

2019

Change Agents (2019)

University of Mississippi. Office of Research and Sponsored Programs

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and their revolutionary research

2019



Greetings

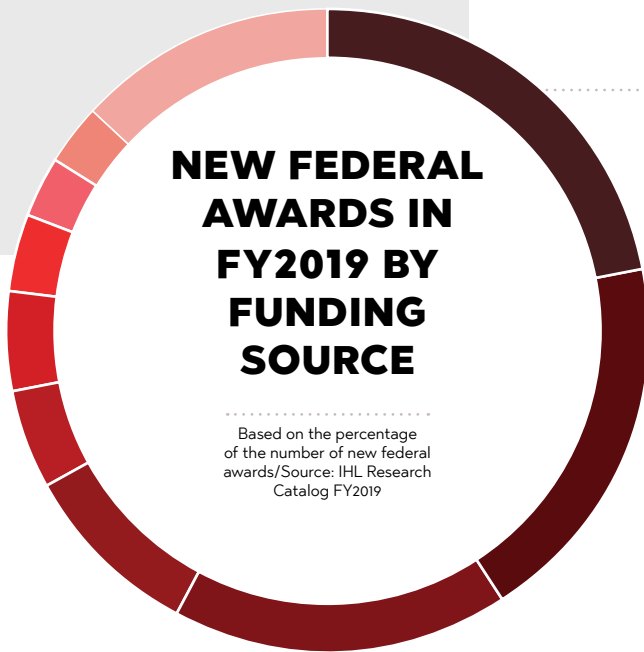
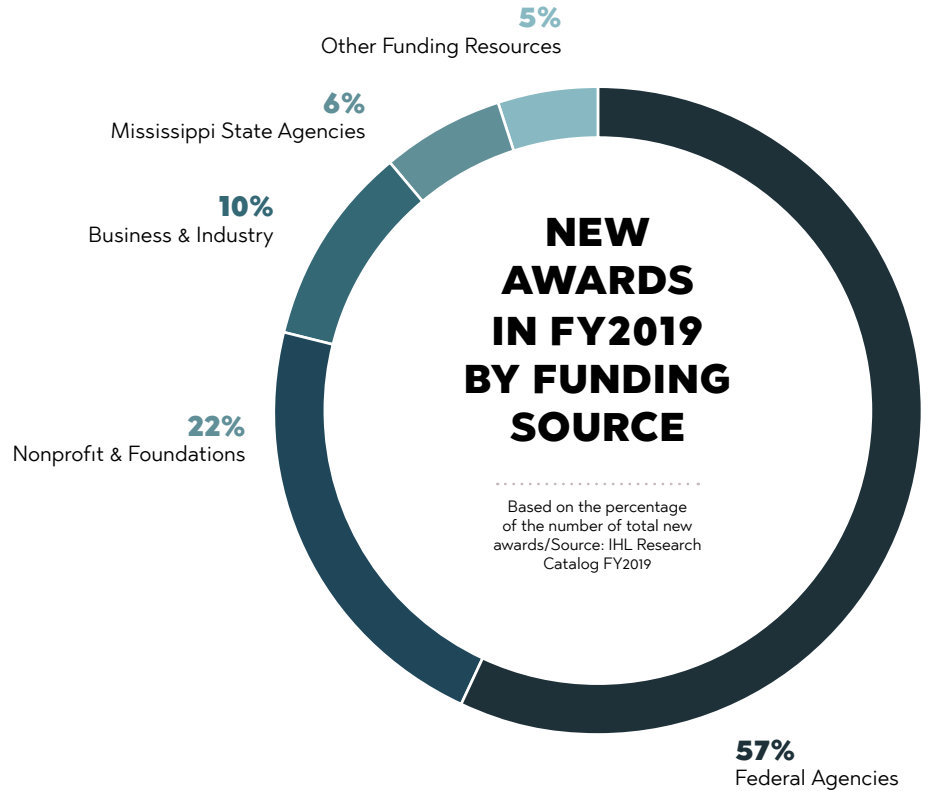


What an exciting and productive year we had in 2019 in the Ole Miss research community! One of the great joys of working at a comprehensive research university is the opportunity to view firsthand how such a wide range of scholars can make a positive impact for our state, nation and world. As you browse through this sampling of breakthroughs and achievements, I think you will be as impressed as I am with the range of Rebel researchers. From space to the oceans to the depths of the human mind — we are there, making a difference.

