

# OWL RESEARCH & INNOVATION



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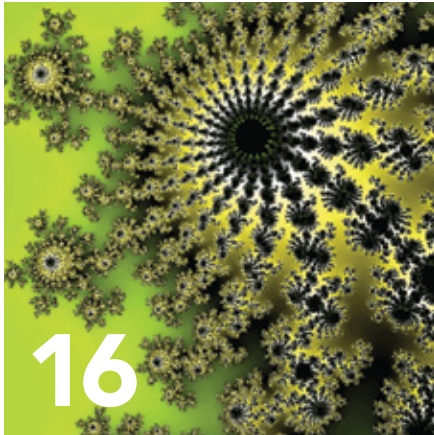
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*On the cover: Rania Katamish, a research assistant in the lab of Randy D. Blakely, Ph.D., a professor in the Charles E. Schmidt College of Medicine and executive director of the FAU Brain Institute, continues research during the global pandemic, but under new safety measures.*

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## OWL RESEARCH & INNOVATION

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## Thriving During an Unprecedented Time



In a time when we're faced with much uncertainty around the world, FAU continues to conduct groundbreaking research, and receive a great deal of media coverage for our efforts. While learning and working remotely since the middle of the spring semester, our faculty, staff and students found opportunity in adversity, from contributing to the fight against COVID-19 to simply looking at different ways of doing things — and ultimately becoming more creative.

In addition to learning about COVID-19 prediction and prevention, FAU remains committed to our priority research areas of healthy aging; neuroscience; sensing and smart systems; ocean science and engineering; and environmental science. You can read about our COVID-19-related efforts, as well as our research on Alzheimer's disease, sea turtle conservation, using augmented reality to enhance education, and more, in this issue of *Owl Research & Innovation*.

Community Engagement is one of the platforms highlighted in the university's strategic plan, and I'm happy to share that FAU recently became one of 119 institutions nationwide to receive the Carnegie Community Engagement Classification. This designation reaffirms the importance of our programs and partnerships in enhancing our students' learning experiences, while promoting community development and economic prosperity. Additional information about the designation is available on page 26.

We expect that fiscal year 2019-20 will be another record year for research expenditures, following a robust fourth quarter, in spite of the interruption to our normal way of life. We continue to navigate this unprecedented situation with great care for our students, staff and community, and we look forward to returning to campus soon. On behalf of everyone at FAU, thank you for your continued support.

Stay safe, and Go Owls!

**John Kelly**  
President

# GLOBAL VENTURES

## First Stops for New Worldwide Initiative: **Israel and Brazil**

By Lynn Laurenti

The Research Park at FAU has extended its reach worldwide with the creation of Global Ventures at FAU, an initiative designed to bring foreign-based, second-stage companies into the community.

Second-stage companies are defined as those that achieve annual sales of \$1 million and employ at least six people. As Research Park tenants, these businesses stand to realize substantial benefits, helping them advance to the next level of success, including flexible terms on office and lab space and the extensive resources of the university.

“Bringing international companies to South Florida ensures that new capital is infused into our economy and that new ideas are developed here, creating sustainable high-paying jobs,” said Andrew Duffell, president of the Research Park at FAU. “The first two markets we will target are Israel and Brazil, which both have strong business and cultural links to South Florida and strong tech sectors poised for growth.”

Advantages offered include translation services and language training, domestic market research and access to capital and potential investors. Participating organizations include the Small Business Development Center at FAU and GrowFL, which support the ongoing development of second-stage companies throughout the state.

The core objective of Global Ventures at FAU is to contribute to the growth of South Florida’s technology sector, building upon successes of the Research Park’s business incubator and FAU Tech Runway, which together have helped hundreds of young high-tech companies get off to a strong start.

The Global Ventures initiative is funded by the Research Park at FAU, Florida Atlantic University, the City of Boca Raton and Palm Beach County.

For more information and to apply, visit [Research-Park.org/global-ventures](http://Research-Park.org/global-ventures).

## FAU-Israel Partnerships Win Two International Grants

A 2019 Florida trade mission to Israel in which FAU President John Kelly and Vice President for Research Daniel Flynn took part, led to two joint research awards.

Erik Duboué, Ph.D., assistant professor of biology in the Harriet L. Wilkes Honors College, and Prof. Yoav Gothilf of Tel Aviv University, have received a \$320,000 grant from the US-Israel Binational Science Foundation for their work on the neuronal and genetic basis of anxiety. Duboué, a molecular geneticist, has conducted extensive research on how the brain perceives, processes and responds to changes in the environment. He has studied

fear behaviors in live zebrafish, whose small size and transparency permits monitoring activity of neurons in the brain. His work is shedding new light on how neural circuits are altered in fear/anxiety disorders.

“We know a good deal about how neurons in the brain control behavior, but much less is known about how experience shapes the function of these neurons,” Duboué said. “This binational award will provide a unique opportunity for our group to work with the Gothilf lab, a world-renowned zebrafish laboratory in Israel. We hope our joint expertise will allow us to understand better how stress impacts feeding.”

Additionally, the US-Israel Binational Agricultural Research and Development Fund is underwriting a workshop on the development of Florida-Israel collaboration in smart agriculture. Recipients of this award are Jason Hallstrom, Ph.D., professor and director of I-SENSE (Institute for Sensing and Embedded Network Systems Engineering), and Anton Post, Ph.D., associate vice president for corporate and international relations, with co-PIs Tarin Paz-Kagan, Ph.D., and Victor Alchanatis, D.Sc., of Israel’s Volcani Center.

Post recently accepted a position to lead the US-Israel Binational Science Foundation as its executive director. ♦

# DID YOU KNOW?



CHARLES E. SCHMIDT COLLEGE OF SCIENCE

## Studying Sea Turtles



Jeanette Wyneken, Ph.D., a professor of biological sciences in the Charles E. Schmidt College of Science, worked with nine FAU students and the U.S. Coast Guard to provide three female baby sea turtles with a "seat" on board a 33-foot special law enforcement boat for their journey home. To

keep tabs on the three green neonate sea turtles, the marine scientists outfitted them with small solar powered satellite transmitters, which is the smallest technology currently available for tracking marine turtles.

In addition, researchers from the College of Science discovered that 75 percent of female sea turtles from Sanibel Island, in southeastern Florida, were monogamous due to stored sperm. The study examined paternity patterns in a sample of nesting loggerhead female sea turtles after mating once and fertilizing multiple eggs. Their research provides insights into the relative numbers of male turtles present in the breeding population.

COLLEGE OF ENGINEERING  
AND COMPUTER SCIENCE

## Trusting a Self-Driving Car

Researchers from the College of Engineering and Computer Science have introduced a new approach to measure trust between passengers and self-driving cars in real-time. Their unique, immersive virtual reality simulation combines visual, audio and movement engagement that provides a convincingly realistic simulation.

The simulator they have developed provides a safe platform to expose human subjects to any trust-damaging incidents such as sharp turns, sudden stops, stoplight violations, speeding, tailgating, unexpected accidents, among others.

*From left, Shervin Shahrदार, graduate student, and Mehrdad Nojournian, Ph.D., an assistant professor in the College of Engineering and Computer Science, observe a simulation to test trust between humans and self-driving cars.*



*From left, Avron B. Fogelman and FAU President John Kelly hold Babe Ruth's pinstripe uniform pants worn on his first day as a New York Yankee in 1921.*

DOROTHY F. SCHMIDT  
COLLEGE OF ARTS AND LETTERS

## New Sports History Museum Opens

The Avron B. Fogelman Sports History Museum opened its doors in the Schmidt Family Complex on FAU's Boca Raton campus.

This museum serves as part of Dorothy F. Schmidt College of Arts and Letters Museum Management program, the MBA Sports Management program and other related programs across FAU.

The new 3,500-square-foot space has free admission and is open to the public. It is considered FAU's fifth largest one-time donation in the university's history.



CHRISTINE E. LYNN COLLEGE OF NURSING

## Genetic Testing in Breast Cancer

Although breast cancer mortality has steadily declined over the past decade, disparities in both incidence and mortality persist across racial/ethnic and socioeconomic groups. Tarsha Jones, Ph.D., an assistant professor in the Christine E. Lynn College of Nursing, collaborated with other researchers to examine racial and ethnic differences in genetic testing frequency and results among diverse breast cancer patients diagnosed at age 50 or younger from January 2007 to December 2017.



The results of the study, published in the *Journal of Cancer Education*, showed that among diverse young breast cancer patients, less than half completed hereditary breast and ovarian cancer genetic testing.

## COVID-19 Change Challenge and FAU's Keep Moving

The Division of Research announced the winners of the COVID-19 Change Challenge, an opportunity for FAU students to earn up to \$2,000 to help implement their idea to combat COVID-19 issues. One of the winning projects, Keep Moving, is aimed at engaging the community with at-home challenges, virtual volunteer hours, motivational segments and mental health check-ins. In addition, the students are collaborating with FAU Thrive, a student mental health program, to provide motivational podcasts.

Keep Moving was an idea from students Christy LaFlamme, Harriet L. Wilkes Honors College, Alexia Betances, College of Social Work and Criminal Justice, Michelle Cunningham, College of Education and Tolueke Famuyiwa, Charles E. Schmidt College of Science.

Other winners from the challenge include Sean Paz, Charles E. Schmidt College of Science, for his project on optimizing the COVID-19 testing process to improve the methodology; Elena McLaughlin, College of Education, for her project on supporting fine motor skills development of young children with Autism spectrum disorder; and Steven Shiba, Charles E. Schmidt College of Medicine, for his idea to build an individualized COVID-19 early detection and symptoms monitoring system.

FAU HARBOR BRANCH AND CHRISTINE E. LYNN COLLEGE OF NURSING

## The Nose Detects Airborne Exposure

Researchers from the FAU Harbor Branch Oceanographic Institute and Christine E. Lynn College of Nursing, along with other collaborators, recently detected an airborne exposure of microcystin, a class of toxins produced by blue-green algae species, in the nasal passages of 95 percent of the individuals tested.

The study is part of ongoing research at Harbor Branch to understand and protect against the potential health effects of harmful algal blooms. The results provide evidence of aerosol exposure to microcystins among coastal residents.

In addition, a newly developed method for detecting toxins in human urine established

by a Harbor Branch researcher along with the U.S. Centers for Disease Control, can detect even low-dose human exposure to toxins, which helps the study of the long-term health impacts of harmful algal blooms, especially the low-level concentrations from human inhalation.

These findings are the first to report toxins produced by freshwater concentrations directly from exposed residents impacted by bacteria in both fresh and salt-water ecosystems in southern Florida.



Algal blooms and toxins in Florida's St. Lucie Estuary.

## FAU Makes Top List

More than a dozen Florida Atlantic University graduate programs are included in the latest *U.S. News & World Report's* "Best Graduate Programs" for 2021. Each year, U.S. News ranks professional school programs in business, education, engineering, law, medicine and nursing, including specialties in each area. Beyond the six major disciplines ranked annually, U.S. News also periodically ranks programs in the sciences, social sciences and humanities, health and many other areas based solely on academic experts' ratings.

This year, U.S. News also published fresh academic reputation rankings for graduate programs in public affairs, audiology, physical therapy, speech-language pathology, pharmacy, clinical psychology, occupational therapy and nursing midwifery and for master's programs in fine arts.



CHARLES E. SCHMIDT  
COLLEGE OF MEDICINE

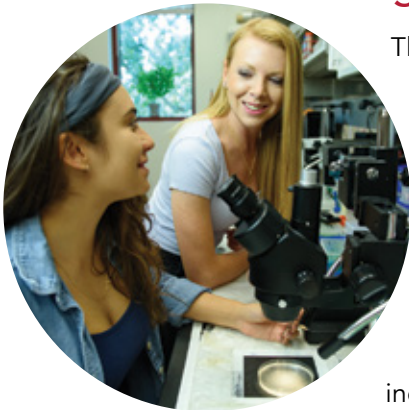
## Could This Toothpaste Prevent Strokes?

