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CLASS ACT :: Undergraduate students and faculty members at work.
INNOVATION AT WORK
Cross-campus collaborations tackle projects ranging from a new way to diagnose osteoporosis to student training for the virtual reality industry.

PROMOTING INNOVATION
Ohio University’s Innovation Strategy program has funded projects ranging from a new motion capture studio for immersive media work (this page) to technologies for the shale energy industry. On the cover, Russ College of Engineering and Technology undergraduate student Colton Nissen conducts work at the Institute for Sustainable Energy and the Environment. (See story, page 32)
Innovation in action

Over the last two years, Ohio University has embarked on the Innovation Strategy initiative to ensure that our university continues to engage substantively with the challenges of the 21st century. The initiative not only focuses on our endeavors in research, scholarship, and creative activity, but our teaching and institutional operations as well.

In early 2015, we announced that Ohio University would make a significant investment to support interdisciplinary teams of faculty and staff with innovative ideas for addressing major issues. The response from the university community was tremendous. We received 60 letters from cross-campus teams expressing initial interest in the program, and 49 of those teams submitted pre-proposals for funding.

After a comprehensive process of review, Ohio University has designated $4 million to support four major projects spanning topics from improved healthcare diagnostics to immersive media technologies, as well as almost $500,000 in planning and seed grants to 12 teams to help them further develop their concepts. We will launch a second cycle of funding in fall 2016 to help advance additional Innovation Strategy initiatives.

The need for faculty and staff to work across disciplinary boundaries to address complex issues in our world is a well-known concern in higher education. We are pleased to establish a formal mechanism for the Ohio University community to work collaboratively to pursue and enhance innovative ideas that they can achieve only in a truly interdisciplinary environment.

The excitement on campus for this initiative is palpable. We look forward to reporting on the progress and results of these projects in the pages of Perspectives magazine.
For the new book *I Dreamed About Sam Shepard Last Night*, Ohio University Professor Scott Minar introduces American audiences to the renowned Swedish poet Ingela Strandberg.

“Strandberg is what people in literary circles call a ‘poet’s poet,’” Minar says. “She's kind of difficult but also has a lot of energy in her writing.”

Although Strandberg is highly regarded in her homeland—she’s the recipient of the Swedish Academy’s Bellman Prize, which is on level with the Pulitzer, Minar notes—her work hasn't been known across the Atlantic.

That changed after Minar came across the work of Göran Malmqvist, a linguist and Swedish Academy member who has translated the work of his fellow Swedish poets into English. Minar, Malmqvist, and Strandberg began a correspondence, which led the Ohio University professor to make inquiries with American literary presses about publishing the Swedish authors’ works.

“I have never seen responses like the ones I received to the Malmqvist translations of Strandberg's work,” Minar says. “People misuse the word ‘unique,’ but her work is truly unique.”

Within hours or days, several prominent journals expressed interest in publication, a process that often takes six months to a year, Minar notes.

In 2015, Marick Press published *I Dreamt About Sam Shepard Last Night*, a book of selected Strandberg poems. Journals such as *The Laurel Review*, *Poetry International*, and *Crazyhorse* also have featured the translated works. In 2016, Marick Press will publish Malmqvist’s translation of another Swedish poet, Lennart Sjogren.

In addition to writing the introductory essay about Strandberg in the Marick Press book, Minar will serve as a contributing editor to a special international edition of *The Laurel Review* that will spotlight the work of the Swedish writers and others from across the globe. Malmquist also has translated Minar’s “Introducing Ingela Strandberg” into Swedish, which will be published in a new book of her poetry in Stockholm, Minar reports.

Minar, a professor at Ohio University’s Lancaster campus, is the author of two books of poetry, *The Palace of Reason* and *The Body’s Fire*, and has a third one in the works. While his own writing is different from the poetry of his Swedish colleagues, Minar says he relates to their desire to continually push themselves out of their creative comfort zones.

“The connection I have with the Swedish and international writers is that, they do things in a way that’s sort of refreshingly different,” he says. “I try for that, too.”

**SCOTT MINAR**

Scott Minar is a professor at Ohio University’s Lancaster campus and the author of two books of poetry.

*photo: courtesy of ohio university lancaster*
Christopher France has spent his career exploring how an understanding of human psychology could prompt more people to become repeat blood donors. A fear of physical discomfort—whether real or anticipated—deters some adults from participating in donation drives.

Driving donors

Health psychology researchers to study strategies for retaining volunteer blood donors

Christopher France has spent his career exploring how an understanding of human psychology could prompt more people to become repeat blood donors. A fear of physical discomfort—whether real or anticipated—deters some adults from participating in donation drives.

To conduct his research, France received a $3.5 million grant from the National Institutes of Health.
France, an Ohio University Distinguished Professor of Psychology, has made a few discoveries that have helped calm donor nerves. His research has shown that proper hydration before donation, visual distractions, and muscle-tensing exercises can help reduce donors’ negative physical reactions to the blood donation experience. That makes first-time donors more likely to return to future blood drives.

With a new $3.5 million grant from the National Institutes of Health, France now is studying how three different techniques—on their own and in combination—could help even more adults become lifelong donors. Over the next five years, France and Ohio University colleagues Janis France and Bruce Carlson will work with the New York Blood Center to recruit 2,400 individuals for the project.

The study aims to explore how three psychological needs—competency, autonomy, and relatedness—play into an individual’s decision to become a repeat blood donor. According to self-determination theory, which has been used in psychology research for the last 25 years, the desire to satisfy these three basic needs can help explain the choices we make, France says.

Several of France’s previous studies addressed the issue of competency, or the need to feel good at something and have others recognize those qualities about us, he says. Mind-body techniques such as distractions and exercises not only reduce physical unease about blood donation, but make participants feel more confident that they can do it, he explains.

France’s team also has conducted studies that address the issue of autonomy, or the idea that people are more likely to continue their own chosen behaviors. Psychology researchers interview study subjects to learn more about their motivations and values.

“The goal is to let them process their motivations for giving, for and against, and help them make the best decision moving forward,” he explains.

The novel piece of the study addresses relatedness, or the need to be part of a larger community that engages in certain behaviors and has common values.

Participants in the new NIH study will be randomly assigned to a usual-care control group or one of seven intervention groups that focus on one, two, or all three of these needs: competency, which will teach prevention and distraction strategies to use at the blood drive; autonomy, which will engage participants in a phone interview about their donation goals and values; and relatedness, which will allow participants to interact with other new donors on a closed Facebook group.

“If you look at the average first-time donor, about 40 to 50 percent come back in the next year,” France notes. “Can we make that number bigger? By addressing basic psychological needs for competency, autonomy, and relatedness we hope that a higher proportion of new donors will opt to return.”

story by :: ANDREA GIBSON

Over the next five years, Distinguished Professor Christopher France and colleagues Janis France and Bruce Carlson will work with the New York Blood Center to recruit 2,400 individuals for the project.

