Dear Friends:

It is with great pleasure that I provide you with our 2012 Annual Mechanical and Aerospace Engineering Newsletter. As you enjoy this newsletter, I am convinced you will agree that we can take pride in our many accomplishments. You will find our enrollment continues to be strong in both the undergraduate and graduate programs, with a total enrollment of approximately 1,000 students. Our undergraduate students received a record number of scholarships that were awarded by our department, and many of those scholarships were made possible by you, our alumni and friends. Upon graduation, our graduates continue to be in strong demand nationally, with over 200 companies visiting the campus during the Fall Career Fair. Even in a difficult economy, approximately 80% of our reporting mechanical engineering students indicated having accepted a job and another 10% are heading to graduate school. The same was true for over 75% of our aerospace engineering students. More than ever before, our faculty deliver their knowledge through distance courses offered online. The audience for these distance courses includes both traditional students and practicing engineers who are pursuing either graduate certificates or non-thesis Master of Science degrees. These courses are delivered over the internet to locations throughout the U.S. and beyond. Through these distance programs, our faculty are truly educating the world.

Amidst the strong student enrollments our faculty have continued to develop their nationally and internationally recognized research programs and provide our graduate students with new funding and educational opportunities. Our research activities are particularly strong in advanced manufacturing, highlighted in this newsletter by an article on the Center for Aerospace Manufacturing Technologies, directed by Professor Ming Leu, Bailey Distinguished Professor. We are growing our energy research, bolstered by the emergent research programs of our junior faculty. MAE has two new faculty this year, Jie Gao and Xiaodong Yang, whose expertise includes nano-photonics, solar energy harvesting and light-matter interactions. We have provided you with a short introduction to Jie and Xiaodong in this newsletter and know that you will be pleased with the great enthusiasm and passion they bring to their teaching along with the significant potential of their research and collaborative prospects with the other faculty. Two additional new faculty will join us this Fall, and we currently have active searches for several new faculty. We will continue to recruit new faculty talent to the MAE department as we plan to grow our faculty size to meet the strong demand for our mechanical and aerospace engineers.

In closing, I invite you to read through our newsletter to learn more about the department. I would also like to extend my thanks to the many alumni and friends whose donations continue to enhance the activities of the department, particularly those who are helping us transform the undergraduate laboratory experience. Please consider contributing to the efforts of your department that will enable us to continue to offer one of the nation’s best mechanical and aerospace engineering programs.

Best regards,
Bob Hribar: Honorary Knight

Welcome New Faculty, Drs. Yang & Gao

Dr. Sheffield receives Missouri Impact! Award
The vision became a reality in 2004 when Missouri S&T formed a partnership with Boeing Research and Technology, with major funding provided by the Air Force Research Laboratory, and created the Center for Aerospace Manufacturing Technologies (CAMT). In 2007, CAMT established an industrial consortium to better disseminate information and transition technology for the aerospace supply chain in the United States. Today, the CAMT Consortium has eight active members that sponsor a number of research activities at Missouri S&T: Boeing, Rolls-Royce, Spirit Aerosystems, GKN Aerospace, Bell Helicopters, Siemens, KMT Waterjet and Steelville Manufacturing. The research projects funded by the CAMT Consortium focus on fabrication and assembly technologies and their applications to aerospace manufacturing. These projects also benefit automobile and other manufacturing industries.

The MAE department houses many of the CAMT research labs. One such lab is the Additive Manufacturing Laboratory where Drs. Leu, Landers and Hilmas, along with a group of very talented graduate students, are developing a process to create “functionally graded” material that could be used for hypersonic aircraft or as parts of ultra-high-temperature engines and rocket boosters. The research combines metal and ceramic materials through the process of extrusion, which is similar to squeezing toothpaste through a tube. The result is a blended material that combines the toughness of the metal with the heat resistance of the ceramic. However, the best part of this process is that it allows manufacturers to create customized parts for aircraft, spacecraft, and other products.
Other Missouri S&T professors are also researching ways to improve manufacturing processes. Dr. Frank Liou is investigating how using a high-power laser to melt metal particles as they exit a nozzle could make or repair specific parts, leading to more cost-effective repairs to expensive components instead of scrapping them. Dr. Chandrashekhara is currently developing an “out-of-autoclave” process to manufacture composites by bypassing the autoclave step which could cut a company’s expenses and production time significantly. Drs. Landers and Bristow are developing an approach that would allow any machine tools controller to compensate for the inherent errors that come from dimensional tolerances, temperature changes, etc. that could increase machining accuracy in the near future.

The research projects that the CAMT Consortium provides give the Missouri S&T students a great opportunity to take part in groundbreaking research and innovation. Many of the graduate students who work on these projects have presented their research results at professional conferences and published their work in a number of technical journals.

