UF
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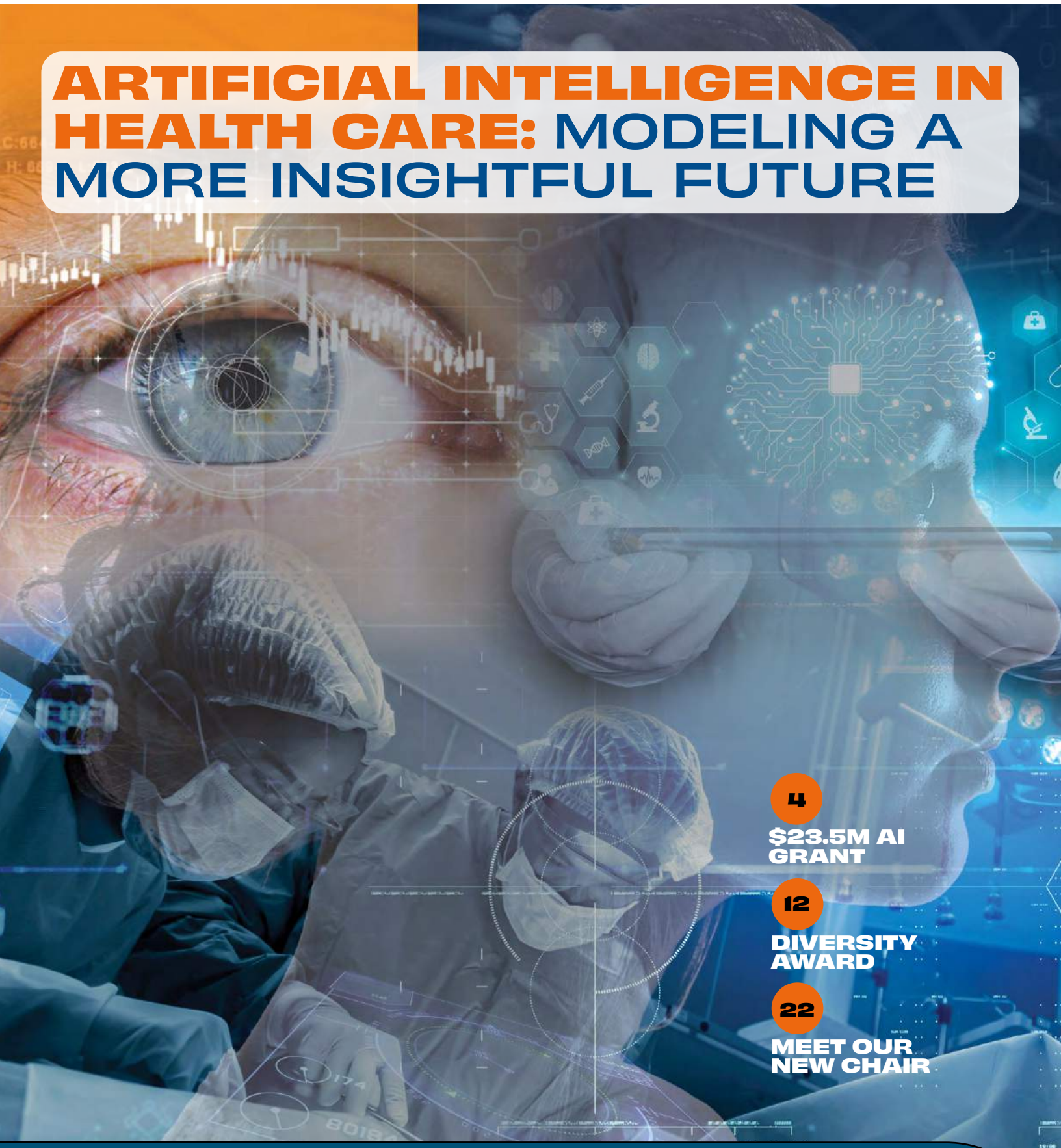
CrossLink



ARTIFICIAL INTELLIGENCE IN HEALTH CARE: MODELING A MORE INSIGHTFUL FUTURE

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MEET OUR NEW CHAIR

BIOMEDICAL ENGINEERING *at the* UNIVERSITY of FLORIDA

MESSAGE FROM THE CHAIR

Welcome to the 10th issue of CrossLink, a magazine dedicated to research and education activities of the J. Crayton Pruitt Family Department of Biomedical Engineering at the University of Florida.

It is with great honor and enthusiasm that I write to you as the incoming chair. It is an honor to represent this esteemed institution and its vibrant community!

The University of Florida has long possessed an exceptionally fertile environment for biomedical engineering through its co-localization of top-ranked colleges and its robust infrastructure in engineering, biotechnology, and artificial intelligence. However, what truly distinguishes our department is its people. Our highly engaged faculty, students, and staff collaboratively support an environment that promotes innovation, collaboration, academic rigor, and a societal impact. I am honored to showcase their accomplishments and impact in this latest issue.

Our 10th CrossLink magazine issue highlights Artificial Intelligence (AI) in healthcare. Our faculty have long led from the front in this space, from uncovering medical image patterns and predicting disease to using facial recognition to improve critical care monitoring. With two new faculty hired in the last year working in biomedical AI, the opening of the brand new Malachowsky Hall for Data Science & Information Technology building, and robust infrastructure funding from extramural sources, our impact in this space will only continue to grow.

We have long recognized that translational innovation is driven by creating a community where all stakeholders can share their diverse perspectives. With this vision, our department has developed and implemented numerous strategies to create an inclusive community where all voices can be engaged and heard. As outlined in this issue, our faculty have contributed to a publication that outlines faculty hiring practices that seek to not only create a broad applicant pool but to remove hidden barriers to ensure all applicants can showcase their best selves. This collective department culture was recently recognized with a 2023 Diversity Lecture Award from our flagship society, the Biomedical Engineering Society (BMES)!

We also wanted to take an opportunity to highlight and thank our former chair, Christine Schmidt, for her outstanding leadership of our department over the past ten years. Her transformative vision not only led to the significant growth of our faculty, research, students, and rankings, but did so in a manner that generated a collaborative, supportive, and inclusive community. We are forever indebted to her investment in this department, and I know I have big shoes to fill!

As our department continues to evolve and expand, our core mission remains constant – contributing to societal progress through biomedical innovation. With the continued dedication to the UF BME community, I'm confident in our ability to achieve this mission.

Thank you for your ongoing support of UF BME. We hope you enjoy reading this edition of CrossLink, and we look forward to staying updated on your endeavors.

> "AI PAVES THE WAY FOR PRECISION MEDICINE, RESHAPING HOW WE DIAGNOSE, TREAT, AND CARE FOR PATIENTS. IT'S A REMARKABLE FUSION OF HUMAN INGENUITY AND THE TECHNOLOGICAL ADVANCEMENT THAT HOLDS THE POTENTIAL TO REVOLUTIONIZE OUR ENTIRE APPROACH TO HEALTHCARE."

Sincerely,
Cherie Stabler
J. Crayton Pruitt Family & UF Foundation Preeminence Professor and Department Chair

AI NEWS

DID YOU KNOW?

Over the past 10 years, UF has made significant computing infrastructure investments, including a $15 million data center to house the $3.4 million HiPerGator supercomputer. That work set the stage for UF's giant next step. In 2020, alumnus Chris Malachowsky and NVIDIA, the company he co-founded, gave UF more than $50 million in cutting-edge processing tools and training to build the most powerful Artificial Intelligence computer in higher education. Faculty and students now have access to the best AI technology on the planet, and the response from the UF faculty has been incredible. Researchers with existing AI expertise are accelerating their programs while others are quickly pivoting toward AI. ***READ MORE AT: AI.UFL.EDU***

CrossLink

A publication of the J. Crayton Pruitt Family Department of Biomedical Engineering at the University of Florida

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UF TO USE $23.5 MILLION GRANT TO BUILD AI INFRASTRUCTURE TO IMPROVE CRITICAL CARE

By Cody Hawley, PH.D.

