UCF

Pursuit

University of Central Florida
College of Sciences
2018-2019

A MESSAGE FROM THE DEAN

One of the joys of this great institution is our determination to continue our development as a prominent national research university, while at the same time offering a first-rate education to students from all backgrounds. You may know that a quarter of our students are the first in their families to have attended college. In addition, this year UCF has been officially designated a Hispanic-Serving Institution. We are proud of our success in boosting the lives and livelihoods of a diverse student body, and determined to do it even better in coming years.

Our faculty and students do work that matters. I would like to mention a few bright stars.

- UCF's **Nicholson School of Communication and Media** is a key piece of the new campus opening this fall in downtown Orlando. The move is a new gateway for faculty and students to access internships, hands-on learning and jobs in the media outlets and businesses downtown.

- This year we launched the National Center for Integrated Coastal Research, or **UCF Coastal**, in response to a dire challenge: improving the resiliency of our coastal communities. The human, economic and environmental health of coastal communities are inextricably linked, and UCF Coastal researchers ranging from ecologists to economists to epidemiologists work with government agencies and private sector companies to ensure the future of our coastal communities.

- UCF is a national leader in **data science**. We started some of the nation's first integrated data analytics degree programs through a coordinated effort among faculty in the fields of business, computer science, engineering, statistics and mathematics. Partnerships with private business leaders throughout the nation ensure the programs keep up with rapidly changing demand.

- I hope you know of the work at the **Rosengren Trauma Clinic at UCF RESTORES**. This is a nationally recognized center of training, research and treatment of stress disorders, including PTSD. Treatments developed there outperform conventional methods, and are replicated across the country. UCF recently opened a clinic in Brevard County, and is extending services at all clinics to first responders and victims of mass shooting traumas.

- UCF has one of the nation's top **planetary science** programs. Last year, UCF assumed management of the the Arecibo Observatory in Puerto Rico, the second-largest radio telescope on the planet. Our faculty and students are also working closely with the private space industry, including scientists researching how to extract minerals from asteroids and mine ice from the moon.

It's been a wonderful year. Charge On!

Michael Johnson, Ph.D.
Dean, UCF College of Sciences

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PURSUIT

2018-2019

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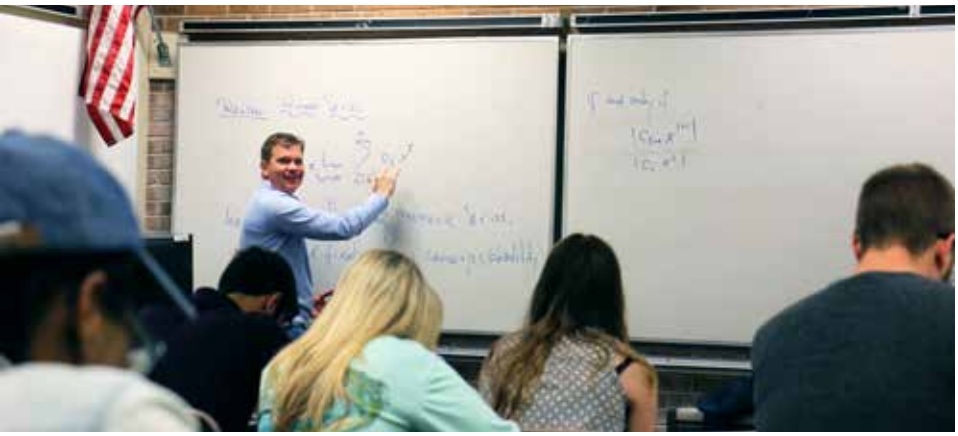


SOWING SUCCESS

GROWING THE UCF ARBORETUM

Someone once asked Hank Whittier, Ph.D., "What's going to happen to the Arboretum when you're no longer here?"

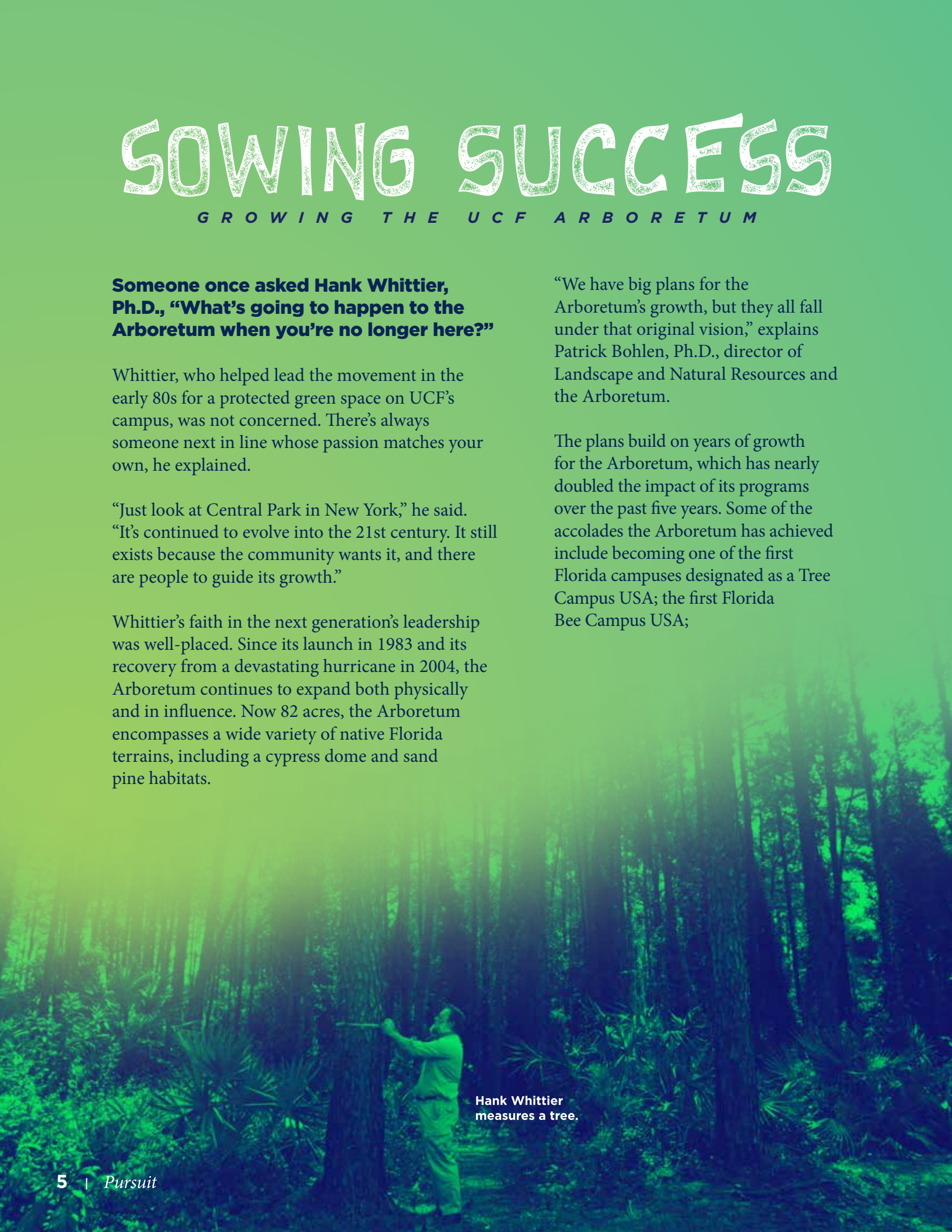
Whittier, who helped lead the movement in the early 80s for a protected green space on UCF's campus, was not concerned. There's always someone next in line whose passion matches your own, he explained.

"Just look at Central Park in New York," he said. "It's continued to evolve into the 21st century. It still exists because the community wants it, and there are people to guide its growth."

Whittier's faith in the next generation's leadership was well-placed. Since its launch in 1983 and its recovery from a devastating hurricane in 2004, the Arboretum continues to expand both physically and in influence. Now 82 acres, the Arboretum encompasses a wide variety of native Florida terrains, including a cypress dome and sand pine habitats.

"We have big plans for the Arboretum's growth, but they all fall under that original vision," explains Patrick Bohlen, Ph.D., director of Landscape and Natural Resources and the Arboretum.

The plans build on years of growth for the Arboretum, which has nearly doubled the impact of its programs over the past five years. Some of the accolades the Arboretum has achieved include becoming one of the first Florida campuses designated as a Tree Campus USA; the first Florida Bee Campus USA;



Hank Whittier measures a tree.

Students plant long leaf pine in a recently burned unit to help restoration efforts.

and an Outstanding Urban Forestry Program Award in 2017 from the Florida Urban Forestry Council. The recently expanded community garden logs thousands of student volunteer hours every year, and takes an active role in changing students' lives by supplying fresh produce to the Knight's Pantry.

The Arboretum's urban setting in Central Florida perfectly positions it to attract not just students, staff and faculty, but the surrounding community. Plans are underway to capitalize on this location by rebuilding the core Arboretum site that was central to Whittier's original work and vision. A new master plan includes creating new trails, building a small amphitheater and establishing a footbridge to connect the community garden to the rest of the site.

A central feature of the new plan is to use many of Whittier's favorite plants to create the immersive, natural experience that he envisioned and worked so hard to create. The first phase of this planting begins this year with a cabbage palm grove where students can hang hammocks, a camellia garden and a special entry garden for Whittier's Walk, a boardwalk that he built with student help many years ago, and that was officially dedicated in his honor this past spring.

The evolution of the Arboretum from protected green space to living classroom is exactly what Hank Whittier envisioned, says his widow, Barbara Whittier '70, '74M.Ed.:

"Hank would love all of it. It's evolved in a way that closely meets the needs of students."

