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On behalf of the faculty and students of the Department of Mechanical Engineering at the University of Kansas, thank you for your interest in our 2011 – 2012 Biennial Report.

Invariably, visitors to the University of Kansas are struck by the beauty of our campus, as described by Thomas Gaines in *The Campus as a Work of Art*. Collectively, the stunning, hand-crafted architecture that is interspersed with important works of art is testament to the vision of the artists and artisans of the past. The creative energy and the time that was expended to provide future generations with these extraordinary treasures is readily understood.

Less apparent to many, however, is the intellectual struggle that accompanies scientific and engineering research. Indeed, the task of generating new knowledge that is of lasting value is a primary function of any great university. Moreover, the process of discovery prepares students for lifelong learning, and publishing the discovery both enables its usage, and draws the admiration and respect of our professional colleagues. The need to acknowledge faculty and student achievement has motivated our new Biennial Report series.

Currently, the Mechanical Engineering Department consists of 16 tenure-track faculty members who, in addition to being dedicated to excellence in the classroom, contribute to society by way of their research endeavors and professional service. This Report is a compendium of faculty activities during 2011 and 2012. In addition, we are very proud of the student achievements that are included herein.

Although we are pleased to share our recent successes with you, we look forward to reporting many more achievements in the future. I hope you enjoy our inaugural Biennial Report.

Sincerely,

Theodore L. Bergman
Charles E. & Mary Jane Spahr Professor
Chairman, Department of Mechanical Engineering
Theodore L. Bergman  
Charles E. & Mary Jane Spahr Professor  
Chair, Department of Mechanical Engineering  
Ph.D. Purdue University, 1985

Dr. Bergman joined the Department of Mechanical Engineering in 2012. He was previously a faculty member at the University of Connecticut (1996 – 2012) and The University of Texas at Austin (1985 – 1996). From 1998 to 2004 he was Head of the Mechanical Engineering Department at UConn and served as Associate Dean of Engineering for Research and Outreach in 2004 and 2005, also at the University of Connecticut. He directed the Thermal Transport Processes Program at the National Science Foundation from 2008 to 2010. Early in his career, Dr. Bergman worked at Black & Veatch as a design engineer.

Dr. Bergman conducts research in the thermal sciences as applied to advanced manufacturing and alternative energy systems. He is a co-author of several heat transfer texts, has served as an Associate Editor for the ASME Journal of Heat Transfer and Frontiers in Heat Transfer, and has received a number of awards including the NSF Presidential Young Investigator Award, the ASME Heat Transfer Division Best Paper Award, and the ASME Melville Medal. He has published over 110 refereed articles and holds one patent. Dr. Bergman is a Fellow of the American Society of Mechanical Engineers.

Christopher Depcik  
Assistant Professor  
Ph.D. University of Michigan, 2003

Dr. Depcik joined the Department of Mechanical Engineering in 2008. He previously worked at the University of Michigan as a post-doctoral research fellow. Dr. Depcik conducts research pertaining to sustainable energy usage and the transportation infrastructure including Feedstock-to-Tailpipe analyses of fuel production and its subsequent combustion including the influence of the feedstock and fuel on exhaust emissions. Also of interest is energy recovery utilizing multiple feedstocks and different fuels. A major effort is the development of predictive models for catalytic exhaust aftertreatment devices.

Dr. Depcik’s EcoHawks students design and research electrified vehicles and renewable energy sources, including the interconnection of the vehicles and energy sources with the electrical grid. He has published over 45 refereed articles and is a member of both the American Society of Mechanical Engineers and the Society of Automotive Engineers (SAE). In 2011, he received campus-wide recognition as a W. T. Kemper Fellow for Teaching Excellence. In the following year, he received the SAE Ralph R. Teetor Educational Award in recognition of his transportation-related research and educational activities.
Faculty Profiles

Ronald L. Dougherty

Professor

Ph.D. University of Missouri – Rolla (now Missouri S&T), 1978

Dr. Dougherty joined the Mechanical Engineering Department at KU in 1999. He was previously on the faculty at Oklahoma State (1985 – 1999), and worked in industry at Pratt & Whitney (1978 – 1982) and Terra Tek (1982 – 1985). He served as Chair of the Mechanical Engineering Department for 13 years, from 1999 to 2012. Dr. Dougherty's areas of research include laser diagnostics, particulate characterization, two-phase fluid flow and heat transfer, power plant thermal modeling, improvement of pumping systems, boiling, and forensic blood spatter. He has been funded by the National Science Foundation, the Nuclear Regulatory Commission, Grundfos Pump Company, Purolator Products, and other industries as well as state agencies. He has published over 30 peer-reviewed articles and has produced over 70 conference papers and reports.