For decades, researchers have suggested a link between oral health and inflammatory diseases affecting the entire body — in particular, heart attacks and strokes. Researchers from the Charles E. Schmidt College of Medicine, collaborated to further explore whether a plaque identifying toothpaste, reduces a sensitive marker for future risks of heart attacks and strokes.



FAU HIGH SCHOOL

## FAU Opens Owls Imaging Lab



The "Owls Imaging Lab" will provide students access to cutting-edge equipment to work on high-level research projects, including cancer treatment research, vaccine development and prosthetic creation, among others. The lab includes a micro-computed tomography scanner; scanning electron microscope, microtome and embedding station; inverted compound microscope and stereoscope. Students can gain access to some of the world's most challenging problems at an early age as well as share their research and publish it in peer-reviewed journals.

*Bethany Stanhope, Ph.D., executive director for Academic Operations of FAU's Jupiter campus, and Jessica Chomisky, Harriet L. Wilkes Honors College student, studying cavefish.*

COLLEGE OF SOCIAL WORK AND CRIMINAL JUSTICE

## Teaching 'Safe' Sexting

It's time to teach youth "safe" sexting, according to a recently published study by Sameer Hinduja, Ph.D., professor in the School of Criminology and Criminal Justice in the College of Social Work and Criminal Justice.

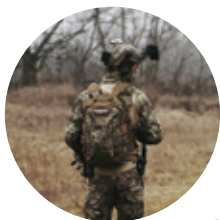


Hinduja acknowledges that although participating in sexting is never 100 percent "safe" (just like engaging in sex), empowering youth with strategies to reduce possible resultant harm seems prudent.

In addition, the co-director of the Cyberbullying Research Center also conducted a recent study that showed more than 28 percent of teens in a romantic relationship were, at one point, victims of digital dating abuse.

The results also pointed to males being significantly more likely to experience digital dating abuse compared to females, and more likely to experience all types of digital dating abuse and were even more likely to experience physical aggression.





#### COLLEGE OF ENGINEERING AND COMPUTER SCIENCE

## Researchers Upgrade Body Armor

Hassan Mahfuz, Ph.D., Oren Masory, Ph.D., and Leif A. Carlsson, Ph.D., all professors in the College of Engineering and Computer Science, lead a team with the J.M. Rubin Foundation, developing and enhancing materials to improve the performance of military helmets and body armor. The team received \$569,482 from the Combating Terrorism Technical Support Office under the advanced Armor Materials Program, to develop advanced fibers for body armor.

“Although current body armor provides increasingly advanced protection to our soldiers, it comes at a cost. It’s heavy, cumbersome, and way above the desired aerial density, which limits mobility and physical performance of our soldiers,” Mahfuz said.

#### COLLEGE OF BUSINESS

## Research Reveals Internet Crime Increase

Internet crimes are becoming more sophisticated and persistent in Florida and several of America’s other most populous states, according to Michael Crain, Ph.D., director of the Center for Forensic Accounting in the College of Business.

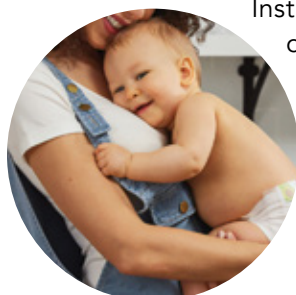
Crain and other researchers have identified online crime trends in the last four years before 2019 for the top six states with the highest internet crime activity. Their research also includes fraud committed online through the internet on individuals and businesses, showing trends in types of internet crimes and U.S. states with the highest reported victim losses and number of victims. Researchers hope this information can be used to increase public awareness and to inform government agencies for law enforcement and policy making.



#### CHARLES E. SCHMIDT COLLEGE OF SCIENCE

## A Mother’s Touch

In a new study, Nancy Aaron Jones, Ph.D., an associate professor in the Charles E. Schmidt College of Science, and a member of the FAU Brain Institute, demonstrates that mother-infant touch and contact are essential for optimal neurodevelopmental regulation in early infancy. Jones’ new research shows that extended use of Kangaroo Care, a skin-to-skin, chest-to-chest method of caring for a baby, can positively benefit full-term infants and their mothers during the post-partum period.



#### FAU WAVE

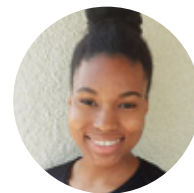
## The FAU Wave Celebrates Annual Competition

FAU students working on innovative projects for the past two semesters, took their ideas from concept to reality as part of the annual FAU Wave Competition, an undergraduate research competition organized by FAU’s Division of Research.

For the first time, the annual event was held virtually, boasting more than 65 virtual attendees.

The program challenges students to submit innovative ideas that target societal issues and provides seed funding for project development. Projects are rated on their innovation, feasibility, commercialization, research efforts and problem significance.

This year’s first place winner, Paris Prince, right, a junior at FAU High School, developed SPod – Sanitizing Pod, which allows for easy and affordable sanitation while benefitting the environment. The goal is to create sanitizing pods, with a torus shape as a squeezable bioplastic spherical ball that contains clean water.



# Guiding FAU Into New Markets

Regional Director to Introduce FAU's Research to the World

By Judy Gelman Myers

Colombian native Sandra Marin spent a lifetime building business relationships worldwide. And now, as the new regional director of Florida's Small Business Development Center (SBDC) at FAU, she plans to continue building those connections for FAU, adding the commercialization of research and export to Latin America to the portfolio.

"I'd like to open up a Latin American market for new technology developed at FAU," said Marin who spent more than 12 years as head of an information technology software company and a nonprofit organization geared to helping underserved communities create micro businesses. "After spending so much time building businesses, I understand the challenges of navigating a startup and the path it takes to become successful."

With a master's in international trade, Marin moved to the University of Missouri where she received a second master's in public administration. There, she found the SBDC community and began her journey to building bridges for technology-based entrepreneurs and exporters.

Marin, who is also certified as a global business professional by America's SBDC, previously served as unit head for entrepreneurship and industry engagement for the

University of Missouri Extension, and as associate director of the Missouri Environmental Assistance Center. Prior to coming to FAU, she was director of the Free Enterprise Center at the University of Missouri-Kansas City.

She also began a technology-series program that has served more than 250 technology-based startups in the last four years attracting more than \$17 million in capital for commercialization.

Even though Marin's short time at FAU has been overshadowed by the COVID-19 pandemic, she and her team have already fielded thousands of specialized consulting hours for capital access, business continuity, government contracts and more as a result of applications from local businesses eager to receive their help.

"Leading the Florida SBDC at FAU grants me the opportunity to continue working in business and community development in a larger capacity and the opportunity to get back to my roots," she said.

## WHAT IS THE SBDC?

Florida Small Business Development Centers offer high-level consulting and training to small and medium businesses. They're hosted by universities, state economic development agencies and private partners across the state. The Florida SBDC at FAU is under the Division of Research, where it serves as a resource for the research enterprise in several ways, including connecting researchers with other researchers and companies, as well as connecting companies with exporters, both here and abroad. Florida's SBDC at FAU also provides businesses in Broward and Palm Beach counties with specialized expertise in government contracting, export assistance and cybersecurity.

FAU has hosted the SBDC for about two years. Marin said she aims to leverage that relationship, as well as the network she's built in Latin America, to make the university a leader in regional economic prosperity and an asset for the business community. In addition, she also plans to use her international trade experience to partner with university initiatives such as the Research Park at FAU's new Global Ventures. ♦



# Leading Veterinary Care

New Health Management Role for Expert in Animal Pathology

By Cammi Clark, Ph.D.

Kenneth Salleng, DVM, was only 13 years old when he set his sights on becoming a veterinarian. As a teen on his family's 30-acre backyard farm in rural Kentucky, he was hooked by his first real work experience with a local veterinarian traveling from farm to farm.

"I would start IVs, collect samples, run samples, hold the animals, whatever prep needed to be done," said Salleng, who recently took on the role of director of veterinary care, Comparative Medicine at Florida Atlantic University.

Salleng's journey to FAU began by earning a bachelor's degree from Berea College in Kentucky and a doctorate in veterinary medicine from the University of Missouri-Columbia. He furthered his education with a residency in laboratory animal medicine and pathology and a postdoctoral fellowship in pathology at Wake Forest University in North Carolina. He also became a certified professional on the Institutional Animal Care and Use Committee and is a diplomate of the American College of Laboratory Animal Medicine.

For almost 20 years, he was an assistant professor at East Carolina University and Vanderbilt University Medical Center, Tenn., where he held several positions including clinical veterinarian, associate director of the Division of Animal Care and director of the Office of Animal Welfare Assurance. Salleng also

served as chief of the veterinary pathology in the department of comparative medicine at East Carolina University and as a staff veterinarian at private practices.

"Ken has a lot of experience in lab animal medicine, and he's very talented in pathology, which is a field where our researchers often ask for support," said Sylvia Gografe, DVM, Ph.D., assistant vice president for Research, Comparative Medicine at FAU.

In Salleng's new position, he is responsible for health management of all animals on FAU campuses, from mice to turtles to fish, including health surveillance, quarantine and environmental monitoring programs. But it's Salleng's proficiency in animal lab pathology where he says he hopes to make a huge

impact at FAU, adding that his expertise will help researchers with gross necropsy perspectives and evaluating the tissues.

Overall, Salleng's combined decades of education, expertise and experience make him a perfect fit. "This is a job where I (will practice) pathology, work with investigators, closely monitor the animal populations and help out using my degree and knowledge." ♦



# Two Researchers: ONE CAUSE

Alzheimer's:  
Predicting it and  
Seeking a Cause

*By Judy Gelman Myers*

**E**ven though Alzheimer's disease was discovered more than 100 years ago, scientists still know shockingly little about what causes it, how to treat it, and how to diagnose it. But, hopefully, that will change soon.

Two research groups at the FAU Brain Institute have received grants to study these problems with the expectation that their work will result in new, more effective approaches to understanding and diagnosing the disease.

In 1906, Alois Alzheimer dissected the brain of a patient who died of a mysterious pathology. He discovered a buildup of plaque between brain cells and long tangles inside the cells. Ever since then, the scientific community has regarded that plaque, called amyloid-beta, and those tangles, called tau, as the culprits in Alzheimer's disease (AD).

Qi Zhang, Ph.D., a research assistant professor of biomedical science in the Charles E. Schmidt College of Medicine, isn't so sure. Zhang hypothesizes that the amyloid-beta plaque and tau tangles don't cause the disease; he believes they're



**Elan Barenholtz, Ph.D.**, associate professor in the department of psychology in the Charles E. Schmidt College of Science



**Qi Zhang, Ph.D.**, research assistant professor of biomedical science in the Charles E. Schmidt College of Medicine

merely pathological outcomes. The real culprit, according to Zhang, is misregulation of cholesterol in the brain cells, especially neurons.

Cholesterol is critical to neurons' ability to send and receive the chemical signals that drive our thoughts and actions. When there's too much or too little cholesterol on the surface of brain cells, they stop functioning and eventually die – leading to shrinking brain. When there's a lot of cholesterol on the surface, there's very little amyloid precursor protein (APP), which is the stuff that gives rise to the amyloid-beta plaque. Conversely, when there's little cholesterol on the surface, there's a lot of APP. Zhang suggests that APP regulates cell surface cholesterol, thereby affecting the neurons' ability to function.

