitoring, composite manufacturing, experimental characterization

DR. KIRK CHRISTENSEN  
ASSISTANT TEACHING PROFESSOR OF MECHANICAL AND AEROSPACE ENGINEERING  
Education: Ph.D., University of Missouri - Rolla  
Research Interests: Development of propulsion system models using Matlab/Simulink and VBA software packages, Development of pump-fed liquid rocket engine “power balance” calculation methodologies, Model and hardware development of liquid and solid fueled Air Turbo Rocket (ATR), Thermodynamics, Dynamics, and Development of database document storage & retrieval systems for teaching applications

DR. AL CROSBIE  
CURATORS’ PROFESSOR OF MECHANICAL ENGINEERING  
Fellow, ASME, 1987  
Fellow, AIAA, 1988  
Fellow, AAAS, 1999  
Education: Ph.D., Purdue University  
Research Interests: Multidimensional radiative heat transfer, laser processing of materials, radiative heat transfer in combustion processes, microscale heat transfer, biomedical optics, interaction of radiation with conduction and convection, multiple scattering and polarization of laser beams, solutions of integral equations, numerical heat transfer

DR. KYLE DEMARS  
ASSISTANT PROFESSOR OF AEROSPACE ENGINEERING  
Education: Ph.D., University of Texas at Austin  
Research Interests: Stochastic estimation and control theory; information theory; nonlinear uncertainty propagation and rectification; autonomous guidance, navigation, and control of aerospace vehicles; orbit determination, data association, conjunction assessment, and collision avoidance; attitude dynamics, determination, and control; autonomous sensor management; high-fidelity dynamical and observational modeling

DR. VICTOR BIRMAN  
PROFESSOR OF MECHANICAL ENGINEERING  
DIRECTOR OF ENGINEERING EDUCATION CENTER  
Fellow, ASME, 1996  
Education: Ph.D., University of Illinois at Urbana-Champaign  
Research Interests: Dynamic modeling and control of micro- and nano-positioning systems, atomic force microscopes and additive manufacturing systems; volumetric error compensation; iterative learning control, multi-dimensional control and signal processing.

DR. LOKESWARAPPA R. DHARANI  
CURATORS’ PROFESSOR OF MECHANICAL AND AEROSPACE ENGINEERING  
Associate Fellow, AIAA, 1996  
Fellow, ASME, 2000  
Education: Ph.D., Clemson University  
Research Interests: Aircraft structures, fracture mechanics, fatigue and failure analysis, micro mechanics, composite materials and structures, process modeling of ceramic matrix composites, friction and wear of composites, fracture of laminated glazing

DR. JAMES A. DRALLMEIER  
CURATORS’ TEACHING PROFESSOR OF MECHANICAL ENGINEERING  
DEPARTMENT CHAIR  
Education: Ph.D., University of Illinois at Urbana-Champaign  
Research Interests: Combustion, laser based diagnostics for sprays and combustion, optical measurement systems, fuel injection, internal combustion engines
DR. XIAPING DU
ASSOCIATE PROFESSOR OF
MECHANICAL ENGINEERING
Education: Ph.D., University of Illinois at Chicago
Research Interests: Design optimization, multidisciplinary optimization design, probabilistic/statistical methods, system/structural reliability, robust design, kinematics, mechanism synthesis, petroleum machinery

DR. WALTER EVERSMAN
CURATORS’ PROFESSOR OF AEROSPACE ENGINEERING
Fellow, AIAA, 2011
Education: Ph.D., Stanford University
Research Interests: Noise control, acoustics, vibrations, aircraft structural dynamics and aerelasticity, systems and control

DR. KAKKATTUKUZHY M. ISAAC
PROFESSOR OF AEROSPACE ENGINEERING
ASSOCIATE CHAIR FOR AEROSPACE ENGINEERING
Education: Ph.D., Virginia Polytechnic Institute and State University
Research Interests: Fluid dynamics, aero-structure interaction and control, intelligent aircraft, active flow control, unmanned air vehicles, electrochemical magnetohydrodynamics-based microfluidics and CFD simulations of transport phenomena