The University of Florida has been awarded $3.6 million of a $23.5 million multicenter grant for a four-year data-generation project that is unprecedented in its scope, aimed at building an infrastructure for artificial intelligence in critical care and advancing artificial intelligence in ways that improve patients' ability to recover from life-threatening illnesses.

Funded by the National Institutes of Health's Bridge to Artificial Intelligence, or Bridge2AI program, this project creates a network of university health systems that will support a comprehensive repository of data for AI research from more than 100,000 critically ill patients. The patients' data will be made anonymous.

Although the project's highlight will be the 100,000-patient data set, key aspects of the project include AI workforce training events, a set of standards for ethical use of AI in critical care, publicly available AI tutorials and guidelines for a collaborative approach to medical AI research.

PARISA RASHIDI, PH.D.
Associate Professor, UF Research Foundation Professor & IC3 Co-Director

Read more about her research on page 10

A team of eight principal investigators, including three from UF — Azra Bihorac, M.D., M.S., FCCM, FASN; Parisa Rashidi, Ph.D.; and Yulia Levites Strekalova, Ph.D., M.B.A. — will lead the network of connected intensive care units. UF Health will be a vital contributor to the data repository, along with other major health systems, including Massachusetts General Hospital at Harvard; Emory University; Duke University; the University of California, Los Angeles; Nationwide Children's Hospital; Columbia University and the Mayo Clinic.

"This project is a huge win for UF AI research and will put us on the map for biomedical AI," said Bihorac, the senior associate dean for research affairs at the College of Medicine and co-director of UF's Intelligent Critical Care Center, or IC3. "The success of our UF team builds on the investment of UF Health and the UF College of Medicine in the digitization of clinical infrastructure and the generation, integration and standardization of medical data for both clinical and research use."

The program, called "A Patient-Focused Collaborative Hospital Repository Uniting Standards for Equitable AI," or CHoRUS, will expand and generate biomedical data that can be used for monitoring, diagnosing and treating critically ill patients, as well as augmenting doctor's rapid decision-making.

Previous data-generation efforts have lacked geographical and demographic diversity. CHoRUS will greatly increase the scope and scale of AI-ready data sets by creating the repository of anonymized data, composed of structured electronic health records and other biomedical information.

> **"THE CHORUS DATA SET WILL BE THE LARGEST AND MOST COMPREHENSIVE CRITICAL CARE DATA SET. PROVIDING THIS DATA SET TO THE SCIENTIFIC COMMUNITY WILL ACCELERATE ADVANCES IN THE DEVELOPMENT OF AI ALGORITHMS IN THE CRITICAL CARE DOMAIN AND IN THE MEDICAL AI DOMAIN IN GENERAL,"**
>
> - PARISA RASHIDI
>
> J. CRAYTON PRUITT FAMILY TERM FELLOW AND AN ASSOCIATE PROFESSOR AT THE UF HERBERT WERTHEIM COLLEGE OF ENGINEERING, CO-DIRECTOR OF THE IC3.

Earlier large-scale data sets used by ICUs have been insufficient for general use, Bihorac said.

"So far, the large, high-resolution data sets needed to utilize AI technology in ICUs have been limited to single sites," Bihorac said. "CHoRUS will lead to more research advances and more ICUs being able to utilize AI advances and give critically ill patients the best possible care. UF's involvement will yield benefits for patient care that will extend beyond the duration of our project."

Other Bridge2AI components — involving UF faculty from the colleges of medicine, communication, pharmacy, law and engineering — include expanding access to AI knowledge and resources by involving the Gainesville community in AI training through UF's Citizen Scientist program and a fellowship initiative for local high school teachers.

The Citizen Scientist program, which enables researchers to receive feedback from the community about their work, will offer a publicly available educational module about medical AI ethics, and the UF Center for Precollegiate Training will offer summer fellowships for two local high school math teachers who will develop an AI and programming curriculum for high school students that can be shared with teachers across the country.

"By design, this project brings together experts from multiple disciplines," said Levites Strekalova, an assistant professor in the College of Public Health and Health Professions department of health services research, management and policy. "We're creating skills and workforce development programs for medical professionals, K-12 teachers and citizen scientists. Our efforts will have a national impact, which is both humbling and exciting."

Furthermore, UF will build an industry innovation collaborative with NVIDIA and others to help industries seeking to develop AI algorithms for medical practice and to raise awareness about CHoRUS data. NVIDIA provides the technological power behind HiPerGator, one of the nation's fastest supercomputers, and

partners with UF to advance the university as a national leader in the application of AI.

"By leveraging our open-source technology stacks like MONAI, a framework for developing medical imaging AI, and NVIDIA FLARE, a systems development kit for ensuring security and data privacy, we can quickly equip a new generation of AI builders and accelerate their journey to AI proficiency," said Mona G. Flores, M.D., the global head of medical AI at NVIDIA.

To fortify the privacy of personal data used in medical AI, a team of legal, ethics and communication scholars will recommend privacy policies beyond the current legal standards to strengthen protections and enhance public trust.

The team will consult with up to 10 CHoRUS citizen scientists to identify and address any ethical questions or weaknesses in the public's perception of medical AI.

"CHoRUS is building data resources to support a wide array of socially beneficial goals — not just to enhance research but also to improve health care, to make medical products safer and to benefit public health," said Barbara J. Evans, J.D., Ph.D., the Stephen C. O'Connell Chair and a professor of law and engineering at UF. "Each such use poses distinct legal and ethical issues, so we're examining ways to give people confidence that their data will be safe in medical AI systems."

UF will help this multicenter group provide better critical care for all patients through more effective AI monitoring and diagnostics.

"This exciting project will leverage the investments made by the University of Florida to build the AI University, as well as the donation of the HiPerGator AI supercomputer by UF alumnus and NVIDIA co-founder Chris Malachowsky," said Erik Deumens, Ph.D., UF's senior director of research computing.

Overall, the CHoRUS program expands upon UF's campuswide AI initiative and UF Health's focus on advancing trustworthy AI and machine learning in the clinical realm.

Principal investigators for the UF multidisciplinary team:

- Azra Bihorac, M.D., M.S., FCCM, FASN, professor and senior associate dean of Research, College of Medicine
- **Parisa Rashidi, Ph.D.,** ***associate professor, UF Research Foundation Professor & IC3 Co-Director*****, Herbert Wertheim College of Engineering**
- Yulia Levites Strekalova, Ph.D., MBA, assistant professor, College of Public Health and Health Professions department of health services research, management and policy

Members of the UF multidisciplinary team:

- Barbara Evans, J.D., Ph.D., Stephen C. O'Connell Chair and professor, Levin College of Law and professor, Herbert Wertheim College of Engineering
- Benjamin Shickel, Ph.D., assistant professor of nephrology, hypertension & renal transplantation, College of Medicine
- Tezcan Ozrazgat-Baslanti, Ph.D., research assistant professor, College of Medicine
- Elizabeth Shenkman, Ph.D., chair of the department of health outcomes and biomedical informatics, College of Medicine; co-director, the UF Clinical and Translational Science Institute; and associate director for community outreach and engagement, UF Health Cancer Center
- Yi Guo, Ph.D., associate professor of health outcomes & biomedical informatics, College of Medicine
- Serena Guo, M.D., Ph.D., assistant professor of pharmaceutical outcomes & policy, College of Pharmacy

Data acquisition sites of the CHoRUS program:

- University of Florida
- Massachusetts General Hospital at Harvard
- Beth Israel Deaconess Medical Center at Harvard (through Massachusetts Institute of Technology)
- Columbia University
- University of Pittsburgh Medical Center
- Duke University
- University of Virginia
- University of California, Los Angeles
- Emory University
- Nationwide Children's Hospital
- Mayo Clinic
- Seattle Children's Hospital
- University of New Mexico
- University of California, San Francisco

Additional partners in the CHoRUS program:

- Johns Hopkins Medical Center
- Tufts University Medical Center
- University of Oregon
- University of Texas Health Science Center, Houston

ARTIFICIAL INTELLIGENCE IN HEALTH CARE: MODELING A MORE INSIGHTFUL FUTURE

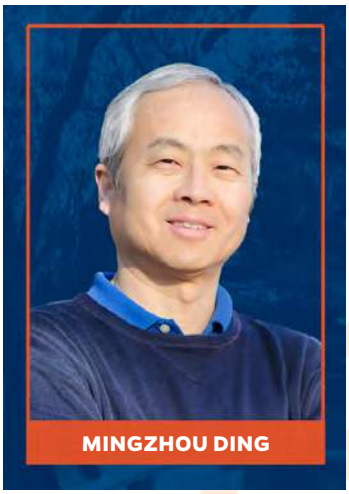
EXTREME FACIAL PAIN. AUTISM. ORTHOPEDIC TRAUMA FROM A CAR ACCIDENT. ALZHEIMER'S DISEASE. A PROLONGED STAY IN A CRITICAL CARE UNIT, WITH A SLOW, STEADY BATTLE TO RECOVER. THESE ARE SOME OF THE HEALTH CHALLENGES UF BIOMEDICAL ENGINEERS ARE WORKING TO COMBAT USING ARTIFICIAL INTELLIGENCE.

While significant advancements have been made in the research of these conditions, offering relief options such as multiple surgical procedures and medications for trigeminal neuralgia, there remains an ongoing quest for permanent pain relief. Current therapies for these conditions may still have room for improvement, and the search for curative treatments continues. Artificial intelligence now paves the way for deeper insights into these conditions and potential treatment breakthroughs. Innovative AI-driven data exploration methods are providing researchers with valuable insights, enabling the development of new screening techniques and treatment approaches. These advancements promise to become powerful tools in addressing complex medical challenges, including conditions like autism and Alzheimer's disease.

THIS ARTICLE DISCUSSES JUST SOME OF THE WAYS IN WHICH UF BIOMEDICAL ENGINEERS ARE USING AI IN THEIR RESEARCH.

TEXT WRITTEN BY Laura Mize

Mingzhou Ding, Ph.D., Distinguished Professor and J. Crayton Pruitt Family Professor in the UF College of Engineering's Department of Biomedical Engineering, relies on AI in his three-part investigation to determine where in the brain the debilitating condition of trigeminal neuralgia originates.

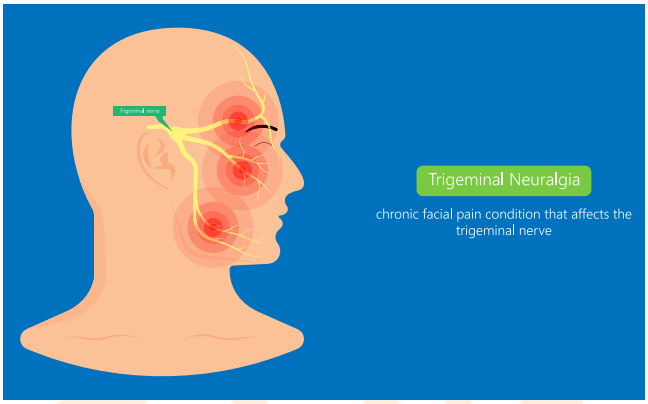

MINGZHOU DING

This rare condition causes attacks of searing facial nerve pain that can last up to two minutes and may repeat almost continuously. The slightest touch to the face — even the pressure of a breeze — can trigger an incapacitating attack. Other times, a bout of pain comes with no identifiable trigger.

Trigeminal neuralgia "is really the most severe form of pain," Ding explained.

It results from injury to or pressure on the trigeminal nerve, one of the 12 cranial nerves. This complex nerve carries signals from the mouth, sinuses and face to the brain, and aids in chewing and swallowing. Because of the nerve's extensive structure, pinpointing the pain's cause and point of origin can be tricky. Patient response to treatment varies widely.

Past research has identified numerous regions thought to be involved, but with a lack of consistency in results. Ding and his



collaborators have now captured MRI images of people in the midst of a trigeminal neuralgia episode — a first for this condition — as well as people with the condition not actively in pain. The researchers used correlational analysis plus two artificial intelligence methods — a convolutional neural network and a graph neural network — to more thoroughly examine the MRI images for patterns, then find conclusions reached by all three methods.

Using this combination, "we are able to get additional insights into this pain condition that we cannot get with other methods," Ding explained, adding that the ultimate goal is to identify a therapeutic target.

The three-pronged approach highlighted 23 regions and paves the way for further research into the etiology of trigeminal neuralgia and how to best treat it.

Ding is involved in numerous other projects that rely on AI, including one with **Ruogu Fang, Ph.D.**, an associate professor and a Pruitt Family Endowed Faculty Term Fellow, that focuses on understanding how the brain recognizes emotional context in what we see.

To do so, they use an AI construct called a deep neural network, — essentially an AI model of a part or the whole of the human brain.

Ding and Fang have discovered that a deep neural network, modeled after the human visual cortex and trained to recognize images, can also assign appropriate emotional context to the images. This discovery about the neural network prompts the question of whether the human visual cortex possesses a similar ability. In other words, it raises the question of whether the human visual cortex can also assign appropriate emotional context to images without any specific training in emotion or any connection to a network trained in emotion, much like the neural network in the study.

"This is kind of unorthodox in the sense that people think the visual part of your brain is just going to process all the features [of what you see]: Here's a bar; here's some curtains," he said while gesturing toward a window dressed with curtains. "You shouldn't have these high-level semantic concepts."

The network's ability to assign emotional context "seems to suggest that contrary to what we believe, we really don't need some of these higher level [sections of the brain] to feed stuff back to the visual areas to let it know, 'Ah, this is a pleasant image; this is unpleasant.' So this is what this deep network has offered us."

Findings like this, if verified as true of the human brain, could prompt neuroscientists to ask new questions and pursue recently developed directions of research into this mysterious organ.

PREDICTING ALZHEIMER'S DISEASE AND PREVENTING DEMENTIA

Fang focuses much of her work on neurodegenerative diseases, including leveraging AI to develop a screening for Alzheimer's and Parkinson's diseases and interventions to prevent dementia.

This method focuses on subtle changes in the vasculature of the retina that may indicate disease.

Research that Fang and collaborators published in 2021 "found that bifurcations of the vessels will change and also their thickness, their randomness, the spread of the microvasculature will all change with the neurodegenerative diseases."

Other research in this area compares a person's retinal vasculature characteristics to group-level data to provide a generalized prediction of the likelihood of developing Alzheimer's disease.

But such screenings lack detail on the probability of illness development, Fang said. AI methods can analyze more variables than this group research traditionally has, providing a deeper understanding of an individual patient's brain health.

> **"We can predict, based on the holistic observation of all the different morphology changes or vasculature representation from the fundus [back of the eye] image, whether this person already has Alzheimer's disease, or will have Alzheimer's disease in a few years."**

RUOGU FANG

Fang is involved in numerous other projects featuring AI.