Dr. Dougherty is a member of the American Society of Mechanical Engineers, the American Institute of Aeronautics and Astronautics (Associate Fellow), the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, the American Society for Engineering Education, and Sigma Xi. He was an Erkine Fellow at the University of Canterbury, Christchurch, New Zealand in 2009. He has served for over a decade as an Associate Editor for the AIAA Journal of Thermophysics and Heat Transfer, and is a Registered Professional Engineer in the state of Oklahoma. He has served on a wide range of committees and has held positions as an officer in various professional and technical societies including ASME, AIAA, and Sigma Xi.

Terry Faddis

Professor

D.E. University of Kansas, 1972

Dr. Faddis joined the Department of Mechanical Engineering in 1986. He was at Didde Graphic Systems from 1974 – 1986 where he had been Vice President of Engineering. He was previously in the Device Division at Lawrence Livermore National Laboratories. Dr. Faddis became Chairman of the department in 1991 and served in that capacity until 1999.

Dr. Faddis currently has research programs in algae recovery, robotics and electric vehicles. He heads the Intelligent Systems and Automation Laboratory at KU and teaches machine design as well as microprocessor development courses. Dr. Faddis has received a number of awards including the Miller Award for Outstanding Research, the Wesley G. Cramer Mechanical Engineering Faculty Award, the Mechanical Engineering Outstanding Faculty Award, the Miller Award and the Kipp Distinguished Teaching Award. He has published over 30 journal and conference papers and holds three patents. Dr. Faddis is a member of the American Society of Mechanical Engineers, the American Gear Manufacturers Association, the Society of Automotive Engineers, the Canadian Association of Road Safety Professionals, and is a past member of the University of Kansas Mechanical Engineering Advisory Board.
Faculty Profiles

Kenneth J. Fischer
Associate Professor
Ph.D. Stanford University, 1995

Dr. Fischer joined the Department of Mechanical Engineering in 2000. He holds secondary faculty appointments in both the Departments of Orthopedic Surgery as well as in Physical Therapy and Rehabilitation Sciences at the University of Kansas Medical Center. He was previously a faculty member at the University of Pittsburgh (1995 – 2000). Early in his career, Dr. Fischer worked at Boeing Commercial Airplanes as a systems engineer and in manufacturing research and development.

Dr. Fischer conducts research in musculoskeletal biomechanics. He has served as an Associate Editor for the ASME Journal of Biomechanical Engineering and has published over 30 refereed articles. Dr. Fischer is a member of the American Society of Mechanical Engineers, the American Society of Biomechanics, the Orthopaedic Research Society, and the American Society for Engineering Education.

Elizabeth A. Friis
Associate Professor
Ph.D. Wichita State University, 1994

Dr. Friis joined the Department of Mechanical Engineering in 2001. Before coming to KU, she was a Research Scientist at the Orthopaedic Research Institute from 1987 to 2001. Dr. Friis’ main research interests are in biomaterials and biomechanics, with emphasis in spine biomechanics and mechanical testing and design of implants. Dr. Friis helped develop the Product Design and Development track in the KU Bioengineering Graduate program and has served as its Co-Director since 2007. She has received several teaching awards, including the KU Outstanding Woman Educator Award in 2007 and a Kemper Fellowship in 2006. Dr. Friis has led several efforts at KU to incorporate technology entrepreneurship education into the engineering curriculum.

