

OWL RESEARCH & INNOVATION

A Neuroscience Odyssey

*Randy D. Blakely –
From Small Town to
Executive Director
of FAU Brain Institute*

HANDS-ON LEARNING TRANSFORMS

Students Nursing Care in Guatemala

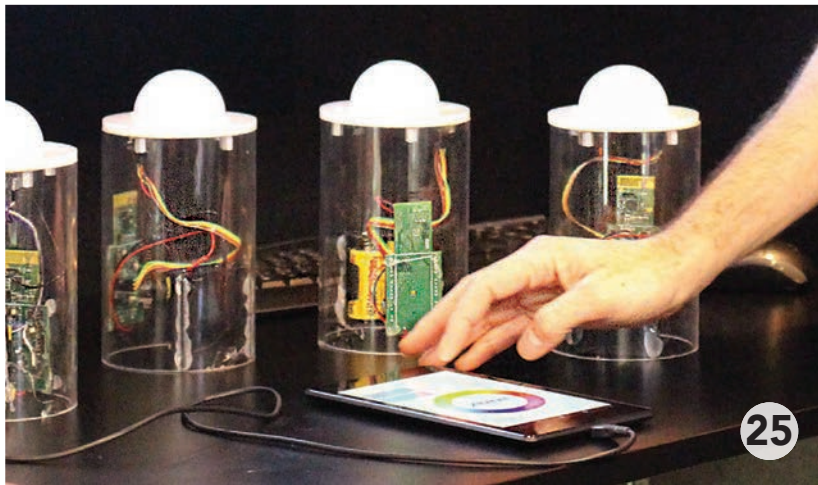
PRESIDENT OBAMA'S ENCOURAGING WORDS

Student Builds a BEACON of Hope

FAU

**FLORIDA ATLANTIC
UNIVERSITY**

Division of Research



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 Editor: Beth C. Barak
 Copy editors: Cindy Jones-Hulfachor, Lynn Klein Laurenti

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On the cover: Randy D. Blakely Ph.D. and Meagan Quinlan of FAU's Brain Institute, photo by Gina Fontana



President's Message

JOHN W. KELLY, PH.D.

■ Research a Key Focus of FAU's Strategic Plan

Research is the engine that propels progress on a host of critically important fronts, including biomedicine and biotechnology, neuroscience, robotics, computer engineering and environmental science. Florida Atlantic University's researchers are hard at work in all these areas and more, achieving advances aimed at making life better for people here in our own country and all over the world. As president of this vigorous institution, I take tremendous pride in their achievements, some of which are described in this magazine.

Building FAU's research capability is a central goal of our 2015-2025 strategic plan, which places special emphasis on initiatives we've defined as Pillars and Platforms. Pillars are programs focused on creating knowledge that benefits society, including those that promote healthy aging, increase understanding of brain disorders and contribute to preserving the natural environment. Platforms are specific research activities that directly support the Pillars. For detailed information on our institutional goals and the paths we're creating to reach them, I invite you to visit www.fau.edu/strategicplan.

As you will see as you read the stories in these pages, FAU is undergoing rapid development as a center of world-class research. I'm proud of the progress that's been made by our dedicated researchers and excited to think of the new frontiers they'll cross in the years ahead. •



Taking FAU Research to New Heights

The strategic investments Florida Atlantic University has made to grow its research enterprise are starting to pay off. Faculty members are energized, submitting more grant applications in the constant search for research funding. Grant application submissions have increased by nearly 160 percent in three short years. That has led to a 25 percent increase in the 2016 fiscal year in total award dollars FAU researchers have won to make discoveries and develop innovations, as compared to last year.

As we continue to follow President John Kelly's Strategic Plan for the Race to Excellence 2015-2025, those numbers are expected to remain on the same upward trajectory. This is truly an exciting time to be part of the research enterprise at Florida Atlantic University! As FAU scientists continue to achieve more and more success, we'll

bring you the news in the pages of this magazine, *Owl Research & Innovation*. You'll notice that we've made some changes in this edition of the magazine. We're working to bring you our researchers' success stories in a compelling publication that provides insight into some of the exciting work taking place at FAU. We hope you enjoy it .•



DANIEL C. FLYNN, PH.D.
Vice President for Research

NEWS BRIEFS

■ Advancing Lewy Body Dementia Interventions

Internationally acclaimed Florida Atlantic University neuroscientist James Galvin, M.D., is leading the charge to find new methods to help patients with Lewy Body dementia — a common degenerative disorder that gained national attention when afflicted actor and comedian Robin Williams took his life.

Galvin, associate dean for clinical research and professor in the Charles E. Schmidt College of Medicine, and professor in the Christine E. Lynn College of Nursing, is conducting the first U.S. clinical trial to evaluate an investigational medicine to treat patients with Lewy Body dementia.

Some 240 patients across the country will be able to enroll in the six-month study. At present, there are no medications designed to treat Lewy Body dementia, so Alzheimer's medications are often prescribed.

In addition, Galvin recently developed a test to assess the signs and symptoms of Lewy Body dementia. His Lewy Body Composite Risk Score has a 98.6 percent accuracy rate in determining whether patients suffer from Alzheimer's disease or Lewy Body dementia. This disorder is characterized by fluctuations in cognition, particularly in alertness and attention, and can aggravate depression. Many Lewy Body dementia patients also have visual hallucinations and REM sleep behavior disorder. •

Students Reap Benefits of Collaboration with Research Powerhouse

Kuo-Sheng Lee, a student in the integrative biology and neuroscience doctoral program offered jointly with the Max Planck Florida Institute for Neuroscience (MPFI), recently had his research published in the prestigious journal *Nature*. Working in collaboration with David Fitzpatrick, Ph.D., CEO and scientific director of the institute, Lee contributed to all aspects of the study – designing experiments, collecting and analyzing data, and writing the journal article, which explores how neurons in the cortex process spatial patterns, motion and depth.

“This study reveals a fundamentally new organizing principle for cortical processing in the brain, a discovery that rewrites the textbook picture of cortical circuits,” Fitzpatrick said.

Some FAU undergraduates aren’t waiting for graduate school to get hands-on research experience. A scientific poster developed by Monique Tromp as a senior in the Harriet L. Wilkes Honors College and a MPFI Scholar, scored in the top three of all 60 posters displayed at the Symposium for Young Neuroscientists and Professors of the Southeast (SYNAPSE) in Clinton, South Carolina.

Tromp’s poster, “Maturation in Laminar Distribution of Inhibitory Neurons During Development,” was based on her collaboration with Amanda Jacob, Ph.D., Dan Wilson, an FAU Ph.D. student, and Fitzpatrick. Tromp, who graduated in May, launches her career as a full-time research technician in Fitzpatrick’s lab this fall.

While reflecting on her year in the MPFI Scholars, Tromp said, “The rewarding part is that I was able to contribute to science. Not many people get to say that.”

The institute is located on FAU’s Jupiter campus. •



“This study reveals a fundamentally new organizing principle for cortical processing in the brain, a discovery that rewrites the textbook picture of cortical circuits.”

DAVID FITZPATRICK, PH.D., CEO
Max Planck Florida Institute
for Neuroscience



4/17/2017

■ Student's Research Addresses Public Safety Fears

We look to science to separate fact from fiction, especially if we feel our safety is threatened. Doctoral candidate Gabrielle Barbarite's research on *Vibrio vulnificus*, a bacterium that has caused three local deaths in the past four years after victims came into contact with Indian River Lagoon water, is helping to educate an anxious public.

Her study, conducted under the supervision of FAU Harbor Branch Research Professor Peter McCarthy, Ph.D., is the first to systematically examine *Vibrio* in the lagoon. Information about the study, including frequently asked questions and safety tips, is available on the Harbor Branch website. Among the facts presented is that *Vibrio* is not a form of flesh-eating bacteria because it does not have the ability to decompose healthy, unbroken skin. •

Leading FAU Scientist Charting New Paths in Mental Health

John Newcomer, M.D., vice dean for research and innovation at Florida Atlantic University's Charles E. Schmidt College of Medicine, co-authored two important recent studies investigating mental health in different patient populations.

In the first study on hard-to-treat depression in older people, Newcomer and his colleagues found combining antidepressant medication with an antipsychotic medication to treat clinically depressed people 60 and older is beneficial to those who do not get relief from an antidepressant alone.

The study, published in *The Lancet*, involved 468 people 60 and older who were diagnosed with depression. It found that the two-drug combination relieved depression in 44 percent of treatment-resistant patients.

Newcomer also co-authored a study published in the *Journal of the American Medical Association Internal Medicine* examining the dearth of diabetes screening in patients with severe mental illness, who are up to three times more likely to develop Type 2 diabetes compared to the general population.

Despite recommendations from both the American Diabetes Association and the American Psychiatric Association, patients with mental health conditions are infrequently screened for diabetes. The study looked at 50,915 Californians with severe mental illness who were on Medicaid. More than 70 percent of them were not screened for diabetes. •

Preparing Educators to Teach Students with Autism

A \$1.2 million U.S. Department of Education grant awarded to Cynthia L. Wilson, Ph.D., a professor in the Department of Exceptional Student Education in FAU's College of Education, will provide tuition support for teachers who are pursuing master's degrees and eligibility for state of Florida teaching endorsement in autism spectrum disorder (ASD).

The graduate program focuses on preparing teachers to become skilled in implementing effective research-based teaching methods for students with ASD. It is a timely and critically important effort to alleviate the dire shortage of special education teachers across the country.

One in six children in the U.S. has a developmental disability ranging from mild — speech and language impairments — to serious conditions such as cerebral palsy and autism. ASD has been identified in one in every 68 children. Autism is a neurological disorder that typically appears before the age of three and impacts social development and communication skills. •



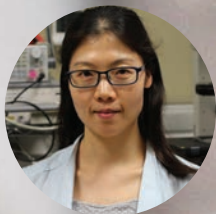
Smart Biosensor Technology Will Aid Sickle Cell Patients

With the assistance of a \$167,000 grant from the National Science Foundation, Florida Atlantic University assistant professor E. (Sarah) Du, Ph.D., plans to develop a portable smart sensor and app for sickle cell patients to analyze and store their blood test results. The new technology will help those dealing with the disorder identify abnormal blood cell activity and take steps to ward off a pain crisis.

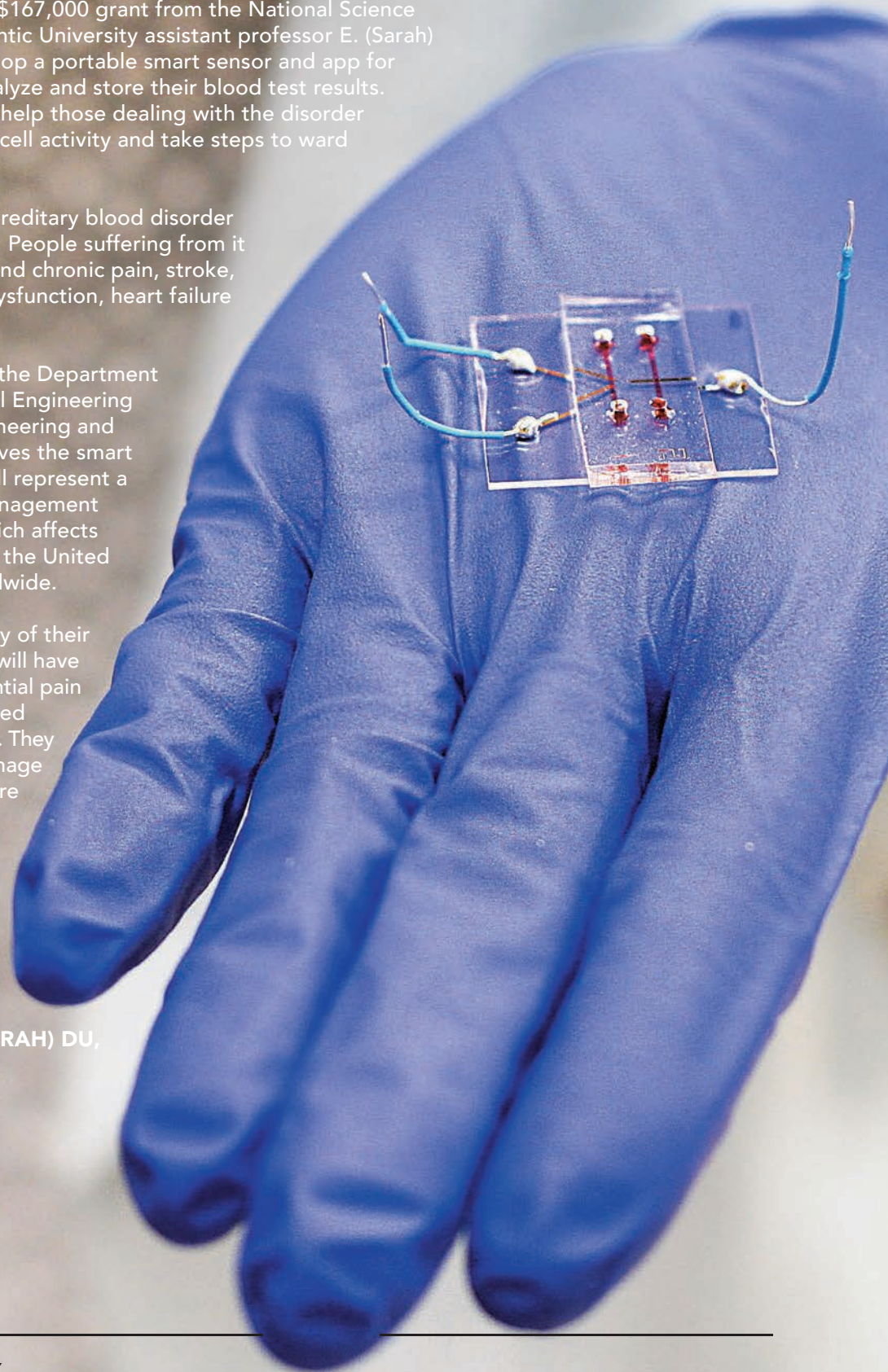
Sickle cell disease is a hereditary blood disorder affecting red blood cells. People suffering from it may experience severe and chronic pain, stroke, organ damage, spleen dysfunction, heart failure and even death.

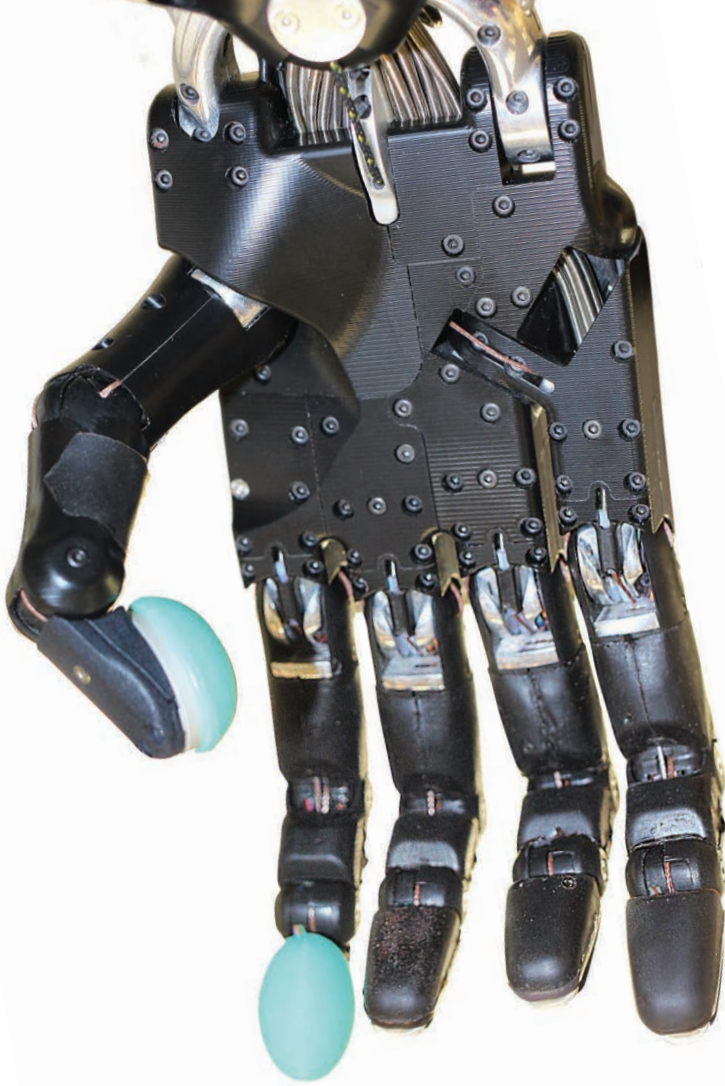
Du, a faculty member in the Department of Ocean and Mechanical Engineering in FAU's College of Engineering and Computer Science, believes the smart biosensor technology will represent a major advance in the management of sickle cell disease, which affects about 100,000 people in the United States and millions worldwide.

