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Message from the Vice President

Achieving greater impact through collaboration

Ohio State’s research community is one of the most comprehensive in the nation, and its breadth and excellence make it a leading force for change locally, nationally and globally. In my role as vice president for research, I am privileged to serve as an advocate and unified voice for research across Ohio State and share the successes of the more than 5,000 faculty, staff and students, representing all 15 colleges, who are making ground-breaking discoveries and creating new technologies that address society’s critical issues.

Ask our researchers what sets Ohio State apart and they will tell you: the power of interdisciplinary work. Convergent research is not just a “trend” here—our work embodies the interdisciplinary, as together we facilitate and capture opportunities. And we do this because we know that when we work together, we have greater impact.

The real value of Ohio State research is the IMPACT that it has on society—the real ways in which research changes lives. For our students, for our communities here in Ohio, as well as nationally and globally—our research makes a difference. Health is improved, the environment is cleaner, food is more accessible, and so much more—because of the work that we do here at Ohio State.

In my role as an advocate and voice for research at this university, I will keep telling the stories that represent the best of what we do. And I will continue to help shape the face of interdisciplinary research across campus so that we continue to make connections that cross disciplines and colleges, institutions, regions, nations and the globe.

I would like to share with you some highlights from 2014-2015 that exemplify the collaborative impact of Ohio State research.

Caroline Whitacre
Vice President for Research
TOP OHIO PUBLIC UNIVERSITY IN ACADEMICS

RANKED 16TH AMONG THE NATION’S BEST PUBLIC UNIVERSITIES BY U.S. NEWS & WORLD REPORT

12th IN THE NATION FOR SOUGHT-AFTER GRADUATES
- WALL STREET JOURNAL

29th WORLD’S MOST INNOVATIVE UNIVERSITIES
- REUTERS TOP 100 LIST

THE OHIO STATE UNIVERSITY WEXNER MEDICAL CENTER NAMED ONE OF “AMERICA’S BEST HOSPITALS” FOR 23 CONSECUTIVE YEARS
- U.S. NEWS & WORLD REPORT

Ten-Year Research Funding Profile (2006-2015)

Dollars in Millions

- 2006: $652
- 2007: $720
- 2008: $703
- 2009: $716
- 2010: $756
- 2011: $832
- 2012: $934
- 2013: $967
- 2014: $983
- 2015: $962
### Federally-Financed R&D Activity (FY 2015)

Dollars in Millions

<table>
<thead>
<tr>
<th>Federal Agency</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>National Institutes of Health</td>
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<tr>
<td>National Science Foundation</td>
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<tr>
<td>Department of Defense</td>
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<td>Department of Education</td>
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<td>Department of Agriculture</td>
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### Research Awards by Prime Source of Funds

Awards by Sponsor: January 1, 2015 - December 31, 2015

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<tr>
<th>Sponsor</th>
<th>Number of Awards</th>
<th>Funded Amount</th>
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<td>Other Non-Federal</td>
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It isn’t enough to simply generate discoveries.

To meet the challenges of an increasingly interconnected world, we must draw on the breadth of our capabilities and resources and create a network of scientists and scholars from multiple disciplines who can work together to solve the most compelling issues of the 21st century. This is how we ensure that Ohio State research has impact.

Research has real impact.

WHEN WE WORK TOGETHER, WE HAVE GREATER IMPACT

We need to look beyond federal agencies for alternative funding sources to fuel our research endeavors, and forge links with industry and our communities. And we must look to our bright and talented students to make connections that will prepare them to tackle the grand challenges of the 21st century. Only in this way can we realize the full impact of Ohio State discovery.

We would like to share a sampling of the exciting discoveries, technologies, scholarship and creative works generated by our incredibly gifted faculty and students.
Research brings enormous returns on investments through economic development, exciting life discoveries for students, world-changing innovations and new knowledge that advances human understanding and curiosity. But the real value of research is the impact that it has on society and the ways in which it changes lives.
Treating rare inherited forms of arrhythmia

An interdisciplinary team of researchers at The Ohio State University Dorothy M. Davis Heart and Lung Research Institute have identified a rare and deadly form of inherited arrhythmia and developed a method to target the disease. The team, led by Peter Mohler (physiology and cell biology), sequenced every protein-encoding gene in a 37-year-old man's rare form of inherited arrhythmia genome and designed a specific therapy to treat it. And now, the findings from this one patient will lead to more life-saving discoveries for many other patients and families.

LEARN MORE
go.osu.edu/treating-arrhythmia

Harvesting electricity from the air

A team of Ohio State engineers developed new technology that makes cell phone batteries last up to 30 percent longer on a single charge. A phone case harvests the energy emitted by the phone and converts it into direct current power. The team, led by Chi-Chih Chen (electrical and computer engineering), worked with the Fisher College of Business Technology Entrepreneurship and Commercialization Institute to create a startup company, Nikola Labs, to commercialize the technology. This not only impacts the environment, but positively impacts the economy. Co-inventors include Can Emre Koksal and graduate student Roland Tallos (both from electrical and computer engineering) and Ness Shroff (computer science and engineering).

LEARN MORE
go.osu.edu/electricity
Bridging the gap between the energy grid and sources of renewable energy

A team of Ohio State researchers debuted the world’s first solar battery that offers a 20 percent energy savings over traditional lithium-iodine batteries. A solar panel on top and flowing water inside puts this technology in the new class of battery called aqueous flow batteries. Created in the lab of Yiying Wu (chemistry and biochemistry), the technology can be easily integrated with current technologies and could potentially bridge today’s energy grid with sources of renewable energy. The Wu Lab’s ultimate goal is to increase the solar cell’s energy savings to 100 percent, meaning a fully solar-rechargeable battery.

LEARN MORE
go.osu.edu/batteries-included
go.osu.edu/solar-rechargeable-battery

Catching memory problems early

A simple pen-and-paper test created by Douglas Scharre (neurology) is helping people and their medical professionals determine if they are experiencing early signs of dementia. The Self-Administered Gerocognitive Examination (SAGE) test can be taken at home and shared with physicians to help spot early symptoms of cognitive issues such as early dementia or Alzheimer’s disease. Scharre’s SAGE test has been downloaded from Ohio State’s website more than 1.5 million times.

LEARN MORE
go.osu.edu/SAGE-test
go.osu.edu/SAGE-test-download
Capturing real-time images of atoms vibrating in a molecule

Using a new ultra-fast camera, Louis DiMauro (physics) recorded the first real-time image of two atoms vibrating in a molecule. This discovery has the potential to steer chemical reactions toward a desired path. It also offers a new way to study the structure and dynamics of matter, eventually leading to applications that can help to address our planet’s energy challenges.