ILLUSTRATION: CHRISTINA ULLMAN; PHOTO: BEN SIEGEL
If you've ever wondered about how students are involved in research, scholarship, and creative work at Ohio University, look no further than the Student Expo. For an entire day in April, student scientists, artists, engineers, and entrepreneurs take over the Convocation Center to showcase their innovation and ingenuity. Some have received grants from the university, while others have worked independently with faculty or peers to tackle projects that provide hands-on learning beyond the classroom curriculum. On Thursday, April 6, 2017 the Convo will be buzzing with unmanned aerial vehicles, theater props and costumes, homegrown video games, and hundreds of other examples of student work. Join us from 11:30 a.m. to 2:30 p.m. to meet these curious and creative Bobcats.
Kingsley Antwi-Boasiako, a doctoral student in media studies, poses for a photo with his 2015 first-place ribbon, awarded for his research on newspaper coverage of Ebola in Western African countries. PHOTO: OHIO UNIVERSITY / ROB HARDIN

Lily Gelfand, a dance major in the Honors Tutorial College, demonstrates how to use a loop-pedal system. Gelfand uses the pedal to loop her live cello music during dance classes and performances. PHOTO: OHIO UNIVERSITY / EMILY MATTHEWS

Huafeng Liu, right, explains the tricopter design his team built to his classmates Bingxing Xu, left, and An Liu, center, at the 2014 Expo. PHOTO: OHIO UNIVERSITY / JONATHAN ADAMS
Geoff Dabelko believes that addressing environmental issues can be essential to national security. It’s a way to build trust between communities based on mutual needs, he says, and it can teach different groups—military, environmental, and humanitarian-aid—how to work with and learn from one another.

Dabelko is a professor and director of the environmental studies program at the Voinovich School of Leadership and Public Affairs at Ohio University, as well as a senior adviser for The Wilson Center, a research and public policy center based in Washington, D.C.

In his view, issues of the environment aren’t the cliché of oil drillers versus tree-huggers, but something much more complex. “The reality is that several billion people in the world depend on natural resources for survival day to day,” Dabelko says. “We need to move away from the Western idea of conservation—the ‘save the pandas’ view—to, ‘Do I have food to feed my kids?’”

Dabelko recently co-authored a report commissioned by the G7 Foreign Ministers on the geopolitical risks associated with climate change. While climate change by itself may not cause violent conflict, the report finds, it multiplies the threats posed by scarce natural resources and political instability. The 172-page report illustrates its claims with infographics, tables, and specific case studies of conflicts incited or inflamed by those two factors.

Dabelko says cooperation on environmental issues can enhance national security, citing the work of EcoPeace Middle East, a nongovernment organization that works with communities living side-by-side in Jordan, Israel, and the Palestinian Territories. Despite conflict in the region, Dabelko says, the three communities share water sources; a contamination issue for one is a problem for them all. “You have Palestinian and Israeli communities that are physically abutting one another, but if you don’t [clean the shared resource], then kids on both sides of the line get sick, so there’s a rationale for communication,” he says.

EcoPeace sponsors a number of water-based projects, including cross-border measures for wise water usage and efforts to rehabilitate the Jordan River. While the cooperation fostered by EcoPeace Middle East will not resolve the age-old conflict, Dabelko says in this sense, environmental cooperation can be a vehicle to reach better conditions on the ground and more trusting interactions.
“Is it going to solve the larger problem? No, of course not,” he says. “But it builds an avenue for dialogue and building trust at the community level via a mutual dependence on clean water and sanitation.”

Robert Litwak, director of international security studies at the Wilson Center, says Dabelko was a pioneer of the idea that environmental degradation can generate conflicts within and between states because he was present when the field of environmental security was established. Dabelko has put in roughly 25 years of work on the issue since then. Referencing Dabelko’s work on the G7 summit report, Litwak says that Dabelko is putting forward some of the best solutions to these problems.

“Policymakers are hungry for ideas,” Litwak notes, “and Geoff is generating work that is high caliber, has academic excellence, and high policy relevance.”

Dabelko’s next research project focuses on the recent climate change international agreement made in Paris. He and two students are working with an international team to assess how the agreement may cause conflict or serve as a mechanism for peacebuilding.

While climate change by itself may not cause violent conflict, the report finds, it multiplies the threats posed by scarce natural resources and political instability.
Early detection
How asymmetrical fingerprints can forecast risk for diabetes

The same technology used by forensic investigators to capture fingerprints also can help doctors predict whether patients might be at risk for developing diabetes, a new study finds.

A team of scientists and clinicians led by Molly Morris of Ohio University has discovered that a technology called wavelet analysis can take detailed snapshots that reveal the level of asymmetry in an individual’s fingerprints. The study found that fingerprint asymmetry is a marker of type 2 diabetes in adults. In addition, the team discovered a connection between the irregular fingerprint patterns and patients with type 1 diabetes.

The use of fingerprints to diagnose diseases is currently an active field of medical research, but this study is the first to efficiently measure fluctuating asymmetry in fingerprints—which are differences in fingerprints between the corresponding fingers on the right and left hands—and show that it can be used to predict a person’s risk to develop diabetes.

The new study compared a ridge-counting technique with wavelet analysis and found that the latter approach provided a more accurate, detailed assessment of fingerprint asymmetry.

“The wavelet method takes a very global approach to comparing how similar two fingerprints are,” said Morris, a professor of biological sciences. “Wavelet analysis is almost like taking a picture of your fingerprint. It’s a more sophisticated analysis.”

The research, funded by Ohio University, recently was published in the Journal of Diabetes Science and Technology. To gather data for the study, Morris and Jay Shubrook, at the time a faculty member in the Ohio University Heritage College of Osteopathic Medicine and now with Touro University California, recruited 340 adult patients. Of those, 200 had been diagnosed with type 2 diabetes and 57 other subjects had type 1 diabetes. Fingerprint were taken and then analyzed by counting the number of ridges on the fingers and by using wavelet analysis.

Bjoern Ludwar, an electrophysiologist with Longwood University and a former Ohio University postdoctoral fellow, had suggested the wavelet analysis method, which can represent the fingerprint image as a short string of numbers. This process can help researchers assess the asymmetry of the patient’s fingerprints more accurately than other methods, even when the fingerprints are rotated at different positions, he explained.

“Wavelet analysis is almost like taking a picture of your fingerprint. It’s a more sophisticated analysis.”

Current methods of diagnosing diabetes rely on physical signs of disease progression or expensive genetic testing.

“We really need to become better at addressing diabetes mellitus upstream—the earlier we can find people at risk, the more we can do to take action to help prevent these diseases,” Shubrook said.

Because an individual’s fingerprints are set at birth, they can provide a very early indicator for the propensity to develop diabetes, the team noted. Fingerprint are influenced by both genes and the environment, which could explain why the method was more accurate than genetic testing, the researchers added.

Ludwar plans to optimize the method to make the process available for commercial use, as the team hopes to create a mobile app that could identify at-risk individuals before they develop symptoms.

The researchers have filed for a provisional patent on the method. In addition to focusing on enhancements to the technology, in the next phase of the research the team will gather fingerprint data from a second, more ethnically diverse pool of patients in California, Morris said. The team hopes to recruit about 300 individuals, half of whom will be patients over the age of 40 without type 2 diabetes to broaden the control groups tested.
Coping Strategies

Medical resident Bridget Lombard, left, and playwright Merri Biechler, right, participate in an exercise in the Integrated Mind-Body Medicine Program.

story by
CORINNE COLBERT

photos by
JANE COWAN
HERITAGE COLLEGE OF OSTEOPATHIC MEDICINE
Joe Bianco and Tracy Shaub were worried. It was 2005, and the two faculty members in Ohio University’s Heritage College of Osteopathic Medicine were watching their medical residents in the family practice clinic grow increasingly frustrated and burned out from dealing with their largely underserved Appalachian patients.

