Making an Impact
ACHIEVING GREATER IMPACT THROUGH COLLABORATION
For our students, for our communities here in Ohio, as well as nationally and globally—research makes a difference. Health is improved, the environment is cleaner, food is more accessible, and so much more—because of the work done here at Ohio State.

Ask researchers what sets Ohio State apart and they will tell you: the power of interdisciplinary work. Convergent research is not just a trend here—it embodies the interdisciplinary, as together we facilitate and capture opportunities. When we work together, there is greater impact.

In my role as an advocate and voice for research at this university, I will keep telling the stories that represent the exciting discoveries, technologies, scholarship and creative works generated by our incredibly gifted faculty and students. And I will work 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.

This report represents a sampling of the ways Ohio State research is making an impact.

Caroline Whitacre
Senior Vice President for Research
Treating Rare Inherited Forms of Arrhythmia
An interdisciplinary research team, led by Peter Mohler (physiology and cell biology), has identified a rare and deadly form of inherited arrhythmia and developed a method to target the disease. The team 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 individual will lead to more life-saving discoveries for many other patients and families.

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.
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 ultimate goal is to increase the solar cell’s energy savings to 100 percent, meaning a fully solar-rechargeable battery.

Catching Memory Problems Early

A simple pen-and-paper test, created by Douglas Scharre (neurology), can help determine whether a person is 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.
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.

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, led by Brad Bushman (communication and psychology), 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.

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. 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. Employees felt less like victims when they retaliated against bad bosses.

Impact
FROM THE BASICS OF MATTER TO OUR EVERYDAY LIVES
Diminishing Pain and Pleasure With Acetaminophen

A social psychology study, conducted by doctoral students Geoffrey Durso, Andrew Luttrell and 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.

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.
Targeting Food Insecurity in Central Ohio
An interdisciplinary group of researchers, led by Michelle Kaiser (social work), is creating a food map of Columbus neighborhoods that visually depicts areas of the city in which fresh, nutritious food is plentiful—or hard to come by. The team 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 and the amount of fruits and vegetables they consume—to design interventions that impact food security and improve health.

Improving Water Quality in the Great Lakes Region
The Field to Faucet initiative is an innovative suite of research and extension efforts aimed at reducing harmful algal blooms while keeping farms productive and profitable. It was launched in response to a 2014 water quality crisis in Lake Erie by Bruce McPheron, dean of the College of Food, Agricultural, and Environmental Sciences (and now provost). The initiative began with a targeted investment of $1 million in technology development by Ohio State that led to research on a new hand-held detector for algal toxins and a nutrient recovery system that can convert manure into useful products. The end-to-end systems approach—and initial investment—was leveraged when Ohio State was invited to co-lead an $8 million statewide research initiative funded by the Ohio Department of Higher Education and nine other Ohio universities. This application-oriented research has already armed state agencies with new knowledge and tools to tackle harmful algal blooms in the future.
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. 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.

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.

Turning Water into Economic Prosperity
The WE3 Program for Tanzania (Water, Energy, Education and Economic Development) developed by the Global Water Institute at Ohio State, is a multi-faceted initiative aimed at making measurable, far-reaching progress toward water and food security in Tanzania. As part of the program, Ohio State has teamed with university, government, industry and non-profit partners in Tanzania to turn 125 broken wells into functioning village water systems that utilize renewable energy, address the health and sanitation needs of the communities and introduce related economic activities from agriculture to aquaponics. If the 125 community pilot is successful, the WE3 model will be replicated in 5,000 communities, leading to a potential impact on over 5,000,000 people. Marty Kress (research development) leads the institute.
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 those with mantle cell lymphoma and chronic lymphocytic leukemia (CLL). The improvement in patient outcomes represents a major milestone in the treatment of CLL.

Experiencing the Arts First-Hand in the Digital Age
Ann Hamilton (art) was awarded the 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 installations. 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.

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 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.
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. The company created a 3D model of a human trachea that was surgically implanted into four patients in Europe—extending those patients’ lives. Johnson is creating other products used in regenerative medicine, veterinary and 3D cell culture applications.

Connecting Underserved Populations with Community Resources
What started as a class project for a team of five graduate students from the College of Nursing turned into a resource to tackle community health issues. Through their research, Sarah-Jane Baserman, Megan Miller-Lloyd, Phillip Newman, Stephanie Ritchie and Hayley Townsend discovered that smartphone and mobile technology usage is consistent across all socioeconomic levels, and that lower income individuals are more dependent on smartphones for Internet access than others. Using resources compiled from their community health clinical experiences, the team developed the “MobileYou” app. MobileYou provides Columbus’ underprivileged and vulnerable populations with confidential, free, easy access to community resources, such as food pantries and free meals, free health care clinics and mental health resources, housing and shelters, employment opportunities, and more. The team wants to expand the reach of the application to other cities and states.
To meet the challenges of an increasingly interconnected world, we will continue to draw on the breadth of our capabilities and build a network of scientists and scholars from multiple disciplines who can work together to solve the most compelling issues. And we will look to our bright and talented students to make connections that will prepare them to tackle the grand challenges of the 21st century.

THIS IS HOW WE ENSURE THAT OHIO STATE RESEARCH HAS REAL IMPACT.
OFFICE OF RESEARCH

208 Bricker Hall
190 North Oval Mall
Columbus, OH 43210
614-292-1582

research@osu.edu
research.osu.edu
twitter.com/researchatOSU

Visit research.osu.edu/annualreport to learn more about research at Ohio State.