LEARN MORE
go.osu.edu/atoms-vibrating

Praising children too much can lead to narcissism

In a study that aimed to find the origins of narcissism, researchers found that when parents “overvalued” their children—describing them in surveys as more special than other children and deserving something extra in life—their children scored higher on tests of narcissism later on. The researchers surveyed parents and their children four times over one-and-a-half years to identify which factors led children to have inflated views of themselves. The study is led by Brad Bushman (communication and psychology).

LEARN MORE
go.osu.edu/narcissism

Fighting back against hostile bosses

Research led by Bennett Tepper (management and human resources) found that employees who had hostile bosses were better off on several measures if they returned the hostility. The researchers found that employees felt less like victims when they retaliated against bad bosses. Two studies were conducted, one of which featured 169 participants who filled out two surveys, and the other involved 371 participants who completed three online surveys. Results showed that when bosses were hostile—but employees didn’t retaliate—the workers had higher levels of psychological distress, less satisfaction with their jobs and less commitment to their employer.

LEARN MORE
go.osu.edu/fight-back
go.osu.edu/hostile-bosses
Impact: Sometimes Research Surprises Us

Diminishing pain and pleasure with acetaminophen

A social psychology study conducted by doctoral students Geoffrey Durso and Andrew Luttrell, along with Baldwin Way (all from psychology), found an unusual side effect for the common painkiller acetaminophen: it blunts emotions. In the study, participants who took the drug reported less-strong emotions when looking both at very pleasant and at very disturbing photos, compared to a placebo group. The findings could have an impact on psychological theory, or could be used to develop new therapeutic treatments.

LEARN MORE
go.osu.edu/acetaminophen

Revealing the secret lives of urban coyotes

Research on urban coyotes in Chicago has provided a glimpse into a part of nature that is all around us but unseen. In partnership with National Geographic, “crittercams” uncovered that coyotes live among us very peacefully—despite conventional perception that they avoid urban human populations. Led by Stanley Gehrt (environmental and natural resources), the team also discovered that urban coyote populations are much larger than expected and live longer than their rural counterparts.

LEARN MORE
go.osu.edu/revealing-coyotes
go.osu.edu/urban-coyotes
**Impact: From Food to Water**

**Targeting food insecurity in Central Ohio**

An interdisciplinary group of researchers is teaming up with external partners like Mid-Ohio Food Bank, Columbus Public Health and Local Matters to create a food map of Columbus neighborhoods. Food maps utilize surveys, census data and other information to visually depict areas of the city in which fresh, nutritious food is plentiful—or hard to come by. The team, led by Michelle Kaiser (social work), is analyzing and geocoding the data gathered—including information on how often and where people obtain their food, the type of transportation they use to get there, their access to a stove and the amount of fruits and vegetables they consume—with the goal of designing interventions that impact food security and improve health.

**LEARN MORE**

[go.osu.edu/food-insecurity](http://go.osu.edu/food-insecurity)
[go.osu.edu/food-access](http://go.osu.edu/food-access)

**Improving water quality in Ohio**

The Field to Faucet initiative is an innovative suite of research and extension efforts aimed at ensuring safe drinking water while keeping farms productive and profitable. The initiative began in 2014 after a water quality crisis in Lake Erie. The College of Food, Agricultural, and Environmental Sciences invested $1 million to get the effort off the ground. Led by Jay Martin (food, agricultural and biological engineering), the effort is tapping interdisciplinary talent at Ohio State and partnering with other universities and industry to tackle harmful algal blooms that have threatened Lake Erie’s drinking water and farming in surrounding communities. The initiative has conducted training to reduce fertilizer impact on water supplies with 6,500 growers and producers who collectively farm one million Ohio acres. It is also developing an app to record nutrient application information, a data warehouse so producers and researchers can share data, a sensor to detect microcystin levels in Lake Erie and removing phosphorus and nitrogen from manure and anaerobic digester discharge before they are applied to fields. This unprecedented effort promises to protect Lake Erie and the health of Ohio communities.

**LEARN MORE**

[go.osu.edu/water-quality](http://go.osu.edu/water-quality)
[field2faucet.osu.edu](http://field2faucet.osu.edu)

Office of Research 2014-2015 Research Highlights, Page 12 of 42
Impact: From the U.S. to the World

Celebrating 50 years of making data available to the world

Ohio State’s Center for Human Resource Research, led by Randall Olsen (economics), Elizabeth Cooksey (sociology) and Audrey Light (economics), is celebrating 50 years of leading the nation’s longest-running longitudinal survey, a truly giant data set. Their five decades of designing survey instruments and collecting and disseminating data has helped government, private research institutions and universities throughout the world address a wide range of contemporary problems. Information collected on nationally representative samples of men and women over time—such as education, employment experiences, training, health, children and more—has become some of the most analyzed data in the social sciences. With a $52 million reinvestment from the U.S. Department of Labor, this landmark survey project will continue to impact research and lives throughout the nation.

LEARN MORE

go.osu.edu/chrr
go.osu.edu/52M-NLS-contract

Making a difference in Malawi

Through the program called Umoyo wa Thanzi—or, Health for Life—Alison Norris (epidemiology) and partners including Baylor College of Medicine and the University of Malawi, are conducting qualitative research which is changing lives in Malawi. Malawi is one of the poorest nations in the world, with low life expectancy, high rates of HIV and high infant and maternal mortality rates. The study about contraceptive decision-making and other health issues that overlap sexual and reproductive health is producing potentially life-saving interventions.

LEARN MORE

go.osu.edu/Malawi

Turning water into economic prosperity

Ohio State’s Global Water Initiative’s WE³ Program (Water, Energy, Education and Economic Development) is a multi-faceted initiative aimed at making measurable, far-reaching progress toward water and food security in Tanzania. As part of the WE³ National Water Point
Rehabilitation Initiative, Ohio State, in partnership with the University of Dodoma in Tanzania, as well as government, industry and non-governmental organization partners, are working to turn 110 broken water wells into functioning, sustainable village water systems. These systems include water, sanitation, renewable energy and linkages to agriculture and other economic opportunities, especially for women. The Ohio State effort is led by Marty Kress (research development).

LEARN MORE
go.osu.edu/GWI-WE3
Impact: From Our Bodies to the Hearts and Minds We Touch

Revolutionizing the treatment of leukemia

Thanks in large part to clinical and basic-science research led by John Byrd (hematology), patients with Waldenstrom’s macroglobulinemia—a rare type of non-Hodgkin’s lymphoma that begins in the immune system—now have access to a life-saving drug. The drug ibrutinib was approved for patients in 2015, in addition to patients with mantle cell lymphoma and chronic lymphocytic leukemia (CLL). The improvement in patient outcomes represents a major milestone in the treatment of CLL.

LEARN MORE
go.osu.edu/CLL-drug

Experiencing the arts first-hand in the digital age

Ann Hamilton (art) was awarded the 2014 National Medal of Arts, the highest award given to artists and arts patrons by the U.S. government. Hamilton is internationally recognized for the sensory surrounds of her large-scale multimedia installation. Her art is immersive in nature and rich with sensory details. Her installations are poetic in their cultural contexts, responding to issues such as slavery and oppression and print culture in the digital age.