Barbara praises the bold vision for the Arboretum's future as a strong countermeasure to a generation spending more time indoors than ever. "Growing a sense of wonder is the key to the Arboretum's survival," she says.

SUPPORT ARBORETUM CONSERVATION TODAY

Contact:
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Visit:
ucffoundation.org/arboretum

GENEROSITY'S RIPPLE EFFECT

IT'S TOUGH WORK RAISING MONEY.

But late nights, early mornings and thankless hours dedicated to a cause all add up to magical moments when a life is permanently changed. That's what drives Maggie LeClair's philanthropy, and inspired her to secure her legacy through donations to scholarships to three different areas of biology.

"As I get older I start to think of the mark I've made on the world," explains LeClair, executive assistant to College of Sciences Dean Michael Johnson, Ph.D. "And it's not like you're going to miss your paycheck when you're gone."

LeClair's service philosophy was inspired by a fundraising event not long after moving to Orlando from London in the mid-70s and starting a career at UCF. The event, jointly hosted between the Florida Public Relations Association and the Nicholson School of Communication and Media, raised scholarship money for communications students through a "Roast and Toast" featuring local celebrities. LeClair was recruited for the organizing committee, and saw firsthand the work that goes into making dreams come true.

And it is work. People are much more likely to give when they have a vested interest in something, be it scholarships for students or funding research. But excuses are abundant and easy to manufacture, so LeClair has developed a technique over the years that perfectly falls between guilt trip and gentle reminder.

"I drive people in the (College of Sciences) and every organization like we're training for the Iditarod," LeClair says with a laugh.

Over the years, LeClair has seen scholarships awarded to students who achieved academic excellence while sleeping in their cars, or overcoming lives rocked by addiction and abuse. LeClair witnessed not just gratitude in the moment, but, over time, students who built successful careers and returned the favor by giving their own time and resources to scholarships.

"That ripple effect is truly amazing," LeClair says. "The impact extends so much farther than one life changed."

Discover giving opportunities:
ucffoundation.org/givetocos

INSPIRING CHANGE THROUGH RESEARCH

Andre Garcia '08, '16MBA, Ph.D., sees huge potential for the Puerto Rican community in Central Florida, not unlike the Cuban influence in South Florida. But to reach that level will take time, resources and commitment.

That's why Garcia supports the Puerto Rico Research Hub, which was founded in 2018 to gather data on the booming Puerto Rican population in Central Florida. The data generated by the Hub will reveal important demographics, demonstrate buying power and influence elections. From Garcia's perspective, it will also demonstrate to leaders outside the community that the Puerto Rican voice matters.

"Puerto Ricans are a powerful force for change, and that should be recognized," Garcia says.

A research summit in early 2019 brought together community influencers, academics and business leaders to decide on specific issues for Hub researchers to explore. Health (both physical and mental) and education emerged as top priorities, along with issues that are not unique to the Puerto Rican community like affordable housing.

"Getting feedback from the community, versus deciding topics from an academic standpoint, helps us to focus on issues that really matter," says Fernando Rivera, Ph.D., director of the Hub.

The end goal for the data is to lay an agenda for improving quality of life for Puerto Ricans living in Central Florida. Garcia believes the first step in that agenda is education, and UCF's designation as a Hispanic-Serving Institution is a move in the right direction.

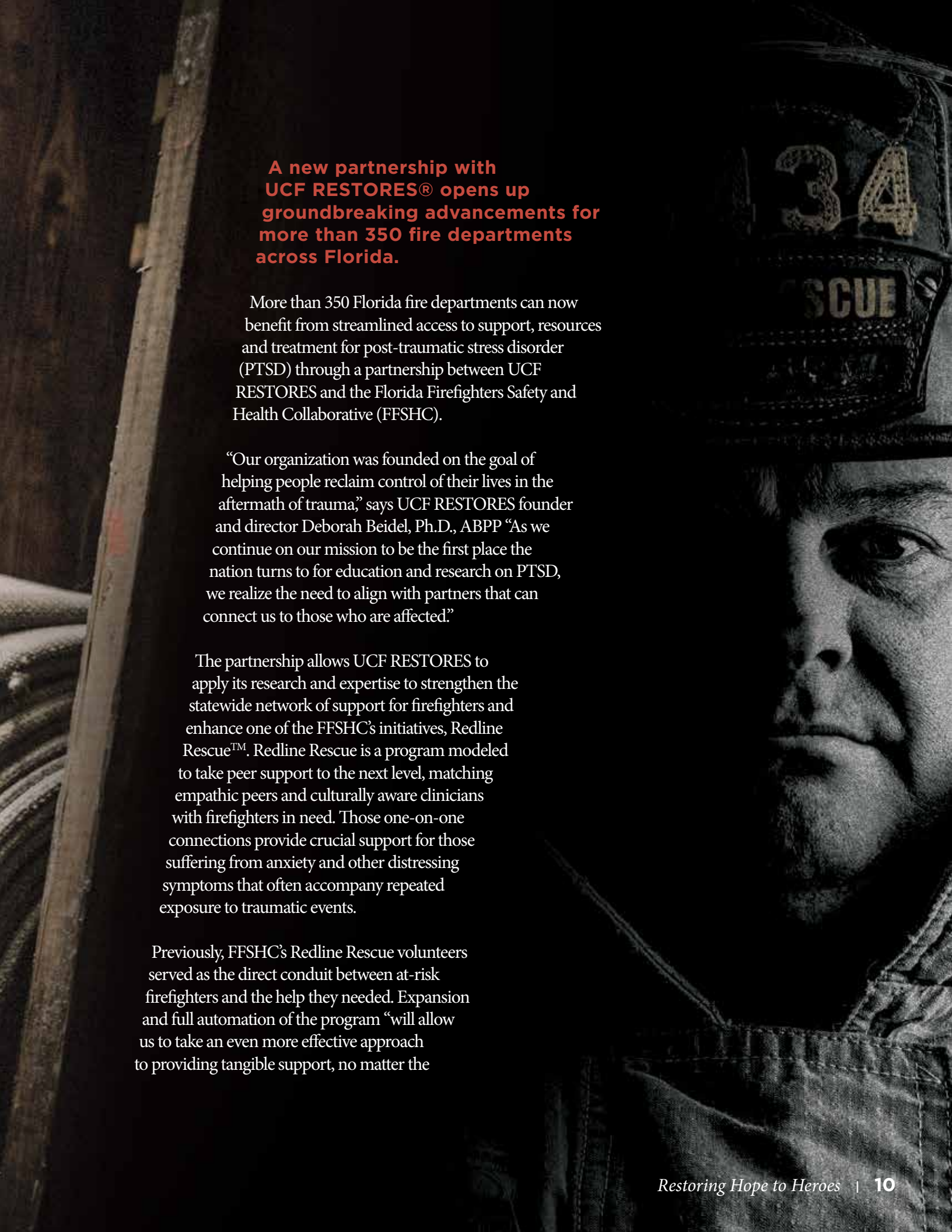
"I'm a big believer in education. Education changes a family tree forever, and improves the standard of living better than anything else," Garcia says.

Fernando Rivera, Ph.D.
Director
UCF Puerto Rico Research Hub

To learn more about the Puerto Rico Research Hub visit:
sciences.ucf.edu/puerto-rico-hub

RESTORING HOPE TO HEROES

• UCF RESTORES •



A new partnership with UCF RESTORES® opens up groundbreaking advancements for more than 350 fire departments across Florida.

More than 350 Florida fire departments can now benefit from streamlined access to support, resources and treatment for post-traumatic stress disorder (PTSD) through a partnership between UCF RESTORES and the Florida Firefighters Safety and Health Collaborative (FFSHC).

"Our organization was founded on the goal of helping people reclaim control of their lives in the aftermath of trauma," says UCF RESTORES founder and director Deborah Beidel, Ph.D., ABPP "As we continue on our mission to be the first place the nation turns to for education and research on PTSD, we realize the need to align with partners that can connect us to those who are affected."

The partnership allows UCF RESTORES to apply its research and expertise to strengthen the statewide network of support for firefighters and enhance one of the FFSHC's initiatives, Redline Rescue™. Redline Rescue is a program modeled to take peer support to the next level, matching empathic peers and culturally aware clinicians with firefighters in need. Those one-on-one connections provide crucial support for those suffering from anxiety and other distressing symptoms that often accompany repeated exposure to traumatic events.

Previously, FFSHC's Redline Rescue volunteers served as the direct conduit between at-risk firefighters and the help they needed. Expansion and full automation of the program "will allow us to take an even more effective approach to providing tangible support, no matter the

time of day," says Dustin Hawkins, FFSHC mental wellness director. "With our roster of firefighters and UCF RESTORES' game-changing approach to treatment – the success of which we've seen firsthand – the foundation is laid for us to make a greater difference than ever before."

UCF RESTORES, which was established in 2011, offers a unique approach to treatment, including the first-of-its-kind three-week intensive outpatient program, combining emerging technology, one-on-one exposure therapy and group therapy sessions to help those suffering from PTSD. Research has shown that the multidisciplinary approach is effective, with 66% of participants with combat-related PTSD and 76% of first responders no longer meeting the diagnostic criteria for PTSD at the end of treatment.

UCF RESTORES has treated nearly 500 veterans and active-duty personnel and has expanded to treat military veterans from 20 states. The organization has also served survivors of mass shootings and nearly 215 first responders, including those from the Pulse nightclub tragedy in Orlando.

"Our relationship with the FFSHC serves as an invaluable pipeline to firefighters in Florida and beyond," says Beidel, "We are so grateful for the opportunity to serve those that devote their lives to serving others."