By monitoring the activity of their red blood cells, patients will have a risk indicator of a potential pain crisis that might be avoided through early intervention. They will be able to better manage the disease by making sure they are appropriately hydrated and have sufficient oxygen. •



E. (SARAH) DU,
PH.D.





Researcher's Robotic Finger Heading to Ocean Depths

A cutting-edge robotic finger developed by a Florida Atlantic University faculty member will be used undersea in an effort to address the challenges humans encounter working in the ocean depths.

Erik Engeberg, Ph.D., published details about the design and development of his invention in the journal *Bioinspiration & Biomimetics*. To create the finger, Engeberg employed new technology that included shape memory alloy, a 3D CAD model of a human finger, a 3D printer and a unique thermal training technique. The result is a robotic finger that looks and feels like the real thing. Although its initial purpose is to help divers grasp things underwater, it could ultimately be adapted for use as a prosthetic device.

Engeberg is an assistant professor in the Department of Ocean and Mechanical Engineering in FAU's College of Engineering and Computer Science. •



Palm Beach County Awash in Agricultural Riches

A study out of Florida Atlantic University's College of Business digs into the agricultural gold mine existing on the west side of Palm Beach County. While the eastern side caters to the Florida lifestyle, the west is abundant with rich soil. That soil and the produce that comes from it are the reasons why the county is the largest agricultural producer in Florida in terms of the value of its products.

"Most of us who are on the East Coast don't realize the vital importance of the agriculture industry," said Scott W. Barnhart, Ph.D., associate professor of finance and director of the Certified Financial Planner Program at the college. Barnhart worked with Alan W. Hodges, Ph.D., an extension scientist at the University of Florida, on the study, titled "Economic Contributions of Agriculture, Natural Resources and Food Industries in Palm Beach County." They recently presented at the Palm Beach International Agricultural Summit to more than 1,000 attendees.

The study analyzed the role and importance of agriculture, natural resources, and food industries in Palm Beach County, as well as the importance of the agricultural sector relative to non-agricultural-food sectors within Florida and the county. Total sales revenue contributions grew by 42 percent from 2001 to 2014, reaching \$16.85 billion in 2014, equivalent to approximately 15 percent of total business sales. In addition to agriculture and food manufacturing, the analysis includes industries such as mining, forest products manufacturing, food distribution/restaurants and allied inputs and services sectors. •

■ Climate Changes Impacting Sea Turtle Reproduction

The results of a four-year study conducted by Florida Atlantic University researchers show that the changing climate affects the embryonic sea turtles, whose sex is determined during incubation by environmental conditions, including rainfall, sun, shade and sand type.

Drought, heavy rainfalls and other climactic changes are impacting hatchlings' sex ratios and may affect the future reproduction of Loggerhead turtles, which have been around for more than 60 million years.

Sea turtles don't have X or Y chromosomes, so their sex is defined by the environmental conditions during the incubation period. Warmer conditions tend to produce females and cooler conditions produce males. Sex ratios are already strongly female biased.

The findings are included in an article, authored by FAU graduate student, Alexandra Lolavar, and Jeanette Wyneken, Ph.D., professor in the Charles E. Schmidt College of Science, published in the journal *Endangered Species Research*. The team looked at the effects of sea turtle nest and sand temperatures on the sex of hatchlings across multiple years with extreme weather. •



Sea-Level Rise: Impacts from Alaska to Florida

Florida Atlantic University's third Sea-Level Rise Summit attracted top scientists, government officials and members of the private and public sectors seeking to identify ways of enhancing coastal resilience, defined as the ability of people and ecosystems to prosper in the face of changing conditions.

Topics addressed at the summit this past spring, titled "Connected Futures from Alaska to Florida," included the economic implications of sea-level rise, impacts on infrastructure, health and livelihoods, and response success stories.

"While Florida and Alaska are on opposite ends of the continent, they share mutual concerns about the imminent challenges presented by environmental changes," said Colin Polsky, Ph.D., director of the Florida Center for Environmental Studies at FAU.

The U.S. Department of Defense and U.S. State Department have warned that ice melting in the Arctic affects people, infrastructure and ecosystems worldwide, multiplying risks everywhere.

"The rapid melting of Arctic ice is threatening coastal locations globally, with impacts that include increased flooding from sea-level rise in Florida to infrastructure instability from permafrost melting in Alaska," said Polsky. •

"While Florida and Alaska are on opposite ends of the continent, they share mutual concerns about the imminent challenges presented by environmental changes."

COLIN POLSKY, PH.D.



■ Non-Surgical Treatment of Cataracts May Be on the Horizon

FAU researchers have discovered that cells in close proximity to each other can sense when another cell is dying — due to environmental stressors such as UV light and smoke — and eat the cell before it becomes toxic.

“Our work has the potential to lead to the development of treatments and therapies that would eliminate the need for surgery, which is the only way to treat cataracts today,” said Marc Kantorow, Ph.D., professor and assistant dean of graduate programs in FAU’s Charles E. Schmidt College of Medicine.

Kantorow, who led the study, reports that UV light exposure is a major contributor to age-related cataract formation. At some point in their lifetime, he says, most people will get cataracts.

While the researchers studied cells in the eye lens, their work will also provide important information about more complex tissues and disease states.

“Our work has the potential to lead to the development of treatments and therapies that would eliminate the need for surgery, which is the only way to treat cataracts today.”

MARC KANTOROW, PH.D.

“It is widely known that cells have very specific functions and that environmental damage is associated with cell death,” said Lisa Brennan, Ph.D., associate research professor. “Before this study, the common knowledge was that what removed these dead cells were specialized immune cells that literally go into the tissue and eat dead cells, and that’s how your body got rid of them.”

These findings were recently published in the *Journal of Biological Chemistry*. •

Academic Risks for Children in Spanish-Speaking Homes

A \$2.9 million grant from the Eunice Kennedy Shriver National Institute of Child Health and Human Development of the National Institutes of Health will allow a Florida Atlantic University psychology professor to continue a long-term study of children from Spanish-speaking homes, who are at a greater risk of poor academic outcomes than those from English-only speaking homes.

Erika Hoff, Ph.D., of the Charles E. Schmidt College of Science, has been following 137 children from Spanish-speaking homes and 34 children from monolingual English-speaking homes since the children were ages 2½ through 5. Hoff and her team will now be able to follow the children until age 10. The researchers hope to identify factors that put children from dual-language environments at risk for poor language, literacy and academic outcomes. Some 31 percent of children who speak English, but who hear a language other than English at home, fail to complete high school, compared with 10 percent of students from English-only homes. •

Student Researcher Makes Strides Against Breast Cancer

A graduate student has helped pioneer both a potential new way to treat breast cancer and an important partnership with a major local hospital. Ramon Garcia-Areas, who is pursuing a Ph.D. in Integrative Biology, began his journey at the university as an undergraduate, earning a bachelor's degree in biology.

His doctoral dissertation, titled "Delineating the Novel Role of Hypoxia-induced Semaphorin7A in Breast Cancer," focuses on understanding previously unstudied genes. He has been awarded a patent as the primary inventor of a new method of cancer treatment.

In addition, Garcia-Areas and his advisor, Vijaya Iragavarapu-Charyulu, Ph.D., associate professor in the Charles E. Schmidt College of Medicine, established FAU's first partnership with the Lynn Cancer Center at Boca Raton Regional Hospital. Active in campus life as well as in the laboratory, Garcia-Areas served on the Graduate and Professional Student Association. He helped institute a program to provide financial support to graduate student researchers – an initiative he describes as "a way for FAU to invest in FAU." •



From left: María de los Ángeles Ordóñez, DNP, and co-investigator Debra Hain, Ph.D.

Wellness Center Receives \$1.3 Million to Expand Dementia Services

A three-year, \$1.3 million grant from the U.S. Department of Health and Human Services' Administration on Aging will enable Florida Atlantic University's Louis and Anne Green Memory and Wellness Center to expand its services and programs to reach underserved patients with dementia and their families.

An integral part of the Christine E. Lynn College of Nursing, the Center received \$100,000 from Louis and Anne Green to support this project.

"This important award and generous matching gift will enable us to take our dementia-specific, nurse-led model of care into medically underserved communities that are in great need of these services," said María de los Ángeles Ordóñez, DNP, director of the Center and the grant award's principal investigator.

Alzheimer's disease is the sixth leading cause of death in the United States, affecting an estimated 5.3 million people, and the fifth leading cause of death for those 65 and older.

"Our faculty are at the forefront of research and best practices in care for individuals who have Alzheimer's disease and related disorders," said Marlane Smith, Ph.D., dean of the college.

To carry out the project — titled "Bridging the Gap: Providing Specialized Dementia Care and Supportive Services through Community Partnerships" — the center will work in partnership with Artis Senior Living and St. Joan of Arc's Santa Ana Circle, both based in Boca Raton, Fla., and the Palm Beach County Department of Community Services. •



■ More Resilient Critical Infrastructure

Florida Atlantic University is a key player in one of 12 projects nationwide funded under a National Science Foundation initiative aimed at enhancing the resilience of critical infrastructure systems in the face of extreme weather events.

Researchers at FAU, Lehigh University and Georgia State University will collaborate on a three-year, \$2.2 million project that will bring together experts in civil engineering, systems engineering, computer science, economics, urban planning and policy making. They will focus on making the next generation of power and water distribution systems,

transportation networks and communication systems more resilient to disruptive events such as hurricanes and earthquakes.

“The critical infrastructure systems that Americans rely upon on a daily basis ... are becoming increasingly complex to manage as our cities grow,” said Diana Mitsova, Ph.D., principal investigator for the collaborative award and associate professor of urban and regional planning at FAU.

The endeavor is part of the NSF’s “Critical, Resilient, Interdependent Infrastructure Systems and Processes” program, known by the acronym CRISP. •

Facebook Support for Cyberbullying and Teen Dating Violence Study

Cyberbullying expert and Florida Atlantic University professor Sameer Hinduja, Ph.D., is the recipient of a \$189,000 grant from the Digital Trust Foundation, formed by Facebook, to conduct a study to better understand the scope of cyberbullying and electronic dating violence.

Hinduja and University of Wisconsin-Eau Claire professor Justin Patchin, Ph.D. — who are co-directors of the Cyberbullying Research Center — will collect and analyze data from a nationally representative panel of teens who will be surveyed with parental consent. Hinduja and Patchin expect to better illuminate the background factors associated with those who are involved, as well as what can be done about it.

Studies indicate that patterns of dating violence often begin during adolescence and carry on into adulthood. Social media have provided new platforms through which it can occur. •



CYBERBULLYING IN THE U.S.

Sameer Hinduja, Ph.D., is studying how cyber-bullying affects teens, by threatening and harming via electronic devices.

Using Quantum Physics to Stop Cyber Attackers

Florida Atlantic University and SK Telecom, South Korea's largest telecommunications company, have teamed up to employ quantum physics to create more secure telecommunications in sectors where cyber attacks are on the rise, such as healthcare, banking and government.

FAU researchers in the Center for Cryptology and Information Security, the Department of Computer and Electrical Engineering and Computer Science, the Department of Mathematical Sciences, and the Department of Physics will collaborate with SK Telecom to conduct basic quantum physics research for applications in cryptology, hardware engineering and quantum computing.

Standard encrypted electronic communications use a predetermined secret key to transmit data, making it vulnerable to hackers who have a variety of techniques to steal it.

With quantum cryptography, systems use quantum signals that are fragile, like bubbles. If a cyber attacker tries to find out the secret key, the quantum signals are destroyed, just like bubbles, making eavesdropping impossible. •

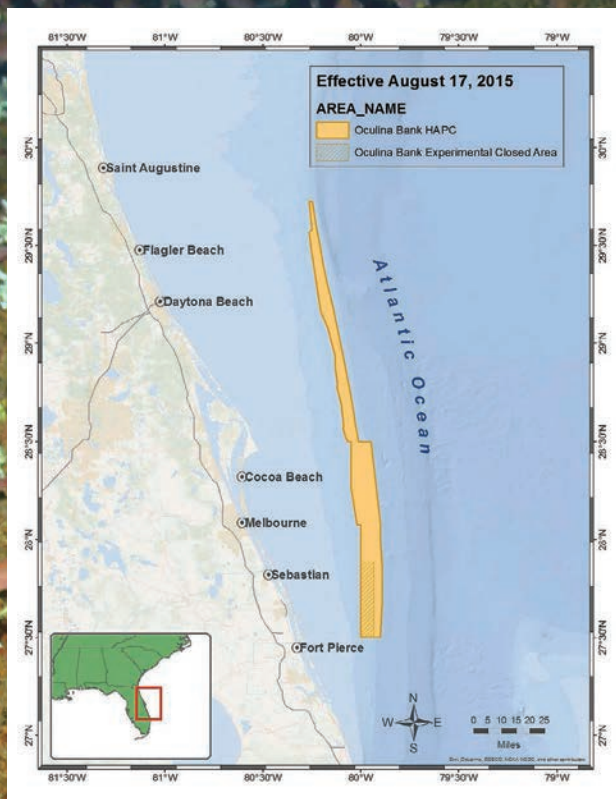


Protected Coral Reef Area Expands

The work of researchers at FAU's Harbor Branch Oceanographic Institute has led to a recent increase in a protected coral reef area off the Florida coast. With the 2015 enactment of Amendment 8 to the Magnuson-Stevens Fishery Conservation and Management Act, the Oculina Habitat Area of Particular Concern off the state's east coast nearly doubled in size to 632 square miles.

The area was established in 1984 as the world's first deepwater protected coral area about a decade after scientists discovered the ancient, slow-growing reefs and began documenting destruction caused by commercial fishing practices.

John Reed, an HBOI research professor, was involved in the area's discovery and has been central to the research and conservation efforts necessary to attain protected status for this and other coral reef areas. He works as an advisor for the South Atlantic Fishery Management Council with support from the National Oceanographic and Atmospheric Administration. •




Water Drone Protects Dwindling Grouper Population

In an effort to combat the decline of the grouper population, Florida Atlantic University researchers have developed a water drone with robotic sensing technology that detects grouper mating sounds, enabling fisheries managers to prevent overfishing during spawning seasons. Overfishing during these short seasons has resulted in a scarcity of spawners for many commercially important groupers, including the Nassau, warsaw, black, yellowfin and red hind.

“Each grouper species is identified through the unique sounds that are produced by muscles contracting against their swim bladder,” said Laurent Cherubin, Ph.D., associate research professor at FAU’s Harbor Branch Oceanographic Institute.

The technology was developed by a team of scientists from Harbor Branch and the University of the Virgin Islands’ Center for Marine and Environmental Studies. •



“Each grouper species is identified through the unique sounds that are produced by muscles contracting against their swim bladder.”

LAURENT CHERUBIN, PH.D.

Understanding Cell Maturation and Death in the Eye Lens

A \$2.8 million grant from the National Eye Institute of the National Institutes of Health has been awarded to the Kantorow Lab at the Charles E. Schmidt College of Medicine to study the process by which cells either mature or die, crucial information that can shed light on how healthy cells become cancer cells and how stem cells become organs.

