THE GRADUATE SCHOOL

ANNUAL REPORT 2015
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In 2011, three graduate teaching assistants (TAs) saw a need for training graduate students in teaching and decided to do something about it. Julie Weast, Lori Gresham and Annie Schmidt banded together to found the Graduate Association for Teaching Enhancement (GATE), a student-run organization that has grown from a small training program to a larger resource for TAs who want to have a career in academia. Through cross-disciplinary pedagogical workshops, GATE supports the growth and development of new and continuing TAs to foster teaching excellence at UC.

"[GATE] is all about professional development, passion—there is the development of teaching skills but also this emotional aspect of getting enthusiastic about it—and networking," said Matteo Magarotto, GATE’s 2014-15 president.

Networking is not only key for the job search but also for becoming a better teacher. GATE members and workshop participants spend time with students from many different departments, as well as faculty speakers. This interaction between seasoned faculty, current graduate students and postdocs produces meaningful insight that many TAs and aspiring teachers lack in the beginning of their careers.

"If you are attending a GATE workshop, being able to meet other people in other fields is a huge benefit," said Anna Donnell, current GATE vice president. "You may share a lot of struggles with them and can talk about that and resolve them."

These connections are just one benefit of participating in GATE events. The teaching knowledge and professional practice attendees receive is unparalleled. Not many universities across the United States offer programs that function like GATE does. While most of GATE’s events and resources are aimed towards graduate TAs, all UC students, faculty and staff may attend.

"The idea is also that even if you attend only once, there is a huge difference," said Magarotto. "It won’t train you as an accomplished teacher just because you go once, but it does spark awareness of a world of serious research on pedagogy (the scholarship of teaching on learning) that most people didn’t know even existed."

This scholarship focuses on enhancing learning by meeting the needs of students who vary in learning style. The GATE workshops provide the practical knowledge budding teachers need in order to best reach students—regardless of their field of study. "They’re all workshops that aren’t discipline specific; they can all be applied to everyone," explained Donnell.
Workshops like “Get Up and Go”—a workshop for TAs facing their first teaching assignment—offer new TAs insight on topics like classroom management, student motivation and dealing with real classroom situations. At the end of each semester, GATE offers “Teach Me to Teach,” a full day of pedagogical training and career advice. Featuring two graduate student presenters, two faculty presenters and an undergraduate student panel, this workshop is an opportunity for TAs to immerse themselves in teaching methods, activities and honest conversations with faculty and students.

Magarotto explained that the teaching training received at GATE workshops is desperately needed, both to create better teachers and to help graduate student teachers find employment. He said, “You are trained as a doctor to perform as a doctor; you need to be trained as a teacher to perform as a teacher.”

Part of that training involves having open, honest discussions with people who have experienced the hiring process and transition from graduate student to professor. The portion of the “Teach Me to Teach” workshop that includes a discussion with recently hired faculty members is particularly impactful for the graduate students who attend, according to Donnell. “It’s a huge eye-opener. You can read books on how to apply for an academic position, but being able to ask someone actual questions and have them give you a real, honest response about their [hiring and teaching] experiences has been really great,” she said.

GATE’s benefits aren’t just for those attending workshops, though. Workshops allow GATE members to gain experience as both attendees and presenters. Presenters are expected to not only research the teaching methods being discussed, but also to put them into practice during the workshops. This “practice what you preach” mentality helps get workshop attendees involved in both sides of the teaching process and work together with other aspiring teachers.

“There are a lot of things you can learn in the workshops that apply beyond teaching,” Donnell added. “Things like time management, interpersonal skills, how to communicate more effectively with people. If you become a member of GATE, the presentation skills [you gain] help immensely, especially going to conferences.”

“Practice what you preach” mentality helps get workshop attendees involved in both sides of the teaching process and work together with other aspiring teachers.

“Teach Me to Teach,” a full day of pedagogical training and career advice. Featuring two graduate student presenters, two faculty presenters and an undergraduate student panel, this workshop is an opportunity for TAs to immerse themselves in teaching methods, activities and honest conversations with faculty and students.

You are trained as a doctor to perform as a doctor, so you need to be trained as a teacher to perform as a teacher.”

-Matteo Magarotto

Photos Courtesy of GATE

The current leadership team for GATE hopes to extend its reach in the student population by offering webinar options for some of the workshops throughout the 2015-16 year. Because many students at UC are in distance learning programs, they can’t be physically present at GATE workshops. Having a webinar option available would mean that even those students off campus could benefit from GATE’s resources.

Both Magarotto and Donnell increasingly hope that GATE will continue to grow and reach more students as the years go on. In a perfect world, they’d like to see a university setting in which training in teaching and learning is mandatory for all TAs. “I would love to see university-wide training for graduate student teaching, both as TAs and as instructors,” said Donnell. “It would be able to provide solid support for graduate students who are teaching a full course.” While this goal may not be immediately attainable, the practices of teaching and learning can become a more integral part of the graduate school experience through the hard work of students like Anna Donnell, Matteo Magarotto and their peers.
The University of Cincinnati and its affiliated medical centers stand on the cutting edge of medicine, offering expert guidance to those on the challenging journey of improving their health and wellbeing. But patients often run across barriers when attempting to access these resources. Whether it’s an elderly hypertensive’s inability to get a ride to the hospital, an HIV sufferer’s fear of the disease or a speech-disabled child’s distance from a therapist, these obstacles can keep people from making the most of vital treatments. The researchers profiled here hail from a wide range of academic fields, but all are driven by the desire to make high-quality healthcare highly accessible.
For Dr. Andrew Steckl of the UC College of Engineering and Applied Science, the road to innovation runs in parallel with an oft-travelled route to the hospital. His father had developed high blood pressure late in life, and his doctors had decided to treat him with anticoagulant medication. “That was maybe, in the scheme of things, not the worst thing that can happen to a person,” Dr. Steckl recounts, “but nonetheless it was an issue because he had to be tested on a regular basis.” Dr. Steckl was responsible for taking his father to the almost weekly monitoring sessions for his anticoagulants, battling the traffic between his home and the hospital for a test that took ten minutes at most to complete. Understandably, this hassle for both his father and himself led Dr. Steckl to ask whether there was a way patients could keep tabs on their anticoagulants, as he says, “without having to go to all that trouble.”

The Steckls’ annoyance reflects a much larger issue: although healthcare spending and availability have never been higher, many patients still face barriers to treatment. Whether due to logistics, lack of knowledge or cost, people often aren’t able to access the resources they need to properly manage their health. Researchers from across the colleges of UC, including Dr. Steckl, are conducting research to address this difficulty, helping to bridge the gaps between caregivers and those in need.

Although healthcare spending and availability have never been higher, many patients still face barriers to treatment.

Dr. Steckl’s training is in electrical engineering, and his lab’s primary focus is the development of cutting-edge nanoelectronics. But the solution to his father’s problem employs a much older technology: paper. Using the microfluidics principle of capillary action, the same phenomenon that causes paper towels to absorb spilled liquids, the resulting device draws a drop of blood from a sample pad at one end to a wicking pad on the other through a nitrocellulose membrane. The distance that the blood moves in a given time is determined by its viscosity, which is in turn influenced by its coagulation ability. Patients could self-test at home with this device to determine if their coagulation fell outside an appropriate range; if so, they would know to visit a doctor for more accurate quantitative testing and medication adjustment.

As an old radio plays classical music in Dr. Steckl’s neatly arrayed office on the eighth floor of Rhodes Hall, he discusses the surprising synergy between electrical engineering and his foray into microfluidics. The complicated physics underlying how liquids behave may be outside his background, but working with circuits and semiconductors since
his graduate school days has made him an expert in crafting very small and intricate objects. “Because of this knowledge of microfabrication, we’re a lot more comfortable with microfluidic devices; not the fundamentals, but the devices and the applications,” he explains.

The engineer could channel this ability in a practical way thanks to his existing collaboration with Dr. Giovanni Pauletti of the James L. Winkle College of Pharmacy. Dr. Steckl had previously worked with Dr. Pauletti on several smaller projects, such as an array of paper needles designed to deliver medication with less pain and cost than a traditional syringe. That particular experiment wasn’t successful, but he wisecracks that “the chemistry was good” with the pharmacy professor. Dr. Pauletti agrees that “personality-wise we get along well, and we can have hours of discussions” about what pharmaceutical problems can be addressed with engineering. The current project arose out of one of those far-ranging conversations after the two realized the significant impact it could have on the convenience of healthcare.

The task of transforming that concept into reality largely fell on Hua Li, who earned her master’s of science with her effort on the project and continues to work on the device as a research assistant in Dr. Steckl’s lab. Although the principles and materials at work were comparatively simple, Li still had to solve plenty of engineering challenges, from determining the right dimensions and materials for the device to dealing with inconsistencies in different batches of paper from the same manufacturer. Perhaps most difficult was calibrating the apparatus to handle the wide variation of blood properties found between people. Luckily, she had some help from her fellow students for establishing a range of healthy responses. “It’s half mandatory,” she laughs. “Every lab member has been my volunteer.”

Human testing is far from over, however, and pharmacy professor Dr. Michael Hegener is in charge of establishing the clinical usability of the device. In conjunction with his duties at UC, he helps run the anticoagulation clinic of a local hospital, which allows him to easily recruit anticoagulated volunteers for testing. Dr. Hegener says his patients are very excited about contributing to the research. “Some of them ask really in-depth questions about, ‘Well, why do they think this is going to work?’ And they want me to explain to them the science behind it.” Like Dr. Steckl’s father, most of these patients are elderly and reliant on others for transportation to the clinic, and giving them the ability to monitor their medication on their own would boost their independence and safety.

“We have the resources in the U.S. for a person to have an undetectable HIV status, but less than half of the people in the country who have HIV are achieving that goal.”

-Joe Perazzo
The burden of continuous monitoring is the major hurdle for anticoagulation patients, but for those with other conditions, simply getting into care can be a bigger obstacle. Joe Perazzo, a recent doctoral graduate from the College of Nursing, finds this to be true for people with human immunodeficiency virus (HIV), the infection that leads to acquired immunodeficiency syndrome (AIDS).

Perazzo reflects on coming across the issue as he searched for a doctoral research project. “When I was going out into the literature, I was fascinated by people who would go get tested, get their test results and then—disappear.” If HIV is diagnosed soon after transmission and treated promptly with antiretroviral drugs, the amount of viral particles in the blood can drop below detectable levels, greatly reducing symptoms and transmission risks. Timely entry into care is thus critical for newly infected HIV patients, but many people aren’t following up on their test results. Perazzo’s generally gregarious features go serious when he discusses the gap between the possibilities and realities of controlling HIV. “We have the resources in the U.S. for a person to have an undetectable HIV status, but less than half of the people in the country who have HIV are achieving that goal.”