To learn more about UCF RESTORES visit:
www.ucfrestores.org ***-or-***
ucffoundation.org/ucfrestores

COMMUNICATING IN A CRISIS

UCF'S NEW STRATEGIC COMMUNICATION PH.D.

Effectively countering rumor, misinformation and fear during times of crisis is the focus of a new doctoral program from the Nicholson School of Communication and Media. The strategic communication Ph.D. will provide hands-on instruction in developing potentially life-saving messages for a variety of events including food recalls, mass shootings and natural disasters. It will also focus on theory and research for developing more effective models of crisis communication.

"It runs the whole range of crises," explains Timothy Sellnow, Ph.D., director of graduate studies at Nicholson. "Students will be ready to respond from the outset of a crisis to the recovery stage."

The program will emphasize public health safety, both reactionary — like a recall of E.coli-tainted Romaine lettuce — and more complicated campaigns like vaccination reminders. The latter is an important instructional element of crisis communication that helps people and their families take action to protect themselves.

Professionals who want to teach and consult in the field of strategic communication and first responders are ideal for this program. Having completed the program, graduates can go on to careers in academia and with agencies like the Centers for Disease Control and Prevention, the Department of Homeland Security and the Florida Division of Emergency Management.

"These are people who are highly interested in building their communication skills and deeply committed to the focus of the program," Sellnow says. "Our mantra is: 'The right words at the right time save lives.'"

To learn more about the Nicholson School of Communication and Media visit:
communication.ucf.edu

KNIGHTS FOR SOCIAL JUSTICE

Sociologists research and quantify the way humans treat each other — and the often-terrible results of those actions. But topics like racism, sexism, homelessness and poverty are just words on a screen if you never leave the office.

That's the purpose behind Knights for Social Justice (KSJ), a student-run organization on a mission to put a human face to research. This year, for instance, KSJ hosted a three-day event spotlighting human trafficking, with guest speakers from local law enforcement, non-profits and government agencies detailing their experiences on the front lines. Out in the community, they're cleaning up trash on the banks of the Econlockhatchee River and advocating for reforms with state and federal legislators.

"We want to impact lives. We are identifying all these communities with inequalities, but without action you're sitting there and working. These are real people," says Lauren Daniel '17, '19M.A., the club's incoming president and a master's student studying social sciences.

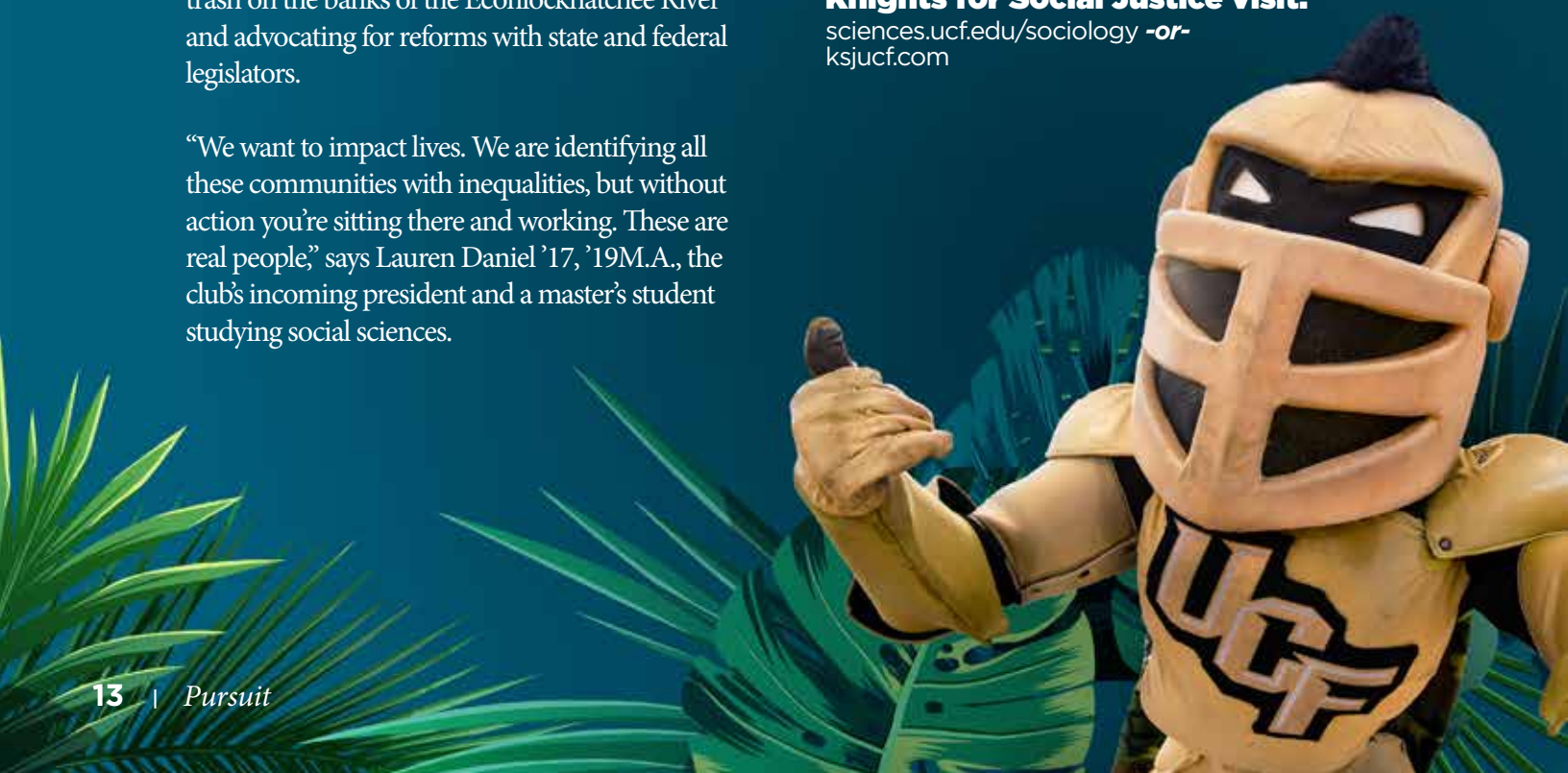
The club is broken out into caucuses, each focused on a different subject. For instance, there are caucuses for criminal justice reform, political action, LGBTQ rights and environmental justice. This structure allows students to concentrate their efforts on a topic that's personal to them, or to expand their viewpoints on the world.

One of Daniel's goals as president is expanding the mentorship program at Evans High School in the Pine Hills community.

Research has its value, but often publications are limited to a niche audience, explains outgoing president Jackie Reiss, '17, also a sociology master's student. This broad approach sets up students for a lifetime of personalizing their sociology passions.

"Instead of just publishing, we're incorporating a hands-on aspect," Reiss says.

To learn more about Knights for Social Justice visit:
sciences.ucf.edu/sociology ***-or-***
ksjucf.com



PSYCHOLOGY

ON THE SILVER SCREEN

Most people watching a movie don't think twice about a cat jumping on a counter or a raven landing on a shoulder. But Katelyn O'Rourke '14 knows better.

The psychology alumna is an animal trainer who has worked with everything from porcupines to dogs. Most days you can find her performing at the animal-actor show at Universal Orlando, but she's also worked on TV commercials and was recently on set for the Hallmark movie *Christmas Everlasting*.

UCF's psychology classes taught O'Rourke the fundamentals of conditioning and behavioral coaching she leans on every day to prepare her for working with animals. O'Rourke combined that head knowledge with hard work and determination to get where she is today.

"It's a hard business to get into, but you can do it if you're willing to work hard," O'Rourke says.

To learn more about the Psychology Department visit:
sciences.ucf.edu/psychology

A BRUSH <WITH HISTORY>

UCF archaeologists are working hard on Florida's Space Coast to preserve historic sites before they're overtaken by erosion and rising seas.

The work is part of a project with the Air Force's 45th Space Wing, called the Cape Canaveral Archaeological Mitigation Project. The goal is to help the Air Force collect and preserve as much as possible before the sea reclaims the area in an estimated 20-25 years.

Meanwhile, the project gives UCF students invaluable field experience with twice-weekly site visits while providing internship credit.

"This program is one of the few in Florida where we're working hard to give students primary professional experience during the regular semester for the price of a regular class," says Stacy Barber, Ph.D., a UCF archaeologist whose students are helping excavate sites at the Cape Canaveral Air Force Station.

Barber says archaeology typically has a high barrier to entry because it requires field training, which can be an expensive commitment. The field experience here

will give participants an advantage when they enter the job market.

"Most students can't take six weeks of their summer off from a job to learn how to do archaeology at a remote location, so here we are less than an hour from Orlando and our students are taking this class just like a regular class," she says.

Burial sites, settlements, the original Cape Canaveral lighthouse and a historic hotel are the places undergoing study at Cape Canaveral Air Force Station.

On a recent dig day, UCF students and researchers were excavating in square pits deep in the brush, near a burial mound. From the earth, the students pulled fragments of pottery, shells and bones from fish, indicating the location was perhaps a place for meals.

"What we're really eager to see is how people were using this area," Barber says. "We think it is probably feasting, maybe some kind of ceremonial ritual next to the burial mound, but we can't say for certain until we can get some good hard data."

Unlike many archaeological sites on Florida's West Coast, these East Coast sites are almost completely unstudied. Learning about the past and how its resources were used may very well help the Space Coast community forge its future, Barber says.

The research team also included Neil Duncan, Ph.D., an assistant professor of archaeology, Sandra Wheeler '98, '02M.A., Ph.D., an associate lecturer of biological anthropology, and Amanda Groff '03 '07M.A., Ph.D., an associate lecturer of archaeology.

