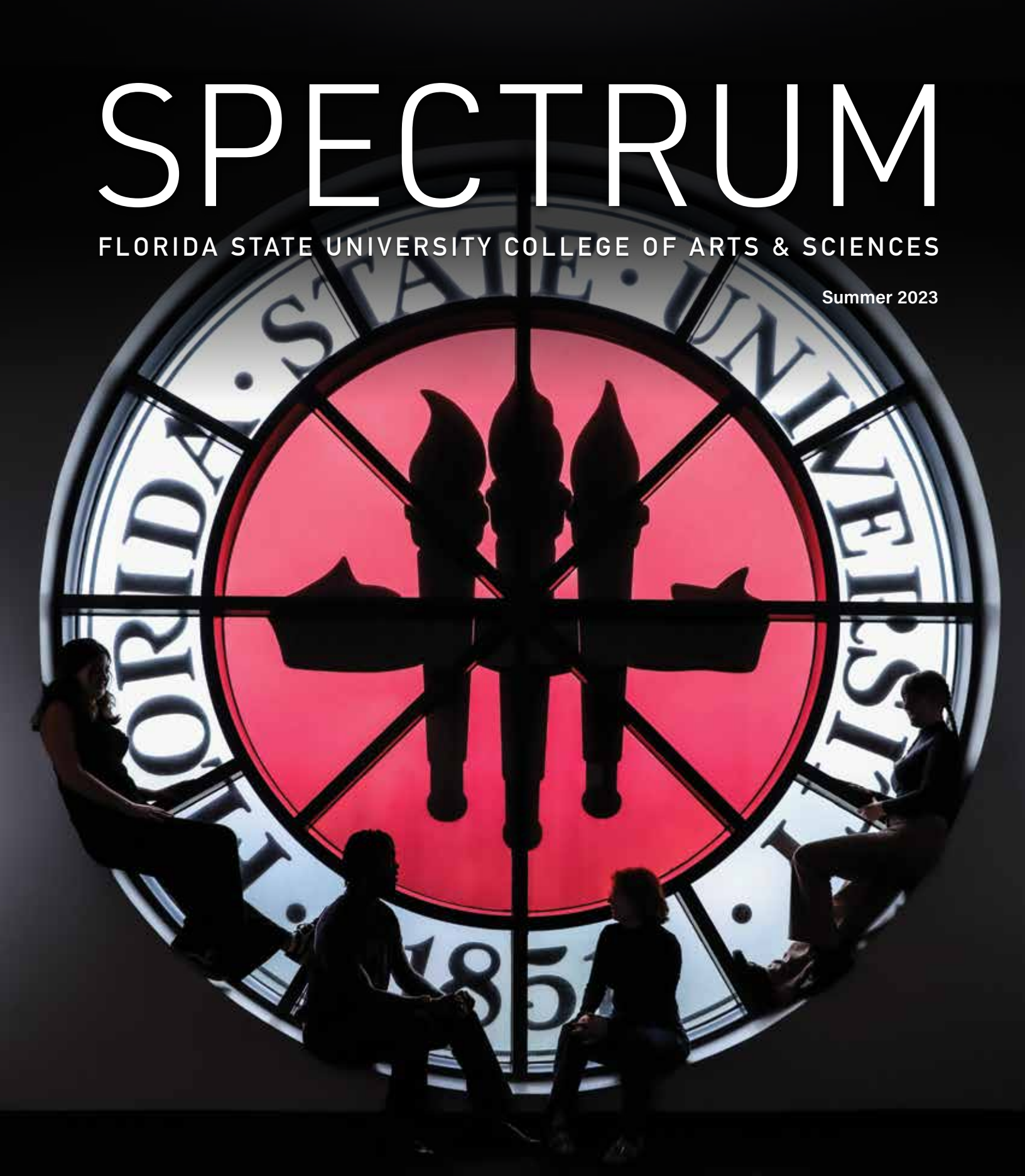
SPECTRUM

FLORIDA STATE UNIVERSITY COLLEGE OF ARTS & SCIENCES

Summer 2023



From the Dean

Welcome to the Summer 2023 edition of Spectrum magazine, the alumni publication of Florida State University's College of Arts and Sciences. It is my pleasure to share with you some of the highlights from the past academic year and preview some of the exciting opportunities awaiting us in 2023-2024.

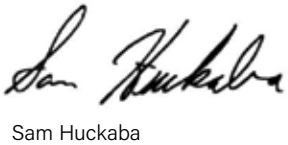
In May, we celebrated a robust FSU commencement with Arts and Sciences graduates feted at two ceremonies, a stand-alone doctoral hooding ceremony followed by the traditional Friday evening event recognizing all of our college's graduates. The former was the inaugural event of its type and involved all 18 FSU colleges, while the latter featured a splendid commencement address from distinguished College of Business alumna Nan Hillis, a special friend of the university. More than 2,600 students were awarded degrees in Arts and Sciences disciplines this year, and the college continues to be FSU's highest producer of doctoral graduates, generating over 40 percent of the university's total.

Talented and innovative Arts and Sciences faculty continue to stand out both locally and globally. Along with winning competitive national and international awards for research, they have also earned recognition at home by accumulating distinguished campus awards for both scholarship and teaching. Meanwhile, our students set shining examples for those who will follow by excelling in the classroom and beyond.

Across campus, initiatives pursued by President Richard McCullough have energized the academic community. These include FSU Health, which will be anchored by the health sciences but will involve the entire campus; quantum science and engineering, which will engage many of our science area departments; and the Native and Indigenous Studies Center, which will include heavy participation from humanities area departments. A complement to these is our continuing effort, led by faculty in computer science, mathematics, scientific computing, and statistics, to expand data science to all corners of campus.

Vice President for Research Stacey Patterson is a dynamic new addition to our ongoing production of high-quality research, scholarship, and creative works, and I am so pleased she found time to engage with Spectrum. I hope you will enjoy her insightful perspective in this issue's Q-and-A feature as well as delight in the articles highlighting our faculty, students and alumni. These pieces convey just a snapshot of all that is happening but are representative of why I am so humbled by the privilege of leading this great college.

Thank you, as always, for being part of the Arts and Sciences family.



Sam Huckaba
Dean, College of Arts and Sciences

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FEATURES

Alumni engagement makes all the difference

Philanthropy has the power to change lives, and when you direct a gift to the FSU College of Arts and Sciences, you have the chance to make a positive impact on a broad scale. From astrophysics to statistics, from classics to religion, and beyond, the college is home to more than 200 major programs of study, and you're sure to find a range of opportunities that allow you to make a gift that is both meaningful to you and that will help current and future Seminoles secure an outstanding education or conduct groundbreaking research.

This year, we invite you — our more than 100,000 alumni — to reconnect and engage with the college in support of Florida State's goal of increasing the percentage of alumni who give back to the university with a gift of any amount. Alumni giving is a key contributor to Florida State's continued rise in national preeminence, and making a gift is your chance to directly affect that success.

Whether you choose to support the college's general fund, a fund in your home department, or one of our existing scholarships, you're demonstrating your commitment to tomorrow's leaders. FSU offers a variety of ways to give that fit our alumni's life stages, from one-time and annual gifts, to pledges over time, to corporate matching, to real estate and planned gifts. You can learn more at artsandsciences.fsu.edu/give.

The college is honored to be included in your philanthropic plans. Please know we are also grateful that many of you give the gift of time and share your career expertise and mentorship with future generations of students.

For more information, or if you have questions about giving to FSU, contact Nancy Smilowitz, the college's assistant dean for development, at 850.294.1034 or nsmilowitz@fsu.edu.

On the cover
This Florida State University seal, seen in reverse, overlooks campus from high atop University Center A adjacent to Doak Campbell Stadium and is part of one of the nation's premier sports facilities. Beyond its well-known athletic uses, University Center is home to academic and administrative spaces that support FSU's year-round operations. From left: Annalia Buchanan, Joachim Adams, Anne Tirrell, McKenzie Harris. Photo by Devin Bittner.

Nole Notes

The top news from around the college

Sea urchin Diadema antillarum. Photo by Rachel Best.

FSU announces bold investments in quantum science and engineering

Florida State University will dedicate more than $20 million to quantum science and engineering over the next three years, funding that will support hiring at least eight new faculty members, equipment and dedicated space in the university's Interdisciplinary Research and Commercialization Building, and seed money for a new program focused on this emerging field. FSU President Richard McCullough announced the investments at the first day of the university's Quantum Science and Engineering Symposium in April.

The investments are part of the university's efforts to support the development of applications that exploit quantum mechanics to make engineering breakthroughs.

"We're excited about building on our strengths in magnetism, quantum materials, superconductors, spectroscopy and cryogenics, just to name a few areas," said Vice President for Research Stacey Patterson. "The university is committed to building on these programs by investing in the recruitment of top national talent who can complement existing expertise and open new opportunities for faculty and students."

The federal government has made expanding knowledge of quantum information science and developing new technologies a strategic priority. Agencies such as the National Science Foundation, Department of Defense, Department of Commerce, Department of Energy and others are part of the $2.6 billion National Quantum Initiative.

"College of Arts and Sciences faculty have a major role to play in FSU's emerging quantum science focus, and we are enthusiastic partners in this exciting initiative," said Sam Huckaba, dean of the College of Arts and Sciences. "In particular, our expertise in chemistry, computer science, and physics will anchor the university's early participation, and other disciplines will join as these endeavors coalesce."

Researchers find sea urchin die-offs threaten Caribbean coral reefs

The sustained loss of a once abundant species of sea urchin in the Caribbean could also result in the functional extinction of diverse coral species from the region's reefs, according to new research led by FSU professor of biological science Don Levitan.

The urchin species Diadema antillarum has long been considered the most important grazer in the Caribbean, feeding on algae that would otherwise overrun the reef and make it difficult for coral to thrive. But two mortality events over the past 40 years have caused much of that urchin population to die off.

Don Levitan

Levitan's research shows the loss of these algae-free areas, due to the sea urchin die-off, is threatening the existence of corals that populate Caribbean reefs.

Levitan, along with collaborator Peter Edmunds, a professor at California State University Northridge, has been collecting data on D. antillarum since his first research trip to St. John, U.S. Virgin Islands, in 1983, recording population density of the species and tracking it through mass mortality events in 1983-1984 and in 2022.