His literature review found little research examining how HIV-positive people come to initiate care after receiving their diagnosis, so Perazzo set out to interview recently diagnosed HIV patients who had made the choice themselves. Under the guidance of Dr. Donna Martsolf, Perazzo and several collaborators analyzed his interviews separately, then came together to discuss their perspectives on the patients’ stories. Half-jokingly, he notes that this approach was “the best way to see that it wasn’t just the Joe Perazzo show”; the team had to achieve consensus before moving forward, giving methodological rigor to the study’s conclusions.

Together, the interviews suggested that patients process an HIV diagnosis in the manner of “bad news.” Nearly all study participants described how, after they had received and interpreted this news, they came to the realization that HIV was not necessarily “a death sentence,” despite their existing preconceptions. After patients incorporated the news based on their better understanding of the disease, they took the action to initiate HIV care—and began to move beyond the news. “It’s not like everybody goes through it the same way,” Perazzo explains, “but those were consistently the major stopping places.” Individual responses to the news are most profoundly shaped by perceived susceptibility to HIV, the presence of symptoms, feedback from others and HIV information.

Importantly, many new patients shared that they drew their assumptions about HIV from messages in the mass media, which often don’t reflect the current state of treatment. Early public faces of HIV/AIDS, such as Rock Hudson and Tom Hanks’s character in “Philadelphia,” were often portrayed as ravaged by the disease and unable to control its progression. “These are ingrained images in their minds,” Perazzo emphasizes, “regardless of what is actually going on in the current climate of healthcare.” Those visions of unstoppable degradation by HIV can lead to hopelessness or resignation, discouraging people from seeking care.
“Many participants believed their outlook was bleak,” Perazzo continues, “until they met the new intake coordinator. This first point of contact with the HIV care system was crucial for correcting the inaccurate media-based messages and other misinformation patients had believed about the disease. Just as important was the emotional support offered to people still reeling from the doubts and fears of their diagnosis. Perazzo says that the coordinator “completely puts all of that to rest and lets them know that, short of something else happening to you, you’re going to live your life.”

Perazzo will further explore his model of diagnosis as news during a postdoctoral fellowship at Case Western Reserve University, where his entire focus will be on HIV intervention research. By expanding on the lessons of his research, he hopes to target different interventions to people in unique diagnosis situations. “There were several people [in my study] who thought they were going into the hospital for a flu, or pneumonia that wouldn’t go away,” he offers as an example. “They learn in that environment that they have HIV! How can we develop interventions for people like that?” Much like the very first interactions with a new intake coordinator set the groundwork for a patient’s success, Perazzo’s initial research is laying foundations for the future improvement of HIV care.

The importance of the new intake coordinator to HIV patients speaks volumes to the importance of a personal touch in healthcare. Some doctors wonder, however, if that personality need be delivered in person. Dr. Lisa Kelchner, a clinical research speech pathologist at the Cincinnati Children’s Hospital Medical Center and an associate professor for the College of Allied Health Sciences, has been testing that assumption through a telehealth system for administering pediatric voice therapy.

Dr. Kelchner’s colleagues at CCHMC are regarded as international leaders in pediatric airway reconstruction surgery, drawing patients from as far away as Australia and the Middle East. But after their operations, these children often need extensive therapy to adapt to their new vocal anatomy, and therapeutic specialists such as Dr. Kelchner may not practice anywhere near the recovering kids. “After we do our piece,” she says, “they don’t have anybody in their area who specializes in this kind of treatment.” Even people who live closer to speech clinics may be overwhelmed by the logistics of getting their children into treatment: Dr. Kelchner notes that many families “have to drag three children to sit in a waiting room in those after-school hours between 3:30 and 7, when they have to crowd in piano lessons and soccer practice and deal with crosstown traffic.”

In 2012, Dr. Kelchner won a nearly $300,000 federal exploratory grant to pilot a program for addressing these issues by delivering personalized voice therapy over the Internet. Together with two graduate students, Casey Keck and Katherine Davidson, she

“Families are begging for this.”

-Dr. Lisa Kelchner

in regards to her research on telehealth for speech pathology
recruited ten families from CCHMC’s weekly voice disorder clinic to test different methods of remote speech therapy. The team both treated children in real time and developed an interactive web portal loaded with therapeutic exercises so kids could practice independently between sessions. With a clinician’s patient humor, Dr. Kelchner jokes that the tracking capabilities afforded by this website gave her useful (if sometimes disappointing) data: “A lot of the little kids said, ‘Yes, we did our homework,’ and we could see they hadn’t even gotten on!”

Although Dr. Kelchner outfitted every participant with the necessary software and hardware for the study, including high-quality headsets and microphones, her team still encountered some glitches in delivering treatment. Children’s voices are particularly tricky to capture with high acoustic fidelity because of their higher pitch, so the therapists sometimes had trouble identifying particular problems from their recorded speech. Additionally, the Internet connections of the families sometimes fell below the study’s desired bandwidth; the team had to tinker with the software so it would accept slower connection speeds. Despite these technical troubles, Dr. Kelchner says the greater convenience and lack of transportation costs associated with telehealth means “families are begging for this”; many wanted to continue receiving remote therapy even after the study’s end in 2014.

Dr. Kelchner notes that while the public is enthusiastic about the possibilities, mainstream healthcare “still has some suspicion” regarding the use of telehealth treatment. She admits that some of this resistance is appropriate caution; at this early stage, practitioners must still solve technical problems and validate clinical procedures. But she gently chides those concerned with losing the intimacy of a face-to-face meeting by pointing out an already widespread medical practice: “With electronic medical record keeping, most of what you see in your physician’s office when you visit is their back as they enter stuff into the computer.”

Regulatory paperwork also poses a hurdle to the widespread adoption of telehealth. According to current laws, therapists must be licensed in each state where their patients receive care, so those working remotely could need a ream of credentials. “Even if we’re sitting in Cincinnati, and we diagnosed them and saw them and evaluated them in Cincinnati, if they go back to Pennsylvania, we have to have licensure in Pennsylvania,” she explains.

But Dr. Kelchner remains hopeful about the potential of remote care for her field and for medicine in general. She and her graduate students are now working on a federal grant to evaluate the efficacy of their treatment program, as well as address the technical issues they identified in the pilot study and survey families about the benefits they experience as a result of telehealth. Creating a strong research foundation for new treatments, Dr. Kelchner says, is absolutely crucial. Work on the cutting edge is exciting, but “the challenge is to do it right. And that’s what inspires me, is to help do it right.”
Graduate School

Dean’s Fellows

Dissertation completion fellowships support outstanding students during the last stage of their research. Finding a means of support can be difficult for doctoral students who are close to finishing their dissertations, especially during tough economic times.

The Graduate School established the Dean’s Fellowship to make their search for funding a little easier. The fellowship provides students with $20,000 and a full tuition scholarship to help them complete their dissertations by the end of the 2015-16 academic year.
Drosophila melanogaster, commonly known as the fruit fly, has been used for almost 100 years to study genetics and behavior. This model organism is studied in order to gain insight into the genetics of more complex organisms like humans. While humans have almost four times as many genes as fruit flies, Drosophila’s gene sequences are remarkably similar to those found in humans. Researchers like Elizabeth Brown, a doctoral student in biological sciences, use Drosophila to study behaviors that can later be related to people.

Brown got her start with behavior genetics in a lab at Florida State University as an undergraduate student worker cleaning fly vials. While it wasn’t the most glamorous job, it piqued her interest in how Drosophila can help scientists understand more about the way genes and behavior are connected. It also led Brown to pursue a doctoral degree that focuses on genetics. Her dissertation research uses Drosophila to better understand olfactory behaviors—those that result from interacting with a particular scent.

“The olfactory systems in humans and Drosophila are very similar. There are receptors on the periphery—like the nose or antennae—and the receptors are on neurons, which go into the brain,” said Brown. “The nice thing with fruit flies is that they have only 62 odor receptors, whereas humans have well over 1000.”

Brown spends most of her time in the lab cataloguing Drosophila behaviors to identify genes that are utilized within olfaction. She uses a device called an olfactometer to determine the flies’ odor preference. The flies are placed in the middle of a clear tube, and a specific odor is pumped into one end. At the other end, there is air without odor. If the flies are attracted to the odor, they gravitate towards it, but if not, they walk towards the end of the tube with no odor. Brown videotapes the actions of the flies over time, which she uses to determine the extent of their attraction, as well as the length of time they’re attracted to an odor before becoming sensitized or habituated to it.

Cataloguing Drosophila attraction and repulsion is vital to understanding which genes are associated with olfaction. This is a preliminary step in a research pathway that could help researchers better understand the way the brain works to process odors.

“What my research suggests so far is that a lot of these genes aren’t at the level of our nose or the antennae, they’re actually in the brain,” Brown explained. “The central processing [of odors] occurs in the brain, and what happens there is pretty much a black box; that’s the next big thing [in research]. We know how an odor binds to our nose or to receptors and how it gets to the brain, but how does that translate into an action?”

Over the course of her doctoral program, Brown has fallen in love with performing research. She hopes to continue investigating behavior genetics even after she graduates in 2016. “My favorite part about [researching] is asking a question that no one has asked before and getting an answer,” Brown said. “It’s not always the answer that you want, or that you’re expecting—and the response to the question usually ends up with more questions—but there’s just something about saying, ‘No one knows the answer to this, and now I’m going to answer this question.’ It’s a little like exploring.” Brown hopes that her explorations will be a step on the pathway to understanding the way the brain, olfaction and behavior connect through genetics.
The history of music and the history of the world have developed hand in hand. Often, the events of a particular time period have inspired musical composers to make specific choices in their work—such as borrowing elements from composers who came before them or using common thematic features—to portray the feelings of the time. Adam Shoaff, a doctoral student in the musicology program, is exploring these types of aesthetics in German opera during the 1760s and 1770s.

According to Shoaff, little extensive research has been done on the mid-18th century German operas. It’s the lack of research surrounding this time period in opera that makes it so intriguing. Not many people, musicians included, have much knowledge about the operas written after Handel and before Mozart.

“Most educated musicians can tell you about Handel’s operas from the early 18th century and Mozart’s operas from the end,” explained Shoaff, “but if you ask them about the operas of the 1750s, 60s, and 70s, you’ll probably get a blank stare.”

It’s Shoaff’s goal to bridge this gap in knowledge. In the summer of 2015, he researched at the Staatsbibliothek in Berlin (the largest scholarly universal library in Germany), where he spent time analyzing a long list of operas from the 1760s and 1770s. The more time he spent exploring these operas, the more he saw a tie between the historical events of the time and the elements included in the operas.