“The residents were going out of their way to educate them, really trying to help them,” says Bianco, assistant professor of social medicine. “And the patients were coming back saying, ‘Nah, I didn’t do that.’ The residents were saying, ‘I’m doing all the work; they don’t care’—it’s demoralizing after a while.”

Bianco and Shaub already had noticed that their patients were challenging—not only in a tendency to not take medications or make lifestyle changes, but also in the sheer magnitude of adversity in their personal histories.

“When you asked them about their early lives, there was a lot of poverty and with poverty comes a lot of adversity,” says Bianco. “But it was more than that—it was a ton of adversity and lots of trauma at different levels. It was, ‘Yes, then I was in this foster home where I was molested and later, after that, my birth mother died right in front of me.’ And it went on and on.”
There was a medical link between their patients’ traumatic histories and their treatment noncompliance. The Adverse Childhood Events Study, conducted by Kaiser Permanente in the mid-1990s, found that adults who experienced chronic stress during their childhood—ranging from living with a mentally ill parent to experiencing sexual or physical abuse—were more likely to smoke, use alcohol or drugs, or overeat, and thus have higher rates of depression, heart and lung diseases, cancer, and early death.

And the reason those adults make poor lifestyle choices? They are wired that way from childhood trauma. “Seventy-five percent of brain growth occurs outside of the womb,” Bianco says.

When that brain is subject to constant stress, it focuses only on developing vital functions—like talking and walking—and skips what it considers less important.

“Higher functions—planning, memory, being able to reason things out—those things don’t get developed well,” says Sue Meeks, R.N., manager of the Heritage College’s Family Navigator program. “And there’s nothing that says that at age 18, they suddenly learn how to do all that.”

Moreover, those children are hard-wired to be hyperaware of threats—real or imagined.

“They don’t have to be jumped by someone with a gun or face a real physical threat. It could be someone yelling at them,” Bianco says.

The result: Adults who may fly off the handle when told their doctor’s appointment has to be rescheduled. Or who can’t seem to keep track of their medications. Or who see no point in changing their eating habits, because their life experience tells them that nothing ever changes.

So Bianco and Shaub knew why their patients were so difficult: “The slow accumulation of mini-trauma that no one would diagnostically call trauma that was woven into a person’s physiology,” Bianco says.

The question was: What could be done to help residents cope?

**MIND OVER MATTER**

Fast-forward six years. It’s 2012, and The Ohio Department of Medicaid has launched the Medicaid Technical Assistance and Policy Program (MEDTAPP), bringing together universities and state agencies to research ways to improve the efficient and effective administration of the state’s Medicaid program. One such MEDTAPP project is the Healthcare Access (HCA) Initiative, an effort to develop and retain healthcare providers to better serve the Ohio Medicaid population using emerging, interdisciplinary, and evidence-based care models. Using federal funding, the Ohio Department of Medicaid awards MEDTAPP HCA grants to entities such as the Heritage College.

While most other Healthcare Access Initiative-funded projects focus on increasing the number of providers, Heritage College’s project takes a different tack: Making sure that existing providers can handle the unique stresses of working with rural people—based on Bianco and Shaub’s earlier exploration of the Adverse Childhood Events Study.

Their Integrated Mind-Body Medicine Program is an interdisciplinary, all-levels method that combines an understanding of patients’ trauma with tools to reduce the stress those traumas induce in their healthcare providers. The expected result is a system of medical practices based in trauma-informed care—a treatment framework that focuses on providing an empathetic and safe environment for patients who have experienced trauma. While trauma-informed care is widely implemented in behavioral health and social service agencies, Bianco believes that the Heritage College may be unique in applying it in primary care.

**BEYOND THE CLASSROOM**

Since the initial grant was awarded in 2012, the Integrated Mind-Body Medicine Program has received two Healthcare Access Initiative renewals, giving it funding through June 2017. The project now includes Meeks, who modified Bianco’s curriculum for nurses and office staff; Dawn Graham, an assistant professor of social medicine and clinician at Counseling and Psychological Services who conducts mind-body training now that Shaub has moved to the Cleveland campus; and Merri Beechler, a playwright who will use her drama skills to help students and providers improve their communication skills.

“Each person we bring in makes it more than what we envisioned and makes it better,” Bianco says.

The expanded staff has allowed the program to reach beyond residents to entire medical offices, which is vital to achieving Bianco’s...
vision of trauma-informed care practices. “A whole organization is dealing with this patient population,” Graham says. “The provider, the ultrasound tech, the front line staff, the billing person—everybody’s walking around with their own stuff, added to the triggers of our patient population.”

The first medical office to receive training was OhioHealth O’Bleness Hospital Athens Medical Associates Obstetrics and Gynecology, which has 22 staff members and eight doctors who see up to 2,500 patients a month. “My staff has multiple things facing them every day—pregnancy loss, fetal malformations, patients yelling at them, patients’ families fighting in the lobbies,” says practice manager Pam Born, R.N. “Plus the stuff they’re dealing with on the outside of their lives. Sometimes they’re crying uncle: ‘I can’t do this anymore.’”

Through the Integrated Mind-Body Medicine Program training, everyone from the receptionist to the most senior physician learned how to better cope with their stressful work environment. “I see them using these things on a daily basis,” Born says.

Born’s observations echo end-of-training surveys from residents about the training. “The concept of trauma and learned helplessness really helped with understanding why (patients) are this way,” wrote one resident.

“The technique that I have learned from these group sessions was very helpful,” wrote another. “Not only has it increased my knowledge, I will try to apply them on myself and share them with my patients.”

That last part—sharing techniques with patients—may not be a goal of the Healthcare Access Initiative, but it is definitely on the Heritage College team’s agenda.

Stressed-out physicians, nurses, and office staff definitely affect their patients, Graham notes. “As a patient, my provider may be disengaged or curt,” she says. “They may drive away patients—if you have a choice between groceries and the doctor’s office, and you know you won’t have a meaningful conversation with the healthcare provider, you won’t go there.”

A trauma-informed office, in contrast, is healthier for healthcare workers and patients alike. And that, in the end, is what Bianco and Shaub are hoping for.

“We’re hoping at some point that these things create an environment where patients can say, ‘This is an environment where I feel safe,’” Bianco says.
In a new book, communication scholars examine what happens when entertainers reveal health conditions—and how it impacts the public.

When a celebrity has a health crisis, it’s always news. In our saturated media environment, it’s nearly impossible not to know that Angelina Jolie had a preventive double mastectomy, or that Charlie Sheen is HIV-positive, or that Robin Williams’ suicide was a result of a rare form of dementia. Such revelations can put organizations that promote awareness of particular health issues into the spotlight and provide hope and inspiration to millions of fellow sufferers. But the combination of fame and illness can create challenges for the celebrities themselves, says Christina Beck, professor of communication studies at Ohio University.
by CORINNE COLBERT

illustrations by
ALIX NORTHRUP
Seeing the give-and-take between celebrities and their fans was rewarding for co-author Chapman, who—like Ruhl and Simmons—were Ohio University graduate students when they worked on the book. “Reading how vulnerable strangers were on public blogs and social media spaces, in light of what a celebrity tweeted or posted in their blog, was very moving,” says Chapman, now teaching online communications courses from Guangzhou, China. “Each celebrity gave hundreds of people hope and support to continue their health journey in a positive way.”