More information about the Center for Aerospace Manufacturing Technologies is available at http://campus.mst.edu/camt.

ASME/ISCIE 2012 International Symposium on Flexible Automation

In addition to Dr. Ming Leu’s efforts in research at S&T, he also chaired the American Society of Mechanical Engineers/Institute of Systems, Control and Information Engineers 2012 International Symposium on Flexible Automation in St. Louis, Missouri, in June. The conference's technical program included four speeches given by world-renowned experts, three panel discussion sessions and 104 technical papers covering a range of topics relevant to flexible automation. Also arranged for attendees were pre-conference and post-conference programs, such as a baseball game between the Kansas City Royals and the St. Louis Cardinals, a tour of the Boeing Prologue Room, a tour of the Anheuser-Busch Brewery and a visit to the Missouri S&T campus, as well as the Wal-Mart Distribution Center in St. James, Missouri.
Miners in Space

This year Devin Cornell, Pavel Galchenko, Keenan Johnson, Edward Nickel, Gregory Niles, Taylor Rinehart, Parik Sahilkumar and Jacob Woods represented Missouri S&T in NASA’s Reduced Gravity Education Flight Program. This program selects teams of undergraduate students from across the nation to propose, design, build, fly and evaluate a reduced gravity experiment.

On June 14, 2012, after designing their experiment and researching the feasibility and effectiveness of Active Decompression C.P.R. on board a gravity defying aircraft, the team took to the skies and flew their experiment in two successful flights at Ellington Field, Houston, Texas. Prior to this experiment the team had to pass the Test Readiness Review. The students from the Miners in Space student design team tested their experiment on board NASA’s “Weightless Wonder,” a microgravity aircraft that can produce periods of weightlessness lasting from 18 to 25 seconds at a time by flying a series of about 30 parabolas which is a steep climb followed by a free fall. This testing took place over the Gulf of Mexico.

This experiment accomplished the team’s goals of evaluating the fluid mechanics of Active Decompression C.P.R. in microgravity, and the team is now busy evaluating their data. The next step for the Miners in Space team is to complete their analysis and issue a final report to NASA and the scientific community.

For more information regarding the team, please visit: web.mst.edu/~rgsfop/.

FSAE-Electric

Last year, the Society of Automotive Engineers (SAE) announced that they would add an electric vehicle class named “Formula SAE Electric” to Formula SAE in 2013. The electric class will be introduced in June 2013 at Formula SAE Lincoln in Lincoln, Nebraska.

The first function as a team was to assist with the Pre-College Summer Camp: EcoCAR Summer Camp which took place from July 8 – 12, 2012.

For more information please visit www.formulasaelectric.com.
The Advanced Aerospace Vehicle Group (AAVG) consists of two teams; one team's attention is focused on rocket applications, and the other team's emphasis is geared towards aeronautical applications. The rocket group participates in the U.S. Launch Initiative, sponsored by NASA and several corporations, where teams launch rockets to altitudes of approximately 5,000 feet carrying innovative payloads that record trajectory parameters and include various scientific experiments. The aeronautical group competes in SAE AeroDesign, sponsored by the Society of Automotive Engineers and hosted by Lockheed-Martin, where teams fly in three possible size categories that emphasize the ability to maximize the payload to weight ratio.

In the Spring of 2012, the rocket group went to the NASA University Student Launch Initiative (USLI) competition at Marshall Spaceflight Center in Huntsville, Alabama. Many teams competed, ranging from high school through collegiate. The MST team had a nicely constructed rocket with a payload that, among other things, demonstrated an on-board turbine power unit driven by rams air. Despite the weather conditions the MST rocket had a successful launch and achieved most of its objectives, though it did not finish among the award winners.

In May 2012, the SAE AeroDesign East competition took place in Atlanta, Georgia. The Missouri S&T team competed in the advanced class, which limited total engine displacement, had no limitation on engine modification, required an active braking system and an on-board data acquisition system that recorded take-off and landing distance. The MST team opted for a conventional aircraft with a single engine of the maximum allowed displacement, a maximum aircraft weight of 55 pounds and empty weight near 20 pounds. In the competition the data acquisition system performed flawlessly, and the aircraft achieved a successful flight, meeting all the requirements. However, some problems were encountered in lateral control and the aircraft was not able to finish in the top three to receive a prize.

The Missouri S&T Satellite team (M-SAT) is pushing forward into the final months of the Nanosat-7 competition, sponsored by the Air Force Research Laboratory. M-SAT is designing and building two small satellites that can demonstrate new or improved technologies for proximity operations. The Protoqualification Review occurs this August 2012 as part of the Small Satellite Conference at Utah State University in Logan, Utah, with the Final Review occurring this upcoming January 2013 in Albuquerque, New Mexico. Along with finishing the NS-7 competition, M-SAT will also be submitting a proposal for the NS-8 competition during the Fall 2012 semester.