1760s Germany saw a new beginning in the opera world; musical activity in the previous decades had been dampened by a lack of permanent opera houses and devastating events like the Seven Years War. Opera had been previously dominated by Italian and French models, but it was during this time that Germans began to experiment with creating their own forms of opera. Often, these operas borrowed elements from French and Italian operas while incorporating German cultural elements. Shoaff is analyzing these elements to find out what Germans valued in their operas.

“I’ve found that the composers I have been looking at were very willing to borrow from whatever sources served their purposes from one number to the next,” he said. “I was just looking at a piece today that used elements of the majestic French overture style (traditionally associated with the reign of Louis XIV) to ironically underscore the pompous attitude of a comic character.”

The more operas Shoaff analyzed, the more he noticed their strong, thematic connections. Many of these operas—performed in public houses rather than courts—deal with class conflicts and depict the resentment over the exploitation and abuse of the lower classes. “Remembering that these operas were being written during a pre-revolutionary time, I think they provide a fascinating window into some of the sentiments coursing through European society at the time,” said Shoaff.

Shoaff hopes that his dissertation will shed light on an entire period of music that hasn’t been well catalogued. He explained, “There simply aren’t enough people working on mid-century opera. My dissertation will help us better understand [this time period] and its aesthetic preferences for opera.”
Even from a young age, Matthew Vrazo, a doctoral student in geology, knew that he wanted to be a paleontologist. “I was a typical, cliché little kid who wanted to do dinosaur stuff. But unlike everybody else, I continued to want to do it much later,” he said. Today, Vrazo spends his time researching organisms much smaller than most dinosaurs. His dissertation work focuses on extinct Paleozoic arthropods called eurypterids, small invertebrates closely related to present-day horseshoe crabs and scorpions.

“I’m looking specifically at [eurypterid] ecology and how they’re preserved,” said Vrazo. “I’m also examining one aspect of their history that is quite unique for many animals, which is that they transitioned from entirely marine environments into entirely freshwater environments.”

Vrazo’s goal with his dissertation work is to use novel approaches to answer traditional questions about eurypterids and where they lived. He’s doing this by applying quantitative methods to his field work. “Traditionally, you might go out and observe things in the field. You can describe them and write them up, and that is how a lot of paleontology is done,” explained Vrazo. “The other school of thought is that you apply a quantitative framework to things and remove the subjective aspect of being able to answer these questions. That’s the approach I’m taking.”

Rather than identifying specific parameters that seem to control where eurypterids appear through anecdotal evidence, Vrazo observes their occurrences in the field along with the surrounding fauna, rock type and other sedimentological features. He then puts every known eurypterid location in the region into a spreadsheet, including those co-occurring features. This process produces a more comprehensive picture of eurypterid ecology than previously understood.

Using this approach, Vrazo has helped falsify one of the classic assumptions about eurypterids—that they lived in hypersaline (very salty) environments. His field studies are focused on the Appalachian basin (represented by today’s Appalachian mountain range). This area was once the site of a small ocean that showed periods of hypersalinity, likely caused by lack of input from regular rainwaters. While the paleontological community has been finding eurypterids in this environment for years, Vrazo wasn’t convinced that eurypterids lived there during hypersaline periods.

“Horseshoe crabs are their closest living relatives; they can tolerate a range of salinities, but you’ll never find them seeking out incredibly saline environments,” said Vrazo. “There was a conflict there in terms of what made sense and having to explain what we were seeing.”

Vrazo’s database approach has helped him determine that where there is evidence of hypersalinity and eurypterids on the same horizon, the hypersalinity happened after the eurypterids were buried. This discovery will help researchers better understand the types of conditions eurypterids were living under. He plans to continue his work with this type of approach after he graduates in 2016, when he hopes to implement it with other organisms. “I think I’ll be very interested in expanding,” said Vrazo. “I’d be really happy to be in a museum setting with the ability to continue my research.”
Many diseases in the human body are caused by a malfunction of some sort. Often, these diseases result from dysfunctional proteins. Ryan Walker, a doctoral student in the Department of Molecular Genetics, Biochemistry and Microbiology, is using his dissertation research to understand how a particular protein within the muscular system affects muscle growth.

“Our lab studies proteins called transforming growth factor beta (TGF-β) proteins, which are proteins that signal in all sorts of pathways from embryonic development all the way into adulthood,” said Walker. “When signaling pathways are interrupted or perturbed in some way, many different diseases can occur; cancer can be one of them, as can muscular dystrophy.

Muscle wasting—when muscles are weakened or shrink away—is an issue with many diseases but is especially common with cancer and muscular dystrophy. When a person’s muscles waste away, they lose strength and muscle functionality, sometimes losing the ability to walk or even breathe independently. Walker’s research is geared towards understanding how TGF-β proteins affect muscle growth, which could one day help combat the effects of muscle wasting in disease.

Walker specifically studies myostatin, a TGF-β ligand that limits muscle growth. Without myostatin, muscles would grow to an incredibly large size. However, to function properly, the human body needs some muscle mass, so it has natural mechanisms to inhibit myostatin. One of the naturally occurring myostatin inhibitors is called a growth and differentiation factor-associated serum protein (GASP) protein, which Walker works with.

“The protein GASP naturally inhibits myostatin. However, what people don’t know is how it actually does that, so that’s my main focus,” said Walker. To do this, he is taking a structural approach. Structural biology attempts to correlate structure with function by using both biophysical and biochemical methods. Walker uses both a biochemical approach and X-ray crystallography (where he crystallizes the protein and views it in a model-type setting) to study the interaction between GASP and myostatin. X-ray crystallography can reveal the overall fold (the structure) of a protein, which can provide insight into how the protein functions.

Walker explained that protein folding is similar to origami. “If you have a paper airplane, there are all sorts of ways to fold it. If you fold it in a rectangle, it tends to do loops; if you fold it the traditional way, it will fly with a straight trajectory,” he said. “However, if you misfold that airplane, it’s not going to fly correctly. Proteins operate very similarly; they need to be folded in a specific way so they can carry out their function.”

Understanding the structure of GASP proteins is key to determining exactly how the protein inhibits myostatin in the body. In the future, this understanding could lead to therapies for people suffering from muscle wasting diseases. “Our thought is that if you block the myostatin the body is producing, then maybe we can facilitate muscle growth and restore muscle mass and function,” said Walker. This restoration of muscle mass and function could mean more mobility, less pain and even longer lifespans for patients with diseases like muscular dystrophy. Walker will spend the 2015-16 academic year finishing his research, which he hopes will help build a foundation for future myostatin-inhibiting therapeutic treatments.
In 2002, the collapse of a Rhode Island-sized portion of the Larsen B ice shelf in Antarctica triggered an intense reaction in the scientific community. Since then, researchers have been focused on Antarctica’s ice shelves and glaciers and the way climate change affects them. Shujie Wang, a doctoral student in geography, is one of those researchers; her dissertation research examines glacier flow velocities in the Antarctic Peninsula from the 1960s to the present.

Wang’s research covers the Larsen ice shelf and its tributary glaciers on the Antarctic Peninsula. Wang is calculating the glaciers’ flow velocities—how fast glaciers are moving across the land towards the ocean—in relation to the Larsen ice shelf. Ice shelves are made up of large, floating masses that provide a barrier to glacier flow, slowing the speed at which glaciers enter the ocean. As ice shelves shrink, it takes glaciers less time to flow into the ocean, which means that sea levels rise much faster than previously anticipated. Even a small increase in sea levels can have an impact on coastal environments all over the world.

As the climate warms in the Antarctic Peninsula, the glacial ice melts, causing the Larsen shelf’s glaciers to accelerate their journey across the continent. Wang’s work to calculate a half century’s worth of flow velocities will provide a cohesive picture of changes to the glaciers and the ice shelf—a picture that until now has not existed. This collection of data could help researchers determine what types of events lead up to an ice shelf’s collapse.

Wang uses satellite image data to determine the rate at which the glaciers are moving into the ocean. By comparing the same features over time, she can determine the flow velocities across specific time periods. As she processed the satellite images, Wang started to see relationships between glacial ice flow velocity and the stability of the surrounding ice shelves.

“I found that before the [Larsen B] collapse, the glaciers’ flow velocities had a very dramatic change,” said Wang. “That made me want to go deeper: to find out why flow velocities can be a precursor of an ice shelf collapse.”

This sense of curiosity and discovery has led Wang to not only catalogue over a half-century of satellite image data, but also to infer that ice shelf collapses can be predicted. She hopes that the collection of data will help her find a pattern to look for when determining the date of the next ice shelf collapse in the Antarctic Peninsula. This type of information would not make another collapse avoidable, but it could provide enough warning to help coastal environments prepare for an increase in sea level.

Wang’s research will proceed during the 2015-16 academic year, after which she plans to keep working with glacier and ice shelf data. “I think I will continue the Antarctica research because I really like the glaciers. They can change very fast, and it’s very attractive,” she said. “You just go step by step, closer to the truth. That’s the most interesting part.”
## UC Graduate Student Satisfaction

### 2014-2015

<table>
<thead>
<tr>
<th>Category</th>
<th>Master's</th>
<th>Doctoral</th>
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<tr>
<td>Overall Satisfaction</td>
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### Overall Satisfaction

![Overall Satisfaction Chart](chart-image)

### Curriculum

![Curriculum Chart](chart-image)

### Career Development

![Career Development Chart](chart-image)

### Faculty Satisfaction

![Faculty Satisfaction Chart](chart-image)

### Graduate Aid

![Graduate Aid Chart](chart-image)

### Thesis/Dissertation Advising

![Thesis/Dissertation Advising Chart](chart-image)
Every year, graduate students gather from the university’s 300+ degree programs to share their research, scholarship and fine art while honing their presentation skills. The Graduate Student Expo & Poster Forum serves as a “dress rehearsal” for many students who are preparing to present at a regional or national conference. As a professional development opportunity hosted by the UC Graduate School, the Expo rewards outstanding oral communication and exceptional poster design. UC faculty members and local scientists volunteer to evaluate presentations within their area of expertise, providing valuable feedback and numerical scores.

This year, over 100 students entered posters, presented their scholarship or shared their art. Award-winning posters covered a wide range of topics, from improving wind turbine performance to the Draw-It Technique to optimizing the distribution of “telestroke” telemedicine units.