Others are more reticent about their disclosures. Actress Catherine Zeta Jones might never have told the world about her struggles with bipolar II disorder if an employee at the Connecticut hospital where she sought in-patient help in 2012 had not alerted the National Enquirer. Zeta Jones confirmed her illness and made statements encouraging others to seek treatment, but she did not become an activist in the same way that Fox did or reveal personal details as Burke-Charvet had.

In a new book, Beck and co-authors Stellina Aubuchon Chapman, Stephanie Ruhl, Nathaniel Simmons, and Kelly Tenzek explore the public-yet-private nature of celebrity health revelations. Each chapter of Celebrity Health Narratives and the Public Health takes on a different topic—usually an individual celebrity’s issue and how he or she announced it—and then looks at the responses of fans, often on social media, by applying the theory of communication privacy management. Developed by Sandra Petronio in 1991, the theory describes the process by which individuals decide how much of their private information to share and with whom they share it.

“We guard our privacy,” Beck explains. “We have particular boundaries. I decide what I want to disclose to you based on the possible benefits. Revealing information about ourselves to others enables us to connect more with them.”

What applies between individuals applies between a celebrity and the public, Beck says, because the familiarity of fame makes actors, athletes, musicians, and TV personalities seem like friends. “You see someone on TV, you feel as though you know them,” Beck says. “If you follow them on Twitter and they ‘like’ your tweets, it’s more like a relationship.”

The authors contend that this sense of relationship creates a co-narrative shared by the celebrity and the public. Just how that co-narrative forms is the book’s primary subject. “My personal story becomes our story because I have expanded these boundaries,” Beck says.

Some celebrities embrace that sense of personal relationship. TV host Brooke Burke-Charvet announced her diagnosis of thyroid cancer in a personal home video posted on her blog and Facebook page. Fans responded by sharing their own stories, posting extremely personal health details and even inviting Burke-Charvet to speak privately to them if she had any questions.

“When a celebrity decides to share, they decide, ‘Is it worth it to give up my privacy to put this out there?’”

CHRISTINA BECK
professor of communication studies

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That disappointed and upset many, who felt she was shirking a responsibility, says co-author Simmons. “It was fascinating to me that people were basically saying, ‘I made you and I own you. Tell me your deepest darkest secrets. This is your job,’” he says. “As a communication nerd with an interest in privacy boundaries, I found it fascinating how others lay claim to information that our culture claims individuals can own and conceal.”

Not all chapters focus on individuals, though. For a chapter on celebrity deaths, co-author Tenzek, a 2006 Ohio University alumna in communication studies, asked college-age students about social media and celebrity death stories using online open-ended questionnaires. She discovered that students not only followed news about such events on social media, but also used them as springboards to talk about difficult issues – drug and alcohol abuse, mental illness, suicide – with friends and family.

“I loved that chapter – how they used the opportunity to talk with their families about these issues,” Beck says. “It could warrant more research.”

Indeed, she notes, the topic of celebrity health narratives offers numerous research possibilities. For one: What impact do celebrities have on research priorities? Celebrities or their surviving families often launch foundations to raise funds for research: Jimmy Valvano’s V Foundation for Cancer Research; soap star Michael Zaslow’s ZazAngels, focused on ALS; and the Elizabeth Glaser Pediatric AIDS Foundation, to name a few. Celebrities also take their concerns to Capitol Hill, testifying before Congress on the need for federal support for research into Parkinson’s disease (Fox), spinal cord injuries (Christopher Reeve), type 1 diabetes (Mary Tyler Moore), Crohn’s disease (Mary Ann Mobley), and various forms of cancer (Gene Wilder, Katie Couric, Lynda Carter, Lance Armstrong).

“As we close this book, we commend these efforts but also wonder about long-term policy decisions that might be impacted by this ‘disease of the week approach,’” the authors write in the conclusion.

Simmons is planning his own research project. Now a communication faculty member at the all-online Western Governors University, Simmons confesses he was never much of a celebrity watcher. But working on the book heightened his awareness of the impact celebrities can have on major societal issues.

“While working on this project, I began noticing celebrity LGBTQ coming out narratives,” Simmons says. “I’ve collected hundreds over these last four years and am just now finding time to start analysis. Dr. Beck always says, ‘Never let data die!’ She’s right. Yes, it might take a while because there’s life and then there are logistics, but perseverance pays off.”

Beck, however, won’t be returning to celebrity health narratives anytime soon. She didn’t begin her career intending to specialize in health communication; her first love was television, particularly soap operas. Her master’s thesis was about soap opera couples.

And she’s finally back to where she started, working on a book about soap opera fans. “Celebrity Health Narratives was a nice gentle way of easing back into what I love,” she says.
GERARDINE BOTTE PROMOTES THE POWER OF ELECTROCHEMICAL ENGINEERING TO ADDRESS ISSUES RANGING FROM WASTEWATER TREATMENT AND ALTERNATIVE ENERGY TO NOVEL WAYS TO MANUFACTURE PRODUCTS.
Distinguished Professor Gerardine Botte, center, is internationally recognized for her research in electrochemical engineering. With assistance from Ph.D. candidate Ali Yazdani, left, Botte teaches Ohio University students how to analyze electrochemical systems, such as through experiments designed to produce hydrogen and oxygen from water.
Her concept of using specialized engineering processes to convert urine into fuel and clean water captured the attention of fellow researchers—as well as the public.

It wasn't just the catchy name, but the promise of the invention's potential applications. Botte has explored how the technology could be used to treat wastewater from agricultural operations or create alternative fuel sources, among other ideas.

But the Ohio University professor's quest is even bigger than this. She firmly believes that the engineering technology behind "pee-to-power" can revolutionize her field. She's one of fewer than a dozen researchers around the globe focused on using a process called electrolysis to transform products and processes. In addition to converting wastewater to clean water and energy, Botte's group is exploring novel ways to manufacture graphene—a highly prized material—from coal.

"My goal is to transform the chemical industry—and that's a big goal," says Botte, the Russ Professor of chemical and biomolecular engineering and Ohio University's 2015 Distinguished Professor.

Botte wants to change the way chemicals are manufactured, making the process cheaper, less complex, and more sustainable. Although she didn't set out to shake up the chemical industry when she started in academia in 2002, she says she found that she's in the right place at the right time—given the availability of new technologies and the current industry needs—to try.

For more than a decade, she's been building capacity at Ohio University to do that. She founded the Center for Electrochemical Engineering Research (CEER), attracted government and industry funding, worked with the Technology Transfer Office to patent and license her inventions for commercial development, and has cultivated a large team of students, postdoctoral fellows, technicians, and fellow researchers who can tackle multifaceted industry problems.

Colleagues note that Botte's focus on applied research and working with industry has helped energize students and scholars excited by the opportunity to move academic innovations out into the world.