“Understanding these controls is critical in learning how to make transplantable tissues to cure human disease,” said Marc Kantorow, Ph.D., principle investigator on the award, professor and assistant dean of graduate programs in the College of Medicine. Sue Menko, Ph.D., a professor at Thomas Jefferson University in Philadelphia is co-principal investigator on the award, and FAU’s Lisa Brennan, Ph.D., is a co-investigator.

The researchers will study the eye lens, which grows throughout life and thus is an ideal model for testing individual gene functions in isolated cell mechanisms. •





■ Grant Funds New Approach to Stroke Treatment

The Florida Department of Health has awarded a Florida Atlantic University scientist a \$1.2 million grant to develop an innovative new approach to treating stroke.

Jang Yen (John) Wu, Ph.D., a professor of biomedical science in FAU's Charles E. Schmidt College of Medicine, is conducting a study designed to explore ways the brain can be protected against stroke-induced injury and stimulated to generate new brain cells using

granulocyte colony-stimulating factor, an FDA-approved drug used to enhance blood cellular development. Wu notes that, to date, no clinically effective therapeutic intervention for stroke — which claims the lives of some 130,000 Americans annually — has been developed.

Stroke is the leading cause of serious long-term disability, costing the U.S. an estimated \$34 billion each year for healthcare services, medications and missed days of work. •

Alzheimer's, Marriage and Communication Patterns

A unique study of 15 long-married couples affected by Alzheimer's disease has identified 10 key communication patterns that can help the caregiver and the patient remain connected. Declining communication in marriages affected by Alzheimer's disease often leads to feelings of isolation, depression and estrangement. The FAU study was the first to focus on communication patterns that support continued intimacy. It was conducted by Christine L. Williams, DNSc., professor in FAU's Christine E. Lynn College of Nursing.

Among the findings was the importance of discussing the routine events of daily life, which provided a sense of normalcy to both parties. Sharing memories — conversations steered by the caregiver about people and past events — also proved beneficial. Storytelling was another effective approach, with the caregiver recalling some event rich in detail, sometimes without responses from the Alzheimer's patient. Caregivers showed delight when their spouses contributed more to the conversation than expected. Researchers also observed that caregivers accepted their spouses' version of the story with no interruptions or corrections, showing that they valued the relationship more than being right.

The study's findings were published in *The International Journal of Human Caring* in an article titled "Maintaining Caring Relationships in Spouses Affected by Alzheimer's Disease." •




Collaborating on STEM Retention

A five-year National Science Foundation grant was recently awarded to Florida Atlantic University to increase the number of science, technology, engineering and mathematics — known as STEM — undergraduates.

The \$1.8 million grant will fund a collaborative effort by FAU, the University of Central Florida and Western Carolina University. The universities plan to create a consortium to address the national need to promote STEM education and develop a retention model for increasing the number of STEM undergraduate students, who will more than likely pursue graduate education and professional careers in the sciences. FAU's efforts are led by Donna Chamely-Wiik, Ph.D. and Evelyn Frazier, Ph.D., of the Charles E. Schmidt College of Science, and Daniel Meeroff, Ph.D., of the College of Engineering and Computer Science. FAU's portion of the grant is \$620,000.

The project will benefit more than 500 undergraduates attending the three universities and will focus on introducing them to undergraduate research through structured coursework and direct research experiences. A number of graduate students will serve as research mentors, giving them experience in hands-on training and potentially preparing them to become faculty members. •



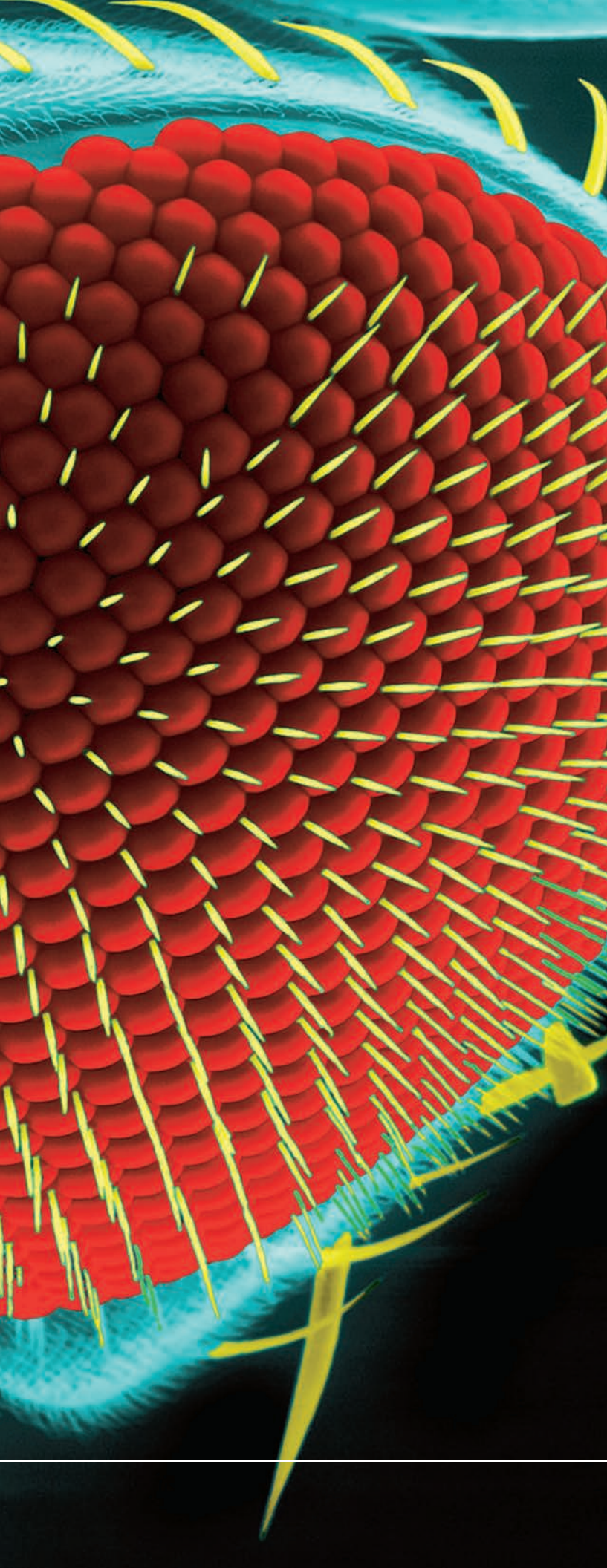
■ A Connection Between Sleep Loss, Diabetes and Obesity

Fruit flies and humans share remarkably similar sleep habits, according to Florida Atlantic University researchers, who have identified a gene in fruit flies that is an integrator of sleep and metabolic state. Their finding could shed new light on metabolic disorders such as diabetes and obesity.

Evidence has long shown a relationship between sleep loss and metabolic dysfunction. Acute sleep loss in humans is associated with increased appetite and insulin insensitivity. Those who are chronically sleep-deprived face a greater risk of developing obesity, Type 2 diabetes and cardiovascular disease.

“In humans, sleep and feeding are tightly interconnected, and pathological disturbances of either process are associated with metabolism-related disorders,” said Alex C. Keene, Ph.D., associate professor in the Department of Biological Sciences on FAU’s John D. MacArthur Campus in Jupiter.

Findings from the study have been published in *iCurrent Biology*. •



■ On the Hunt for Connective Tissue Disease Treatments

A grant of \$540,250 from the National Cancer Institute of the National Institutes of Health will allow a leading Florida Atlantic University scientist to continue his groundbreaking research to develop new therapeutic agents for connective tissue diseases such as multiple sclerosis, cancer and sepsis.

Gregg Fields, Ph.D., principal investigator, professor, chair of the Department of Chemistry and Biochemistry and director of the Center for Molecular Biology and Biotechnology in FAU's Charles E. Schmidt College of Science, has spent more than 15 years investigating how certain protein structures influence cellular and enzymatic behaviors.

"This grant will enable (Dr. Fields) to continue his lifesaving work to develop treatments for some of the most devastating diseases and conditions that afflict us globally," said Janet Blanks, Ph.D., interim dean.

Connective tissue diseases involve the protein-rich tissue that supports organs as well as other parts of the body such as fat, bone and cartilage. Connective tissues serve as the framework for the body and are composed of two major structural protein molecules, collagen and elastin. •

"This grant will enable (Dr. Fields) to continue his lifesaving work to develop treatments for some of the most devastating diseases and conditions that afflict us globally."

JANET BLANKS, PH.D.

Medicare Data Show Elderly Women Benefit From Mammograms

While the American Cancer Society recommends that women have regular breast mammograms until age 74, research conducted by a renowned Florida Atlantic University professor in collaboration with researchers at Meharry and Baylor Medical College found that, in Medicare data, black and white women ages 75 to 84 who had an annual mammogram had lower 10-year breast cancer mortality than women who had biennial, no or irregular mammograms.

The study's results have been published in the prestigious *American Journal of Medicine*. Charles H. Hennekens, M.D., Dr.P.H., the first Sir Richard Doll Professor and senior academic adviser in the Charles E. Schmidt College of Medicine at FAU was the senior author.

Among the study's other findings was that women between the ages of 69 and 84, who had an annual mammogram during the four years immediately preceding a breast cancer diagnosis, had consistently lower five-year and 10-year risks of breast cancer mortality than women with no or irregular screening regardless of race.

The study explored Medicare data from non-Hispanic white and black women. Hispanic women were not included because Hispanic white women have substantially lower mortality than non-Hispanic whites, and the number of Hispanic blacks is small. Hennekens pointed out that these data should be considered hypothesis generating, not testing. •



FAU Team to Develop Improved Stent for Esophageal Cancer

A bioengineer in the College of Engineering and Computer Science at Florida Atlantic University has received a \$142,000 grant from the National Institutes of Health to develop a stent designed to both prevent complications and serve as a drug delivery system for esophageal cancer patients.

Currently, metal mesh stents are usually inserted in inoperable esophageal cancer patients, but the device can cause a variety of complications, including bleeding, chest pain, perforation and tumor ingrowth.

Principal investigator Yunqing (Kevin) Kang, Ph.D., an assistant professor of biomaterials and regenerative medicine in the Department of Ocean and Mechanical Engineering, will work with a team to develop a tissue-engineered stent using biodegradable elastomeric polymer materials that will make it sufficiently rigid yet flexible enough to expand and contract with the esophagus. •

Student Lands NIH Grant for Neuroscience Research

As a senior in FAU's Harriet L. Wilkes Honors College, Roberto Hernandez, 22, was awarded a "Research Supplement to Promote Diversity" by the National Institute of Neurological Disorders and Stroke to enable him to continue his work after graduation. Hernandez is a research assistant at FAU's John D. MacArthur Campus in Jupiter, working under the direction of Greg Macleod, Ph.D., an associate professor in the Charles E. Schmidt College of Science and the Harriet L. Wilkes Honors College. The supplement covers his salary and benefits for 12 months.

He's part of the team that is working on Macleod's National Institutes of Health-funded project focusing on how mitochondria, the powerhouses of the cell, influence the release of neurotransmitters from nerve endings. The release of neurotransmitters is affected when health deteriorates in many neurodegenerative diseases such as Parkinson's, Alzheimer's and Huntington's. •



"I am delighted that these grants will allow the University Galleries to serve more public audiences and provide career-related training to more FAU students."

W. ROD FAULDS

University Galleries Awarded Three Grants

Three grants awarded to the University Galleries at Florida Atlantic University will fund upcoming exhibitions, programming and mentoring programs for area children, including the launch of a visual arts summer camp. The money will also provide for free artist lectures and panel discussions related to the exhibitions.

"I am delighted that these grants will allow the University Galleries to serve more public audiences and provide career-related training to more FAU students," said W. Rod Faulds, FAU University Galleries director.

The grants, totaling \$143,857, come from the Florida States Arts Council, the Florida Humanities Council and the Community Foundation for Palm Beach and Martin counties.

The Community Foundation for Palm Beach and Martin Counties grant will expand FAU's Arts Mentoring Program for local Boys and Girls Clubs, providing art education to students from low socioeconomic backgrounds. Looking ahead, the grant will also help launch a visual arts summer camp. •



■ Professor Debuts Trans-Media Opera in Miami Beach

"This has also been a research project for me in the sense that we've integrated or fused practically every media in 'multimedia' into this opera – with dance also as one of the 'media.'"

JOEY BARGSTEN, PH.D.

A trans-media opera, conceived by Florida Atlantic University associate professor Joey Bargsten, Ph.D., recently premiered at the Miami Beach Cinematheque.

"MelanchoLalaland" — with libretto by Bargsten's wife, Thea Zimmer — mixes performers with video, animation and digital music, blending electronic experimentation with traditional opera.

The Knight Foundation Knights Art Challenge in 2013 awarded Bargsten a grant for "MelanchoLalaland," describing it as "a not-so-distant, dystopian future in which a drug giant called Melancuria Inc. peddles happiness."

"This has also been a research project for me in the sense that we've integrated or fused

practically every media in 'multimedia' into this opera – with dance also as one of the 'media,'" said Bargsten.

"Opera is due for an extreme makeover," Bargsten told the Sun Sentinel, explaining why he chose the art form. "When people think of opera, they have a bunch of stereotypes from the 19th century. It's not the same as musical theater, or theater. It's not like going to a concert, and it's not the same as film. There have been developments in all of those genres, but not opera, so I want to start the ball rolling in that direction."

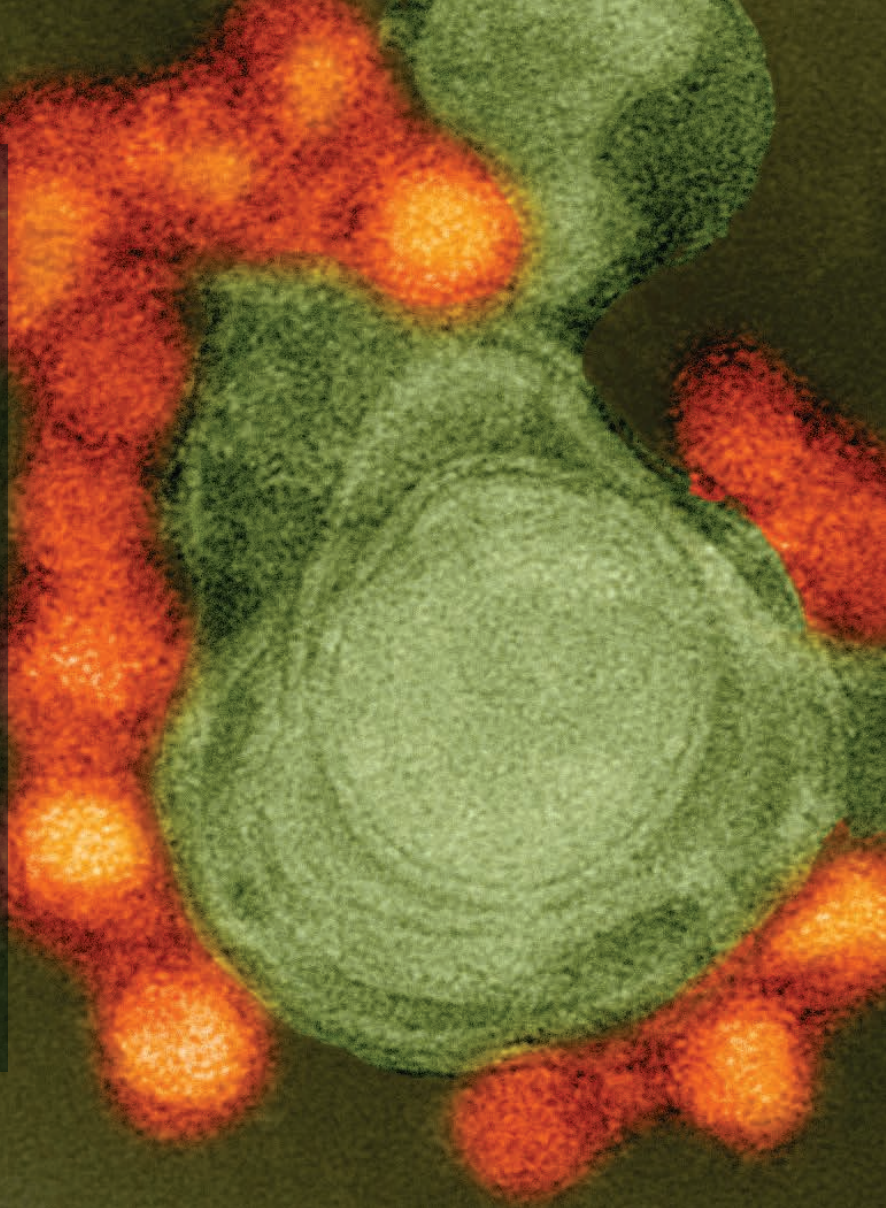
Bargsten is on the faculty of FAU's School of Communication and Multimedia Studies. •

■ Making Gains In Zika Virus Research

While there is currently no treatment for the Zika virus, which is spread by daytime-active *Aedes* mosquitoes, the work of a Florida Atlantic University researcher could change that.