**Winners**

**Master of Fine Arts Gallery**
Kathryn Ball  
*Fine Arts, MFA*

**Arts & Humanities**
Eva Lutz  
*Design, MDes*

**Life Sciences & Medicine**
Amy Donnellan  
*Nursing Practice, DNP*

Jerusha Clark  
*Health Services Management, MPH*

**Physical Sciences & Engineering**
Patrick Malsom  
*Physics, PhD*

Annette Volk  
*Mechanical Engineering, PhD*

Arundhoti Chakraborty  
*Chemistry, PhD*

Mohammed Shaheen  
*Aerospace Engineering, PhD*

**Social & Behavioral Sciences**
Elham Torabi  
*Business Administration, PhD*

Mitchell Jones  
*Counselor Education, EdD*

Sue Schlembach  
*Educational Studies, PhD*
When Jerusha Clark, a 2015 graduate of the master of public health (MPH) program, started at UC, she knew that she wanted to spend her time improving the lives of others. “My long-term goal is to become a medical doctor and bridge the gaps in health disparities amongst vulnerable populations at the local level, both here in the United States and globally,” she said. Clark began her journey towards that goal by working her way through the health services management concentration in the MPH program.

At the 2015 Graduate Student Expo & Poster Forum, Clark presented the research she performed as a part of her practicum. She completed a community needs assessment for a nongovernmental organization (NGO) in the Blue Mountains of Jamaica. The NGO, called the Blue Mountain Project, serves the Blue Mountain region of Jamaica by improving water quality and education while also increasing access to healthcare. To best serve the community, the Blue Mountain Project needed to determine which areas of their service were functioning effectively and which weren't. That's where Clark’s community needs assessment came in.

“They wanted to know where they should allocate their resources, which programs they should or should not develop and how best to facilitate those programs by using and bridging the community participation and involvement,” she said. To perform the community needs assessment, Clark first had to develop a culturally competent survey. She interviewed key stakeholders in the community to determine if the survey used language that made sense in terms of the community she would be working with. Once this was done, she and a fellow MPH student, Alexandra Vrazo, traveled to the Blue Mountains for two weeks to administer over 100 surveys to community members.

After collecting the survey responses, Clark and Vrazo compiled a report for the Blue Mountain Project detailing their findings. Inside that report, Clark and Vrazo proposed adjustments that would allow the Blue Mountain Project to better serve their target communities. The results showed that while the Blue Mountain Project primarily focuses on improving water quality, the community suffered from almost no gastrointestinal diseases that would be caused by poor water quality. The people’s real needs had to do with access to healthcare.

“One of the survey questions we asked the families was ‘What services would you prefer if you could rank them?’ and everyone said a doctor,” explained Clark.
“They want somebody to give them good healthcare, good-quality healthcare.”

Though the Blue Mountain Project said that the community needs assessment was well done and provided valuable insight for them, they ultimately decided to not follow Clark’s recommendations. They felt that their organization would better serve their target communities by continuing their work to improve water quality. While frustrating, it taught Clark what some of the challenges of working in global health initiatives can be.

“I think it’s a mistake we make at the global health level when providing any type of healthcare service or public health initiative; we do something for the short term, or we provide some type of data, but then what do we do with it?” asked Clark. “It was disappointing, because the people who ultimately suffer are the community members that we were trying to help. It’s not about me as an individual, it’s not about our team; yes we’re doing the work, but we’re doing the work to help somebody else.”

Rather than discouraging Clark, the Blue Mountain Project’s choice to not use her research results has only increased her passion for global health. In the next year, she will take the MCAT and apply to medical schools. She sees herself using her skills as both a health services manager and as a medical doctor to serve the members of underrepresented populations. She would like to work for an organization like Doctors Without Borders for a while before returning to the Cincinnati area to start a grassroots clinic. Clark wants her clinic to be a resource for more than healthcare.

“I don’t want it to just address healthcare issues,” said Clark. “I think we make that mistake by ignoring the fundamental causes of poor quality health, mainly the impact of violence, of socio-economic status, of race and of clearly marginalized populations. I’m hoping that the practice I develop will address those issues and help bridge gaps in healthcare.”

It is this drive to solve the issues in healthcare and to meet communities’ needs that makes Jerusha Clark such an impressive health professional. Her work with the Blue Mountain Project, while frustrating at times, has helped her become an excellent researcher and advocate for the needs of a community. Because of this experience, Clark has the skills to positively affect change in communities all over the world in the future.

“Whether it’s somebody you disagree with fundamentally at an economic, spiritual, faith-based, etc. level, the bottom line is that all people deserve access to care. And not just access to care—I think we misconstrue that word a little bit—but quality care.”

Jerusha Clark, Health Services Management, MPH
"I'm looking at how the laws in place in the United States impact everyday lives of individuals who are forced to accept a formal label or sanction," Black said of his research. "[Sex offenders] are formally labeled, and that goes up on the internet, so [my work] looks at how the stigma, how the shame affects how they get through life."

Not only does the research focus on the laws impacting those labeled as sex offenders, but it also looks at the daily lives of those labeled. Black explained that he follows these participants for two years, cataloguing their experiences through formal and informal interactions. These formal interactions often consist of interviews, while other interactions are made up of phone calls from the participants to Black, whenever they need him.

"I've developed questions as I go along, because people have a telephone number to reach me at. The calls happen at all hours of the day or night," said Black. "They happen whenever anything takes place; it's like I've become their confidant. I do it because the point [of this research] is to tell the story through the lens of those who are enduring this every day."

The close relationship Black has with his participants helps make his research very insightful. Because they call and discuss the details of their lives, he gets to experience what it's like to be labeled a sex offender side by side with the participants. As he writes his dissertation, Black will be able to use this insight to portray the quality of the lives of sex offenders under the current legal system.

Throughout the summer, Johnston was able to participate in some of the interactions with participants, performing a portion of the formal interviews as well as constructing her own research project: a risk assessment of participants. A risk assessment is a tool used in the criminal justice department to determine the likelihood of a person reoffending or committing another crime.
“The participants would come in, and I would interview them and ask different risk assessment questions, basically seeing if these people are actually dangerous in society,” said Johnston. “Are they going to commit the crime again or a different offense—are they more likely to get into a fight, are they more likely to have substance abuse issues, that sort of offense.”

Johnston’s risk assessment results surprised her, finding that almost all of the participants of the risk assessment were at low risk of reoffending. While the information didn’t surprise Black, it did offer a new way to think about his research.

“I had never actually thought about including anything about the risk assessment in my work, because it didn’t seem to be that important to me,” said Black. “But a lot of the questions that she asked as a part of the risk assessment provided more interesting information—not necessarily intuitive information. You would usually think that people who are offenders, who were deemed dangerous by society, would be higher-risk people.”

Another of Johnston’s findings from the risk assessment was that most of the participants she interviewed were uninformed about the laws governing their lives. All sex offenders are required by law to register their current place of residence, which most participants understood. However, if a participant wants to move from one area to another, he or she is required to both register the new address and unregister the old address. Failing to unregister can result in an offender having to go back to jail, often for a longer sentence than for their original conviction.

“One person had to go to jail because he didn’t unregister from his last location. It was for three years, when he had a one-year sentence for the original crime,” said Johnston. “That really stuck out to me.”

Sex offenders are required to register not only their physical location, but also their license plate, phone number, email address(es) and any social media account they have ever created. Johnston noted that most people have old social media accounts they don’t remember their logins for anymore. However, if a sex offender fails to register an account, he or she can be sentenced to more jail time.

“We are applying this whole set of laws that the common ordinary person would be appalled and offended beyond belief if they had to be subjected to them,” explained Black. “I’m not going to be the one to say that we should scrap these laws, I’m going to be the one that tells you what people go through and let you make up your mind. Do you really think that we’re better off for this?”

Black hopes that his dissertation, including the information from Johnston’s risk assessment, will be read by policymakers and those who have the ability to effect change at a higher level. While Black and Johnston have finished their research partnership, both of them are hopeful that the research they’ve done—and that Black will continue to do—will impact the future of policies governing sex offenders.

The partnership has certainly impacted Black and Johnston on a personal level. Their close mentor relationship produced not only interesting insights, but also a friendship among scholars. The pair learned from each other academically and they had a lot of fun. “We had a blast working together!” said Johnston. “It made me more excited about graduate school.” Black agreed, saying, “I had a really fun time with her. It was nice to have somebody from another department; I got a different perspective than other people did.” Both felt that the GSUM/SUMR-UC program provided an excellent opportunity for graduate and undergraduate students to learn from each other.

“I think this is the best thing that ever happened. It sounds crazy, but it’s not even about the research, it’s about getting exposed to likeminded people,” explained Johnston. “I think this is the best opportunity and one of the best programs that UC offers. I was really happy to be a part of it.”
The Excellence in Doctoral Mentoring Award is presented each year to a faculty member who demonstrates outstanding and sustained guidance of doctoral students. Recipients are selected for this award because they intellectually challenge students, encourage them to work towards scholarly independence and help them obtain the resources they need to succeed. These mentors create a strong foundation of support upon which students can build their own professional successes.
Dr. Siva Sivaganesan, known to his students as Dr. Siva, is a respected faculty member and researcher in the Department of Mathematical Sciences. His ability to bridge academic disciplines in both his research and teaching makes him an exemplary role model for graduate students. An expert in Bayesian statistics, Dr. Siva is frequently sought by researchers from various medical and physical sciences disciplines, leading him to establish research collaborations with some of the leading minds from multiple academic fields. This cross-disciplinary atmosphere extends to Dr. Siva’s teaching. He has a unique talent for making complex statistical topics accessible and applicable for graduate students across the university, from environmental health and business to engineering and geography. Yet, within his own department, Dr. Siva is known for his passion for cultivating doctoral students’ academic, professional and personal growth.

When asked what inspires him to devote so much time to doctoral student mentoring, Dr. Siva responded, “You get to learn about many different students and their strengths and weaknesses. Not only that, you continue to work with them on a one-to-one basis for a while. It’s really a relationship.” He said, “One student comes in and does very well, and another comes in and doesn’t do very well. I find out why and try to help out, and they feel good about it, and then next time they do better. You don’t necessarily get [this type of interaction] by teaching one semester and then done. This is a different type of experience that I enjoy.”

Dr. Siva’s former students state that he has been an integral part of their academic careers. Despite the demands that research and teaching place on his time, Dr. Siva always has time and energy for his mentees. Dr. Dandan Li, one of Dr. Siva’s recent doctoral students, said, “I benefitted tremendously from Dr. Siva’s mentoring. He provided continuous support and outstanding guidance in all stages of my doctoral study and research, and he always had faith and confidence in me.”

Dr. Dongming Jiang, a biostatistician for Monsanto, stated that Dr. Siva’s passion for sharing his knowledge and helping his students understand background and research objectives is part of what makes him such a great mentor. “He is always patient, supportive, encouraging, and inspiring,” Dr. Jiang said. “The wisdom with which he helped me understand and more effectively work with technical challenges made a lasting impact on my ability to approach and solve difficult problems. As my advisor, Dr. Siva encouraged my innovative research ideas wholeheartedly and facilitated my work as much as possible.”

