Happy Holidays, ME Jayhawks!

As always, we’re most pleased to keep you informed as to the Department’s activities and accomplishments. From the included articles, you can see that our editors, Shannon Linton and Jessica Fell, have spared no effort to show you highlights of our energetic activities, research presence, camaraderie, pride in our/your achievements, and results of our growth.

The School is growing overall; and the Department is the largest in student population (400 undergraduates and 80 graduates) since the early 1970s - - with continued upward growth projections. The School has major plans for the future: Building on Excellence (BoE), which includes an added 140,000 square feet of buildings over the next approximately seven years, 500-600 more undergraduate students, 100-200 more graduate students, and 30 more faculty. These are exciting and challenging times, requiring our unwavering commitment to match the BoE funds provided by the State and KU.

Proportionally, during those seven years, KU-ME is planning to grow by 30-40% in students, faculty and space. As we transition to handle our projected increase in size, we hope that you will be able to partner with us in the changes to come. We welcome your input, your enthusiasm and your support as we take the next major steps in making KU-ME even stronger and more productive - - working to better serve the State of Kansas and Society, producing even more outstanding graduates and even higher-level research results in order to improve the quality of life for everyone. Our website (http://www.me.engr.ku.edu/) and the School’s website (http://www.engr.ku.edu/) will continue to have updates on our progress in reaching these goals - - please visit these any time.

As all of us quickly approach the Holiday Season, naturally taking time to reflect and be thankful, we want you to know that we wish you and yours the very best, now and well beyond; and we extend our deepest gratitude to you for all that you do for the Department and for promoting engineering everywhere.

PS: We welcome information on your careers that we can include in Vibrations. In order to do so, please fill out the information on the back of the Newsletter.
Numerous graduate and undergraduate researchers are getting an exciting and unique experience by working in the EJBRL and interacting directly with engineers from orthopedic companies and surgeons from around the world who are helping design the next generation of total knee prostheses. Over the past three years the lab has performed dynamic physiological simulations on over 25 human cadaver knees using custom designed and built equipment including the Kansas Knee Simulator. The recent test evaluations are designed to better measure and understand the envelope of soft tissue constraint of the human knee and how it affects the kinematic motions that result once the total knee replacement is implanted. Some of these simulations include different kinds of walking, a pivoting maneuver, and a deep knee squat. Work both in Learned Hall with cadavers and at KU Med with live patients are also looking at rotary instability, a condition where some total knee patients have feelings of giving way when they rotate on their leg, something that is required for desired activities like dancing or golfing. The graduate researchers have come to KU from universities across the country and with different degree backgrounds, and recent doctoral students now work for three of the top orthopedic companies in the world. Undergraduate researchers in the lab from various departments are also able to get first-hand experience with research in an exciting and growing field.

If you have a total knee replacement or know someone who does who might be interested in taking part in our clinical trial, please contact Dr. Maletsky to find out more information.
In January 2011, Dr. Frank Gordon was nominated for the Distinguished Engineering Service Award. The nomination letter states: “Dr. Gordon’s outstanding accomplishments demonstrate that he is most deserving of high honor... As a strong advocate of KU’s School of Engineering and demonstrating the utmost integrity in his dealings with all, he makes quite a role model for young engineers, showing them what can be accomplished with a KU degree and how to behave appropriately in professional and personal circumstances.” Dr. Frank Gordon did indeed end up winning the 2011 Distinguished Engineering Service Award.

Dr. Frank Gordon graduated from the University of Kansas with a Bachelor of Science degree in 1967 and with a Doctor of Engineering degree in Mechanical Engineering in 1971. Upon graduation, Dr. Gordon immediately started his professional career in Naval Research in San Diego, California. After only a few months, Dr. Gordon was named to manage a $1 million per year funded program to develop new concepts for submarine design. He was surprised because he didn’t know anything about submarines and had not applied for the job but he was told that he was selected because they wanted new concepts and his lack of submarine knowledge would be a benefit. The program was a success to say the least; it caught the attention of Admiral Hyman Rickover, who is also known as the “Father of the Nuclear Navy,” and new concepts were successfully employed in future submarine designs. After that project, Dr. Gordon was promoted to head the Test Division that was responsible for testing torpedo development programs and for projects like the underwater launch phase of the Tomahawk cruise missile. His career continued with increased management responsibility and in 1987, he was promoted to the rank of Senior Executive Service, the top civilian rank in government. When Navy in-service electronics and communications support functions throughout the Pacific were consolidated into a new command, Dr. Gordon was selected as the Executive Director. The Command, headquartered in San Diego, had facilities and people in San Diego, Hawaii, Guam, Japan, and the Philippines. He spent the last 12 years of his 38 year career as the head of the Research and Applied Sciences Department at the Space and Naval Warfare Systems Center in San Diego.