LEARN MORE
go.osu.edu/national-medal-arts

Understanding the educational pathways of Appalachian youth

The Appalachian Project, Ohio uses interdisciplinary approaches to identify the factors affecting Ohio Appalachian students’ decisions and/or readiness to obtain post-secondary education. The team of faculty, staff and graduate and undergraduate students takes a narrative approach to collect data to assist students in the region in meeting the economic and educational challenges they face. The project is also creating a peer mentorship program, called the Community of Appalachian Student Leaders, to engage students from
the Appalachian region with a community of like-minded students, faculty and staff while providing them with opportunities to develop new academic, professional and leadership skills. The project is a collaboration between the Center for Folklore Studies, Social Change at the Office of Student Life, and the Department of Women's, Gender and Sexuality Studies. 

LEARN MORE

go.osu.edu/appalachian-project
Building synthetic scaffolds that mimic structures found in the human body

As a PhD candidate in materials science and engineering, Jed Johnson developed a nanofiber technology using a process of electrospinning. Johnson’s nanofiber-coated 3D cell culture plate, similar to a petri dish, was first used by researchers at Ohio State’s Comprehensive Cancer Center to grow brain tumors in the laboratory and study how they reacted to treatments. Johnson and an interdisciplinary team of scientists and technology entrepreneurs won Ohio State’s Business Plan Competition in 2009, and today, he and a business partner run Nanofiber Solutions. At the urging of scientists in Sweden, the company created a 3D model of a human trachea that was surgically implanted into four patients in Europe—extending those patients’ lives. Now, Johnson is creating other products used in regenerative medicine, veterinary and 3D cell culture applications.

LEARN MORE

go.osu.edu/Jed-Johnson
nanofibersolutions.com

Improving MRI images of the brain

A group of Ohio State students was among 13 winning teams of the Neuro Startup Challenge, a national competition designed to foster commercialization of promising medical inventions based on technologies created with National Institutes of Health funding. The students developed NeuroCognetix, a patent-pending technology consisting of a camera and a proprietary software algorithm that reduces the number of MRI rescans caused by patient movement, a problem that costs the U.S. health care system approximately $6 billion annually. The team will continue to work with MRI companies to integrate their technology.

LEARN MORE

go.osu.edu/NeuroCognetix
go.osu.edu/Neuro-Startup-Challenge
Creating strategic partnerships and improving the lives of our citizens is fundamental to our land-grant mission. Ohio State’s strong national ranking in industry-sponsored research attests to the university’s long and successful history of creating collaborations that push the frontiers of science.

Every day, Ohio State researchers are engaging multiple perspectives and sources of expertise that discover, create, innovate and transform lives. They are making connections that cross disciplines and colleges, institutions, regions, nations and the globe. Not only scientists, but engineers and physicians, economists, psychologists, educators, humanists and artists are forging links with industry and with communities to develop innovative solutions to the complex challenges of the 21st century.
New Approaches to Collaboration

American Lightweight Materials Manufacturing Innovation Institute

In response to a solicitation from the U.S. Navy, a $148 million high-tech manufacturing research institute was created to develop advanced lightweight materials and technology for use in everything from new hulls for Navy ships to lighter, safer and more efficient automobiles. The American Lightweight Materials Manufacturing Innovation Institute (ALMMII) is a public-private consortium of universities, companies and non-profits organizations. ALMMII was co-founded by EWI, the University of Michigan and Ohio State to bridge the gap between basic research and the commercialization of light-weight metals, and boost the manufacturing sector through the creation of hubs to accelerate development and adoption of cutting-edge manufacturing technologies. The institute is expected to create more than 10,000 jobs in the Midwest. ALMMII operates the Lightweight Innovations for Tomorrow (LIFT) program, a partnership between Ohio State and Boeing focused on vacuum-aided aluminum die casting production.

LEARN MORE

go.osu.edu/ALMMII

Neurotechnology Innovations Translator

The Ohio Third Frontier Commission invested $21 million in the formation of the Neurotechnology Innovations Translator (NIT), in collaboration with Ohio State, to create neurotechnology companies and high-tech jobs in Ohio. The neurological frontier is important for medical exploration and discovery, affecting over one billion people worldwide and impacting virtually every clinical condition. While similar centers have emerged, none has assembled the resources and capabilities necessary to build the critical mass for leadership in this sector. The NIT brings an extensive innovation pipeline, a highly-selective focus on commercializable, venture-ready projects and a concept-to-clinic infrastructure to catapult innovations into the marketplace. The NIT’s network of collaborators includes the Air Force Research Laboratory, Battelle Memorial Institute, Cardinal Health, Medtronic, Wright State University and several venture capitalists. Ali Rezai (neurological surgery) leads the NIT.

LEARN MORE

go.osu.edu/neurotechnology-hub
Collaborations Across Disciplines

Investing in the future: Discovery Themes

Since Ohio State opened its doors in 1873, the university has embraced its land-grant mandate to bring the practical results of its research prowess to the community. From the development of the state’s Meteorological Service in 1873 to today’s advances in nanotechnology, climate change and materials science, Ohio State has pioneered the discoveries and innovations that change—and save—lives. The Discovery Themes initiative is the natural evolution of Ohio State’s time-honored tradition of finding solutions to grand challenges.

The areas identified in which the university will make a global impact are Energy and Environment, Food Production and Security, and Health and Wellness.

Focus areas include:
- Brain injury
- Foods for health
- The humanities and the arts
- Infectious diseases
- Food and agricultural transformation
- Materials and manufacturing for sustainability
- Sustainable and resilient economy
- Translational data analytics

LEARN MORE
discovery.osu.edu/

Studying the relationship between foods and health

The focus of the Center for Advanced Functional Foods Research and Entrepreneurship (CAFFRE) is on the relationship between diet and health—from crops to the clinic to the consumer—to maximize the health benefits
of the foods we eat and decrease the risk of developing diseases. The center, part of the College of Food, Agricultural, and Environmental Sciences, encourages collaboration across disciplines. Researchers from nine colleges and schools, including the College of Medicine and the Comprehensive Cancer Center, are working together to look at the role fat in avocados has on the body’s absorption of carotenoids, study how a nectar made from black raspberries could provide protection against certain types of cancer and examine the absorption and distribution of lycopene from red and tangerine tomatoes in prostate cancer patients. Steven Schwartz (food science and technology) is the director of CAFFRE.