All of the former students who nominated Dr. Siva for this award attribute much of their success to his efforts in mentoring them. They speak in glowing terms of his passion for statistics, his academic encouragement and his dedication to his students above all else. They speak of someone who supports and assists in their professional development with each student’s particular career goals in mind. Most importantly, students speak of Dr. Siva as a man who goes out of his way to be a mentor on every level, relishing in the triumphs of his students and helping them work through their failures. This outpouring of support is the most telling proof of Dr. Siva’s effectiveness as a mentor. The stories of his exemplary mentoring efforts and the accomplishments of his former students combine to paint the picture of a faculty member who has a truly profound impact on his students.
Strive not to be a success,
but rather to be of value.

–Albert Einstein
Each year, the Graduate School recognizes two outstanding teaching assistants—one master’s student, one doctoral student—with the Excellence in Teaching Award. Recipients are selected first at the college level and then at the university level based on several criteria, such as student learning and engagement, instructional design and delivery, class evaluations and innovation in the classroom.

The Graduate School was pleased to award the 2015 Excellence in Teaching Award to Vanessa Plumly in the doctoral category and Kyle Borkowski in the master’s category.
Becoming an excellent teacher is a daunting task; it takes hours of preparation, years of hands-on experience and countless professional development events. Teaching assistants (TAs) face the unique challenge of learning to be effective instructors while simultaneously developing themselves as students and budding researchers. Both Vanessa Plumly and Kyle Borkowski have earned the right to call themselves excellent teachers by going above and beyond the call of duty to help their students engage in the language learning process. They focus on creating an open, friendly atmosphere in their classrooms, and they make learning a foreign language fun and effective. Plumly and Borkowski each have a unique teaching style that helps them connect with their students, and that connection leads to more meaningful learning.

Both Plumly, a 2015 graduate from the doctoral program in German studies, and Borkowski, a 2015 graduate from the master’s program in Spanish, have taught outside of the United States. Plumly spent a year teaching in Kiel, Germany for her Fulbright teaching award. Borkowski spent a year teaching in Spain and then returned to the United States to teach in Cincinnati before entering his master’s program. These experiences allowed Plumly and Borkowski to better understand the culture and language they teach.

This understanding of language and culture is part of what makes a foreign language teacher so successful. Plumly and Borkowski both cite these experiences as having influenced their teaching and their passion for imparting knowledge. For Plumly, it helped remind her that teaching is as much about the student as it is the subject.

“I love the interaction with [students],” said Plumly. “I think that’s what I love the most about the field that I’m in, too, because in German [classes], you have to get to know students personally. You have to have intercultural and interpersonal exchanges, and you learn a lot about [students’] personal lives.”

Plumly’s focus on creating an open dialogue with her students is what makes her such a great teacher. She used classroom exercises and icebreaker activities to get students comfortable talking to each other and to her in German. In a language classroom, this type of interaction is vital to a student’s learning curve. The open classroom atmosphere Plumly created helped her figure out what types of exercises and teaching techniques worked for her students. Plumly explained that trying new exercises and teaching techniques helped her learn from her students as they learned from her.

“As a teacher, that’s what you always do,” said Plumly. “You’re always getting new perspectives on what you’re doing in the classroom.”

Another way Plumly kept students and their needs at the center of her teaching was through her research. Her dissertation looked at diversity in Germany, which Plumly used to try to broaden the type of students who study German at UC.

“My research inspires me in the classroom in terms of diversity and getting students involved who may not consider German studies as an option,” said Plumly. “Often the image that is perpetuated in textbooks is this homogenous, white image of Germany, which isn’t the case at all—and has never been the case. I focus on Afro-German cultural productions since the fall of the Berlin wall.”

During some of her classroom activities, Plumly included the poetry, videos and German hip-hop music videos from her research to help students connect better with the language. These types of additions bridged the gap between the picture of Germany depicted by textbooks and the reality of the German language and the culture surrounding it.

One of the challenges Plumly had to face as a doctoral student and TA was maintaining excellence in both her teaching and her studies. Balancing graduate-level classes, teaching and research exerts a unique strain on TAs that other developing teachers typically don't experience.

“That’s the hardest part: trying to figure out what you need to do for your students and doing it well without sacrificing your own research,” said Plumly. “It does influence how you teach as well, and it also motivates you. For me, if I’m not performing as a teacher, then I’m not doing my job—even if I’m doing my research—because it’s not what I’m here for; I’m here to do both.”

Plumly’s dedication to her students was what drove her forward in her research, and her research gave her ideas to better connect with her students and help them...
learn. For her, one of the most rewarding things about teaching is when her students really start to understand the language.

“When their minds click in a language or when they come in and they say, ‘I dreamt in German last night’ or ‘I had this thought as I was walking around campus, and I could only think of it in German and I don’t know why,’ those are the moments that really inspire me,” explained Plumly. “Because it means that I’m really doing my job and they’re working hard outside of class too.”

Plumly isn’t the only TA who loves when the language clicks with her students. Borkowski, who teaches Spanish language classes, is driven to help students understand and use the language. One of the ways he helps facilitate this is by making his students feel comfortable getting involved in the learning process.

“I like joking with them,” said Borkowski. “I usually start out by making a fool of myself at the beginning of the semester, letting them know—since I’m not a native speaker—that I was once where they are now.”

Because his Spanish language classes focused on quite a bit of grammar—which is difficult even in English—Borkowski was challenged to make grammar fun and less intimidating. On top of joking and being silly, he challenged students to learn the different parts of Spanish speech by asking them to complete out-of-the-box activities. When teaching the subjunctive, he asked his students to be a “bad, very demanding roommate.” They had to make up rules (in Spanish) for their roommates that would be considered ridiculous.

“[Students] like that, where they have to use the grammar that we’re learning, but they’re using it in a funny way. They get more excited about it because they’re trying to think of the most ridiculous thing they could ask someone to do, like ‘I don’t want you to breathe while sleeping,’” explained Borkowski. “So they have to think creatively and it helps them use the language more, because they have to not only reproduce a sentence, they also have to think of a sentence that is going to be interesting and funny to say.”

Borkowski’s dedication to creating a connection with his students through having fun is what makes him such an excellent teacher. His efforts to do so are rooted in the pedagogical classes he took as part of his master’s program. These classes focused on the ways a student’s brain acquires new languages and on methods for circumventing common mistakes made by new Spanish speakers. Borkowski designed silly yet meaningful activities, like the bad roommate exercise, with these common mistakes in mind.

He explained that a comfortable classroom setting is critical to language learning, because it encourages students to speak the language more with their peers and the instructor, and it improves classroom involvement. Creating an open learning environment to connect with students is at the core of Borkowski’s teaching philosophy.

“I think that the most important thing for teaching is having a really good relationship with students. None of them should feel left out or like they’re being attacked
in Spanish [class],” he said. “It’s really hard to demand someone to do something if they don’t feel comfortable around you.”

The exercises Borkowski employed are just one way he tried to get students to open up and participate in the classroom. He also tried to make students feel comfortable speaking to him and to their classmates in Spanish by being careful to not embarrass them.

“When we’re practicing in class, I try to draw [students’] attention to their mistakes in a way that they don’t feel like I’m being overbearing or they feel like I’m stopping them,” said Borkowski. “I always hated when I was learning Spanish and my teachers stopped me mid-sentence to correct me.”

Borkowski’s own experiences learning Spanish as a non-native speaker help him recognize his students’ needs. He takes the time to understand his students, and then he engages with them using his unique sense of humor. The personal connections he forged during fun classroom exercises helped lead to lasting learning for Borkowski’s students.

Both recipients of the 2015 Excellence in Teaching Award demonstrate an ability to connect with students on a personal level that many teachers don’t have. Plumly used her research on Afro-German cultural productions as an entry point to engage with her students, while Borkowski employed a joyful sense of humor to gain his students’ trust. The meaningful interactions these two TAs have had with their students during their time teaching at UC have resulted in more successful student learning, as well as their own growth as teachers.

Excellent teachers not only have an incredible knowledge of what they’re teaching, they also understand their students and their learning needs. They go above and beyond to make their classrooms an open, welcoming environment where students feel comfortable learning, making mistakes and becoming stronger academics. The best teachers do all of this and leave a lasting impression on their students. Vanessa Plumly and Kyle Borkowski have earned the title of excellent teacher. They are sure to continue this path as they move into their careers as full-time faculty members.

“I like joking with them. I usually start out by making a fool of myself at the beginning of the semester, letting them know — since I’m not a native speaker — that I was where they are at some point.”

-Kyle Borkowski
Jeffrey Brewer, a self-proclaimed “water nerd,” has been interested in the intricacies of the Maya sites in Mexico, Belize and Guatemala for years now. With a background in archaeology at both the undergraduate and master’s level, Brewer’s focus during his doctoral program has been on the water management of the southern Campeche region of Mexico. In this heavily forested area with very specific wet and dry seasons, water management is incredibly important—especially because the region receives almost no rainfall for five months of the year and lacks permanent water sources, such as lakes and rivers.

“I’m looking at how they were able to build these big urban areas without any measurable rainfall,” said Brewer. “How were they storing water, managing water, distributing water and collecting water—enough to support these big populations?” Not only did these areas support large populations, they often did so for long periods of time. Yaxnohcah, the site Brewer is currently researching, is home to structures dating from 900 BC to 1100 AD.

One of the ways Brewer is gathering data on the water management at the Yaxnohcah site is through a technology called LIDAR. LIDAR, which stands for light detection and ranging, collects incredibly high resolution imagery shot from an airplane. An airplane flies over the site and shoots images at 30,000 points per second, which means that the images are accurate to within 15 centimeters. “Once the imagery is processed and post-processed, it allows us to see the ground’s surface by eliminating the tree canopy,” Brewer explained. “So it’s really helpful for mapping sites that you can’t see unless you’re on the ground. You can walk right by a mound that covered up an ancient house and not even know it’s there.”

The use of LIDAR allows Brewer to build a 3D virtual elevational map upwards from a flat image. The laser component of the LIDAR reflects off of the surface of the landscape and the resulting data are stored to be processed. Once the images have been post-processed, the resulting image (like the one shown at the right) can show the exact shape of anything from an ancient temple to a small water reservoir. However, LIDAR technology is only one step in Brewer’s research process. Once the mapping data were collected, he and an interdisciplinary team of researchers spent time at the site to collect more data. The research team consisted of Dr. Nick Dunning (Brewer’s advisor), a colleague from the Department of Geography, a group from the University of Calgary and a group of Mexican archaeologists. This trinational research team headed to the site in early May, where they worked together to identify some of the architecture clusters and water features by “ground truthing” the LIDAR images—walking the site to check the accuracy of the LIDAR data.