Dr. Friis serves on the Editorial Board of The Journal of Biomedical Materials Research – Part A since 2007. In 2004, Dr. Friis was a Kauffman Entrepreneurial Faculty Scholar and was in the charter class of an entrepreneurial development program (PIPELINE) in 2007. She served as the Director of the Graduate Fellowship Program for the Institute for Advancing Medical Innovation from 2009 to 2011. Dr. Friis has received several National Science Foundation and National Institutes of Health Small Business Innovation Research awards, and has licensed technologies that are currently commercialized.
**Faculty Profiles**

**Sarah L. Kieweg**

Assistant Professor

Ph.D. Duke University, 2005

Dr. Kieweg joined the Department in 2006. She has also held a courtesy position in Obstetrics & Gynecology at the KU School of Medicine since 2007. Dr. Kieweg conducts research in non-Newtonian fluid mechanics with applications in biomechanics, primarily to improve the drug delivery of anti-HIV microbicides. Her research also has applications in women's health including instrument design, soft tissue mechanics of the female pelvic floor, and the biomechanics of delivery.

Dr. Kieweg was a National Institutes of Health (NIH) K12 Building Interdisciplinary Research Careers in Women's Health (BIRCWH) Scholar (2007 – 2011) and is the Principal Investigator of a 5-year NIH phased R21/R33 award, funded through the NIH Microbicide Innovation Program. As co-PI on a Major Research Instrumentation grant from the National Science Foundation, she is conducting high performance computational simulations of thin film flow of non-Newtonian fluids to enable the rational design of microbicide delivery vehicles. Other projects include the development of mathematical models of relevant transport phenomena to design nanomedicines for microbicide drug delivery. Additional funding includes a Kauffman Foundation/Institute for Advancing Medical Innovation proof-of-concept award for a device that will automatically vitrify reproductive cells and tissue to preserve fertility in cancer patients.

**Carl W. Luchies**

Associate Professor

Ph.D. University of Michigan, 1991

Dr. Luchies joined the Department of Mechanical Engineering in 1996. He was previously an Engineering Physics faculty member at Hope College (1991 – 1996). At KU, Dr. Luchies has served as the Interim Director of the Human Performance Laboratory at the KU Medical Center (2004 – 2006) and was the Academic Director of the Bioengineering Graduate Program (2007 – 2010). He holds a secondary faculty appointment in the Department of Physical Therapy and Rehabilitation Science at the KU Medical Center. Dr. Luchies has received the Louise Byrd Graduate Educator Award (2010), a campus-wide recognition for scholarly activity as well as devotion to graduate students and graduate education. He also received the School of Engineering Miller Scholar Award three times, the Wesley G. Cramer Mechanical Engineering Faculty Award twice, and the Center for Teaching Excellence in Teaching Award once. He directs the KU-Korea University of Technology Joint Master's degree program.

Dr. Luchies leads the Biodynamics Research Laboratory which integrates the methodology of mechanical engineering with the biological and medical sciences to study the mechanics of the human musculoskeletal system. Experimental studies, mathematical modeling, and computer simulations are conducted to produce insights into the biomechanics of human balance and motor control related to aging and neurological disease. Dr. Luchies collaborates with colleagues in the KUMC Center on Aging, Movement Disorders Clinic, and Molecular and Integrative Physiology. He has published over 20 refereed articles and is a member of the Society of Neuroscience.
Lorin P. Maletsky

Associate Professor
Associate Chair, Department of Mechanical Engineering

Ph.D. Purdue University, 1999

Dr. Maletsky began teaching at the University of Kansas in 2000. His courses are in the design and mechanics tracks of the curriculum, and he also offers graduate courses in dynamics and manufacturing.

Dr. Maletsky has received a number of teaching awards including the Kemper Fellowship for Teaching Excellence and the Sharp Teaching Fellowship.

Dr. Maletsky’s research area is machine design and biomechanics, specifically the experimental testing of cadaveric joints using custom-designed physiological loading equipment. He has had funding from the orthopedic industry, the National Science Foundation, and the Center for Disease Control. Graduates from his laboratory hold positions in a number of the world’s largest orthopedic companies, as well as in academia and in other industries. He is a member of the Bioengineering Division of ASME and currently chairs the Design, Dynamics, and Rehabilitation Technical Committee. Dr. Maletsky is also a member of the Orthopedic Research Society and the American Society for Engineering Education.