She is co-principal investigator for a study funded by $1.2 million from the National Science Foundation, which will work to evaluate the "trustworthiness" of machine learning models in health care applications, to improve human understanding of why such models reach the conclusions they do and to provide ways for scientists to "verify the model's performance and explanations with proofs," according to the NSF award abstract. The research team will do this work within the context of a developing AI-powered method for early detection of neurodegenerative disease.

One requires creating a model of the brain anatomy of individual patients who are candidates for transcranial direct current stimulation (tDCS). tDCS is an intervention for cognitive decline used for people both with and without neurocognitive disease. It involves transmitting a mild electrical shock into the patient's brain, and is usually paired with cognitive training

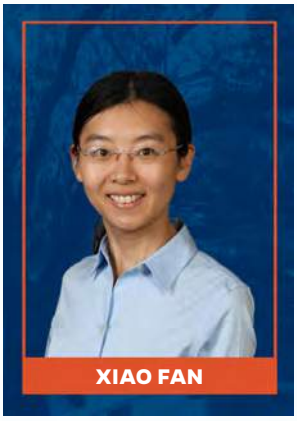
Fang and her collaborators are "trying to build a precision intervention and dosing method, so that we can adjust the intervention by changing how much electrical current we are injecting into the brain and where we inject the electrical current," she said.

With a personalized model of a patient's brain, "we can adjust those parameters to make the treatment actually individualized and effective for each individual based on their brain structure."

The model should also allow clinicians to evaluate whether tDCS is likely to have any significant benefit for the patient.

Fang also is a principal investigator for a related study leveraging AI to analyze "cognitive training response in amnestic mild cognitive impairment," with a focus on tDCS. The National Institute on Aging has funded this study with a $2.9 million grant.

HUNTING GENETIC VARIANTS


XIAO FAN

Xiao Fan, Ph.D., an assistant professor, uses AI to advance neuroscience, by analyzing genomic data to locate and "interpret genetic variants" that may cause or contribute to neurodevelopmental diseases, such as autism.

Fan and her collaborators employ an AI model called a Transformer to analyze patterns of nucleotides in the Human Genome Reference Sequence. Through such analysis, the model learns to specify which nucleotide is most likely to appear in a given spot on the genome.

Next, the researchers use another AI method to analyze a patient's genome, comparing it against the data from the Transformer. The goal is to identify whether any nucleotides seem out of place.

"We know this is the most unlikely nucleotide we're going to see at this position," Fan said, providing an example, "and this is the least possible nucleotide we're going to see in this position. And if this individual has a nucleotide that has the least probability, and it's so different from the highest probability, then we say this might be a disease-causing variation."

Currently in their analysis, the researchers are striving to learn whether the variant might change the given gene's function. More research is needed to understand how the function changes and what health implications may exist.

Fan also collaborates on similar work involving variants that may play a role in certain cardiovascular diseases, in congenital heart disease and in other conditions. One day, identification of genetic variants that are causal to certain diseases may allow for the creation of genetic therapies.

MODELING A RETURN TO HEALTH


JENNIFER NICHOLS

What if a doctor could accurately predict which treatment would allow a patient to regain the most daily functions after a serious injury? Or enable a person suffering from osteoarthritis to return to a beloved activity?

That's what **Jennifer Nichols, Ph.D.**, an assistant professor and a Pruitt Family Term Fellow, aims for in developing personalized mechanistic models.

"If you have a traumatic accident and you injured your ankle — if the doctor says, 'You should return to 60% of function,' — well, what's 60% of function?" Nichols asked. "Could [you] get to 80% of function or 100% of function" with different treatments?

Personalized models are based not only on the physics of human movement, but also require "understanding what individual characteristics are important if I want to predict movement," Nichols explained.

This requires extensive data derived from the movements of a large, diverse sample of people during motion capture sessions. Nichols' Musculoskeletal Biomechanics Laboratory conducts such sessions, with the goal of creating a dataset sizable and varied enough that an AI program can recognize how personal characteristics such as sex, age, activity level, and other health characteristics affect movement.

> **"A 20-YEAR-OLD COLLEGE ATHLETE IS GOING TO FUNCTION VERY DIFFERENTLY THAN AN 80-YEAR-OLD ADULT WITH A CADRE OF ILLNESSES," NICHOLS NOTED. "SO, IN TERMS OF MAKING A PERSONALIZED MODEL, YOU HAVE TO ASK THE QUESTIONS: HOW DO I MODEL THAT DIFFERENCE IN AGE? HOW DO I MODEL DIFFERENCE OF BIOLOGICAL SEX?"**
>
> - Jennifer Nichols

This requires understanding why an AI model makes its specific predictions. A model that employs the AI principle of explainability provides researchers with a summary describing which of the hundreds of input parameters it considers most important in reaching its conclusions.

"When you apply that to the biological system," Nichols said, "you can start to say, 'Oh, this part of the brain or these particular muscles or this combination of things is why person A moved this way and person B didn't.'"

BUILDING MORE INFORMED CRITICAL CARE

Parisa Rashidi, Ph.D., co-director of UF's Intelligent Critical Care Center and an associate professor, uses AI to analyze a host of data recorded in critical care and peri- and post-operative settings. Information captured in these situations includes environmental data, such as measures of air quality, light levels, and sound pressure; and patient data including not only vital signs, but also muscle movement, sleep quality, facial expressions, and more. Another data point captured is the number of people in the room.

AI analyzes the de-identified patient information to look for patterns of facial movement that may indicate the person is in pain, whole-body movement patterns that may indicate the person is moving abnormally to "guard" an injured or ill part of the body, and activity levels and sleep quality that could signal circadian rhythm disruption and development of delirium.

PARISA RASHIDI

For now, the models Rashidi is developing are only collecting information.

"We are still continuing to collect more and more data to see how best we can identify, for example, delirium subtypes or other mobility patterns in the patients."

The researchers will eventually test the models for other uses, such as providing data on individual patients to clinicians, identifying patterns for the clinicians and suggesting possible courses of action.

In addition to the goals of helping individual patients and clinicians, this work has societal implications.

Rashidi is one of the principal investigators for CHoRUS, a project funded by $23.5 million from the National Institutes of Health. CHoRUS unites scientists from 18 institutions to build a 100,000-patient dataset that is representative of the U.S. population.

CHoRUS is one of four projects under the NIH Bridge to Artificial Intelligence program. The Bridge program "will propel biomedical research forward by setting the stage for widespread adoption of artificial intelligence that tackles complex biomedical challenges beyond human intuition," its website reads.

> **"A KEY STEP IN THIS PROCESS IS GENERATING NEW 'FLAGSHIP' DATA SETS AND BEST PRACTICES FOR AI AND MACHINE LEARNING IN MEDICINE."**
>
> - Parisa Rashidi

Creating a truly representative dataset will guard against biases inherent in more homogenous samples.

AI NEWS

NEW BME FACULTY

Kuang Gong, Ph.D.
Assistant Professor

Research Interests:
Deep learning, medical imaging, and data science

Please read more about Dr. Gong's research on page 14.

NEW AI SCHOLARSHIP

Akshay Ashok

Grace Cheng

Akshay Ashok and Grace Cheng were selected to the UF Center for UG Research AI Scholars Program.

This scholarship was established to introduce outstanding full-time UG students to the exciting world of academic research. In this program, students work one-on-one with UF faculty on selected research projects. Both are mentored by Dr. Ruogu Fang.

NEW UF FACILITY

Malachowsky Hall for Data Science & Information Technology

A 263,000-square-foot academic building located in the heart of UF's main campus that will connect students and researchers from across disciplines and create a hub for advances in computing, communication and cyber-technologies with the potential for profound societal impact.