Ramaswamy Narayanan, Ph.D., professor of biological sciences in FAU's Charles E. Schmidt College of Science, has identified 55 possible drug targets for the virus from the human genome. He did so by studying similarities between the Zika virus and other mosquito-borne viruses such as dengue and yellow fever.

Narayanan also identified 79 drugs approved by the U.S. Food and Drug Administration to treat other diseases that could possibly be repurposed to treat Zika virus infections. His research is published in the international journal *MOJ Proteomics and Bioinformatics*. •



■ FAU Researchers Get Their Own Computer Network

Infrastructure that's in the process of being installed separates Florida Atlantic University's research network from its academic and administrative ones, providing a tenfold increase in capacity to faculty and students engaged in data-intensive science and engineering research.

The dedicated network, funded by a \$500,000 grant from the National Science Foundation, will allow congestion-free communication among researchers working on the Boca Raton, Jupiter and Harbor Branch campuses, including those affiliated with The Scripps Research Institute and the Max Planck Florida Institute for Neuroscience, which are both based on the Jupiter campus.

"This project is exciting because of its potential to catalyze work across so many disciplines," said

Jason Hallstrom Ph.D., director of FAU's Institute for Sensing and Embedded Network Systems Engineering and a professor in the Department of Computer and Electrical Engineering and Computer Science.

"Researchers working on marine compounds for cancer treatment will have the ability to exchange datasets with colleagues at Scripps Florida, as though the two groups were working in the same office," said Hallstrom. •



"This project is exciting because of its potential to catalyze work across so many disciplines."

JASON HALLSTROM, PH.D.

NEW FACES

New Leadership Set on Taking Tech Runway to New Heights

Rhys Williams, the new managing director of Florida Atlantic University's Tech Runway, has traveled an unconventional path to his current role.



**RHYS
WILLIAMS, J.D.**

After Williams graduated as one of the top students of his South Plantation High School class, his father, a lawyer, wanted him to attend the prestigious United States Military Academy at West Point. But Williams wanted to go to Harvard. The elder Williams agreed to pay the amount it would have cost for his son to attend a state university. However, the money came with a requirement: Williams had to join the National Guard. So the summer between high school and college, he shipped out to basic training. "I resented my father for forcing my hand, but it was a phenomenal experience," he said.

Williams relied on his parents, summer jobs, a campus job cleaning bathrooms and working in the mailroom, a small scholarship and a student loan to get through Harvard.

After graduation, he served in the Army's elite Special Forces, followed by a stint in corporate America. He earned a law degree at the University of Florida. He passed bar exams in three states, but he "knew (being a lawyer) wasn't what I wanted to do."

Serendipity struck when Williams went to a job

interview with a start-up company in New Jersey. He left the meeting as director of operations. "Post-Harvard, post-military, post-law school, post-corporate life . . . this was heaven," he recalled. "I felt I'd found the culture and environment that fit me perfectly. I needed to be with start-ups and entrepreneurs. I never looked back."

He earned an MBA at UF while his wife, a physician, completed a fellowship there. Following graduation, Williams accepted a position as a venture capitalist. In 2002, he returned to South Florida and launched three biotech companies before co-founding New World Angels, an angel investor group that focuses on tech start-ups.

FAU recruited Williams, who is also an associate vice president in the Division of Research, to lead Tech Runway, a business accelerator launched in 2014 to foster start-ups. Participants are provided with mentor networks, office space and instruction in areas that include marketing, business forecasting and raising capital.

Williams has high praise for all that Tech Runway has accomplished in two short years. His goal is to help it grow to the next level, encompassing emerging industries that are aligned with FAU research priorities, such as biotechnology, drones and robotics.

"We're going to try to help our entrepreneurs network in more efficient ways, taking advantage of the many resources on campus," he said, noting FAU's "amazing researchers, core facilities and equipment."

"We're going to make it easier for them to find resources and shorten the development path." •

Global Leadership at FAU

It would be an understatement to say that the founding executive director of FAU's Peace, Justice and Human Rights Initiative has a macro view of the modern world and its challenges and inequities.

Steven Roper, Ph.D., a political scientist, has been at the epicenter of "transitional justice," designing

constitutions in countries like Romania and Hungary following the fall of the Berlin Wall. He faced complex issues while helping build governments that afford rights to ethnic and linguistic minorities, no small feat in highly heterogeneous nations. He has seen genocide up close in Bosnia, Rwanda and the civil wars in Sierra Leone. In all, Roper's work in transitional justice has taken him to some 50 countries.

He came to FAU from San Francisco State University, where he recently completed a visiting scholar appointment. His experience also includes serving as the dean of the School of Humanities and Social Sciences at Nazarbayev University in Astana, Kazakhstan, as editor-in-chief of *Human Rights Review* and as a consultant to the U.S. Department of State, the U.S. Agency for International Development, and the World Bank. A former Fulbright senior scholar and Fulbright senior specialist, Roper has been an election observer on more than a dozen missions for the Organization for Security and Co-Operation in Europe.



**STEVEN
ROPER, PH.D.**

While his previous work has been global in nature, Roper expects his focus at FAU to be on tackling

issues specific to South Florida, such as the environmental impact of global warming and rising seas, homelessness and human trafficking.

“Being the first executive director means I have the potential to innovate and create programs of global importance, while serving the local community,” he said. “(FAU) is poised for some great things over the next five to 10 years.”

The initiative's signature themes are:

- * Inequalities and social inclusion
- * Environmental justice and sustainability
- * Mindfulness and well-being
- * Conflict violence and genocide
- * Creative expression and social change

Roper is also a professor in the Department of Political Science within the Dorothy F. Schmidt College of Arts and Letters. •

Pair Sharpens Optics Research at Harbor Branch

FAU's Harbor Branch has been in a growth phase fueled by a generous grant from the Harbor Branch Oceanographic Institute Foundation to expand and diversify its research portfolio through targeted faculty hiring. As of September 2016, eight faculty members will have been added. The Harbor Branch Faculty Assembly's hiring plan included an oceanographer/technologist and a biological oceanographer, but nobody anticipated that the two would come with a well-oiled working relationship. Research Professor Michael Twardowski, Ph.D., was the first of the two to join FAU as oceanographer/technologist, having collaborated previously with the Harbor Branch Ocean Visibility & Optics Laboratory, which develops laser technologies for undersea imaging and communications.

Previously, Twardowski was vice president and director of the Advanced Technology & Research group at Western Environmental Technology Labs (WET), a developer of underwater instrumentation. He remains an adjunct professor at the Universities of Rhode Island and Connecticut. His research interests include using optical sensing techniques to study problems in imaging, ocean color remote sensing, harmful algal blooms, oil detection, long-term and autonomous monitoring, sediment transport and particle characterization.



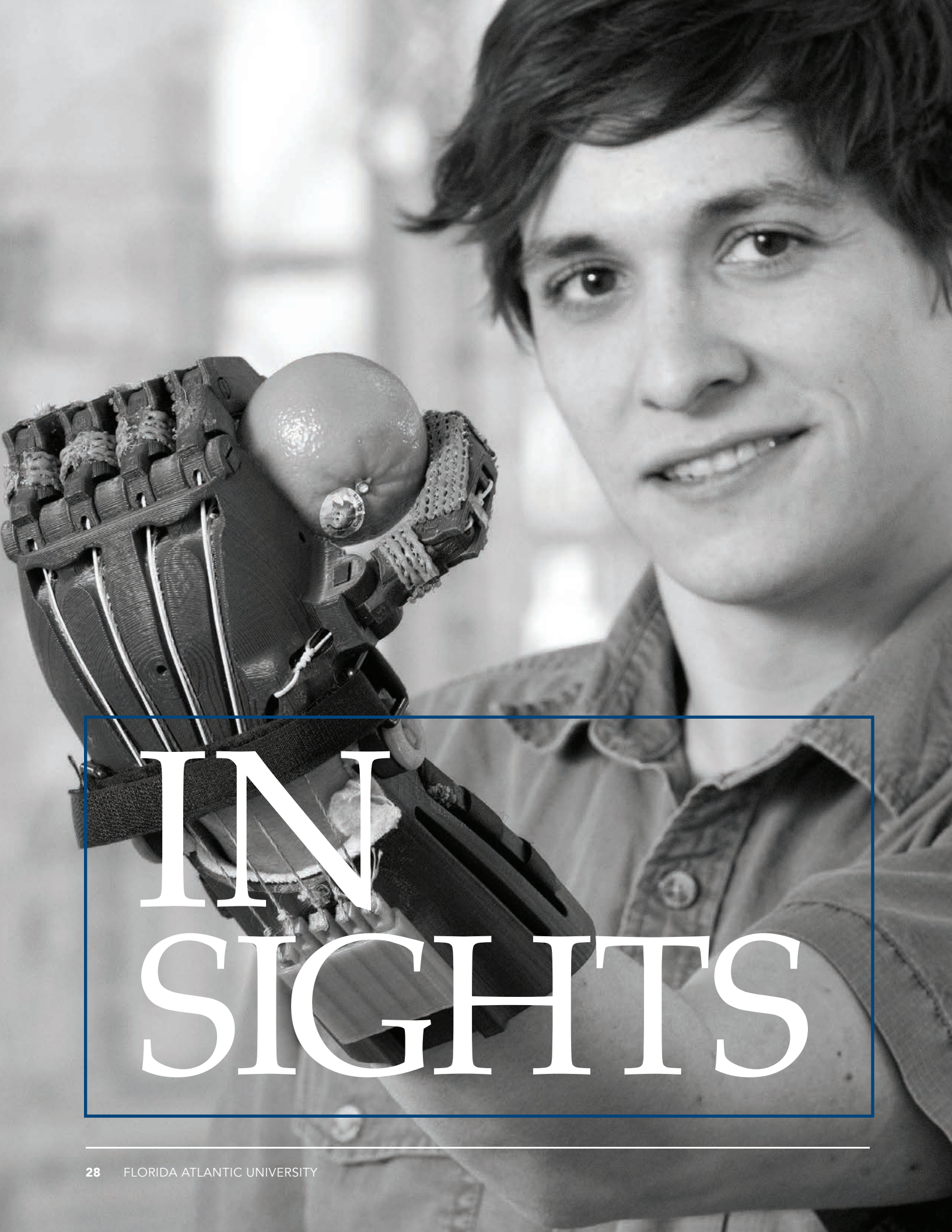
**JAMES
SULLIVAN, PH.D.**



**MICHAEL
TWARDOWSKI, PH.D.**

As fate would have it, one of Twardowski's WET Labs colleagues turned out to be the ideal biological oceanographer candidate. James Sullivan, Ph.D., is interested in phytoplankton, harmful algal blooms (HABs), bioluminescence and the development and use of technology and techniques to study such things. Phytoplankton – the microscopic plants that are the foundation of aquatic food webs – and HABs also are significant factors in ocean optics research and applications. Prior to and while at WET Labs, Sullivan was a member of the research faculty at the University of Rhode Island Graduate School of Oceanography.

With the Harbor Branch appointments, the pair continues a working relationship that spans two decades and has produced numerous technological innovations, including a submersible holographic microscope that produces 3D images of phytoplankton and other marine particles in their natural environment and orientation. (See *related story on page 30*). •



IN SIGHTS

Students Lend a Hand, Making Dreams Come True

The Centers for Disease Control estimates that each year approximately 1,500 babies in the United States are born with upper limb reductions, yet few receive prostheses because of the steep cost that's normally involved. But a creation dubbed "the bionic glove" – the brainchild of two enterprising Florida Atlantic University graduate students — has already made life a little easier for a few people and it's on the way to becoming an affordable next-generation prostheses for children and adults.

Perry Weinthal, 51, and Chad Coarsey, 26, met in a graduate-level engineering class. Weinthal immediately noticed Coarsey's diminutive left hand, which had knuckles but no fingers due to a birth defect. Coincidentally, a few weeks before registering for the class, Weinthal had been doing research on creating an electro mechanical hand gripper. Weinthal asked Coarsey if he'd like a hand, literally, and the idea for the bionic glove was born.

The students hit the lab, designing electronics and computer software to read electrical signals that could be turned into actions, such as opening and closing fingers. They downloaded and modified hand designs from the Internet and used a 3-D printer — which takes 10 to 14 hours to melt polylactic acetate in layers — to build the glove. After several hours of assembling cables and padding and painting the glove, it was ready.

"The first glove was green, my favorite color," Coarsey recalled. "When I put it on it felt like a glove and that's where the name bionic glove came from. After the first day, I was already picking things up. For a month, I used it twice a week for a couple hours. I noticed my arm was getting bigger and bigger. That's when we noticed muscle atrophy in my arm was reversing."

So the engineers returned to the lab to scale up the size and make another glove. Coarsey – an FAU Graduate Student Research Scholarship recipient for another project – is now on his fourth glove, which is 14 percent larger than the first one.

Around the same time, a local pediatric hand surgeon, Aaron Berger, M.D., learned about the



"You have to see it to appreciate what a game-changer this is for kids. We can do a lot of good for a lot of people."

PERRY WEINTHAL

project. He reached out to Weinthal and Coarsey on behalf of a 6-year-old patient who was born without fingers on his right hand. The bionic glove they made for the child was described by his mother as "a dream come true."

So far the entrepreneurs have created some fifteen gloves, including one for a local woman who lost her hand at age five during the civil war in her native Sierra Leone. Their work is being funded by a grant of more than \$21,000 from FAU, taken from the technology fee paid by all students, and the Quantum Foundation.

Weinthal and Coarsey recently launched a non-profit organization called The Bionic Glove Project to make their innovation available to as many people as possible. The cost of making one of their gloves is just a few hundred dollars, as compared with tens of thousands of dollars for a traditionally manufactured prosthetic hand. They'll be refining their project with guidance from experienced business professionals through FAU Tech Runway.

"You have to see it to appreciate what a game changer this is for kids," said Weinthal. "We can do a lot of good for a lot of people." •

A background image showing a dense field of microscopic phytoplankton, appearing as small, glowing red and yellow particles against a dark background.

■ Revolutionizing the Study of Phytoplankton

A case can be made for considering phytoplankton Earth's most important life form, yet most people know little or nothing about these microscopic, floating, plant-like organisms.

Small but powerful, they provide the majority of the oxygen we breathe, remove carbon dioxide from the atmosphere and provide the foundation for aquatic food webs. Yet when phytoplankton grows out of control, it can produce algal blooms that can damage ecosystems and human health. Although scientists know more than most about phytoplankton, plenty of mystery remains, in part, because it is difficult to study them as they exist in nature.

Viewing individual phytoplankton traditionally involves taking water samples to a laboratory for inspection under a microscope or perhaps

submerging an instrument that pumps water through a tube and past an imaging lens. Neither method permits observation of the organisms in their natural, undisturbed environment, which would allow, for example, measurement of their preferential orientation to the underwater light field to enhance their growth rate. Considering the fact that many terrestrial plants have evolved to grow and even move in directions that best capture the sun's energy, using sampling methods that do not allow undisturbed observations of phytoplankton constitutes a major shortcoming. Also, transporting water or artificially manipulating its flow can disrupt fragile phytoplankton structures or naturally occurring formations (e.g., chains, colonies), so while images captured in these ways can provide useful information, other data will be misleading or missing.