With a grant from the Ed and Ethel Moore Alzheimer's Foundation, Zhang will investigate the mechanisms, genetic and otherwise, by which APP regulates cholesterol. "We believe that the death of neurons may be rooted in the malfunction of cholesterol regulation," he said. "Using genetic tools to surgically sever the tie

between the cholesterol and amyloid precursor protein, we hope to find whether the regulatory role of APP and cholesterol is neurologically meaningful and plays a role in the development of neurodegeneration of the disease."

Understanding the mechanisms behind cell death will help researchers – including Zhang – find ways to prevent it.

As scientists struggle to find the causes of Alzheimer's disease, they also wrestle with the difficulties of diagnosing it, especially in early stages, before the patient displays significant loss of speech, memory or capacity to reason.

Elan Barenholtz, Ph.D., an associate professor in the department of psychology, in the Charles E. Schmidt College of Science, has received a grant from the Florida Department of Health to develop a test that can diagnose AD in its early stages based on a patient's eye movements and speech patterns. Barenholtz will supervise postdoc Michael J. Kleiman, who contributed significantly to the design of the study and will work on the test.

Eye movements reflect very small changes in cognition. The test takes 15 to 20 minutes and doesn't require a doctor to administer. The patient is asked to read sentences or describe a picture while a machine records his or her eye movements and ability to respond linguistically. The grant funding will help fund an eye tracker that records 300 frames per second – that will produce a lot of data.

Barenholtz and Kleiman will apply machine learning analytics to sift through the data to determine which patients are at risk of developing Alzheimer's and which are not. "If there's some pattern in there, a good machine learning algorithm will find it and say, yes, I can predict this patient will develop AD a year from now," Barenholtz said. "Machine learning is an excellent tool to find patterns that are predictive of something. In this case, it would be a preliminary pathology that we can't detect."

Barenholtz's test is based on accepted neuroscience. Zhang's research challenges accepted neuroscience. Together, both research approaches could lead to major steps forward in the fight against this terrifying disease. ♦

# Turtle Talk

## Deadly Virus is Affecting Sea Turtles Worldwide

By Bethany Augliere

**A**round the world, a tumor disease called fibropapillomatosis (FP) plagues young green sea turtles, sometimes causing them to become stranded and die. The tumors can grow so large they cover their eyes, mouth and flippers, hindering their ability to swim, eat, escape predators and avoid boats. Rehabilitation facilities treat these turtles and cut off their tumors, in hopes of releasing them back to the wild. It turns out, however, many of them don't survive, according to a new study by Annie Page-Karjian, DVM, Ph.D., a research scientist and veterinarian at Florida Atlantic University's Harbor Branch Oceanographic Institute.

A type of herpesvirus causes the tumors, and it impacts all seven sea turtle species, though it's most lethal to young green turtles. While the exact cause is unknown, it's linked to polluted water from human activity as well as warming waters — and it's spreading globally.

In 2014, Page-Karjian published a study on the survivorship of turtles with FP at a single rehabilitation facility in Georgia. It turns out that paper is one of the most important studies she's ever done, in terms of other people referencing and citing it. So, she decided to do the study "bigger and better," she said. Not to mention, understanding the regrowth of tumors is a research priority for the Florida Fish and Wildlife Commission.

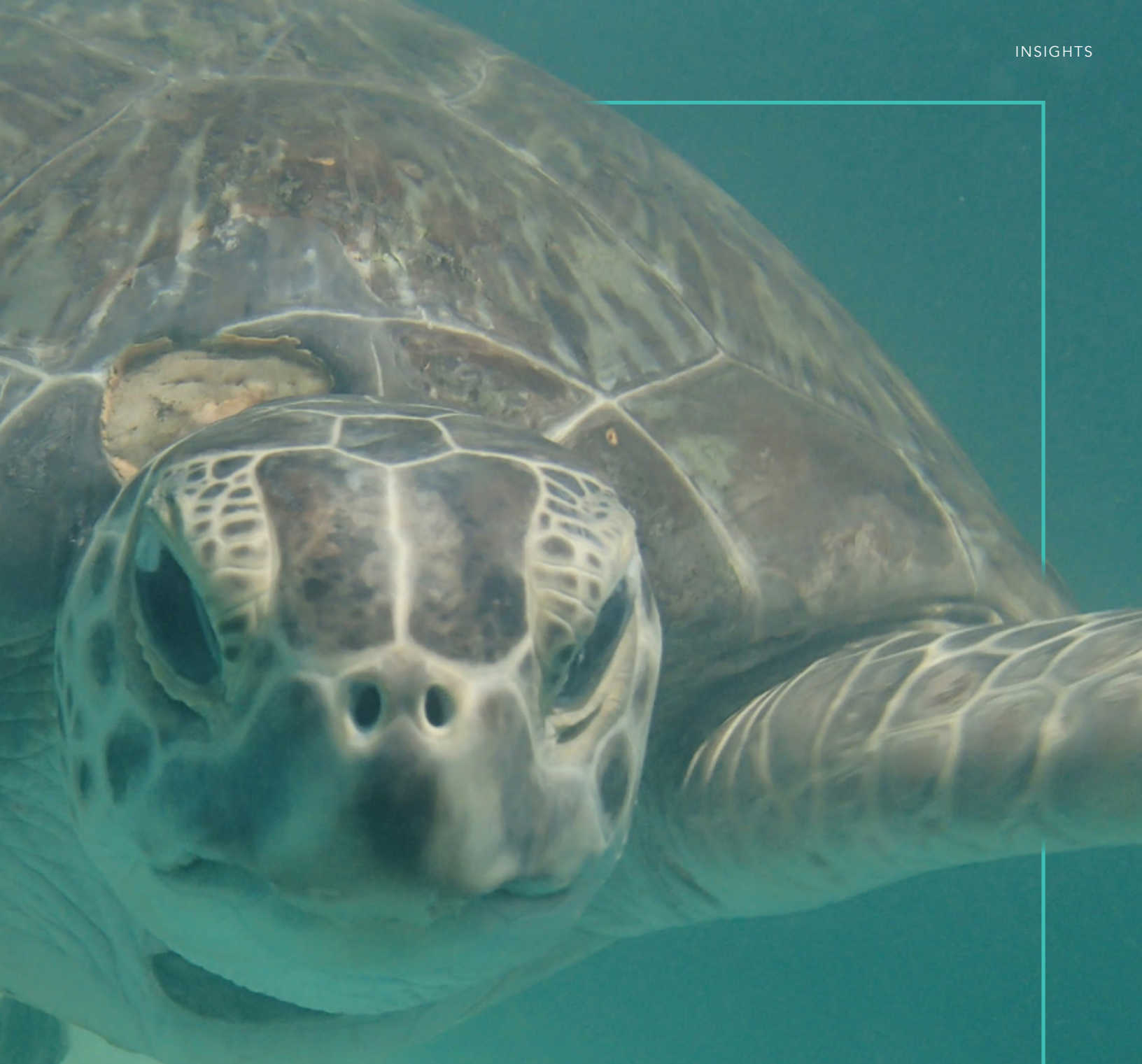
In the new research, published in 2019 in *Diseases of Aquatic Organisms*, Page-Karjian and her coauthors examined the survivorship

of 756 juvenile green sea turtles who became stranded with FP and received treatment at four rehabilitation facilities in the southeast from 2009 to 2017. The results were a bit surprising, said Page-Karjian — 75 percent of the sea turtles did not survive. Of the 25 percent that did survive and had their tumors lasered off, 50 percent regrew tumors. "What we found isn't great, but it's the truth, and it's important to know," she said.

Additionally, when it comes to protocols for treating FP patients, Page-Karjian hopes this information can help facilities make critical decisions. "If you are a facility strapped for cash and with limited resources, then maybe you should make a more stringent triage protocol, knowing that up to 75 percent of the turtles may not survive to be released."

Every case is different, and many turtles come in with more than just tumors, like starvation or boat strike injuries. It's up to each facility to make treatment decisions on a case-by-case basis.

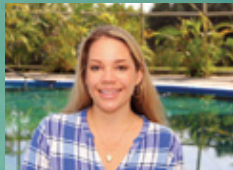
While Page-Karjian is grateful to collaborate with rehabilitation facilities, she's begun to shift research priorities from captive animals to wild animals, recognizing that the problem is in the ocean. She has several projects in the works to understand more about FP, including how the turtles pass the virus to one another and how it impacts their overall health and immunity. "The turtles come into rehab, humans are doing everything they can to help them and many of the turtles with FP are still not surviving," she said. "To get at the problem, we need to address what is making them sick in the first place." ♦



*Above and right: A green turtle with fibropapillomatosis that was rehabilitated.*

*Bottom right: Researcher Annie Page-Karjian, DVM, Ph.D., Florida Atlantic University Harbor Branch Oceanographic Institute researcher.*

*Far right: Page-Karjian leads a team of marine scientists and combat veterans to study and save threatened green sea turtles in the Florida Keys.*





# Successful Surprise

## How Surprise Helps Get a Taxing Job Done

By John Tibbetts

**N**euroscientists have documented an unflattering truth about humanity: We generally try to avoid demanding tasks. But sometimes need or desire overrule inertia, and the brain must put in the effort.

New research illuminates how one region of this organ, called the dorsal Anterior Cingulate Cortex (dACC), helps us marshal mental power necessary to fulfill tasks such as taking a math test, assembling furniture or navigating a maze of unfamiliar streets.

William Alexander, Ph.D., an assistant professor of psychology in the Charles E. Schmidt College of Science, and his colleagues found evidence that the dACC tracks the likelihood of events, and when the brain's predictions don't match reality, activity in this region increases. They say, the dACC's response helps the brain update its predictions. Their research was described recently in the journal *Nature Human Behaviour*.

Surprise from unexpected events can also drive activity in other areas of the brain, Alexander said.

"We think it's possible that the dACC and other regions in the brain's cognitive control network, which prevents undesirable behavior and allows us to perform challenging tasks, talk with one another in a language of surprise."

Tucked into the brain behind a point about a quarter of the way up your forehead, the dACC bridges the organ's left and right halves, an ideal position from which to integrate information from other parts of the brain, Alexander said.

Studies of brain activity have shown that dACC contributes to decision making. "If you are trying to decide where to go for dinner or navigating an unfamiliar route, anything that requires thought, those kinds of tasks tend to elicit cingulate activity," he said.

Alexander and his colleagues looked to three theories used to explain dACC's activation under various circumstances. These theories posit that the dACC activates when you face a difficult choice such as when you must control your behavior to prevent a bad outcome or in response to unexpected or surprising events.



To see if any of these theories predict the dACC's activity task, Alexander and his colleagues, Eliana Vassena, Ph.D., an assistant professor at Radboud University in the Netherlands, and James Deraeve, Ph.D., a graduate student in Alexander's lab, devised an experiment that required participants to concentrate and rewarded that effort with money.

Study participants first learned to associate images of fractals with quantities of points. Once inside an fMRI machine (conducted at Ghent University in Belgium), which measures brain activity by detecting blood flow, participants had less than a second to select sets of these images. The more points they earned, the more money they received.