- **Located in the heart of campus and co-located with medicine, pharmacy and bioinformatics to create multidisciplinary solutions to the world's greatest challenges**
- **State-of-the-art artificial intelligence, machine learning and innovation**
- **New maker spaces for virtual reality, internet of things and robotics**
- **3 BME primary faculty will have laboratories in this new building**

CONTROLLING AI

Merging the powerful, ever-evolving technology of AI into medical research and health care brings a host of ethical and safety concerns.

WILL AI ALWAYS MAKE DECISIONS IN THE BEST INTERESTS OF THE PATIENTS?

WILL AI MAKE POOR DECISIONS BECAUSE OF OVERSIGHTS IN THE DESIGN OR TRAINING OF THE MODEL?

WILL DOCTORS MAINTAIN ENOUGH SAY IN DECISION MAKING?

WILL PATIENT INFORMATION REMAIN PRIVATE?

One strategy for maintaining safe, ethical operation of AI is the use of a "locked model," noted Nichols.

Such a model receives only select data that is carefully defined by engineers and is not updated frequently, if at all. This is a popular approach to use of AI in orthopedics, she said.

"We've input all of this data so that we can make good predictions," Nichols said. "And we're not going to kind of continuously update it, because we know that needs oversight."

For Rashidi, redundant assessment and testing of the model, coupled with a protracted rollout, provide a prolonged period of oversight to see whether the model operates as intended.

Implementation of the AI model she is developing for critical care settings will not occur

"unless we have gone through many, many phases of test and evaluation, or offline development and testing, usually doing external validation against data from other institutions" to guard against bias, Rashidi said.

The next step would be "silent prospective validation," of the model, in which the scientists will "observe its behavior.

"And after all of that," she emphasized, "if we are happy with the model results, then we usually go ahead with small-scale deployment, and even that will be with many considerations in place."

It's also key, Rashidi said, to remember that even an AI model could be wrong.

You also want to make sure that the care providers understand that the results might not be 100% accurate in all of these cases. Also, as would be the case with a physician colleague, They might not always provide the right recommendation.

After all, despite the extensive advantages AI can provide for health care workers, researchers and patients, *there is no substitute for people.*

"As leaders in the field, it's our responsibility to be intentional about broadening inclusive excellence. - Christine Schmidt

2023 BMES DIVERSITY LECTURE AWARD

The University of Florida's J. Crayton Pruitt Family Department of Biomedical Engineering was honored with the 2023 BMES Diversity Lecture Award by the Biomedical Engineering Society. This award recognizes exceptional efforts in advancing gender and racial diversity in biomedical engineering, encompassing research, education, and services. The department, nominated by emeritus Dean Cammy Abernathy, has excelled in recruiting and supporting women and historically marginalized students. Dr. Christine Schmidt will accept the award on behalf of the department. This achievement stems from inclusive initiatives, faculty-student interactions, partnerships, and outreach, driven by strategies such as comprehensive faculty recruitment, training, an inclusive environment, mentoring, and effective communication.

A 6-step Roadmap to Diversify Faculty Hiring

Researchers at the University of Florida have teamed up with 16 leading engineering programs to develop a roadmap for diversifying faculty recruitment. In a recent paper published in Nature Biomedical Engineering, the authors advocate for a comprehensive transformation of engineering hiring processes, acknowledging the persistent need for greater diversity in academia.

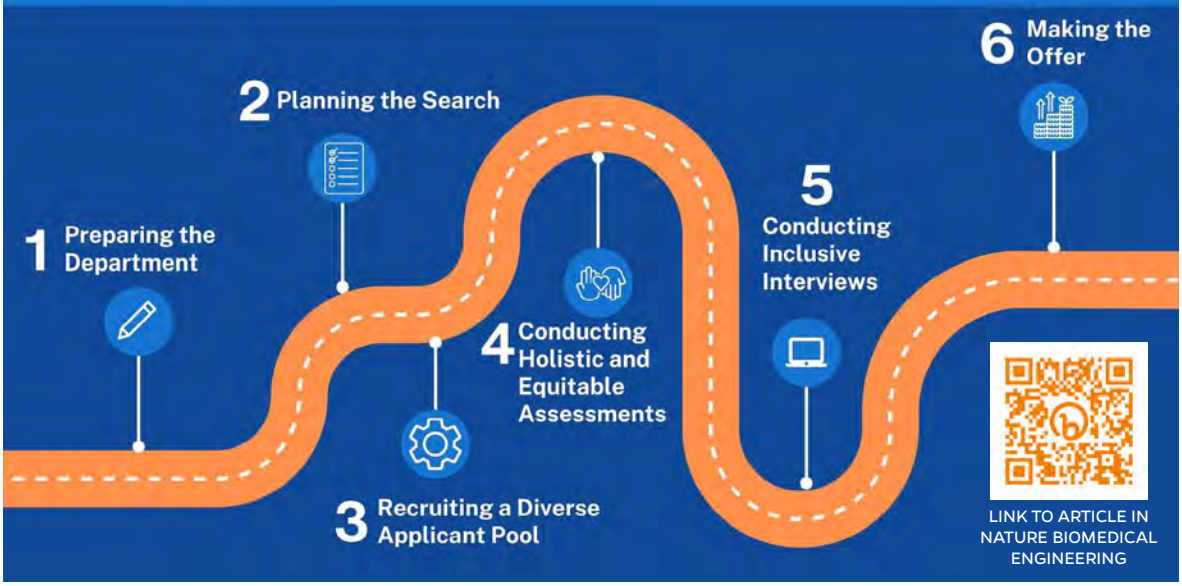
The core challenge highlighted in their paper is the lack of knowledge and skills within academic departments to effectively recruit faculty members from historically marginalized groups. To address this, the research team has meticulously outlined six key steps for enhancing diversity in faculty recruitment. These steps are based on evidence-based best practices and insights from their institutional experiences. The overarching goal is to actively attract a more diverse pool of applicants and increase the representation of individuals from historically excluded groups with PhDs in faculty positions.

One significant facet of the challenge is the underrepresentation of PhD recipients from historically marginalized backgrounds. According to the paper, only 4.4% of all PhDs are awarded to individuals from such groups. However, the researchers argue that even if this percentage were to grow exponentially, a substantial "conversion problem" would persist in facilitating the transition of these individuals into faculty roles, hindering the diversification of academia.

Throughout their paper, the researchers emphasize the importance of establishing consistent evaluation rubrics with comprehensive criteria for assessing candidates. They support this argument by citing studies that reveal how the absence of stringent standards leads to less diverse hiring practices and perpetuates "sliding bias." Implementing evaluation rubrics levels the playing field for candidates from historically excluded groups.

This collaborative initiative stems from a collective known as BME UNITE, a national network of biomedical engineers that formed in 2020 with the goals of self-education, enhancing representation, and combating racism within STEM disciplines. The group has formed various sub-committees, each contributing to scientific journals with publications focused on critical issues of bias and the lack of representation within academia.

THE RESEARCHERS RECOMMEND THE FOLLOWING 6-STEP ROADMAP



UNIVERSITY OF FLORIDA RESEARCHERS:

Dr. Gregory A. Hudalla, Associate Professor, Integra LifeSciences Term Professor & Graduate Coordinator, Department of Biomedical Engineering

Dr. Ana Maria Porras, Assistant Professor, Department of Biomedical Engineering

Dr. Erika Moore, Rhines Rising Star Assistant Professor, Department of Materials Science and Engineering
(Currently at Fischell Department of Bioengineering at the University of Maryland)

A DECADE OF TRANSFORMATION

INSPIRING OTHERS

Dr. Christine Schmidt,
Distinguished Professor & J. Crayton Pruitt Family Endowed Chair

As Dr. Schmidt transitions from her role as chair, let's celebrate her remarkable achievements.

Dr. Christine Schmidt joined the J. Crayton Pruitt Department of Biomedical Engineering in 2013, bringing with her skills as a leader in establishing the biomedical engineering department at the University of Texas at Austin and an illustrious reputation as a leading authority in biomaterials science and tissue engineering.