"The approach that the center takes is to look for opportunities that not only expand knowledge but apply it to actual problems," says Damilola Daramola, assistant director for technical business development at CEER and a former graduate student and postdoctoral fellow.

(Continued on page 27)
“My goal is to transform the chemical industry—and that’s a big goal.”

GERARDINE BOTTE

Yuxuan Wang, facilities and instrumentation manager at CEER, operates the facility’s transmission electron microscope, which can provide images up to one millionth of the size of a pin head.
Natalie Tzap, an undergraduate student researcher at CEER, examines an electrode catalyst for an experiment. CEER offers hands-on research opportunities for both undergraduate and graduate students.
CEER fabricates electrode catalysts in different dimensions and shapes for various experiments. Zhe-fei Li, a catalyst scientist at CEER, collects experimental data.

One of CEER’s strengths is its modeling expertise and facilities. The CEER team can illustrate relevant chemical processes for graphene, ammonia, urea, and nickel hydroxide. Dongmyung Suh, mathematical modeling scientist, and Ali Estejab discuss a computational model.
Ph.D. candidate Hamed Bateni sets up an experiment to fabricate an electrode catalyst for the synthesis of ammonia.
In the last two years, Botte has pursued several major new initiatives to achieve that goal. She moved CEER to a former manufacturing facility in Athens to allow room for the center’s multiple research projects, scientific equipment, and growing team, as well as to accommodate industry visits and meetings. With a grant from the National Science Foundation, Botte established an official industry-university cooperative research center, called CEProTECH, which allows her team to work more easily with industry partners to solve their research problems. In addition, a grant from the National Institutes of Standards and Technology paved the way for Botte’s creation of a new consortium of chemical company partners that is identifying pressing industry needs and mapping out the research to address them.

“It’s interesting because electrochemistry is not well known except for niche areas of industry, so we’re educating a lot about how it can be applied to advanced applications in new ways,” says Lisa Rooney, who served as CEER’s industry liaison from 2012 to 2016, about the latter project.

Electrochemistry is an old science, Botte says, responsible for building batteries or creating products such as aluminum foil. But she’s trying to disrupt that notion by showing how new scientific concepts and materials could be used for and benefit from electrochemistry.

Although the new building and scientific equipment are important tools, Botte emphasizes that CEER’s biggest strength is the interdisciplinary team that can pull together expertise in areas such as materials, chemistry, characterization, and modeling. Industry needs teams like these that can quickly examine a problem from all angles, she notes.

Rooney also cites the center’s specialized research expertise, industry focus, and Botte’s international reputation as an expert in the field as other drivers of its success.

“She’s become such a superstar, which has helped us along the way,” Rooney says. “Now it’s more selling what we can do and how we can do it.”

Whether she’s talking to elementary school science classes or corporate CEOs, Botte says she has been pleased that she’s been able to convey the message about the power and promise of electrochemical engineering to a wide audience. Botte is motivated to change things for the better, she notes.

“I find that I really enjoy implementing a vision,” she says. “It makes me really happy.”

“She’s become such a superstar, which has helped us along the way. Now it’s more selling what we can do and how we can do it.”

Lisa Rooney
the legend of Tammy Faye

THEATER TROUPE REVISITS THE LIFE AND PASSIONS OF THE LATE TELEVANGELIST TAMMY FAYE MESSNER

story by ANDREA GIBSON


(Right) Delaney stars as the late televangelist Tammy Faye Messner in the Brick Monkey Theater Ensemble production in Athens in January 2016.

PHOTOS: (ABOVE AND RIGHT) MAGDALENE GRUBE
he day before her death, Tammy Faye Messner gave an interview to CNN's Larry King. The one-time queen of a televangelism empire was visibly marked by cancer, her face gaunt and her voice a hoarse whisper, but she still wore her signature makeup and brightly colored clothing. Although she struggled to speak, she was determined to share her commitment to her Christian faith with American viewers one last time.

Messner passed away in 2007, but video of that final television appearance—alongside many more clips of a jubilant, dazzling Messner in her prime as the co-host and founder of the Praise the Lord Network (PTL) with her then-husband Jim Bakker—still lives online. Actress Shelley Delaney saw the interview when it was originally broadcast and never forgot it. The clip, as well as a more recent read of Messner's autobiography, prompted Delaney to wonder about what drove Messner to get in front of the camera time and time again, from the height of her cable television career to her very last hours.

Tammy Faye also is relevant to today's audiences, as she presaged our

“On a deeper look, there was something very authentic about her in an inauthentic environment,” Delaney notes. “She had a compulsion to be witnessed and a compulsion to witness.”

When playwright Merri Biechler invited Delaney and friends to vote for the topic of her next piece, the actress stuffed the ballot box—it had to be Tammy Faye. The duo marshalled their Ohio University colleagues, fellow founders of the Brick Monkey Theater Ensemble, to join them on a journey to uncover the legendary woman. Their creation, Tammy Faye's Final Audition, appeared in fringe festivals in Cincinnati, Washington, D.C., and New Jersey in 2015. The play was staged in Athens in early 2016 and is part of the inaugural summer 2016 season of Ohio University's Tantrum Theater in Dublin, Ohio.

A WOMAN REVEALED

Tammy Faye and Jim Bakker rose to fame in the 1970s and 1980s through televangelism, which brought the power of the church pulpit directly into Americans’ living rooms. With her bubbly and charismatic banter and song, dramatic black eyelashes and baubles, she was a singular personality on the small screen. Her husband’s sex scandal and financial troubles in the late 1980s ended their PTL empire, however, placing the couple under public scrutiny and eventually sinking their marriage. Tammy Faye Bakker remarried in 1993 (taking the name Messner) and moved on with her career, but it’s the image of her from the 1980s—the big hair, the glittering shoulder pads, the charming television host—that remains iconic.

Although Biechler was concerned that audiences under 35 wouldn’t know Tammy Faye Messner—and indeed, some don’t—she quickly found after the first reading of the play that the woman’s story resonated with people of all ages, whether they were familiar with the original events or not.

Biechler, Delaney, and other members of the ensemble spent hours reading about Tammy Faye and watching video footage of her life to understand and identify themes and motivations. Although Tammy Faye enjoyed a remarkable career, the ensemble has focused on her more universal human elements: her genuine faith and her drive to succeed, coupled with struggles with her public identity and feelings of doubt that she was doing all she could.

“What does it mean to have questions about who you are and whether you will be judged?” Biechler asks.

Tammy Faye's Final Audition imagines the televangelist in her final years, grappling with her mortality and reflecting on her experiences. Through flashbacks and dream sequences, the audience watches Tammy Faye interact with four key men in her life: Jim Bakker, her second husband Roe Messner, her son Jay Bakker, and the actor Jim J. Bullock, with whom she hosted a talk show in 1996.

The connections between those men needed to be clear, says Delaney, who plays the title role. Brick Monkey's solution was to cast one actor, David Haugen, in all four parts. Haugen says that he's strived to do justice to these very different figures.

“How do you capture something about these real people and make it appropriate for the stage so it isn’t an imitation or caricature, and show how they add to the story?” he asks.

Delaney describes Tammy Faye as someone in search of answers and who at some points struggled with the public persona she had worked hard to create. The actress is still seeking to understand the character’s inner struggle, she says.

