MU researchers receive funding to take projects from lab to market

From left, research team members Olivia Apperson, an undergraduate research assistant; Salman Ahmad, assistant professor at the MU School of Medicine and medical director of the trauma and surgical ICU for MU Health Care; undergraduate researcher John Gillis; and Prasad Calyam, assistant professor of computer science, discuss their augmented reality project called Panacea’s Cloud on Thursday at Engineering Building West.

By MEGAN FAVIGNANO
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A program at the University of Missouri is helping faculty take their research from the laboratory to the marketplace.

The Coulter Translational Partnership Program at MU aims to increase innovation in the biomedical field by awarding funding to ideas that serve patients by addressing unmet clinical needs.

The program recently awarded five grants designed to help several teams take their research from the laboratory to the marketplace. The grants encourage entrepreneurship and collaboration among researchers of different disciplines — both of which are part of the UM System’s goal of boosting research.

Hank Foley, senior vice chancellor for research and graduate studies at the university, said commercializing research is the right thing to do. Foley likened small businesses to the engine for opportunity and job growth in the state.

“We need more small businesses that are growing from the grass roots up,” Foley said. “To get that, you have to have entrepreneurs. And you have to have serial entrepreneurs who have tried and failed and tried again.”

There are more funding opportunities for research that is interdisciplinary and entrepreneurial, Foley said. The best schools around the country realize that, he said.

Universities “are recognizing that we have to prove we can do more than the academic side of the research,” Foley said. “We are able to translate that research into better outcomes and benefits” for our region.

Next
Research and job growth are important components for land-grant universities such as MU, he said. MU is a member of the Association of American Universities, a prestigious group of only 62 schools. The association emphasizes the importance of research among its members, and its rating metrics strongly weigh research at each university.

When Foley became vice president for academic affairs, research and economic development for the UM System two years ago, he created a five-point strategic plan to bolster research: collaboration across the system, entrepreneurship among researchers, changes to the university’s policy on intellectual property, recognizing researchers who make the leap from lab to marketplace, and encouraging the university to pay attention to other universities’ good ideas.

“Entrepreneurship is crucial,” Foley said. “We need faculty innovators, and some may become entrepreneurs.”

The five grants recently awarded — totaling about $500,000 — were possible because of a $5 million partnership between MU and the Wallace H. Coulter Foundation. MU is one of 16 academic institutions in the country and the only university in Missouri that offers a Coulter Translational Partnership Program.

DISASTER COMMUNICATIONS

Technology and communications often are problematic for first responders in disaster situations; they often don’t have reliable Internet or phone access.

Prasad Calyam, an assistant professor in the Department of Computer Science, and Salman Ahmad, an assistant professor in the Department of Surgery, developed Panacea’s Cloud — a portable system that acts as a wireless hot spot and enables communication for medical directors on the scene. Calyam said two undergraduate students, John Gillis and Olivia Apperson, also contributed to the research.

The team plans to use its about $100,000 grant from the foundation to move the project forward.
Using Panacea’s Cloud, first responders can evaluate a scene and quickly form a strategy.

Ahmad said the technology can establish a Wi-Fi network in the middle of nowhere. First responders can then virtually tag a patient’s condition using Bluetooth technology, giving medical commanders information necessary to coordinate medical attention.

Medical commanders can even use Google Glass to see whether individuals in disaster areas are in stable or critical condition based on the virtual-tagging system.

“Research can be interesting and fun,” Ahmad said. “But when you realize that the work you’re doing will be used in a practical sense to make lives easier — that’s why we’re here.”

Calyam said the project truly is innovative by making the technology available in disaster situations using a cloud platform.

“It’s critical,” Calyam said. “There’s nothing like it on the market.”

The researchers plan to test the system with MU ambulances in the next month. They also hope to test the cloud-based technology on a larger scale: a mass casualty simulation with Missouri Task Force 1, a federal urban search and rescue unit stationed at the Boone County Fire Protection District.

PATHOGEN DETECTION

Another team of MU researchers will use about $100,000 to advance its GermSensor system, which rapidly detects salmonella and other pathogens.

Mahmoud Almasri, an associate professor in the Department of Electrical and Computer Engineering, and Shuping Zhang, a professor in the Department of Veterinary Pathobiology, designed a sensor that quickly detects pathogens present in food.

Sending samples to labs can be expensive and time-consuming, Zhang said.

“The industry and the patients have to wait to get the results,” Zhang said.

She said getting results sooner would allow companies to recall contaminated products earlier, which could decrease the number of people who get sick from the food.

The Coulter grant allows Almasri to upgrade a sensor his lab produced to detect multiple pathogens at once instead of one at a time. That upgrade will make the sensor more time-efficient, he said.

Once the new sensor has been tested, the next step will be commercializing it. Almasri said he can see the portable technology being popular among food producers who want to catch contamination early as well as primary care physicians who are interested in testing patient samples more quickly.

SENSING DIABETES

Raghuraman Kannan, an associate professor in the Department of Bioengineering, is receiving Coulter program funding for the third time.

This time around, the grant will fund a new sensor that will help health practitioners detect diabetic retinopathy, a diabetes complication that affects the eyes.

Kannan is working with Dean Hainsworth, a professor in the Department of Ophthalmology, to develop the sensor.

The grant money will fund the development of a disposable sensor that can be administered by any primary care provider. Ophthalmologists and optometrists have been the only ones who can administer diabetic retinopathy tests during patients’ annual eye exams.

The sensor is more affordable than current diabetic retinopathy tests, according to a news release.

OXYGEN CONTROL

Three MU professors are collaborating to create a device that automatically varies oxygen levels for premature infants.

Roger Fales, an associate professor in the Department of Mechanical and Aerospace Engineering; John Pardalos, an associate professor in the Department of Child Health; and Ramak Amjad, an assistant professor in the Department of Child Health, are working together on the device.

The device uses feedback from multiple sensors to monitor blood-oxygen saturation and heart- and respiratory-rates. In doing so, the device is able to increase the amount of time premature infants spend in a desired oxygen saturation range.

BUILDING A BETTER LASER

By shifting the angle of lasers used for a variety of dermatology treatments, a research team hopes to reduce the risk of serious injuries for the procedures.

Randy Curry, Logan Distinguished Professor of Electrical and Computer Engineering, and Nicholas Golda, an assistant professor in the Department of Dermatology, are working together to develop the new laser device. The grant will help increase the safety and effectiveness of several procedures.

Curry, who also is director of the Center for Physics and Power Electronics, said dermatologists use lasers to treat skin for a wide variety of procedures, including tattoo removal and skin cancer. The new laser beam would be delivered directly into the skin, eliminating the risk of the beam being reflected around the room during treatment.

Conventional lasers are directed at the skin, Curry said, and could potentially be reflected into the eyes of patients or doctors. With the recent grant, Curry said researchers hope to have a laboratory prototype ready by next September. Curry said the Center for Physics and Power Electronics produces technology that can be used in multiple ways.

“We believe in developing technologies that have what’s called dual use,” Curry said. “One funding agency may fund them for one application, but then they may have many other applications as well.”

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