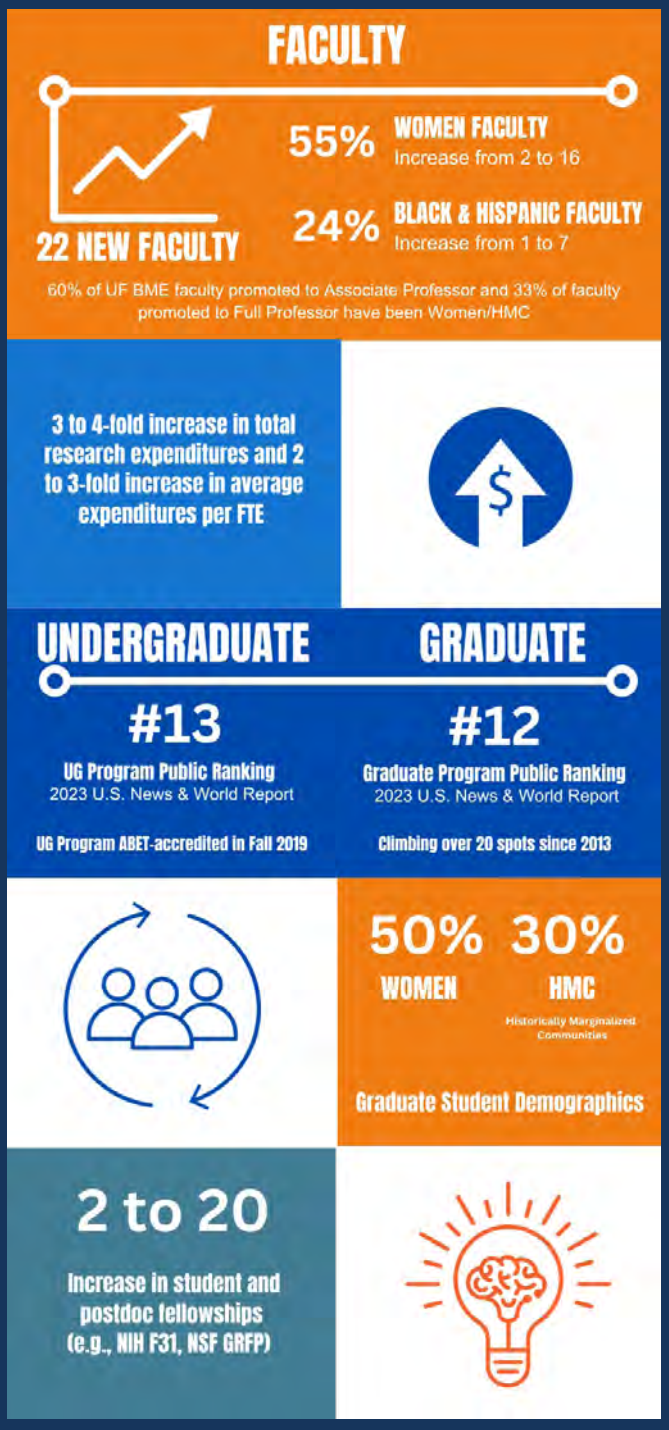
Widely recognized as a luminary and inventor in the realm of tissue engineering, her innovative work has earned her numerous accolades and is also the basis of technologies that have been used to help many thousands of patients. Her accomplishments include her induction into the esteemed Florida Inventors Hall of Fame, as well as fellowships in the International Academy of Medical and Biological Engineering, the National Academy of Inventors, and the American Society for the Advancement of Science. She has received some of the field's highest recognitions, including AIMBE's Pierre Galletti Award and the Society for Biomaterial's Clemson Award.

Under Dr. Schmidt's stewardship, UF BME has ascended to a position of prominence within the biomedical engineering landscape. During her tenure as department chair, significant milestones have been achieved, including the establishment of an ABET-accredited bachelor's degree program. Additionally, UF BME's graduate program has risen an impressive 21 places among public institutions and 29 places overall in the past decade, currently ranking as the #12 public graduate program in the nation. The department has also undergone substantial growth, doubling its faculty and staff sizes while embracing diversity.

Dr. Schmidt's transformative leadership is further evident in the successful implementation of initiatives such as the Distinguished Leadership Seminar Series and the creation of the Industry Partners Program, which boasts ten engaged members and has garnered over $250,000 in philanthropic support. Notably, she introduced the tradition of "BME alumni pinning" for all graduates, secured endowments for a named professorship (Integra LifeSciences), established three endowed faculty fellowships for assistant professors, and secured a bequest to endow the William Harper Graduate Scholarship. Furthermore, her strategic approach has strengthened the department's marketing and communication efforts, exemplified by a strong social media presence and the annual CrossLink magazine publication.

Most importantly, Dr. Schmidt focused on community and creating an environment of inclusivity. This was achieved through intentional and consistent messaging, coaching, and the implementation of many programs and events to strengthen community and to build awareness of commonalities and differences.

MAJOR ACCOMPLISHMENTS AS CHAIR



NEW FACULTY
Welcoming new team members

Markia Bowe, Ph.D.
Instructional Assistant Professor

With a dedication to higher education, Dr.Bowe completed her Ph.D. in Biomedical Engineering at the University of Florida in 2023. Guided by Dr. Kyle Allen, her research exemplifies her commitment to advancing the field. Her educational journey began at Kettering University, where she earned a Bachelor of Science in Mechanical Engineering with a specialization in Biological Engineering in 2017. Her research focuses on understanding the relationship between subchondral bone remodeling, gait changes, and pain in osteoarthritis.

During her undergraduate years, Dr. Bowe actively contributed to the educational ecosystem by tutoring fellow students through the National Society of Black Engineers and the Black Unity Congress. Her enthusiasm for teaching grew as a graduate student, where she served as a teaching assistant for two undergraduate courses and delivered guest lectures for the Biomedical Engineering department. Recognizing the significance of merging education with outreach, she co-founded the Bahamian Collegiate Advancement Society, dedicated to increasing international student representation in universities through pre-college programs. Additionally, Dr. Bowe served as a mechanical engineering stream instructor for the Bahamas Engineering Technology Advancement group, promoting STEM education among high school students.

Dr. Bowe's commitment to diversity, equity, and inclusion is evident in her leadership roles. She played a pivotal role in the University of Florida's BME Inclusion, Diversity, Equity, and Access committee, spearheading initiatives to cultivate an inclusive environment within the department. Her advocacy includes planning events that celebrate diversity, fostering open communication between students and faculty, and collaborating with various organizations on impactful STEM outreach efforts.

Chris Geiger, Ph.D.
Instructional Associate Professor

Dr. Geiger earned his Ph.D. in Biomedical Engineering from Northwestern University in 2003, studying under the guidance of Dr. Matt Glucksberg and Dr. Chris Waters. His doctoral research demonstrated his early dedication to advancing our understanding of critical biomedical phenomena. His academic journey also includes a Master of Science in Biomedical Engineering and a Bachelor of Science in Chemical Engineering, both from Northwestern University.

As one of the founding faculty members of the Bioengineering program at Florida Gulf Coast University (FGCU), Dr. Geiger has played an instrumental role in its growth and development. Having witnessed the success of the UF BME program under the leadership of Bruce Wheeler and Christine Schmidt, Dr. Geiger recognizes the potential and caliber of the department's undergraduate curriculum. He views his appointment as a natural progression of his career, aligning perfectly with his skills and passions.

Dr. Geiger's extensive experience as a faculty member at FGCU includes the development of the initial Bioengineering curriculum and the teaching of various engineering courses. Over the past 15+ years, he has nurtured a diverse range of students, bringing expertise in areas such as engineering design, cellular and tissue engineering, and engineering fundamentals.