Perhaps more important than the brain of a Rebel researcher is the heart. It is that heart that motivates our faculty and staff to get up every morning and do the hard work to help people — to develop that new vaccine, to craft that piece of literature or art that touches souls, to design and build a sensor that saves lives, or to ask exactly the right question at the right time. It's been said the mark of a great society is constant improvement. Twelve months a year, Ole Miss researchers work with a spirit of service to do just that.

Josh Gladden

UM RESEARCH



- 22% National Institutes of Health
- 19% Department of Defense
- 17% National Science Foundation
- 9% Department of Agriculture
- 5% Department of Commerce
- 5% Department of Education
- 4% Department of Energy
- 3% Department of Health and Human Services
- 3% Department of the Interior
- 13% Total Other Federal Awards

(Other federal sources include: Corporation for National and Community Service, Department of Homeland Security, Department of Justice, Department of Labor, Environmental Protection Agency, NASA, National Endowment for the Arts, National Endowment for the Humanities, National Security Agency, Small Business Administration, U.S. Agency for International Development and U.S. Geological Survey)

\$58.9 million
in new external
funding awards

301
total new awards

approx. **1,220**
students, staff and
faculty on campus
involved in externally
funded research or
scholarly projects



\$87.3 million
in research expenditures
↑21%
from the previous fiscal year

15
awards of more
than \$1
million



Pharmacy Ranked Sixth Nationally in Research Funding

● The University of Mississippi School of Pharmacy rose to sixth in the nation in external research funding for 2018, according to the American Association of Colleges of Pharmacy. Research funding reached \$21.2 million in 2018, placing the school second in the SEC and among the top 5 percent of pharmacy schools nationwide. The \$21.2 million includes funding for projects that span botanical research with international impacts to inquiries into how to better provide necessary pharmacy services for underserved Mississippians. The school's comprehensive laboratories, nationally recognized researchers and international research collaborations contribute significantly to the university's R1 designation in the Carnegie classification system as a doctoral university of very high research activity.

<https://news.olemiss.edu/school-pharmacy-ranked-sixth-research-funding/>



Student Research Program Studies Brain Wellness

● As an initiative of the University of Mississippi's Flagship Constellations, six UM undergraduate students spent their summer exploring research opportunities in neuroscience and brain wellness as part of the inaugural Neuroscience Summer Research Education Program. The program provided stipends for undergraduate students to engage in eight-week collaborative research with a mentor, exploring neuroscience related to brain wellness. Split between the Oxford campus and the University of Mississippi Medical Center, the program aimed to develop new pipelines for pre-graduate and pre-medical students interested in neuroscience. At the end of the program, students presented their work during an expo at the School of Pharmacy.