DR. EDWARD C. KINZEL
ASSISTANT PROFESSOR OF MECHANICAL ENGINEERING
Education: Ph.D., Purdue University
Research Interests: Infrared/optical antennas applied to energy transport, sensing, and manufacturing, metamaterials/frequency selective surfaces for engineering radiation properties, near-field radiation heat transfer, direct energy conversion and energy harvesting and laser based micro/nanomanufacturing including electronics packaging

DR. EDWARD C. KINZEL
ASSISTANT PROFESSOR OF MECHANICAL ENGINEERING
Education: Ph.D., Virginia Polytechnic Institute and State University
Research Interests: Fluid dynamics, aero-structure interaction and control, intelligent aircraft, active flow control, unmanned air vehicles, electrochemical magnetohydrodynamics-based microfluidics and CFD simulations of transport phenomena

DR. RYAN S. HUTCHESON
ASSISTANT TEACHING PROFESSOR OF MECHANICAL ENGINEERING
Education: Ph.D., Texas A&M University-College Station
Research Interests: Design theory and methodology, design of complex systems, behavioral modeling of complex systems, design of hybrid powertrain systems, engineering software development, graphical simulations of engineering systems

DR. JIE GAO
ASSISTANT PROFESSOR OF MECHANICAL ENGINEERING
Education: Ph.D., Columbia University
Research Interests: Nanophotonics devices based on silicon photonics, plasmonics and metamaterials; light-matter interactions in photonic nanostuctures; optical sensing; quantum dots; quantum optics and quantum information processing; solar energy harvesting; light emitting devices

DR. NISHANT KUMAR
ASSISTANT TEACHING PROFESSOR OF MECHANICAL ENGINEERING
Education: Ph.D., New Mexico University
Research Interests: Nonlinear dynamics and vibrations, study of deterministic and random dynamical systems, model order reduction, theoretical modeling and numerical computation, structural dynamics

DR. KELLY HOMAN
ASSOCIATE PROFESSOR OF MECHANICAL ENGINEERING
Education: Ph.D., University of Illinois at Urbana-Champaign
Research Interests: Fluid dynamics, heat transfer, and thermodynamics of energy systems, heat and mass transfer in buoyant flows, second-law and exergy analysis, numerical simulation of transport phenomena and experimental methods

DR. SERHAT HOSDER
ASSISTANT PROFESSOR OF AEROSPACE ENGINEERING
Education: Ph.D., Virginia Polytechnic Institute and State University
Research Interests: Computational fluid dynamics (CFD), aerodynamics, micro/nano flows, stochastic CFD, uncertainty and error quantification in computational simulations, multidisciplinary design and optimization, robust design, numerical methods