Robert M. Sorem

Associate Professor

Ph.D. University of Kansas, 1991

Dr. Sorem joined the Department of Mechanical Engineering in 1994. He previously worked for Schlumberger Oilfield Services from 1991 to 1994 in Research and Engineering developing downhole oilfield tools. During his tenure at Schlumberger he co-developed 17 patents. Dr. Sorem served as Associate Dean for Undergraduate Studies in the School of Engineering for the 2002-2012 academic years.

Dr. Sorem’s research areas are engineering education, computational mechanics and vehicle dynamics. His work in engineering education is focused on retention strategies and graduation rates. He has advised KU’s Jayhawk Motorsports Formula SAE (Society of Automotive Engineers) Racing Team for 17 years. In 2012 Jayhawk Motorsports won the Formula Hybrid – Electric Division and the Formula SAE Lincoln events. In 2009 Dr. Sorem was awarded the Carroll Smith Mentor’s Cup by Formula SAE and the Sports Car Club of America (SCCA)—the highest award that can be earned by any Formula SAE advisor.
Faculty Profiles

Paulette Spencer

Deane E. Ackers Distinguished Professor
Director, Bioengineering Research Center

Ph.D. University of Missouri-Kansas City, 1993
D.D.S. University of Missouri-Kansas City, 1978

Dr. Spencer joined the department in 2007. She was previously a faculty member at the University of Missouri-Kansas City School of Dentistry (1998 – 2007) and is a Curators’ Professor Emerita from the University of Missouri. Working with her research team, Dr. Spencer designs, synthesizes, and develops novel biomaterials for the reconstruction of mineralized tissues damaged by disease, age or trauma. Dr. Spencer has published more than 150 articles, conference proceedings papers, and book chapters.

Dr. Spencer’s work has been continuously funded by the National Institutes of Health for more than 20 years. She has served as Mentor on 4 NIH-supported career development awards and as Director of a NIH-supported training program. She serves on several editorial review boards, is a past member of the Center for Scientific Review, NIH (2010 – 2012), and was Visiting Professor at the Bauru School of Dentistry, University of Sao Paulo in 2009. She is a Fellow of the American Institute for Medical and Biological Engineering, the Biomaterials Science and Engineering International Union of Societies for Biomaterials Science and Engineering, the American College of Dentists, and the American Association for the Advancement of Science.

Karan S. Surana

Deane E. Ackers Distinguished Professor

Ph.D. University of Wisconsin, 1970

Dr. Surana joined the Department of Mechanical Engineering in 1984 as an Associate Professor. He had previously worked at Structural Dynamics Research Corporation (1970 – 1973) as a Special Consultant, Engineering Mechanics Research Corporation (1973 – 1978) as Director of Research and Development, and McDonnell Douglas in St. Louis as Principal Consultant. Over this period he was the principal architect, originator and developer of the commercial finite element software systems IDEAS, NISA and FINESSE.

Dr. Surana conducts research in computational mathematics, computational mechanics, and continuum mechanics including development of constitutive theories. His work on the k-version of the finite element method is one of his most notable contributions. Dr. Surana’s current research foci include ordered-rate constitutive theories in addition to fundamental and applied topics in computational mathematics. He is the author or co-author of over 275 journal publications, research reports, and conference proceeding publications. He serves as an Associate Editor for The International Journal for Computational Methods in Engineering Science and Mechanics and The International Journal of Modeling and Simulation. Dr. Surana is a member of International Association for Computational Mechanics and a life member of the American Society of Mechanical Engineers.
Faculty Profiles

Peter W. TenPas

Associate Professor

Ph.D. Iowa State University, 1990

Dr. TenPas joined the Mechanical Engineering Department in 1987. Early in his career he worked as a research engineer in the fluid mechanics research group at the Trane Company Corporate Research Laboratory. While at KU, he has served as the Director of the KU Industrial Assessment Center and the KU Energy Analysis and Diagnostic Center. Under these U.S. Department of Energy supported programs, Dr. TenPas led student teams to assess the potential of energy conservation and waste reduction opportunities at over 80 industrial facilities in the region.