LEARN MORE
go.osu.edu/foods-health

**Using data to prescribe antibiotics**

Courtney Hebert (biomedical informatics) is developing a way to help physicians select antibiotics for patients with serious infections before the cause of the infection is identified. A $1.9 million award from the National Institute of Allergy and Infectious Diseases will enable Hebert and a multidisciplinary team of researchers from infectious diseases, pharmacy, microbiology and biomedical informatics, to automate and validate a tool that uses microbiology data from the hospital and clinical information from the patient to predict which antibiotic regimen would best treat a patient’s infection before culture results are available. The methodology is being developed at NorthShore University Health Systems in Chicago to show that the tool can be easily generalized to other sites. An automated algorithm for formatting the data will then be created. This tool has the potential to reduce the use of broad-spectrum antibiotics.

LEARN MORE
go.osu.edu/antibiotics

**Studying naturally occurring antitumor agents**

A. Douglas Kinghorn (medicinal chemistry and pharmacognosy) is furthering his research on naturally occurring antitumor agents from tropical plants, aquatic cyanobacteria and filamentous fungi with a $71 million continuation grant from the National Cancer Institute. Kinghorn and his team of investigators from the Colleges of Pharmacy and Medicine hope to identify and synthetically modify new, naturally occurring lead compounds that have potential as cancer chemotherapeutic agents and advance them toward clinical use. Additional collaborators on the study include the University of Illinois at Chicago, the University of North Carolina-Greensboro, Columbia University, Mycosynthetix Inc. and Eisai Inc. This grant is one of the largest in the College of Pharmacy’s history.

LEARN MORE
go.osu.edu/antitumor-agents
Collaborations Across the State

Launch of I-Corps@Ohio

I-Corps@Ohio launched a statewide program to help faculty and graduate students move their technologies out of the labs and into the marketplace. The program, modeled after the National Science Foundation’s successful I-Corps program, helps researchers from Ohio universities validate the market potential of their technologies and launch startup companies. Ohio is the first state to have such a program. Ohio State University, University of Akron, University of Cincinnati, Lorain County Community College, Ohio University and the University of Toledo collaborated to get the program off the ground. Michael Camp (Technology Entrepreneurship and Commercialization Institute at Ohio State) is the I-Corps@Ohio program director.

Two Ohio State teams were among eight chosen from across the state to be I-Corps@Ohio’s first participants to see if their technologies had commercialization potential. Glenn Daehn and Anupam Vivek (materials science and engineering) developed an impact spot welding technology for high strength metals that will be used for lighter-weight automobiles. Renukaradhya Gourapura (veterinary preventive medicine) developed a nanoparticle-based swine influenza vaccine for pigs.

LEARN MORE
go.osu.edu/inaugural-icorps

Ohio State spinoff developing biosensor technology

ProteoSense LLC, a Columbus-based Ohio State spinoff, is developing a portable sensor technology to detect foodborne pathogens that threaten the food safety of fresh produce—in 15 minutes or less. Using the RapidScan™, a hand-held device developed by Len Brillson (electrical and computer engineering and physics) and Stephen Lee (biomedical engineering), customers can immediately test produce for dangerous pathogens like salmonella, E. coli and listeria, instead of reacting after a contamination problem has occurred. ProteoSense, led by Ohio State electrical engineering alumnus Mark Byrne, received $1 million from the Ohio Third Frontier Technology Validation and Start-up Fund.
Byrne is working to forge strategic partnerships with Ohio companies, trade associations and other major entities in Ohio’s entrepreneurial ecosystem.

LEARN MORE
go.osu.edu/sensing-something-big
Collaborations Across Universities

Making sense of big data for improved patient care: MD2K

Ohio State is a member of a 12-institution consortium, led by the University of Memphis, responsible for developing tools to make it easier to gather, analyze and interpret data generated by health sensors. Researchers within the National Institutes of Health funded National Center of Excellence for Mobile Sensor Data-to-Knowledge (MD2K) are designing novel, big data solutions capable of reliably quantifying and interpreting physical, biological, behavioral, social and environmental factors that contribute to hospital readmissions for two health care challenges with high mortality rates—congestive heart failure patients and relapse among people who have quit smoking. At Ohio State, William Abraham (cardiovascular medicine) is leading clinical studies of technologies developed for heart failure care and Emre Ertin (electrical and computer engineering) is designing the novel biosensors.

Participating institutions include: Cornell Tech; Georgia Institute of Technology; Northwestern University; Ohio State University; Rice University; University of California, Los Angeles; University of California, San Diego; University of California, San Francisco; University of Massachusetts Amherst; University of Memphis; University of Michigan; and West Virginia University and Open mHealth (a non-profit organization).

LEARN MORE
md2k.org/about/
go.osu.edu/MD2K-first-year

Fighting drug abuse, promoting prevention

A new center established with $2 million in funding from the Conrad N. Hilton Foundation, is helping college and community leaders develop, implement and evaluate programs and policies to address student alcohol and drug use. The Ohio State University Higher Education Center for Alcohol and Drug Misuse Prevention and Recovery (HECAOD) serves as the nation’s premier substance abuse prevention and recovery resource. In partnership with the nation’s colleges and universities, HECAOD promotes student success by providing data-
driven solutions to alcohol and drug misuse and leads the national dialogue on collegiate alcohol and drug misuse and recovery. The center takes a four-tiered approach to servicing health care providers and students, folding services into the areas of education and training, research and evaluation, technical assistance and technology development. John Clapp (social work) is the center’s director.

LEARN MORE
go.osu.edu/Promoting-prevention

Furthering research on strong field laser matter interactions

Louis DiMauro (physics) is leading a $12.5 million Department of Defense Multidisciplinary University Research Initiative (MURI) project to further research in strong field laser matter interactions at mid-infrared wavelengths. The researchers are addressing fundamental nonlinear ultra-fast physics, production of compact particle accelerators and mid-infrared laser technology. Collaborators include the University of Central Florida; University of Texas, Austin; University of Arizona; Louisiana State University; and Imperial College London. The MURI supports basic research in science and engineering areas intersecting more than one traditional discipline and advances defense research, accelerates technology transition and educates scientists and engineers in interdisciplinary areas important to national defense.

LEARN MORE
go.osu.edu/DoD-MURI-Collaboration

Studying the genetic basis of cardiomyopathy

The Dilated Cardiomyopathy Consortium, led by Ray Hershberger (human genetics), is studying the genetic basis of dilated cardiomyopathy (DCM), the most common cause for patients needing a heart transplant. The consortium, made up of researchers from 11 clinical sites, received a $12.4 million grant from the National Heart, Lung, and Blood Institute and the National Human Genome Research Institute. The researchers will conduct cardiovascular phenotyping of 1,300 people with DCM and their 5,200 family members from across the U.S. The team will determine the frequency of a familial link to DCM in patients of European and African ancestry and Hispanic ethnicity. The end result: transforming understanding of DCM to lay the groundwork for precision medicine in DCM.

