Spring 2018 Design Day

April 26, 2018

Spring Design Day to show off innovations of 219 teams and 1,100 students on Friday, April 27, many designed to help people with special needs

Michigan State University’s Spring 2018 Design Day on Friday, April 27, offers Spartan Engineering students an opportunity to present projects that benefit society and help people with special needs.

Take the efforts of Team Urban Science in Computer Science and Engineering (CSE) Class 498, for example.

“‘There is a humanitarian aspect to our project that we liked,’” explained senior Alex Wuillaume, a CSE major from Plymouth. “‘We created a mobile app to help people who are often forgotten.’”

The CSE team designed Mobile Maestro for Talem Technologies, a sister company of Urban Science, that builds medical devices to help empower people with disabilities. The capstone team designed a mobile app for a Maestro exoskeleton arm used by people with Duchene Muscular Dystrophy or spinal cord injuries to gain a larger range of motion.

Maestro is a mechanical device mounted to a wheelchair that works on springs and tension forces. The arm must be calibrated to a stable angle of incline and is adjusted using a push button key fob connected by Bluetooth. Unfortunately, pushing a key fob can present a significant challenge for some users, Wuillaume said.

The new mobile app allows voice controls or the gentle touch of a smartphone screen to lock and unlock arm joints and enable auto leveling of the arms. The app supports both Apple iOS and Google Android devices.

“I think we’re the happiest with the auto-leveling feature,” Wuillaume said.
The team worked with tester Zach Smith of Orlando, Fla., who explains his reactions to the project’s success in this video: [http://www.capstone.cse.msu.edu/2018-01/projects/urban-science/](http://www.capstone.cse.msu.edu/2018-01/projects/urban-science/).

More than 1,100 students on 219 teams will present their creative and innovative projects from 7:30 a.m. to almost noon in the Engineering Building, 428 S. Shaw Lane, East Lansing. Awards will be presented at 1:15 p.m. in 1281 Anthony Hall. Design Day is free and open to the public.

Also at Design Day:

• Another technology-enhanced project being presented at Design Day is an electronic control interface to improve the grip of a 3-D printed prosthetic hand. A team from Electrical and Computer Engineering Class 480 worked with MSU’s Resource Center for Persons with Disabilities to create an affordable prosthetic that has the ability to open and close all fingers at one time, based on neural signals. The team’s bionic arm is very affordable at a cost of $380 and is easily replicated, providing a low-cost prosthetics option for people in developing countries.

• A CSE 480 team for Herman Miller of Grand Rapids developed the app, Adjust. It helps users maximize the comfort of highly configurable ergonomic chairs. Using image recognition, Adjust can ID the model of a chair using an iPhone camera, computer vision, and machine learning. The iOS app then displays an interactive 3D model and guides the user through an ergonomic adjustment session, including an instructional video and additional adjustments tips.

Design Day Executive Director and CSE Professor Wayne Dyksen noted that the event presents the innovation of students as they enter the engineering profession.

“At Design Day, student teams present their ideas to their client, defend their ideas before faculty and industry experts, and have to think on their feet – which is what is going to happen when they leave MSU and start their careers,” he said.

Design Day includes competitions and project presentations from a variety of engineering classes. The 15-week capstone course, which is required for graduation, provides a platform for students to apply the knowledge and experiences gained throughout their engineering education at MSU. Working in teams of four or five, seniors put their best efforts into solving real-world problems for big and small companies. At the end of each semester, teams present at Design Day

**Spring 2018 Design Day by the numbers**

• 219 teams
• 1,100 students
Capstone projects represent:
• 610 students
• 100 teams
• 83 sponsored projects
• 63 Michigan-based companies and institutions (76 percent)

Pre-college outreach programming includes:
• 4 schools
• 140 students in grades 9-12
• 11 teachers

Design Day Awards Ceremony: 1:15 p.m., Anthony Hall Room 1281
• 14 awards conferred to top Design Day teams
• Judges include faculty and corporate representatives

Background
• All 10 MSU College of Engineering undergraduate degree programs represented
• Twice yearly event on last day of each semester (before finals week)
• 24th Year for Design Day (initiated in 1994 by the Department of Mechanical Engineering)

See the team members and their projects in the 2018 Spring Design Day Program Guide.

More on Design Day
Also featured at Design Day will be projects developed in the first year Cornerstone engineering courses, EGR 100: Introduction to Engineering Design, and EGR 102: Introduction to Engineering Modeling. EGR 100 introduces students to the engineering profession and design process through team-based assignments. The course is an integral part of the MSU CoRe Experience, a residential program for all first-year engineering students. Additionally, EGR 102 is a foundational course in programming, data management, and numerical modeling.

Approximately 140 high school students will attend activities at the Dart Innovative and Creativity Design Day for students and teachers in grades 9-12. This year, students will get hands-on experience with VEX robotics – controlling a robot and writing Robot C language – plus teaming up to create an engineering support system – from a simple beam to an intricate bridge with gussets, trusses, and cables. The high school students also play a key judging role on Design Day, serving as judges for “People’s Choice” awards for the college students’ most popular projects.

Related Website: Communications contact: Patricia Mroczek

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