Throughout his career, he had the opportunity to work with very talented people on some important and challenging national defense problems. He has also maintained a strong connection to KU as a member of the Mechanical Engineering Advisory Board. Since retirement, he has set up a laboratory to conduct experiments in alternative nuclear energy. He is also the co-chairman for the 2012 International Conference on Low Energy Nuclear Reactions that will be held in Daejeon, Korea next August.
ECOHAWKS EFFORTS REGARDING SUSTAINABLE ENERGY AND TRANSPORTATION

By starting KU EcoHawks as a senior design course in the Fall of 2008, with the stated goal of a sustainable approach to automobiles and associated energy infrastructure, students were encouraged to look at the broader scope of their design decisions. They must address their choices through discussion as to how sustainability relates to the application of engineering techniques to solving real-world problems by holistically approaching the situation from five vectors of success: the environment, energy, economics, education and ethics. This effort has resulted in the publication of two papers (one journal, one conference) with KU Mechanical Engineering undergraduate students, along with awards in the area of sustainability and recognition of the EcoHawks as the 2009-2010 Student Organization of the Year for Academic Enrichment by the Student Involvement and Leadership Center. From these beginnings, a graduate emphasis in this area has begun with a number of former EcoHawks staying for advanced degrees with funding coming from various sources such as Smith Electric Vehicles. To illustrate the sustainable nature and relevance to real world topics and research that this course delivers, the students first recycled a 1974 Volkswagen Super Beetle into a model of energy efficiency by turning it into a plug-in series hybrid (effectively a Chevy Volt) that runs on 100% biodiesel created from used cooking oil on campus along with the creation of a solar energy filling station allowing the Beetle to fill up from renewable sources. As part of two students’ Masters Theses, this vehicle is being driven around campus in order to collect data for calibration of vehicle and energy grid models. Currently, students are implementing enhanced technologies of lithium iron phosphate batteries, an alternating current electric motor and cabin comfort in the transformation of a 1997 GMC Jimmy into a modern battery powered electric vehicle (effectively a Nissan Leaf). The goal of this vehicle is for use by KU Libraries in their daily delivery of materials and to connect to the new Center for Design Research building on campus in order to explore Vehicle to Grid charging capabilities. This important area of research will help KU researchers understand how electrified vehicles can improve the safety and security of the Nation’s energy grid, such as offsetting peak power plant energy demand, while reducing hazardous emissions. Perhaps what is most exciting is that the students have gotten the chance to explore future technologies, like hydrogen fuel cells, in designing their car of the future on the small scale. This extension to future technologies has allowed the students to compete and receive an Honorable Mention in the 2011 Environmental Protection Agency’s People, Prosperity and the Planet (P3) Student Design Competition for Sustainability in their construction of a scale model smart electrical grid complete with data collection and controls. In fact, a number of companies documented their support of the program, demonstrating the pertinence of the course in today’s energy climate.
In August of 2009, Dr. Fischer received an NIH independent investigator (R01) grant to examine the effects of wrist injury and repair on wrist mechanics. This work, related to Scapholunate dissociation, began several years before that.

Scapholunate dissociation (ligament disruption between the scaphoid and lunate bones) is essentially a severe sprain of the wrist, resulting in the rupture of the ligament between two carpal (wrist) bones. This trauma can cause changes in joint kinematics and contact patterns, which can lead to secondary radiocarpal osteoarthritis (OA) with advanced collapse (SLAC wrist). The relationship between consequent abnormal mechanics and the onset of OA is not clearly understood, however elevated joint contact pressure is believed to be an associated factor. Knowing how injuries affect joint physiology and mechanics and how well surgical repairs restore the mechanics may improve surgical efficacy and help predict OA risk. The objective of this research is to compare radiocarpal joint mechanics from injured wrists to contralateral controls and also injured versus surgically repaired wrists using MRI-based contact modeling. MRI images are obtained with the hand and wrist relaxed and during active functional loading. These images are used to build surface contact models. Finite element modeling is also used to investigate 3D stresses and strains from cartilage surface to subchondral bone. We are also evaluating the biochemical status of the cartilage in these joints using MR imaging.