M-SAT is in a great position to be very competitive in the NS-7 competition, mainly due to the major steps made in the last year. M-SAT has finalized a complex design, completed a critical design review by members of the Air Force Research Laboratory and completed vast amounts of testing on the technologies and software developed by its students. Because of the effort and hard work the students have dedicated to M-SAT, many of the students have prospered at the professional level. Internships, full-time jobs, and graduate research fellowships have been commonly acquired by the students over the past year, as well as a defended thesis by one student and a first prize paper by another student.
The Human Powered Vehicle team made great strides this year, starting with focusing on the development of an adjustable boom and suspension fork. The team is also planning future innovations in design since it proved to be successful in competition this year.

At the end of April, 2012, the team participated in the East Coast competition held by Grove City College in Grove City, Pennsylvania. The team placed 2nd in women’s drag racing, 2nd in men’s drag racing, and 3rd in design, giving S&T a 2nd place finish overall after the first day of racing. The next day the Miners placed 5th in innovation, but were victorious in the endurance race to establish their 2nd place finish overall.

The week after the East Coast competition, the University of Utah hosted the West Coast event. The competition started with a drag race competition where the Miners placed 1st in both men’s and women’s drag racing, and also placed 5th in design. The next day the team had to hold out to win the 2 1/2 hour endurance race to place first overall against three other teams fighting for the same win. The Miners succeeded and took home the victory. Next year the team is planning to focus on the frame design and building on their established winning innovations.

The Missouri S&T SAE Baja Team started the year with an ambitious plan, to compete in all three SAE off-road events in 2012. Those three events were held in Alabama, Oregon and Wisconsin.

At the season-opening event in Alabama, the Miners ran a very light car which was half the weight of their original 2006 vehicle, “Overkill.” Light weight meant better handling, speed and fuel economy, but it also meant the risk of sacrificing durability. Unfortunately, during the Alabama event, the #25 car broke a
steering part. Using their Miner know-how, the team was able to repair the part, and the car completed the four-hour endurance race.

Equipped with their new-found experience and with an eye to improving the overall vehicle’s design, the team chose not to compete in the Oregon or the Wisconsin events but is aiming high for next year’s competitions. They look forward to a successful 2013 racing season.

The Missouri S&T team at Formula SAE Lincoln, in Lincoln, Nebraska, saw improvement over the already impressive Michigan performance. Not only did they win autocross and skidpad, but they made it to the top five in design presentation as well. Sadly, the car once again did not finish the endurance event, this time due to the judges declaring the car unsafe after a rear wing mount broke – a result of fatigue from the many hours of testing to which the car had been subjected.

Next on the horizon for the team is a competition in Germany in August 2012. This will be the first time the team has competed outside of North America, and they are confident they will prove they are a truly world-class team.

For more information visit fsae.mst.edu.

FSAE

Continuing a long-standing tradition, Missouri S&T Formula SAE has shown that they have what it takes to compete both on and off the track. At the Brooklyn, Michigan competition with over 100 international competitors, the team did well, earning third place finishes in both autocross and skidpad. Additionally, the team earned a fifth place finish in business presentation, which is the best the team has ever achieved in that event. Unfortunately, the car suffered a failure in the driveline during endurance, causing the team to be unable to complete the event.

The Missouri S&T team at Formula SAE Lincoln, in Lincoln, Nebraska, saw improvement over the already impressive Michigan performance. Not only did they win autocross and skidpad, but they made it to the top five in design presentation as well. Sadly, the car once again did not finish the endurance event, this time due to the judges declaring the car unsafe after a rear wing mount broke – a result of fatigue from the many hours of testing to which the car had been subjected.

Next on the horizon for the team is a competition in Germany in August 2012. This will be the first time the team has competed outside of North America, and they are confident they will prove they are a truly world-class team.

For more information visit fsae.mst.edu.
Students Published at AIAA Conferences

Students from the Mechanical and Aerospace Engineering department were abundant at two AIAA conferences. In January 2012, many of Dr. Rovey's students attended and presented papers at the 50th AIAA Aerospace Sciences Meeting in Nashville, Tennessee. These students included Ryan Pahl, Mark Emanuel, Warner Meeks, Jing Hu, Steven Berg, Timothy Nichols and Alexander Satonik. Timothy Nichols' paper, “Fundamental Processes of DBD Plasma Actuators Operating at High Altitude,” received the 2012 Plasmadynamics and Lasers Best Student Paper Award.