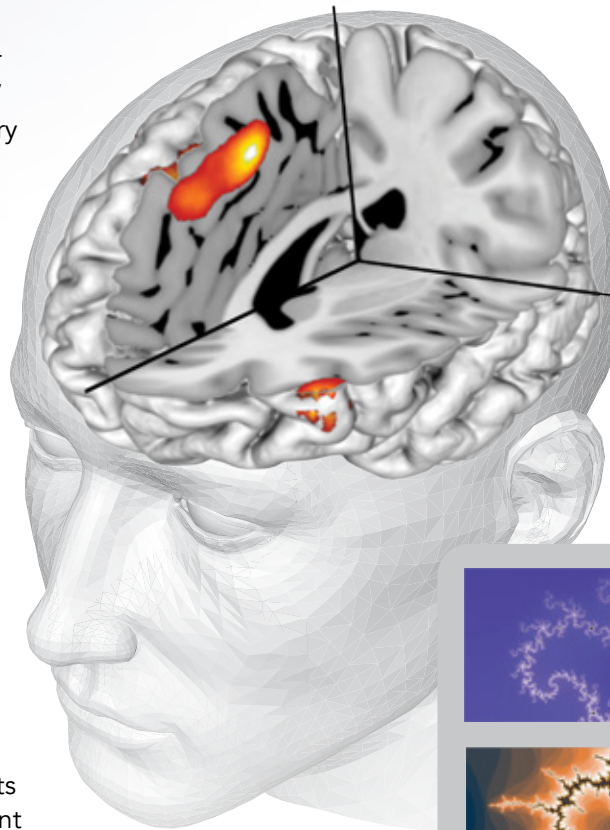
The researchers compared their brain activity with three models' predictions. Only one, the theory that the dACC responds to unexpected events, matched up. The researchers said that during the experiments, two factors elicited surprise: Rare combinations of images and an internal conflict experienced by participants who had to choose between similar options. Without time to consider their selection, participants' actual choices frequently did not match their expectations — a discrepancy that fits with this theory, Alexander said.

After being fired up, the dACC helps the brain update its predictions, a crucial component to mentally demanding tasks, according to the researchers.

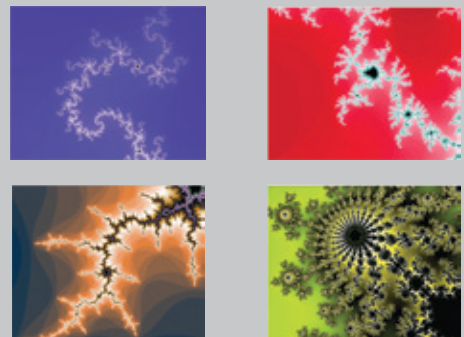
Because the dACC interacts with many other parts of the brain and contributes to high-level processes, this discovery has wider implications for how this organ functions, Alexander said. "It implies other regions must also act in response to surprising events or act to prevent surprising events from occurring in the first place." ♦

***We think it's possible that the dACC and other regions in the brain's cognitive control network, which prevents undesirable behavior and allows us to perform challenging tasks, talk with one another in a language of surprise."***

**— William Alexander, Ph.D.**



Centrally located in between the right and left sides of the brain, the dACC contributes to decision making.



Study participants earned points by rapidly selecting pairs of fractals, which the researchers figured were unlikely to carry any good or bad associations.

# Historic Milestone

## Using Our Gulf Stream to Generate Power

By Gabriel Alsenas

To demonstrate that ocean currents, like the Gulf Stream, offer powerful power-generating opportunities, FAU's Southeast National Marine Renewable Energy Center (SNMREC) engineers recently deployed a turbine that generated electricity from the current for a continuous 24-hour period.

Unlike other conventional renewables that only generate power intermittently, the Gulf Stream offers utility-scale baseload power.

Industry partner OceanBased Perpetual Energy, LLC, Miami, Fla., is planning a large scale commercial ocean current turbine installation off the shores South Florida and requested FAU's help to achieve this milestone.

The team deployed a turbine built by SNMREC in cooperation with another South Florida company, Ocean Current Energy, LLC, under a Florida Office of Energy grant in 2018-19.

Led by Bill Baxley, SNMREC's chief engineer, the team also demonstrated FAU's unique expertise deploying turbines more than 20 miles offshore from commercial work vessels.

The U.S. Department of Energy has recently awarded \$1 million to FAU to expand its towed turbine testing capabilities to accommodate larger turbines and SNMREC's partnership with the City of Lake Worth Beach, which will bring more opportunities for economic development in Palm Beach County.

SNMREC is currently planning an expansion of its U.S. Department of Energy center with other universities along the eastern U.S. seaboard and will lead a new consortium to help harness our tides, waves and ocean currents. ♦

# History Comes

# Alive

Game Technology Converges With Film and Animation  
to Create Interactive Experiences

*By John Tibbetts*



3D DESIGNS BY LEDIS MOLINA AND JAMES JEAN-PIERRE, 2019-20.

Imagine coming face-to-face with Harriet Tubman; or how about interacting with a prehistoric saber-toothed tiger.

Christopher “Topher” Maraffi, MFA, and his students are resurrecting vanished moments in history inside new interactive exhibits using a combination of traditional and emerging media technologies.

“We want to make visitors feel as if they are really experiencing and interacting with past environments,” said Maraffi, assistant professor of multimedia production in the Film, Video and New Media program in the Dorothy F. Schmidt College of Arts and Letters.

Maraffi, who also teaches graduate courses in the Media, Technology, and Entertainment master’s of fine arts program, was recently awarded a National

Endowment for the Humanities Digital Project for the Public grant, and an Epic Games Megagrant. Through this research, he is developing a multi-format project on the history of the first Freedman’s town in the United States during the Civil War at the Historic Mitchelville Freedom Park on Hilton Head Island, S.C. This transmedia project, called “Historic Mitchelville AR Tour: Stories of Emancipation and Freedom,” will consist of a site-specific augmented reality (AR) tour application, a portable AR museum installation and a 360-degree interactive website.

The FAU research team is collaborating with preservation groups and others to design the exhibits for the Mitchelville Augmented Reality (AR) Tour Project. The tour app will dramatize scenes of critical events during the Reconstruction era with important historical figures such as Harriet Tubman and Robert Smalls. Mitchelville



3D DESIGN BY RICHIE CHRISTIAN, 2019-20

## Saber-toothed Tiger

Another research exhibit will visualize the prehistoric saber-toothed tiger’s natural history in Florida for the Museum of Discovery and Science in Fort Lauderdale.

“In this exhibit, the saber-toothed tiger will look at you, the visitor, and respond to you,” said Christopher “Topher” Maraffi, MFA. “We want these visitor experiences to be similar to full-bodied, life-sized theatrical ones. We are bringing dramatization techniques from the arts and cinema, which are translated into game engines through coding and logic, and then we are developing animation and 3D models to create immersive experiences. The visitor will interact with models of human figures or a saber-toothed tiger that move with animation we create.”

is at the center of the story of resistance and survival among the Gullah Geechee people of South Carolina Sea Islands.

"We're modeling these life-sized, virtual historical characters who will be able to interact in scenes with visitors," he said.

Research teams, led by graduate students, are creating design and production pipelines with game engines and advanced media technologies to develop interactive exhibits based on content provided by experts such as historians, scientists and theatrical performers. ♦

For more information, visit [tophermaraffi.com](http://tophermaraffi.com).

**"We are using these tools to make the interactive experience as engaging as possible so visitors can learn in the best way possible."**

— Christopher "Topher" Maraffi, MFA

3D DESIGN BY RICHIE CHRISTIAN, 2019-20



## Journey to FAU

In 2018, Christopher "Topher" Maraffi, MFA, arrived at FAU as a new assistant professor, drawn by the innovative Media, Technology, and Entertainment master's of fine arts program, which was conceived as a collaboration of computer science and multimedia studies. "This MFA program was the right fit for me and my background," he said.

In the 1990s, Maraffi worked as a broadcast designer and animator for television news and independent films, and later graduated with an MFA in digital arts and new media, and a master's degree in computer science, games and playable media, both from the University of California, Santa Cruz.

His FAU student research teams are experimenting with extended reality (XR) technologies powered by game engines. For the exhibits, the teams can choose among several XR hardware and software applications, including 360 interactive video, virtual reality (VR), augmented reality (AR) on mobile devices, or spatial computing in Magic Leap headsets,

which are manufactured in Plantation, Fla. Supporting technologies include virtual production and artificial intelligence.

XR technologies have applications in many industries, including advertising, television and film, healthcare, education, news and, of course, video games.

"Everything is converging now," Maraffi said. "Game technology is converging with film and animation. People who have skills in one industry or medium are starting to work across multiple industries and media. If you can develop 3D models for an animation, you can use the same models in developing a game or a television commercial. We're on the cutting edge in that we're adopting this convergence of technologies for these educational exhibit projects. Each project must have a design and production pipeline created for it, and that's where our research really comes in. We are using these tools to make the interactive experience as engaging as possible so visitors can learn in the best way possible."



# UNZIPPING Genes

Students Tasked With Unlocking Genetic Mysteries

*By Jim Hellegaard*

Students in Florida Atlantic University's first course-based undergraduate research experience (CURE) recently explored unlocking the genetic puzzles of one of nature's unique creatures: Mexican cavefish.

These cavefish sleep very little, don't become stressed and tend to binge eat. Their evolved distinctive traits are linked to diseases such as obesity, diabetes and insomnia.

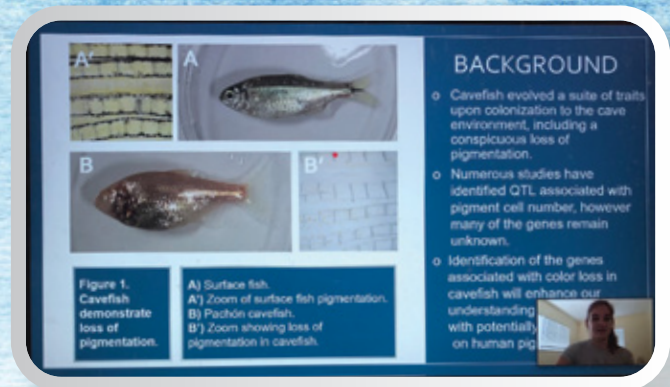
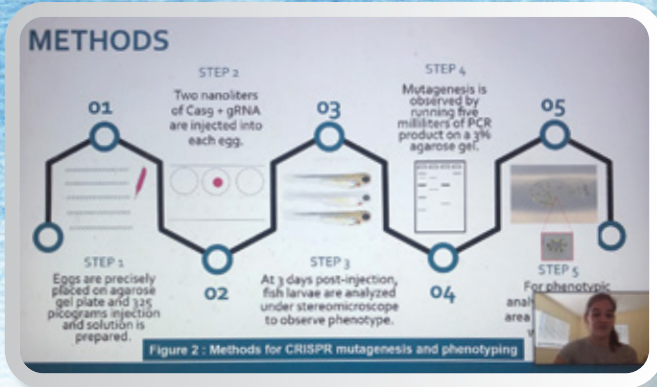
The ultimate goal in this first-of-its-kind course is to identify the candidate genes that play an important role in the cavefish's evolution.

The advanced course at the new STEM Training Hub at FAU's John D. MacArthur Campus in Jupiter is led

by Bethany Stanhope, Ph.D., the executive director for academic operations of FAU's Jupiter Campus, and Johanna Kowalko, Ph.D., an assistant professor of biology in FAU's Harriet L. Wilkes Honors College.

Stanhope and Kowalko are part of a team of researchers at FAU who have studied this single species of fish that has become an important model for understanding the genetic basis of trait evolution, Stanhope said.

Students are trained in the latest gene-editing technologies, known as Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR), in order to generate original scientific data for publication. They explore bioinformatics databases to



Due to COVID-19, adjustments were made to FAU classes, including the first course-based undergraduate research experience. Students like Amanda Wade, bottom right corner of these slides, continued to analyze data presented in their final projects. Students in this new course will finish their experiments when labs reopen.

select and test genes related to eyes, pigmentation and taste bud development with an ultimate goal of using CRISPR tools to generate mutant fish for analysis.

"You can compare cavefish and the surface fish and then you can map regions of the genome that are associated with particular traits such as loss of pigmentation or eye loss," Stanhope explained.

"So, one of the goals in the class was to take some of the mapping studies and look at those regions of the genome that are associated with these different traits. The students then identify candidate genes that fall under those QTL (quantitative trait loci) and actually functionally test those genes and see, if they mutated them, if they would potentially replicate and make cave-like traits."