Of primary interest in scapholunate ligament tears are the mechanics of the radiocarpal joints between the forearm (radius bone) and the wrist. As the scaphoid and lunate bones separate, radiocarpal cartilage is loaded in new areas and often with higher pressures. These changes can lead to arthritis and further collapse of these joints. The goal of Dr. Fischer’s research team is to understand the changes in joint mechanics with injury, and how well surgical repair restores the mechanics to normal. His team is also looking at important mid-carpal mechanics with scapholunate ligament tears. The capitate is the central bone of the wrist and articulates with both the scaphoid and lunate. So it is also important to look at this joint which also becomes arthritic after injury. Finally, the team is also trying to assess the health of the cartilage over time, using (you guessed it) MRI. A different type of MRI scan allows the analysis of free water in the cartilage to determine the integrity of the tissue matrix.
Interview with Chancellor Bernadette Gray-Little: by Jessica Fell

How will the new expansion building help the University?

At its core, KU exists to educate the next generation of leaders, to build healthy communities and to make discoveries that change the world. The School of Engineering is central to all these goals, so anything we can do to help the School grow and succeed will have benefits for KU and for Kansas.

Do you see a future flux in undergraduate enrollment?

Kansas need more engineers, so we are expanding our enrollment to meet the need. The goal of the expansion of the state’s engineering schools is to increase by 60 percent the number of engineers we graduate. That’s what industry leaders, many of whom are KU alumni, say they need to grow their businesses here in Kansas. Engineering intensive industries account for a third of the state’s payroll and two-thirds of its exports, so meeting this goal will result in new jobs and expanded prosperity.

How will this enhance KU’s academic stature and research productivity?

The School of Engineering is a valuable part of the university. It is home to some of our most talented students, productive faculty members and dedicated alumni, so this expansion will only help the university overall. Expanding enrollment and adding faculty members will give KU opportunities to increase our stature, place graduates in good jobs, and increase the amount of research conducted.

What expectations do you have of the School of Engineering’s development?

I see the School of Engineering continuing its growth and being a center for teaching and research that benefits not only our students, but also our state and world. The expansion of the number of students the school teaches is being matched by growth in its research capabilities, through the new research building under construction and through the talent of its faculty, staff and students. These will have tremendous benefits far beyond campus.

NEW FACES IN THE DEPARTMENT

Carole Chavarria  
Admin. Assoc Sr.  
Started December 2010

Jason Habbiger  
Tech Support Specialist  
Started August 2011

Krissie Druen  
Admin Assoc Sr. II  
Started August 2011

Ashley Shearer  
Student Assistant  
Started October 2011

Jim Hammen  
Accountant  
Started November
ME Kick-Off Event

The ME office hosted a back to school event on October 13, 2011 at the Jaybowl. Students, faculty, and staff go to know each other better, bowling the night away, while enjoying free pizza, Coke products, cake, door prizes, t-shirts and a gift-card giveaway.

ME Advisory Board

The ME Advisory Board met this fall from October 27th-28th. On Friday, October 28th, a recognition luncheon was held in honor of Charlie Salanski, as he stepped down as Chair of the Advisory Board after serving for thirty-two years. Below are pictures taken at this event. Look for more on Charlie Salanski in the upcoming Spring 2012 ME Vibrations Newsletter.

Above: Posing (left-right) are undergraduate students Joshua Sharp, Joseph Lauth, Clayton Nguyen and William Marshall.

Right: Dr. Lisa Friis is determined to get a strike.

Above: Graduate students (left-right) Quiros Luis, Michael Powell, Tyler Stone, Jason Carter and Preston White pose for a picture.

Left: One-year-old Billy bowls with his mom, graduate student Molly McVey.

Above: The ME Advisory Board and Faculty enjoy a meal catered by KU Dinning. Pictured are Terry Faddis and toward the right are Larry Rusco, Greg Monroe, Charlie Salanski, and Joe Bauman.

Above: Advisory Board Members (left to right) LaRoux Gillespie, Greg Monroe, Greg Towsley, Mike Garrison, Charlie Salanski, Frank Gordon, Angela Chammas, Joe Bauman, Larry Rusco.
ALUMNI UPDATES

Fill in this form or email us at kume@ku.edu and let us know what you are doing. You could be featured in an upcoming Newsletter!

Return To:
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