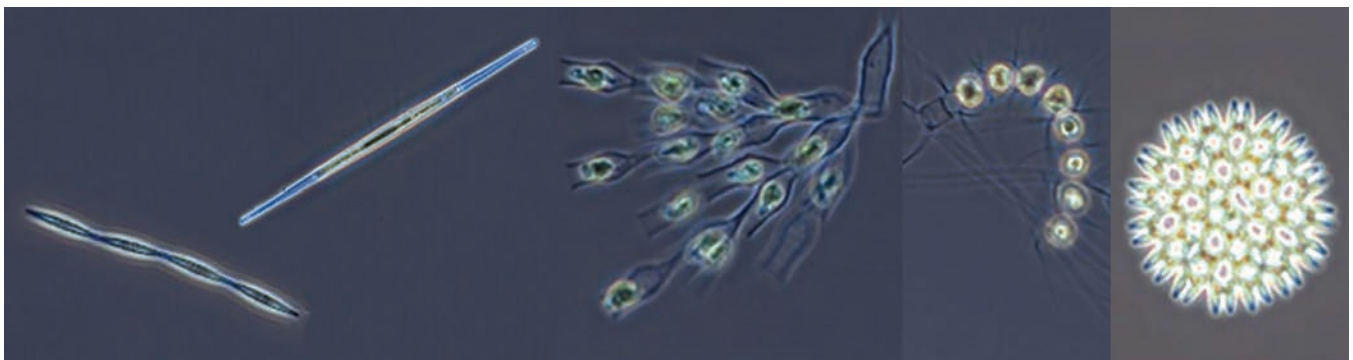
FINDING A BETTER WAY

FAU Harbor Branch Oceanographic Institute research professor James Sullivan, Ph.D., has a better way: a submersible holographic microscope known as a HOLOCAM that produces 3-D images of undisturbed particles, including phytoplankton. He led the instrument development team, which included fellow Harbor Branch research professor Mike Twardowski, Ph.D., prior to joining FAU while he was serving as a senior oceanographer at WET Labs, Inc. The work reflects the dual-track research focus – phytoplankton physiology and ecology plus bio-optics and biophysics – that Sullivan first began pursuing in graduate school.

Detailed HOLOCAM images from early tests revealed long chains of a type of phytoplankton called diatoms with a largely horizontal orientation, which may occur to maximize absorption of sunlight and minimize sinking. Understanding how the organisms are oriented in the water can have a major impact on interpretation of the satellite imagery that is used to estimate how much phytoplankton is present in a particular area. The HOLOCAM also showed that the chains existed as thin layers within the water column, with the other layers tending to contain smaller particles and aggregates.

These images complement the lab-based approaches Sullivan uses to study phytoplankton, which include traditional and epifluorescence microscopy and flow cytometry. A laser-based method of counting, identifying and analyzing individual species, flow cytometry is particularly useful when working with smaller specimens.

Sullivan and his colleagues continue to work on developing new ways of studying phytoplankton in their ongoing effort to unlock more secrets of these tiny, diverse and remarkably important organisms. •





Clinical Translational Research Unit Launched at FAU

Clinical translational research – taking an idea born in a laboratory and testing it in human subjects to determine its effects – enables new medical devices and medicines to reach the market. A state-of-the-art Clinical Translational Research Unit (CTRU) is taking shape in FAU’s Charles E. Schmidt College of Medicine.

Volunteer subjects will enjoy a welcoming environment featuring comfortable chairs, two-tone wood grain floors, pleasant lighting and a refreshment bar. They’ll have access to computers and television sets to pass the time or check email while they wait to participate in their study of choice. To James Galvin, M.D., the college’s associate dean for clinical research, these details are critical to the success of the new unit’s mission. “If you’re volunteering your time,” he said, “we want to make you as comfortable as possible. We want you to come back!”

Located on the ground floor of the college’s new building, the CTRU has four exam rooms, three infusion rooms and a large procedure room – all surrounding a nurses’ station with a 360-degree view of the facility.

Psychometric testing will take place in several soundproof rooms. Walking, balance, body composition, physical abilities, mobility, sleep, hearing and vision will be tested in a cutting-edge lab. The facility will include a sample processing lab, a research pharmacy and a family conference room. Each bed will have its own television set and adjustable lights for reading and relaxing.

UP FIRST: LEWY BODY DEMENTIA TRIAL

The first drug scheduled for testing is one to treat Lewy Body dementia. Despite the prevalence of the disease, no drugs specifically designed to address

it have been approved. Galvin will test a drug developed by Axovant Sciences, Ltd., in the hope of helping some 1.3 million Americans suffering from the disease who are currently being treated with off-label medications. Additional trials in the areas of Alzheimer’s disease, psychiatric disorders and other neurological illnesses will be launched in the future.

The Clinical Translational Research Unit will be a resource for researchers throughout FAU and the local scientific community. In addition to providing space for the facility, the College of Medicine will offer a variety of support services to researchers engaged in patient-centered projects. Fee-based services will include study design, budget development, contract negotiation, Institutional Review Board and other regulatory support and guidance, and more.

The CTRU will play a major role in helping the university fulfill its research mission while maximizing the value of ongoing clinical and basic research being carried out at FAU and its partner organizations, including The Scripps Research Institute and the Max Planck Florida Institute for Neuroscience.

“FAU’s Clinical Translational Research Unit will advance the process of taking biomedical discoveries from the laboratory through human testing to the marketplace, offering innovative new treatment options to patients,” said John W. Newcomer, M.D., vice dean for research and innovation.

Moreover, the unit will help bridge the gap between FAU’s research enterprise and the public, allowing local residents to participate in 21st century research. “It will be a one-stop shop to facilitate bench-to-bedside, and bedside-to-clinical practice translation,” Galvin said. •

Making an Impact Far Beyond the Classroom

Graduate students step into Frank Schnidman's urban planning workshop expecting to learn something on their way to earning master's degrees. What they may not imagine is that their work with Schnidman could change their lives, unearth government corruption, land them jobs and spur the passage of new laws that will impact communities for years to come.

That was the case for a group of four students who enrolled in the workshop in the fall of 2015. They continued their research with Schnidman the following spring in an independent study course, looking into the practices of community redevelopment agencies in Miami-Dade County. What they found led to a grand jury investigation, a list of 29 recommended reforms and a vote by the county commission to institute legislative changes, which have rippled across South Florida and the entire state. The students' work was so impressive that two of them were offered jobs.

In March 2016, Miami-Dade County State Attorney Katherine Fernandez Rundle sent a letter to FAU President John Kelly praising the students and Schnidman, LL.M., who is the John M. DeGrove Eminent Scholar Chair in FAU's School of Urban and Regional Planning. "The work that he and his students have done the past few years helped lay the foundation for the legislative and administrative changes recommended by the grand jury," she wrote.

DUBIOUS SPENDING

Local governments commonly establish community redevelopment agencies, known as CRAs, to foster redevelopment within specified areas. Funded by taxpayer dollars, they are supposed to address issues of slum, blight and the shortage of affordable housing. But Schnidman and his students found otherwise, sparking the grand jury inquiry in Florida's most populous county.

The grand jury's final report stated: "We discovered several examples of CRA boards spending large amounts of taxpayer dollars on what appeared to be pet projects of the elected

officials." The investigation found public money being spent on fairs, carnivals and community entertainment. "We found it alarming that various CRAs justified spending hundreds of thousands of dollars, if not millions of dollars, on projects that clearly did not directly address any slum, blight or affordable housing," the report said.

What began as a classroom exercise for Abigail Weiss, Max Wemyss, Annielle M. Darucaud and Christopher Riley still reverberates, even though the students have graduated.

Soon after they received their degrees, an official from the Miami-Dade County State Attorney's office contacted Riley. "It was at that moment I realized this was no ordinary case study," he said. "I never imagined it would gain the traction it has. The case study consumed much of my life at the time, and seeing this today makes it worth all the long days and nights it took to put it together."

Schnidman finds opportunities for his students to present their work outside the classroom in public forums. It's a tool to keep students motivated, he said. Close to 150 people attended presentations by Riley and his classmates, including the former mayor of Miami, county commissioners, officials from the county Inspector General's office and several lawyers from the State Attorney's office.

"FAU students have actually changed the entire dialogue" around CRAs, Schnidman said. Not only that — their work has led to changes in the law. •

CRAs

To account for its expenditures, Florida law requires each CRA to submit an annual activity report and conduct an independent financial audit. These items are to be sent to Department of Housing Finance and Community Development by March 31 of each year.

ANNUAL ACTIVITY REPORTS FOR FY 13
Florida Statute: Sec. 163.387 (8)

ALL CRAS

INDEPENDENT AUDITS FOR FY 2013
BC Administrative Code: Sec. 18.87 (a)

ONLY PROVIDED BY CORAL SPRINGS, HOLLYWOOD, AND HALLENDALE BEACH

LEFTOVER FUNDS

Florida Statute: Sec. 163.387 (7)

- 1) Be returned to the County
- 2) Used to reduce indebtedness to which TIF revenues are pledged
- 3) Be deposited into an escrow account to reduce TIF indebtedness
- 4) Applied to a specific redevelopment project that is in an approved CRA plan and that will be completed within three years from the from the date of such appropriations.

REPORTS, AUDITS, & LEFTOVER FUNDS

According to the County they have never received any remaining funds at the end of a fiscal year.

Also, many of these funds are not being used on projects that are in an approved CRA plan or the projects are not completed within three years from the from the date of such appropriations.

Excerpt from student presentation, "Miami-Dade County Community Redevelopment Areas," Center for Urban & Environmental Solutions, FAU

■ Inaugural FAU Wave Competition a Home Run

When program coordinator Jenny Reed launched the inaugural FAU Wave competition in the fall of 2015, she figured a handful of teams might participate in the undergraduate research and entrepreneurial challenge. She was astonished by the number of applicants and their wide variety of ideas.

"We had almost every single college represented, 17 different majors," said Reed, who collaborates on the project with Daniel Flynn, Ph.D., FAU's vice president for research. "We were really going for diversity and we definitely got it." In all, 20 teams participated, with the concepts ranging from the highly scientific to enterprising business ideas to documentary photography.

Biology student Evan Clark took home first place — and a \$1,500 prize — for his research on identifying how a particular protein impacts T-cell activation. The 19-year-old — an undergraduate at the time he entered the competition — is on track to complete all requirements for a master’s degree in bioengineering by December 2016. His goal is to become a physician scientist working in the field of genomic medicine, specifically “new and advanced treatments for the most terrible diseases, primarily cancer.”

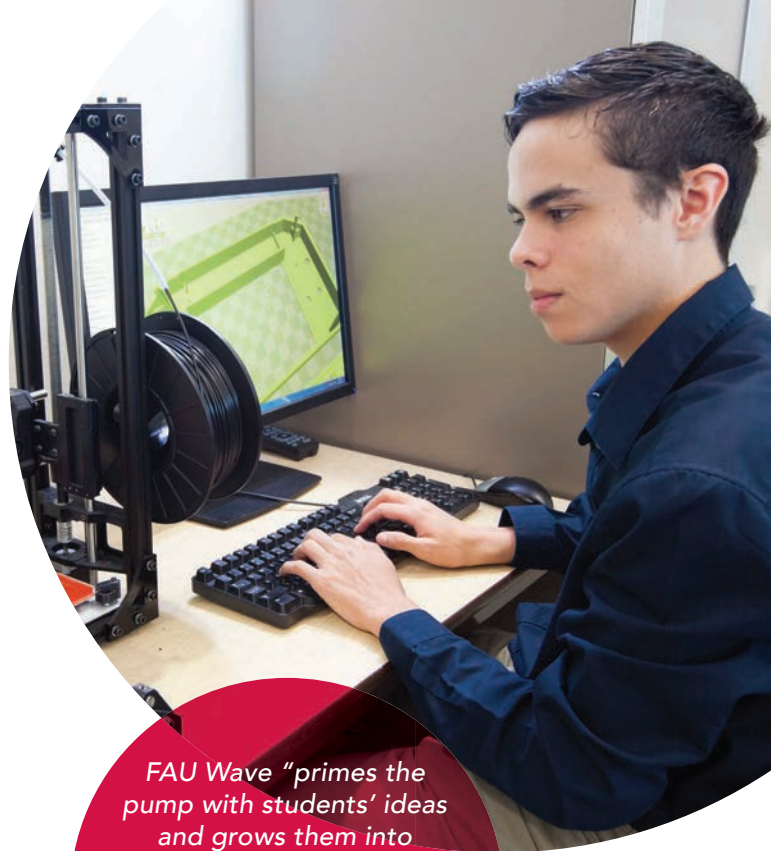
“The competition is a unique opportunity for undergraduates to dive into what truly drives them,” said Clark. “Not only did I learn that I love working in genomics, but that my work could be applied to better the lives of everyone.”

Second place — which came with a \$1,000 prize — went to mechanical engineering students Brent Marshall, Jean Baptiste Dalien, Weendell Esthema and Jonathan Padilla for their Automated Baseball Pitching Machine. Marshall and his brother, avid baseball players, wanted a high-end pitching machine to practice hitting curveballs and fastballs, but a dearth of funds to pay the \$8,000 price tag spurred Marshall into action. “We decided to build one,” said Marshall, a mechanical engineering major. “I was getting ready to enter my senior year of school ... so I used it for my senior design project.”

He and his team logged a combined 360 hours manufacturing the machine, which uses Bluetooth technology to instruct it on what kind of pitches to throw, allowing the person in the batter’s box to run the entire operation. “Most other machines on the market are not controlled by a computer,” Marshall said. “There’s a dial to adjust the settings. With this one, the computer makes an automatic adjustment to get the pitch the batter wants. It can be programmed to pitch like any pitcher, giving baseball players the chance to practice against any pitcher they may face.”

Marshall said he’s been told someone connected with the Miami Marlins has expressed interest in seeing the prototype.

FAU’s Flynn was thrilled with the outcome of the competition’s first time at bat, noting that it “primes the pump with students’ ideas and grows them into tangible start-ups, devices, intellectual property or research.” •



FAU Wave “primes the pump with students’ ideas and grows them into tangible start-ups, devices, intellectual property or research.”

DAN FLYNN, PH.D.
Vice President
for Research

2015 - 2016 WINNERS

NAME	PROJECT TITLE	PRIZE
Evan Clark	Identification of the Role of SRSF1 in T-Cell Activation and Functions Through the Analysis of High-Throughput Sequencing Data	1st: \$1,500
Brent Marshall	Automated Baseball Pitching Machine	2nd: \$1,000
Jean Baptiste Dalien	Automated Baseball Pitching Machine	2nd: \$1,000
Weendell Esthema	Automated Baseball Pitching Machine	2nd: \$1,000
Jonathan Padilla	Automated Baseball Pitching Machine	2nd: \$1,000
Pedro Flores	Using Technology to Build Better Lives – the Parking App	3rd: \$500
Charles Pratt	Queer Images – A Portrait of LGBT Americans	3rd: \$500
Bianca Lucien	ProScore & Meti Co.	Poster: \$250



■ Going Deep for Malaria Treatments

Last year, malaria infected an estimated 215 million people worldwide and caused 438,000 deaths, mostly children. Although the disease has not posed a major public health threat in the U.S. since the late 1940s, the kinds of mosquitoes that can transmit malaria remain prevalent here, and there have been 63 localized outbreaks since 1957. More ominously, malaria is getting harder to control around the world because the parasite that causes the illness is becoming resistant to the drugs that prevent and treat it. The U.S. public may not be worrying about malaria, but the country's health officials are.

Accordingly, the National Institutes of Health is helping to fund the search for answers, and FAU's Harbor Branch Oceanographic Institute is one place where that investment is paying off. Research professors Amy Wright, Ph.D., and Peter McCarthy, Ph.D., have been working with University of Central Florida malaria researcher Depobam Chakrabarti, Ph.D., to find new treatment options from the sea. Five classes of marine natural products have shown activity against drug-resistant forms of the parasite, and in July a U.S. patent protecting four of these was approved.