<https://news.olemiss.edu/student-research-program-explores-brain-wellness/>



ERIK HOM



JONAH JURSS

Professors Seek to Improve State's STEM Success

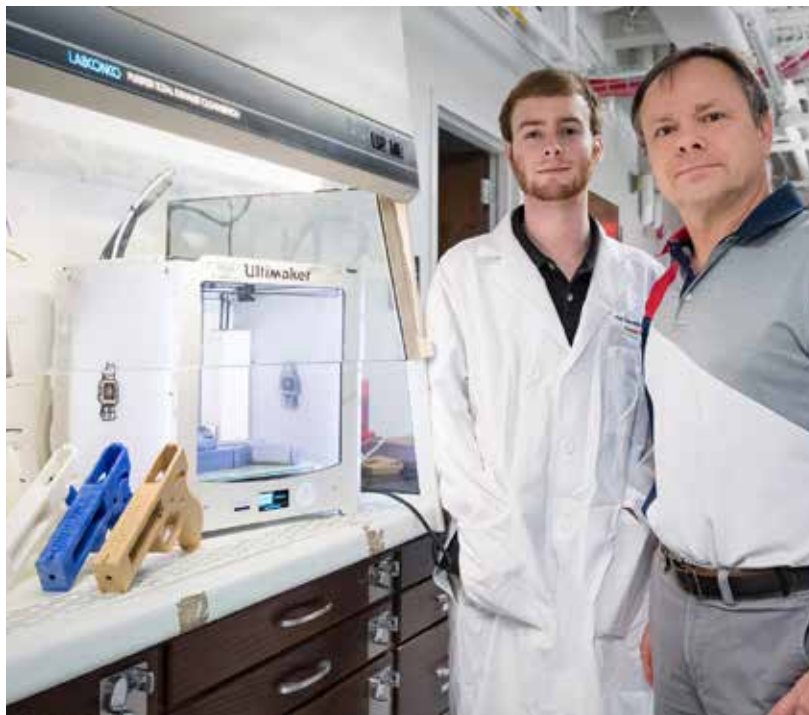
● Two University of Mississippi professors announced plans to use portions of their National Science Foundation awards to further science, technology, engineering and mathematics, or STEM, education in the state. Erik Hom, assistant professor of biology, and Jonah Jurss, assistant professor of chemistry and biochemistry, each garnered a prestigious Faculty Early Career Development Award from the foundation. The awards are endowed to early career faculty — assistant professor or equivalent — who show potential to serve as academic role models in research and education and who could lead advances in their institution's mission. Both professors said that parts of their projects will focus on giving Mississippi students better access to careers in STEM fields.

<https://news.olemiss.edu/two-professors-seek-improve-state-stem-success/>

Researchers Examine Forensic Unknowns of 3D-printed Firearms

With 3D-printed firearms becoming more available, researchers at the University of Mississippi tackled some of the forensic unknowns surrounding the weapons. James Cizdziel, associate professor of chemistry and biochemistry, and Oscar “Beau” Black, a recent doctoral graduate, developed analytical methods to explore how the firearms might be traced using chemical fingerprints rather than relying on physical evidence. The goal of the research is to offer tools for law enforcement to track the guns as they become more widespread. Through a grant from the National Institute of Justice — part of the U.S. Department of Justice — the duo created a growing reference library of mass spectra from 3D-printed firearms for use by law enforcement by identifying polymers and organic gunshot residue in evidence from 3D-printed guns.

<https://news.olemiss.edu/tackling-forensic-unknowns-3d-printed-firearms/>



UM in Space

University of Mississippi researchers are pursuing the final frontier through two International Space Station Flight Opportunity Awards. Patrick Curtis, an associate professor of biology, is using an award to send bacteria grown in his UM laboratory to the space station in the coming years to better understand how bacteria respond in very weak gravity. And new nano-reinforced materials created at the university are already being tested aboard the space station. The two materials — a graphene-enhanced polymer and a nanostructured hybrid polymer — were part of a payload launched from NASA’s Wallops Flight Facility in Virginia. The materials are spending a year attached to the outside of the space station so their impact protection and shock absorption potential can be assessed.

<https://news.olemiss.edu/bacteria-handle-microgravity/>

<https://news.olemiss.edu/um-manufactured-materials-launched-outer-space/>



UM Obtains New Patent for Poison Ivy, Oak Vaccine

The University of Mississippi was issued its fourth in a series of patents for a product that could prevent the painful itching and rash that many experience following exposure to poison ivy, poison oak and poison sumac. The compound is based on research conducted in the School of Pharmacy and at ElSohly Laboratories Inc. Hapten Sciences, a Memphis-based biopharmaceutical company, obtained a worldwide, exclusive license for the technology from the university in 2010 and has conducted extensive preclinical and clinical development work. The compound is a small molecule that acts like a vaccine or immunotherapy to prevent itching and rash after exposure to a sap oil found in the poisonous plants. One or more of these common plant species are found throughout the contiguous U.S.