“Tammy is out on a limb, and I can’t do it if I’m not also out on a limb,” she explains.

The play’s director, Dennis Delaney, notes that the narrative structure of the play is reminiscent of the Dickens classic A Christmas Carol, in which the central character ponders what he did well in life and how he could have done more. Brick Monkey Theater Ensemble has produced its own take on that story—set in an Appalachian coal mine in 1907—that's attracted big audiences in Athens the last several holiday seasons.

Tammy Faye also is relevant to today's audiences, as she presaged our
modern obsession with constantly documenting our lives and sharing them publicly. Shelley and Dennis Delaney both note. “What was the driving need to be seen?” Dennis Delaney asks. “That’s certainly a reflection of our culture today. Everything needs to be photographed or recorded or it’s not real. We’ve all become Tammy Faye—we can’t stand to go two minutes without posting about what we are eating and what we are wearing.”

SETTING THE SCENE

Lips of the PTL Club from 1985 show Tammy Faye interviewing her guests from a plush living room couch; oil paintings, silk flower arrangements, glass coffee tables adorn the television soundstage. But audiences of the early productions of Brick Monkey Theater Ensemble’s Tammy Faye’s Final Audition saw Tammy in a much more stripped-down setting. The ensemble debuted the show at Cincinnati and Washington, D.C., venues that require a low-tech approach, such as a few small pieces of furniture that easily can be swapped off the stage, Dennis Delaney explains.

For these early shows, sound design was key. In addition to gospel recordings, Dennis Delaney used Tibetan bells to connect the scenes, looping and echoing the sound. For future shows, Delaney and set and costume designer C. David Russell plan to create a more detailed traditional set design, though Russell pledges to keep it flexible so the show can be crafted for a variety of theatrical venues. As for the costumes, Russell relished diving into the details of Tammy Faye’s signature look. After researching the televangelist’s sartorial choices from the 1990s, the designer focused on “shocking pink” and animal prints, sketching new creations for colleague Cassandra Paine to build. Other clothes were purchased or found in stock. “Because this is a fantasy piece, it’s an idealized image of how she saw herself at that point,” Russell explains about his approach.

In addition to the clothes and jewelry, the wigs for Delaney had to be perfect. Russell called Mitch Ely, an alumnus in New York City who had done work for Broadway and cable television, to handcraft the famous hair. Although it was fun to replicate the Tammy Faye look, Russell was careful to work with Shelley Delaney to create something functional on stage, and costumes and wigs that “wouldn’t consume” the actress. “I was looking forward to the hair and makeup at the beginning because I knew it was part of the key to Tammy Faye, and it has become essential to the process,” Delaney notes. “That said, it’s kind of strange to put on that much makeup and realize that she wore it every waking hour of every day.”

REATIONS

The production, Tammy Faye’s Final Audition, has garnered positive press in the cities where it’s been produced. Dennis Delaney has watched how the heartfelt and the comic moments have registered with audiences. “This show is essentially a drama,” he says. “It happens to be naturally funny, but that’s not the primary tone of the piece.”

Various members of the Brick Monkey Theater Ensemble note that other fictional portrayals of Tammy Faye have satirized or even villainized the televangelist, but their show is determined to honor the complicated, fascinating woman embedded in the public figure. They stress that Tammy Faye’s sincerity and genuine passion for her faith and her followers, as well as her humor and willingness to be different, as some of the facets of her personality that keep them and their audiences enthralled. “What I really love is that the play has a lot of heart,” Russell says. “It’s uplifting in a surprising way, more so than I thought it would be.”
INNOVATIVE SOLUTIONS

STORY BY
ANDREA GIBSON

2016 INNOVATION STRATEGY WINNERS
Interesting things happen when artists connect with scientists, engineers work with healthcare professionals, and media technology experts meet paleontologists. These partnerships not only can generate novel ideas, but may devise that unusual solution to a problem that has stymied any one scholarly field.

Ohio University has launched a major new initiative that offers its faculty and staff a vehicle for moving beyond academic silos and into these prized cross-campus collaborations. The Innovation Strategy program has energized the university community with opportunities to create new interdisciplinary connections. The university has designated funding to provide those diverse teams with the equipment, resources, staff, and tools needed to bring creative ideas to life.

During the 2015-16 school year, Ohio University awarded more than $4.5 million to 16 teams seeking to advance innovations in research, teaching, creative activity, and institutional operations. The majority of the funding has been designated for four groups who are developing an improved diagnostic tool for osteoporosis, a system for incubating and hatching novel classroom teaching methods, a strategy for keeping more jobs and revenue from the shale industry in Appalachia, and a new immersive media program that will support research and creative work in virtual and augmented reality technologies and prepare students for this fast-growing field.

The university also has provided grants to help 12 teams further develop their concepts for future funding. Those teams are working on projects that range from a diabetes needs assessment in southeastern Ohio to an initiative to monitor the environmental conditions of hydraulic fracturing operations and report the data to the public.

The following snapshots of the four major award-winning teams show how the Innovation Strategy is uniting faculty, staff, and students from a wide range of fields to find new ways to tackle problems and seize opportunities.
THE PROBLEM: Measuring bone mineral density is the primary tool used for diagnosing osteoporosis, but Ohio University scientists note that this method is actually a poor predictor of which patients will experience osteoporosis-related bone fractures. One study has shown that 96 percent of women diagnosed with osteoporosis did not fracture, while 81 percent of women who suffered fractures had been diagnosed as not having the condition. Although clinicians are aware of the current system’s flaws, “there’s no medical device to replace it,” said Anne Loucks, an Ohio University professor of biological sciences.

THE INNOVATIVE STRATEGY: An Ohio University team has made improvements to a technique that uses vibrations to measure bone stiffness, a better marker of bone strength than mineral density. Researchers are developing an advanced prototype of a device that shakes a probe against the arm to determine the patient’s likelihood of developing osteoporosis bone fractures. The team is creating a companion software system that will talk to the medical devices in their clinical settings, gathering data to help doctors make more accurate diagnoses.

THE TEAM: The team is led by Brian Clark, who is seasoned at working with interdisciplinary teams at the Ohio Musculoskeletal and Neurological Institute, where he serves as executive director. Loucks, a physiologist with expertise in bone health, and Lyn Bowman, a research scientist with a background in engineering, have worked with physical therapists and biomedical engineers to test and improve the bone stiffness device over the last few years. The Innovation Strategy program prompted the core team to bring in other expertise, such as an electrical engineering and computer science professor who can help perfect the software system and entrepreneurs who have suggested revamping the business model for the product.

THE VISION: The team hopes to create a more accurate system of determining which adults are most at risk for osteoporosis-related bone fractures in order to get treatments to the right patients and reduce healthcare costs.
THE PROBLEM: Appalachia may be enjoying the economic benefits of the shale industry now, but a team of Ohio University engineers and public policy experts is concerned about the fate of the region once the extraction of those natural resources is over.