To learn more about the Anthropology Department visit:
sciences.ucf.edu/anthropology

Wading Room

Getting an "A" in chemistry has never been sweeter.

Just ask the students studying under Lecturer Emily Heider, Ph.D., who made Orlando's wetlands a hands-on classroom for examining the effects of sucralose on the environment.

The artificial sweetener is suspected of harming the intestinal bacteria of native wildlife, but its true impact is yet to be fully explored. It was an important topic for Heider, who values wetlands enough to volunteer as a public tour guide for the Orlando Wetlands Park. But she also recognized its potential for service-learning.

"Diagrams in a textbook don't have the texture or smell of actually wading out into wetlands," Heider says. "That's where learning really happens."

Heider guided her class through designing a sampling strategy, then led them through testing water for its pH levels, chloride, total dissolved solids and, of course, sucrose.

Soon after the service-learning project, Heider's submitted paper on the experience was published in the January 2018 edition of the Journal of Chemistry Education, then featured as the cover story in April 2018. That inspired the St. Johns Water Management District to pursue further studies into the topic.

Heider plans to take her service-learning model to the Brevard Museum of History and Natural Science and Orange County Regional History Center to inspire more STEM projects.

"It's such a joy to see that 'click' when a student gets it," Heider says. "I'm excited to see where we go from here."

To learn more about the Chemistry Department visit:
sciences.ucf.edu/chemistry

DATA TRAILBLAZER

Businesses have been trying to get into the minds of their customers for centuries. Now they're closer than ever.

While there's still no mind-reading device on the market, there is data — about 2.5 quintillion bytes of data created per day. That data can reveal customers' preferences, from time of day they're likely to go shopping to the deals that will grab their attention. The key is knowing how to interpret that data and use it correctly, and that's Daniel Stiefel's '98, specialty.

"We're taking the guesswork out of business."

Stiefel first discovered the value of data as head of East Coast operations for OfficeMax.

The data set was massive, with thousands of products for purchase across thousands of locations. Point-of-sale data helped Stiefel and his team build promotions, sift out the dud products and pinpoint the big sellers. Slight tweaks added up.

"One percentage point change still impacts the bottom line," Stiefel says.

Stiefel also brought his insights to Church's Chicken, where he continued studying customer patterns through data. Data guided decisions on menu combinations and marketing campaigns tailored to local, regional and national levels. The technology he depended on for these decisions continues to develop at an accelerated pace, making it possible to dig deeper and generate more granular results.

In 2010, Stiefel set out on his own and started his own consulting business called Steeful. His employees deploy intricate algorithms to help businesses interpret existing data and capture future data in comprehensive, but easy-to-understand reports. Just as the technology has changed, Stiefel says his hires are also bringing more diverse backgrounds. A competitive resume not only includes data analytics, but experience in computer science and programming as well.

"The old days of being a business manager and not knowing computer science are over," Stiefel says.

To learn more about the Statistics and Data Science Department visit:
sciences.ucf.edu/statistics


Smart Moves

Seven "smart cities" are in the works after a groundbreaking agreement was made in 2018 between UCF and the Indian state of Madhya Pradesh.

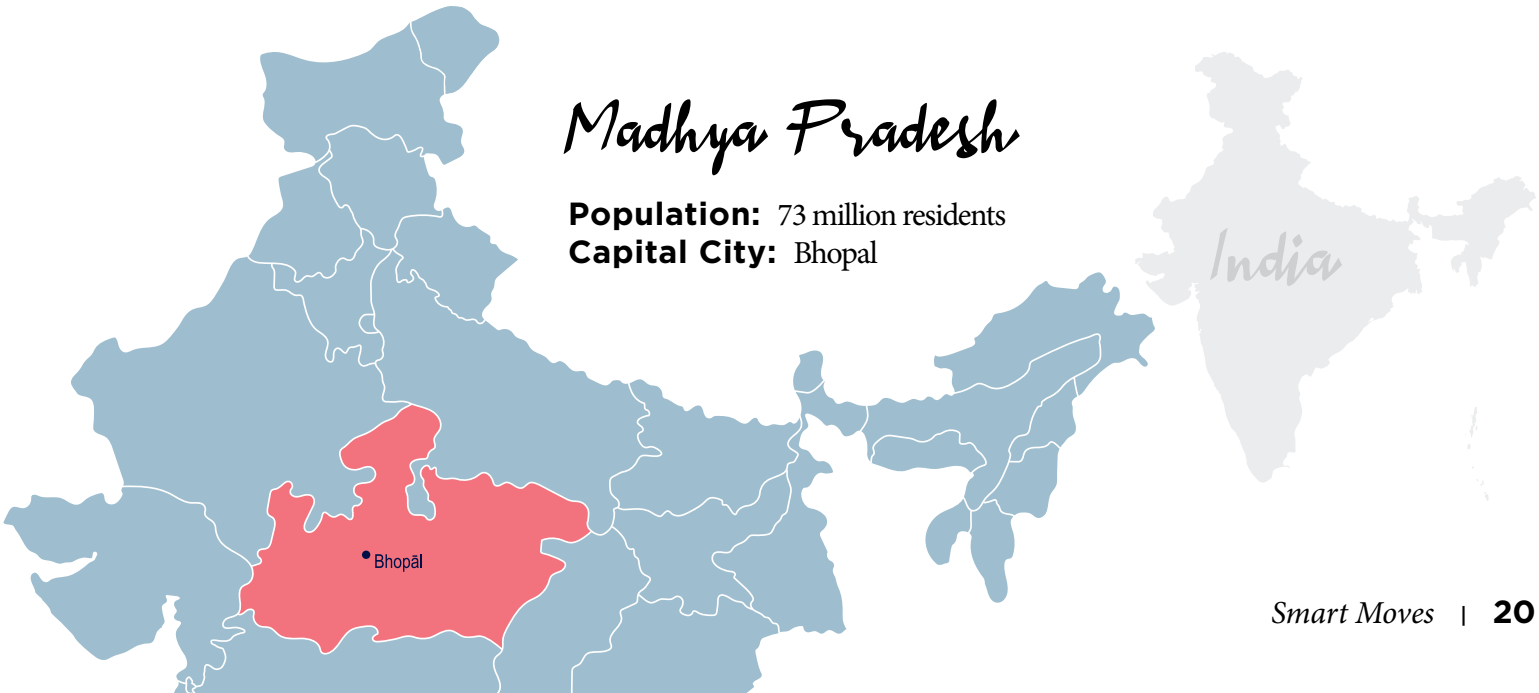
The Smart City Initiative has been championed by the Modi government as the best way to guarantee sustainable growth in India. Madhya Pradesh has established seven "smart cities," more than any other Indian state. The groundbreaking 2018 agreement between Madhya Pradesh and UCF will help the state remain India's smart city leader by scientifically measuring performance, testing new technologies and employing innovative approaches to meet environmental, demographic and infrastructure challenges.

UCF scientists, including those from the College of Sciences, and their Indian counterparts plan to focus their research in areas including sustainability, transportation and tourism. The next steps include establishing a permanent smart city research cell. This cell, part of The India Center at UCF, would include UCF faculty members from multiple colleges, and would capitalize on academic partnerships with Madhya Pradesh universities.

The memorandum of understanding is the first of its kind between a U.S. university and an Indian state. Working with the Washington, D.C.-based Center for Strategic and International Studies, UCF hosted Madhya Pradesh Principal Secretary Vivek Aggarwal in April 2018. This visit led to the signing of a comprehensive agreement calling for collaboration on economic, research, cultural and educational issues. Dean Michael Johnson, Ph.D., led a delegation to Indore and Bhopal that fall. After a week on the ground, the delegation proposed conducting a smart city workshop that eventually would lead to the creation of a permanent research cell supporting Madhya Pradesh's smart cities.

The UCF team working on the Madhya Pradesh smart city project includes faculty and staff from the College of Sciences, College of Engineering and Computer Science, Rosen College and the Florida Solar Energy Center. The Indian government and U.S. Department of State believe the UCF-MP partnership could be a template for future engagement with Indian states.

To learn more about The India Center at UCF visit:
theindiacenter.ucf.edu



GOING DIGITAL

For Yvette Kanouff '88, '93M.S., who has built a C-Suite career at companies like Cisco and Time Warner Cable using math, a student's reluctance to embrace math represents a chance to astound a struggling student with math's possibilities.

"I thought I hated math, but it turns out I just wasn't really paying attention," Kanouff says. "My teacher helped me focus and see the fun in math, and that was the turning point for me."

The influence of that "turning point" in Kanouff's life extends far beyond her career. In fact, the next time you watch a cat video on YouTube or Netflix, you can thank mathematicians like Kanouff.

"I love the challenge when I hear a kid say they hate math."

Streaming video was under development in the mid-90s, but the obstacles were huge. A massive file like a digital video had to be compressed small enough to fit through a fiber optic cable in real-time without sacrificing quality. The algorithms developed by mathematicians like Kanouff also paved the way for DVDs. Kanouff won a technical Emmy for her work in the video-on-demand arena, along with several patents.

The practical value of math is what Kanouff preaches to anyone who will listen, but especially those who "don't like" math. It's why she pursued a master's degree in mathematics at UCF, and why she helped developed the industrial track for the department. The latter allows students to sample a wide variety of math applications, including pattern recognition, scientific computing and developing math models.

Kanouff graduated from UCF while working at Lockheed Martin in a role that relied on math to develop radar algorithms. Her professors encouraged and challenged her to go beyond by-the-book problem solving and pursue unconventional solutions. The warm relationships developed during that time continue to this day.