<https://news.olemiss.edu/university-obtains-new-patent-poison-ivy-oak-vaccine/>





ANNE CAFER

Sociology Professor Receives 'Brainy Award'

● Anne Cafer, an assistant professor of sociology at the University of Mississippi, was awarded a prestigious Andrew Carnegie Fellowship, becoming the first UM faculty member — and the first faculty member from any Mississippi university — to receive the fellowship. Cafer was among 32 fellows chosen for the 2019 Andrew Carnegie Fellows Program, which was created in 2015 by the Carnegie Corp. of New York. As a recipient of the so-called “Brainy Award,” Cafer will leverage the \$200,000 grant to conduct research, write and publish in the humanities and social sciences. She is studying community well-being and resilience with the goal of better understanding how communities withstand, mitigate or adapt to outside pressures and shocks.

<https://news.olemiss.edu/sociology-professor-named-andrew-carnegie-fellow/>

UM Designated Innovation and Economic Prosperity University

● The Association of Public and Land-grant Universities named the University of Mississippi an Innovation and Economic Prosperity University, a designation that recognizes the university’s strong commitment to economic engagement and its work with public and private sector partners in Mississippi and the region. UM joined more than 60 other top universities named by the association and known for their leadership in fostering economic growth, prosperity and innovation. While UM has long-standing partnerships and provides support to business and industry in the state and region, the designation will help the university develop and strengthen its activities and collaborations that foster economic prosperity in the state through research, innovation and experiential education opportunities for students.

<https://news.olemiss.edu/um-named-innovation-economic-prosperity-university-designee/>



UM Undergraduates Explore Summer Research

● Six University of Mississippi undergraduates spent their summer immersed in further academic exploration through the UM Summer Undergraduate Research Experience program. Begun in 2018, the program’s goal is to expand and enhance undergraduate research and creative achievement. The program involved undergraduate students conducting research or creative scholarship projects for nine weeks in the summer with a faculty mentor. The six students explored topics such as the use of hearing aids and over-the-counter hearables in adults over the age of 50, tumor immunotherapy using nanoparticles and women’s leadership in the theatrical avant-garde. The proposals were intended to result in or contribute to a finished, significant product for each student.

<https://news.olemiss.edu/university-funds-six-undergraduate-projects-summer-research/>

Researchers Look into Health Effects of Competitive Video Gaming

● With market research indicating the global esports audience has surpassed 440 million people and generated about \$1.1 billion in revenues, researchers at the University of Mississippi are focusing on the health implications of competitive video gaming. Thomas Andre, assistant professor of health, exercise science and recreation management, and student researchers began studying the effects of playing competitive video games on the human body. The group focused on measuring the heart rates of the Ole Miss Esports team while playing different video games and showed that esports players had accelerated heart rates and recovery periods similar to competing athletes under physical stress. The research was presented at the American College of Sports Medicine annual conference.



<https://news.olemiss.edu/researchers-explore-health-effects-competitive-video-gaming/>

Calls for Innovation Highlight Fourth Technology Summit

Representatives from the computer, telecommunications, internet and cybersecurity industries spoke at the University of Mississippi's fourth annual Technology Summit at the Gertrude C. Ford Center for the Performing Arts. Presenters and panelists addressed such topics as workforce diversity, expansion of rural broadband and technology applications. Speakers included Ajit Pai, chairman of the Federal Communications Commission; U.S. Sen. Roger Wicker; and David L. Cohen, senior executive vice president and chief diversity officer for Comcast. The event also included UM students discussing their technology experiences and panels discussing the effects of 5G, 10G and beyond; technology and society; and technology and the workforce of tomorrow.