THE INNOVATIVE STRATEGY: The team will explore ways to keep more jobs and revenue from the energy industry in Appalachia and prepare the workforce and communities for life after the shale boom. Engineers are developing technologies to increase the amount of natural gas that companies can extract from shale; that can separate components of natural gas at the drilling site for use in other applications such as in the plastics industry; and that can convert wastewater from the hydraulic fracturing process into clean water on site, reducing the need for companies to transport and store wastewater. Other engineers are developing tools to monitor greenhouse gas emissions from hydraulic fracturing sites. Public policy experts will examine the manufacturing climate and public and economic development policies that can stimulate the regional shale industry. In addition, they will explore financial and economic development strategies that can be used to reinvest wealth generated by the shale industry boom in Appalachian communities.

THE TEAM: The team includes engineers from the Russ College of Engineering and Technology, public policy experts from the Voinovich School of Leadership and Public Affairs, economists, and colleagues from other universities and industry.

THE VISION: “We’d like to make the benefits of the shale industry not fleeting but more lasting so that if the shale market changes, we’ve created value that has a permanence, richness, and depth that can transcend the boundaries of shale,” says Mike Zimmer, an executive-in-residence at the Voinovich School.
THE PROBLEM: Higher education institutions can be conservative and cautious about classroom innovations—and often for good reasons—but also realize that they must explore new models, according to Bradley Cohen, senior vice provost for instructional innovation. Universities face challenges such as helping high-risk, first-generation college students navigate courses with high drop rates; assisting faculty with video conferencing or flipped classroom models to teach low-enrollment courses across multiple campuses; developing courses that focus on mobile technology; or using technology to offer students different types of global immersion experiences.

THE INNOVATIVE STRATEGY: Faculty and administrators are exploring whether the type of system popularly used to help entrepreneurs launch start-up companies also could help faculty members to cultivate novel methods for teaching and education. In the Academic Innovation Accelerator, a cross-campus team of faculty members will help other academics shape and develop their ideas for possible investment from a team of deans and senior administrators. Unlike models at other U.S. schools, the Ohio University initiative focuses on fostering academic innovation ideas in-house that can be applied widely across the institution.

THE TEAM: The Academic Innovation Accelerator, led by Cohen, has attracted broad involvement from the faculty and deans of Ohio University’s academic colleges, as well as senior administrators involved in implementing curricular changes.

THE VISION: “So many times as faculty we have ideas we’d like to try out, but too often those ideas never make it out of the garage because we anticipate roadblocks or the lack of resources necessary to move forward,” said Linda Rice, a professor of English involved with the project. “The accelerator, as its name implies, really is to provide an increased fluidity, to mitigate or remove some of the risks and barriers, to help ideas turn into actionable plans and real-world projects and experiments.”

(Above) Charlie Morgan, assistant professor of sociology, uses team-based learning strategies in this classroom setting.

PHOTO: BEN SIEGEL
THE PROBLEM: Companies in many industries—from media and entertainment to tourism—are investing billions of dollars in virtual and augmented reality technologies. They're eager to find professionals with the expertise and skills to work in this burgeoning field.

THE INNOVATIVE STRATEGY: The Immersive Media Initiative is developing a new curriculum and hands-on research and creative projects for Ohio University students to gain the experiences they need to enter this fast-growing industry. The initiative already has involved students in 360-degree video shoots to create short fiction films and immersive emergency training experiences for medical students. This summer the first student cohort is working with WOUB Public Media to bring virtual and augmented reality tech to its regional news coverage. The initiative also will partner with faculty across Ohio University to examine how immersive media could be used for projects such as reducing anxiety in blood donors, helping patients recover from low back pain, training healthcare professionals, offering virtual visits to paleontology field sites and museums to explore fossils, and remotely connecting humans and robots.

THE TEAM: John Bowditch, an instructor in the School of Media Arts and Studies and director of The Game Research and Immersive Design (GRID) Lab, is leading the cross-campus, interdisciplinary effort, working closely with Josh Antonuccio and Eric Williams in the School of Media Arts and Studies to spearhead efforts to create a formal immersive media program. They will work with colleagues in the Scripps College of Communication, Heritage College of Osteopathic Medicine, College of Health Sciences and Professions, College of Arts and Sciences, Russ College of Engineering and Technology, and Patton College of Education on research and creative projects that utilize virtual and augmented reality technologies.

THE VISION: The Innovation Strategy team seeks to create a nationally prominent immersive media training pipeline for Ohio University students interested in this emerging industry. The students can work with faculty in disciplines ranging from medicine and paleontology to engineering to integrate virtual and augmented realities into their research and educational projects. Bowditch notes that “as far as higher education goes, we’ll be a leader in the pack in this field. That’s going to be huge for this university.”

The Immersive Media Initiative team seeks to create a nationally prominent immersive media training pipeline for Ohio University students interested in the virtual reality industry.

(Left) Eric Williams, center, discusses production of a 360-degree film with students and colleagues in the Immersive Media Initiative’s new motion capture studio in Scripps Hall. (Above) The initiative’s GRID Lab also offers students experience with computer animation and interactive digital media technologies.

PHOTOS: BEN SIEGEL
The science, technology, engineering, and math (STEM) fields have faced challenges with attracting students from historically underrepresented groups. To address the issue, an Ohio University student is evaluating a scholarship program that was designed to draw more Appalachian students into STEM careers, and, in the future, could be used to recruit and retain other underrepresented groups.

For the past four years, the Appalachian Cohort of Engineering (ACE) program has supported a group of eight to 12 Appalachian students per year to enroll in the Russ College of Engineering and Technology and given them tools to help them succeed. Mica Smith, a Voinovich School of Leadership and Public Affairs Undergraduate Research Scholar, has been monitoring and evaluating the program to determine its efficacy.

Smith is majoring in Spanish and political science, while also studying Arabic and earning a Teaching English to Foreign Learners certificate. She has a unique understanding of the ACE students: Smith is a native of Portland, Ohio, a small township in rural Meigs County.

The ACE program is no ordinary scholarship. While most programs simply give students money, the ACE program requires the students to attend weekly peer-mentoring sessions, as well as several different monthly meetings.

Students also have access to pre-enrollment summer programs, and instruction and mentoring in entrepreneurship.

Holly Raffle, associate professor at the Voinovich School, says ACE is unique in how it’s designed for students to reciprocate their scholarship with time, effort, and feedback. Raffle heads up the ACE program evaluation team on which Smith serves as the lead undergraduate student researcher.

“We want to help them through their transition from high school to college, which is difficult for a lot of students, but particularly Appalachian students who have always lived at home, close to family, in the same general location ... and are just not used to not being around that family support they’ve always had,” Smith says.

Smith conducts interviews with the freshmen and with faculty, as well as focus groups with the juniors. She will conduct exit interviews with the program’s first batch of graduating seniors. Using her findings from the interviews, Smith and her colleagues suggest ways to rework the program on a continual basis so it evolves to cater to the students’ needs.

The team also compiles its findings into formal reports, which have been submitted to the National Science Foundation and a 2015 mentoring conference at the University of New Mexico, where the team presented its results.
Chemistry students test river for nitrate levels

Nothing causes panic like a water problem in a major city. For two Ohio University students, a recent nitrate advisory in the Columbus area gave them a chance to test their scientific research skills on a real-world problem.

Chris and Nate Frazier were students in Shadi Abu-Baker’s general chemistry class at the Ohio University Zanesville campus when the issue of regional water safety made news. The brothers joined Abu-Baker in the field to measure nitrate levels in the Muskingum River.