Dr. TenPas’ research interests are in the areas of Computational Mechanics and Computational Fluid Dynamics. He has published in the areas of viscous flow with heat transfer, compressible flow, aero-acoustics, and modeling of visco-elastic fluids. Dr. TenPas teaches both undergraduate and graduate courses in thermodynamics and fluid mechanics. He has received several awards for excellent teaching and has been a recipient of the Sharp Teaching Fellowship from the KU School of Engineering. He is a member of the American Institute of Aeronautics and Astronautics, the American Society of Engineering Education, and the American Society of Mechanical Engineers.

Sara E. Wilson

Associate Professor

Ph.D. Massachusetts Institute of Technology, 1999

Dr. Wilson joined the Department of Mechanical Engineering in 2001. In addition to her position as an Associate Professor in Mechanical Engineering, she is the academic director of the Bioengineering Graduate Program at KU and has a courtesy appointment in Physical Therapy and Rehabilitation Sciences at the University of Kansas Medical Center. Prior to joining KU, she was a postdoctoral researcher at the University of Virginia.

Dr. Wilson conducts research in the neuromuscular control of human motion using engineering principles from control theory and dynamics. She has studied the effects of occupational exposures such as vibration on the lumbar spine and low back disorders. She is also involved in the development of medical devices used in physical therapy, obstetrics and internal medicine. She has served as an Associate Editor for the Journal of Applied Biomechanics and in a number of leadership roles in the ASME Bioengineering Division. She is also active in teaching and development of educational tools in the area of responsible conduct of research for graduate students in engineering. She was a 2006 W.T. Kemper Fellow for Teaching Excellence at the University of Kansas. Dr. Wilson is a member of the American Society of Mechanical Engineers, American Society of Biomechanics, and the American Society for Engineering Education.
Faculty Profiles

Xinmai Yang
Assistant Professor
Ph.D. Boston University, 2003

Dr. Yang joined the Department of Mechanical Engineering in 2008. He was previously a postdoctoral research associate at Washington University in St. Louis (2006 – 2008). He has also worked at the National Center for Physical Acoustics at the University of Mississippi as a postdoctoral fellow. Dr. Yang conducts research in photoacoustic imaging and biomedical applications of ultrasound. He has authored or co-authored over 40 peer-reviewed journal articles and conference proceeding publications.

Dr. Yang’s research focuses on early cancer detection, as well as molecular imaging and brain functional imaging with both optical and/or ultrasound methods. His research has been funded by the National Institutes of Health. Dr. Yang is a member of Society of Photographic Instrumentation Engineers, and is an associate member of the Acoustical Society of America.

Bedru Yimer
Professor
Ph.D. University of Dayton, 1979

Dr. Yimer joined the Mechanical Engineering Department in 1979. He was previously a member of the Ethiopian Air Force as a Fighter Pilot (1963 – 1972) and a Lecturer at the United States Air Force Academy (1972 – 1974).

Dr. Yimer’s research interest is in the general area of thermal-fluids science and systems. His work has included numerical studies of the thermal performance characteristics of air-cooled thermal systems, as well as the experimental development and evaluation of planar heat pipes for cooling electronic devices. His primary area of research is the analytical and experimental study of phase change energy storage and recovery systems. Dr. Yimer’s work in this area has included the analytical development and modeling of multi-dimensional, transient phase change energy storage behavior accounting for the effects of internal thermal radiation. Dr. Yimer has published over 20 refereed articles.
“Courage,” one of four 9-foot-tall bronze doors of the Campanile, Bernard “Poco” Fraizer, 1955, The University of Kansas
Grants and Contracts

Theodore L. Bergman


Christopher Depcik


“University of Kansas Smart Grid Demonstration Project,” Environmental Protection Agency, $10,000, 2010 – 2011.

Grants and Contracts

(Depcik cont.)


Ronald L. Dougherty


Kenneth J. Fischer

“Biomechanical Rehabilitation Engineering Advancement in Kansas (BREAK),” National Science Foundation, $125,000, 2012 – 2017, with A. Agah and M.Z. Southard.


Elizabeth A. Friis


“Institute for Advancing Medical Innovation,” Kauffman Foundation, $8,100,000, 2009 – 2014, with approximately 15 other investigators.
Grants and Contracts

(Friis cont.)


“KU ’BET 4 Teachers’ Bioengineering Toolkits for 4th Grade Teachers,” National Science Foundation, $500,000, 2008 – 2012, with approximately 10 other investigators.