LEARN MORE
go.osu.edu/DCM
Collaborations with Industry

Advancing medical imaging technology
Ohio State and Cardinal Health have teamed up to establish a central resource with the latest technology to advance the molecular imaging industry. The Cardinal Health Translational Research Center for Molecular Imaging Pharmaceuticals is a one-stop-shop that combines the university’s research capabilities with Cardinal Health’s manufacturing and commercialization expertise for molecular imaging agents. The facility houses a radiopharmacy, a state-of-the-art training center for nuclear pharmacists, a biomarker manufacturing facility and two cyclotrons. As new Ohio State developed imaging pharmaceuticals move through the drug approval pipeline, Cardinal Health will support their development, manufacturing and dispensing for clinical drug trials in Ohio and across its national network of radiopharmaceutical facilities.

LEARN MORE
go.osu.edu/imaging-technology

Coal power plant that captures carbon dioxide
Researchers from the College of Engineering and Babcock & Wilcox Power Generation Group Inc. are working on the development of iron-based coal direct chemical looping (CDCL) technology and design of a power plant to capture carbon. Liang-Shih Fan (chemical and biomolecular engineering) pioneered the CDCL technology, which chemically harnesses the coal’s energy and efficiently contains the carbon dioxide produced before it can be released into the atmosphere. The technology has been proven in the lab, but there is an enormous difference between a lab facility and a commercial plant. Through a multi-phase contract with the Department of Energy, Babcock & Wilcox and Ohio State are working to bridge the gap. Before a full-size commercial plant is feasible, the researchers must show success with a demonstration-scale facility that could generate 550 megawatts of electricity.

LEARN MORE
go.osu.edu/carbon-coal
go.osu.edu/coal-CO2
fan-1.engineering.osu.edu

Office of Research 2014-2015 Research Highlights, Page 26 of 42
Accelerating data sharing worldwide

A portfolio of Ohio State-developed software technologies for health care data sharing and advanced analytics was licensed to Signet Accel LLC as part of an exclusive worldwide agreement. The technologies enable rapid and efficient analysis of health care data in ways that had not previously been possible, and allow providers, patients and health care companies to make treatment decisions based on up-to-date information. Company co-founders Philip Payne and Peter Embi (biomedical informatics) developed the technologies. Signet Accel chose to locate in central Ohio near the Ohio State campus to take advantage of the university’s highly-skilled biomedical and computational workforce.

LEARN MORE
go.osu.edu/data-sharing

Remote microscopy collaboratory

Air Force Research Laboratory (AFRL) scientists at Wright-Patterson Air Force Base will be able to more quickly analyze materials needed in weapon systems by remotely using Ohio State’s electron microscopes that can peer deep into materials. AFRL launched its first remote materials characterization “collaboratory” in partnership with the Center for Electron Microscopy and Analysis (CEMAS). CEMAS and AFRL will be able to link and share state-of-the-art technology and instrumentation and analyze samples using the other’s technology remotely, thereby avoiding the expense and time of travel or separately purchasing equipment. The CEMAS instruments, which are equipped with remote operation capabilities through a connection to the 100 gigabit per second OARnet network, provides a unique opportunity for remote teaching and research to partners across the State of Ohio. The remote user experience is equal to that of sitting in front of the microscope. David McComb (materials science engineering) is the director of CEMAS.

LEARN MORE
go.osu.edu/microscopy-collaboration
go.osu.edu/launch-remote-microscopy
Ohio State is a global institution. Our extraordinary faculty, staff and students possess both the intellectual capacity and compassion needed to solve the world’s greatest challenges. We are working towards internationalizing our curriculum, our service and our research and we are inspiring in our students an unquenchable thirst for knowledge about the world around them to prepare them to undertake global tasks.

Expanding international collaborations

Ohio State is broadening its international strategy and encouraging the rise of Global Gateways. These Gateways serve as home bases for the university’s expanding teaching and research collaborations around the world and connect thousands of students and alumni living and working abroad.

Current Gateways:
- Shanghai, China (2010)
- Mumbai, India (2012)
- São Paulo, Brazil (2014)

The university has been strategically engaged in Brazil for more than 50 years. A research partnership between Ohio State and Fundação Amparo à Pesquisa do Estado de São Paulo (FAPESP) established a $1.4 million funding source to build on existing collaborations and support research and innovation. The partnership encourages researchers at Ohio State and any university in the state of São Paulo to collaborate on studies that can help citizens in both countries and people around the world. In 2013, 24 projects were funded to get new collaborations off the ground. In 2015, 12 awards were made for new projects, and seven awards were made to further existing collaborations.

LEARN MORE
- oia.osu.edu/global-gateways
- go.osu.edu/Brazil-collaboration

Advancing health care in the 21st century: One Health Partnership

The Ohio State University-Ethiopia One Health Partnership is training students to address major emerging health threats—cervical cancer, rabies,
neonatology and food and environmental quality—in the East Africa region. Ohio State students and faculty members are working with 19 Ethiopian and U.S. institutes to improve health and build capacity in sub-Saharan Africa. The partnership exemplifies Ohio State’s efforts to fully integrate international experiences and perspectives into the university’s teaching, research and engagement mission. Reciprocal adjunct faculty appointments have been created. Workshops and field training have been conducted through the One Health Summer Institute. Students have gained increased opportunities with health science courses developed for iTunes U, just one of which enrolled 6,600 students from 90 countries. And, this is the first time that the university’s seven health sciences colleges have teamed up for an international project of this magnitude.

The program was recognized for excellence with the 2015 Andrew Heiskell Award for Innovation in International Education, given annually by the Institute of International Education to honor “the most outstanding initiatives in higher education” among their 1,400 campuses.

LEARN MORE
[go.osu.edu/Ethiopia-partnership](go.osu.edu/Ethiopia-partnership)
[oncampus.osu.edu/the-ethiopian-way](oncampus.osu.edu/the-ethiopian-way)
[go.osu.edu/Ethiopia-One-Health](go.osu.edu/Ethiopia-One-Health)

**Building food security in Africa**

Now more than half way through its six-year, $25.5 million grant, Ohio State University’s Innovative Agricultural Research Initiative (iAGRI) is becoming a prototype for strengthening the capacity of agricultural universities to improve African food security. iAGRI aims to enhance training and collaborative research capacities of Sokoin University of Agriculture and the Tanzanian Ministry of Agriculture, Food Security and Cooperatives, with the goal of improving food security and agricultural productivity in Tanzania. Initiatives include advancing academic training for junior faculty through support of graduate degree training in agriculture; supporting women in agricultural leadership positions; building institutional capacity at Sokoin University in academics, research and outreach; and fostering connections between academics and the private sector. Partners in the Ohio State consortium, led by Mark Erbaugh (international programs in agriculture), include Michigan State University, Iowa State University, Virginia Tech, the University of Florida and Tuskegee University.

