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College of Engineering and Applied Sciences

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Read Full Story
WMU researcher finds a way to repair heart defects using 3D printing

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Read Full Story

WMU’s College of Engineering and Applied Sciences is celebrating Pi Day 2018 – celebrated on 3.14 March 14 -- with the first ever “Give a Slice” campaign. It’s a 36-hour giving campaign in support of academic programs, scholarships and student activities specifically for WMU’s College of Engineering and Applied Sciences. Supporters can make gifts from noon on Tuesday, March 13 until the campaign ends at midnight on Wednesday, March 14.

Look for more details in the March issue of InSPIRE!
Thanks to innovative work by one of WMU’s mechanical engineering professors, surgery to repair a hole in the heart using 3D printing is being used successfully here in Kalamazoo. In an unusual collaboration, Dr. William Liou, professor in the Department of Mechanical and Aerospace engineering, is working with Dr. Vishal Gupta, an area interventional cardiologist, to transfer images of a patient’s heart to a 3D printed model. Gupta then uses the 3D printed model to plan the repair of the hole so that the procedure best fits the patient’s anatomy.

The process is being used for surgery to correct atrial septal defect, a congenital defect of the heart in which there is a hole in the dividing wall between the two upper chambers of the heart, or atria. The hole allows freshly oxygenated blood that returns to the heart from the lungs to mix with deoxygenated blood that is returning to the heart after circulating throughout the body. The condition can damage the heart and lungs because of the excessive amount of blood circulating through the two organs, and can cause significant cardiovascular and pulmonary issues.

One surgical option is through cardiac catheterization, in which a small tube with a plug is inserted into the patient’s blood vessel and delivered to the heart to close the hole. Cardiologists guide the delivery of the plug device using medical imaging. However, this can be quite challenging as the hole can be of different shapes and sizes, and it is difficult to visualize other areas the plug might compromise because of the proximity to the hole.

“This is groundbreaking and quite revolutionary,” Gupta said. “Using a 3D model helps not only pre-plan the procedure but even practice an operation before it is done. It gives me great confidence that the device is going to be placed accurately for the best outcome for the patient. ”

Liou noted that using 3D technology in medicine has tremendous potential. “The use of 3D printing technologies in engineering fields has advanced from simple prototyping to making functional parts for airplane engines and spacecraft. We are only beginning to unlock its potential in applications like medicine.”

Liou heads WMU’s Computational Engineering Physics Lab and is involved in numerous research projects to help gain a better understanding of the hemodynamics and biomechanics of the human heart and brain.
In celebration of 2018 National Engineers Week, the Southwest Michigan Engineering Societies Committee will bring a nationally known comedian engineer to headline its Engineers Week Dinner on Feb. 20. The event, hosted by WMU’s College of Engineering and Applied Sciences, will be held at the Bernhard Center (North Hall). The event begins at 5:30 p.m. with a social hour, dinner at 6:30 p.m., and the presentation at 7:30 p.m.

Tickets are $25, $12 for students.

Don McMillan has performed more than 500 shows nationwide for major corporations including Microsoft, Apple, IBM, Google and ExxonMobil. McMillan’s customized shows use his unique engineering background to take a lighthearted look at technology, business, and the everyday life. He has made numerous television appearances including “The Tonight Show” on NBC, CNN’s “The Larry King Show,” MTV’s “Half Hour Comedy Hour,” and A&E’s “Evening at the Improv.” He also has two big YouTube hits: “Life After Death by PowerPoint” and “Live from My Cubicle.”

McMillan graduated from Stanford University with a master’s degree in electrical engineering and a bachelor’s degree in electrical engineering from Lehigh University. He joined AT&T Bell Laboratories where he worked as part of the team that designed the world’s first 32-bit microprocessor. He then moved to the Silicon Valley where he worked at VLSI Technology as a computer chip designer. During his six years at VLSI, he designed more than 20 Standard and ASIC Designs, many of which are still in use today.

After winning the 16th Annual San Francisco International Stand-Up Comedy Competition in 1991, McMillan turned in his chips for a microphone. He went on to be the $100,000 Grand Champion on “Star Search” in 1993.

Use the following links to register for the 2018 Engineers Week Dinner. Please complete the registration process on or before Feb. 15, noon.
College will celebrate National Engineers Week 2018

National Engineers Week 2018 runs Feb. 18-24 and Western Michigan University’s College of Engineering and Applied Sciences will participate in the celebration with several special events.

The Southwest Michigan Engineering Societies Committee will bring a nationally known comedian engineer to headline its Engineers Week Dinner on Tuesday, Feb. 20. The event, hosted by WMU’s College of Engineering and Applied Sciences, will be held at the Fetzer Center. (See related story in this issue.)

The college also is inviting 400 area middle school and high school students to a special screening of the IMAX Dream Big film at IMAX Celebration! Crossroads in Portage on Monday, Feb. 19 and Thursday, Feb. 22. Sponsors for the outreach event are Custer Office Environment Lecture Series and Wightman & Associates.

According to DiscoverE (formerly the National Engineers Week Foundation), Dream Big: Engineering Our World is part of a movement “aimed at bringing engineering into the forefront of our culture.” It is the first film of its kind to highlight engineers, engineering feats and to inspire a new generation of young people to pursue engineering.

The film is described as having “an eclectic, stereotype-bursting engineer cast” and features engineering’s greatest marvels. Highlights include the 13,000-mile Great Wall of China, the twisting and turning Shanghai Tower, underwater robots, solar cars and smart, sustainable cities. It also showcases female engineers who share their stories and work in the field.