The course was developed in part as the result of a National Science Foundation (NSF) grant awarded to Kowalko, Suzanne McGaugh, Ph.D., University of Minnesota, and Nicolas Rohner, Ph.D., Stowers Institute for Medical Research in Missouri. McGaugh and Rohner joined the course as guest expert instructors, adding to the students' experience.

In addition, the creation of the course is also part of several joint NSF cavefish grants awarded to Kowalko, Erik Duboué, Ph.D., an assistant professor of biology in FAU's Harriet L. Wilkes Honors College, and Alex Keene, Ph.D., an associate professor of

biological sciences in FAU's Charles E. Schmidt College of Science, to expand undergraduate training and outreach.

"Watching the students learn the process of scientific discovery — starting with an idea, designing experiments, sometimes struggling, but ultimately triumphing by generating original data and results — is quite amazing," Stanhope said.

**“ You can compare cavefish and the surface fish and then you can map regions of the genome that are associated with particular traits such as loss of pigmentation or eye loss. ”**

—Bethany Stanhope, Ph.D., executive director for academic operations of FAU's Jupiter Campus

Restrictions from COVID-19 concerns caused the State University System of Florida to order all of its institutions to transition to online education in March. Unfortunately, this meant Stanhope and Kowalko were unable to functionally test the genes the students had chosen to target.

The researchers made a number of adjustments, including providing students with images to analyze from research previously performed by Stanhope and Kowalko. The students continued to analyze data and presented their final projects, said Stanhope, adding students will finish experiments when the labs reopen.

"The students still got to implement their proposed protocols, with some adjustments made, analyze data and evaluate the results," Kowalko said. "All of which was really important to us and allowed us to stay true to the learning goals of the (new) course, even in a remote setting." ♦



# DOUBLE DUTY DRUG

FDA-approved  
Drug to Boost  
White Blood Cells,  
May Also Treat  
Stroke Victims

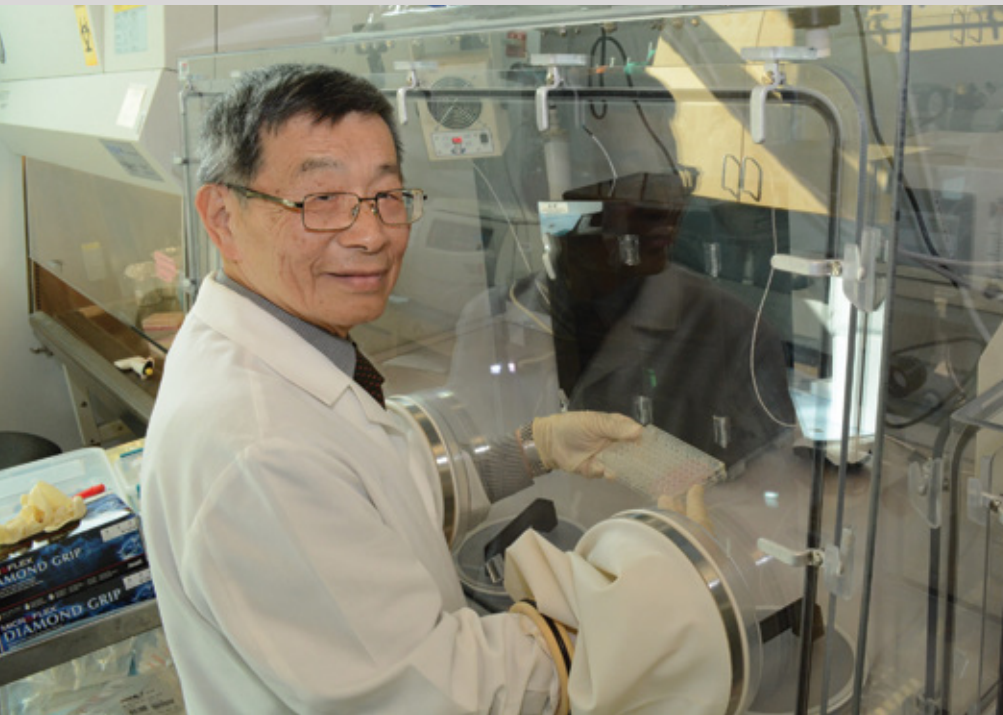
*By Judy Gelman Myers*

**S**troke is the number one cause of serious long-term disability, such as brain injury or paralysis, in the United States, according to the Centers for Disease Control and Prevention (CDC). About 85 percent of those strokes are ischemic, or caused by blood clotting. And, there has been no way to treat the debilitating brain injuries it causes – until now.

A new study led by Jang-Yen (John) Wu, Ph.D., a professor of biomedical science in the Charles E. Schmidt College of Medicine, indicates that a drug used to boost production of white blood cells may also reduce the brain damage that happens when blood flow to the brain is blocked – a condition that causes ischemic stroke. The drug, known as granulocyte-colony stimulating factor (G-CSF), has been approved by the Food and Drug Administration (FDA). It is already on the market, so it will be available for immediate use should clinical trials be successful, Wu said.

When blood flow to the brain is blocked, the blood cannot deliver oxygen to nearby cells. Wu and his team found that oxygen deprivation stresses structures inside the cell that keep the cell healthy and functional. When these structures are stressed, they trigger events that induce the cell to die. The





Jang-Yen (John) Wu, Ph.D., studying granulocyte colony-stimulating factor (G-CSF), currently used to treat neutropenia, a low number of white blood cells, a side effect due to chemotherapy.

outcome is brain damage and loss of brain functions, leading to partial or total paralysis or loss of cognitive functions in areas of the body that were controlled by the now-dead brain cells.


Working with mice, Wu and his team discovered how G-CSF protects the brain. First, they induced ischemic stroke in mice. Twenty-four hours later, they administered G-CSF and continued administering it for four days. They found that G-CSF reduces the stress on two organelles, or structures inside the cell: the mitochondria and endoplasmic reticulum (ER). When stressed, mitochondria release cytochrome c, which commits the cell to kill itself (apoptosis). Stress on the ER is associated with overexcitation of the neuron and various signaling pathways that lead to cell death. When G-CSF is introduced, it binds to the neuron and activates enzymes that reduce stress on

both organelles and trigger a cascade of events that keep the cells from killing themselves.

The team conducted behavioral tests to gauge the extent of brain injury, as well as chemical analyses to assess the amount of cell death triggered by stress. They discovered that in addition to G-CSF reducing stress on the ER and mitochondria, it also stimulates production of new neurons.

“G-CSF has a dual effect,” Wu said. “One is to protect neurons from dying. The second is it can generate new neurons — neurogenesis. It can increase the number of neurons to replenish the ones that already died.”

This discovery also has implications for diseases such as Parkinson’s and Alzheimer’s, which are characterized by progressive death of brain cells. Wu received a patent for work showing that



**“G-CSF HAS A DUAL EFFECT. ONE IS TO PROTECT NEURONS FROM DYING. THE SECOND IS IT CAN GENERATE NEW NEURONS — NEUROGENESIS.”**

—Jang-Yen (John) Wu, Ph.D.

Parkinson’s patients who received G-CSF improved on a neurological scale and clinical outcome by 60 percent. Understanding that G-CSF’s dual ability to protect neurons from dying and generate new neurons could also work for other brain diseases, he continued to test on an Alzheimer’s animal model, receiving another patent.

Most recently, Wu and his team have designed a delivery vehicle called a gene vector that can convey G-CSF only where and when it is needed, in neurons under ischemic stroke conditions. They’ve shown that this gene therapy works in animal models, and they’ve applied for an international patent. Wu predicts the new gene will stimulate a continuous supply of G-CSF that will generate and protect new neurons on a sustainable, long-term basis — thus changing the lives of more than seven million Americans suffering from neurodegenerative disease. ♦

# Gateway to Exploration

FAU Recognized as Dynamic Center of Community Engagement  
by the Carnegie Foundation

*By Lynn Laurenti*

Every university, public or private, measures itself by three key performance standards:

- Quality of education for its students
- The work its researchers carry out
- Services it renders to host communities

FAU has a long, distinguished record of excellence in the first two areas, and now it has won high recognition in the third area as well. The Carnegie Foundation recently announced that FAU is among 119 U.S. colleges and universities that have been awarded the Carnegie Community Engagement Classification for 2020.

Through the Office of Community Engagement, headed by Ron Nyhan, Ph.D., an associate professor in the Dorothy F. Schmidt College of Arts and Letters, FAU faculty, students and staff help deliver a host of human services in cities throughout South Florida and even reaching as far as Tallahassee. More than 300 partner organizations have joined hands with the university to help address a broad range of issues, including homelessness, access to health care, affordable early childhood education and animal welfare.

"Florida Atlantic University is committed to being a force for positive change," Nyhan said. "The Carnegie designation is a reflection of this commitment, which stems from our faculty, staff and students working with, learning from and contributing to the communities FAU serves."

The Carnegie Community Engagement Classification is the leading framework for institutional assessment and recognition of community engagement in U.S. higher education.

"I'm delighted that FAU's community engagement efforts were recognized by the Carnegie Foundation, which reaffirms the importance of our world-class educational and outreach programs and partnerships in enhancing our students' learning experiences, while promoting community development and economic prosperity," FAU President John Kelly said.

Examples of the university's effective community outreach work abound throughout its large service region. Here are a few with broad impacts:



Left: Community members explore the new interactive brain exhibit at the South Florida Science Museum and Aquarium, a collaborative effort with FAU.

Bottom left: Nurse from Christine E. Lynn College of Nursing tends to a community member.

Below: FAU's Harbor Branch Oceanographic Institute offers the community educational tours of the Indian River Lagoon from a pontoon boat.



- Scientists at FAU's Harbor Branch Oceanographic Institute in Fort Pierce have taken the lead in promoting public understanding of the Indian River Lagoon, a unique, highly diverse shallow-water estuary stretching along 156 miles of Florida's east coast. In recent years, the lagoon has been threatened by harmful algal blooms. Free lectures by researchers working within the framework of the Indian River Lagoon Observatory are presented periodically and available to all on YouTube. In addition, members of the public can take a moderately-priced educational tour of the lagoon aboard the pontoon boat Discovery, with narration by an FAU Harbor Branch scientist.

- The Christine E. Lynn College of Nursing operates the FAU Community Health Center in West Palm Beach, in collaboration with community partners. In addition to seeing patients onsite, the center has an outreach team that brings healthcare services to neighborhoods where people live and work. Accessibility is also offered via telehealth technology.
- Collaboration between FAU and the South Florida Science Museum and Aquarium in West Palm Beach turned into a \$2.5 million interactive exhibit called Journey Through the Human Brain, which takes visitors on a tour of the brain and its different parts and functions, including what it is that makes us all human. The permanent high-touch and high-tech exhibit gives the public a better understanding of brain health, brain medicine and brain disorders.

## Gateway to Exploration



### FAU Continues to Create Community Outreach Opportunities

By John Tibbetts

Florida Atlantic University makes a conscious effort to share their innovative research with the community in an effort to educate through activities for residents. And, despite the global pandemic, researchers are developing, sustaining and even enhancing many existing community outreach programs by transitioning or expanding them to virtual platforms.

In 2019, the Division of Research launched a monthly lecture series (Research in Action) at the Boca Raton Downtown Public Library, where researchers would talk to the community about their field of expertise. On average, the series attracted between 40 to 80 attendees. Amidst the global pandemic, the series went virtual and increased their presentations to weekly. The results average between 200 and 300 attendees every week.