The work, funded by the National Science Foundation, was published this spring in the Proceedings of the National Academy of Sciences.

Xiaobing Zhang

Psychologist awarded $1.6M NIH grant to study how the brain regulates eating behaviors

The National Institutes of Health reports that more than two in five adults in the U.S. are considered obese or severely obese. But what occurs in the brain that leads someone to reach for food?

Xiaobing Zhang, an assistant professor in the FSU Program in Neuroscience, has received a four-year, $1.6 million grant from the NIH's National Institute of Diabetes and Digestive and Kidney Diseases to identify the role that a specific group of neurons in the brain play in driving hunger-motivated, or homeostatic, food seeking and eating, and how these may differ from the neural mechanisms that impact non-hunger motivated, or hedonic, food seeking and eating.

The grant comes on the heels of a five-year, $1.8 million NIH grant Zhang's lab received in 2021 to study how certain neural circuits in the brain regulate eating behaviors.

His previous study revealed that a brain region located between the thalamus and hypothalamus, the zona incerta, plays a critical role in controlling food intake. This latest research aims to identify how a small group of zona incerta neurons drive hunger-motivated behaviors and how they compare to neurons that regulate the motivation for hedonic eating.

Classicist elected National Humanities Center Fellow

Professor of classics Andrea De Giorgi has earned one of the nation's most competitive humanities awards.

De Giorgi, who also serves as director of the FSU Cosa Excavations in Italy, was elected a fellow of the National Humanities Center in support of his project "Cosa and the Water Systems of the Roman Conquest of Italy (3rd–2nd c. BCE)," which focuses on the cultural responses to hydrological instability by communities across the Italian peninsula during the Roman conquest of Italy.

The National Humanities Center, founded in the mid-1970s, is a private nonprofit organization dedicated to supporting and advancing study in all areas of the humanities. Since its creation in 1978, NHC's Residential Fellowship Program has supported 1,558 fellows-in-residence with scholars taking leave from their normal academic duties to pursue research at the center.

De Giorgi joins the 46th class of resident scholars and is among 35 fellows appointed for the 2023-2024 academic year from a pool of 541 applications. He is one of six FSU researchers to be named NHC fellows since 1981.

Physicist elected American Physical Society Fellow

Professor of physics Oskar Vafek has been elected a Fellow of the American Physical Society. Vafek, who is also a researcher at the FSU-headquartered National High Magnetic Field Laboratory, was recognized by APS for his work in correlated electron physics, which explores how a collection of particles, or a material system such as graphene, is more than a sum of its individual parts and can exhibit complex, novel behavior because of interactions within the system.

Vafek's research has focused on graphene, an ultrathin yet strong and flexible material

Oskar Vafek

that conducts electricity. Layered sheets of graphene placed at precise angles facilitate superconductivity under the right conditions and are part of a carbon-based two-dimensional superconductor known as twisted bilayer graphene.

The APS Fellowship Program, created in 1921, recognizes physicists who have contributed to advances in physics through original research, innovative applications, teaching and leadership. Each year, no more than one half of one percent of APS members are nominated by peers for election to the status of fellow. FSU is home to nearly 50 APS fellows, including Vafek, attesting to the quality of research conducted by the Department of Physics.

Neuroscientist awarded $5.7M to study PTSD, pain

Associate professor of psychology and neuroscience Wen Li has been awarded $5.7 million to conduct two research studies that will give scientists a better understanding of the brain mechanisms surrounding post-traumatic stress disorder and pain, paving the way for safer, more effective treatment options.

She will use a five-year, $1.9 million grant from the National Institute of Mental Health and a five-year, $3.8 million grant from the National

Wen Li

Institute of Neurological Disorders and Stroke to conduct the work.

Li, whose research on the brain's sensory cortex and its role in processing fear was published earlier this year in Trends in Cognitive Sciences and The Neuroscientist, said the NIMH grant will allow further investigation into the importance of the sensory cortex in the brain's fear system and the role of this system in patients afflicted with PTSD.

Chemist earns NSF CAREER Award for contributions to solar energy research

Assistant professor of chemistry and biochemistry Lea Nienhaus has earned one of the most prestigious awards available to early career faculty members for her work to improve solar cell efficiency.

Nienhaus is the recipient of a Faculty Early Career Development Award, or CAREER Award, from the National Science Foundation for her research into light-matter interactions in semiconductors with the long-term goal of improving solar cell efficiency.

CAREER Awards are the NSF's most prestigious awards in support of up-and-coming researchers who have the potential to serve as academic role models in research and education and to lead advances in the mission of their respective departments.

The award provides funding for the researchers' labs to support students and groundbreaking ideas while granting them an opportunity to work closely with NSF staff on developing their professional endeavors.

Lea Nienhaus

Nienhaus is the 52nd Florida State faculty member to earn a CAREER Award since 2007. The honor came just weeks after she was named as recipient of the Grammaticakis-Neumann Prize from the Swiss Chemical Society, an award granted to a promising young scientist for commendable work in experimental or theoretical photochemistry. Named a rising star by notable scientific journals Advanced Optical Materials and American Chemical Society Materials Au, Nienhaus also has been featured by the American Chemical Society Energy Letters in its special edition on "Women Scientists at the Forefront of Energy Research."

English professor to use second Fulbright Award to teach in Japan

Perry Howell, a senior lecturer in the Department of English, has been awarded a second prestigious Fulbright U.S. Scholar Award and will return to Tokyo, Japan, to teach

Perry Howell

two classes each at Tokai University and J.R. Oberlin University.

"Every Fulbright placement presents its own unique challenges, so you have to respond flexibly to what each particular university needs from you," Howell said. "Like studying abroad, teaching abroad challenges your habitual ways of seeing and responding to the world, so the experience can inspire a lot of creative thinking."

The Fulbright U.S. Scholar Program offers over 400 awards in more than 135 countries for U.S. citizens to teach, conduct research and carry out professional projects around the world. Fulbright scholars teaching in Japan focus their classes on various aspects of American culture.

Howell earned his first Fulbright U.S. Scholar Award in 2019 and taught at Yokohama National University for the 2019-2020 academic year.

Chemist helps protect Navy ships from marine fouling

On ships and in ports around the world, plants, algae, and marine animals such as barnacles find homes on whatever surfaces they can reach. The problem, known as marine fouling, costs the shipping industry billions each year in additional fuel costs and drydock time.

Antifouling coating to protect Navy ships. U.S. Navy photo by Petty Officer 3rd Class Wyatt Huggett.

A team of polymer chemists in FSU's Department of Chemistry and Biochemistry, led by Robert O. Lawton Professor of Chemistry Joe Schlenoff, is developing a new antifouling coating to keep these sea creatures at bay. The work is funded through a new $510,000 grant from the U.S. Office of Naval Research.

Various antifouling coatings already exist, but many release toxic chemicals into the water that can harm marine organisms. Schlenoff's new coating, "zwitterglass," does not contain leachable materials, and it can be sprayed onto a surface using water instead of solvents that contain volatile organic compounds, making it a more environmentally friendly alternative. Zwitterglass is also tougher than the gel-like coatings used in some other antifouling finishes.

Schlenoff invented this antifouling coating last year. He and graduate student John Akintola submitted a patent for the formula this year with the help of the FSU Office of Commercialization. The Office of Commercialization will assist the inventors throughout the patenting process and work with companies to turn zwitterglass into a commercial product.

The ONR grant will allow Schlenoff's team to further explore how the coating works against marine organisms and refine its composition.

Recovery of endangered sunflower sea stars may play key role in restoring devastated submarine forests

Scientists working to understand the decimation of kelp forests on the Pacific Coast have found that the endangered sunflower sea star plays a vital role in maintaining the region's ecological balance and that sea star recovery efforts could potentially help restore kelp forests as well.

The multi-institution team, which includes assistant professor of biological science Daniel Okamoto, has published a study showing that a healthy sea star population could keep purple sea urchins — which have contributed to the destruction of kelp forests — in check.

In recent years, sea star wasting disease, driven by rising water temperatures, has led to the species largely disappearing in its native ranges from Alaska to Baja, Mexico. This die-off is attributed as the cause for an explosion in purple sea urchin populations in many parts of the West Coast. Overgrazing by the urchins — along with warming sea temperatures — has led to the loss of kelp forests, which are among the planet's most productive ecosystems and create suitable habitats that support the biological diversity and ecological wellbeing of coastal waters.

By combining data collection, laboratory experiments, and modeling to scale up the laboratory studies, the research team discovered that pre-disease populations of sunflower sea stars were likely able to control sea urchin populations through predatory behaviors.

Their work is published in the Proceedings of the Royal Society B.

Left: Sunflower sea stars and purple sea urchins. Photo by Lynn Lee. Above: Daniel Okamoto.

Star Power

Alumnus **Jesus Perello Izaguirre** combines astronomy, nuclear physics to strengthen national security

By McKenzie Harris

Florida State University physics alumnus Jesus Perello Izaguirre would love to tell you about his work, but he can't say much — it's a matter of national security.

About 35 miles northwest of Santa Fe, in the presence of New Mexico's breathtaking views, Perello, a nuclear astrophysicist, builds and maintains space-based neutron and radiation detectors that monitor international compliance with nuclear treaties as part of Los Alamos National Laboratory's Intelligence and Space Research Division.

"I calibrate the detectors, analyze the signals they're putting off, and account for performance degradation due to radiation. I'm also developing an Earth-based neutron detector system for nuclear emergency response applications," Perello said. "If some device or material is found, this detector can look at the distribution of neutron energies to give us an idea of what material we're looking at, such as whether or not it is special nuclear material."

Perello has collaborated with fellow physicists, engineers, chemists, and other scientists to develop international nuclear safeguards and further the science of nuclear nonproliferation at Los Alamos since joining the lab as a postdoctoral research scientist after earning his Ph.D. from FSU's Department of Physics in 2021.

"I'd been told by many peers while earning my bachelor's at Florida International University that FSU would be a great fit for graduate studies, especially with access to a nuclear accelerator on site, but I didn't think I was good enough to be admitted until I spoke with the bridge program coordinator at FSU," Perello said.