Another AIAA conference, where MAE students had a strong showing, was the AIAA Region V Student Conference at which two of our students placed in the Masters Division. Bharat Mahajan received first place with his paper, “Orbit Determination of an Uncooperative Maneuvering RSO During Proximity Operations,” and Victoria Prokopf placed third with her paper, “Processing and Mechanical Characterization of Polyurea Aerogels.” Congratulations to all of the students who represented Missouri S&T and MAE at the AIAA conferences this year!

AMAE Graduate Teaching Awards

Two graduate students were honored at the AMAE Induction Dinner in October 2011 with Excellence in Graduate Teaching awards. Jeff Massey was acknowledged for his efforts in teaching the Fall 2010 course, ME 221, Applied Thermodynamics. Mark Emanuel was honored for his hard work in assisting Mitch Cottrell in teaching the Spring 2011 course, ME 240, Mechanical Instrumentation. The AMAE committee based the awards on exemplary contributions to the department and exceptional educational experiences imparted to the students.

Alumni recognized by MSPE as Newly Licensed Engineers

The MAE department would like to congratulate the following alumni for becoming Licensed Professional Engineers with the Missouri Society of Professional Engineers:

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<thead>
<tr>
<th>Name</th>
<th>Year</th>
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<tr>
<td>Patrick Brinker</td>
<td>ME '07</td>
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<tr>
<td>James Kelley</td>
<td>ME '80</td>
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<td>Jacob Kraybill</td>
<td>ME '07</td>
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<td>Matthew Molitor</td>
<td>ME '09</td>
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<td>Brian Perrin</td>
<td>ME '03</td>
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<td>Justin Province</td>
<td>ME '07</td>
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<td>Timothy Quinn</td>
<td>ME '08</td>
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<tr>
<td>Karel Safarik</td>
<td>ME '07</td>
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<tr>
<td>Chad Swope</td>
<td>ME '08</td>
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<tr>
<td>Scott Virtue</td>
<td>ME '93</td>
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Once again, enormous generosity by MAE alumni is making a difference in the lives of our students. Contributions from Jon (ME ’73) and Barbara Jansky and Rob (ME ’74) and Kathy Williams have enabled the Department of Mechanical & Aerospace Engineering to initiate development of a new instructional lab focused on teaching the principles of internal fluid flow, pump performance, measurement of fluid flow as well as the fundamentals of control systems as applied to flow control. The transformation of the fluid dynamics laboratory is the first in a series of instructional laboratories to be redesigned and integrated into the curriculum in new ways. Construction of this facility is beginning in the summer of 2012 with the introduction of a few demonstrator stations in the undergraduate mechanical engineering fluid dynamics course in the fall of 2012. Completion of the entire facility is targeted for the spring of 2013. When completed, this facility will provide students access to a state-of-the-art instructional lab for teaching the principles of fluid dynamics from an introductory level through our graduate courses. Students will also have access to the facility to conduct experiments they have designed as part of our Systems Laboratory. When completed, we estimate the facility will see more than 800 students per year.

Employers often say the distinguishing characteristics of Rolla grads are their work ethic, ability to learn whatever is necessary to get the job done and a practical perspective that was developed from hands-on laboratory experiences. Instructional laboratories offer a superb setting for students to more deeply understand engineering science. The goal is to give students opportunities to actively think about, discuss and address real world problems. Learning during a laboratory period is often accomplished through personal discovery, group discussion and interaction with the instructor. A laboratory experience models how scientific knowledge is constructed and how new knowledge is related to what is already known. It is difficult to learn, or to learn about, engineering without actively participating in it. One big challenge is that laboratory facilities must be constantly modified and upgraded to address the changes in relevant technologies.

The MAE Department is setting forth on a mission to not only repair instructional laboratory equipment but transform the laboratory experience for students. The fundamental concept is to design experiment stations that can be used by the students throughout their curriculum. Newly designed experiment stations will serve three purposes in the curriculum: demonstrating fundamental engineering principles, teaching the fundamentals of engineering instrumentation, and training in the correct approaches to engineering experiment design. With this approach, the student will encounter an experimental station multiple times throughout their education, each time learning a new concept or principle. Not only does the facility get used more frequently, making it more cost effective, but the students become familiar enough with the facility to be able to design and conduct their own experiments at the end of their program.

While engineers are more important than ever to the future of our state and nation, we have entered a new era of public funding. The quality of engineering education at Missouri S&T now hinges on the generosity of our alumni, friends and other interested constituencies. The State of Missouri had provided annual appropriations to upgrade engineering laboratory equipment beginning in the administration of Governor Christopher “Kit” Bond through the year 2000. That was also the last year the capital budget was funded for new and renovated facilities at public higher education institutions. With the generous gifts by the Jansky and Williams families to fund the first instructional lab, the department is actively seeking alumni and corporate support to transform the remaining labs to better educate the next generation of engineering students. The series of flexible experiment stations will demonstrate and teach engineering principles and be available to student-designed experiments, providing students with a unique experience. With the ability to “experiment across the curriculum,” students will have the opportunity to more fully encounter the engineering principles taught in the classroom. We look forward to partnering with our alumni and friends in each of the next stages of this unique project.