“The most popular topics are ones that affect people personally — including anything COVID-related such as sleeping well despite the pandemic,” said Karin Scarpinato, Ph.D., senior associate vice president for research. “I get emails from people saying, ‘I always meant to come to the series at the library, and I just

couldn't make it. But now I can go online.’” Research in Action will eventually return as a monthly activity at the public library while weekly webinars continue remotely.

In February 2020, Scarpinato and her colleagues launched the first Research Encounter, an annual event inviting the public to experience hands-on research-related demonstrations set up at the Osher Lifelong Learning Institute on FAU's Boca Raton campus. The event, which drew more than 300 people, gave attendees an up-close look at research happening right in their backyard – everything from therapy dogs, to an opportunity to fly a drone to the chance to interact with Astro, a mechanical canine that runs on artificial intelligence.

Another annual program, the FAU Research Showcase, previously held at FAU's Tech Runway, brings the community in for two days of fun-filled research activities from a poster presentation that highlights new and innovative happenings to talks by top researchers in their field. This annual event, which usually happens in mid-fall, will most likely be rescheduled for 2021.

*Top left: An FAU student practices flying a drone at the 2019 Research Encounter, which offered the community a hands-on opportunity to check out the research happening at FAU.*

*Bottom row, from left: James Sullivan, Ph.D., executive director of FAU's Harbor Branch Oceanographic Institute, talks with the community at the Boca Raton Public Library during a Research in Action event.*

*Center: Nicole Baganz, Ph.D., research assistant professor of biomedical science in the Charles E. Schmidt College of Medicine, and director of community engagement and programming for the FAU Brain Institute, engages with the community at the 2019 Research Encounter.*

*Christine Spadola, Ph.D., left, assistant professor in the College of Social Work and Criminal Justice, talks to the community about sleeping well despite a global pandemic during a virtual Research in Action event, moderated by Karin Scarpinato, Ph.D., senior associate vice president for research.*

*FAU President John Kelly with Fenway, a certified therapy Goldendoodle dog, at the 2019 Research Encounter.*



It's efforts like the Research in Action, Research Encounter, Research Showcase and other outreach programs that "help change the perception that universities are doing poorly in communicating the value of research," Scarpinato said.

In the past few years, community outreach efforts have ramped up throughout the university. Here's a look at a few others.

### FRONTIERS IN SCIENCE

Frontiers in Science, an outreach program organized by the Charles E. Schmidt College of Science, recently expanded to add an online platform. The organizers of Frontiers in Science invite scientists from institutions outside FAU to present talks and answer questions about their research.

"The speaker has to be doing research that's of general interest and must be experienced in giving public talks," said Ata Sarajedini, Ph.D., professor of physics in the College of Science, adding that by Spring 2021 semester, he expects to have Frontiers in Science in two modes — in-person and online.

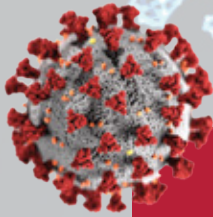
Sarajedini also hosts the popular "Ask a Scientist" podcast, interviewing FAU faculty about their research. "I want more people to have opportunities to learn about research that we do on this campus, research that improves and informs our teaching mission," he said. "FAU already communicates effectively with the public through podcasts, YouTube videos, Facebook and other social media sites. In the future, remote methods will rise to even more prominence in our community outreach."

### ASCEND

Inside FAU's Brain Institute, researchers have developed community outreach programs to connect with local youth as well. One example is Advancing STEM: Community Engagement through Neuroscience Discovery (ASCEND), which teaches youth, primarily middle-schoolers, about neuroscience. ASCEND was designed to support classroom and neuroscience lab visits, hands-on and virtual reality demonstrations and the development of digital and web-based lessons and other educational content. To help excite students about neuroscience, ASCEND taps graduate, post-doctoral and early-career faculty associated with FAU Brain Institute labs, the Harriet L. Wilkes Honors College, the Scripps Research Institute and the Max Planck Florida Institute for Neuroscience.

But the COVID-19 crisis required some adjustments. "Our transition to online was surprisingly fluid," said Nicole Baganz, Ph.D., research assistant professor of biomedical science in the Charles E. Schmidt College of Medicine, and director of community engagement and programming for the FAU Brain Institute.

"We are planning for ASCEND to be online for fall semester, and it will allow us to reach additional kids in the local community and beyond," Baganz said. "We will have virtual opportunities and access to our lessons for underprivileged youth and other populations interested in brain science." ♦



# Inside the Outbreak

FAU researchers adapt to the COVID-19 pandemic

By Wynne Parry

**B**y staying home, researchers at FAU have done their part to help contain the spread of COVID-19. Yet even with limited access to their labs and fieldwork, most research at FAU never stopped.

“A lot of research that happens here can be done with a computer,” said Daniel Flynn, Ph.D., vice president for research. Although he described the transition as relatively seamless, he also noted that work restrictions have slowed the pace at which faculty generate data, the raw material for research.

Keeping people physically distant from one another — one of the primary precautions enacted

to prevent the spread of the virus — required little change to some projects and a lot to others. It has, for example, limited experiments such as those involving microscopes in a busy lab or sample collecting trips in small boats. Meanwhile, psychology experiments that require in-person contact went on hiatus.

As researchers find themselves with fewer data and publications, Flynn expects that the university could experience a decline in grant applications, which reached an all-time high in the first quarter of 2020. “We may see a little bit of a downturn later this year and early next year, but I am confident it will bounce back,” he said.



*Sirisha Madem, Ph.D., a postdoctoral fellow in the lab of Lucia Carvelli, an associate professor in the Charles E. Schmidt College of Medicine, continues research during the global pandemic, but under new safety measures.*

In this regard the university has an advantage. Since most research at FAU never stopped, it can recover more readily than that at institutions in states where shutdowns forced researchers to vacate their labs.

Even after normalcy returns, the pandemic could have lasting effects on how researchers communicate and collaborate, but these impacts are unlikely to affect the research process itself, Flynn said.

“At the end of the day, researchers are like small businessmen; they are driven to create and innovate,” he said. “They will find the information and the partners they need.”

“At the end of the day, researchers are like small businessmen; they are driven to create and innovate. They will find the information and the partners they need.”

— Daniel Flynn, Ph.D.

### STILL GOING STRONG

Engineering projects are typically well suited to distancing measures because most are carried out by collaborators working across distributed teams with varying degrees of in-person interaction, according to Jason Hallstrom, Ph.D., a professor in the College of Engineering and Computer Science and director of FAU's Institute for Sensing and Embedded Network Systems Engineering.

"The challenges we face as a result of the pandemic will be highly discipline specific and area specific," Hallstrom said. "We are very fortunate in engineering. Despite the challenges, this has been an extremely productive time."

There have been occasional setbacks: Many labs have limited field experiments and production work, once typically team efforts, to a single student. However, if anything, he said, the pandemic has energized engineers, who are applying their expertise by, for example, using data on people's interactions to simulate viral transmission or visualizing how air flows from a cough.

### MAKING IT WORK

Researchers in other fields, however, routinely share workspace. In Randy Blakely's

neuroscience lab, for example, up to six scientists could simultaneously use their so-called "worm room" to study the creatures' neurons under microscopes. Distancing measures, though, have meant that only three researchers can work in the room at a time, according to Blakely, Ph.D., a professor of biomedical science in the Charles E. Schmidt College of Medicine and executive director of the FAU Brain Institute.

Other shared spaces became less communal too. A calendar once used to schedule absences was converted to a list designating when and where each scientist plans to work, minimizing overlap. In the lab, everyone must always wear masks and other protective gear. Meetings are held remotely, and Blakely's team does tasks such as reading literature and writing papers and grants at home to ensure that the lab continues moving forward.

Precautions like these have slowed, but fortunately not stopped the lab's research, Blakely said. "I suspect the amount of real time we spend in the lab doing experiments is down by at least half, maybe 60 percent."

Blakely's group also cut back on experiments involving mice. Unlike the worms, which live in the lab, the mice are housed and fed by the university's animal care staff.

## COVID-19

### Timeline

The pandemic caused by a novel coronavirus is a marker in time that will be remembered throughout history. In the middle of March, businesses temporarily closed, schools became an online platform and working from home was the new normal. As the epidemic spread worldwide, FAU faculty, staff and students took steps to address COVID-19 and its impact.





Above: Jillian Hardin, Ph.D., center, an associate professor in human development in the Charles E. Schmidt College of Science, and Areti Vassilopoulos, an undergraduate honors student, in the Harriet L. Wilkes Honors College, conduct research with a baby, who is wearing an electroencephalography. In-person research, like this, came to a halt in March due to the global pandemic.



Right: When COVID-19 hit, FAU classes retreated to meeting virtually, like this, the first course-based undergraduate research experience led by Bethany Stanhope, Ph.D., executive director for academic operations of FAU's Jupiter Campus, and Johanna Kowalko, Ph.D., an assistant professor of biology in FAU's Harriet L. Wilkes Honors College.

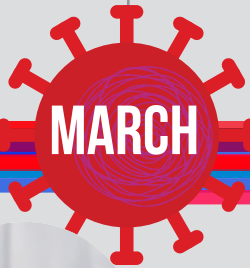
Charles E. Schmidt College of Medicine and Christine E. Lynn College of Nursing publish a study urging public health leaders to take action to control the spread.



Michael DeDonno, Ph.D., College of Education and Charles E. Schmidt College of Medicine, begins research on Reactions to COVID-19 Pandemic: A Society Perspective.



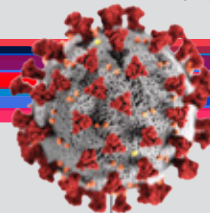
College of Business hosts series discussion on their podcast about COVID-19 and the economic crisis behind it.



Intercept TeleMed, an FAU Tech Runway graduate, provides critical telemedicine services to intensive care units.



Massimo Caputi, Ph.D., Charles E. Schmidt College of Medicine, develops COVID-19 testing, supporting a larger FAU project.



I-Health's Infectious Disease Focus Group continues to address diseases like COVID-19, while addressing the global health threat.

Sameer Hinduja, Ph.D., College of Social Work and Criminal Justice, presents research on the pandemic and an increase in cyberbullying.

Florida SBDC at FAU provides more than 2,000 specialized consulting hours to small businesses.

### A PLAN TO PREVENT THE WORST

To limit contact between her staff and others, Sylvia Gografe, FAU's attending veterinarian, asked researchers, like those in Blakely's lab, to limit their visits and schedule the use of rooms where they work with the animals.

"The animals have to be attended to every day, and our technicians, who really are the ones on the front lines, have come in reliably and have not been fearful," said Gografe, DVM, Ph.D., attending veterinarian, assistant vice president for research, Comparative Medicine, and associate professor of biomedical science in the Charles E. Schmidt College of Science.

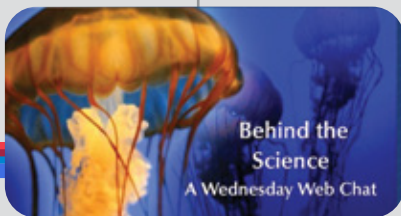
Should illnesses and quarantines interfere with the technicians' ability to work, Gografe could face a grim prospect of the inability to care for the animals.

To prevent gaps in staffing, she put a plan in place. Her office has cross-trained research technicians from labs as well as administrative staff, including Gografe herself. "This was a very conscientious decision made early on: We don't reduce the animal populations except in truly excruciating circumstances," she said.

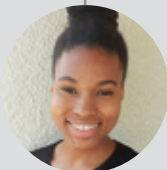
### FEW OPTIONS, NONE OF THEM GOOD

Some research simply requires close contact. While much of the work at FAU Harbor Branch Oceanographic Institute has continued, the institute curtailed fieldwork typically done by teams in tight quarters, according to James Sullivan, Ph.D., executive director of Harbor Branch. Sample collecting trips on small boats became less frequent, carrying fewer people who adhere to new precautions such as wearing masks. Meanwhile, SCUBA diving was largely suspended.