“Nitrate is a major component in commercial fertilizers used in crops and agriculture going along the river ways down there (the southeastern Ohio area),” Nate Frazier says. “It actually can mess with the plants and the fish populations and the ecosystem as a whole.”

According to the World Health Organization, nitrate runoff into drinking water can cause adverse health effects for humans, especially infants and the elderly. Nitrate in the water has been in the spotlight after the city of Columbus issued its June 2015 advisory.

By comparing their findings to a 2011 EPA report on the water quality of the river, the Fraziers confirmed that the water was fit for human consumption after regular treatment by the city.

Besides conducting legitimate research on a pressing issue, both brothers used the work as a learning experience.

“I found it’s a lot different than what you would think,” Chris Frazier says. “When you think of doing chemistry, you don’t see a lot of the actual applications. Physically getting the water samples and seeing how it relates to reality and the practicality of it really helps you understand it more.”

Nate Frazier agrees.

“One of the good things about research is it combines all the knowledge that you’ve learned so far,” he says. “There’s some chemistry mixed into it, but you also have to understand some physics, some biology as well.”

The Fraziers are working to finish their degrees while continuing research opportunities. In August 2016, the students and their mentor published findings from their project in the scientific journal Green and Sustainable Chemistry. In addition, Abu-Baker has received funding from Ohio University’s 1804 Fund to allow more Zanesville students to participate in water quality testing research.
Most of the public debate in education policy focuses on standardized testing. One Ohio University student, however, conducted research on something she finds equally as important: breakfast.

Sarah Nestor is an Ohio University undergraduate studying early childhood education, and she never skips breakfast. During her freshman year, it occurred to her that missing the first meal of the day could have adverse effects on elementary school students, so she put her theory to the test in a real classroom.

“I'm interested in how schools can support the development of the whole child,” Nestor says. “I don't think schools should only focus on academics; they should support other spheres: students' emotional, social, and physical well-being. So I really wanted to look into how we support their physical well-being, and one of those is breakfast.”

Nestor separated a class of elementary students into two groups: those who reported that they ate in the mornings and those who skipped breakfast. She found that the breakfast eaters had higher attendance rates, better academic performance, and lower tardiness rates, and also felt better in general. Those who skipped the morning meal complained of headaches, hunger, and fatigue.

At the 2015 Ohio University Student Expo, Nestor's research won an award in one of the teacher education categories. The project impressed Renée Middleton, dean of the Patton College of Education, who decided to take Nestor to Washington, D.C., to present her findings to notable Ohio University alumni.

Although action research is required of honors students, Eugene Geist, Nestor's professor and research adviser, feels all education majors should cultivate the ability to conduct research in real time when they're in a classroom to improve their students' learning experience, he says.

Nestor now is working on new research into effective ways to teach social studies to older students. She said she plans to make her life's work doing anything to innovate learning processes for young learners.

“Down the road, the sky is the limit for me,” Nestor says. “I never settle. For better or for worse, I'm always pushing myself to go further and further.”

Imagine: You're driving down the interstate. It's late at night, there are no lights on the highway, and cloud cover is blocking the stars and the moon. Driving through the valley, the treeline and Appalachian peaks to the right and left knock out your phone's GPS signal. You're lost, alone, and in the dark.

While this may be an inconvenience in your car, the stakes are higher for the military, commercial airplanes, and other public services that all rely on GPS—regardless of its pitfalls. This is a problem Natasha Norris, an Ohio University undergraduate student in the Russ College of Engineering and Technology, has spent the better part of her college life trying to solve.

Norris is working on a receiver with a powerful antenna that can find out what
happens to a satellite signal when it’s interrupted, so GPS receivers can adjust to compensate for the disturbance.

“GPS doesn’t work in all areas, so we need to look at where it doesn’t work and why it’s not working. If you can predict the problem, then you can come up with a solution,” says Norris, whose faculty research adviser on the project is Professor Frank Van Graas.

When GPS is in use, four satellites send signals to a receiving device to calculate location. Three of those satellites are needed to make an estimate of the receiver’s location, while the fourth satellite is used to calculate the time it takes to send those signals. Once the receiver interprets the three locational inputs and calibrates them against the time input, a location is estimated.

Norris’ work focuses on what happens when trees, buildings, or other foliage interfere with any one of the four signals—a phenomenon called multipath. She is working on building a dish that can determine what happens to the signal while it’s being disturbed.

“We’re going to take the high-gain dish and put it under the trees and then collect data for a certain amount of time in different tree settings and then look at what’s happening to the signal,” she says. “If we can characterize the signal, we can create a receiver to correct for those errors and to predict them.”

Along with enhancing GPS, Norris is also working on viable alternatives. One is a magnetic tensor cube. This device, in coordination with a compass, uses maps of the Earth’s magnetic fields and manmade additions to determine location. Her idea is that these cubes could be used as a navigation alternative when GPS fails or enemy forces deliberately jam it.

While she hopes her work can protect American forces at large, Norris does have a personal tie to the matter: Her brother currently serves in the U.S. Army and has completed several tours overseas. According to Norris, he frequently finds himself relying on fallible GPS technology while in the field.

“The world is too reliant upon GPS and it’s actually kind of scary,” she says.

I t’s 7 p.m., one month to opening night for The Penelopiad, and Ohio University Professor David Haugen is working with Zyrece Montgomery on creating the behavior of a spoiled male teenaged brat.

Over the last four years, Montgomery and her friend Luli Gomez have taken classes with Haugen and built a trusting, steady relationship. That relationship will culminate with the debut of Margaret Atwood’s The Penelopiad.

The play, in typical Atwoodian fashion, relies on an unreliable narrator to carry the narrative, with both feminine and marginalized voices telling the tale. The story itself is a familiar one; it’s Homer’s The Odyssey told through Penelope, Odysseus’ wife.

“What’s interesting about this play is that it’s told by women,” Gomez says. “You have Penelope’s side of the story and the maids’, and it’s a constant competition between them. The women have a voice, and we’re really trying to find that in rehearsals.”

In between sets, Montgomery explained some of the challenges of playing a cross-dressing role.

“My character comes from a teenage boy to a young man, so not only am I not a teenager, but I’m not a boy or a young man,” Montgomery says with blunt humor. “So it’s interesting trying to find the gestures, the posture. ‘Do I change my voice? Do I not?’”

Both seniors in the theater program, Montgomery and Gomez have enrolled in Haugen’s classes since they were freshmen. Although this is their first play together, the trio has a dynamic and it shows in their rehearsals.

When directing a university production, Haugen notes that he wears the hats of director and teacher simultaneously. He finds it easy to work with Montgomery and Gomez.

“I give them a few comments and they go do it, because we’ve had a rapport for a number of years now,” he says.

To Gomez, great acting is about letting oneself go, and to do so requires the deep-seated trust the three share.

“There’s been a trust that’s been building since freshman year,” Gomez says. “I think it’s liberating to know that I can—although I’m still trying—let myself go and put myself in David’s hands knowing I’ll be fine.”

Luli Gomez, left, and Zyrece Montgomery, right, perform together in a scene from The Penelopiad.
Coping better
A new mind-body program helps clinicians and medical students cope with stress

A woman revealed
Theater troupe revisits the life of televangelist Tammy Faye Messner

Change agent
CEER Lab tackles industry problems