



**THE GLOBAL IMPACT OF RESEARCH** conducted at Auburn University's Samuel Ginn College of Engineering can best be described in three words: quality of life.

Our research partnerships with industry and government, collaborative cross-campus projects and commercialization opportunities lead to life-saving technologies that touch our daily lives. Whether keeping your car and precious cargo safe on the road, finding buried land mines in war-torn parts of the world or taking germs off the table in hospitals, schools and airplanes, research conducted by Auburn Engineering faculty brings cutting-edge solutions from the classroom and laboratory to our homes.

We are making significant strides in medical imaging research, tissue engineering and transparent armor materials. We continue to take the lead in the latest developments for vehicle electronic stability control, drug delivery, wireless software engineering, biofuels and bioenergy, automotive manufacturing, artificial intelligence and cyber security.

As our research efforts have grown, so has our graduate student body. These students and their faculty advisers conduct almost half of Auburn University's research, which includes 16 research centers developing improvements to areas such as information technology, transportation and food safety.

We invite you to visit us at [www.eng.auburn.edu](http://www.eng.auburn.edu) to learn more about our leadership in engineering research.



Ralph Zee  
Associate Dean for Research



## WE GOT THE BEAT

The human heart beats almost 75 times per minute, more than 4 million beats per year. In Elizabeth Lipke's lab, hearts that have lost their rhythm are getting a jump start. Lipke, a faculty member in the Department of Chemical Engineering, is using induced-pluripotent stem cells to grow heart tissue that responds to electrical pulses, just like a beating heart. By engineering polymers that guide these cells to become specialized heart cells called cardiomyocytes, Lipke's team can form new engineered cardiac tissues that respond in the same way as existing heart tissue. These new tissues can also be used outside of the body to test pharmaceuticals and their potential to produce dangerous side effects such as cardiac arrhythmias. For a grandmother who suffered a heart attack or a child with a genetic hole in his heart, Lipke's work with engineered cardiac tissue is offering unhealthy hearts the chance to heal.



## CLOSE UP

Chances are you or someone you know has had an MRI. Physicians of old would be amazed to see clear images of nerves, arteries, muscles and ligaments inside a living person. This relatively young and rapidly developing technology has quickly become the doctor's tool of choice for imaging soft tissues. However, work still needs to be done to unleash the technology's full potential. Thanks to a partnership among Auburn University, Siemens Healthcare USA and East Alabama Medical Center (EAMC), that work will happen in the new Auburn University Magnetic Resonance Imaging Research Center. The center brings together Auburn's expertise in engineering, science, pharmaceuticals, agriculture, veterinary medicine, kinesiology and speech and hearing with Siemens' expertise in MRI. It will house two Siemens MRI units: a 3T scanner, the most powerful MRI cleared for clinical use with humans, and a 7T research scanner, the only actively shielded, human-scaled 7T MRI unit in the nation. Taking a closer look just got a lot clearer.



## LITTLE BUG, BIG BITE

In the humid heat of south Florida, the citrus psyllid is as fond of oranges as we are, but this little bug is causing citrus crop farmers big trouble. Auburn Engineering faculty members Andy Shelton and Ron Neuman, along with an entomologist at the University of Florida's Citrus Research and Education Center, are studying a citrus psyllid repellent called dimethyl disulfide, which is found naturally in onions, cabbage and garlic. To us, and the psyllids, it's stinky stuff. With Neuman's expertise in physical chemistry and chemical analysis and Shelton's computational fluid dynamic simulation and deployment analysis, the team is developing a mixture, as well as a dispenser, to deliver the repellent at the right time and location in the orange groves with minimal impact on the surrounding environment. And the little psyllid? It will live another day, somewhere else.



## NEW AGE ARMOR

Explosions leave a wake of destruction in their path, even injury or death. In war-torn areas of the world, they present a daily threat. Faculty members Maria Auad and Hareesh Tippur are working with new transparent armor materials to lessen the force of a harsh blow. Their materials are stronger, more resistant to a blast and absorb a greater impact, making them ideal for windshields, safety goggles or other transparent military equipment that keep soldiers safe. They also have distinctive characteristics such as the ability to withstand extreme mechanical stress and toxic chemical environments often found with weapons of mass destruction. Soon enough, the impact being felt will be the positive one made by their life-saving materials.



**Our state-of-the-art facilities ensure that Auburn Engineering provides faculty and students with the most advanced environment in which to teach and conduct research. The new Shelby Center for Engineering Technology and recently renovated Ross Hall and Wilmore Laboratories attract the brightest students, recruit world-class faculty and provide crucial spaces to conduct leading-edge research.**



Samuel Ginn College of Engineering  
1301 Shelby Center  
735 Extension Loop  
Auburn, Alabama 36849

Nonprofit  
Organization  
U.S. Postage  
PAID  
Permit # 530  
Montgomery, AL