FAU Harbor Branch Oceanographic Institute releases first virtual series, Behind the Science – A Wednesday Web Chat.



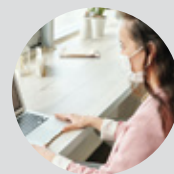
The annual FAU Wave competition ceremony moves online. Winner Paris Prince, below, FAU High School.



School of Architecture uses 3D printer to create plastic face shields and pseudo N95 respirators.



FAU Medicine, operated by Charles E. Schmidt College of Medicine, offers Telehealth or virtual physician appointment for patients.



College of Engineering and Computer Science and I-SENSE create 4,000 face shields for healthcare workers.



Charles E. Schmidt College of Science moves the Frontiers in Science lecture series online.



Division of Research launches COVID-19 Change Challenge, a platform for students to submit their COVID-19-related ideas.

### Let's Talk Research

Division of Research creates an original Let's Talk Research page for all virtual research-related community events.





# SCIENCE

## Behind the Virus

**James X. Hartmann, Ph.D., professor in the Charles E. Schmidt College of Science and immunologist in the Center for Molecular Biology, talks about the science behind the coronavirus that caused the recent global pandemic.**

**Q. What is coronavirus?**

**A.** The coronaviruses are a group of viruses that primarily cause respiratory infections, but their infection may spread to other parts of the body. There are a variety of coronaviruses that infect animals and humans with a range of severity. They are single stranded RNA viruses surrounded by a protein coat that stabilizes the RNA and further enveloped in a membrane studded with the receptors (spike proteins) needed to bind and infect target cells. the membranous

envelope with the spike proteins produces a halo or "corona" around the virus particles when viewed in an electron microscope. The current strain of the coronavirus is referred to as SARS COV-2, the abbreviation SARS referring to severe respiratory syndrome. There are seven strains of coronaviruses that can infect humans and when a human is infected with both human and animal strains, recombination of their genomes can occur - leading to new strains that may have increased virulence such as SARS COV-2, the causative agent in the current pandemic.

**Q. How does it infect the body?**

**A.** Typically the virus particles are expelled from the lungs of an infected, often asymptomatic, individual following a cough or forced exhalation during exercise etc.

The virus particles are inhaled into the lungs where the spike proteins of the virus particles bind to a key receptor on the surface of a variety of cells. The receptor the spike proteins bind to is called angiotensin converting enzyme-2. That receptor is found on a wide variety of cells including the lung, brain, heart and muscles. Although the infection may begin in the lung, it may spread and multiple in a variety of tissues.

**Q. Why is it so difficult to trace the virus and flatten the curve, or create a short vaccine for the virus?**

**A.** The main difficulty in tracing the virus infection among the population and degree of herd immunity is the availability of test kits. A second major problem is that both the tests for presence of the virus or antibodies is the failure rate of the test. The tests can give either false

positive or false negative readings so infections may be missed, and we do not really know how many individuals, especially those asymptomatic, may have resistance through the production of antibodies.

**Q. What evidence provided suggests truth that the virus is airborne and does the social distance or six-foot rule help reduce spreading?**

**A.** Evidence that it is airborne comes from studies in Wuhan China where virus particles were detected in the air collected within hospitals, with highest concentrations of virus particles found in intensive care units administering to virus infected patients. Social distancing, six-foot rule and wearing a mask, all contribute to reducing the spread but obviously air movements may lessen their effectiveness.

The Cane Institute for Advanced Technologies at A.D. Henderson University School and FAU High School create 3D printed personal protective equipment.

Through the CARES Act, Florida SBDC at FAU offers clients no-cost, fast, specialized services.

Florida SBDC at FAU consultants expand skillsets to include re-opening business plans, emergency preparedness and more for disaster recovery.

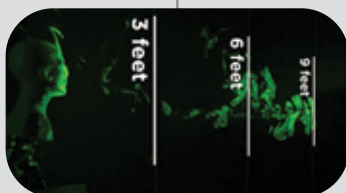


Division of Research's first weekly virtual Research in Action reaches more than 300 attendees.



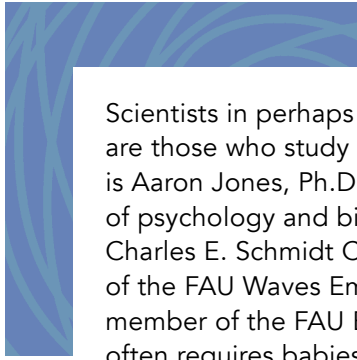
FAU creates Healthy Mind Study, an annual web-based survey on mental health, to support students effected during COVID-19.

National news outlets like CNN and Today, talk about a cough simulator designed by researchers in the College of Engineering and Computer Science, to detect if social distancing of six feet is enough.



Division of Research designs a web page dedicated to showcasing COVID-19-related research





Scientists in perhaps the most difficult situations are those who study humans. Among them is Aaron Jones, Ph.D., an associate professor of psychology and biomedical science in the Charles E. Schmidt College of Science, director of the FAU Waves Emotion Laboratory, and member of the FAU Brain Institute. Her research often requires babies and mothers, whose interactions she studies, to come into her lab.

In one such project, Angela Bernardo, a graduate student in the lab, has been observing babies' emotional reactions and brain activity when their mothers ignore them in favor of a potential competitor, a lifelike baby doll. Researchers scheduled the babies to visit twice in three months to observe potential changes over time. Only a fraction had completed

*(continued on page 38)*



FAU veterinary staff continue to care for all animals in FAU's labs throughout the global pandemic.



Tech Runway becomes a testing center for COVID-19.

Charles E. Schmidt College of Medicine conducts training using ultraviolet light to reinforce the proper procedures of wearing personal protected equipment, tracking the spread of germs

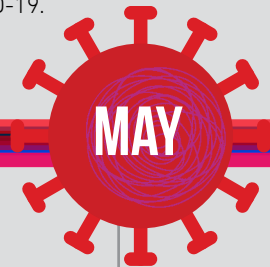
Charles E. Schmidt College of Medicine researchers use Ouraring, a smart ring for the heart, to predict COVID-19 cases.



Winners of the COVID-19 Change Challenge create motivational podcast to promote student mental health.



Charles E. Schmidt College of Medicine students collect and donate more than 23,000 personal protective equipment to local healthcare workers.



Researchers collaborate on a grant to conduct research for RAPID: COVID-19 Coronavirus Testbed and Knowledge Base Construction and Personalized Risk Evaluation.

Florida SBDC at FAU promotes Small Business five-day video challenge to help businesses during the pandemic.

Six certified public accountants from Palm Beach County join Florida SBDC at FAU to help provide capital access consulting.

# PREPARING FOR PANDEMIC RESPONSE

By Judy Gelman Myers

**D**ramatic images in the nightly news capture the emotional state of the nation, but do they help us better understand the real felt impact of COVID-19?

Michael DeDonno, Ph.D., assistant professor in the College of Education and the Charles E. Schmidt College of Medicine, is leading a team of researchers who collect and assess people's firsthand responses to the pandemic. The goal is that rigorous data acquisition and analysis, rather than emotion-laden pictures, will lead to better decision making about the challenges we face, now and in the future, DeDonno said.

The team of researchers will connect with citizens, healthcare workers and first responders through online surveys distributed by Facebook groups such as Florida COVID-19 Updates and Information, as well as professional organizations. When the team receives responses, they quickly write up

summaries and dispatch them to media outlets, or do more detailed analyses, which they submit to rapid-response journals. Their goal is to swiftly publicize their findings to get real-time empirical evidence to policy- and decision-makers.

DeDonno started the project when he saw news clips of college students packing Florida's beaches. "There was a lot of media attention about college students not taking this seriously, but I thought there could be something more empirical to uncover there," DeDonno said.

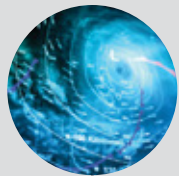
The team collects information on how people are coping with the pandemic, if they're complying with Centers for Disease Control and Prevention recommendations, and which recommendations they find difficult to follow. The researchers are trying to better understand the factors that predict compliance within a community; how people are dealing with depression, anxiety and stress; and what trajectory we're seeing over time.

"Many of our frontline professionals – nurses, law enforcement, physicians, EMTs – will come out of this pretty exhausted, with some degree of post-traumatic stress. We need to think about interventions and treatments," DeDonno said.

He and his team, which includes Ximena Levy, MD, MPH, director of the FAU Clinical Research Unit, and Joy Longo, Ph.D., associate professor in the Christine E. Lynn College of Nursing, plan on playing a role in post-pandemic interventions.

A methodologist and psychologist by training, DeDonno will design research studies to elicit a better understanding of frontline professionals' post-traumatic stress and determine feasible interventions, which could include partnerships linking FAU College of Medicine resident programs with hospitals as well as contributions from FAU's psychiatry residency program and counselor education program.

Katherine Heinze, Ph.D., Christine E. Lynn College of Nursing, discusses ethical challenges related to COVID-19.



The National Science Foundation Rapid Response Research funds FAU researchers to study the impacts of COVID-19 on vulnerable populations in hurricane-prone areas.

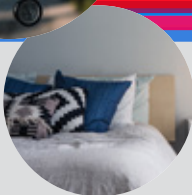
Researchers collaborate to develop a model of COVID-19's spread, using big data analytics, computer science data visualization techniques and decision support systems.



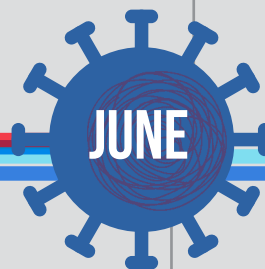
Florida SBDC at FAU consultants assist with Paycheck Protection Program and Loan Forgiveness applications.



Christine Spadola, Ph.D., Christine E. Lynn College of Nursing, talks about sleeping well during a global pandemic.



Paul Peluso, Ph.D., College of Education, presents tips on building and maintaining relationships while social distancing.



Researchers on the FAU Jupiter campus at the Scripps Research Institute in Florida found that the coronavirus has mutated to infect human cells easier than before.

At the time of publication, FAU continued making great research-related strides in the combat against COVID-19.

their second visit when social distancing precautions made it necessary for Jones to put the experiments on hold.

She said she hopes to find a way to continue, but the options aren't good. "Babies don't respond well to masks," she said. "They think the usually playful time at the lab is a visit to the doctor's office and that we may be giving them an injection."

Professional societies, such as the International Congress of Infant Studies, are encouraging researchers to switch to remote studies. To do so, she would need to drop off brain recording equipment at babies' homes and train mothers to use it. Home visits, another component of her research, have also stopped.

If too much time passes, the remaining children will get too old to complete the study, leaving Bernardo with only limited data for her thesis.

Other experiments in the lab have gone on hiatus too. As much as Jones wants them to continue, she worries about doing so. "As a researcher, I am very concerned that I don't give parents bad advice and that I don't put them or their infants at risk for the virus," she said.

If the need for distancing persists, she fears a worst-case scenario: Losing the ability to study crucial aspects of mother-infant interactions.

"Some research can only be done in the lab, over multiple visits," she said. "The larger issue is that the pandemic is constraining our ability to conduct this important work indefinitely." ♦

## STUDY AIMS TO PREDICT THE UNPREDICTABLE

By John Tibbetts

Employers want to keep employees safe from the coronavirus, but testing for COVID-19 is often slow or unavailable. People often don't know when they've been infected, and may show symptoms days later or never show symptoms at all. The great majority of people tested for the presence of COVID-19 already present symptoms, which can lag for days after the infections occur, causing them to unknowingly spread the virus.