Brewer hopes that his work will help discover more about water management outside of the typically studied areas of the Maya sites—the grandiose urban centers inhabited by the Maya elite. “A lot of the work that has been done in water management has looked at the elite Maya, or the urban core,” he said, “so I’m looking at how some of the smaller structures have been constructed and managed. Were they making the same physical investment in this and were they maintaining these water structures for the same length of time?”

This interest in the areas occupied by the “common people” of the Maya populations is a newer trend in the research being done at sites such as Yaxnohcah. “A lot of the studies with LIDAR, and certainly with archaeology and water management, are starting to look at the exterior areas, and we’re beginning to see how the common people lived—people like us—who were not born into all of this awesomeness of the Maya elite,” said Brewer.

Brewer sees much of the future research on Maya sites focusing on the exterior areas of each site. With the help of technology like LIDAR, it will be easier to recognize the size of a site and where its boundaries lie so that the hinterland areas can be better studied.

“There’s still so much that we don’t know about a critical resource like water. It’s really, obviously necessary for us to survive,” explained Brewer, “It’s interesting to look at how an area that’s so dependent on this natural resource was able to develop like it did, and maintain this development over thousands of years.”
Every year, the National Science Foundation (NSF) awards the Doctoral Dissertation Improvement Grant (DDIG) to a number of outstanding doctoral candidates across the United States. The DDIG is presented to candidates whose dissertation research falls within selected areas of the biological sciences and is considered both interesting and impactful. Jeffrey Brewer, a doctoral student in Geography, received the 2014 DDIG from the NSF for his research on water management in the hinterlands of Maya sites in southern Mexico.
Nathan Wukie has always studied sound. Through high school, he pursued piano performance and even considered entering the University of Cincinnati’s College-Conservatory of Music. Now a doctoral student in aerospace engineering and a National Science Foundation Graduate Research Fellow (NSF GRFP), Wukie continues to explore acoustics and harmonics, vibrations and volume. But instead of the dulcet tones emanating from a concert grand, he investigates the full-throated roar of jet turbines.
Wukie's scientific work still involves creating on a keyboard. His focus is in computational fluid dynamics, designing simulations that aerospace engineers use to develop aircraft engines. His hands move constantly when he describes his work, drawing quick sketches in a way that shows the kinship of visualization between art and science.

“When I’m writing code as a software developer, I have a lot of liberty and creativity. I can piece different mathematical parts together in different ways to be more flexible,” Wukie explains. Crafting simulations seems almost like musical composition, like writing a symphony in differential equations. But Wukie’s high-flying mathematical theory is also heavily practical. “You want to build a machine and know how it’s going to perform. If it’s going to break, we can predict that ahead of time.”

In a simulation, the complex geometry of a machine is split into millions of tiny pieces, or cells. The simulation then describes the fluid behavior of air, including its density, momentum and energy, in each cell; air is modeled as a fluid because, like water, it flows continually under stress. “Essentially, you know what’s coming in and what’s going out,” Wukie says, “but you don’t know what’s going on in-between.” In a jet turbine, “in-between” is a maelstrom of vortices and shock waves that must be carefully understood before the turbine is built, much less takes flight.

Computers like the cells of a simulation to follow a regular, structured pattern called a grid, but this approach rarely mirrors reality. Engineers often have to tweak grid cells manually because the surfaces of the simulated machine follow irregular curves or shapes. However, this stretching and squishing of the grid degrades the accuracy of computation. Wukie and his fellow researchers in the Gas Turbine Simulation Laboratory of Dr. Paul Orkwis address the problem using the Chimera method. Named after the mythical beast with overlapping features of lion, goat and snake, this approach sidesteps the problem of grid deformation by overlapping multiple, simpler grids. “You don’t have to do any fanciness in the grid generation process, and that’s quite easy for an engineer to knock out pretty quickly,” says Wukie. Complications then arise at the points where the grids overlap, and he jokes that “it starts to get a little more mathy.” In effect, the model solves the equations for fluid flow in each cell with other equations, which collectively represent the properties of air at grid junctions.

Over the course of his NSF fellowship, Wukie plans to refine his lab’s existing models, making them easier for other engineers to understand and modify. He explains that his co-op experience as an undergrad at UC, working with companies such as General Electric, showed him the importance of academia in developing new simulation programs. “You see the issues [businesses] have to deal with on a day-to-day basis,” Wukie says, “so it’s exciting to have the time and resources at the university to solve some of these problems.”

Wukie then wants to apply his simulations to novel functions, such as predicting the acoustics of jet engines under development. In collaboration with engineers performing physical experiments, his computational analysis informs design factors like the spacing of turbine blades or placement of acoustic liners. He laughs that working with experimental engineers presents its own challenges: “It’s a running joke that experimentalists say the computationalists are wrong and the computationalists say the experimentalists are wrong!” But in the end, Wukie says, the greatest successes come from the two groups tackling problems “hand-in-hand to confirm reality. That’s really what you’re trying to do, is confirm reality.”
The UC Graduate School by the numbers...

**Application Trend**

**Newly Matriculated Students**

**Enrollment Distribution**

DISTANCE LEARNING TRADITIONAL

**Enrollment Distribution**

INTERNATIONAL DOMESTIC

**Degrees Awarded**

MASTER'S DOCTORAL TOTAL

**Tuition Scholarship Trend**

Total Graduate Assistant Scholarship Graduate Incentive Award

**Stipend Support Trend**

* In the fall of 2012, UC transitioned from quarters to semesters. This led to a significant inequality in the reporting period used for our 2012 reports and it affected the numbers given here.
Dear friends of the Graduate School,

My hope is that this Annual Report convinces you of two things.

The first is that our comprehensive university gains much of its reputation from the inspired scholarship of our faculty and graduate students. This Annual Report highlights the amount of motivation and talent that graduate students bring to the university every day, as well as the breadth of their scholarship. It is a point of pride that only a handful of universities can showcase excellence in musicology right next to engineering innovation.

The second is that the Graduate School is integral to supporting and recognizing the work that makes our university great. Our graduate programs and student body continue to grow. Our university has seen large expansions in distance learning as a mode of teaching our students seeking master’s degrees, and in the programs that cross between the classic disciplines to give our students a more broad preparation for the modern workplace. In these pages you will read about some of the students who have been recognized by the Graduate School (and prestigious national funding agencies) with a broad array of awards and scholarships to support their work. There is more to come. We are excited that the Graduate School is starting a strategic partnership with Xiamen University in China to jointly sponsor Chinese students who join our doctoral programs in support of the university-wide cluster hiring initiatives. We are also building a new program to select Graduate Student Fellows. This group of doctoral students with academic career aspirations will integrate with some of our most accomplished faculty among the Graduate Fellows to learn more about the joys of life in the academy.

The University of Cincinnati is enriched and enlivened by our graduate students and the faculty who teach and mentor them. I hope you are equally enriched as you read about their accomplishments.

You are always welcome to visit our Graduate School offices in Van Wormer Hall, and we encourage you to follow our news on social media sites as we continue to develop and engage opportunities for graduate students and faculty.

Like us on Facebook at http://on.fb.me/GradSchool_UC
Follow us on Twitter at http://twitter.com/GradSchool_UC

Chip Montrose
Vice-Provost
Dean of the Graduate School
Bai, Qing  
PhD, Summer 2014  
**Essays on Stock Return Predictability: Novel Measures Based on Technology Spillover and Firm’s Public Announcement**  
Advisor: Michael Ferguson, PhD

Dugan, Riley  
PhD, Summer 2014  
**I’d Like to Add You to My Professional Network: An Exploratory Look into the Effect of LinkedIn Usage on Sales Performance**  
Advisor: Joshua Clarkson, PhD

Kuppusamy, Saravanan  
PhD, Fall 2014  
**Essays on Electric Vehicle Adoption**  
Advisors: Uday Rao, PhD and Michael Magazine, PhD

Presgrave, Trevor  
PhD, Spring 2015  
**Collaborative Search Engines: Toward a Metadesign for Improving the User Experience**  
Advisor: Vivek Choudhury, PhD

Qin, Fei  
PhD, Summer 2014  
**Supply Chain Strategies in the Presence of Supply Capacity Uncertainty, Consumer Trade-in Services or Human Behavioral Biases**  
Advisors: Uday Rao, PhD and Michael Fry, PhD

Sundar, Aparna  
PhD, Summer 2014  
**Visual Brand Language: Color, Complexity and Harmony**  
Advisor: Frank Kardes, PhD

Wang, Xin  
PhD, Summer 2014  
**Bounded Multiattribute Utility in Behavioral Decision Research: Theory, Estimation and Experimental Tests**  
Advisor: David Curry, PhD
The Graduate School is proud of the diverse academic endeavors completed by its master’s and doctoral students during the 2014-15 academic year. University of Cincinnati master’s theses and doctoral dissertations can be found online at etd.ohiolink.edu.

The following listing of doctoral dissertations represents the quality, vitality and diversity of graduate research and scholarship at UC.

**College of Allied Health Sciences**

**Deshpande, Aniruddha**  
PhD, Summer 2014  
Functional Magnetic Resonance Imaging (fMRI) as a Pre-Implant Objective Tool to Predict Post-Implant Speech-Language-Hearing Outcomes in Children with Cochlear Implants  
Advisor: Robert Keith, PhD

**Deshpande, Shruti**  
PhD, Summer 2014  
Characterization of Cochlear Implant-Related Artifacts during Sound-Field Recording of the Auditory Steady-State Response (ASSR): A Comparison between Normal Hearing Adults, Cochlear Implant Recipients and Implant-in-a-Box  
Advisor: Robert Keith, PhD

**Powell, Maria**  
PhD, Spring 2015  
The Efficacy of Laryngeal Imaging to Assess the Effect of Vocal Fold Masses on Vibratory Function  
Advisor: Lisa Kelchner, PhD

**Griffith, Julie**  
PhD, Fall 2014  
Post-Stroke Language Remediation through Constraint-Induced Aphasia Therapy  
Advisor: Aimee Dietz, PhD
**College-Conservatory of Music**

**Barnett, Jessica**  
PhD, Spring 2015  
*Clusters, Clouds and Constellations: Twelve-Tone Techniques and Variation Strategies in Two Concertos by Ginastera*  
Advisor: Cristina Losada, PhD

**Dolan, Drew**  
DMA, Fall 2014  
*Our Little Secret*  
Advisor: Michael Fiday, PhD

**Jin, Yei-in**  
DMA, Spring 2015  
*A Study of Quarter-Tone Music for Solo Violin by Alois Hába*  
Advisor: David Berry, PhD