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The Missouri S&T Academy of Mechanical and Aerospace Engineers (AMAE) held their annual induction dinner gala on Thursday evening, October 6, 2011. The evening’s program began with a welcome from the MAE Department Chair, Dr. Jim Drallmeier. Steve Moss (ME ‘76), retiring president, passed the academy leadership to Dr. Randall Wood, incoming president for 2011-2012. Dr. Wood (ME’85) is the Staff Vice President of Leggett Business System in Joplin, Missouri. Lisa Sombart, the new 2nd Vice President, gave the invocation prior to the dinner. The attending academy past presidents surprised Dr. Ashok Midha with a very special presentation in honor of his 13 years as department chair of the Mechanical and Aerospace Engineering department. Each former president commented on his personal relationship with Dr. Midha during that time. Also honored were the members of the 5, 10 and 15-year academy classes of 1996, 2001 and 2006. Dr. Patrick Davidson, one of the founding members of this academy, presented those in attendance with a certificate. Mike Bytnar, chairman of the scholarship awards committee, announced the winners of the 2011-2012 academy scholarships and the Fall and Spring semester graduate teaching awards.

The highlight of the evening culminated with the induction into the Academy of Mechanical and Aerospace Engineers of Edward Gerding and Charles Ketterer. Presentations and personal comments were given by their mentors, John Eash and Ted Peachee, respectively.

The academy members met in the Havener Center for their annual membership meeting on Friday, October 7th. At this meeting the members entertained proposals and presentations by various student design teams. Spouses/guests of the members and faculty spouses were given a presentation by Mary Meyer on Angels Arm’s, a St. Louis not-for-profit agency helping siblings stay together while in foster care. Mary is the wife of Mike Meyer, a past president of the academy. The Meyers have been very active in the Angels Arm’s project since their retirement. After a fun craft project coordinated by Cathy Williams, AMAE secretary, the spouses joined the members for a barbeque luncheon in Toomey Hall. The two-day event concluded with a department open house. Here, the members and their guests met with students and faculty to enjoy a beautiful Fall day with refreshments on the Toomey Hall balcony.
2011 AMAE Inductees:
Edward Gerding, BSME ‘84  
Director of Engineering  
Global Services & Support  
The Boeing Company  
St. Louis, MO

Charles Ketterer, BSME ‘89  
Vice President  
Information Technology & Supply Chain  
Emerson Hermetic Motors  
St. Louis, MO

Executive Board 2011-2012

Dr. Randall Wood – President  
Chris Thomason – 1st Vice President  
Lisa Sombart – 2nd Vice President  
Greg Kellerman – Secretary/Treasurer

It is with great sadness that we report the passing of two great friends of the department and distinguished academy members. They will be fondly remembered for their dedicated support of the Department of Mechanical and Aerospace Engineering.

Undergraduate Scholarships

Academy of Mechanical and Aerospace Engineers Scholarships  
AE Alumni Endowed Scholarship  
Bassem and Gery Armaly Scholarship  
William M. Byrne Endowed Scholars  
Caterpillar Scholarship  
Chevron Scholarship  
Clark Family Scholarship  
Robert and Shirley Clooney 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 Alwilda 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 Scholarship  
Robert L. Seaman Memorial Scholarship  
U.S. Steel Scholarship  
Amy L. Weir Scholarship  
Daniel K. and Linda K. Wright Endowed Scholarship  
Wyatt Endowed Scholarship

Scholarships Awarded

Scholarship Funds Awarded
Dr. Joshua Rovey received the 2011 Young Professional Engineer Award from the St. Louis Section of the American Institute of Aeronautics and Astronautics. The award is given to those who have made a significant impact to the aerospace community early in their career. Rovey’s research focuses on advanced propulsion systems for next-generation space vehicles, and he is developing the Missouri Plasmoid Experiment (MPX) to study plasma physics of a high-density, heavy gas plasma propellant.

Dr. Rovey joined the MAE department in 2008 as an assistant professor of aerospace engineering. Before coming to Missouri S&T, he was a research engineer at Starfire Industries LLC, a small business in Champaign, Illinois, and a graduate research assistant at the University of Michigan in Ann Arbor. Dr. Rovey received his Ph.D., Masters and Bachelors degrees from University of Michigan in 2006, 2003 and 2002, respectively.