DR. UMIT O. KOYLU
PROFESSOR OF MECHANICAL ENGINEERING
Education: Ph.D., Columbia University
Research Interests: Nanophotonics devices based on silicon photonics, plasmonics and metamaterials; light-matter interactions in photonic nanostructures; optical sensing; quantum dots; quantum optics and quantum information processing; solar energy harvesting; light emitting devices
<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Education</th>
<th>Research Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR. ROBERT G. LANDERS</td>
<td>Professor of Mechanical Engineering</td>
<td>Ph.D., University of Michigan at Ann Arbor</td>
<td>Manufacturing, systems, and control; modeling, analysis, monitoring, and control of manufacturing processes; metal cutting; laser metal deposition; freeze extrusion fabrication; friction stir processing; electro-hydraulics; analysis and control of alternative energy systems; digital control applications</td>
</tr>
<tr>
<td>DR. MING C. LEU</td>
<td>Keith and Pat Bailey Distinguished Professor of Mechanical Engineering</td>
<td>Ph.D., University of California at Berkeley</td>
<td>Rapid prototyping, intelligent manufacturing, virtual reality, CAD/CAM, robotics, mechatronics and automatic control</td>
</tr>
<tr>
<td>DR. FUEWEN (FRANK) LIOU</td>
<td>Michael and Joyce Bytnar Product Innovation and Creativity Professor of Mechanical Engineering</td>
<td>Ph.D., University of Minnesota at Twin Cities</td>
<td>CAD/CAM, rapid prototyping, rapid manufacturing, fuel cell manufacturing</td>
</tr>
<tr>
<td>DR. GEAROID MACSITHIGH</td>
<td>Associate Professor of Mechanical and Aerospace Engineering</td>
<td>Ph.D., University of Minnesota at Twin Cities</td>
<td>Finite elasticity, viscoelasticity, liquid crystal hydrodynamics, solid and continuum mechanics</td>
</tr>
<tr>
<td>DR. KEVIN B. MARTIN</td>
<td>Assistant Research Professor of Mechanical Engineering</td>
<td>Ph.D., Missouri University of Science and Technology</td>
<td>Hydrogen infrastructure modeling, fuel cell technology, energy policy</td>
</tr>
<tr>
<td>DR. ASHOK MIDHA</td>
<td>Professor of Mechanical Engineering</td>
<td>Ph.D., University of Minnesota at Twin Cities</td>
<td>Mechanical design, rigid-body and compliant mechanism design, high-performance machinery analysis and design, machine vibration and stability</td>
</tr>
<tr>
<td>DR. J. KEITH NISBETT</td>
<td>Associate Professor of Mechanical Engineering</td>
<td>Ph.D., University of Texas at Arlington</td>
<td>Kinematics, mechanical design, synthesis of mechanisms</td>
</tr>
<tr>
<td>DR. ANTHONY OKAFOR</td>
<td>Professor of Mechanical Engineering</td>
<td>Ph.D., Michigan Technological University</td>
<td>Manufacturing including intelligent machining, high speed machining, machine tool dynamics and metrology, metal forming, sensors and signal processing, computer numerical control (CNC), virtual manufacturing, and neural network applications; smart structures including structural health monitoring, aging aircraft, damage assessment and repair of metallic and composite structures, non-destructive evaluation, and proton exchange membrane (hydrogen) fuel cells</td>
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<tr>
<td>DR. HENRY (HANK) PERNICKA</td>
<td>Associate Professor of Aerospace Engineering</td>
<td>Ph.D., Purdue University</td>
<td>Astrodynamics, orbital mechanics, spacecraft design, spacecraft mission design, satellite attitude dynamics, nonlinear analysis, dynamics and control, optimization</td>
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<td>Ph.D., Purdue University</td>
<td>Astrodynamics, orbital mechanics, spacecraft design, spacecraft mission design, satellite attitude dynamics, nonlinear analysis, dynamics and control, optimization</td>
</tr>
</tbody>
</table>
DR. JOSHUA L. ROVEY
ASSISTANT PROFESSOR OF
AEROSPACE ENGINEERING
Education: Ph.D., University of Michigan
Research Interests: Plasma aerospace applications, advanced space propulsion, plasma aerodynamics and flow control, plasma-enhanced combustion, applications to energy systems, hypersonics/re-entry body plasma interactions, plasma physics, rarefied gas dynamics

DR. JOHN W. SHEFFIELD
PROFESSOR OF MECHANICAL ENGINEERING
ASSOCIATE DIRECTOR OF CTIS
NATIONAL UNIVERSITY TRANSPORTATION CENTER
Education: Ph.D., North Carolina State University
Research Interests: Industries-of-the-future, industrial energy management, energy efficiency, hydrogen energy systems, thermal contact conductance/resistance

DR. DANIEL S. STUTTS
ASSOCIATE PROFESSOR OF
MECHANICAL ENGINEERING
Education: Ph.D., Purdue University
Research Interests: Dynamics, vibrations, modeling and development of piezoactuators and transducers-mechatronics, embedded systems and control

DR. SHUN TAKAI
ASSISTANT PROFESSOR OF
MECHANICAL ENGINEERING
Education: Ph.D., Stanford University
Research Interests: Design theory and methodologies, design for manufacture, lifecycle engineering, sustainable design, applications of decision analysis and game theory in design, creativity and innovation, customer need analysis, uncertainty modeling for product cost, warranty cost, market share, and competition