The American Physical Society Bridge Program increases the number of underrepresented minority students pursuing doctoral degrees in physics by matching students with faculty members working in their research area, and this mentorship continues throughout their studies.

"Jesus thoroughly impressed us with his enthusiasm for nuclear physics and his determination to succeed in a graduate program. His undergraduate nuclear physics research experience at FIU prepared him well for the transition to our graduate program," said Simon Capstick, professor of physics and one of two bridge program site leaders at FSU when Perello was admitted.

FSU was among the first institutions to receive funding from APS in 2014 to develop bridge programs. Bridge Fellows receive full stipend and tuition support to conduct research through physics laboratories. Thanks to funding from the College of Arts and Sciences, fellows are not assigned teaching duties for their first year, allowing them to dive deeply into coursework and research.

"We're thankful to be able to offer these opportunities to highly talented students who would otherwise not have gone on to graduate school to pursue a doctorate in physics at FSU or other physics Ph.D. programs," Capstick said.

At FSU's John D. Fox Superconducting Linear Accelerator Laboratory, part of the U.S.'s Center for Excellence in Nuclear Training and University-Based Research, or CENTAUR, Perello worked alongside associate professor of physics Sergio Almaraz-Calderon to better understand observations made by the NASA Fermi gamma-ray telescope orbiting in space that detected radioactive elements throughout the galaxy.

"Jesus helped develop a neutron detector system and measured important nuclear reactions in order to answer general questions such as how different elements in the universe are formed and what processes create them," Almaraz-Calderon said. "He's both easy-going and passionate about contributing to the lab, always wanting to help out and excited to discuss his research."

This collaborative spirit keeps the Fox lab on the cutting edge of nuclear physics research as graduate students run experiments 24 hours a day, 7 days a week. Perello absorbed as much knowledge as he could from mentor Almaraz-Calderon and professors of physics Jorge Piekarewicz and Ingo Wiedenhöver, both of whom are APS fellows and distinguished leaders in the pursuit of novel nuclear physics discoveries.

"My work focused on a radioactive isotope of aluminum called aluminum-26 that has a lifetime of around 700,000 years. Since we're still detecting it in the galaxy, it's hypothesized the isotope is created and released during star explosions such as core-collapse supernovae and classical novae," Perello said. "Using the neutron detector systems we developed, we studied the reactions that occur during these star explosions to better understand how elements are created and destroyed in these processes."

While always drawn to the cosmos, Perello's path to a career in physics wasn't necessarily written in the stars. Now, he can't fathom a better fit.

"I just wanted to better understand the universe," Perello said. "Pursuing physics has answered so many of my personal questions, and now, I'm doing research that has major implications for the security of our country and the world. If labs like Los Alamos aren't building systems to detect detonations in space or determine if materials found on Earth can be used for weapons, it could be catastrophic — I remind myself of this when I get caught up in the science side of my work."

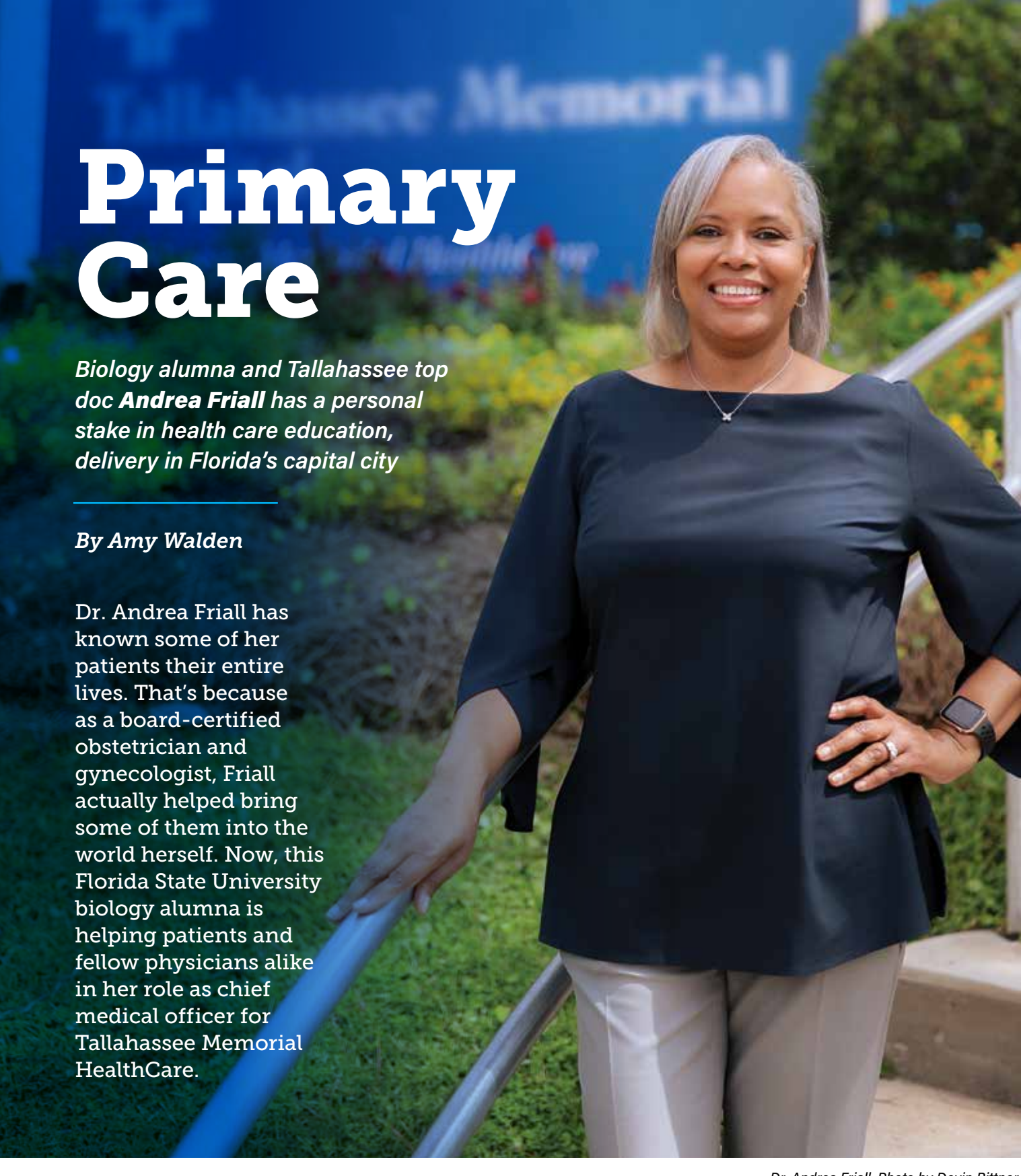
An aerial view of Los Alamos National Laboratory. Courtesy photo.
Left: Jesus Perello Izaguirre. Courtesy photo.

Primary Care

*Biology alumna and Tallahassee top doc **Andrea Friall** has a personal stake in health care education, delivery in Florida's capital city*

By Amy Walden

Dr. Andrea Friall has known some of her patients their entire lives. That's because as a board-certified obstetrician and gynecologist, Friall actually helped bring some of them into the world herself. Now, this Florida State University biology alumna is helping patients and fellow physicians alike in her role as chief medical officer for Tallahassee Memorial HealthCare.



Dr. Andrea Friall. Photo by Devin Bittner.

As the CMO, Friall oversees the hiring and credentialing of the hundreds of physicians and medical professionals who support patients' needs in North Florida and South Georgia through TMH's 21-county operational footprint. Assessing the needs of the community and ensuring demand is met by top physicians is a role to which the Florida native is perfectly suited — she has been serving women and families throughout Florida's Big Bend for more than 20 years practicing as an OB-GYN.

"I really enjoy the practice of obstetrics and gynecology, from delivering babies to performing surgery, to counseling," Friall said. "I have gained so much from the patients and families I have met along this journey."

Friall's path to a medical career began early with a fascination for science and anatomy. But her drive for helping others was inspired by a daughter's love for her mother, who passed away when Friall was just six years old.

"As I matured, I became curious about how to help women like my mother who suffered from depression," said Friall, who highlights the importance of maternal mental health advocacy in her work today.

As an FSU undergrad, Friall already had her sights set on medical school. She earned a bachelor's from FSU's Department of Biological Science in 1993 and her M.D. from the Howard University College of Medicine in Washington, D.C., in 1997, before completing her OB-GYN training in 2001 at Tulane University in New Orleans, Louisiana.

When FSU announced plans to open a College of Medicine that same year, Friall was eager to get involved. She returned to Tallahassee, becoming the first female physician to join the practice at North Florida Women's Care and seizing an opportunity to teach the College of Medicine's inaugural cohort of medical students as an associate clinical professor.

"I was excited to get to work with students and see how the medical school would take shape. My husband Eric and I met at FSU and love that we have been able to give back and endow the Walter T. King Scholarship in the Black Alumni Scholarship Fund in my father's name to support other first-generation medical students," Friall said.

In addition to her faculty role, Friall began serving on the FSU Foundation Board of Trustees, working with the board to foster donor relationships. The goal, Friall said, is helping students feel supported and find the comfort and sense of family she experienced at FSU.

"I love working with students because they are the purest reminder of why you go into medicine. Their excitement for wanting to do good things fills my soul. The work the FSU Foundation does enhances that feeling as we help students and faculty strengthen the entire FSU community through commitment of our time, talents and treasure," Friall said.

As Friall's career progressed, she sought leadership roles with Tallahassee Memorial HealthCare, including chair of the Department of Obstetrics and Gynecology and chair of medical staff, and extended her involvement as a legislative chair and District XII officer of the American College of Obstetrics and Gynecology, where she passionately advocates for women's health, as well as a member of the William Gunn society, National Medical Society, and the Capital Medical Society.

Friall is the first Black woman to serve as CMO for TMH, and since starting in the role in 2016, she has helped ensure health care continuity during a series of hurricanes and the COVID-19 pandemic. This year, under Friall's leadership, TMH ranked among the top 25 best hospitals in Florida, according to U.S. News and World Report.

Fellow FSU alumna Brenda Spencer was among Friall's most influential graduate advisers at FSU. Spencer, now director of Florida A&M University's Undergraduate Student Success Center, has cheered her former advisee, now friend, on for three decades.