"My bond with my UCF professors began with math discussions," Kanouff says. "But then we started talking about families and all of our other interests. Now we've kept in touch for years."

To learn more about the Mathematics Department visit:
sciences.ucf.edu/math

FORWARD PROGRESS

A first-of-its-kind mobile science laboratory, GeoBus, is freshly wrapped and ready to be outfitted for its charter mission.

The GeoBus is a 40-foot bus that, when complete, will be filled with technology like an interactive touch-screen map, mini-drones, an augmented reality sandbox and virtual reality goggles that bring the world of mapping and geospatial technologies to life for K-12 students. Geospatial technology encompasses a variety of mapping techniques like sonar, radar and satellites to provide everyday conveniences like GPS, and supply researchers with valuable insights into topics like flooding, disaster recovery and environmental pollution.

While the interior lab of GeoBus is still in the works, the outside just received a fun, kid-friendly facelift, courtesy of bus donor LYNX.

"We are thrilled to have the LYNX partnership. They are the transportation leader in Central Florida, and their partnership allows GeoBus to become a reality," says Timothy Hawthorne, Ph.D., founder of Citizen Science GIS and GeoBus.

Matt Friedman, director of marketing and communications for LYNX, says the transit authority believes in investing into the community. The 40-foot GeoBus represents the perfect mesh between community responsibility and advancing science.

"We see this as a way to excite, inform and educate all in one," says Friedman.

An additional donation from IBM establishes the technology giant as a bronze level sponsor, and allows the GeoBus team to purchase some equipment.

IBM and GeoBus share a commitment to educating the public about the power of technology to improve disaster relief and recovery efforts. The partnership will include training for GeoBus teachers to use IBM's Teacher Advisor with Watson Resources and IBM's Teachers TryScience.

"IBM has a strong commitment for enhancement and augmentation of STEM programs. It is the strength of community partnerships that enable collaborative and successful outcomes," says Beth Tracy, IBM Corporate Citizenship Manager.

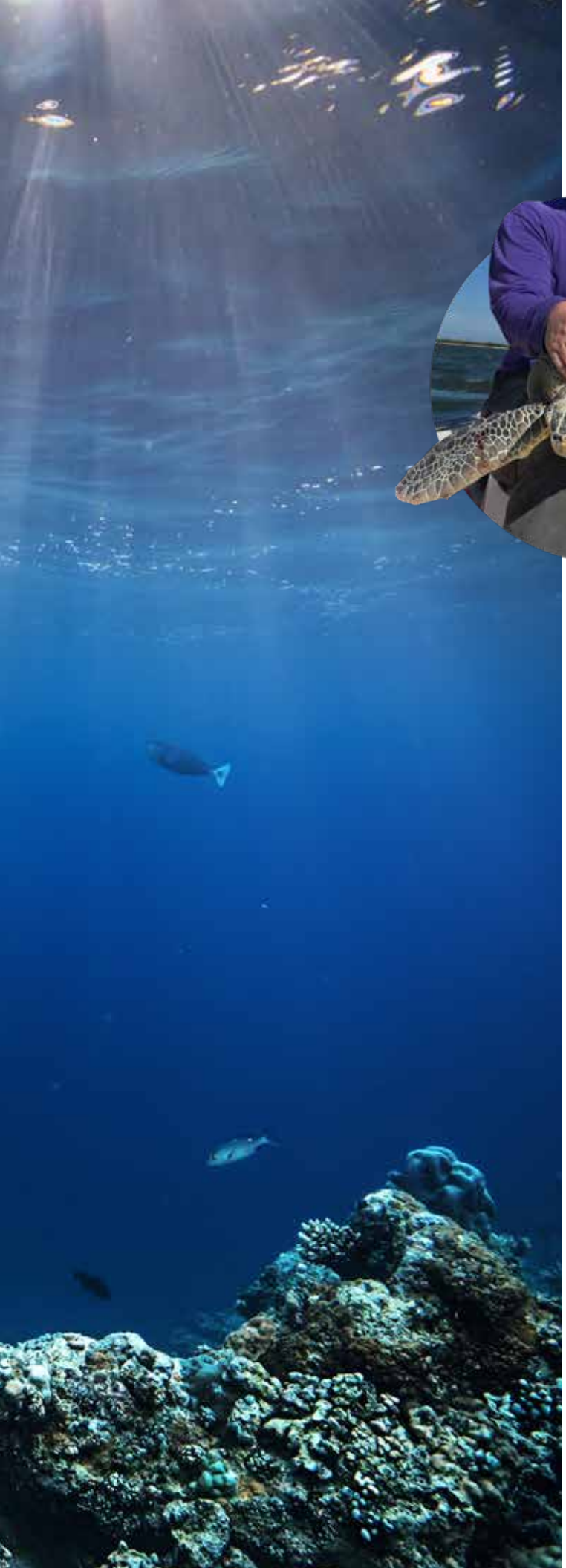
"GeoBus is about connecting people with technology. People are the greatest assets at both IBM and GeoBus. We are thrilled to have innovative technology leaders at IBM invest in the future of science through GeoBus, and we are eager to have IBM staff members volunteer their time as GeoBus mentors in future K-12 school stops," Hawthorne says.

GeoBus is expected to be fully operational in 2019.

To learn more about GeoBus and how to support its needs visit:
citizensciencegis.org/projects/geobus

Turtle Power

Two UCF doctoral students, Chris Long and Katie Martin, who are part of UCF's Marine Turtle Research Group, are conducting research on threatened green sea turtles and loggerhead turtles in the Indian River Lagoon.



Chris Long '13M.S., is researching the effects of harmful algal blooms on green sea turtles in the lagoon. Algal blooms regularly hit the Indian River Lagoon, and were especially intense from 2011-2013. The lagoon is an important foraging area along the eastern Florida coast for juvenile green turtles.

The blooms, likely caused by excess nutrients in the lagoon, choke the lagoon by blocking light from reaching through the water and using up the oxygen in the water. That leads to the death of seagrass, fish and other creatures in the lagoon, which in turn causes a stink and upper respiratory issues for some people. Recently, the lagoon also endured two raw-sewage spills, according to news stories.

While Long hasn't finished his analysis, the early data indicate decreases in the number of turtles in the lagoon in 2011-13, the years when the lagoon experienced superblooms and brown tide events.

"We don't think those blooms killed turtles, so stable isotope analysis can help us understand whether their habitat use and diet changed in response to the blooms," he says.

"The goal is to understand how turtles respond to rapid changes in their habitats, and use that information to protect turtles more effectively. The changes aren't likely to go away in the short term, so now we need to focus on how to respond," Long says.

Research photos taken during permitted activities of the UCF Marine Turtle Research Group. Permits: Florida MTP-186, Florida MTP-231 and NMFS Permit 19508.

Katie Martin, who is co-advised by Anna Savage, Ph.D., in the amphibian and reptile disease ecology lab, is researching an infectious disease that affects about half of the sea turtles in the lagoon. The infectious disease, known as fibropapillomatosis, causes tumors to grow inside and outside of sea turtles' bodies. While the tumors may be benign, they can become debilitating if they obstruct the turtle's internal organs or compromise its mobility or eyesight.

Martin is surveying loggerhead and green sea turtles in the lagoon to understand the diversity of major histocompatibility complex genes, which are part of the turtle's immune system to fight off disease. It is suspected that a turtle herpesvirus causes fibropapillomatosis, and she and fellow researchers are investigating why some turtles with the virus don't have tumors.

One hunch they have is that turtles with a greater diversity of the genes may also be more likely to be tumorless despite having the virus.

Martin said other factors may also play a role in developing tumors, including warmer waters; increased nutrient levels from runoff and inland sources; increasing ocean acidification; and pollution.

"From a research perspective, we've seen a huge uptick in infectious diseases threatening a range of ectothermic vertebrates that depend on environmental temperature to maintain immune function, suggesting a link to climate change or other global processes."

2018 NEST TOTALS

Archie Carr National Wildlife Refuge, Brevard County*

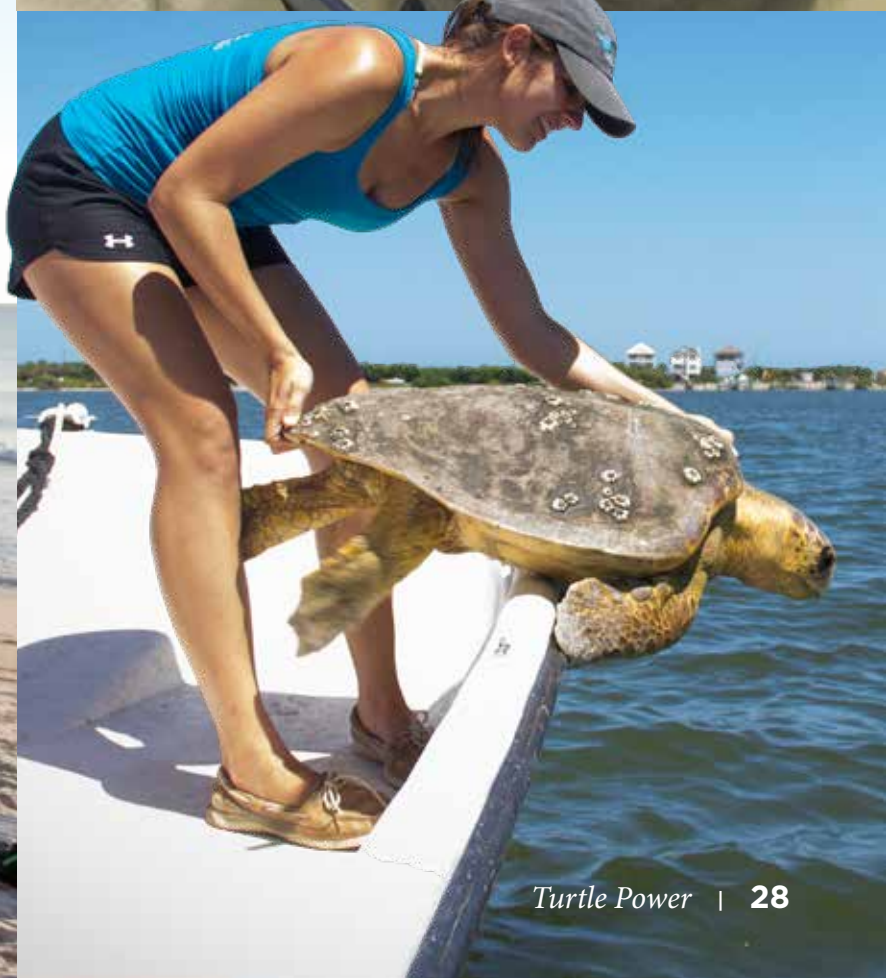
11,901 LOGGERHEAD TURTLE NESTS

1,230 GREEN TURTLE NESTS

17 LEATHERBACK TURTLE NESTS

**Data collected from the portion of the Archie Carr National Wildlife Refuge that the UCF Marine Turtle Research Group monitors.*