Harbor Branch is home to the Florida Center of Excellence in Biomedical and Marine Biotechnology. Led by Wright, the Center houses a repository of thousands of marine organisms collected from the ocean, dating back to the mid-1980s. Most of the specimens are plants or invertebrates such as sponges, capable of producing chemicals called natural products that provide advantages to the organisms, such as aiding in defense or reproduction. Harbor Branch

also has an extensive collection of microbes cultured from tissues of marine invertebrates and environmental samples, and this is another rich source of natural products.

More than 40 percent of all medicines are from natural sources, including aspirin, penicillin and two mainstays of malaria treatment: quinine and the artemisinins. In fact, the 2015 Nobel Prize in Physiology or Medicine recognized the discovery of artemisinin and the avermectins, another class of natural products effective against parasites, highlighting the importance of naturally derived medicines. Although a wide variety of molecules can be designed and produced in laboratory settings, nature continues to surprise us with unexpected structural diversity and biological activities.

In addition to identifying possible new anti-malarial medicines, the Harbor Branch natural products collections have recently revealed natural products with selectivity in models of tuberculosis, cancer and Alzheimer's disease. Because the marine natural products covered by the patent have unique structures, it is expected that they act upon new cellular targets and thus can be effective against resistant strains of the malaria parasite. This suggests a potential strategy for fighting the disease that involves using a combination of medications attacking via separate mechanisms at different stages of the cellular life cycle. Harbor Branch scientists will continue to gather specimens and comb through their collections in search of answers to serious health challenges. •



First Study on How Police Leaders View Body Cameras

High-profile incidents involving police use of deadly force have resulted in increased scrutiny of officer behavior and police-community relations by the media, policymakers, civil rights groups and academics. This has led to nationwide interest in police-worn body cameras to increase transparency and accountability.

There is scant evidence to support or refute the perceived benefits or drawbacks of such cameras. A first-of-its-kind study led by John Ortiz Smykla, Ph.D., professor and director of the School of Criminology and Criminal Justice in FAU's College for Design and Social Inquiry, measured the attitudes of law enforcement leaders about police body cameras. Results of the study were published in the *American Journal of Criminal Justice*.

Ortiz collaborated with his FAU colleague Vaughn J. Crichlow, Ph.D., and researchers from the University of West Florida. The study was conducted in a large southern county served by 27 local law enforcement agencies and a number of state and federal law enforcement agencies.

Among the team's findings:

- Fifty percent of the law enforcement leaders surveyed support the use of body-worn cameras in their agencies.
- Nearly 50 percent agree that body-worn cameras will impact police officers' decision to use force in encounters with citizens.
- Nearly 50 percent believe that body-worn cameras will improve citizen behavior during interactions with police. •

Increased Focus on Research Pays Off for CDSI

Florida Atlantic University's College for Design and Social Inquiry is significantly increasing its emphasis on research, developing infrastructure to pave the way for faculty to obtain more outside funding.

These efforts are already yielding dividends, as the number of research grants has doubled and total funding has more than tripled over the last fiscal year.

"This is a sea change for us," said Wesley Hawkins, Ph.D., interim dean and professor. "We're seeking to collaborate on all of FAU's pillars – or strategic priorities. It's a very exciting time. We've increased our external funding 346 percent in this year alone." •



Committee members from left: Wesley Hawkins, Ph.D., Juyoung Park, Ph.D. and Jeff Huber. Members not pictured: Jerry Clinton, Sameer Hinduja, Ph.D., Diana Mitsova, Ph.D., Ron Nyhan, Ph.D., John Renne, Ph.D., Alka Sapat, Ph.D. and Emmanuel Vermisso.

FEATURES





■ A Transformational Experience in Guatemalan Villages

In two week-long, hands-on study abroad sessions in rural Guatemala, 22 registered nurses studying to become nurse practitioners provided primary care to about 1,700 Maya villagers of all ages. The Christine E. Lynn College of Nursing students, under the leadership of Rhonda Goodman, Ph.D., associate professor, working collaboratively with non-governmental organizations such as Nursing Heart, Inc., Faith in Practice and Hombres y Mujeres en Accion, set up rural clinical outposts to provide much-needed health screenings and medical care to underserved Maya families. Equipped only with basic supplies such as stethoscopes, blood pressure cuffs and glucometers, in addition to conducting general physical exams, they screened at least 500 women for cervical cancer, the most common kind of cancer found in Guatemalan women. Goodman works closely with non-governmental organizations for physician follow-up for those with chronic health conditions.

In carrying out their work, they found fertile ground for research. Goodman's interviews with Maya women informed her recent article in the *International Journal of Human Caring*, and some doctoral students have been conducting research that draws on their experiences in Guatemala. In response to student demand, Goodman reinvented the curriculum and stayed on a third week so undergraduates could participate for the first time. She and the students teamed up on wellness screenings for about 200 children at two schools, bringing to nearly 6,000 the number of patients seen by FAU students in four years in 14 Guatemalan villages.

"I'm constantly teaching on this program," she said. "I got to co-teach with a former student on this trip – that's the ultimate reward." We asked her students to tell us a little about their experiences.

Here's some of what they shared:

THE ART OF CARING

"I consider this experience to be one of the most life-changing moments of my life – not only because I was able to serve the Guatemalan community, but for the opportunity to grow as a human being. ... I encourage nurses to roll up their sleeves and become part of this great opportunity to serve the Guatemalan Maya community.

This experience will not only change the lives of others, but in the process you will be transformed. Needless to say, the clinical experience one will acquire in Guatemala transcends monetary value. It lifts the human experience and puts the art of caring into a much greater perspective."

— Ada Saidenstat, Nurse Practitioner, recent graduate





PLANTING A SEED

"Awakening each day filled me with anticipation. I loved heading to the clinic to assist the local doctor with the many ailments that the people suffered. Despite lacking many aspects of modern technology, the small clinic thrived. ... A piece of me will always remain in Guatemala. One of my highest goals is to return and to serve as a nurse practitioner.

And so, Dr. Goodman, just as you recited the Greek proverb that 'a city flourishes when its people plant trees under which they may never sit,' you planted a seedling within me. This opportunity allowed that seedling to take root within me.

Someday I will return, and it is my greatest hope that the people I serve will enjoy the shade of the tree you planted in me."

— Erica Dixon, Bachelor of Science in Nursing, recent graduate; recipient of University Scholar Award, 2016

A SPARK

"I learned so much throughout this trip in Guatemala. Not only was I able to apply the clinical nursing skills that I already have, I was able to further expand my skills. ... It has changed me and my future in nursing for the better in the sense that it has lit a spark in me to put much more passion, understanding and heart into my work as a nurse.

I had never done anything like this in the past, and now I truly cannot envision my future without continuing this kind of work for those

less privileged. ... The care I provide for each of my patients will show the same kind of love and compassion I had for the people of Guatemala.

I will also refrain from any preconceived judgments and treat each patient holistically and based on their own values. Guatemala has changed me not only as a student nurse, but as a person."

— Taylor Hunter, Bachelor of Science in Nursing, recent graduate





LIFELONG MEMORIES

"As students we were able to apply our textbook knowledge; we interviewed, assessed and treated a patient population outside our norm. In addition, it was a once in a lifetime experience. ... This experience ignited a drive to continue to volunteer my nursing knowledge and time in my local community. ... I am forever changed by this study abroad trip; the memories will last a lifetime."

— Cheslyn Morisset,
Nurse Practitioner, recent graduate •





President Barack Obama talks with Hannah Herbst about her science project as he tours the White House Science Fair in the State Dining Room of the White House, April 13, 2016. (Official White House photo by Lawrence Jackson.)



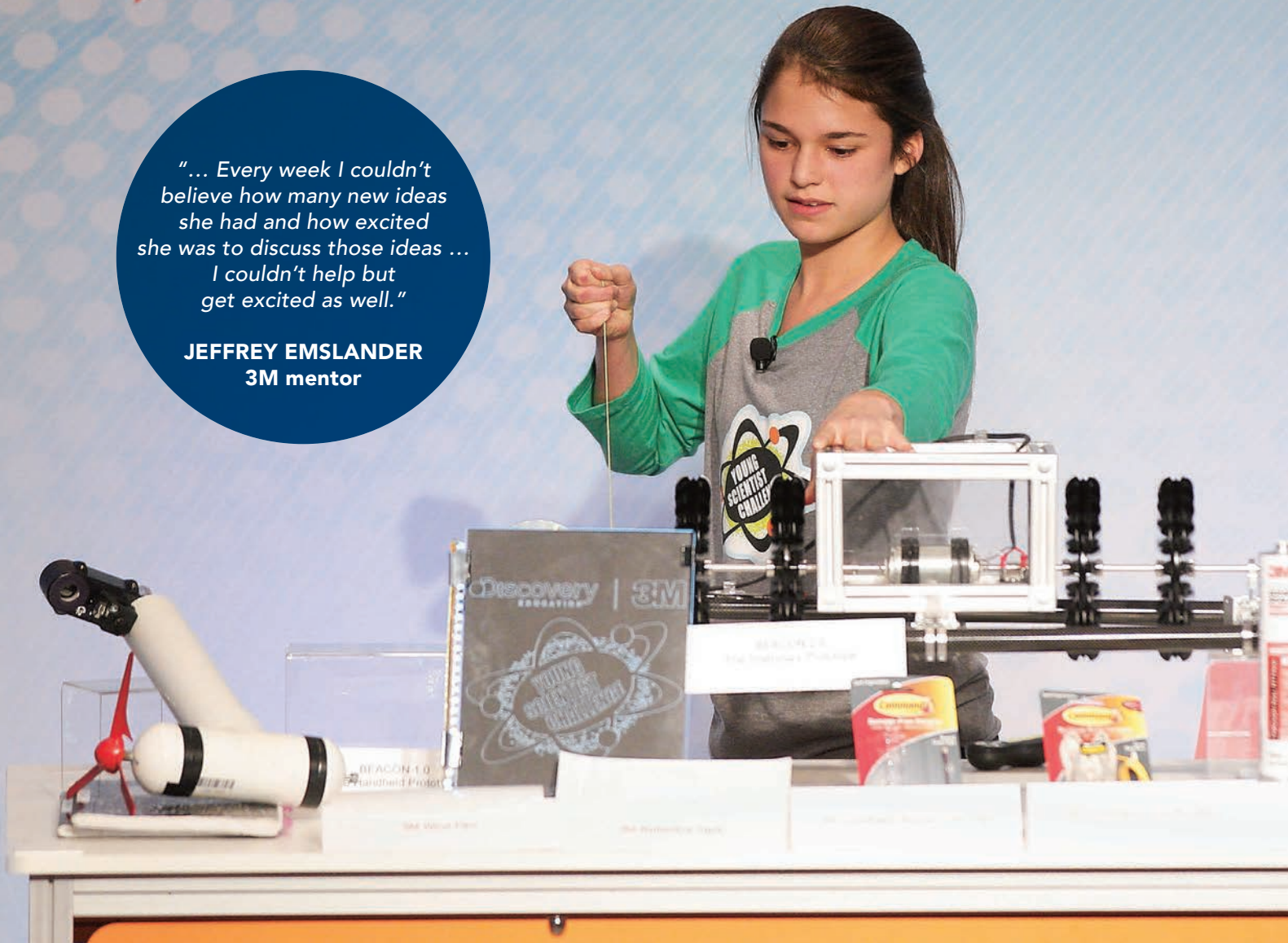
■ A Dizzying Array of Achievements for a Young Scientist

She was named America's Top Young Scientist. She's often invited to give talks, attend national meetings and has had job offers from the likes of companies like Apple. President Obama encouraged her to keep up the good work. Not bad for a 16-year-old.

Hannah Herbst, an FAU High School sophomore, is garnering national acclaim for her ocean energy prototype that aims to provide a stable power source to developing countries by using untapped energy from ocean currents.

"... Every week I couldn't believe how many new ideas she had and how excited she was to discuss those ideas ... I couldn't help but get excited as well."

JEFFREY EMSLANDER
3M mentor



The idea dawned on her while she was out on her family's boat.

Herbst, who is also enrolled as an FAU freshman, calls her project, Bringing Electricity Access to Countries through Ocean Energy (BEACON): Combatting Energy Poverty Through the Development of a Novel Ocean Energy Probe. Her science, technology, engineering and math (STEM) coordinator at FAU High helped Herbst get materials to build the probe.

NOT JUST FOR BOYS

Her passion pivoted from sports and theater the summer after sixth grade, when her parents encouraged her to give FAU's engineering camp a try. She wasn't so sure, nor was she comforted to find herself as the only girl. Realizing that the boys were engineering novices too, she figured she could do just as well. Her team went on to win first place in the

camp's robot programming competition. She's been on a winning streak ever since.

In eighth grade, Herbst competed in the Office of Naval Research's National SeaPerch Underwater Remotely Operated Vehicle Challenge. Her team placed second in the national poster presentation.

She entered the 2015 Discovery Education 3M Young Scientist Challenge, and was named a finalist. Herbst was mentored by Jeffrey Emslander, a 3M corporate research and development scientist, who helped her win that competition – earning the title America's Top Young Scientist and \$25,000. The spotlight has been shining on Herbst since then.

"I was impressed by her enthusiasm and desire to learn," Emslander said. "We had weekly Skype meetings, and every week I couldn't believe how many new ideas she had and how excited she was to discuss those ideas and share what she learned

... I couldn't help but get excited as well."

A PRESIDENTIAL BOOST

Tapping into nearby FAU experts, she gleaned insights from university engineers who built the world's first ocean energy turbine.

Herbst thought the probe could bring electricity to Ruth, her 10-year-old pen pal in Ethiopia. When the two were matched five years ago, Herbst didn't realize the extent of Ruth's poverty.

"She doesn't have stable electricity," Herbst said. "Without technology, her opportunities don't compare to mine. I wanted to do something to help her get some opportunities."

And in doing so, maybe even help solve the global energy crisis, she has said.

Since winning the top young scientist award, Herbst placed second at the 2016 Annual State Science and Engineering Fair and earned a \$2,500 sustainability innovation award at the International Science and Engineering Fair in Arizona.

Herbst describes herself as obsessed with science fairs, relishing the opportunity to meet young scientists from all over the world. She seems to have enjoyed meeting the young scientists at the White House Science Fair as much the President himself.

Describing her experience at the White House, she said, "I loved it. It was incredible. I was in the State Dining room and met really amazing people. I met Bill Nye the Science Guy. It was pretty awesome to meet the President. He asked me about my project and encouraged me to keep going."

A GIFT TO HUMANITY

Herbst isn't interested in scaling up her innovation or in commercializing it. After two years and three iterations, the probe is now intentionally less advanced, costing only \$12 in materials. Using water bottles from home and other recycled materials, Herbst wants to make her technology widely available.

"I want to lay the foundation so others can use my ideas," she said. "I plan to open source it – put it online."

When asked about her message to younger students, Herbst says, "Try stuff. Why not try engineering camp? If I didn't enter the Discovery



Education 3M challenge, I wouldn't be standing here talking to you."

She echoes that sentiment to parents who ask her how to get their children to be more like her.

Herbst credits theater camp with helping her gain the confidence for all the public speaking she's been doing lately. Apparently, she's doing a good job. Her talk at Silicon Valley's Social Innovation Summit caught the attention of Apple, Inc. Herbst's eyes light up when talking about the possibility of working there in the summer of 2017. She was too young to work there any sooner. And that's not her only job prospect. The inventor of Segway and founder of the DEKA Research and Development Corporation, Dean Kamen, invited her to contact him when she's job hunting.



IN DEMAND

The young scientist's growing list of invitations has taken her to present on a student panel for school superintendents in Denver, Colorado and to the University of Wisconsin, Stout, where she gave remarks at the National Science Olympiad opening ceremony. Back home, Herbst has presented to Florida Gov. Rick Scott, his wife Ann and the Florida Board of Governors.

For her inventiveness, she has been featured on *Who Wants to Be a Millionaire's* "Whiz Kids" week, *Fox & Friends* and *Wake Up with Al* on the Weather Channel. She's been recognized by Mashable, a global media company, which ranked her probe 13 on a list of 26 Incredible Innovations. That Improved the World in 2015, just ahead of a mechanical hand invented at John's Hopkins University.