In his new capacity, Dr. Geiger will spearhead the Senior Design Program, a pivotal initiative that empowers students to devise solutions to real-world challenges. This role will equip them with a robust foundation in intellectual property, engineering economics, federal regulations, reimbursement principles, and business planning, positioning them for success in a dynamic engineering landscape.

Kuang Gong, Ph.D.
Assistant Professor

Prior to joining UF BME, Dr. Gong served as an Assistant Professor in the Department of Radiology at Massachusetts General Hospital, Harvard Medical School, where he conducted research in the field of medical imaging. He obtained his M.S. degree in Statistics and Ph.D. degree in Biomedical Engineering from the prestigious University of California at Davis. Furthermore, he pursued postdoctoral training in the Department of Radiology at Massachusetts General Hospital and Harvard Medical School, solidifying his expertise in the intersection of medicine and engineering.

Dr. Gong's research interests are centered around the convergence of deep learning, medical imaging, and data science to enhance the diagnosis and treatment monitoring of various diseases, particularly Alzheimer's disease (AD) and cancer. His work involves developing novel methodologies in medical physics-informed deep learning, leveraging prior information-guided network design, and applying clinical task-driven network training for more accurate and precise results.

During his academic career, Dr. Gong has an impressive track record of scholarly accomplishments, with 32 published journal papers and multiple research grants from the National Institutes of Health (NIH). He was also recognized with the prestigious Bruce H. Hasegawa Young Investigator Medical Imaging Science Award from the IEEE Nuclear and Plasma Sciences Society in 2021. This award acknowledges his outstanding contributions to machine learning-based PET image reconstruction, denoising, and attenuation correction, which have significant implications for the field of medical imaging.

FACULTY AWARDS

Celebrating our success

Kyle Allen

UF Doctoral Teaching Award, 2022-2023

Wesley Bolch

Herbert Wertheim College of Engineering Teach Scholar of The Year, 2022-2023

Ruogu Fang

President, Women in Medical Image Computing & Computer Assisted Intervention Society, 2023 - 2025

Dan Ferris

Fellow from the American Society of Biomechanics (ASB)2023

Greg Hudalla

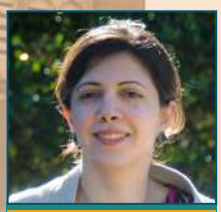
Appointed Integra LifeScienes Term Professor

Kevin Otto

UF Doctoral Teaching Award, 2022-2023

Ivana Parker

UF Outstanding Young Alumni '40 under 40', 2023



Parisa Rashidi

AIMBE Fellow & UF Research Foundation Professorship, 2023-2026

Carlos Rinaldi-Ramos

AAAS American Association for the Advancement of Science Fellow, 2023

Christine Schmidt

American Institute for Medical and Biological Engineering Pierre Galletti Award, 2023

A Snapshot of New Awards

Kyle Allen, NIH NIAMS UC2 Award, "Innervation of the Knee and TMJ" for $10M

Benjamin Keselowsky & **Greg Hudalla**, NIH IAID R01 Award, "Tissue-Anchored vs. Circulating Engineered Enzyme Constructs for Immunometabolic Resolution of Psoriasis" for $3.8M

Kevin Otto, NIH NINDS U01 Award, "Engineering the Neuronal Response to Electrical Microstimulation" for $4.4M

Blanka Sharma, NIH NIAMS R01 Award, "ROS Scavenging Nanoparticles for Mitigating Oxidative Stress in Osteoarthritis" for $2M

Parisa Rashidi, NIH Bridge2AI UC2 Award, "Patient-Focused Collaborative Hospital Repository Uniting Standards (CHoRUS) for Equitable AI" for 23.2M

Lakiesha Williams, NIH NINDS R01 Award, "In Vitro and In Vivo Assessments of Xenogeneic Cranial Dura Mater and Naturally Derived Commercial Dural Grafts" for $1.7M

Promotions & Appointments

Kyle Allen
Promoted to Professor

Aysegul Gunduz
Promoted to Professor

Lakiesha Williams
Promoted to Professor

Sarah Furtney
Promoted to Instructional Associate Professor

Christine Schmidt
Promoted to Distinguished Professor

Greg Hudalla
HWCOE Strategic Advisor for Biomedical Research Translation & BME Graduate Coordinator

Cherie Stabler
Appointed Chair

2023-2026 Fellowships

Ruogu Fang
Pruitt Family Endowed Faculty Fellowship

Sarah Furtney
Pruitt Family Endowed Faculty Fellowship

Jennifer Nichols
Pruitt Family Endowed Faculty Fellowship

Dr. Ivana Parker receives support through the UF Clinical and Translational Science Institute's (CTSI) KL2 Multidisciplinary Scholars Program. Ivana's project seeks to develop an ex-vivo model using vaginal fluid that can be interrogated using multi-level proteomics to determine mechanisms of BV-mediated HIV transmission.

Dr. Brittany Taylor was awarded an Alliance for Regenerative Rehabilitation Research and Training (AR3T) pilot grant. The overall goal of her project titled "Mechano-Engineered Extracellular Vesicles for Targeted Tendon Repair" is to provide clinically relevant insights on the enhanced therapeutic potential of extracellular vesicles (EVs) to improve the quality and function of repaired tendons.

2023 BMES Track Chairs

Ana Porras
Technologies for Emerging Infectious Diseases

Brittany Taylor
Orthopaedic and Rehabilitation Engineering

Lakiesha Williams
Neural Engineering

STUDENT SPOTLIGHT
Next Generation of Leaders

SEOWUNG LEEM, PH.D. STUDENT, FANG LAB

Seowung is a graduate student venturing into the convergence of neuroscience and artificial intelligence which leads the forefront of cutting-edge exploration. Collaborating with Drs. Ruogu Fang, Mingzhou Ding, and Andreas Keil, they are forging a neural network-based computational model to delve into the intricate realm of human affective processing. By reproducing behavioral observations in Pavlovian Conditioning, their groundbreaking work not only advances our understanding of human emotion but also holds the potential to uncover novel insights into the workings of the human brain, paving the way for transformative discoveries in both fields.

AVA BURGESS, PH.D. STUDENT, GUNDUZ LAB

Ava is a graduate student and NSF GRFP fellow in the Brain Mapping Laboratory under Dr. Aysegul Gunduz, with research collaborations at the Norman Fixel Institute for Neurological Diseases. Her current neural engineering research focuses on using deep brain stimulation (DBS) to identify neurophysiological markers of movement intention and tremor in hopes of developing a closed-loop system for patients with essential tremors. Her research targets neural networks within the ventral intermediate nucleus of the thalamus to gather electrophysiological activity to regulate abnormal signals as delivering electrical stimulation discharges oscillatory muscle activity to mask tremor cells. Additionally, Ava seeks to integrate artificial intelligence into the DBS closed-loop system to improve the brain-computer interface of current device systems.

ARINOLA LAMPEJO, PH.D. CANDIDATE, MURFEE LAB

Arin's research focuses on discovering novel dynamics in vascular growth in the cancer microenvironment. By seeding rat mesenteric tissues with tumor spheroids we can measure their unique readouts related to blood and lymphatic vessels such as angiogenesis, lymphangiogenesis, immune cell presence, and pericyte coverage. Validating these metrics has allowed for the novel discovery of lymphatic/blood vessel plasticity in the tumor microenvironment including the formation of lymphatic/blood vessels connections and hybrid "mosaic" vessels that are part lymphatic and part blood vessel in nature. These novel results highlight the use of the rat mesentery culture model as an innovative method to study cell dynamics in the cancer microenvironment.