Dream Big is the first giant screen project to promote the educational STEM movement (Science, Technology, Engineering and Math). It was produced by the MacGillivray Freeman Films, the Academy-Award nominated producers of Everest and The Living Sea, and in partnership with the American Society of Civil Engineers, Bechtel and a coalition of engineering organizations.

State of the college presented at February 2018 meeting

Faculty and staff recently received an update on the state of the college at the first “All Hands Meeting” of 2018. Dean Houssam Toutanji provided an overview of enrollment, research spending, and priorities for the college. Among the highlights:

- Research expenditures for the college were $2.35 million from July 1-Dec. 31, 2017. Diversifying external funding and improving research expenditures will be a priority for 2018.
- An Industry Outreach Office is being established and will offer a central location for companies to interact with the college. A staff person will help develop relationships for student co-op and intern positions, more industry involvement in courses and research efforts, better industry interaction with student organizations and contacts for senior design projects. Industry partners are looking to help develop students’ skills so that they are the “best and brightest” when they are recruited for careers in industry.
- $445,000 was approved in spending for improving undergraduate labs and the computer center.
• Efforts continue to build a new biomedical engineering program in collaboration with WMed (WMU’s Homer Stryker M.D. School of Medicine) and the College of Arts and Sciences.
• The college is committed to continuing to support Registered Student Organizations, providing more resources to faculty and staff for professional development and seed-money research opportunities, and sustaining the STEP (Stem Talent Expansion Program).

Other recent activities and initiatives at the college include hiring a retention advisor to help boost 2nd year retention and 6-year graduation rates.

During the meeting, Dean Toutanji also recognized a number of faculty, staff and students. Those receiving the 2018 CEAS Outstanding Faculty and Staff Awards included:

**Outstanding New Researcher**
Dr. Jennifer Hudson
Assistant Professor, Electrical and Computer Engineering

**Outstanding Senior Researcher**
Dr. Massood Atashbar
Professor, Electrical and Computer Engineering

**Outstanding Senior Teacher**
Dr. Said AbuBakr
Professor, Chemical and Paper Engineering

**Outstanding Staff**
Anetra Grice
Student Success Center/STEP

**Outstanding Service**
Kim Cho
International Admissions Counselor

Dean Toutanji also announced the four faculty members whose proposals were accepted as part of a new Faculty Creativity Initiative. The initiative is designed to jump-start mid-career faculty looking to explore new research areas or classroom innovations as they look to reinvigorate, expand and enhance their teaching and research expertise.

A review committee of four faculty members evaluated the 11 research proposals submitted. Four proposals with a maximum funding of $10,000 were accepted and will go to:
Tonya Noble, 1996 WMU graduate in electrical engineering, returned to the college for a recent visit and served as the speaker at an event celebrating the future of women in engineering. Admitted students from Michigan, Illinois and even as far away as Buffalo, N.Y., spent a beautiful Saturday at the Parkview campus, meeting current students, faculty and staff, touring the building and learning more about what the college has to offer.

Noble’s talk, titled The Power of STEAM (Science, Technology, Engineering, Arts and Mathematics) covered her experiences, challenges and insights as an engineering student and as an engineer. She currently is a director in Boeing Global Services – handling International Services for Southeast Asia, India and Australia. In her 20-year-career at Boeing, she has held numerous positions including handling director responsibilities for providing flight simulators and other training devices and services for military and space programs.

She has served as a board member of WMU’s Alumni Association as well as the college’s Electrical and Computer Engineering Industrial Advisory Board and the Engineering Board of Visitors. She received a 2015 Distinguished Alumni Award from Western.
The event was sponsored by the Custer Office Environment Lecture Series.

**The Next Generation of Papermakers**

Students from the WMU paper engineering program recently returned from a TAPPI student summit in Charleston, S.C. The event featured an engineering competition, paper mill tours, sessions on how to network and interview, and opportunities to connect with peers at leading paper engineering programs internationally. A dozen companies were there conducting interviews for internships, co-ops and full-time jobs.

The theme of this year’s summit was “The Next Generation of Papermakers.” For some students this was their first summit, for others it was a return trip and a chance to reconnect with friends and mentors from across the country.

Roundtable discussions provided an excellent opportunity for students to gain insight in diverse topics from professionals in industry. Talks focused on wet end chemistry, quality assurance, environmental impact and water treatment, working effectively with union employees, recycled board manufacturing, tissue manufacturing, flexible packaging, nano cellulose coatings and printed electronics.

Students visited and toured a mill at KapStone Paper and Packaging in Charleston, exploring the entire papermaking process from woodchip piles to the manufacturing of the final product.

Attendees also participated in an engineering competition, with WMU students participating on teams that garnered the 1st and 3rd place wins. This year’s challenge was to create a bridge that would span two cinderblocks and support a series of tests: the passing of a wind-up toy car, supporting a five-pound weight placed in various locations, withstanding a simulated earthquake, maintaining structural integrity when water was poured over the bridge structure, supporting additional weights, and finally, sustaining the dropping of a 5-pound weight from waist height.

The only materials available to the teams were three 1 x 3 foot cardboard cut-outs, three 3-foot strips of tape, and a crayon.

The College of Engineering and Applied Sciences will help host next year’s TAPPI Student Summit in Kalamazoo Jan. 18-21, 2019.