DR. HAI-LUNG TSAI
PROFESSOR OF MECHANICAL ENGINEERING
Fellow, ASME, 2009
Education: Ph.D., University of California at Berkeley
Research Interests: Ultrashort laser pulse-material interaction, laser micromachining for micro-sensors and micro-devices, gas metal arc welding, laser welding and hybrid welding, Ab Initio MD modeling, multiscale modeling

DR. XIAODONG YANG
ASSISTANT PROFESSOR OF
MECHANICAL ENGINEERING
Education: Ph.D., University of California at Berkeley
Research Interests: Optical materials and devices in nanophotonics and plasmonics; physics and applications of optical meta-materials; nanoscale optomechanics, optical nanoelectromechanical systems (NEMS); integrated optofluidic devices and optical sensors; photon management for solar/thermal energy harvesting; optical device micro-/nano-fabrication

Faculty Awards and Honors

Campus Recognition and Honors
Global Learning Outstanding Teaching Commendation
Dr. V. Birman
Dr. L. Dharani
Global Learning Outstanding Teaching Award
Dr. H. Pernicka
Faculty Research Award
Dr. S. Hosder
Dr. J. Rovey
Faculty Teaching Award
Dr. X. Du
Faculty Service Award
Dr. K. Isaac
Faculty Achievement Award
Dr. R. Hutcheson

Professional Recognition
Dr. N. Kumar, Silver Slide Rule Award for Teaching Excellence, Pi Tau Sigma, Missouri University of Science and Technology Chapter.
Dr. M. Leu, Siemens Product Lifecycle Management (PLM) Software Certificate of Achievement.
Dr. X. Yang, Oak Ridge Associated Universities - Ralph E. Powe Junior Faculty Enhancement Award, April 2012.
Dr. X. Yang, Optical Society of America - Journal Referee Lapel Pin Award for the Most Active Reviewers, May 2012.

Publication Recognition and Awards
Dr. K. Chandrashekhara, “Foam Pattern Agining and Its Effect on Crack Formation in Investment Casting Ceramic Shells (12-025),” selected for the Best Paper Award at the American Foundry Society Conference in Schaumburg, IL, April 5 - 8, 2012.

2012
Balakrishnan, S.

Balakrishnan, S. (100%), Indiana University, Quantum Decision Theory; $52,775, July 15, 2012 - July 14, 2013.

Banerjee, A.


Banerjee, A. (100%) and Allada, V. (10%), National Science Foundation, “Graduate Research Fellowship - Pamela Roach,” $42,000, June 1, 2012 - November 30, 2014.

Birman, V.


Bristow, D.


Chandrashekhara, K.


Du, X.


Eversman, W.


Koylu, U.


Kumar, N.

Kumar, N. (100%), Missouri S&T Office of VPAA and CERTI, “Student Usage and Perceptions of Virtual Office Hours that Extends beyond the Traditional Face to Face Setting,” $500, August 20, 2012 - August 31, 2013.

Landers, R. G.


Leu, M.


Liou, F.


Liou, F. (70%) and Newkirk, J. (30%), Rolls-Royce Corporation, “CAMT/Direct Metal Deposition of Functionally Gradient Materials,” $40,000, October 7, 2012 - October 6, 2013.

Liou, F. (100%), GKN Aerospace Services, “CAMT/Comparison of Laser Deposition and Welding for Metal Defect Rework,” $20,000, October 27, 2012 - October 26, 2013.

Pernicka, H.


Rovey, J.

Rovey, J. (100%), Lockheed Martin Corporation, “Characterization of Altitude Effect of Plasma Actuators; $25,000, August 1, 2012 - August 31, 2013.


Yang, X.

Yang, X. (100%), Oak Ridge Associated University, “Enhanced Bipolar Optical Forces and Optomechanics in Engineered Plasmic Nanostructures; $5,000, June 1, 2012 - May 31, 2013.

