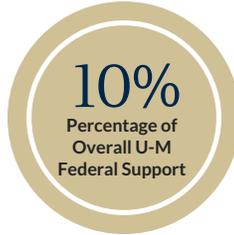




DEPARTMENT OF DEFENSE
SUPPORTED RESEARCH AT THE



UNIVERSITY OF MICHIGAN



FY 2016 Research Expenditures: \$74,712,047

Year-to-year, Department of Defense-supported projects involve about:

Faculty Researchers.....	415
Postdoctoral Fellows.....	52
Graduate Student Researchers.....	53

Examples of U-M projects supported by the Department of Defense, as well as those funded by U.S. Army Office of Research, Office of Naval Research, Air Force Office of Scientific Research, and TARDEC.



MILITARY VEHICLE SEATING:
KEEPING SOLDIERS SAFE

Transportation crashes have accounted for two-thirds of U.S. noncombat military deaths since 2000—a trend U-M researchers are hoping to help reverse. Research at U-M aims to make seating in military vehicles safer, more effective and more comfortable for soldiers. The research was funded by TARDEC through the Automotive Research Center, a U-M-based U.S. Army Center of Excellence for modeling and simulation of ground vehicles at the College of Engineering.



COATING ICE-PROOFS PLANES,
POWER LINES, WINDSHIELDS

Funding provided by the Office of Naval Research, Air Force Office of Scientific Research, National Science Foundation and Nanomanufacturing Program helped U-M researchers develop a spray-on formula that can make ice slide off equipment, airplanes and car windshields with only the force of gravity or a gentle breeze. On your car windshield, ice is a nuisance. On an airplane, a wind turbine, an oil rig or power line, it can be downright dangerous. This could have major implications in industries like energy, shipping and transportation, where ice is a constant problem in cold climates.



PROMISING FINDINGS EASE
PTSD FOR VETERANS

Brain changes seen in veterans with PTSD after mindfulness training offered surprising findings and suggest promise of mind-body techniques. Researchers from U-M Medical School and the VA Ann Arbor Healthcare System saw brain changes that surprised even them. Veterans' brains changed in ways that may help them find their own "off switch" for that endless loop. The changes showed up on functional MRI, or fMRI, brain scans that can visualize brain activity as different areas of the brain "talk" to one another through networks of connections between brain cells. More study is needed.





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HIGH-TECH MANUFACTURING HUB COULD CREATE 10,000 JOBS

The American Lightweight Materials Manufacturing Innovation Institute (ALMMII) aims to bridge the ongoing innovation gap by investing in translational R&D to mature emerging technologies and their manufacturing readiness.

Led by U-M, Ohio-based manufacturing technology nonprofit EWI and the Ohio State University, more than 50 other companies, universities and nonprofits from around the country also will be involved in ALMMII, a public-private partnership.

ALMMII will move cutting-edge lightweight metals out of the research lab and into tomorrow's cars, trucks, airplanes and ships for both the commercial and military sectors.

As part of the National Network of Manufacturing Innovation and led by the DoD, ALMMII is charged with establishing a regional manufacturing ecosystem. It serves our nation in setting the standard for world-class lightweight metals manufacturing. The institute will receive \$70M in federal funding over five years, matched by consortium partners.



BULLETPROOF BATTERY

New battery technology from U-M should be able to prevent the kind of fires that grounded Boeing 787 Dreamliners in 2013.

The innovation is an advanced barrier between the electrodes in a lithium-ion battery.

Made with nanofibers extracted from Kevlar, the tough material in bullet-proof vests, the barrier stifles the growth of metal tendrils that can become unwanted pathways for electrical current.

A U-M team of researchers also founded Ann Arbor-based Elegus Technologies to bring this research from the lab to market.

The research was funded primarily by the National Science Foundation under its Chemical, Bioengineering, Environmental and Transport Systems and its Innovation Corp. Partial funding also came from Office of Naval Research and Air Force Office Scientific Research.



PROTEIN RESEARCH GIVES INSIGHTS ALZHEIMER'S, PARKINSON'S

In research that could one day lead to advances against neurodegenerative diseases like Alzheimer's and Parkinson's, University of Michigan engineering researchers have demonstrated a technique for precisely measuring the properties of individual protein molecules floating in a liquid.

Proteins are essential to the function of every cell. Sometimes, however, proteins don't form properly. Scientists believe that some types of these misshapen proteins, called amyloids, can clump together into masses in the brain. The sticky tangles block normal cell function, leading to brain cell degeneration and disease.

But the processes of how amyloids form and clump together are not well understood. There's currently not a good way to study them.

The team is working to improve the technique's accuracy, honing it in order to get a better approximation of each protein's shape. They believe that in the future, the technology could also be useful for measuring proteins associated with heart disease and in a variety of other applications as well.

The study is titled "Real-time shape approximation and fingerprinting of single proteins using a nanopore." Funding for the project was provided by the Air Force Office of Scientific Research, National Institutes of Health, and the National Human Genome Research Institute.