> *"I love working with students because they are the purest reminder of why you go into medicine. Their excitement for wanting to do good things fills my soul."*
> *— Dr. Andrea Friall*

"I am so proud of Andrea's growth as a person and all she has accomplished," Spencer said. "It has been great to see her fulfill the goals she had set for herself."

On the horizon for Friall is the growing partnership between FSU and TMH to construct an academic health center on the TMH campus. The center will provide about 130,000 gross square feet of medical and research-related space distributed over several floors. It will accommodate an estimated 30 principal investigators, producing an estimated $40 million of additional annual grant funding focused on clinical trials, data-driven precision health, digital health and clinical informatics, and clinical and translational research.

For Friall, all aspects of her work circle back to one thing — affecting positive change in the community.

"It is true that if you love what you do, you never work a day in your life," Friall said. "To me, being CMO continues to be an honor to serve in a role where I make a difference not only in patients' lives but those of my colleagues."

Creative **Collision**

Neuroscience, modern languages alumnus Michael Baiamonte blends STEM and humanities for a global focus

By Dena Reddick

Michael Baiamonte. Photo by Devin Bittner.

There's an old joke that quips "Science can tell you how to clone a dinosaur. Humanities can tell you why that's probably a bad idea."

For some people, the idea of studying both the sciences and humanities is baffling, with advocates on each side fiercely defending their respective fields. Yet, there are others, like two-time Florida State University alumnus Michael Baiamonte, who capitalize on the competitive advantage that arises by combining precision STEM analysis with the humanities' ability to see the larger picture.

Baiamonte always knew he was a different kind of thinker. In high school, he balanced his fascination with neuroscience — because it combined his interests in psychology, anatomy and biology — with Chinese language study.

"I prefer to see and understand the world through a variety of interconnected perspectives, making for a unique view on topics ranging from neurology, to language acquisition, to literature," he explained.

Viewed through that lens, Baiamonte's path from earning a bachelor's degree in neuroscience in 2020 with the Program in Neuroscience to pursuing a master's degree in East Asian Languages and Cultures with the Department of Modern Languages and Linguistics later that year makes logical sense.

Rather than being overwhelmed by the wide-ranging interests competing for his time during undergrad, Baiamonte felt energized. He juggled extracurriculars with ease, including participating in the Neuroscience Undergraduate Student Association and FSU's undergraduate research community through the organization Connecting Experimental Labs and Life Sciences, and organizing social and cultural events in his role as president of the FSU Chinese American Student Organization.

Originally, Baiamonte had intended to double major in psychology and biology. He valued scientific consistencies like dependable data and reliable mathematical equations. After his exposure to the neuroscience program, though, he found himself intrigued by the creativity inherent in scientific exploration.

"Neuroscience is confident in its own uncertainty," Baiamonte explained. "The field is very aware of the limitations on trying to encapsulate the human brain. Everyone's different, and our individual brains even work differently. The nuances of neuroscience helped me learn and appreciate the nuances of research and people."

As he graduated with a robust portfolio of strong grades, leadership roles, and undergraduate research, Baiamonte felt well prepared to make the next step in his academic career by pursuing a neuroscience Ph.D. However, an opportunity arose, and Baiamonte seized the chance to join the FSU Study Abroad Program and spend Summer 2019 in Tianjin, China.

"It was the first time I had to leave my bubble and be fully immersed in Chinese language and culture," said Baiamonte, who joined 23 other students for the trip. "That experience ultimately drew me to the East Asian Languages and Cultures master's program. Suddenly, I could see a future for myself in the humanities."

After years cultivating research skills in undergraduate STEM classes and labs, Baiamonte expected to use those same tools in his master's program to investigate second-language acquisition and classical Chinese literary theory. Instead, he discovered a wholly new research skillset was in order.

"I didn't fully realize how different research is in each field, and finding the connection across disciplines was initially more challenging than I anticipated," Baiamonte said.

It was, in fact, only a temporary roadblock as Baiamonte probed how best to rebalance his research toolkit. His graduate capstone project ultimately explored Chinese diaspora literature via neuroaesthetics, the scientific study of the neural consequences of contemplating a creative work of art.

"Michael is among the very best students in the Chinese program," said Aaron Lan, associate professor of Chinese studies. "He has impressive leadership qualities and a passion for public service."

Baiamonte in China. Courtesy photo.

Besides presenting an innovative approach to humanities scholarship, Baiamonte's neuroscience background also benefited him as an FSU Chinese language instructor by helping him consider the best, most efficient ways for non-native speakers to acquire a new language.

"Michael has an extraordinary ability to connect with his students and engage them in learning," Lan said. "By his effective teaching and readiness to help, he's won the goodwill and respect of his students."

This fall, Baiamonte will take the next step in his neuroaesthetics scholarship when he begins his Ph.D. program in Chinese studies at Stanford University, in California.

"Neuroscience gave me a new way to understand life around me and talk about my research, even in an entirely different field like East Asian Languages and Cultures," he said. "My blended academic background has given me the confidence to be self-assured in my own research identity."

Atmospheric Ignition

Scientific computing doctoral student **Dorianis Perez** uses complex equations to research dynamics that spawn wildfires

By Devin Bittner

Dorianis Perez and Jesse Canfield represent Los Alamos National Laboratory at the Eglin Prescribed Fire Campaign, Eglin Air Force Base, Florida. Courtesy photo.

As lightning strikes dry brush and fires begin to blaze, miles of forest are suddenly overtaken by a sinister orange glow. Firefighters work to control the blaze on the ground while aerial tankers buzz overhead, dropping thousands of gallons of water from above in an effort to quench the flames.

From the safety of her office at Los Alamos National Laboratory in Los Alamos, New Mexico, Florida State University doctoral student Dorianis Perez is also joining the fight, but she's using math to fight fires.

By running equations on her computer to model elements on the ground and in the atmosphere that create and sustain fires, Perez can simulate these chaotic events, and the lines of code she generates inform how fire crews can most efficiently battle on the frontlines.

"I work with a certain set of equations that describe fluid flow of fires, or how they move, and I'll manipulate variables in the equations depending on what I'm trying to physically represent," Perez explained. "Coding and getting my code to run is like figuring out a puzzle."

Perez is working as a research assistant at Los Alamos while completing her Ph.D. in computational science with a focus on fire dynamics through the Department of Scientific Computing, in association with FSU's Geophysical Fluid Dynamics Institute.

It's Perez's second stint at Los Alamos, and her current area of study is cloud microphysics, a field examining the physical processes related to atmospheric clouds — what leads to their formation, growth and capacity for precipitation. While clouds may seem disconnected from the fires raging on the ground, other than to produce rain that could hinder a fire's progress, they actually play a significant role in where a fire starts and how it spreads — or doesn't.

"I returned to Los Alamos to work on a project simulating pyrocumulonimbus clouds, which form when a fire develops its own thunderstorm that can produce precipitation and lightning, further exacerbating the fire," Perez said. "I also started a second project to better understand how wind affects wildfire behavior. They may seem like very different projects, but both concern fire dynamics from the atmosphere and the ground."

It's imperative to study fire from both dimensions because of the complex variables that drive atmospheric conditions at a moment of ignition — a change in wind direction or a rise in relative humidity can be the difference between an inferno like the 2018 Camp Fire in Paradise, California, and a smaller blaze that can be quickly contained.

Dorianis Perez. Courtesy photo.

Perez did not originally intend to study fire dynamics when she chose to attend Florida State in 2018. At the time, she'd just completed a master's degree in forensic anthropology at Mercyhurst University in Pennsylvania and had her heart set on studying quantitative forensic anthropology with then-professor of scientific computing Dennis Slice.

Slice was no longer accepting new doctoral students, but Perez received an offer from FSU she couldn't refuse.

"When I heard about the fire dynamics program in GFDI, I thought it was an important field of study where I could utilize my math skills," Perez said. "I fell in love with physics-based programming and the objective behind understanding the physical processes in such complex phenomena as fires."

At the end of her first year at FSU, Perez accepted a summer graduate research assistantship at Los Alamos. Jesse Canfield, her mentor in the Continuum Models and Numerical Methods group, had also earned his doctoral degree at FSU in association with GFDI in 2014, and he immediately recognized the passion and sharp focus Perez brings to the work.

"She thinks deeply about the problems we're working on. She has an investigative approach to this work that makes her great at what she does," Canfield said.

While fire dynamics may have been an unexpected path for the New York native and first-generation college graduate, a career including mathematics was always an unwavering constant.

"I was born and raised in Long Island to Dominican immigrant parents, and I loved math throughout school," Perez said. "When I was a teenager, my family moved back to the Dominican Republic where I went to high school. I returned to Long Island to attend Hofstra University for my dual undergraduate degrees in forensics and math."

Perez was interning at the New York Police Department's Crime Lab in the controlled substance analysis section when a desire to pursue field work led her to study forensic anthropology.

She understands that like fire, life's track is changeable, but there's no place she would rather be.

"What I especially love about my work is that it draws from so many different disciplines," Perez said. "When I get a chance to be out in the field and work with different scientists collecting data in the name of trying to understand fire behavior, it's truly incredible."

Future Force

*Cadet, Russian and German language student **Brooke Newell** is preparing to lead the Airmen of tomorrow*

By Kendall Cooper

After weeks of grueling field training at Maxwell Air Force Base in Alabama, Florida State University student Brooke Newell was finally graduating. Standing in formation with over 300 other Air Force Reserve Officer Training Corps cadets in the fierce heat of a Southern summer, she reflected on how much had changed since she first signed on at FSU.

Brooke Newell. Photo by Devin Bittner.

"Graduating from field training was the most memorable experience of ROTC so far. It was an awakening," Newell said. "The experience expanded my horizons, and I realized how many opportunities I'd missed out on before simply because I wasn't putting my name in for them."

Her graduation from field training behind her, Newell is still working toward her FSU degree — she's a rising senior double-majoring in Russian and German through the Department of Modern Languages and Linguistics with minors in aerospace studies, also known as Air Force ROTC, and law enforcement intelligence — in preparation to commission as a second lieutenant in the Air Force.