LEARN MORE
[go.osu.edu/food-security-Africa](go.osu.edu/food-security-Africa)

**Tackling disease in Cameroon**

Ohio State researchers from veterinary medicine, geography, anthropology, environmental sciences and public health are using statistics and computer simulations, along with field research, to understand the factors that drive the transmission and persistence of disease among humans and animals in Cameroon in Central Africa. The group, called the Disease Ecology and Computer Modeling Laboratory (DECML), is led by Rebecca Garabed (veterinary preventive medicine). DECML, in collaboration with the National Veterinary Laboratory in Cameroon and Plum Island Animal Disease Center in New York, is looking at how movement factors into maintaining the endemic foot-and-mouth disease. The research will help the Cameroon government determine how best to distribute vaccines.

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[go.osu.edu/Cameroon](go.osu.edu/Cameroon)
Awards and Honors

Our faculty and students are the heart and soul of Ohio State.

They are leading the drive to enrich the lives of people in Ohio, across the nation and around the world with energy, passion and intellect.

Let’s take a look at the ways they are earning acclaim for their creativity, vision and research.

Faculty

22
Named Thomson Reuters’ Highly-Cited Researchers
Recognized by their peers for work vital to the advancement of science. These researchers are some of the world’s leading scientists.
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go.osu.edu/highly-cited

11
Elected Fellows of the American Association for the Advancement of Science
Elected faculty members specialize in disciplines from cancer treatment to number theory.
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12
Received NSF’s Faculty Early Career Development (CAREER) Awards
Given as the most prestigious award offered by the National Science Foundation in support of junior faculty who exemplify the role of teacher-scholars.
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Distiguished Scholars

The award recognizes six faculty members annually for their exceptional scholarly accomplishments and substantial compilation of research. The 2014–2015 honorees are listed below.

**LEARN MORE**
go.osu.edu/DSA-2014 and go.osu.edu/DSA-2015

Frederick Aldama
Samson Jacob
Lung-fei Lee
Samir Mathur
DeLiang Wang
Thomas Wittum

Heather Allen
Rebecca Jackson
Thomas Kasulis
Dhabaleswar (DK) Panda
Steven Ringel
Amy Shuman

Young Investigator Research Program

The Young Investigator Research Program awards, from the Air Force Office of Scientific Research, foster creative basic research in science and engineering and enhance early career development of outstanding young investigators.

**Robert Baker** (chemistry and biochemistry) focuses on understanding the mechanism of catalytic selectivity during electrochemical CO$_2$ reduction using nonlinear soft X-ray spectroscopy.

**Cosmin Blaga** (physics) studies complex systems in intense, ultrafast mid-infrared laser fields.

**Yuejie Chi** (electrical and computer engineering and biomedical informatics) focuses on low-complexity inference strategies for large-scale data streams.

**Yuejie Chi** also received a Young Investigator Program award from the Office of Naval Research. She is...
developing a comprehensive framework for extracting useful parameters from high-dimensional multi-modal datasets that are extremely noisy, incomplete and/or corrupted to enable better decision making for data collected from various sensing and surveillance platforms exploited by the Navy.

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go.osu.edu/Young-Investigator-Research-Program
go.osu.edu/Naval-YIP-Award

Department of Energy Early Career Research Award

Robert Baker (chemistry and biochemistry) became the first Ohio State researcher to receive the Department of Energy Early Career Research Award. He is exploring the use of nanomaterials and solid-state electronic devices for chemical energy conversion and highly-selective catalysis.

LEARN MORE
go.osu.edu/DOE-early-career

Greenwall Faculty Scholar

Efthimios Parasidis (law and public health) received a 2014-2017 Greenwall Faculty Scholars Program in Bioethics award. The program provides outstanding young bioethics researchers with salary support to develop their research programs, as well as feedback on their research, mentoring from senior bioethicists and opportunities to develop collaborations with other researchers. Parasidis’ research focuses on the regulation of medical products and human subjects research, the interplay between health law and intellectual property and the application of health information technology to public health policy. He is Ohio State’s first Greenwall Scholar.

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Humboldt Research Prize

Heather Allen (chemistry and biochemistry) has been awarded the Humboldt Research Prize from Germany’s Alexander von Humboldt Foundation. The award is presented to researchers whose fundamental discoveries, new theories or insights have had a significant impact on their own discipline, and who are expected to continue producing cutting-edge achievements. Awardees are invited to conduct research with German colleagues.

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go.osu.edu/humboldt

National Medal of Arts

Ann Hamilton (art) received the highest award given to artists by the U.S. government—the prestigious National Medal of Arts. In her four-decade career as an installation artist, she has often worked with the senses to powerfully highlight cultural and social issues. Her work demonstrates the importance of experiencing the arts first-hand in the digital age.

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go.osu.edu/national-medal-arts
Wolf Prize in Agriculture

Linda Saif (animal health and veterinary preventive medicine) received the Wolf Prize in Agriculture for her work on viral diseases of critical importance to farm animals, food safety and human health. Her contributions have led to new ways to design vaccines and vaccination strategies and her discoveries have contributed immensely to the improvement of global food safety, food production and animal and human health. She is the first Ohio State scientist and the first woman to earn this prestigious award.

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go.osu.edu/Wolf-Prize

Michael P. Malone International Leadership Award

Wondwossen Gebreyes (veterinary preventive medicine) received the 2015 Michael P. Malone International Leadership Award from the Association of Public and Land-grant Universities. The award recognizes individuals who have made significant contributions to international education at public land-grant institutions. Gebreyes leads the One Health Ethiopia initiative, which connects

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go.osu.edu/Leadership-Award

American Academy of Arts and Sciences

Tin-Lun Ho (mathematics and physical sciences) and Roger Ratcliff (social and behavioral sciences) were elected 2015 members of the American Academy of Arts and Sciences, one of the nation’s oldest and most elite honorary societies. Ho was recognized for his research in condensed matter. Ratcliff was recognized for contributions in cognitive psychology.

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go.osu.edu/academy-arts-sciences

National Academy of Inventors

Ching-Shih Chen (medicinal chemistry and pharmacognosy) and Yasuko Rikihisa (veterinary biosciences) were named 2014 National Academy of Inventors (NAI) Fellows. Caroline Whitacre (vice president for research and microbial infection and immunity) and Katrina Cornish (bioemergent materials) were named 2015 NAI Fellows. Chen developed new classes of cancer therapeutic agents, including two new anti-cancer drugs in clinical trials. Rikihisa developed a parasite screening test that is included in the annual health screening panel for all dogs, and has since become the global standard parasite test. Whitacre developed a peptide that offers significant promise for the treatment of autoimmune diseases and was honored for creating an environment at Ohio State that fosters innovation and the translation of inventions. Cornish has had tremendous impact on the development of alternative natural rubber sources and applications, spanning a range of fields, including transgenic enabling technologies, process engineering and medical products and devices. NAI Fellows are nominated by their peers for outstanding contributions to innovation.