Sarah L. Kieweg


“KU ’BET 4 Teachers’ Bioengineering Toolkits for 4th Grade Teachers,” National Science Foundation, $500,000, 2008 – 2012, with approximately 10 other investigators.


Carl W. Luchies


“KU ’BET 4 Teachers’ Bioengineering Toolkits for 4th Grade Teachers,” National Science Foundation, $500,000, 2008 – 2012, with approximately 10 other investigators.
Grants and Contracts

Lorin P. Maletsky


“KU 'BET 4 Teachers' Bioengineering Toolkits for 4th Grade Teachers,” National Science Foundation, $500,000, 2008 – 2012, with approximately 10 other investigators.

Paulette Spencer


“Gradient-based Strategy for Osteochondral Regeneration,” National Institutes of Health, $1,347,542, with M. Detamore.


“KU ’BET 4 Teachers' Bioengineering Toolkits for 4th Grade Teachers,” National Science Foundation, $500,000, 2008 – 2012, with approximately 10 other investigators.

Karan S. Surana


Sara E. Wilson

Grants and Contracts

(Wilson cont.)


“KU ’BET 4 Teachers’ Bioengineering Toolkits for 4th Grade Teachers,” National Science Foundation, $500,000, 2008 – 2012, with approximately 10 other investigators.

Xinmai Yang


“KU ’BET 4 Teachers’ Bioengineering Toolkits for 4th Grade Teachers,” National Science Foundation, $500,000, 2008 – 2012, with approximately 10 other investigators.
Moses (10 foot tall, 1.5 ton bronze by Elden Teft, 1982) and the Burning Bush (stained glass, approximately 20 feet by 30 feet, by Charles Marshall, 1982), The University of Kansas
Journal Articles

Theodore L. Bergman


Christopher Depcik


18
Journal Articles

(Depcik cont.)


Kenneth J. Fischer


Elizabeth A. Friis


Sarah L. Kieweg

Journal Articles

(Kieweg cont.)


Carl W. Luchies


Lorin P. Maletsky


Paulette Spencer


(Spencer cont.)


**Karan S. Surana**


Journal Articles

(Surana cont.)


Sara E. Wilson


Xinmai Yang


• Books and Book Chapters
• Editorial Positions
• Honors, Awards, Patents and Major Professional Service

Detail of Dyche Hall, Joseph and Vitruvius Frazee, 1901, The University of Kansas
Books and Book Chapters

Theodore L. Bergman


Christopher Depcik


Paulette Spencer


Xinmai Yang

Editorial Positions

Theodore L. Bergman


Ronald L. Dougherty


Kenneth J. Fischer


Elizabeth A. Friis


Paulette Spencer


Karan Surana


Sara E. Wilson


**Honors, Awards, Patents and Major Professional Service**

**Theodore L. Bergman**

Member, U.S. National Science Foundation CAREER Advisory Committee (2012).


Member, Scientific Council, International Centre for Heat and Mass Transfer (elected 2010).

Corresponding Member, Connecticut Academy of Science and Engineering (elected 2003).

Fellow, American Society of Mechanical Engineers (elected 1995).

**Christopher Depcik**

Ralph R. Teetor Outstanding Contributions to Research and Teaching Award, Society of Automotive Engineers (2012).

**Kenneth J. Fischer**


Member, Nominating Committee, Orthopaedic Research Society (2012 – 2013).


**Elizabeth A. Friis**

Member, Program Committee, Society for Biomaterials (2012).

Member, Bylaws Committee, Society for Biomaterials (2011 – 2012).

Member, Education and Professional Development Committee, Society for Biomaterials (2011).

Reviewer/Judge, Society for Women Engineers National Achievement Award (2011 – 2012).

**Sarah L. Kieweg**

Member, Organizing Committee, 2013 ASME Summer Bioengineering Conference (2012 - 2013).

**Lorin P. Maletsky**

Chair, Design, Dynamics and Rehabilitation Committee, Division of Bioengineering, ASME (2012).
Honors, Awards, Patents and Major Professional Service

Paulette Spencer

Member, College of CSR Reviewers, National Institutes of Health (2010 – 2012).