MAE Faculty Recognized for Excellence at Missouri S&T

In 2011, many of the Mechanical and Aerospace Engineering faculty received awards and honors. Our faculty showed excellence in categories such as teaching, research, service and achievement.

Global Learning Outstanding Teaching Commendation
Dr. V. Birman, Dr. K. Chandrashekhara, Dr. L. Dharani

Faculty Research Award
Dr. R. Landers, Dr. H. Tsai

Faculty Teaching Award
Dr. H. Pernicka, Dr. D. Riggins

Faculty Service Award
Dr. J. K. Nisbett, Dr. H. Pernicka

Faculty Achievement Award
Dr. R. Hutcheson

Commendation Letter for Excellence in Teaching
Dr. V. Birman

(Not pictured: Drs. Birman, Chandrashekhara, Dharani and Tsai)
Dr. Robert G. Landers was promoted to full professor of Mechanical and Aerospace Engineering at Missouri S&T effective September 1, 2012, and he was recently promoted to senior member of the Institute for Electrical and Electronic Engineers (IEEE). He is also the Associate Chair for Graduate Affairs in the Mechanical and Aerospace Engineering department. His research interests are in the areas of manufacturing automation and applied controls. He has conducted studies in the process control of metal cutting and friction stir processing operations to increase productivity and part quality. Currently he is investigating the process control of the additive manufacturing processes laser metal deposition for metals and freeze-form extrusion fabrication of ceramics, hierarchical control techniques to integrate process control technologies with existing motion control technologies, novel tool wear monitoring methods and cost-effective volumetric error compensation techniques. He is also investigating the application of systems and control theory to alternative energy systems, namely hydrogen fuel cells and Li-ion batteries. His current work in this area is concerned with temperature control-oriented modeling for both systems, state-of-charge estimation for Li-ion batteries, optimal control of hydrogen fuel cells and the control of hybrid alternative energy systems.

Dr. Landers has received funding for his research activities from the National Science Foundation, U.S. Department of Energy, Air Force Research Laboratory, U.S. Department of Education, Society of Manufacturing Engineers, Missouri Research Board and various companies. He received the Society of Manufacturing Engineers’ M. Eugene Merchant Outstanding Young Manufacturing Engineer Award in 2004 and nine faculty research and teaching excellence awards from Missouri S&T, is a member of ASEE and ASME, and is a senior member of IEEE and SME. He teaches Modeling and Analysis of Dynamic Systems and Automatic Control of Dynamic Systems, and developed the following internet-accessible courses: Manufacturing Equipment Automation, Mechatronics, and Modeling and Control of Manufacturing Processes. He has received several teaching awards, including the university outstanding teaching award, two innovative teaching awards and the silver slide rule award. He has served on numerous department, university and professional society committees and is currently an associate editor for the IEEE Transactions on Control System Technology; the ASME Journal of Dynamic Systems, Measurement, and Control; and the ASME Journal of Manufacturing Science and Engineering.

In 2011, Dr. John Sheffield received the Missouri Impact! Award from Missouri Enterprise for Outstanding Contributions to the Success of Missouri Manufacturers. The award was established in 1998 to recognize companies or individuals who have excelled in the areas of continuous improvement in manufacturing, innovative technology development, environmental solutions or contributions to the success of Missouri business and community/state economic development.

Sheffield served as the primary consultant in partnership with Missouri Enterprise conducting Level II and Level III American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) energy audits funded by U.S. Department of Energy via the Missouri Department of Natural Resources “Energize Missouri Industries” and “Best Price” programs. Dr. Sheffield conducted three Level III ASHRAE energy audits and 16 Level II energy audits in Missouri in partnership with Missouri Enterprise.
Dr. Xiaodong Yang joined the department as an Assistant Professor in Fall 2011. He received his B.S. degree in Mechanics and Mechanical Engineering from the University of Science and Technology of China (USTC) in 2000, his M.S. degree in Physics from the Chinese Academy of Sciences (CAS) in 2003 and his Ph.D. degree in Mechanical Engineering from Columbia University in 2009. He was awarded an Intel Foundation Ph.D. Fellowship from 2006 to 2008. He also received the 2007 Chinese Government Award for Outstanding Students Abroad. Before joining Missouri S&T, Dr. Yang was a postdoctoral fellow in the Nanoscale Science and Engineering Center in Mechanical Engineering, University of California at Berkeley, and Materials Sciences Division, Lawrence Berkeley National Laboratory. His research interests include photonic crystals, plasmonics, optical metamaterials, silicon nanophotonics, optomechanics and optofluidics, optical nano-electromechanical systems (NEMS), light trapping and photon management for renewable energy conversion and transport.