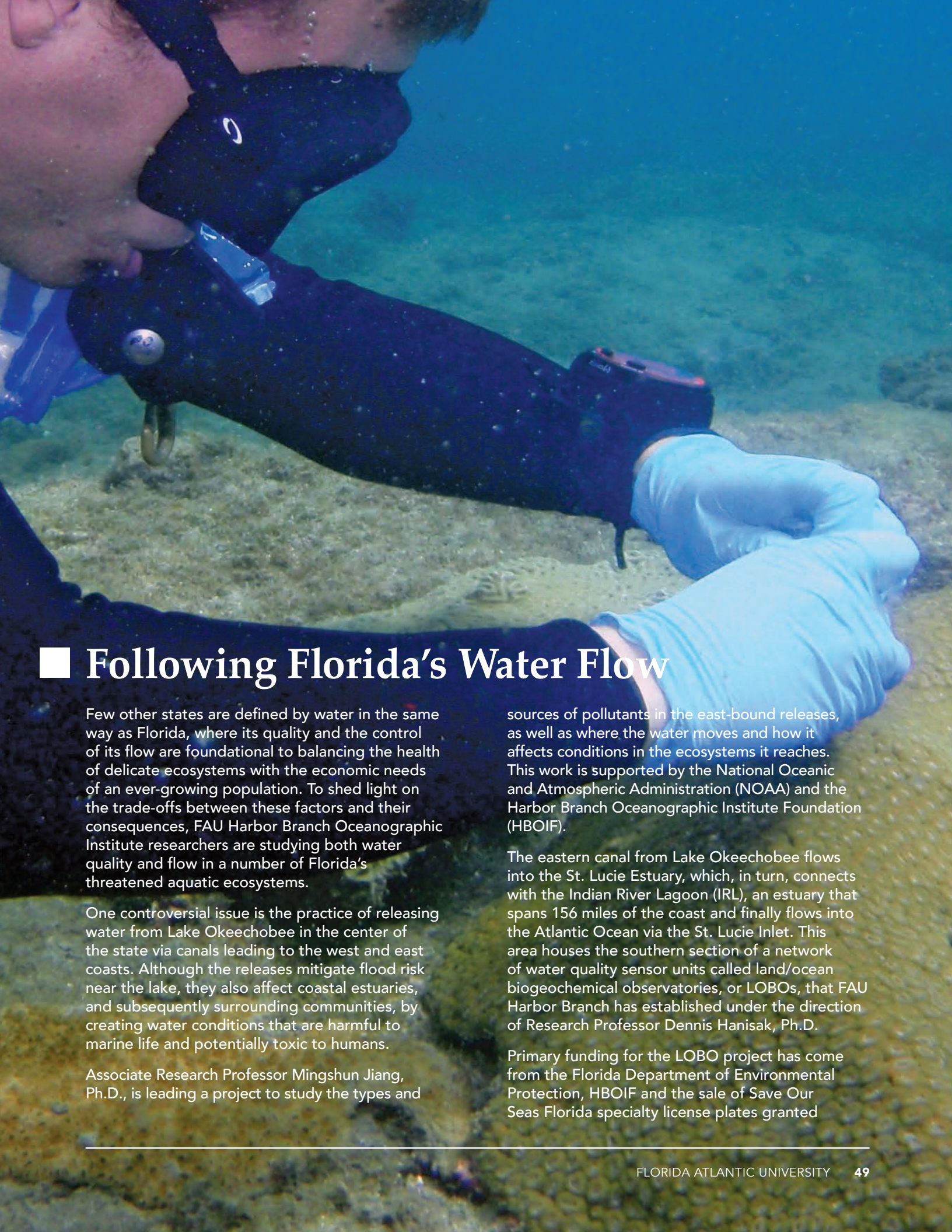
Herbst counts failure as one of the most valuable lessons of her journey.

"I failed more than I succeeded," she said. "Failing has been beneficial even though it didn't feel so at the time."

This summer, the young scientist spoke on a youth in science and innovation panel at the United Nations in New York. She attended the United States of Women Summit, convened by the White House Council on Women and Girls, the first event of its kind to bring together gender equality advocates to highlight achievements, challenges and the path forward. Back in the classroom, Herbst studied business innovation and negotiation at Yale University.

While not engaging in the incredible opportunities coming her way, she was busy giving back on familiar turf. She helped out at FAU High's award-winning Tech Garage, where students focus on engineering research and developing electric vehicles and more. As an alumna, she volunteered at Tech Garage's camp for elementary and middle school students.

Perhaps soon she'll squeeze in some time on the family boat to hatch her next big idea. •



■ Following Florida's Water Flow

Few other states are defined by water in the same way as Florida, where its quality and the control of its flow are foundational to balancing the health of delicate ecosystems with the economic needs of an ever-growing population. To shed light on the trade-offs between these factors and their consequences, FAU Harbor Branch Oceanographic Institute researchers are studying both water quality and flow in a number of Florida's threatened aquatic ecosystems.

One controversial issue is the practice of releasing water from Lake Okeechobee in the center of the state via canals leading to the west and east coasts. Although the releases mitigate flood risk near the lake, they also affect coastal estuaries, and subsequently surrounding communities, by creating water conditions that are harmful to marine life and potentially toxic to humans.

Associate Research Professor Mingshun Jiang, Ph.D., is leading a project to study the types and

sources of pollutants in the east-bound releases, as well as where the water moves and how it affects conditions in the ecosystems it reaches. This work is supported by the National Oceanic and Atmospheric Administration (NOAA) and the Harbor Branch Oceanographic Institute Foundation (HBOIF).

The eastern canal from Lake Okeechobee flows into the St. Lucie Estuary, which, in turn, connects with the Indian River Lagoon (IRL), an estuary that spans 156 miles of the coast and finally flows into the Atlantic Ocean via the St. Lucie Inlet. This area houses the southern section of a network of water quality sensor units called land/ocean biogeochemical observatories, or LOBOs, that FAU Harbor Branch has established under the direction of Research Professor Dennis Hanisak, Ph.D.

Primary funding for the LOBO project has come from the Florida Department of Environmental Protection, HBOIF and the sale of Save Our Seas Florida specialty license plates granted



through the foundation. Each LOBO has sensors that continuously measure a dozen water quality variables, providing data in real time via the Internet. The frequency of the measurements and the placement of LOBOs in different areas of the lagoon make it possible to study trends that vary by space and/or time, as well as the effects of interventions intended to improve water quality. At present, the northernmost unit in the 10-LOBO network is near Sebastian Inlet, about 50 miles north of the St. Lucie Inlet.

SPANNING THE INDIAN RIVER LAGOON

Another FAU Harbor Branch project is focused on investigating water quality at 20 sites that span the entire 156-mile length of the IRL. Its lead investigator is Research Professor Brian Lapointe, Ph.D., an expert on the harmful algal blooms (HABs) that occur when high aquatic nutrient levels foster the growth of macroalgae and phytoplankton that can overwhelm the natural balance of ecosystems. In recent years, the blooms have caused major die-offs of lagoon seagrasses, fish and invertebrates. FAU Harbor Branch researchers will analyze water and algal samples to determine nutrient sources and compare the results with similar studies conducted in Sarasota Bay, the Florida Keys and Guantanamo Bay, Cuba. This project is supported by the sale of Save Our Seas Florida specialty license plates granted through HBOIF.

Toxins produced by blooms also have been linked to disease and death among IRL marine mammals,

including bottlenose dolphins, although the causes are not well understood. It is not known if an animal's vulnerability to the toxins stems from exposure to the HABs, from dietary intake or both. Research Professor Jim Sullivan, Ph.D., intends to begin finding answers to questions such as these by leading efforts to improve the detection and quantification of toxin-producing algae and to develop methods for measuring toxin levels in water and marine mammals.

This project extends the work of one of Sullivan's collaborators, Harbor Branch epidemiologist Adam Schaefer, M.P.H., who studies disease in the lagoon's dolphins to help assess the health of the IRL system and related threats to human health. This work is supported by the sale of Protect Wild Dolphins Florida specialty license plates granted through HBOIF.

INTERACTING WATERS

The land-based factors that lead to harmful algal blooms in the lagoon are balanced to varying degrees by natural processes, particularly the ebb and flow of the ocean through inlets. Little is known, however, about the characteristics of these exchanges, such as how much water is involved and where it goes. Associate Research Professor Laurent Chérubin, Ph.D., is directing a project to measure these variables with the help of moored and watercraft-based instrumentation, GPS-tagged floating drifters and drone aerial surveys. The goal of this effort, which is supported by the sale of Save



NOAA permit no: 18182

Our Seas Florida specialty license plates granted through HBOIF, is to increase understanding of the residence time and flushing rates of the IRL's waters, generating knowledge about how tidal exchange does and does not affect water quality and the presence of harmful algal blooms within the estuary as well as the health of coastal ecosystems near the inlets.

Flushing away land-based pollution and nutrients, for instance, may be good for the lagoon, but what about the effects on nearshore habitats just beyond the inlets?

Assistant Research Professor Joshua Voss, Ph.D., is studying what is perhaps the most vulnerable of these areas – the St. Lucie Reef, just south of the St. Lucie Inlet – to find some answers. This reef is the northern limit for several types of tropical coral, and it provides essential habitat for numerous fish species of commercial and recreational importance.

However, the reef also lies in the path of the east-bound discharges from Lake Okeechobee, which exceeded 100 billion gallons during the first 15 weeks of 2016 after an unusually rainy winter. Voss and his team are investigating how corals and their symbiotic algae are affected by conditions created by blackwater releases, such as sustained, significant reductions in salinity and sunlight. This work is supported by the Florida Sea Grant, the Florida Fish and Wildlife Conservation Commission, the River Branch Foundation and the sale of



Save Our Seas Florida specialty license plates granted through HBOIF.

These studies are just a sample of the many ways in which FAU researchers are following the flow of Florida's water to help the public understand and preserve one of America's most uniquely valuable resources. The diversity of the work speaks to the complexity of the many challenges involved and it demonstrates the broad range of scientific study under way at FAU. •



■ Paying It Forward in Brain Research

FOUNDER OF FAU'S BRAIN INSTITUTE BRINGS WEALTH OF PERSONAL MOTIVATION TO HIS MENTORSHIP ROLE

The 43-page curriculum vitae of neuroscientist Randy Blakely, Ph.D., founding executive director of Florida Atlantic University's Brain Institute, lists myriad honors, leadership positions, published research and patents, as well as degrees from some of the most prestigious universities in America.

Perhaps the only thing more impressive than Blakey's remarkable achievements in synaptic molecular biology, neurotransmitter transporters and human genetics is the story of the journey he has taken to become one of the world's leading researchers in understanding the molecular basis of neuropsychiatric disorders.

A LUCKY BREAK

The youngest of five children raised in Columbus, Georgia, best known for Fort Benning, home of the U. S. Army Infantry School, Blakely has no memory of his father. When he was two, his dad — a 46-year-old active duty master sergeant — died. Throughout his childhood, no one told Blakely how it happened. The subject was never discussed and he intuitively knew not to ask, although he always assumed a heart attack was the cause.

Money was tight for the Blakelys. The high school serving their part of town was vocational, training many lower-middle-income kids like him to work in local businesses or factories. Many of Blakely's friends and members of their families worked in the local cotton mills.

"A few kids went to college, but not many," he recalls.

A stellar student, Blakely wanted to pursue higher education, but says he may not have soared academically without the mentorship of a teacher who saw his potential.

"In high school, I happened to fall, by great luck, into the hands of an amazing mentor," he said, explaining that he met English teacher Jane Bland after asking the school counselor to reassign him from a freshman general education business class. "I was bored and restless and, to make matters worse, the teacher slept regularly in class."

The counselor moved Blakely to a vocabulary class taught by Bland, whose course Blakely characterized as "a literary smorgasbord where we feasted on the origins of words and phrases from the ancient Greeks to the Bible to Broadway musicals to the New York Times Review of Books ... where (Bland) snuck in political and religious history and her own sly sarcasm about current events for dessert."

Blakely continued to take Bland's classes throughout his four years of high school. When he had gone through all the vocabulary exercises she could muster, she switched him to a study of the classics. He ultimately wrote his senior thesis on Virgil's *Aeneid*. Blakely graduated as class valedictorian, crediting Bland's mentorship with helping him become a National Merit Scholar and win a full scholarship to Emory University.

"Jane kept the bar high for me, something desperately needed," he said. "She encouraged me to work hard in all things I did, to be a critical thinker, but also to be compassionate and to value the minds of others."

As an undergraduate majoring in philosophy, Blakely discovered a keen interest in science, leading him to double-minor in chemistry and physics and to pursue research on how drugs affect behavior. A new field called neuroscience was burgeoning, and he knew he wanted to be part of it.

Blakely was accepted into medical school as a college sophomore but changed his mind after a summer job following graduation gave him time to reconsider what he wanted to do with his life. Research, he realized, was his passion.

He went on to earn a Ph.D. in neuroscience at The Johns Hopkins University School of Medicine followed by post-doctoral training at Yale University in molecular neuroscience — (Go to Page 54.)

Institutional Strengths Driving Research Growth

Over the last year, Florida Atlantic University has made great strides in establishing research institutes focused on FAU's institutional strengths. These four areas of focus were identified as pillars in President John Kelly's Strategic Plan for the Race to Excellence 2015-2025: neuroscience, sensing and smart systems, healthy aging, and environmental and ocean science and engineering.

FAU recruited Randy Blakely, Ph.D., an internationally renowned neuroscientist with expertise in synaptic molecular biology, neurotransmitter transporters, and human genetics, to lead the FAU Brain Institute. He came to South Florida from Vanderbilt University School of Medicine, and has already started making progress on FAU's campuses and the community in building a world-class research institute.

He joins other leading scientists who have been recently tapped to build onto FAU's core areas by establishing and leading research institutes.

James Galvin, M.D., one of the most prominent neuroscientists in the country and a preeminent expert in Lewy Body dementia, is now leading FAU's Institute for Healthy Aging and Lifespan Studies. Galvin, whom FAU recruited from New York University, is leading a team that will redesign the healthcare infrastructure to create novel intervention programs to improve the care of older adults with dementia and their caregivers.

Jason Hallstrom, Ph.D., joined FAU to lead the Institute for Sensing and Embedded Network Systems Engineering. He's a renowned expert in computing, communication, sensing technologies and the "Internet of Things;" arriving on campus from Clemson University.

FAU is in the process of recruiting another world-class scientist to lead the Institute for Environmental, Coastal and Ocean Sciences. At the time of publication, a number of prominent experts had already visited the campus as part of the recruiting process.

The combined efforts of the institutes' leaders together with FAU's existing well-regarded faculty will establish the university as an emerging research powerhouse. •

("Paying it forward," continued)

a brand new discipline. At Yale, Blakely and his adviser, Susan Amara, Ph.D., were the first to clone the norepinephrine transporter, which, among other things, regulates mood and anxiety, attention and stress responses. This advance allowed Blakely and his colleagues to identify related genes, including the serotonin transporter gene. The serotonin transporter is the major target in the brain for drugs such as Prozac, "the first blockbuster drug for the treatment of depression." Blakely's work provided drug companies with a faster way to develop more selective antidepressant medications.

The young researcher's odyssey in neuroscience took on new meaning when he became very ill in college. When his doctor asked about the family history of heart disease, Blakely contacted his mother to get more details about his father's death. It was then he learned that his father hadn't suffered a heart attack, but had committed suicide.

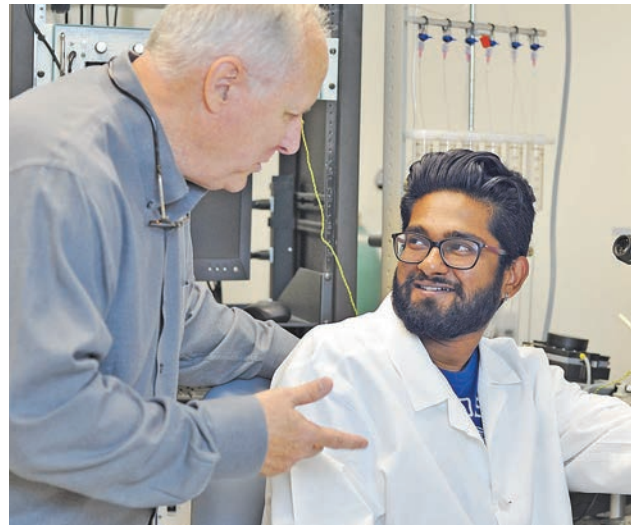
"Then many things in the family made sense," said Blakely. He had witnessed his siblings suffering with depression and was later aware of suicide attempts. Blakely learned that his mother also struggled with mental health issues and had attempted to take her own life.