Languages come easy to Newell, something she first discovered while learning German in high school. ROTC, however, was not always part of the plan: Newell originally aspired to a career in international business like her father, but the topics didn't quite align with her interests. After realizing she thrives in highly structured environments, Newell spoke to veterans within her family about what a career as a military officer might entail.

Encouraged, she applied for ROTC scholarships and earned a scholarship from the Air Force that fully covered her tuition to study Russian language at the university of her choice.

"You only get one life on this Earth, and for me, making the most of my time means learning as much as possible," Newell said.

Studying Russian has provided a foundation for examining common elements of other languages that aren't immediately considered interrelated but that military officers may encounter within a single theater of operation, particularly when serving as part of an international coalition.

"The grammatical bases between Russian and German are similar, and some of the vocabulary between Russian and French is similar. It's fascinating to see how so many languages connect to each other," Newell said.

Olga Seliazniova, the Dean's Postdoctoral Scholar in Slavic, has taught Newell in two different Russian courses. In the most recent, Newell was the only undergraduate in the conversation-oriented class.

"She's the gold standard of a student," Seliazniova said. "She's easy to work with, diligent and hardworking; she puts herself in charge of her education."

Newell is near the top of her class, and she cites self-imposed discipline and routine as the driving forces for her academic excellence, traits that complement her military service. She's also a natural leader and has taken on progressively more complex roles during her time in ROTC.

During her sophomore year, Newell served as a general military course adviser deputy and was responsible for the squadron's general wellbeing and morale. In Fall 2022, she was selected as wing executive officer, a role that provides immediate, chief-of-staff-like support to the wing commander, who is the highest-ranking cadet in FSU's Air Force ROTC Detachment 145.

This summer, she'll be back at Maxwell AFB, this time serving as field training cadet training assistant and using her leadership skills to help train more than 1,000 future Air Force officers.

"As a CTA, she will shape and mold tomorrow's leaders to uphold the high standards that we have set to be an officer," said Air Force Capt. Derrick Drennan, FSU's Air Force ROTC education officer. "Cadet Newell is an excellent student in and outside the classroom, and she strives to develop all the people around her and be a leader who sets the example."

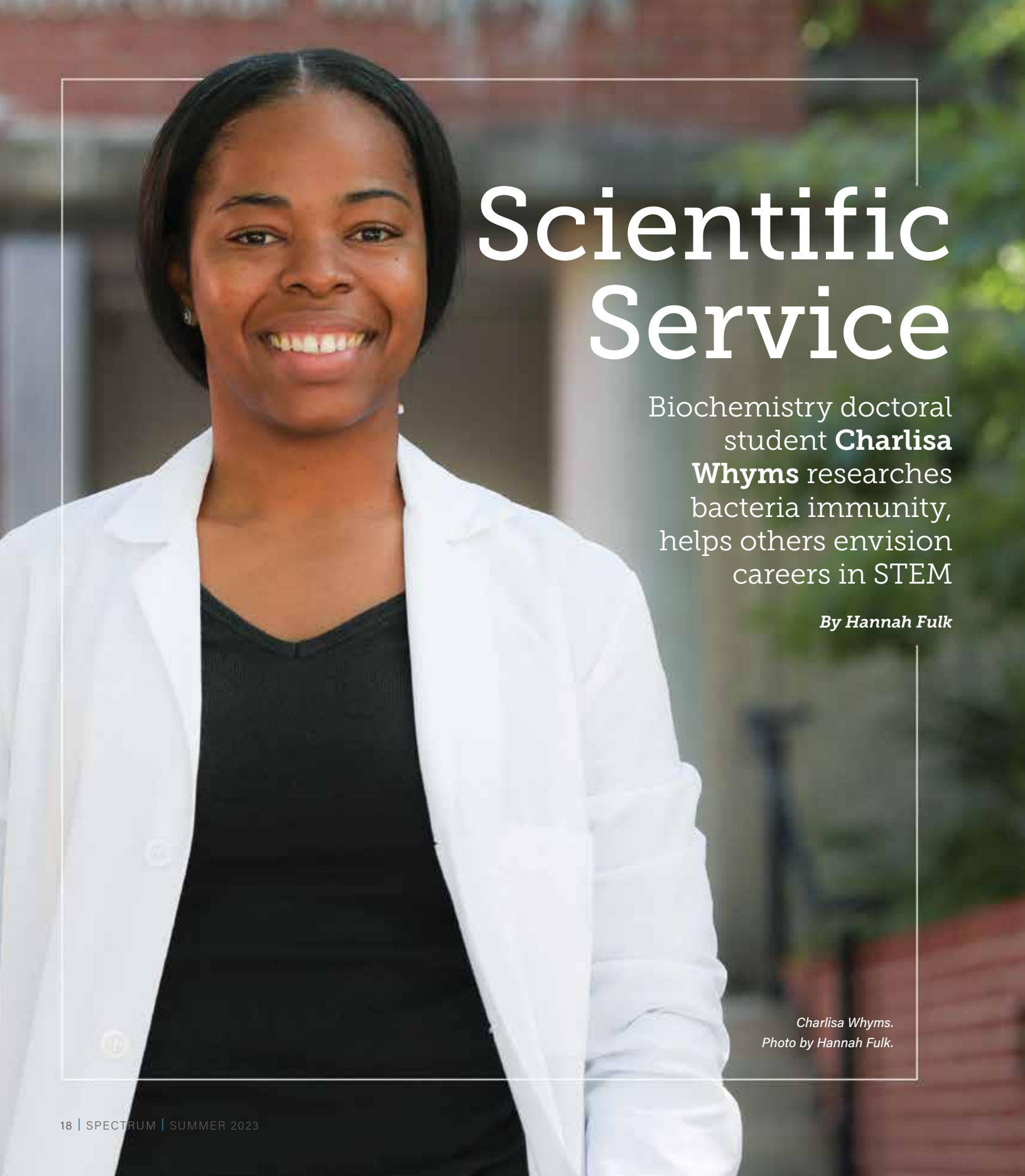
It's Newell's ability to seamlessly blend her disciplines that truly makes her stand out.

"Whether someone is deployed or working in intelligence, the Air Force always needs people who can speak multiple languages," she said. "It's cool to bring my Russian studies into ROTC and vice versa, and to apply the knowledge and experiences I have to each area of study."

Newell looks forward to pinning on her second lieutenant's bars in May 2024, and she hopes to have a long Air Force career using her language skills as a foreign area officer.

"I want to be part of something that's bigger than me," Newell said. "I want to help people, and it doesn't really matter to me if they don't even know I'm helping them. For me, that's kind of the point. It's not about the recognition — it's about helping people."

Scenes from Brooke Newell's Air Force training. Courtesy photos. Center photo by Devin Bittner.



Scientific Service

Biochemistry doctoral student **Charlisa Whyms** researches bacteria immunity, helps others envision careers in STEM

By Hannah Fulk

Charlisa Whyms. Photo by Hannah Fulk.

We've all experienced the nuisance sting of a paper cut, but that tiny skin tear is a signal to the body's immune system that a battle is beginning. As our bodies enlist the power of our immune systems to thwart bacterial invaders attempting to gain entry, the bacteria are employing defenses of their own.

These countermeasures, known as CRISPR-Cas systems, protect the bacteria from virus invasion, much like vaccines protect against disease. For researchers, exploring the cellular mechanics of bacteria defenses can uncover ways to help the human immune system more efficiently fight off infection.

That is precisely the aim for Charlisa Whyms, a doctoral student in Florida State University's Department of Chemistry and Biochemistry, who studies the molecular mechanisms governing CRISPR-Cas systems. Her work in the Molecular Biophysics Graduate Program endeavors to explain how bacteria immunity works and to uncover technological developments understanding CRISPR immunity.

"The purpose of my work is to discover innovative ways to hijack bacteria's defense systems and use them to kill bacteria more efficiently in the human body," Whyms said. "The part of CRISPR-Cas systems I study is how type III CRISPR bacterial molecules act as an alarm to call other proteins to the site of infection and what these molecular responses mean for bacteria behavior overall."

This research played a large role in understanding the COVID-19 virus and developing tools to combat it. Whyms is part of the Hong Li Laboratory, which published and patented an RNA virus detection kit during the onset of the pandemic to identify COVID proteins and establish fundamental knowledge about the virus for treatment efforts. The incorporation of the research team's knowledge about bacterial CRISPR-Cas systems proved useful to international scientists working towards COVID-19 vaccines.

"Charlisa is an energetic and curious student. She instills her passion in her research and works to impact others around her," said Hong Li, Whyms' adviser and director of the Institute for Molecular Biophysics. "She does not easily give up in the face of challenges, which is extremely valuable considering she is pursuing novel and previously unknown mechanisms within CRISPR-Cas systems."

For her work, Whyms was the recipient of an honorable mention in the National Science Foundation Graduate Research Fellowship Program during her first year at FSU. She was also selected as a 2023-2024 fellow in the McKnight Fellowship Program that allows her to mentor younger minority students in science, technology, engineering and mathematics fields.

"The science I do is important for so many reasons; not only does it have global impacts on our understandings of bacteria and how it interacts with our bodies, but I want to use my science to connect with people, specifically younger populations," Whyms said. "If I can demonstrate the importance of science to future generations, then they can start using their creativity to develop solutions to real-world problems just as I do now."

Whyms' desire to inspire means she spends much of her time outside the lab involved in community service. She was previously involved with STEMS4Girls, an initiative to increase representation of women of color in science, technology, engineering, and math studies and careers, and she held leadership roles in the Urban League of Broward County Young Professional Network, a community support program. Whyms now serves as a member of the Junior League of Tallahassee where she contributed to city-wide food distribution of over 50,000 meals to Leon County students experiencing food insecurity during spring break.

"I am a firm believer in lifting while you climb. I cannot do something and have it be all about me. I believe in paving the way for somebody else to do what I do in STEM if they choose," she said.

Before working in Li's lab, Whyms had a different kind of science career. After earning a bachelor's in biology from Florida Memorial University in 2013, she taught for four years at an alternative high school in Broward County. That time spent teaching continues to drive Whyms' research, and the skills she developed, such as open-mindedness and promoting knowledge-building, propel her post-graduation plans.