In July 2012, Dr. Yang received the Powe award which is a competitive research grant that selects 30 junior faculty members throughout the nation. The grants can be used to purchase equipment, continue research or travel to professional meetings and conferences. Yang plans to work on the enhanced optomechanical coupling between different types of metallic nanostructures and reveal the mechanism of both attractive and repulsive optical forces between these nanostructures.

Dr. Jie Gao joined the department as an Assistant Professor in the Spring semester 2012. She received her Ph.D. degree in the summer of 2011 from Columbia University, her M.S. degree from Columbia University in 2007 and B.S. degree from the University of Science and Technology of China (USTC) in 2005. Her research interests include photonic crystals, integrated silicon photonics, quantum dot energy transfer, efficient light trapping and extraction, optomechanics and cavity quantum electro-dynamics for the applications of solar energy harvesting, LEDs and quantum optics. She has authored 16 peer-reviewed journal publications and more than 20 conference proceedings. She has experience reviewing for top journals such as Optics Express, Physical Review Letters and Applied Physics Letters. She is a member of the professional societies of Optical Society of America, American Physical Society and Institute of Electrical and Electronics Engineers. She is the recipient of the Chinese Government Award for Outstanding Students Abroad (2009) and IBM Ph.D. Fellowship Award Finalist (2010).
Dr. Dale M. Pitt of St. Louis, Missouri, a Boeing Technical Fellow in the field of aeroelasticity, unsteady aerodynamics and adaptive structures, earned a bachelor of science and a master of science degree in aerospace engineering from Missouri S&T in 1972 and 1975, respectively. He also holds a Ph.D. in mechanical engineering. Pitt has served as program manager or principal investigator for more than $9 million dollars of contracted research with the Air Force, NASA and the Defense Advanced Research Projects Agency. He holds 11 patents and is co-inventor of a helicopter dynamic inflow technology that is used by every major helicopter company in the world for rotor dynamic simulations. He has published or presented more than 60 technical papers. Currently, he is leading an international team to rewrite the NATO aeroelasticity manual. Pitt is a Fellow of the American Institute of Aeronautics and Astronautics (AIAA).

Dr. Fred B. Parks was appointed CEO at NDS Surgical Imaging in August 2011. Prior to joining NDSsi, Dr. Parks served as Chairman of the Board and Chief Executive Officer of Urologix, Inc. Previously, Dr. Parks served as President and CEO of Marconi Medical Systems, a multimodality supplier of medical imaging equipment and, following its acquisition by Royal Philips Electronics, led its integration into the Philips medical business. He has held positions as President, Chief Operating Officer and Board Member of St. Jude Medical, Inc., a medical device company focusing on implantable cardiovascular products, and as President, Chief Operating Officer and Board Member of EG&G, Inc. (now PerkinElmer), a diversified technology company. Dr. Parks has also served on the Board of Directors of Steady State Imaging, LLC, a privately held developer of specialized magnetic resonance imaging technology, since 2010. Dr. Parks continues to serve on the Board of Directors of Analogic which develops technologies for radiology and security markets.

Dr. Parks earned a Ph.D. from the University of Missouri – Columbia, and M.S. from University of Arizona and a B.S. from Missouri Science in Technology – all in Mechanical Engineering.

George E. Uding of Naples, Florida, earned a bachelor of science degree in mechanical engineering from Missouri S&T in 1959. He began work at Procter & Gamble’s St. Louis plant and managed the Ivory bar soap, Comet cleanser, industrial bulk soap and Cascade departments. He joined Continental Can as assistant to the vice president of manufacturing, then assistant manager of the stockyard plant. Uding then took over the redesign and rebuilding of the experimental dry process hardboard plant for Masonite Corporation, where he served as vice president of manufacturing for the hardboard division and general manager of the asphalt roofing division. Uding then moved to the Portland cement industry, where he spent the rest of the his career, retiring as President and Chief Operating Officer of Medusa Corp. when Medusa was acquired by Southdown Corporation in 1998. Mr. Uding developed a reputation for being able to fix troubled or broken manufacturing companies, mostly in the cement industry. For short periods, he functioned as CEO of Cimentos San Juan, Essroc and Copley.

Alumni Relations News...
Beginning with the Spring 2012 semester, the Mechanical and Aerospace Engineering department made some changes to the way we will advise our students in the future. We have welcomed S&T Alumna, Erica Long, to the department as the Senior Academic Advisor. Erica received her B.S. in Civil Engineering in 2003. Her engineering career included 6 years as a processing engineer with Brewer Science, a global microelectronics company with its headquarters in Rolla. In 2010, Erica began advising part-time with S&T’s Freshman Engineering Program. In addition to these responsibilities, she has also coached the varsity cheerleaders and dance team at S&T since 2004. This extensive relationship with the university and its students proved to be a perfect fit for the full-time advising roll in MAE.