Fellow, Biomaterials Science and Engineering (FBSE), International Union of Societies for Biomaterials (elected 2007).

Fellow, American Association for the Advancement of Science (elected 2007).

Fellow, American Institute for Medical and Biological Engineering (elected 2003).

Karan Surana


Member, International Advisory Board, International Congress on Computational Mechanics and Simulation, Hyderabad, India (2012).

Sara E. Wilson

Information Chair, ASME Summer Bioengineering Conference (2012).

Member, Committee on Responsible Science, National Academy of Science (2012).

Co-Chair, Biomedical Engineering and Technology Track, ASME International Mechanical Engineering Conference and Exposition, (2011, 2012).
• Senior Capstone Projects

• National and International Student and Student Team Awards

Capstone of Spooner Hall, Unknown Artist, 1894, The University of Kansas
Senior Capstone Projects

Accessible Pedal Surrey
Sponsors: Marie Barraclough and Austin Hanson
Team Members: Kevin Messer, Dennis Hugo, Angela Smith
Advisor: Kenneth J. Fischer

Automated Latex Glove Donning System
Sponsor: PRC Systems
Team Members: Kevin Jones, Drew Robinson, Nathan Weaver
Advisor: Ronald L. Dougherty

Biomass Drying for the Purposes of Co-Combustion with Coal
Sponsor: Black & Veatch
Team Members: Heather Roberts, David Yoe, Jesse Coatney, Mitch Favrow
Advisor: Christopher Depcik

Bone Graft Cleaning System
Sponsor: Grant Miner
Team Members: Jamie Branch, Arturo Papa-Silva, Chris Powell
Advisor: Kenneth J. Fischer

Burner Duct Removal/Replacement System
Sponsor: Ash Grove Cement Company
Team Members: David Hagen, Derek Taylor, Stuart Becker
Advisor: Ronald L. Dougherty

Cement Loading Alignment System
Sponsor: Ash Grove Cement Company
Team Members: Kyle Hawkins, Travis Rowe
Advisor: Ronald L. Dougherty

Cement Loading Safety Cage
Sponsor: Ash Grove Cement Company
Team Members: Brian Davis, Mohammed Al-Gahtani
Advisor: Ronald L. Dougherty

Cottonwood One-Handed Bagging Jig
Liaison: Steve Steinbach, Cottonwood Industries
Sponsor: National Science Foundation
Team Members: Aaron Porter, Haley McKee
Advisor: Kenneth J. Fischer

Diesel Brake Re-Design
Sponsor: US Army Materiel Systems Analysis Activity
Team Members: Eric Quarnstrom, Andrew DeLapp, Jordan Dykes, Shin Yang
Advisor: Ronald L. Dougherty

Direct Lateral Spine Fixation Device
Sponsor: Brian Ipsen, MD
Team Members: Melanie Luthi, Lauren Ferris, Markie McConkey
Advisor: Kenneth J. Fischer

Football Helmet to Reduce Concussion Risk
Sponsor: Jeffrey Randall, MD
Team Members: Joseph Sandt, Jared Nance, Kiley Sheehy
Advisor: Kenneth J. Fischer

Lateral Lift Spinal Fusion Cage
Sponsor: James D. (Dusty) Smith, MD
Team Members: Rob Burrows-Ownbey, Andrew Rogers
Advisor: Kenneth J. Fischer

Measuring Effects of a Tissue Pressure Pulse
Sponsor: David Zamierowski, MD
Team members: Wade Billings, Patrick Hildebrandt, Eric Tobaben
Advisor: Kenneth J. Fischer

Minimally Invasive Bone Graft Harvester
Sponsor: Camden Whitaker, MD
Team Members: Anna Peterson, Sharon Roeder, Malvin Warrick
Advisor: Kenneth J. Fischer

Minimally Invasive Spine Surgery Retractor
Sponsor: Frank Feigenbaum, MD
Team Members: Kevin Colbert, Isaac Chappell, Colin Davis
Advisor: Kenneth J. Fischer

Physiologically Instrumented Body Armor
Sponsor: US Army Materiel Systems Analysis Activity
Team Members: Tanner Butz, Peter Haik, Blaine Crow
Advisor: Ronald L. Dougherty