"As a scientist, Charlisa will have a bright future in either an academic or entrepreneurial career," Li said. "Her current project could have lasting impacts in the field of CRISPR-Cas system studies and in biochemistry broadly."

Whyms is in the fifth year of her doctoral program and plans to graduate in Spring 2024. Though she doesn't have a specific career goal yet, her enrollment in the Biomedical Entrepreneurship Graduate Certificate program at FSU prompts her to translate the technologies she develops in the lab to the market.

"I want to keep my options open after graduation to appease my passions for biochemistry, volunteer work, and mentoring initiatives in my community," Whyms said. "I believe I can learn to do anything."

"As a scientist, Charlisa will have a bright future in either an academic or entrepreneurial career. Her current project could have lasting impacts in the field of CRISPR-Cas system studies and in biochemistry broadly."

— Hong Li, Director of the Institute for Molecular Biophysics

Brain Storm

Biomathematics student **Amelie Thompson** uses computer modeling to investigate brain fold formation

By Kendall Cooper

A brain is a brain, right? Each of us has those three pounds of gray matter that make us who we are, from controlling the body's operating systems to storing cherished memories to helping us navigate daily life. But the ultimate shape of the brain, with its intricate patterns of folds, might be able to be used to predict if someone will live with healthy brain function or if they will likely experience neurological disorder.

Amelie Thompson. Photo by Devin Bittner.

Florida State University student Amelie Thompson has always been fascinated by the brain and its complexity, and she's using her combined interests in mathematics and biological science to understand how brains take shape and predict when problems may arise.

Thompson, a rising junior, is majoring in biomathematics, an interdisciplinary program in the FSU Department of Mathematics that prepares graduates for biomedical professions, such as careers in mathematical biology, scientific analysis and pharmaceutical research, and pathways to medical school.

"Biomathematics is so important because it shows the essential role that mathematics plays in the world around us," Thompson said. "Mathematics can change lives in its different applications, such as detecting certain health disorders before symptoms become apparent."

Since January, Thompson has conducted research in professor of mathematics Monica Hurdal's lab, Modeling the Brain. Thompson is working on an Honors in the Major thesis, which encourages students to explore their major disciplines in greater depth by completing a research or creative project. Thompson is studying and modifying computer-coded models to learn how specific chemical conditions can lead to different patterns of folds in the human brain.

"I wanted to conduct some sort of research and contribute to the depth of our scientific knowledge, and the Honors in the Major program made this possible for me," Thompson said.

In high enough concentrations, these chemicals, or morphogens, will trigger the body to create patterns in its tissue through a process called morphogenesis. Some of these conditions Thompson is modeling include the concentrations and locations of morphogens, as well the initial shape of the brain and how fast it grows.

"I was drawn to brain folds because certain abnormalities in folding patterns are associated with brain function and neurological disorders such as schizophrenia, autism and epilepsy," Thompson said. "If these disorders can be linked to specific abnormalities in brain folding, it may be possible to identify these disorders long before symptoms present themselves, as cortical folding takes place early in brain development. This could help prevent the suffering associated with undiagnosed disorders that require intervention, medical or otherwise."

The human brain's folds develop during the second and third trimesters of pregnancy in specific, unique patterns due to the diffusion of morphogens. While these chemicals must be in high enough concentrations to trigger a reaction, such as the formation of brain folds, their distribution is rarely, if ever, uniform. Thompson studies the effects that this lack of uniformity has on brain fold formation by using a mathematical model that describes how morphogens diffuse.

"I love working with Amelie because she takes charge of her learning. She's very ambitious and tackles new ideas with enthusiasm," Hurdal said. "Amelie is helping to push the research in my lab forward by implementing and testing important simulation results related to brain folding pattern development, and her contributions will help provide a better understanding of parameters in models we use and how those parameters may influence brain folding patterns."
The model Thompson uses to investigate brain fold patterning consists of mathematical equations that have been adapted for computer code, allowing her to research the effect chemical diffusion has on the formation of cortical folds. Through the work, Thompson was surprised to learn brain fold patterns develop similarly to animals' coat patterns, like spots or stripes.

"Something I find particularly interesting about my research is how mathematical models can be implemented in computer code to produce graphs that explain the results of the model," Thompson said. "Working in Dr. Hurdal's lab allows me to learn more about the enigma of the brain and gain insight into its function and development."

Following her anticipated spring 2024 graduation, Thompson plans to pursue a graduate degree in biomathematics and hopes to continue her education at FSU.

"The prospect of identifying undiagnosed disorders is my motivation," Thompson said. "As someone who lives with a mental illness, one of the hardest parts is finding a correct diagnosis. Not only does a lack of diagnosis make forming a treatment plan difficult, it can also lead to self-doubt about one's personal experiences. If it were possible to anticipate these disorders, maybe even before symptoms present, it would be easier for patients to receive treatment and avoid many obstacles that occur when seeking a proper diagnosis."

Amelie Thompson and Monica Hurdal. Photo by Devin Bittner.

Ashwanth Francis. Photo by Devin Bittner.

Nucleic Knowledge

*Biologist **Ashwanth Francis** hunts for the mechanisms that may one day unlock a cure for HIV*

By Hannah Fulk

What does it take to turn a once-terminal diagnosis into a manageable chronic health condition? In the four-plus decades since the onset of the HIV/AIDs epidemic, researchers have worked to discover the deadly virus' secrets and understand what makes HIV-1 so challenging to treat. That progress has proved life-sustaining for patients, but scientists around the world continue to work in pursuit of a cure.

Within Florida State University's Department of Biological Science, assistant professor Ashwanth Francis is leading the next generation of research to determine how HIV integrates itself into the nucleus of a human cell and becomes part of an individual's DNA. What his team learns prompts further investigation into earlier identification of HIV-infected cells and how to arrest the virus' replication more quickly.

"In the context of human evolution, understanding how retroviruses such as HIV can integrate themselves and become part of our human genome is extremely important, not only for present-day treatment options and fundamental ideas about the virus, but also for propelling research forward in anticipating how this virus changes with us," Francis said.

Despite ongoing research, HIV remains a unique scientific phenomenon. Individuals infected may manifest a variety of complex symptoms including fever, headache, sore throat, and rash as the virus spreads rapidly — and stealthily — throughout the body.

When infiltrating a human cell, HIV camouflages itself as organic substances called nucleic acids that are transported from the cytoplasm, a gelatinous liquid that fills a cell, to gain access to a cell's nucleus and thereby its genetic material, or DNA. Francis' work focuses on the cloaking mechanism processes and how the virus evolves over the course of its journey within a cell.

"As the virus travels through the pores of a nucleus, it gathers host cellular proteins that stick to it, allowing HIV to infect a cell and start the replication process," he explained. "Once the virus integrates itself into the DNA of a cell's nucleus, it controls the cell's regeneration and copies itself, spreading throughout the body."

Francis was a child when HIV began sweeping the world, and he saw the devastating impact it had on people in developing nations including his hometown of Tamil Nadu, India. He was motivated to focus his fascination with science into a career helping advance knowledge of the virus.

> *Francis brings immense energy and enthusiasm for science to our department. He is open about his research and always eager to share results. Analyzing data and discussing its meaning are my favorite things about doing science, so when Francis appears in my office doorway with an excited look on his face, I know I'm about to see something good."*
>
> *— Scott Stagg, Professor of Biological Science*

"As an undergraduate, I began preliminary work on HIV while working in a pediatric ward in India," Francis said. "I became attached to the work and decided to pursue a doctoral degree to continue my learning efforts."

At the time, India did not have the technology available to facilitate Francis' work, so he searched for educational opportunities abroad — a scholarship offer from Scuola Normale Superiore, a public university in Pisa, Italy, soon followed.

"I spent the next eight years adjusting to Italian culture and utilizing as many resources as possible to develop microscopy methods, which now allow us to see the HIV virus in its environments within a cell," Francis said.

Upon earning his doctorate in 2014, Francis worked as a postdoctoral researcher and assistant professor at Emory University, in Atlanta, Georgia, before joining FSU's faculty in March 2021.

Today, Francis and his team seek new technologies that allow them to better analyze HIV interactions with its host-environment at high-resolutions using FSU's FEI Titan Krios transmission electron microscope. Francis plans to incorporate fluorescent tags he has developed into his lab work to help identify virus structures that correlate to HIV-1 infection. Developing new means to study the virus paves the way for new drug development, cultivating a pipeline of scientific efforts leading back to patient care.

"How the nucleus of a cell functions, which holds our DNA together, is still a big mystery in the science world, so my work allows scientists to discover exciting answers to complex questions regarding interactions between viruses and a cell's nucleus," Francis said.

The Titan microscope is among many cutting-edge technologies at FSU that allow Francis and others in the Stagg Laboratory, led by professor of biological science Scott Stagg, to capture 3-D images of how HIV changes the architecture of a cell's nucleus. Stagg and Francis are co-primary investigators on projects that focus on developing new techniques that reveal the molecular details of how cell proteins and the virus interact within a single cell's architecture.

"Francis brings immense energy and enthusiasm for science to our department. He is open about his research and always eager to share results," Stagg said. "Analyzing data and discussing its meaning are my favorite things about doing science, so when Francis appears in my office doorway with an excited look on his face, I know I'm about to see something good."

Because of the work of generations of scientists like Francis, the World Health Organization notes nearly 95 percent of people with HIV today can take prescribed antiretroviral treatment and live long, healthy lives with effectively no risk of transmitting the virus to others. ‹

Smart Starts

Living-learning community prepares young women for careers in science, technology, engineering and mathematics

By McKenzie Harris

The transition to life as a college student can be challenging. For many freshmen starting at Florida State University, the move to Tallahassee means starting a new life in a new city far from family and friends.

To make this transition a bit easier, FSU freshmen can join living-learning communities, or LLCs, of like-minded students studying similar subjects and living on the same dorm floor, creating their own educational ecosystem while learning from each other and finding their footing during this transformative time.

FSU's 10 LLCs span a variety of interests, from health professions and global and public affairs to entrepreneurship, and host weekly colloquia on personal and professional development, offering first-time-in-college freshmen unrivaled experiences, particularly in service and research involvement.