<https://news.olemiss.edu/calls-innovation-highlight-fourth-um-technology-summit/>



UM's Economic Footprint Nearly \$3 Billion

A report revealed that the University of Mississippi's annual economic impact totaled \$2.9 billion and enabled 43,121 jobs across the state — meaning one of every 37 jobs in Mississippi is supported by the activities of UM and its students. Conducted by a nationally recognized economic consulting firm, the study analyzed data from fiscal year 2016-17. The study also revealed a return of \$4.40 in state tax revenue and public sector savings for every dollar in state funds that supports the university. During the fiscal year examined, Mississippi taxpayers provided \$121.5 million in funding for the Oxford and regional campuses. In return, taxpayers received an estimated present value of \$442.9 million in added tax revenue stemming from students' higher lifetime earnings and increased business output.

<https://news.olemiss.edu/universitys-annual-statewide-economic-impact-close-3-billion/>

National Sea Grant Law Center Awarded Aquaculture Project Grants

The National Sea Grant Law Center at the University of Mississippi School of Law received more than \$300,000 in grants for two projects to advance the sustainability of aquaculture, which involves the farming of seafood and other organisms. The grants also will be used to research and develop legal solutions for industry challenges. The grants were part of \$16 million awarded for 42 projects nationwide through the National Oceanic and Atmospheric Administration's National Sea Grant Program. Supported by \$212,977 in federal funds, the first project is the development of model law or guidance for state use in the sale of seaweed as food. Supported by \$97,129 in federal funds, the second project will examine the advancement of offshore aquaculture in the U.S. Exclusive Economic Zone.

<https://news.olemiss.edu/national-sea-grant-law-center-awarded-grants-aquaculture-projects/>



Blood Pressure Research Makes Waves

A study conducted by a University of Mississippi doctoral student demonstrated that using the cuff method to measure indirect blood pressure may make it difficult to accurately estimate intra-arterial blood pressure. In the study, published in Current Hypertension Reports, health and kinesiology doctoral candidate Scott Dankel conducted a meta-analysis of 62 studies that compared blood pressure measured with a cuff to blood pressure directly measured with an arterial catheter. The data indicated that the cuff method gives values of systolic blood pressure that are a little low and diastolic pressures that are a little high, showing the cuff method is not very precise and simply provides an estimate of blood pressure.

<https://news.olemiss.edu/um-researchers-make-waves-blood-pressure-research/>



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Microplastics Research Tackles a Gigantic Problem

● Microplastics — small plastic bits less than 5 millimeters long, about the length of a mosquito — are everywhere, from the globe’s tallest peaks to the bottom of the oceans and even in municipal drinking water and floating through the air. The extent of microplastic pollution in waterways is unknown, but a University of Mississippi researcher is assessing microplastic pollution in the Mississippi River and oyster reefs in the northern Gulf of Mexico to systematically quantify the concentrations and loads of microplastics. The research could help assess sources of microplastics and guide agencies and policymakers in developing strategies to address this emerging contaminant. The research also is educating the next generation of environmental scientists.

<https://news.olemiss.edu/microplastics-research-tackles-gigantic-problem/>

Nondestructive Testing Sensor Developed by NCPA Researcher

● A University of Mississippi researcher is developing technology that could greatly speed up the process of detecting landmines around the world. Vyacheslav “Slava” Aranchuk at the university’s National Center for Physical Acoustics received a patent on this platform technology, the Laser Multi-Beam Differential Interferometric Sensor, or LAMBDIS, which is far less sensitive to motion than existing laser vibration sensors. The device also presents several market opportunities for nondestructive testing applications in industrial and manufacturing environments. Potential uses include detecting damage and corrosion, assessing bridge and building structural integrity, identifying noise source and locating material defects in composites.

<https://news.olemiss.edu/ncpa-researcher-develops-groundbreaking-nondestructive-testing-sensor/>