Balakrishnan, S.


Banerjee, A.


Dagli, C. (20%), Drallmeier, J. (25%), and Hilmas, G. (75%), Missouri University of Science and Technology, “NASP Bond Test as a Predictor of Strand Bond, Transfer Length, and Development Length - Addendum,” $10,000, September 1, 2011 - May 1, 2013.


Leu, M.


Leu, M. (60%) and Liu, X. (40%), Boeing Company, “CAMT IC Gold Membership,” $80,000, February 27, 2008 - September 14, 2012.


Rovey, J.


Pernicka, H.


Midha, A.


Okafor, A.


Sheffield, J.

Myers, J. (67%) and Sheffield, J. (33%), Department of Transportation, "NUTC (National University Transportation Center for Transportation) Infrastructure and Safety Year 1;" $1,560,000, July 1, 2006 - June 30, 2013.

Myers, J. (70%) and Sheffield, J. (30%), Department of Transportation, "NUTC (National University Transportation Center for Transportation) Infrastructure and Safety Year 2;" $3,010,000, July 1, 2007 - June 30, 2013.

Rolufs, A. (50%) and Sheffield, J. (50%), Department of transportation, "FTA Grant - Research on Alternative Sources of Energy to Power Transit Vehicles," $686,073, April 1, 2008 - October 1, 2013.

Myers, J. (70%) and Sheffield, J. (30%), Department of Transportation, "National University Transportation Center For Transportation Infrastructure and Safety - Yr 3;" $2,686,100, July 1, 2008 - June 30, 2013.


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**ROFESSIONAL & SCHOLARLY ACTIVITIES**

**CHAIRMAN, CO-CHAIRMAN OF TECHNICAL SESSIONS AND CONFERENCES**

Birman, V.


Landers, R. G.


Leu, M.

Chair of the 9th Industrial Advisory Board Meeting of the Center for Aerospace Manufacturing Technologies, Indianapolis, IN, May 8, 2012.


Chair of Technical Session, “Modeling II,” Twenty Third Annual Solid Freeform Fabrication Symposium, Austin, TX, August 6 - 8, 2012.

Chair of the 10th Industrial Advisory Board Meeting of the Center for Aerospace Manufacturing Technologies, Rolla, MO, November 6, 2012.

Liou, F.


**SERVICE ON COMMITTEES OF PROFESSIONAL ORGANIZATIONS**

Birman, V.

Technical Committee Member, ASME Aerospace Division Structures and Materials, International Mechanical Engineering Congress and Exposition (IMECE-2012), Houston, TX, November 13, 2012.


Crosbie, A.


AIAA Editors-in-Chief Committee Meeting (Chair), Nashville, TN, January 11, 2012.


Member of the selection committee for the Benedict Spectroscopy Award, June 2012.


Member of the selection committee for the Poynting Radiative Transfer Award, August 2012.

Gao, J.

Reviewer, Robert S. Hilbert Memorial Student Travel Grant for Frontiers in Optics (FiO) Conference, August 24, 2012.

Hosder, S.


Koylu, U.


Landers, R. G.

Best Paper Award Committee (member), International Symposium on Flexible Automation, St. Louis, MO, June 18 - 20, 2012.

Program Committee Member, International Symposium on Flexible Automation

Program Committee Member, IEEE Conference on Control Applications

Leu, M.

Advisory Committee, 23rd Annual International Solid Freeform Fabrication Symposium, Austin, TX, August 6 - 8, 2012.


Scientific Committee, 17th CIRP Conference on Electro Physical and Chemical Machining (ISEM), Leuven, Belgium, April 8 - 12, 2013.


Mac Sithigh, G.

Arrangements Committee, Society for Natural Philosophy, Udine, Italy, October 2012.

Tsai, S.

Tsai, S. (50%) and Midha, A. (50%), Center for Educational Research and Teaching Innovation (CERTI), Missouri S&T, “Development, Assessment, and Implementation of Metrics to Improve Innovation Thinking through Project-Based Design Courses,” $6,600, June 1, 2011 - May 31, 2012.