In an attempt to reduce this ambiguity, researchers from the Charles E. Schmidt College of Medicine are studying 200 randomly chosen residents and faculty volunteers for a period of three months with the goal of developing predictive algorithms of COVID-19 infection.

"We are looking at COVID-19 prevalence in a population of healthcare professionals," said Massimo Caputi, Ph.D., a professor of biomedical science. "We want to identify when individuals become infected, when or if their bodies

react with symptoms, and when their immune systems develop antibodies to the infection."

Colleagues involved in the study include Janet Robishaw, Ph.D., senior associate dean for research and chair of the Department of Biomedical Science, and Joanne Krasnoff, Ph.D., director, Learning Health Center for Research and Education and research assistant professor of biomedical science.

The researchers will track three parameters.

- Each week, the saliva of healthcare workers will be tested for the presence of the virus, without long waits and the discomfort of traditional methods. Saliva samples are a more preferable indicator for infection than the deep nasal swabs now widely used, recent studies have shown.
- Volunteers will carry an Oura ring, an activity and symptom tracker that measures physiological signals such as temperature, blood pressure, respiratory rate and other data. This

information will be transmitted to the server, providing data to understand clinical signals for illness onset.

- Two serology tests will be conducted to identify antibodies against the virus. One test will occur during the middle of the study period and another few weeks after the study's conclusion.

"We will follow the volunteers for three months to learn how many of them get infected, which we can see with serological and molecular tests," Caputi said. "Are volunteers mounting an immunological response? And how strong is that response? We can identify when they get infected with saliva tests and when they have symptoms with the Oura ring tracker. We can also learn how many were unknowingly infected but without symptoms."

This study will provide data for a predictive algorithm, which eventually could be used in testing and prevention protocols for healthcare workplaces.



# Serious Monkey Business

Search for Lost Monkey Species Takes  
FAU Research Cameras into Treetops of West Africa

*By Lynn Laurenti*

**H**igh in the trees of the Tanoé-Ehy Forest in West Africa, a team led by Florida Atlantic University and the Swiss Center for Scientific Research in Côte d'Ivoire is capturing video of rare monkeys on the verge of extinction.

The project began in May 2019 with the primary aim of finding evidence that Miss Waldron's red colobus monkey, unseen since 1978, still exists. While that objective has yet to be achieved, the camera traps

have caught sight of other rarely-seen monkeys, including the first footage ever taken in the wild of the Critically Endangered rolaway monkey, above.

The monkey at the center of the search was originally discovered in 1933 by Willoughby P. Lowe of the British Museum. He named it after Miss Fanny Waldron, a colleague who accompanied him on the expedition. Although the species was declared extinct in 2000, hope remains alive that some

individuals may have survived in the Tanoé-Ehy Forest of Côte d'Ivoire, based on sightings reported by local hunters. One villager was even able to duplicate its distinctive cry. The Tanoé-Ehy Forest has been designated a Key Biodiversity Area by the International Union for the Conservation of Nature. Today, Miss Waldron's red colobus monkey is on Global Wildlife Conservation's list of the 25 "most wanted lost species."

FAU's involvement in the project traces its origin to the summer of 2018, when Kate Detwiler, Ph.D., associate professor of anthropology in the Dorothy F. Schmidt College of Arts and Letters, took students in her research lab to Nairobi, Kenya, to participate in the International Primatological Society's meetings. "One of the symposia was on the conservation of African monkeys," Detwiler said. "We made a presentation on the multi-level camera system we have developed in our lab to find elusive monkey species."

The technique involves the strategic placement of video cameras on the ground, at mid-level and in the forest canopy. That prompted Barney Long, Global Wildlife Conservation's senior director of species conservation, to invite FAU to join the long-stymied Miss Waldron's search.

"So far, we've been over there three times," Detwiler said. FAU's researcher in the treetops is integrative biological sciences doctoral student Daniel Alempijevic, who built upon tree-climbing experience he gained in a previous collaboration with Detwiler in the rain forest of the Democratic Republic of Congo. The Tanoé-Ehy Forest project has produced more than 20,000 videos yielding images of the white-thighed colobus monkey, white-naped mangabey monkey, spot-nosed monkey, rolaway monkey, Lowe's monkey and the olive colobus monkey. Other denizens of the rain forest caught on camera include the long-tailed pangolin, the white-crested hornbill, the piping hornbill, the Congo serpent eagle and the yellow-billed turaco.

"Back here at FAU, we have a team of undergraduate students who earn research credits by going through the video files to find specific animals and gather information on them," Detwiler said. "We send everything to our partners in

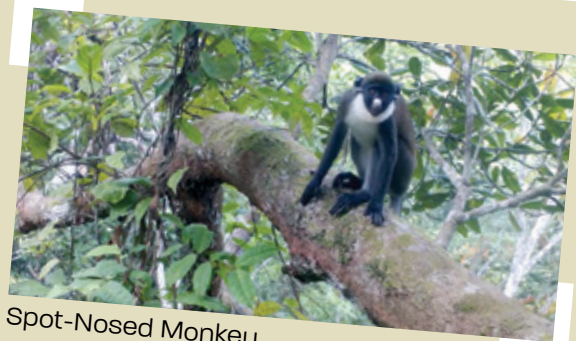
Côte d'Ivoire, who incorporate the information into their database." Leading the massive data entry process at FAU are Aaron Mencia, recent alumnus, and Laurie Udine, a community volunteer.

Does hope live on that Miss Waldron's red colobus monkey still exists? "I think so," Detwiler said. "Hunters report that they still see the monkey."

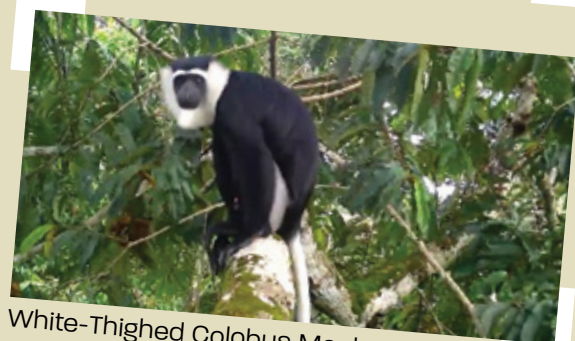
The two main threats to all animals living in the Tanoé-Ehy Forest are hunting activity and possible development of what is currently swampland. "Preserving this area has become an issue of international importance," Detwiler said. "The struggle in Côte d'Ivoire, as here in Florida and other parts of the world, is between development and conservation. Our colleagues at the Swiss Center for Scientific Research are working to protect both the land and its animals." ♦



Olive Colobus Monkey



Spot-Nosed Monkey

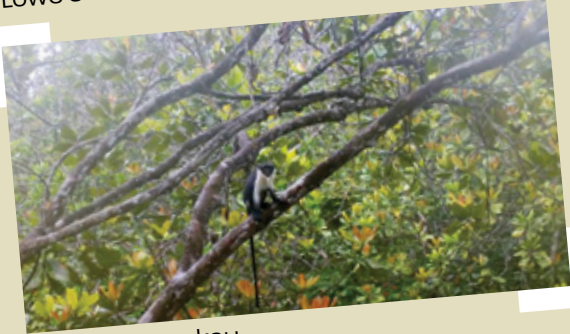


White-Thighed Colobus Monkey

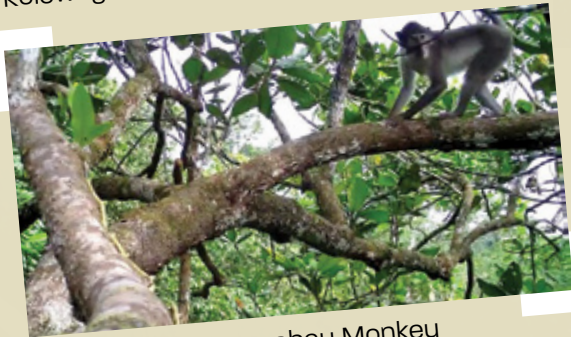




Lowe's Monkey



Roloway Monkey



White-Naped Mangabey Monkey



*Daniel Alempijevic, FAU graduate student, strategically places a video camera in the the forest canopy in effort to capture footage of monkeys on the verge of extinction.*



# OFF THE SHELF



**Aligning Mentor and Trainees Expectations; Addressing Conflict; Mini Grant Proposal; Research Project Outline and Abstract**, a chapter in the book, *Entering Research - A Curriculum to Support Undergraduate and Graduate Research Trainees*

Evelyn Frazier, Ph.D., Charles E. Schmidt College of Science  
Published by W.H. Freeman & Company, January 2020



**Race, Law, and Higher Education in the Colorblind Era: Critical Investigations into Race-Related Supreme Court Disputes**

Hoang Vu Tran, Ph.D.,  
College of Education  
Published by  
Routledge, July 2019



**Becoming Carole Lombard: Stardom, Comedy and Legacy**

Olympia Kiriakou, Ph.D.,  
Dorothy F. Schmidt  
College of Arts and Letters

Published by  
Bloomsbury Academic,  
February 2020



**Safeguarding Your Child with Autism: Strategies and Tools to Reduce Risks**

Jack Scott, Ph.D.,  
College of Education

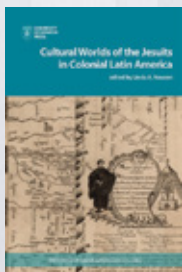
Published by  
Woodbine House,  
March 2020



**Narrative Politics in Public Policy: Legalizing Cannabis**

Hugh T. Miller, Ph.D.,  
Dorothy F. Schmidt  
College of Arts and Letters

Published by  
Palgrave Macmillan,  
May 2020



**A Patriarchal Society in the Rio de la Plata: Adultery and the Double Standard at Mission Jesús de Tavarangue, 1782**, a chapter in the book, *Cultural Worlds of the Jesuits in Colonial Latin America*

Barbara Ganson, Ph.D., Dorothy F. Schmidt  
College of Arts and Letters

Published by the University of London, April 2020



**Conducting Research in Developmental Psychology**

Nancy Aaron Jones,  
Ph.D., Krystal Mize,  
Ph.D., Jillian Hardin,  
Ph.D., all Charles E.  
Schmidt College of  
Science; and Melanie  
Platt, Ph.D., College of  
Education

Published by  
Routledge/Taylor-  
Francis, December 2019

# ART OF SCIENCE PHOTO CONTEST 2020

## **New Horizons Expand Through the Research Lens**

The Division of Research launched the Art of Science photo contest last year for FAU faculty, students and staff. More than 150 submissions rolled in highlighting groundbreaking research happening in the field, in the lab and everywhere in between across all of FAU's colleges. It's photos like these that help engage and educate the community. The 2020 Art of Science photo contest is now accepting new submissions. Aside from winning great prizes like an iPad, top photos may also be published in an upcoming issue of *Owl Research and Innovation* magazine.

Below: A common octopus (*Octopus vulgaris*) hiding in its den, peering out at the photographer. The seashells in the foreground are the remains of the octopus' lunch, which they take back to their dens to consume.

- Photo by Rachel Shanker, graduate student,  
Charles E. Schmidt College of Science, 2019  
Art of Science Photo Contest Submission



Florida Atlantic University  
Division of Research  
777 Glades Road  
Boca Raton, FL 33431

Non-Profit Org.  
U.S. POSTAGE  
**PAID**  
BOCA RATON, FL  
PERMIT NO.77



### **Acid-loving algae**

Iron deposits and acid-loving algae in the freshwater stream in Silverton, Colo. Excessive leaching of iron from surrounding rocks makes local streams acidic and covered with iron crusts known as Ferricretes.

– Picture taken in Colorado during teaching of the Geology Senior Field Camp. Photo by Anton Oleinik, Ph.D., Charles E. Schmidt College of Science. 2019 Art of Science Photo Contest submission.