**Jung, DoHaeng**  
DMA, Summer 2014  
*Joan Tower's Piano Concertos Homage to Beethoven (1985), Rapids (1996) and Still/Rapids (2013): A Style Study*  
Advisor: Bruce McClung, PhD

**Keenan, Brendan**  
DMA, Summer 2014  
*Petals of a Rose Close*  
Advisor: Mara Helmuth, DMA

**Kernan, Thomas**  
PhD, Fall 2014  
*Sounding "The Mystic Chords of Memory": Musical Memorials for Abraham Lincoln, 1865–2009*  
Advisor: Bruce McClung, PhD

**Kim, Jeongin**  
DMA, Fall 2014  
*Musical Borrowing in Selected Piano Works of Ruth Schonthal*  
Advisor: Bruce McClung, PhD

**Lee, Ji Young**  
DMA, Spring 2015  
*A Style Study of Sergei Rachmaninoff’s and Lowell Liebermann’s Rhapsodies on a Theme of Paganini*  
Advisor: Bruce McClung, PhD

**Liao, Wei-Chun**  
DMA, Spring 2015  
*A Study of Musical Rhetoric in J. S. Bach’s Organ Fugues BWV 546, 552.2, 577 and 582*  
Advisor: Roberta Gary, DMA

**Lourenço, Paulo**  
DMA, Summer 2014  
*A Conductor’s Guide to Select Choral Works of Eurico Carrapatoso*  
Advisor: Earl Rivers, DMA

**Pisano, Paul**  
DMA, Summer 2014  
*Ursatz, Grundgestalt and Hyperdissonance: Post-Kuchkist Compound Syntax in Rachmaninoff Etudes-Tableaux, Op. 39, Nos. 1-3*  
Advisor: Steven Cahn, PhD

**Quick, Matthew**  
DMA, Summer 2014  
*Mussorgsky’s Pictures at an Exhibition: Identifying the Expressive Narrative through Comparisons with Vocal Literature*  
Advisor: Christopher Segall, PhD

**Richardson, Collin**  
DMA, Spring 2015  
*Form in the Organ Symphonies of Edward Shippen Barnes (1887-1958)*  
Advisor: Michael Unger, DMA

**Stemmermann, Nell**  
PhD, Summer 2014  
*Church’s Musical Visitor, 1871-1897: Class, Nationalism and Musical Taste*  
Advisor: Bruce McClung, PhD

**Verbeck, Heather**  
DMA, Spring 2015  
*The Archeological Digs of Lou Harrison: An Examination of Transethnicism in Selected Works for Flute*  
Advisor: Bradley Garner, DMA

**Yun, Yeomin**  
DMA, Fall 2014  
*The Sound of Saxophone from South Korea: A Performer’s Guide to Young Jo Lee’s Sori No. 10 for Alto Saxophone*  
Advisor: James Bunte, DMA
<table>
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<tr>
<th>College of Design, Architecture, Art, and Planning</th>
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| **Chubinski, Jennifer**  
PhD, Summer 2015  
*Relationships between Neighborhoods, Housing and Health Outcomes: A Multilevel Analysis of a Midwestern County*  
Advisor: Rainer vom Hofe, PhD |
| **College of Education, Criminal Justice, and Human Services** |
| **Alawadhi, Fawzeyah**  
PhD, Summer 2014  
*Oral History of Women Educators in Kuwait: A Comparative Model of Care Ethics between Noddings and Al-Ghazali*  
Advisor: Stephen Sunderland, PhD |
| **Baker, Christina**  
EdD, Summer 2014  
*Evaluation of Professional Training on Anxiety: Serving Educators in a Low-Income School*  
Advisor: Laura Nabors, PhD |
| **Blair, Lesli**  
PhD, Fall 2014  
*Community Gardens and Crime: Exploring the Roles of Criminal Opportunity and Informal Social Control*  
Advisor: Pamela Wilcox, PhD |
| **Chae, Eunyoung**  
EdD, Summer 2014  
*Early Childhood Teacher Professional Development Using an Interdisciplinary Approach: Teaching English as a Foreign Language for Young Children in Korea*  
Advisor: Holly Johnson, PhD |
| **Chekour, Adam**  
EdD, Summer 2014  
*The Effectiveness of MyMathLab (MML) Learning System on Developmental Math Instruction*  
Advisor: Sally Moomaw, EdD |
| **Dai, Chia-Liang**  
PhD, Summer 2014  
*Evaluation of an Afterschool Obesity Prevention Program: Children's Healthy Eating and Exercise Program*  
Advisor: Laura Nabors, PhD |
| **Debele, Meskerem**  
EdD, Fall 2014  
*Utopianism and Anti-Utopianism in the Ways Older Ethiopian Children Construct their National Identity and Implications for Social Studies Education*  
Advisor: Linda Plevyak, PhD |
| **Dustman, Eric**  
PhD, Spring 2015  
*A Childhood Perspective: The Expressed Understanding of Empathy through Artistic Forms of Meaning Making*  
Advisor: Miriam Raider-Roth, EdD |
| **Elkins, Rebecca**  
PhD, Spring 2015  
*Social and Behavioral Factors Associated with Adolescent Steroid Use*  
Advisor: Keith King, PhD |
| **Fehr, Sara**  
PhD, Spring 2015  
*The Impact of Relationship and Intrapersonal Factors on Condom Use among College Students*  
Advisor: Rebecca Vidourek, PhD |
| **Gacasan, Karla**  
PhD, Fall 2014  
*The Role of Theoretical Groundings in Diversity Training: A Mixed-Methods Case Study of a University Diversity Conference*  
Advisor: Holly Johnson, PhD |
| **Gallagher, Kathleen**  
PhD, Summer 2014  
*Problem Framing in Problem-Oriented Policing: An Examination of Framing from Problem Definition to Problem Response*  
Advisor: John Eck, PhD |
| **Kennedy, Jay**  
PhD, Summer 2014  
*A View from the Top: Managers' Perspectives on the Problem of Employee Theft in Small Businesses*  
Advisor: Michael Benson, PhD |
| **Killham, Jennifer**  
PhD, Fall 2014  
*Exploring the Affordances of Role in the Online History Education Project “Place Out of Time”: A Narrative Analysis*  
Advisor: Prentice T. Chandler, PhD |
| **Madero Hernandez, Arelys**  
PhD, Summer 2014  
*Examining Three Alternative Explanations for the Race/Ethnicity Disparities in Violent Victimization: Mediation, Moderation and Contextual Effects*  
Advisor: Bonnie Sue Fisher, PhD |
| **Ndrecka, Mirlinda**  
PhD, Summer 2014  
*“In Their Own Voices”: A Participatory Research Project with Black Zimbabwean Women in Greater Cincinnati*  
Advisor: Lisa Vaughn, PhD |
| **Nyemba, Florence**  
PhD, Summer 2014  
*The Impact of Reentry Programs on Recidivism: A Meta-Analysis*  
Advisor: Edward Latessa, PhD |
| **Patrick, Steve**  
EdD, Spring 2015  
*Exploration of Factors Related to Institutional Misconduct for Male Youth in a Juvenile Detention Center Located within an Appalachian County: Using the Massachusetts Youth Screening Instrument 2nd Edition*  
Advisor: Cirecie West-Olatunji, PhD |
Perkins, Wendy  
PhD, Summer 2014  
*Application of an Ecological Model to the Labeling of Sexual Aggression*  
Advisor: Bonnie Sue Fisher, PhD

Proffitt, Aaron  
PhD, Spring 2015  
*Transparent, Accessible Accountability in Higher Education: A Sector-Focused Approach*  
Advisor: Mary Brydon-Miller, PhD

Purple, Meghan  
PhD, Fall 2014  
*Effects of Self-Monitoring on the Writing Performance of Elementary Students*  
Advisor: Renee Oliver Hawkins, PhD

Roberts, Charles  
EdD, Fall 2014  
*Self-Esteem, Friendship Support and Depression in College Students*  
Advisor: Laura Nabors, PhD

Shier, Ashley  
PhD, Summer 2014  
*Combining Multiple Assessments to Develop Function-Based Interventions for Children with Autism*  
Advisor: Renee Oliver Hawkins, PhD

Stevens, Douglas  
PhD, Summer 2014  
*Relational Culture among Staff in an Emerging Urban STEM High School*  
Advisor: Miriam Raider-Roth, EdD

Stroud, Mary  
PhD, Spring 2015  
*A Study of Concept Mapping as an Instructional Intervention in an Undergraduate General Chemistry Calorimetry Laboratory*  
Advisor: Helen Meyer, PhD

Szabo, Anita  
EdD, Summer 2014  
*Students’ Task-Related Perceptions and Task Engagement in the ESL Classroom through Qualitative Lenses*  
Advisors: Susan Watts Taffe, PhD and Mary Benedetti, EdD

Ticknor, Bobbie  
PhD, Fall 2014  
*Sex Offender Policy and Practice: Comparing the SORNA Tier Classification System and Static-99 Risk Levels*  
Advisor: Paula Smith, PhD

Tomeo, Nicholas  
PhD, Fall 2014  
*Correlates between Chronic Stress and Executive Function in College Students*  
Advisor: Rhonda Douglas Brown, PhD

Walton, Janet  
PhD, Summer 2014  
*Partners for Change: A Mixed-Methods Case Study of an Intermediary-Led Partnership for STEM Education Reform*  
Advisors: Carla Johnson, EdD and Jonathan M. Breiner, PhD

Wight, Robert  
PhD, Spring 2015  
*Community-Supported Agriculture as Public Education: Networked Communities of Practice Building Alternative Agrifood Systems*  
Advisor: Mary Brydon-Miller, PhD

Willmore, Sharman Empson  
PhD, Spring 2015  
*Healthy Communities: The Role of Neighborhood Support, Safety and Belongingness as Predictors of Physical and Mental Health of Appalachians*  
Advisor: Liliana Rojas-Guyler, PhD

Xiao, Ting  
EdD, Summer 2014  
*Pedagogical Beliefs and Practices through Guided Reflection: A Multiple-Case Study of ESL Writing Instructors*  
Advisor: Connie Kendall, PhD

Young, Bernard  
EdD, Fall 2014  
*Descriptive Study of Democratized Style of Policy Discussion in Health Care*  
Advisor: Mary Brydon-Miller, PhD

Zaidi, Nikki  
PhD, Spring 2015  
*Hidden Variance in Multiple Mini-Interview Scores*  
Advisor: Christopher Swoboda, PhD

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**College of Engineering and Applied Science**

Abbas, Syed  
PhD, Spring 2015  
*Advanced Hybrid Simulation Model Based on Phenomenology and Artificial Intelligence*  
Advisor: Gian Rassati, PhD