To support student research and the UCF Marine Turtle Research Group, please visit:
sciences.ucf.edu/mtrg ***-or-***
ucffoundation.org/turtles



REACHING NEW HEIGHTS

This past December, The UCF Planetary Sciences Group had their NASA-supported research project launch into space on the first Virgin Galactic rocket.

The experiment rode aboard the VSS Unity, a Virgin Galactic spaceplane that was launched from its mothership, WhiteKnightTwo, before flying to its top altitude of 270,000 feet and gliding back down to a runway on Earth.

"This is the kind of experiment you can't really do on the ground," says Joshua Colwell, Ph.D., a professor in the UCF Physics Department whose research was aboard the flight. "So, it's always exciting and a privilege to collect data

like this from a high-quality free fall environment like you get from one of these suborbital vehicles," Colwell says.

The experiment, known as Collisions Into Dust Experiment, or COLLIDE, tested how dust particles ranging in size from about a tenth of a millimeter to about 2 centimeters behave in microgravity, which was achieved when the craft left Earth's atmosphere.

He says the motions of the impactor and any dust particles knocked off the surface would be tracked with high frame rate video. The findings could help scientists better understand what will happen if astronauts or robotic landers were to work

on the surface of a small asteroid. The flying debris could contaminate equipment and create safety concerns.

The experiment supports the graduate research of Stephanie Jarmak, a doctoral student in the UCF Physics Department.

"It's been an amazing honor representing UCF and the Center for Microgravity Research," Jarmak says. "This data contributes directly to my Ph.D. thesis, so I have my fingers crossed."

Co-principal investigator on the research is Adrienne Dove, Ph.D., an assistant professor in the UCF Physics Department and a member of the UCF Planetary Sciences Group.

"This is a huge success – two more Americans get their wings for getting to space, and there were NASA-supported payloads aboard," Dove says.

"We've been waiting a really long time for this, so it's a huge sense of relief that it flew. We're looking forward to seeing the data."

THE UNIVERSITY OF CENTRAL FLORIDA

PLANETARY SCIENCES GROUP

Considering the size of outer space, it's no surprise the range of topics the UCF Planetary Sciences Group covers. They are:

EXOPLANETS

The Exoplanets Group uses space telescopes to reveal the sizes, temperatures, atmospheric properties and orbits of planets and brown dwarfs outside our solar system.

SMALL BODIES

Studying small bodies' behavior and evolution answers some of the most fundamental questions in astronomy and planetary science. "Small bodies" include comets and asteroids that are remnants of planetary formation billions of years ago.

MICROGRAVITY & PLANET FORMATION

Low-speed-impact experiments between aggregates and single particles in the lab — and occasionally microgravity flight environments — help explain the role of surface forces leading to adhesion between aggregates, as well as the dissipation of energy in low-speed collisions.

DUST ENVIRONMENTS

The targets of dust research include solar system environments like lunar and asteroid surfaces, ring systems and interplanetary space.

REGOLITH & SPACE RESOURCES

This area of study examines the physical properties and compositions of the Moon, asteroids and Mars.

ASTROCHEMISTRY & SPECTROSCOPY

This group traces the molecular basis for the evolution of interstellar clouds, the formation of solar systems and the incorporation of molecular species into planetary bodies.

To learn more about the Planetary Sciences Group visit:
planets.ucf.edu

UCF COASTAL CONNECTIONS

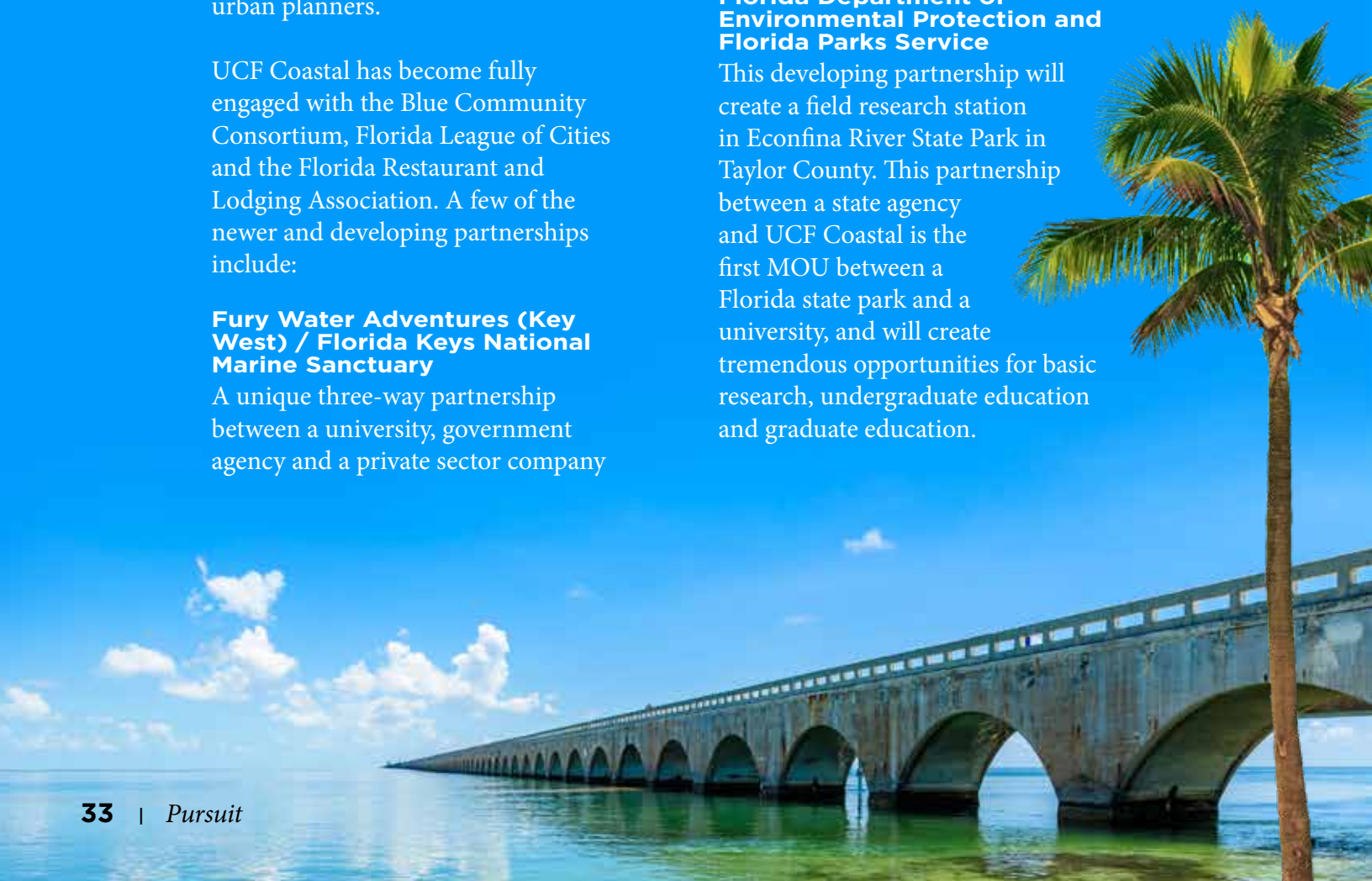
New partnerships are amplifying the scope and strength of coastal research and education underway by scientists with the National Center for Integrated Coastal Research, or UCF Coastal. These community partners, which come from both the public and private sector, deepen a roster of experts across multiple disciplines, including biologists, chemists, engineers, emergency managers, sociologists, political scientists, medical researchers, economists and urban planners.

UCF Coastal has become fully engaged with the Blue Community Consortium, Florida League of Cities and the Florida Restaurant and Lodging Association. A few of the newer and developing partnerships include:

Fury Water Adventures (Key West) / Florida Keys National Marine Sanctuary
A unique three-way partnership between a university, government agency and a private sector company in Key West to deploy sensors, collect basic ecological data, analyze long-term databases and train next generation coastal researchers and practitioners.

Everglades City
Devastated by Hurricane Irma, the city has agreed to host a field station to monitor future rapid onset and slow-moving disasters, educate residents and visitors and grow the next generation of coastal researchers.

Florida Department of Environmental Protection and Florida Parks Service
This developing partnership will create a field research station in Econfina River State Park in Taylor County. This partnership between a state agency and UCF Coastal is the first MOU between a Florida state park and a university, and will create tremendous opportunities for basic research, undergraduate education and graduate education.