The Senior Academic Advisor position was created to fulfill two main objectives: decrease the advising responsibilities and workload of faculty members; and improve the quality and consistency of advising among students. Having a full-time academic advisor on staff means students are able to have all their concerns addressed from one location. By creating an environment that is both available and approachable, Erica hopes to construct a process of teaching students how to become responsible consumers of their own educations to ensure they are gaining the maximum benefit from their college experience at Missouri S&T. To further expand her knowledge, Erica has joined National Academic Advising Association (NACADA). This organization is a great resource for publications, data and education.

We look forward to the future of advising in the Mechanical and Aerospace Engineering department and are eager to share what we learn from this new approach with the rest of the S&T campus.

Bob Hribar: St. Pat’s Honorary Knight

During the recent St. Pat’s celebration one of MAE’s own kissed the Blarney Stone and was dubbed an honorary knight and honored at the public coronation on March 16, 2012. Bob Hribar, who is one of the department’s senior laboratory mechanics in the machine shop and has been with S&T since 1983, joins the ranks of the distinguished group of alumni and friends that have been honored with such a prestigious title. In his time with the university he has been recognized with awards for his contributions to students, faculty, MAE and campus.

Lila Kolker Promoted to Administrative Associate

Lila Kolker became Administrative Associate in Spring, 2012. Throughout the past 13 years with MAE, Lila has proven herself to be highly motivated and enthusiastic in her responsibilities with going above and beyond the call of duty. Lila was hired as a secretary in August of 2000 and was promoted in May of 2001 to Senior Secretary. She received an AMAE Staff Excellence Award in 2002 for her effective management of many departmental affairs and a Staff Excellence Award from S&T’s Staff Council in 2008 for her involvement in the campus community.

In 2005, with the departure of Brenda Mesplay, Lila was promoted to Administrative Assistant. With varied experiences within the department and her positive attitude, she continues to serve the faculty, staff, students, and alumni with grace.
**Dates of Interest**

October 11, 2012
AMAE Induction Dinner

October 12, 2012
AMAE Annual Membership Meeting

October 12 - 13, 2012
Homecoming

December 14, 2012
MAE Design Showcase

March 16, 2013
St. Pat’s Celebration

May 17, 2013
MAE Design Showcase

**Phonathon**

Thank you to everyone who made contributions to last year’s Phonathon. This year’s Mechanical Engineering Phonathon will be held August 20 - September 9, 2012. The Aerospace Engineering Phonathon will take place on October 21 - 24, 2012. When the phone rings, please take a moment to speak with one of our student representatives. Every gift helps make a difference and supports MAE’s mission of enhancing student learning. Make this year’s fundraising efforts the best yet on record!

We look forward to speaking with you soon.

**ADMINISTRATION**

**Department Chair** - Jim Drallmeier  
Associate Chair of Aerospace Engineering - K. M. Isaac  
Associate Chair of Mechanical Engineering - J. Keith Nisbett  
Associate Chair of Graduate Affairs - Robert Landers

**FACULTY**

Curators’ Professor  
S. N. Balakrishnan  
K. Chandrashekhara  
Al Crobie  
Lokesh Dharami  
Walter Eversman

Curators’ Teaching Professor - Jim Drallmeier  
Keith Bailey Distinguished Professor - Ming Leu  
Bytnar Product Innovation and Creativity Professor - Frank Liou

Tenure Track Professors  
Victor Birman  
Fathi Finaish  
K. M. Isaac  
Umit Koylu  
K. Krishnamurthy  
Ashok Midha  
Anthony Okafor  
David Riggins  
John Sheffield  
Hai-Lung Tsai

Tenure Track Assistant Professors  
Arindam Banerjee  
Douglas Bristow  
Jie Gao  
Serhat Hosder  
Joshua Rovey  
Shun Takai  
Xiaodong Yang

Non-Tenure Track Assistant Teaching Professors  
Ryan Hutcheson  
Nishant Kumar

Teaching Associate  
Ken Schmid

Center Directors  
Director, Intelligent System Center - Ming Leu  
Director, Product Innovation and Creativity Center – Ashok Midha  
Associate Director, S& T National University Transportation Center - John Sheffield

**STAFF**

Brianna Bales – Secretary  
Joe Boze – Senior Laboratory Mechanic  
Mitch Cottrell – Senior Research Electronics Technician  
George Green – Research Electronics Technician  
Bob Hribar – Senior Laboratory Mechanic  
Lila Kolker – Administrative Associate  
Randall Lewis – Instructional Lab Coordinator  
Erica Long – Academic Advisor  
Kimber O’Neal – Secretary  
Gail Richards – Senior Secretary  
Tammy Vena – Chief Clerk  
Kathy Wagner – Senior Secretary  
Cathy Williams – Senior Secretary