This fall, the 33 aspiring scientists who enter the music-filled corridors of Cawthon Hall as the newest class of the Women in Math, Science, and Engineering Living-Learning Community, or WIMSE, will join hundreds of women over the past 22 years who have jumpstarted their studies in science, technology, engineering, and math disciplines through the opportunities available.

"The support provided by WIMSE and the community is unmatched," said Ganae Norman, a co-chair of WIMSE's membership committee who is pursuing a double major in biology and French and also serves as a laboratory manager and technician in professor of biological science Hengli Tang's lab. "It's academic as we share books and tutor each other, it's emotional and mental as we're vulnerable and help one another through rough times, it's professional as we learn how to conduct ourselves as young scientists, and it's social as we create lifelong friendships."

WIMSE is led by a faculty director, and its organization includes a student activities council, a service committee, a membership committee, and a social committee, all of which facilitate students' engagement in research and service even in their first year. WIMSE is unique among the university's LLCs in that the community extends beyond freshman year. WIMSE's student activities council plans events for members of all years to facilitate connection from the first year through graduation.

"The research experience program and colloquia are WIMSE's core, and they make the experience unlike any other," Norman said. "The access to university resources is also helpful, as I wouldn't know about many of the tutoring, professional development, and scholarship information offerings if it weren't for WIMSE. Most importantly, I wouldn't have gotten my lab manager and tech job if not for WIMSE!"

The groundwork for WIMSE was established in 2001 by the late Robert O. Lawton Distinguished Professor of Oceanography Nancy Marcus. Only one other FSU LLC existed at the time, and Marcus seized the chance to lend a helping hand to younger women studying STEM disciplines.

"Based on her experiences, Nancy wanted to focus on women in STEM and help recruit and retain their participation," said College of Arts and Sciences Dean Sam Huckaba. "WIMSE gives students an amazing outlet to follow their research interests, and we're eager to ensure we're doing our part for this important pipeline."

A major focus for WIMSE is getting students involved in research, and the community

Women in Math, Science, and Engineering Living-Learning Community, WIMSE, Class of 2023. Courtesy photo.

WIMSE LLC members conduct research in the lab and in the field. Courtesy photos.

facilitates lab tours across campus for freshmen to explore and ask questions of geochemists and oceanographers, neuroscientists and mathematicians, astrophysicists and computational scientists, and many other faculty members. Thanks to funding from the college, WIMSE hosts a research experience program, or REP, in which students, even eligible freshmen, are paid for lab work while they accrue hands-on experience and determine which field fits them best.

"We have more freshmen getting involved in research this year than we've had in many years, and the community keeps growing closer," said Susan Blessing, WIMSE director and a professor of physics. "I love helping them grow into professional young women and develop their talents as scientists."

Blessing became director of WIMSE in 2005 when Marcus moved on to become dean of FSU's Graduate School. Since then, Blessing has headed major expansions of the organization and is delighted to see how engaged and involved the community has become.

"There are lots of social events throughout the year to allow everyone to take part, including before the fall semester begins. All new WIMSE members attend a welcome retreat at the FSU Rez to get to know one another," Blessing said. "The research experience program and research symposium where students present their research, however, are what I hope students take the most from."

WIMSE members Caitlin Volante, a Spring 2023 behavioral neuroscience graduate, and Madison Karram, a Spring 2023 graduate who double-majored in biology and psychology with a minor in chemistry, both discovered their research interests via the lab tours and research symposiums.

Volante, who will head to Tennessee this fall to join Vanderbilt University's cognition and cognitive neuroscience doctoral program, participated in REP for three years, presented at multiple

symposiums, and traveled to Boston, Massachusetts, for a cognitive psychology conference — all as an undergrad. Karram will advance her studies in the research-focused doctoral program in arthropod ecology and evolution at the University of Virginia in Charlottesville.

"Being involved in WIMSE helped me feel a step ahead in my undergraduate research involvement, and it's been one of the strongest experiences in my preparation for graduate school and a professional research career," Karram said. "Without REP, I wouldn't have the research experience I needed to carry out my honors thesis project, which was the driving force in finding my research interests."

Following graduation, alumni continue to draw value from the experiences and knowledge gained through WIMSE. Former student director Megan Stanforth, a 2014 computer science alumna, signed a full-time contract with BMW's manufacturing division even before she completed her bachelor's degree. Stanforth is now an operational lead for quality systems for the automaker.

"Not only did WIMSE provide a community of like-minded and motivated women that helped me succeed at FSU, it also created a STEM-focused environment where we could learn from one another and discover new pathways and career options in a way that felt safe and supportive," said Amy Crisp, a Department of Physics alumna who earned her bachelor's degree in 2007 and master's in 2008 and now works as a biostatistician in the University of Florida's College of Medicine. "While I didn't stay in physics, I credit WIMSE with laying the foundation that allowed me to explore other areas of STEM later in life, resulting in me finding my passion and eventually getting my Ph.D. in biostatistics."

Going into the 2023-24 academic year, WIMSE will see a change in leadership — Blessing is stepping down after nearly 20 years and will hand the reins to WIMSE's new director, professor of oceanography and environmental science Olivia Mason — but students can continue to expect the quality formative experiences for which the LLC has become known.

"Susan has done an incredible job, especially in terms of expanding the program to encompass more than just freshman year," Huckaba said. "We're looking forward to seeing how this continues to grow — especially with Olivia stepping into the director role with perhaps a different approach while coming from another field — and how WIMSE and the college can continue to collaborate and provide even more opportunities for young scientists."

Madison Karram, Caitlin Volante. Photo by McKenzie Harris. Right: Susan Blessing. Below left: Ganae Norman. Photos by Devin Bittner. Below right: WIMSE 2023 seniors. Courtesy photo.

FSU Photography Services photo by Bruce Palmer.

On the Rise

*Vice President **Stacey Patterson** is propelling Florida State research to the next level*

By Amy Walden

Stacey Patterson's job has an impact on every corner of Florida State University. As FSU's vice president for research, she oversees a diverse research portfolio with more than $355 million in annual expenditures and over 50 prominent research centers and institutes.

Patterson also leads a 125-person unit that includes FSU's federal relations and commercialization offices and the Council of Research and Creativity among others, and she has direct responsibility for five research centers: the Center for Advanced Power Systems, the Coastal and Marine Laboratory, the Florida Center for Reading Research, the High-Performance Materials Institute, and the FSU-headquartered National High Magnetic Field Laboratory.

Prior to arriving in Tallahassee in 2022, Patterson sharpened her research and leadership prowess in various roles across the University of Tennessee system, including in 2017 when she became the first woman appointed Vice President for Research, Outreach, and Economic Development in the history of the UT system.

Patterson, a first-generation college graduate, holds a bachelor's in biological sciences from the University of Tennessee, Knoxville, master's in environmental health science from East Tennessee State University, and doctorate in microbiology from UT Knoxville.

Spectrum Magazine talked with Patterson to learn more about her vision for FSU's Office of Research and its intertwinement with the College of Arts and Sciences.

Spectrum Magazine: In July 2022, you were appointed to your present role at FSU. What was it about the university's research portfolio that attracted you to this position?

SP: I wasn't on the job market when I was approached, but the more I learned about FSU, I realized this was such an exciting place with a rich tradition in top-tier scientific research. The National High Magnetic Field Laboratory is truly a national treasure. We have a great portfolio of research directly oriented toward helping communities as well as the burgeoning FSU Health initiative.

Many programs here are scalable to achieve even greater outcomes for the community, state and nation. I love building programs and initiatives. With so much going on at FSU, this was an opportunity I couldn't pass up.

SM: You have previously secured funding from the U.S. Army, the National Oceanic and Atmospheric Administration, the National Science Foundation, Department of Energy, National Institutes of Health, and various private sector partners. You have also contributed to several U.S. patents. How have these experiences prepared you for your current role?

SP: The Office of Research supports faculty members who work hard every day to secure funding to further their individual research. It would be difficult for anyone to run this kind of operation and not understand that process. I love writing grants — you're telling a story, setting big goals, and dreaming about what you can achieve. I hope my expertise aids FSU in setting up research to better support individual investigators and also in helping pursue funding that supports broader initiatives. Both strategies are critical as we work to double our research expenditures, which President Richard McCullough has set as a top goal.

SM: Translational work and bringing research to the marketplace are hallmarks of your career. Why is this so important?

SP: In my first job at Tennessee, I worked with the system's tech transfer office and loved it. Bringing technology developed by scientists and engineers to the public is a major responsibility of public universities. If we produce a new technology or develop a new drug compound, we want that work for more than a good peer-reviewed paper; we want to use it to help people.

President McCullough feels it's important to grow our translational research — increase the number of patents, licenses and startups coming out of FSU. My background in turning my research into patented technology, being involved in a startup company, and working in a tech transfer office ideally positions me to enhance this part of FSU's research and creative activity portfolio.

SM: STEM and humanities disciplines are both part of our college, and research is integral to our mission. How is the Office of Research ensuring researchers across disciplines feel equally supported?

SP: The Office of Research supports all creators, innovators, researchers, scientists, engineers, musicians, artists and writers. People associate university research offices with STEM-related scholarship, but that is just part of our role. Expanding research at FSU means supporting faculty in all disciplines, not just those that traditionally bring in a higher amount of grant dollars.

We've created the university's first Research Fellow in the Arts and Humanities, a position that will rotate every two years and work with the office to identify ways to support scholarship, creativity, and research related to the arts and humanities.

Innovation exists across campus in every discipline, and it is the office's job to support that. No major university exists without a strong commitment to the arts and humanities — they are the building blocks of great societies.

For the latest on FSU's Office of Research, visit research.fsu.edu.

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>
> *— Stacey Patterson, Vice President for Research*

Caterina Gratton. Photo by McKenzie Harris.

Precision **Cognition**

Neuroscientist Caterina Gratton brings a lifelong passion to the fight against Parkinson's disease

By McKenzie Harris

For her seventh birthday, Caterina Gratton's parents pulled out all the stops: big colorful balloons, a delicious cake, and backyard activities galore. Gratton, now an associate professor of psychology and a member of FSU's Program in Neuroscience, especially loved the brain game involving placards with color names written in non-corresponding color ink. All the kids raced to be first to identify the color name written on the card regardless of the physical ink color.