Florida Yacht Club

Negotiations are ongoing with 36 yacht clubs to deploy sensors, store and stock boats, educate and collaborate on critical coastal issues.

Conservation Florida

Partnering with this non-profit group, which is purchasing large tracts of land for conservation purposes, will create numerous opportunities for basic research and education.

Embry-Riddle Aeronautical University

The university's unmanned aircraft systems program boasts a fleet of drones of all shapes, sizes and capabilities, and brings extensive monitoring instrumentation and expertise to bear. UCF Coastal will be able to monitor red tide events, assess health of plants along a shoreline and monitor the health of oyster beds.

Port Canaveral and Brevard Zoo

This three-way partnership in development includes the development of a new aquarium in Port Canaveral, which will include research and outreach facilities for UCF Coastal. This partnership will focus on Indian River Lagoon ecology, problems and solutions.

UCF Coastal's goal is to link the ecological security of coastal ecosystems with the economic security of coastal communities, ensuring the sustainability of our coastlines and economy for generations to come.

To learn more about UCF Coastal Visit:
coastal.ucf.edu

PROPOSED Ph.D. IN SUSTAINABLE COASTAL SYSTEMS

UCF Coastal is moving ahead with plans to expand the focus of UCF Coastal to include graduate students. The proposed program will be an interdisciplinary Ph.D. in Sustainable Coastal Systems.

Individuals involved in coastal research, management and policy making need to be well-versed in a wide range of disciplines. The program will be open to students from a variety of disciplines, including the physical, natural and social sciences, as well as engineering. The central objective of this program will be training the next generation of scientists and leaders to help Florida and other coastal regions around the world navigate these challenges. Graduates of this program will have the skills and experience necessary to become the state, national and international leaders that will help coastal areas transform and adapt to the challenges of the 21st century.

The proposal anticipates the first class will enter the program in fall 2020.

Graham Worthy, Ph.D.
Pegasus Professor, Department Chair & Director-National Center for Integrated Coastal Research

THE Alzheimer's FIGHT

Certain toxic proteins have long been suspected as the culprits killing off brain cells, a process eventually leading to neurodegenerative diseases like Alzheimer's. But exactly how those proteins were prompting the premature death of the cells was, up until recently, a mystery.

UCF researchers developed a method by setting up a synthetic reconstitution of the conditions in which the amyloid beta (A-beta) peptide naturally attacks brain cells. The controlled setting, paired with fluorescence measurements, made it possible to monitor formation of calcium-conducting pores by A-beta in lipid bilayer membranes. They were also able to pin down the molecular structure of the pores by internal reflection infrared spectroscopy.

Now that researchers have achieved a better understanding of how the peptides breach the cell membrane, it's theoretically possible to design strategies of impeding membrane perforation by A-beta, with an ultimate goal of staving off the onset and progression of the disease.

"In order to fight the enemy efficiently, you have to understand how it works. This study gives us a wealth of information that paves the way for further, more clinically oriented research," says Suren Tatulian, Ph.D., professor in the UCF Physics Department, who developed and published the research in Scientific Reports, along with two graduate students, Nabin Kandel and Jason O. Matos '14M.S.

To learn more about the Physics Department visit:
sciences.ucf.edu/physics

Positive Results

Research underway in the National Center for Forensic Science carries life-changing potential for people suffering from malnutrition or exposure to hazardous toxins.

Malnutrition is the source of a host of health issues, including zinc deficiency. Low amounts of the mineral can delay growth in children, suppress the immune system and even cause brain damage. The effects can be reversed with supplements, but only if zinc deficiency is correctly identified through a blood test. That's easier said than done in developing countries where malnutrition is most common, with lab results taking days to complete. Now a near instantaneous result is on the horizon.

A team of researchers led by Matthieu Baudelet, Ph.D., assistant professor in the UCF Chemistry Department and the National Center for Forensic Science, were funded by the National Institute of Health via the company Neurobiotex, Inc. to develop the calibration standards for a device that can test for zinc deficiency using fingernails. The standards have been developed and sent to the company for validation.

Baudelet's team also has been working on the creation of standards for other biological materials such as hairs, teeth and bones for health and forensic applications.

Sitting in a lab for hours is not nearly as exciting forensic work as the explosive crime dramas on TV, Baudelet says. But the work is making a big impact on the world. "It's not nearly as sexy as crime scene work, but the results from that work wouldn't be possible without qualitative standards for chemical profiles. And that's what we're contributing," Baudelet says.

To learn more about the National Center for Forensic Science visit:
ncfs.ucf.edu

OFFICE POLITICS

Three UCF political science alumnae, including Florida's youngest representative, had their names on the November 2018 ballot. Although the three candidates don't always agree on political issues, pursued different careers and attended UCF at different times, they share a passion for politics and a degree in political science.

Amber Mariano '17, a Republican, was re-elected in District 36 in New Port Richey two years after becoming the youngest person elected to Florida's House of Representatives. She will begin her second term in the Legislature at age 23.

When Mariano studied political science at UCF as a Burnett Honors Scholar, she became politically involved on and off campus. She interned for U.S. Sen. Marco Rubio and participated in UCF's Legislative Scholars Internship program. After her internship, Mariano joined UCF's Student Government Association, which she says was her favorite part of her college experience.

"I learned so much and met so many different people. The stakes aren't as high, but it's still the same atmosphere," Mariano says. "It was a good stepping stone to learning how that process would work in the real world."

Mariano was first elected to her seat in 2016. She says the opportunities she seized while at UCF helped her follow her dreams and can help current students if they have the passion to find them.

Carol Lawrence '71, an attorney in DeBary ran as a Democrat for a seat in Florida House District 27.

Carol Lawrence also has a long history with UCF. She did clerical work in Duval County before enrolling in classes when UCF was still called Florida Technological University. She graduated cum laude in 1971 with a degree in political science. Lawrence attended law school at Barry University in 1998 and became an attorney at age 60.

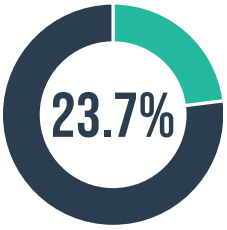
"It took me 46 years, but when you set your mind to something and make it your

dream you shouldn't let anyone talk you out of it," Lawrence says. "And don't talk yourself out of it, either."

Lawrence had an urge to run for office while undergoing chemotherapy for breast cancer. Shortly after she recovered, she told her husband she was tired of yelling at the TV news, so she drafted a plan of who she needed to talk to and things she wanted to help change.

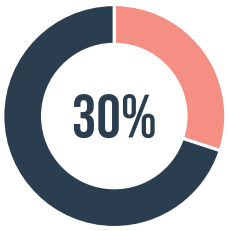
Her advice for current students considering running for office is to try to understand other people's points of view.

"Every experience in life is a blessing if you just look for the blessing," Lawrence says.



The 116th Congress convened in January 2019 with a record 127 women in office, or 23.7%.

Women constituted 30% of the Florida Legislature in 2019.



To learn more about the School of Politics, Security, and International Affairs visit:
sciences.ucf.edu/politics

Anna Eskamani '12 '15MNM '15MPA, a Democrat and first-time candidate, was elected in District 47 in Orange County.

Eskamani began harnessing the power of activism at the age of 10 when she presented her principal with a petition to share a lunch period with a friend. The Burnett Honors Scholar's interest in politics grew from there, but she says it was really her mother's death from cancer in 2004 that motivated her to stay in the community and attend UCF.

She says student organizations at UCF helped her become a better leader on campus and in the Orlando community. She was the women's caucus chair and eventually the state women's caucus chair for the College Democrats at UCF. She was also a member of the Iranian Student Organization and the Political Science Honor Society.

"I always want to be humble and kind and never forget where I come from, and UCF is part of that" says Eskamani, who was featured with other women as first-time candidates on the cover of Time magazine in January.

2018 DISTINGUISHED ALUMNI AWARDS

In November 2018, the College of Sciences Alumni Chapter hosted the fourth annual Distinguished Alumni Awards. One awardee is chosen from each department and school within the college based on distinguished professional achievement, exceptional community service in support of the university and a reflection of the college's mission.

ANTHROPOLOGY
Brian Smith '03 '04, MS
Acting Deputy Associate Administrator for Management
National Nuclear Security Administration

BIOLOGY
Diane Mahony '96 '01Med '14Eds
CEO
Kavaliro

CHEMISTRY
Darlene Slattery '86 '89MS
Retired Researcher
Florida Solar Energy Systems

COMMUNICATIONS
Gloria LeQuang '97
Director of Marketing and Community Relations
BRIDG

MATHEMATICS
Ted Rassmann '82
Retired Vice President and Account Executive
IBM

PHYSICS
Michael LoMurro '89
President
Certified Payments

POLITICAL SCIENCE
Chris Lombardo '80, JD
Managing Partner
Woodward, Pires & Lombardo, P.A.

PSYCHOLOGY
John Mattone '80MS
President and CEO
John Mattone Global, Inc.

SOCIOLOGY
Kathy Black '84 '01 '02MS
Chief Nursing Officer
Dr. P. Phillips Hospital

STATISTICS
Lesley Cheema '97 '99MS
Yield Improvement Engineer for Defect Meteology
Qorvo, Inc.

Protecting Frog Futures

Tracking the source of an infectious disease killing off thousands of frogs recently stepped closer to reality using a new method developed by a UCF researcher.

The mysterious disease threatens long-term damage to local food chains, with frogs both curbing insect populations and feeding predators like birds and snakes. Now there's hope to halt the disease's advance thanks to a discovery made by biology alumna Emily Karwacki '18.