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go.osu.edu/NAI-2014
go.osu.edu/NAI-2015
Chen and Rikihisa were also recognized by the university as Innovators of the Year, in 2010 and 2011, respectively for the commercial significance and impact of their work.

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go.osu.edu/Innovators-2010
go.osu.edu/Innovators-2011

Ohio State’s Most Innovative Researchers

The annual Innovator of the Year awards recognize Ohio State faculty, staff and students working actively to promote commercialization of university intellectual property through invention disclosures filed, patents applied for and/or received, technologies licensed or spin-off companies formed.

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go.osu.edu/Innovators-2014
go.osu.edu/Innovators-2015
2014 Innovator of the Year

Ali Rezai (neurological surgery) is in constant pursuit of new ways to end pain and suffering for patients living with disabilities. His research focuses on neural circuitry, neurological sensors and monitors and development of surgical tools and new neuromodulation approaches. He has developed technologies that regulate specific targets in the central nervous system to treat and alleviate the symptoms of a host of neurological disorders.

In collaboration with investigators from medicine, engineering and the arts and sciences, Rezai initiated the first U.S. trials for deep brain stimulation to treat traumatic brain injury, Alzheimer’s disease, alcoholism and obesity. Working with engineers and scientists from Ohio State and Battelle, Rezai implanted a microchip (Neurobridge) into a patient’s brain that was linked to an external prosthetic sleeve. The procedure allowed the quadriplegic man to move his hand for the first time in four years using his thoughts.

Rezai holds 35 issued U.S. patents and has more than 50 pending for medical devices and technologies. Three spin-off companies are based on his technology and scientific work.

Rezai is the Stanley D. and Joan H. Ross Chair in Neuromodulation, director and CEO of the Ohio State Neurological Institute and director of the Ohio State Center for Neuromodulation.

2015 Innovator of the Year

Robert Lee (pharmaceutics and pharmaceutical chemistry) focuses on the design and development of novel targeted drug delivery systems based on lipid and/or polymer-based nanoparticles.

Lee has invented a series of novel liposome and lipid nanoparticle formulations during his 18 years at Ohio State. These discoveries have resulted in numerous patent applications, invention disclosures, licensing agreements, sponsored research agreements and business startups—and most importantly, have resulted in new and more effective ways to diagnose and treat prostate, ovarian, colon and lung cancers.

In September 2014, a portfolio of Lee’s lipid nanoparticle patents, along with miRNA patents of Carlo Croce (molecular virology, immunology and molecular genetics) was licensed to Microlin Bio Inc. in the university’s largest licensing deal in more than a decade. The portfolio includes nearly 100 issued and pending microRNA patents, as well as a novel nucleic acid delivery technology to distribute these transformational therapies to cancer cells.

Rexahn Pharmaceuticals Inc. licensed Lee’s proprietary nanoparticle delivery technology that specifically targets tumors with oligonucleotides in a way that increases potency and reduces side effects.

In addition, Lee has invented a novel liposomal formulation of the anticancer drug bortezomib, which has increased therapeutic
activity and reduced toxicity in acute myelogenous leukemia—and he has invented a novel liposomal formulation for therapy of multiple myeloma.

2014 Early Career Innovator of the Year

Kubilay Sertel (electrical and computer engineering) developed and commercialized the first real-time, high sensitivity terahertz camera used for medical, communication and security applications. Unlike commercial optical cameras that capture light photons using semiconductor-based sensors, Sertel’s video camera “sees” in THz wavelengths that use microscopic-scale antennas to capture THz power for detection. THz waves contain a wealth of information that allow for immediate applications that include security screening through clothing, identification of explosive compounds and breast cancer detection.

Sertel has one issued U.S. patent and two U.S. patents pending. His camera has been commercialized by Traycer Systems Inc. Sertel’s company, TeraProbes Inc., an Ohio State spin-off founded in 2014, received funding from the Ohio Third Frontier Technology Validation Start-up Fund to enable commercialization of an efficient method of testing next generation electronic chips.

2015 Early Career Innovator of the Year

Melissa Bailey (optometry) works in the areas of visual optics and the development of myopia. Her research is leading to new technologies that are changing the way health care providers diagnose and treat visual impairment.

In 2014, she won the Big Ideas for Health competition hosted by the IDEA Studio for Healthcare and Design at the Wexner Medical Center for a mobile software application, called TESA (The Eye Scan App). TESA allows health care practitioners to make many different measurements of the eye, including an estimate of a patient’s glasses prescription and a new, automated measurement of eye alignment. Current testing for eye misalignment, a condition which causes blurred vision and can’t be corrected after the age of 10, requires high-level technical expertise and specialized equipment. Because of the dramatically simplified hardware and ease of use, Bailey’s device can be used in any location at a fraction of the cost of existing devices. The invention was licensed in 2014 by the start-up company Sight4All.

Bailey is also collaborating with emeritus professor Joseph Barr (optometry) on the development of a new bifocal contact lens design – the Buck-Eye Contact lens, which received a provisional
And her non-invasive imaging technique for measuring the size and shape of the eye’s ciliary muscle was issued a patent in June 2015.

2014 Student Innovator of the Year

David Maung (computer science and engineering) is the chief architect and software developer for an at-home gaming program for stroke patients experiencing motor weakness from hemiparesis, an inability to move one side of the body. Hemiparesis affects 325,000 individuals each year, but less than one percent of those affected receive constraint-induced (CI) movement therapy to improve motor function.

Recognizing the need for a low-cost, accessible therapy to improve function, Maung led a multidisciplinary team of clinicians and scientists in the software development for “Recovery Rapids,” an innovative 3D computer-gaming version of CI that provides in home, high repetition motor exercises. The exercises target the affected hand, arm and shoulder and encourage use of the weaker arm to perform routine daily activities.

What’s next? The formation of a corporation called “Games That Move You” to disseminate the therapy.

2015 Student Innovator of the Year

A team of five graduate students from the College of Nursing developed a mobile app that provides Columbus’ underserved populations with confidential, free, easy access to community resources. The team members are: Sarah-Jane Baserman, Megan Miller-Lloyd, Phillip Newman, Stephanie Ritchie and Hayley Townsend.

What started as a class project to create a resource to tackle a community health problem turned into “MobileYou”—a solution to help low-income and vulnerable populations gain access to food pantries and free meals, free health care clinics and mental health resources, housing and shelters, transportation, employment opportunities and more.

The team submitted an invention disclosure to the Technology Commercialization Office. They plan to make the MobileYou app more robust by adding additional agencies and services, many of whom contacted them after seeing the app featured on a local news broadcast. The team would like to broaden the reach of the app to other cities and states.
Students

**Luce Scholar**

Jacob Bogart (globalization studies and French) was named Ohio State’s first Luce Scholar. The Luce Scholars Program, funded by the Henry Luce Foundation, is a nationally-competitive scholarship program to enhance understanding of Asia among potential leaders in American society.