But he also knows that she fought to keep her family of five kids moving forward, despite limited resources and the stigma associated with his dad's suicide. "She is the hero in this story," Blakely says. He also credits the attention and love he got from his older siblings with filling the gap left by his dad's death.

Blakely's passion for understanding the human brain had become personal. The irony is not lost on him "that a person whose family has suffered from severe depression would actually identify the gene that Prozac acts on, or that I had developed a keen interest in the biology underlying mental illness, never thinking this was a major story in my own family."

A BIG NEUROSCIENCE TENT

In 1995, Vanderbilt University recruited Blakely, then 36, offering him an endowed professorship in pharmacology. He spent 21 years there in a succession of leadership roles that included serving as director of the Vanderbilt/National Institute of Mental Health (NIMH) Silvio O. Conte Center for Neuroscience Research, director of the Vanderbilt/



NIMH Postdoctoral Training Program in Functional Neurogenomics, and director of the Vanderbilt Center for Molecular Neuroscience, with a joint appointment in psychiatry.

In May 2016, Blakely became the founding executive director of FAU's newly formed Brain Institute. He intends to help the University build "a top-flight research infrastructure to support neuroscience investigation across species and across the many levels of investigation that now drive brain research."

A professor in the Charles E. Schmidt College of Medicine, he's also excited about the opportunity to collaborate with The Scripps Research Institute and the Max Planck Florida Institute for Neuroscience, both located on FAU's Jupiter campus. Florida, he said, is one of the most progressive states in terms of putting money into advancing neuroscience.

"My vision for this institute is a broad one, a big tent, and it runs the gamut from molecules and circuits in model organisms to studies of the living, acting human brain and the brain disorders that plague so many," he said.

Despite his accomplishments and professional stature, Blakely exudes humility and is always quick to note how fortunate he has been and to credit those who have mentored him along the way. He credits Professor Darryl Neill, still on the faculty at Emory, with introducing him to the impact that drugs have on brain neurotransmitter systems and giving him key research opportunities at a young age.

There are many others, all highly respected professors and researchers, with whom Blakely crossed paths with at Johns Hopkins and Yale and whose lessons were pivotal to his development.

But he never forgets Jane Bland, the high school English teacher in whose honor Blakely and his wife, Leslie, (his high school sweetheart and also Jane's student), created an award to encourage Jordan Vocational High School students to advance in their studies beyond high school.

"I have shared my love of Jane with my son and my graduate students over the years, letting them know how lucky I felt to have known her, how

different my life would have been without her," Blakely said at Bland's funeral following her 2008 death. "She was a giant in my life, and in the lives of so many others. Jane indulged us, humored us, challenged us and guided us. I can't imagine my life today without the words she gave me, gave so many of us."

He's acutely aware of the impact that educators like Neill and Bland can have on their students – something he strives to emulate. "I never lose that perspective," he says. "Kids smarter than me are out there and just haven't had the luck I had. I've tried to stay aware of how even the simple act of talking to a student can flip a switch and make a difference." •

Molecules & Brain Disorders

For the past 25 years, scientists in Randy Blakely's laboratory have studied the genetics, biochemistry and regulation of a class of brain proteins known as neurotransmitter transporters that if altered, can lead to major brain disorders. Neurotransmitters are small but powerful molecules secreted by nerve cells to excite or inhibit other brain cells. Transporters, acting as nano-scale vacuum cleaners, limit the availability of neurotransmitters, restraining their action.

Transporters for the neurotransmitters serotonin, dopamine and norepinephrine are targets for major psychotropic drugs, such as antidepressants, cocaine and amphetamines. Blakely's team has identified the genes that encode these and other transporter proteins in multiple species, including worms, flies, mice and humans.

In humans, they have identified heritable mutations that modify transporter expression and function, elevating risk for depression, ADHD, and autism, as well as autonomic and neuromuscular disorders. With animal models expressing these mutations, Blakely's lab is pursuing how genetic changes can impact brain signaling and lead to changes in behavior. These novel models also provide a critical opportunity to develop and test new medications.

For his work, Blakely has received numerous awards. He has trained over 30 graduate students and nearly 40 post-doctoral fellows, and has been recognized as a leading educator and scientific mentor. He holds a dozen patents for his gene discoveries and scientific methods and serves regularly on federal and foundation panels that review neuroscience programs nationwide. •



Business Innovation Revving Up at FAU Accelerator



Florida Atlantic University's Tech Runway — a business accelerator — has awarded five companies \$25,000 each, along with the priceless benefits that come with being chosen to participate in its fourth class.

Four of the five start-ups are tech companies that have developed 21st century solutions to simplify life in the digital age. They're creating new software, online applications and social media innovations. The fifth start-up is an aquaculture facility for locally harvested pompano, a commercially popular fish.

"At Tech Runway, early-stage companies find fertile soil to accelerate their growth," said Managing Director Rhys L. Williams. "(Start-ups) are offered a combination of benefits, including free or reduced-cost office space, structured mentorship programs, entrepreneurial networks, and boot camps, which provide formal instruction in business disciplines like forecasting and sales processes. Having a network of fellow entrepreneurs is really key. They learn an immense amount from each other."

Bringing a new product to market is a complex task. "Everyone sees 'Shark Tank' and (Facebook founder) Mark Zuckerberg, but nobody ever talks about the 95 percent that don't succeed," Williams said.



2016 FINALISTS

A BETTER LINK FOR
NURSING STUDENTS
AND HOSPITALS

Rotation Manager is a company that is developing software linking nursing students and hospitals to manage the students' clinical rotations. The rotation process requires hospitals to have a wealth of current information on file about the students, including things like CPR certifications, immunization records and background checks.

"We met with a hospital system in Jacksonville and the clinical coordinator was managing 5,000 students and was going nuts," said Max Cacchione, the company's founder. "She was looking for a better system and we were approached to provide a solution. I'm a tech person, so I said 'yes, let's do it.'"

Cacchione said a number of South Florida medical facilities and nursing schools have already signed up with Rotation Manager, including Nicklaus Children's Hospital, Hialeah Hospital, Florida Medical Center, Kaiser University and Nova Southeastern University.

Cacchione and his partner provided \$400,000 in funding to start the business and are looking to raise an additional \$500,000 to "take it to the next level." He plans to use the \$25,000 from Tech Runway to enhance the company's marketing plan.



AN EYE FOR
HUMAN REACTIONS

In high school, FAU student David Parshenkov realized he had a talent for creating and growing social media accounts and then selling them to businesses. When he got to FAU, Parshenkov and some friends started doing the same thing on Vine, a social media platform that allows users to post six-second looping video clips. He quickly realized he had the ability to be a major player on social media.

Parshenkov and his partners sensed "a missing link of human interaction" between people sending and receiving photos and videos. To remedy this,

they created FacePlay, a messaging platform that captures the reaction of recipients by turning on the front-facing camera of the receiving device.

"It bridges the gap between human interaction and technology," he said. "Not everyone has time for Facetime sessions. With this, you can view a message whenever you want and get an actual feeling from it."

Parshenkov notes that the app can create a feeling of closeness between family members separated by many miles, including deployed soldiers and business travelers. The FacePlay app is scheduled to launch early next year.



When Aquaco founder Joe Cardenas learned that up to 90 percent of seafood consumed in the U.S. is imported due to strict domestic fishing regulations, he saw an opportunity.

Restaurant owners want high quality and consistency, an increasingly difficult combination to achieve, says Cardenas, whose Aquaco fish farm will sell "Never Frozen" pompano from its facility in South Florida.

"Our shores are highly regulated," he explains. "We have quotas and seasons from the Gulf of Mexico to the Atlantic. The demand for seafood is up and wild caught (numbers) are down."

Aquaco's inland fishery — which Cardenas says will provide a sustainable source of high-quality fish that will reduce pressure on the wild pompano population — will be based in St. Lucie County, allowing chefs and others in the retail food industry to see the quality of its product in person.

He met with biologists and engineers who helped create a plan to build and run the operation. Together, they were able to obtain all necessary permits and raise enough capital to move the concept forward.



The idea for Squeeze, a comparison engine for monthly bills that includes an integrated budgeting tool, came to entrepreneur Elias Janetis in a vision he had after 45 days of meditation.

The app, which will be available on Apple and Android devices, evaluates individual telecom bills — think cellphone and cable bills — by comparing pricing offered by major carriers. "The comparison shopping process can be as quick as 60 seconds," said Janetis.

"Americans are feeling squeezed by financial pressures, and this gives them the opportunity to squeeze back by being able to make better pricing decisions," he said. "There's lots of pricing asymmetry in the market, and people don't always sign up for the best plan to meet their needs."

The app's pricing information updates daily, though how it's done is part of Squeeze's "secret sauce," Janetis said. A successful entrepreneur, he also developed MobileHelp, a medical alert system designed for use on smartphones. He said he was able to raise \$1.3 million for his new venture in just four hours.

The free Squeeze app will sync users' online banking and credit cards, compile data on consumption habits, and offer individually tailored advice on how to "win with money."

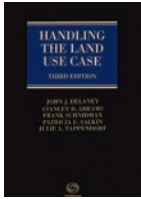
Janetis describes Squeeze as "a matchmaker in your phone that will help you connect with the deal that's best for you."



Symptify is an online symptom checker created by emergency room doctors and software engineers. It allows users to plug in symptoms to help determine a potential cause of what ails them.

Tech Runway Managing Director Rhys L. Williams says that Symptify's algorithm has been reviewed by experts at Harvard University and found to be 70 percent accurate, 40 points better than the next competitor. Cigna, he said, has written a check to the start-up for \$125,000 for a key pilot study.

Symptify's describes the scope of the app in this way: "We have combined the cumulative experience of multiple ER doctors with current medical knowledge to create a tool that helps users narrow the causes of their symptoms, find the closest place to get care, and give a heads-up when going to a facility." •



“Handling the Land Use Case: Land Use Law, Practice & Forms” (Third Edition)
Frank Schnidman, LL.M., John M. DeGrove Eminent Scholar Chair, College for Design and Social Inquiry
(Thomson Reuters, 2016)

From the first client meeting through the administrative and judicial processes, this comprehensive manual navigates the complexities of land use matters. It was co-authored by John J. Delaney, Stanley D. Abrams, Patricia E. Salkin and Julie A. Tappendorf.



“Intricate Thicket: Reading Late Modernist Poetries”

Mark Scroggins, Ph.D., Professor, Dorothy F. Schmidt College of Arts & Letters
(University of Alabama Press, 2015)

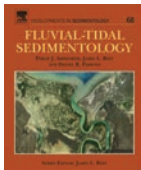
Scroggins’ humor is evident in this book’s nineteen essays covering a range of notable twentieth and twenty-first century poets and writers. A poet himself, Scroggins focuses on interpreting poetry, while assessing the success and failure of the poetry he explores.



The Beluga Whale, a chapter in “Whales, Dolphins and Porpoises: A Natural History and Species Guide”

Greg O’Corry-Crowe, Ph.D., Research Professor, Harbor Branch Oceanographic Institute
(University of Chicago Press, 2015)

The eighty-nine cetacean species that call our seas and rivers home are as disparate as they are smart and elusive. Drawing on contributions of fellow whale biologists, renowned marine mammalogist Annalisa Berta has created the most comprehensive, authoritative overview ever published of these remarkable aquatic mammals. O’Corry-Crowe’s chapter covers the beluga or white whale, a species he has studied across the Arctic for more than two decades.



Estuary Turbidity Maxima Revisited: Instrumental Approaches, Remote Sensing, Modeling Studies, and New Directions, a chapter in “Fluvial-Tidal Sedimentology”

Michael Twardowski, Ph.D., Professor, Harbor Branch Oceanographic Institute
(Elsevier, 2015)

This study, edited by Philip Ashworth, James Best and Daniel Parsons, seeks to bring together recently developed observational techniques including ocean color remote sensing with analytical and numerical modeling results to evaluate the present understanding of estuarine turbidity maxima. This synthesis emphasizes gaps in our knowledge and possible future observational paths, thereby creating research questions.



Special Education and the Linguistically Diverse Student, a chapter in “Fundamentals of Teaching English to Speakers of Other Languages in K-12 Mainstream Classrooms”

Cynthia L. Wilson, Ph.D., Professor, College of Education
(Kendall Hunt, 2015)

This text, edited by E. Ariza, H. Zainuddin, N. Yahya and C. Morales-Jones, helps teachers offer more effective instruction of English-language learner students while also providing English learners with the methodology to improve English and academic content proficiency. The chapter addresses the identification, assessment and effective instruction of English language learners (ELLs) who have disabilities and ELLs who are gifted and talented. Wilson co-authored the chapter with Margarita Bianco.

■ Off the Shelf

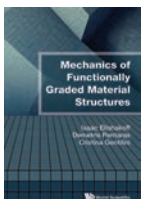
BOOK AND BOOK CHAPTERS



“Cognitive and Intellectual Disabilities: Historical Perspectives, Current Practices, and Future Directions” (Second Edition)

Michael P. Brady, Ph.D., Professor and Chair, Department of Exceptional Student Education, College of Education
(Routledge, 2015)

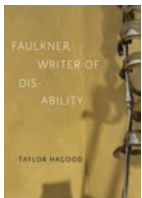
The causes and characteristics of cognitive and intellectual disabilities are thoroughly covered in this comprehensive introductory textbook. It also includes in depth discussions of effective instructional approaches for these disabilities. The book is co-authored by Stephen B. Richards, Margatia Bianco and Ronald L. Taylor.



“Mechanics of Functionally Graded Material Structures”

Isaac Elishakoff, Ph.D., Distinguished Research Professor, College of Engineering and Computer Science
(World Scientific, 2015)

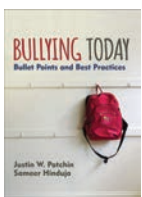
In an authoritative look at various functionally graded materials, Elishakoff pairs materials with the appropriate structures based upon their purpose and use. The book offers a unique take on the effects of grading mechanisms on the structural behavior and considers vibrations and buckling. This book was co-authored by Demetris Pentaras and Cristina Gentilini.



“Faulkner, Writer of Disability”

Taylor Hagood, Ph.D., Associate Professor, Dorothy F. Schmidt College of Arts & Letters
(LSU Press, 2015)

Taylor Hagood employs an experimental style to offer the first extended consideration of impairment in William Faulkner’s life and writing. Little-known ways in which disability affected Faulkner are brought to light as Hagood discusses how the writer incorporated disability into his fiction. This book was recently recognized by the Society for the Study of Southern Literature with its prestigious C. Hugh Holman Award.



“Bullying Today: Bullet Points and Best Practices”

Sameer Hinduja, Ph.D., Professor, College of Design and Social Inquiry
(Sage Publications, 2016)

In short easily digestible chapters, this book for pre-collegiate educators offers concrete, comprehensive, yet concise information to tackle bullying on campus and online. Building on 15 years of research, the book covers prevention strategies, how to distinguish bullying from other hurtful behaviors, the connection between cyberbullying and in-person bullying, and responses that work — and ones that don’t. The book is co-authored by Justin W. Patchin, Ph.D.



“Dramatic Spaces: Scenography and Spectatorial Perceptions”

Jennifer A. Low, Ph.D., Associate Professor, Dorothy F. Schmidt College of Arts & Letters
(Routledge, 2016)

By combining theater history and literary analysis, Low shows what can be missed when drama is treated solely as text rather than performance. She assesses how design shaped the thematic and experiential dimensions of plays by examining period-specific stage spaces.



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