The suspected culprit is a pathogen called Perkinsea, which fatally spreads through frogs after infecting their liver. Perkinsea emerged as a suspect early in research, but there wasn't enough genetic data to consistently test and identify the recently discovered organism. Karwacki, working in the lab of Anna Savage, Ph.D., assistant director in the UCF Biology Department, developed that test.

"I had to align a bunch of DNA sequences from our samples with others from around the world to create my primer set," Karwacki explains. "It was four or five months before we had both the primers and the probe to create a successful test."

Karwacki's research was published in Diseases of Aquatic Organisms, and opened up opportunities for scientists around the world to begin testing frogs for Perkinsea.

With a consistent identification test now in hand, researchers can begin formulating a cure and locating a source. That's good news for the delicate food chain.

"Now scientists can test water and soil to see if Perkinsea is there so we don't send frogs out to die," Karwacki says.

To learn more about the Biology Department visit:
sciences.ucf.edu/biology

Distinguished Speaker Series

The College of Sciences Distinguished Speaker Series brings renowned speakers from UCF to enrich the lives of members of the Central Florida community. Our speakers address topics relevant to the natural, computational, social or behavioral sciences and to the societal implication of developments in these fields. We invite you to join us and enjoy these wonderful evenings with food, drink and intellectual stimulation.

In its fifth year, the series has become very popular with local community members and alumni. Make sure to check our website for information on the 2019-2020 DSS.

sciences.ucf.edu/dss

THANK YOU TO OUR SPEAKERS

2018-2019

ONE FISH, TWO FISH: Weird & Wonderful Adaptations
Michelle Gaither, Ph.D.
September 26, 2018

ARTIFICIAL PHOTOSYNTHESIS: The Future of Sustainable Solar Energy
Fernando Uribe-Romo, Ph.D.
October 17, 2018

CATCHING A BUZZ & PLAYING WITH FIRE: Advancing Urban Ecology at the UCF Arboretum
Patrick Bohlen, Ph.D. & Jennifer Elliott '04 '09M.S.
January 23, 2019

SLEIGHTS OF MIND: Mysteries & Myths of Cognitive Deception
Peter Hancock, Ph.D.
February 20, 2019

THE NAKED AND THE DEAD: Ritual & Sacrifice at the Dawn of the Maya Civilization
Michael Callaghan, Ph.D. & Brigitte Kovacevich, Ph.D.
March 27, 2019

IF THE DINOSAURS HAD RADAR: Asteroids, Arecibo & Earth's Impact Risk
Yan Fernández, Ph.D.
April 24, 2019

Remembering John Bersia

We remember the late John C. Bersia '77, director of UCF's Global Perspectives Office, a professor of international issues and a Pulitzer Prize recipient while an editorial writer at the Orlando Sentinel.

Bersia was invited in 2001 by then-President John Hitt, H'17, to serve as special assistant to the president and head of the Office of Global Perspectives. He was the executive producer and host of a weekly WUCF TV show by the same name, covering diplomacy, world affairs, human trafficking and other issues.

He was viewed by many of his colleagues and students as a global citizen, always pushing education, fairness and international awareness with the goal of a peaceful world.

"John gave UCF and Central Florida a wealth of opportunities to learn about the world and to tackle our toughest challenges, particularly human trafficking and modern slavery," says interim President Thad Seymour Jr.

"He brought many distinguished world leaders to campus and also speakers who challenged us to actively help human trafficking victims and others who had no voice. We will forever be thankful that John has made us a stronger, more civic-minded and more compassionate campus community."

Dean Michael Johnson, Ph.D., of the College of Sciences, of which Global Perspectives is a part, says Bersia dedicated many years to providing students "an opportunity to be part of the world."

"What John knew is that the world has become very small, and our students are going to live in a world where they're going to work and compete with people from every part of the globe," Johnson says. "John played a key role in opening doors for students and faculty to interact, learn and engage with different cultures."

COLLEGE OF SCIENCES

The quality of our faculty and staff is the foundation of our academic mission. Each one of these individuals adds expertise that enhances the college's strengths in our disciplines across the physical, natural and social sciences.

2018-2019 FACULTY & STAFF

86
Professors

89
Associate Professors

74
Assistant Professors

51
Associate Instructors & Lecturers

54
Instructors & Lecturers

122
Non-Student Staff

611
Student Staff

2018-2019 NEW FACULTY

ERIC GOOLSBY
Biology, Assistant Professor
Integrative plant biology.

OLEKSANDRA "SASHA" HARARUK
Biology, Assistant Professor
Ecoinformatics.

KRISTY LEWIS
Biology, Assistant Professor, UCF Coastal
Changes in estuarine and marine food webs and coastal communities.

SETH FENDLEY
Communications, Instructor, Director of Debate
Digital rhetoric, argumentation and advocacy rhetoric.

PATRICE KOHL
Communications, Assistant Professor
Science and environmental journalism, science and technology studies, human conservation.

CARLOS BORGES
Mathematics, Assistant Professor
Inverse and direct scattering problems, wave propogation, numerical analysis, domain decompostition.

CHRISTIAN KELLER
Mathematics, Assistant Professor
Stochastic analysis, mathematical finance and optimal control.

GERRIT WELPER
Mathematics, Assistant Professor

KERRI DONALDSON-HANNA
Physics, Assistant Professor
Formation and evolution of airless bodies.

THEODORA KARALIDI
Physics, Assistant Professor
Exoplanetary and brown dwarf atmospheres, mapping exoatmospheres, spectropolarimetry.

JACOPO BAGGIO
Political Science, Assistant Professor, UCF Coastal
Origin and development of cooperation in human societies; social-ecological networks and resiliancy to future changes.

KENICIA WRIGHT
Political Science, Assistant Professor
Public policy, identity politics, American politics.

KRISTIN HORAN
Psychology, Assistant Professor
I/O Psychology: occupational health.

MARTHA HUBERTZ
Psychology, Lecturer
Social psychology and cognitive development.

HANYI MIN
Psychology, Assistant Professor
I/O Psychology: Item response theory; gender and culture difference.

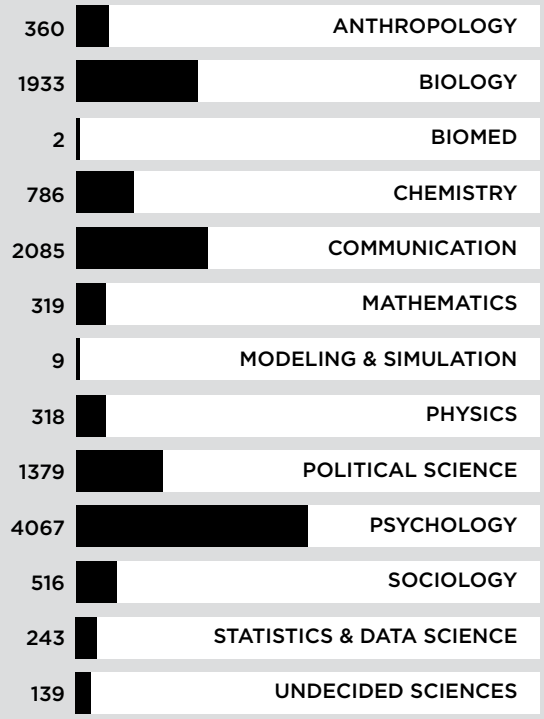
SHIYANG SU
Psychology, Assistant Professor
I/O Psychology: psychometrics and statistics.

UCF COLLEGE OF SCIENCES FAST FACTS 2018-2019

2019 PRIORITIES

1. Improve student success: progression, retention, graduation and careers.
2. Enhance student learning: innovation, experimentation and evaluation.
3. Strengthen research and research funding.
4. Shape nationally competitive Ph.D. programs and professionally useful master's programs.
5. Increase fundraising—both annual giving and major gifts.
6. Foster internationalization efforts in appropriate departments.
7. Build a culture of diversity and inclusiveness for faculty and students.
8. Promote faculty career success and satisfaction.

FALL 2018 ENROLLMENT



UCF Total.....	**68,571**
College of Sciences.....	**12,156**

2019 UCF TOP MAJORS

#1 **Psychology**
4,067 Students

#8 **Biology**
1,933 Students

2018-2019 DEGREE PROGRAMS

20 **Bachelor's**

15 **Master's**

12 **Doctoral**

2018 -2019 NATIONAL RANKINGS

BestColleges.com

Best Online Bachelor's Programs:

Anthropology Communications Political Science	**#1**
Psychology Sociology	**#2**

Best Online Master's Programs:

Forensic Science	**#3**

AffordableColleges.com

Affordable Online Bachelor's Programs: Anthropology Psychology Social Science Sociology	**#1**

AffordableCollegesOnline.com

Affordable Online Bachelor's Programs:

Political Science	**#1**
Psychology	**#2**
Communications	**#3**

OnlineMasters.com

Best Online Master's Programs:

Forensic Science	**#5**

U.S. News and World Report

Best Graduate Programs:

Physics	**#61**

2019 RESEARCH FUNDING

	FY16	FY17	FY18	FY19
New Funding	$14.6M	$16.6M	$26.1M	$27.3M
Expenditures	$13.2M	$13.9M	$15.9M	$20.8M

103k
In Student Awards

49
College of Sciences Students Awarded Endowed Scholarships

18%
UCF Undergrads
Pursue College of Sciences Degrees

COLLEGE OF SCIENCES TOP ALUMNI EMPLOYERS

- Advent Health
- Lockheed Martin
- Orange and Seminole County Public Schools
- Orlando Health
- State of Florida
- Universal Studios Orlando
- University of Central Florida
- U.S. Armed Forces
- Valencia College
- Walt Disney Company

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