AlAdawy, Ahmed  
PhD, Summer 2014  
*Effects of Turbulence on NOx Emissions from Lean Perfectly-Premixed Combustion*  
Advisor: Jongguen Lee, PhD

Bates, Nathaniel  
PhD, Summer 2014  
*Investigation of Anterior Cruciate Ligament and Medial Collateral Ligament Biomechanics during 6-Degree-of-Freedom, Robotically-Simulated Athletic Tasks*  
Advisor: Timothy Hewett, PhD

Breidenbach, Andrew  
PhD, Summer 2014  
*Translating Mechanisms of Tendon Development to Improve Adult Tendon Repair*  
Advisor: David Butler, PhD

Chaturvedi, Amal  
PhD, Fall 2014  
*Wideband Signal Delay and Direction of Arrival Estimation Using Sub-Nyquist Sampling*  
Advisor: H. Howard Fan, PhD

Chen, Xiaoting  
PhD, Spring 2015  
*Optimal Control of Nonconventional Queueing Networks: A Simulation-Based Approximate Dynamic Programming Approach*  
Advisor: Emmanuel Fernandez, PhD
Chen, Ye
PhD, Spring 2015
Fuzzy Cognitive Maps: Learning Algorithms and Biomedical Applications
Advisor: Ali Minai, PhD

Cumby, Brad
PhD, Summer 2014
Laplace-Pressure Actuation of Liquid Metal Devices for Reconfigurable Electromagnetics
Advisor: Jason Heikenfeld, PhD

Darwish, Amina
PhD, Fall 2014
Silica Surface Modifications for Protein Separation
Advisor: Stephen Thiel, PhD

Ernest, Nicholas
PhD, Spring 2015
Genetic Fuzzy Trees for Intelligent Control of Unmanned Combat Aerial Vehicles
Advisor: Kelly Cohen, PhD

Feng, Linqian
PhD, Summer 2014
Synthesis and Characterization of Polyimide Copolymers Containing Ladder-Like Polysiloxane
Advisor: Jude Iroh, PhD

Gomez, Eliot
PhD, Spring 2015
Investigation of DNA Nucleobases for Bioorganic Light-Emitting Diodes
Advisor: Andrew Steckl, PhD

Han, Qiang
PhD, Spring 2015
On Resilient System Testing and Performance Binning
Advisor: Wen-Ben Jone, PhD

He, Xuexiang
PhD, Summer 2014
Kinetic and Mechanistic Studies on the Removal of Cyanotoxins and Antibiotics with Hydroxyl and Sulfate Radical-Based Advanced Oxidation Processes
Advisor: Dionysios Dionysiou, PhD

James, Sagil
PhD, Spring 2015
Study of Vibration-Assisted Nano-Impact Machining by Loose Abrasives (VANILA)
Advisor: Sundaram Murali Meenakshi, PhD

Jia, Zhen
PhD, Summer 2014
Image Registration and Image Completion: Similarity and Estimation Error Optimization
Advisor: William Wee, PhD

Joshi, Vineet
PhD, Spring 2015
Unsupervised Anomaly Detection in Numerical Datasets
Advisor: Raj Bhatnagar, PhD

Kao, Yi-Huan
PhD, Summer 2014
Experimental Investigation of Aerodynamics and Combustion Properties of a Multiple-Swirler Array
Advisor: San-Mou Jeng, PhD

Kapoor, Vikram
PhD, Summer 2014
Integrated Analysis of Bacteroidales and Mitochondrial DNA for Fecal Source Tracking in Environmental Waters
Advisor: David Wendell, PhD

Knapke, Robert
PhD, Spring 2015
High-Order Unsteady Heat Transfer with the Harmonic Balance Method
Advisor: Mark Turner, ScD

Kolli, Kranthi
PhD, Fall 2014
Diagnosis of Coronary Artery Disease Using Pressure Drop Coefficient
Advisor: Rupak Banerjee, PhD

Lalley, Andrea
PhD, Fall 2014
Identifying and Evaluating Novel Biological Targets to Improve Musculoskeletal Tissue Engineering Strategies
Advisor: Jason Shearn, PhD

Li, Zhen
PhD, Spring 2015
The Transport and Fate of Metal and Metal Oxides Nanoparticles under Different Environmental Conditions
Advisor: George Sorial, PhD

Liang, Marissa
PhD, Summer 2014
Quantitative Analysis of Major Factors Affecting Black Carbon Transport and Concentrations in the Unique Atmospheric Structures of Urban Environment
Advisor: Timothy Keener, PhD

M Ayyadurai, Subasri
PhD, Summer 2014
Optical Sensing of Organic Contaminants through Their Immobilization and Reaction inside Perfluorosulfonic Acid Polymer Membranes
Advisor: Anastasios Angelopoulos, PhD
Ma, Tao  
PhD, Spring 2015  
A Framework for Modeling and Capturing Social Interactions  
Advisor: William Wee, PhD

Mandour, Mohamed  
PhD, Fall 2014  
Development and Assessment of Altitude-Adjustable Convergent-Divergent Nozzles Using Passive Flow Control  
Advisor: Shaaban Abdallah, PhD

Nemnem, Ahmed  
PhD, Fall 2014  
A General Multidisciplinary Turbomachinery Design Optimization System Applied to a Transonic Fan  
Advisor: Mark Turner, ScD

Norouzi, Mehdi  
PhD, Fall 2014  
Tracking Long-Term Changes in Bridges using Multivariate Correlational Data Analysis  
Advisor: Victor Hunt, PhD

Palakurthi, Nikhil Kumar  
PhD, Summer 2014  
Direct Numerical Simulation of Liquid Transport through Fibrous Porous Media  
Advisor: Urmila Ghia, PhD

Pasha, Hasan  
PhD, Fall 2014  
Estimation of Static Stiffnesses from Free Boundary Dynamic (FRF) Measurements  
Advisor: Randall Allemang, PhD

Peelukhana, Srikara Vishwanath  
PhD, Summer 2014  
Better Diagnosis of Coronary Artery Disease Using Combined Translesional Hemodynamics and Anatomical Information  
Advisor: Rupak Banerjee, PhD, PE

Perrino, Michael  
PhD, Summer 2014  
An Experimental Study into Pylon, Wing and Flap Installation Effects on Jet Noise Generated by Commercial Aircraft  
Advisor: Ephraim Gutmark, PhD, DSc

Platten III, William  
PhD, Summer 2014  
Fate of Emerging Contaminants in Biomass Concentrating Reactors (BCR) under Conventional Aerobic and Aerobic/Anoxic Treatment  
Advisor: Makram Suidan, PhD

Rajabi Jaghargh, Ehsan  
PhD, Spring 2015  
Effects of Hemodynamic Stresses on the Remodeling Parameters in Arteriovenous Fistula  
Advisor: Rupak Banerjee, PhD, PE

Ravindren, Sriram  
PhD, Spring 2015  
New Insights into the Glass Structure and Melt Dynamics of Ge-As-Se Alloys: Topological Phases, Eutectic Effects, Slow Homogenization of Melts and Nanoscale Phase Separation Effects  
Advisor: Punit Boolchand, PhD

Raymond, Jason  
PhD, Spring 2015  
Bioactive Gas Encapsulation and Release from Echogenic Liposomes  
Advisor: Christy Holland, PhD

Rezvanianian, Seyed Mohammad  
PhD, Spring 2015  
Probabilistic-Based Classification Techniques for Improved Prognostics Using Time Series Data  
Advisor: Jay Lee, PhD

Russell, Ann  
PhD, Fall 2014  
Fundamentals and Application of Large Area Dielectrowetting Optical Shutters  
Advisor: Jason Heikenfeld, PhD

Safwat, Amr  
PhD, Summer 2014  
Stochastic Multimedia Modelling of Watershed-Scale Microbial Transport in Surface Water  
Advisor: Lilit Yeghiazarian, PhD

Schrottenbaum, Ines  
PhD, Spring 2015  
Influence of Wall Biofilm on Pathogen Transport in Water Distribution Systems: Modeling Estimates Derived from Synthetic Biofilm Experiments  
Advisor: James Uber, PhD

Schultz, Alex  
PhD, Spring 2015  
Programmable Control of Nondroplet Electrowetting Microfluidics: Enabling Materials, Devices and Electronics  
Advisor: Jason Heikenfeld, PhD

Schultz, Phillip  
PhD, Spring 2015  
Switchable Retroreflector Films for Enhanced Visible and Infrared Conspicuity  
Advisor: Jason Heikenfeld, PhD

Sista, Sri Narasimha Bhargava  
PhD, Fall 2014  
Dry Static Friction in Metals: Experiments and Microasperity Based Modeling  
Advisor: Kumar Vemaganti, PhD
Spatholt, Rebecca  
PhD, Spring 2015  
*Establishing Design Criteria for Anterior Cruciate Ligament Reconstruction*  
Advisor: Jason Shearn, PhD

Subramanian, Swetha  
PhD, Spring 2015  
*Thermal Ablation Monitoring Using Ultrasound Echo Decorrelation Imaging*  
Advisor: T. Douglas Mast, PhD

Vyas, Aniket  
PhD, Fall 2014  
*Morphology and Properties of Clay/Nylon-6-Epoxy Nanocomposites, Coatings and Films*  
Advisor: Jude Iroh, PhD

Wei, Wei  
PhD, Spring 2015  
*Development of an Effective System Identification and Control Capability for Quadcopter UAVs*  
Advisor: Kelly Cohen, PhD

Worrall, Adam  
PhD, Fall 2014  
*Immobilization of Organic Molecules within Perfluorosulfonic Acid Membranes for Optical Sensing in Humid Environments*  
Advisor: Anastasios Angelopoulos, PhD

Wu, Chao  
PhD, Summer 2014  
*Intelligent Data Mining on Large-Scale Heterogeneous Datasets and its Application in Computational Biology*  
Advisor: Raj Bhatnagar, PhD

Wu, Shuyun  
PhD, Fall 2014  
*Anaerobic Biodegradation Patterns for Biodiesel*  
Advisor: Makram Suidan, PhD

Xu, Zhi  
PhD, Spring 2015  
*Investigations on Molecular Sieve Zeolite Membranes as Proton-Selective Ion Separators for Redox Flow Batteries*  
Advisor: Junhang Dong, PhD

College of Medicine

Acciani, Thomas  
PhD, Spring 2015  
*EGF Receptor Signaling and Diesel Exhaust Particle Exposure in Asthma Pathogenesis*  
Advisor: Timothy Lecras, PhD

Adams, Allie  
PhD, Spring 2015  
*Targeting the DEK Oncogene in Head and Neck Squamous Cell Carcinoma: Functional and Transcriptional Consequences*  
Advisor: Susanne Wells, PhD

Alexander, Eileen  
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ANNUAL REPORT

2015

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