Tsai, H.


Yang, X.


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**ROFESSIONAL & SCHOLARLY ACTIVITIES**
**Editors of Symposia, Proceedings, and Journals**

Balakrishnan, S.
Associate Editor, AIAA Journal of Guidance, Control, and Dynamics
Book Editor, Advances in Missile Guidance, Control, and Estimation

Birman, V.
Associate Editor, Composites, published by the Polish Society for Composite Materials
Associate Editor, Composites Part B: Engineering
Associate Editor and Member of Editorial Board, International Journal of Aeronautical and Space Sciences, published by the Korean Society for Aeronautical and Space Sciences

Bristow, D.
Associate Editor, IEEE International Symposium on Intelligent Control, 2012
Associate Editor, Mechatronics

Chandrashekara, K.
Editorial Advisory Board, Journal of Biobased Materials and Bioenergy

Crosbie, A.
Editor-in-Chief, AIAA Journal of Thermophysics and Heat Transfer
Associate Editor, Journal of Quantitative Spectroscopy & Radiative Transfer

Chandrashekara, K.
Editorial Board, The Open Civil Engineering Journal

Du, X.
Editorial Board Member, International Journal of Reliability and Safety

Isaac, K.

Landers, R. G.
Associate Editor, ASME Journal of Dynamic Systems, Measurement, and Control

Associate Editor, IEEE Transactions on Control Systems Technology

Associate Editor, ASME Journal of Manufacturing Science and Engineering

Leu, M.

Editorial Board, International Journal of Manufacturing Engineering

Editorial Board, CIRP Journal of Manufacturing Science and Technology

Editorial Board, Journal of Virtual and Physical Prototyping

Liu, F.
Associate Editor, Mechanism and Machine Theory, the journal of IFToMM - The International Federation for the Theory of Machines and Mechanisms

Sheffield, J.
Subject Editor and Associate Editor, International Journal of Hydrogen Energy

Tsai, H.

Editorial Board, Journal of Spectroscopy & Dynamics

Editorial Board, ISRN Chemical Engineering

**JOURNAL PUBLICATIONS**

Balakrishnan, S.


Birman, V.


Leu, M.


Liou, F.


Okafor, A.


Pernicka, H.


Rovey, J.


Sheffield, J.


Stutts, D.


Tsai, H.


Yang, X.


Balakrishnan, S.


Dharani, L.


Rovey, J.


Stutts, D.


Leu, M.


Liou, F.

Liou, F., “What are the Key Measurement Science Barriers that Prevent Innovation in Metal-based AM?,” Workshop on Measurement and Standards for Metals-based Additive Manufacturing, National Institute of Standards and Technology, Gaithersburg Campus, Gaithersburg, MD, December 4-5, 2012.

Sheffield, J.


M.S. THESIS AND PH.D. DISSERTATIONS

Balakrishnan, S.


Banerjee, A.


Bristow, D.


Chandrasekhar, K.


Drallmeier, J.


Eversman, W.


Finaish, F.


Homan, K.


Hosder, S.


Isaac, K.


Landers, R. G.


Leu, M.


Liou, F.


Midha, A.


Okafor, A.

Hilary Onyishi (MSAE), Advisor: Okafor, A. C., “Investigation of the Effect of Machining Parameters on Cutting Forces, Shear Angle and Friction in Orthogonal Turning of Titanium Alloy Tube and Ribs,” August 2012.

Emenike Chukwuma (MSME), Advisor: Okafor, A. C., “Effects of Machining Parameters and Cooling Strategies on Cutting Forces and Surface Integrity in High-Speed Slot End-Milling of Titanium Alloy,” December 2012.

Pernicka, H.


Riggins, D.


Rovey, J.


Andrzej Heckman (MSME), Advisor: Rovey, J., “Ultrasonic Communications System for Health Monitoring of Hydrokinetic Turbine Blades,” June 2012.


Takai, S.


Tsai, H.