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[go.osu.edu/Luce](go.osu.edu/Luce)

**Udall Scholar**

Rebecca Plumage (psychology) was recognized by the Morris K. Udall and Stewart L. Udall Foundation for her commitment to a career related to the environment, tribal public policy or Native health care. She plans to serve Native American foster children in urban areas in her home state of South Dakota.

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[go.osu.edu/Udall](go.osu.edu/Udall)

**Churchill Scholar**

Jonathan Timcheck (physics) was named Ohio State’s fourth Churchill Scholar. He wants to become a professor at a major university, teaching students and developing data analysis techniques to study fundamental particle interactions in particle accelerator experiments.

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**Truman Scholar**

David Danesh (microbiology) was awarded a Harry S. Truman Scholarship. He plans to pursue a career in dental public health, focusing on underserved populations in urban and Appalachian regions. Danesh is Ohio State’s seventh Truman Scholar.

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Tillman Military Scholar

Greg Freisinger, a PhD student (mechanical engineering) and a U.S. Army veteran who earned a Bronze Star for his service in Operation Iraqi Freedom, was named Ohio State’s first Tillman Military Scholar. The program was established in 2004 by the Pat Tillman Foundation to invest in military veterans and their spouses through educational scholarships to build a diverse community of leaders committed to service to others. Freisinger, who researches intra-operative knee laxity and outcomes following total knee replacement, wants to be an advocate for wounded service members and initiate research programs that will advance the current state of rehabilitation and improve quality of life.

Goldwater Scholars

The Goldwater Scholarship is the most prestigious national award presented to undergraduate researchers in science, math and engineering in the U.S. Five Ohio State students were recognized in 2014-2015 by the Barry M. Goldwater Scholarship and Excellence in Education Program.

Alexis Crockett (neuroscience and psychology) is investigating the effects of the antidepressant ketanserin on chronic neuroinflammation, a potential contributor to major depressive disorder.

Katrin Daehn (materials science and engineering) is investigating nickel-based superalloys used at General Electric.

Tyler Friesen (mathematics) is researching new planarity conditions for X-graphs.

Joseph Gauthier (chemical engineering) is studying the rheology of fluids used in hydraulic fracturing to find more eco-friendly chemicals for use in fracking fluids.

Henry Tran (chemistry and mathematics) is conducting research on Jahn-Teller distortions of the NO3 molecule.

Denman Undergraduate Research Forum

The Denman Undergraduate Research Forum celebrated its 20th anniversary in 2015, showcasing the importance of research in Ohio State’s undergraduate educational programs. Students are provided with an opportunity to showcase their research and scholarly work before a group of faculty and corporate judges. More than 600 students presented their projects that ranged from the impact of music education in a developing country (Jamaica), to parameter selection for segregating speech from background noise, to investigating a new approach for harvesting low-grade thermal energy using an electrochemical system, to an adaptive multi-sensor data fusion model for in-situ Mars exploration.

National EcoCAR Competition

The EcoCAR 2 team (15 graduate and 30 undergraduate students representing a wide range of majors including mechanical and electrical engineering, business and photography) finished first overall in EcoCAR 2: Plugging into the Future. This three-year competition, sponsored by the U.S. Department of Energy, General Motors and 30 leading government and industry organizations provided teams with real world experience as they worked to improve the environmental impact and energy efficiency of a Chevrolet Malibu.
The EcoCAR 3 team earned top honors in year one of EcoCAR 3, a four-year competition to re-engineer a 2016 Chevrolet Camaro into a performance hybrid. Sixteen university teams from across the U.S. and Canada participated in the competition. The Ohio State team placed in the top five in 27 of 31 scored events, including six first place and three second place finishes.

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go.osu.edu/EcoCAR2
go.osu.edu/EcoCAR3

Electric Motorcycle Team

The Buckeye Current electric motorcycle team placed third—for the second year in a row—in the Isle of Man Tourist Trophy (TT) race in 2014. The only U.S. collegiate team to compete in the race, the Buckeye Current set a new collegiate record with an average speed of 93.531 mph.

The team brought home a second place finish in the all-electric class at the 2015 Pikes Peak International Hill Climb competition with a time of 11:12.752. The team persevered to ensure that its bike made it to the summit of Pikes Peak. Buckeye Current was the only student-built motorcycle to race this year.

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current.osu.edu

KAir Battery

KAir Battery is developing energy efficient and cost effective large-scale stationary potassium air batteries. Unlike competing products, KAir’s batteries produce non-toxic and recyclable byproducts at the end of their lifetime. After winning the 2014 Ohio State Business Plan Competition, the team went on to win the $100,000 Department of Energy’s Clean Energy Prize.

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go.osu.edu/KAir

General Motors Innovation Challenge

Student teams from five universities (Ohio State, Michigan, Michigan State, Virginia Tech and Penn State) competed in the final round of the General Motors (GM)
Innovation Challenge held in Detroit. Teams were challenged with looking for creative methods to develop and present quick and cost-effective ways of incorporating new and rapidly advancing technologies into existing manufacturing facilities. The Ohio State team captured top honors in the challenge. Team members Patrick Beal and Brian Bachir (mechanical engineering), Abed Traboulsi (biomedical engineering) and Geoff Hardy (finance) proposed an energy harvesting solution to minimize GM's carbon footprint and potentially impact the future sustainability of manufacturing.

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go.osu.edu/GM-Innovation-Challenge

Venturi Buckeye Bullet 3
Ohio State’s Venturi Buckeye Bullet team successfully chased down another international record for electric land speed vehicles in 2015. Professional driver Roger Schroer guided the Venturi Buckeye Bullet 3 to an average two-way speed of 240.320 miles per hour. Venturi Buckeye Bullet 3 was designed and built by undergraduate and graduate students at the Center for Automotive Research (CAR) in partnership with Monaco-based Venturi Automobiles. The Buckeye Bullet experience is a unique training opportunity and proving ground for Ohio State’s brightest and most dedicated students, many of whom have moved on to successful careers in industry at companies such as Ford, Boeing, A123 and Lockheed Martin.

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43North Business Plan Competition
Genetesis LLC, a biotech company founded by Peeyush Shrivastava (biomedical science) received $250,000 in the 43North Business Plan Competition, the world’s largest business idea competition. Genetesis was selected as a finalist from more than 6,900 applicants from 96 countries and all 50 states. The company’s technology is geared towards optimizing drug design for the treatment of heart rhythm disorders through the application of novel algorithms that analyze real-time functional heart electrophysiology. Using a patent-pending system, Genetesis is able to quantify responsiveness to drugs before they are administered. Genetesis also won the $10,000 People’s Choice Award for generating the most tweets using a designated hashtag unique to their company over a two week period.

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go.osu.edu/Genetesis-LLC
Buckeyes consider the environment before printing.
An electronic version of the report can be found at research.osu.edu/annualreport