Solar Powered Medical Autoclave
Sponsor: Scott Hoffman
Team Members: Kayla Dill, Travis Rowe, Stuart Bernard, Brian Hatesohl
Advisors: Kenneth J. Fischer & Ronald L. Dougherty

Solar Powered Medical Autoclave - 2
Sponsor: Scott Hoffman
Team Members: Bobby Schmanck, JD Baughman
Advisor: Ronald L. Dougherty

Solar Powered Medical Autoclave - 3
Sponsor: Scott Hoffman
Team Members: Emily Schapker, Justin Burwinkle
Advisor: Ronald L. Dougherty

Sub Sandwich Bread Slicer
Sponsor: Grant Miner
Team Members: Kyle Nealon, Bryce Allenbrandt, Andrew Turner, Owen Martin
Advisor: Ronald L. Dougherty
Senior Capstone Projects

Tablet Counter
Sponsor: Honeywell FMT
Team Members: Michael Streich, Stan Thompson, Keith Richardson, Rob Foree
Advisor: Ronald L. Dougherty

Third World Wind Turbine
Sponsor: Wetzel Engineering
Team Members: Brian Blackwell, Nick Garrett, Tommy Hirst, Brian Larkin
Advisor: Ronald L. Dougherty

Wheelchair Exerciser for Cerebral Palsy
Liaisons/Beneficiaries: Brad and Hayley Minear
Team Members: Kathryn Sanders, Hollie Benson, Sakeeb Medhi, Alex Porter
Advisor: Kenneth J. Fischer

X-Factor Interbody Spinal Fusion Spacer
Sponsor: Ryan Stuckey, MD
Team Members: Byron Davis, Paul Meyers, Joe Bridgewater
Advisor: Kenneth J. Fischer

National and International Student and Student Team Awards

Jayhawk Motorsports: First Place, Formula SAE West Competition, Lincoln, (advised by Robert M. Sorem) 2012.


Lauren Ferris, 2nd Place, Master's Student Paper Competition: Solids, Imaging and Orthopaedics Category. ASME Summer Bioengineering Conference, (advised by Lorin M. Maletsky) 2012.


KU EcoHawks: Honorable Mention, P³ People, Prosperity and the Planet Student Design Competition for Sustainability, U.S. Environmental Protection Agency, (advised by Christopher Depcik) 2011.
Sponsors

Research

Army Research Office
DePuy Orthopaedics
Emission Control Solutions, LLC
Grundfos Pumps, Inc.
Kansas Department of Transportation
Kansas Soybean Commission
Kauffman Foundation
National Institutes of Health
National Institute of Standards and Technology
National Science Foundation
NASA
U.S. Nuclear Regulatory Commission
Smith Electric Vehicles
U.S. Department of Energy
U.S. Department of Transportation
U.S. Environmental Protection Agency
Westar Energy

Capstone Design

National Science Foundation
U.S. Army
Ash Grove Cement Company
Black & Veatch
Cottonwood Industries
Honeywell FMT
PRC Systems
Wetzel Engineering
Marie Barraclough
Frank Feigenbaum, MD
Austin Hanson
Scott Hoffman
Brian Ipsen, MD
Grant Miner
Jeffrey Randall, MD
James D. (Dusty) Smith, MD
Ryan Stuckey, MD
Camden Whitaker, MD
David Zamierowski, MD
Nondiscrimination statement
The University of Kansas prohibits discrimination on the basis of race, color, ethnicity, religion, sex, national origin, age, ancestry, disability, status as a veteran, sexual orientation, marital status, parental status, gender identity, gender expression and genetic information in the University's programs and activities. The following person has been designated to handle inquiries regarding the nondiscrimination policies: Director of the Office of Institutional Opportunity and Access, IOA@ku.edu, 1246 W. Campus Road, Room 153A, Lawrence, KS 66045, (785) 864-6414, 711 TTY.
On the Cover: The Jimmy Green Statue, The University of Kansas
Bronze by Daniel Chester French, 1924

James Woods Green, first dean of the KU School of Law (right) conversing with an engineering student (left). This is believed to be the world's first larger-than-life sculpture of either a university faculty member or a university student.