It wasn't until years later that Gratton realized this game was a famous cognitive psychology exercise, the Stroop task, which showcases the difficulty of naming a physical color when it's used to display the name of a different color — like blue ink used to write the word "red" — because of how the brain processes conflicting information.

But neurological tasks at birthdays and, later, theoretical arguments at the dinner table were a way of life for Gratton.

"Both of my parents, Italian immigrants who grew up outside of Rome, are cognitive neuroscientists. They came to the U.S. to pursue doctoral degrees; I was born when they were in graduate school," Gratton said. "For a long time, I refused to accept that I enjoyed psychology because I couldn't possibly be just like them!"

While her parents' enthusiasm made a science career a no-brainer, Gratton tested other disciplines before ultimately returning to neuroscience. She earned a doctorate from the University of California — Berkeley and completed a postdoctoral fellowship at Washington University in St. Louis , Missouri, before coming to FSU in 2022.

"Many experiences growing up taught me that science is this amazing creative enterprise where every day is different, and there are always new problems that arise. This can seem overwhelming, but it's satisfying to have new challenges and new puzzles to solve," Gratton said.

Currently, Gratton is part of a multi-institution team funded by a five-year, $3 million National Institutes of Health Research Project Grant from the National Institute of Neurological Disorders producing reliable and detailed measures of an individual's brain networks — representations of how brain regions communicate together. The goal is to identify how specific differences in brain networks affect symptoms and progression of Parkinson's, a disease that affects nearly one million people in the U.S. and more than 10 million worldwide.

Among the key tools in Gratton's work is a functional MRI, which measures small changes in blood flow that occur with brain activity and can be used to assess areas of the brain handling critical functions, as well as to evaluate effects of disease. However, fMRI signals produce data on individual brain networks that is inherently noisy, or unclear, so researchers have overcome this issue by averaging data across large groups of people. Averaging data makes it difficult to determine how differences in individuals affect the trajectory of disorders like Parkinson's.

Gratton's team has developed major innovations to address erasure of discrete details and precisely define brain networks by collecting extended amounts of data and combining individuals' data with advanced denoising methods.

"We hope this information eventually points us toward markers to track to better understand prognosis of Parkinson's as well as potential treatment targets," Gratton said. "It means the world to do work that can improve the lives of so many."

Gratton's research has also been supported by the National Institute of Mental Health, the National Institute on Aging and the National Science Foundation. In 2021, she received an NSF CAREER Award, the agency's most prestigious recognition in support of early career faculty with potential to serve as academic role models in research and education and to advance their fields.

"Caterina brings an amazing set of skills and expertise in brain networks that complement our growing neuroscience group, and she's helping make FSU a nationally recognized center of excellence in fMRI and human neuroscience," said Brad Schmidt, chair of the Department of Psychology and director of FSU's Anxiety and Behavioral Health Clinic. "Her new grant expands her work in a clinical direction, providing important new insights, and she's a star on the rise in the field."

"Caterina brings an amazing set of skills and expertise in brain networks that complement our growing neuroscience group, and she's helping make FSU a nationally recognized center of excellence in fMRI and human neuroscience... she's a star on the rise in the field."

— Brad Schmidt, Department of Psychology Chair

Gratton and her husband Terence Crofts, an assistant professor of biomedical sciences in the FSU College of Medicine, may be inadvertently continuing the tradition of a science family as their children's interest in participating in studies and exploring different science fields blossoms on its own. While Gratton's experience comes with privilege of knowledge about academic careers, she's working to break this barrier for future generations.

"In my lab, I have an open-door, ask-me-anything attitude and frequently discuss logistics of academia that often aren't taught to young researchers," Gratton said. "My hope is this knowledge helps demystify some of the complexities around academic careers and makes them more transparent and accessible to a wider group of people."

Cycles of Life

*Ecologists **Brian Inouye** and **Nora Underwood** carry on environmental research more than 50 years in the making*

By Devin Bittner

Brian Inouye and Nora Underwood are spending their summer counting flowers and chasing butterflies. Inouye and Underwood, ecologists and professors at Florida State University, meticulously tally the organisms present in the meadows of Gothic, Colorado, as part of ongoing data collection that will help scientists better understand how some of nature's most sensitive creatures are responding to environmental changes.

For 50 summers now, since 1973, at least one member of the Inouye family has returned to the lush valley to count and catalog changes in numbers and behavior of flora and fauna that populate the area. The current research team is led by Brian, Nora, and collaborators from Tallahassee Community College and North Carolina State University.

"Different species are changing their behavior and responding to different cues in the climate," Brian explained. "Some are more sensitive to temperatures, some to snowpack or rainfall, and some are even sensitive to what happened the summer prior."

Brian is uniquely qualified to make that assertion — he has been part of the work since the beginning.

That first summer at the foot of the Rocky Mountains, Brian was not a research assistant, but a toddler. His father, ecologist David Inouye, was starting a new project. As the bumblebees buzzed and hummingbirds flitted among flowers, David noted every change, from when the pollinators rose to how many flowers they greeted, gathering data that contributes to the field of phenology, the study of the timing of events in an organism's life.

"As a graduate student at the University of North Carolina, I decided to do my research every summer at Rocky Mountain Biological Laboratory, or RMBL, in Gothic," David said. "In 1973, I started a study with my wife Bonnie and other collaborators in which we each set up 2-meter-by-2-meter plots and counted every single flower in those plots every other day. Fifty years later, it's become one of the longest living projects of its kind."

Today, David is a professor emeritus in the University of Maryland's Department of Biology. His lifetime research portfolio is vast, but his most involved research stems from the summers spent tracking the timing and behavior of flowers, pollinators and insects at RMBL. As he approached retirement in 2014, David didn't have to search far for well-trained and experienced successors to assume responsibility for the work.

"We're very fortunate to have received long-term support from the National Science Foundation, and after nearly 50 years, I found it important to continue this research by passing it on to my son and daughter-in-law," David said.

A family tradition

After a childhood punctuated by those Colorado summers, Brian started college with an interest in biochemistry. His yearning to spend time in nature led him to transition his focus to biological science, and he seized opportunities to conduct field work in Costa Rica and Brazil.

No matter where he was working, Brian continued to visit his parents in Gothic over the summers. In 1988, Nora, a biology major at Vassar College, came to RMBL as a research assistant. The two bumped into each other in the dining hall where Brian's mother was teaching folk dancing, and it wasn't long before that meeting became a lifetime partnership.

Left: Brian Inouye and Nora Underwood. Photo by Devin Bittner.
Above: Brian Inouye. Courtesy photo.

Top: Rocky Mountain Biological Laboratory collaborators 2022. Above: Underwood and her daughter. Right: Inouye and Underwood. Courtesy photos.

Brian and Nora went on to pursue separate but parallel careers in biology, always discussing their respective research and trading ideas. Both earned doctoral degrees at Duke University and joined FSU's faculty in 2002.

Brian, a Fulbright Scholar and fellow of the American Association for the Advancement of Science, teaches undergraduate and graduate courses in ecology and experimental biology, and his current research ventures focus on how species respond to climate, such as when plants flower or when animals hibernate, migrate, have pups, or carry out other activities, and why certain plants are consumed more by herbivorous insects than others and why damage from herbivores tends to be distributed unevenly among plants.

Nora's research centers on the evolution of plant defense and growth strategies, herbivore movement, density dependence and population dynamics, and how plant and herbivore communities are influenced by each other. She teaches graduate and undergraduate courses in conservation biology and ecology of food and was recognized with FSU's Distinguished Teacher Award, the university's most prestigious honor for teaching.

Nora also serves as a program director for FSU in a nationwide cohort of institutions that has received an $8.8 million grant from the prestigious Howard Hughes Medical Institute to develop more inclusive pathways from community college programs to four-year universities.

"Initially, we kept our research programs separate," Nora explained. "We began collaborating more after receiving tenure, and that's been very productive. We bring different strengths to our work, and we're a more powerful research team together than either one of us would be alone."

Meaningful moments

Every minute change logged over the past 50 years has contributed to a greater understanding of how climate change has impacted life cycles in Gothic, such as how increasingly earlier snow melts trigger earlier flowering.

"It's indisputable that the climate has been changing, but it's not changing uniformly in all parts of the world," Brian said. "It's exciting to study these changes. For society, it means we need to keep our eyes open and be

Rebecca Prather. Top right: Gothic, Colorado. Center: RMBL collaborators 2022. Right: Hummingbird on delphinium. Photos by Rebecca Prather.

flexible in our responses because we can't predict every change that's going to happen over the next few decades."

David, Brian, and Nora attribute the project's ongoing success to the many collaborators who have participated over the last half century, drawing on established research practices while injecting fresh perspectives. These include college students, K-12 science teachers, and scientists from around the world. Rebecca Prather, an ecologist and United States Department of Agriculture postdoctoral research fellow at FSU, has joined the work at RMBL in recent years.

"Drawing on everyone's expertise is so helpful in understanding the patterns we observe and interpreting them biologically," Rebecca said.

The family also remains personally invested in the project's future success — Brian and Nora's middle-school-aged daughter is already counting flowers.

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>
> *— Brian Inouye, Professor of Biological Science*

Machine Learning Expo highlights FSU's use of AI tools in research

Machine learning and artificial intelligence have grabbed the spotlight with their potential to change the way we interact. AI's groundbreaking technology focuses on building systems that learn and improve from history and experience rather than explicit programming and is profoundly impacting many segments of business and industry including research activity.

This spring, Florida State University presented the 2023 Machine Learning Expo, MLX23, to explore the latest applications of machine learning and AI by FSU researchers. MLX23 examined machine learning and AI trends through presentations by FSU faculty, researchers, staff, and students illuminating how these tools are already being applied to solve complex problems in the fields of linguistics, physics, computer science, data administration, cybersecurity and more.

"There's an opportunity for Florida to become a leader in using advanced AI tools. This expo is an efficient way for the FSU community to become familiar with the tools, their use and the ethical considerations they raise," said Gordon Erlebacher, director of the FSU Interdisciplinary Data Science Master's Degree Program.

To view MLX23 presentations and learn more about AI and machine learning research at FSU, visit **datascience.fsu.edu/mlx.**

SPECTRUM
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