SASANK DESARAJU, MS STUDENT, BANKS LAB

Sasank is a graduate student and researcher in biomedical engineering who actively applies AI techniques to a wide range of projects with biomedical applications. In Dr. Scott Banks' laboratory, he focuses on leveraging visual AI algorithms to enhance orthopedic biomechanics, specifically by accurately identifying bone movements from X-ray images. Furthermore, Sasank collaborates with various departments within the College of Medicine, employing AI methods to enhance surgical safety and radiology practices. Notably, he regularly utilizes the HiPerGator supercomputer system for his computational needs.

KIARA XHINDI, UG STUDENT, NINO LAB

Kiara is a senior biomedical engineering student with a passion for advancing our understanding of the human brain. Her research centers on graph theory-based parcellation, where she investigates how diverse algorithms can dissect brain networks into distinct regions. Unraveling these community assignments holds the key to uncovering the intricacies of neurodegeneration. Beyond her academic pursuits, Kiara serves as a Learning Assistant for the Computer Applications for BME class, enhancing her peers' learning experiences. She has also embarked on internships with notable companies such as Medtronic, Exactech, and Tesla, where she has had the opportunity to explore various engineering skills.

JEREMY EARLE, UG STUDENT, RINALDI-RAMOS LAB

Jeremy is a senior biomedical engineering major where he is currently researching a topic that focuses on synthesizing microporous hydrogel biomaterials to allow for better cellular integration for regenerating peripheral nervous tissue. He is utilizing polymer chemistry synthesis methods, UV light chemistry, and cell culture test methods to help advance the research project. Additionally, Jeremy will be joining BlueRock Therapeutics for a co-op in the spring semester to help advance their stem cell therapy for Parkinson's disease, which is currently in clinical trials.

STUDENT NEWS: Celebrating Student Achievements

JESSICA ALDRICH
SHARMA LAB
Awarded NIH F31 NRSA Fellowship

Jessica interviewed our new Chair, Dr. Stabler, read more on page 22!

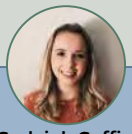
TAYLOR LANSBERRY, PH.D.
STABLER LAB
Awarded NIH T32 Fellowship

CHLOE BARATTA
NICHOLS LAB
Awarded NIH F31 NRSA Fellowship

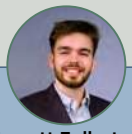
BME students and alums earn NSF Graduate Research Fellowships

Harrison Broadaway
Ph.D. Student
Taylor Lab

Ava Burgess
Ph.D. Student
Gunduz Lab

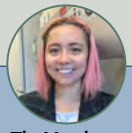


Carleigh Coffin
Ph.D. Student
Lewis Lab

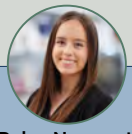


Garrett Fullerton
B.S., UF BME, 2022
Fang Lab

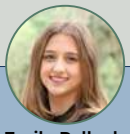
Anne Gormaley
B.S., UF BME, 2019
Otto Lab



Tia Monjure
Ph.D. Student
Porras Lab



Rylee Newport
Ph.D. Student
Sharma Lab



Emily Pallack
B.S., UF BME, 2022
Schmidt Lab

Clinton Smith
Ph.D. Student
Lewis Lab

Natalie Thurlow
B.S., UF BME, 2022
Allen Lab

Clock drawing test emerges as effective tool for dementia diagnosis, reveals new study

A recent study published in the renowned journal **Nature Scientific Reports**, titled *Explainable semi-supervised deep learning shows that dementia is associated with small, avocado-shaped clocks with irregularly placed hands*, has shed light on the potential of the clock drawing test (CDT) as a reliable and affordable tool for diagnosing dementia. The groundbreaking research, led by **Ph.D. candidate Sabyasachi Bandyopadhyay** from the intelligent Health Lab (i-Heal), uses a deep learning model called the relevance factor variational autoencoder (RF-VAE), to analyze digitized clock drawings to identify unique features associated with dementia.

The clock drawing test has long been utilized as a cost-effective screening method for cognitive impairments, including dementia. However, Bandyopadhyay's study delves deeper into this test by employing advanced deep generative neural networks. The findings of the study highlight the significance of specific constructional features in clock drawings that had not been extensively studied in prior research. This pioneering study represents a significant advancement in the field of dementia diagnosis.

New Study Reveals Potential Breakthrough in Using Cell Messengers to Direct Immune Cell Behavior

Matthew Becker, Ph.D., recently published a first author paper in **Science Advances**, titled *Immune Engineered Extracellular Vesicles to Modulate T Cell Activation in the Context of Type 1 Diabetes*, that showcased the potential of extracellular vesicles (EVs) – small bubbles released by cells – in revolutionizing treatments for autoimmune diseases. The research was conducted under the guidance of Dr. Edward Phelps, assistant professor, along with collaborators in the lab of Dr. Todd Brusko in the UF Diabetes Institute. EVs are crucial messengers between cells and are capable of interacting with the immune system in a precise manner. The team conducted experiments examining the effects of engineered EVs on T cells, and successfully reduced T cells' propensity to attack healthy cells through modifications to the EVs. By harnessing the capabilities of EVs and leveraging their impact on immune responses, scientists are gradually advancing toward effective management and potential cures for autoimmune diseases.

Dream Team Engineering

Dream a Better Today, Design a Better Tomorrow

In the heart of Gainesville, a visionary student organization named Dream Team Engineering is shaping the future of healthcare through innovation and collaboration. Comprising both engineering and non-engineering students, this group shares a common goal: to make a lasting impact on patient well-being.

Dream Team Engineering's mission is to create groundbreaking technologies that enhance the lives of patients at UF Health Shands and the broader Gainesville community. Going beyond traditional engineering roles, the team blends creativity and technical expertise to develop solutions that transform the healthcare experience.

Collaboration is at the core of Dream Team Engineering's approach. By working closely with medical professionals, including physicians, nurses, and child-life specialists, the organization ensures that its projects directly address the needs of patients and healthcare providers. The UF BME leadership team driving Dream Team Engineering includes Ashni Zaverchand, Rohan Joshi, Claudia Klejc, Luke Thompson, and Lance Pancoast—exceptional students committed to guiding the organization toward further success.

GATOR ENGINEERS
Where are they now?

ANNE-MARIE KRUEGER, MBA
Quality Engineering Manager, Edwards Lifesciences
BS BME - Biomechanics, 2017

Which lab were you a part of here? Instead of joining a lab at UF, I had the opportunity to work for the University Athletic Association as a Mathematics Tutor for three years, primarily teaching Algebra and Pre-Calc to various UF athletes.

What motivated you to choose BME as your field of study? I discovered my true passion for medicine during my time at UF. As a naturally active person who enjoys sports like football, golf, basketball, and hiking, I was fascinated by the connection between the science and math around the human body. That's why I chose to specialize in biomechanics, which allowed me to explore this connection in depth.

How did your education and training as an engineer prepare you to succeed in your new role(s)? The technical training from the BME program was outstanding, but the collaborative work environment in college truly prepared me for working on cross-functional teams in the workplace. I learned valuable skills such as adapting to different communication styles, appreciating the unique strengths of each team member, and understanding the importance of accountability.

Professionally and academically, what are you most proud of? I am most proud of being selected as a Technical Development Program (TDP) Engineer for Edwards Lifesciences. This program is a leadership rotational program providing exposure to four functions in various business units over 18 months. Out of thousands of applicants, I was one of six individuals selected to participate in the TDP Class of 2017. The education and experiences I gained at the UF were instrumental in preparing me for this opportunity and setting me up for success in my career.

Any advice for current students? Stay connected and engaged with your passions, whether they are related to academia or personal hobbies! This drive will inspire you to become the best version of yourself in this world.

MADISON TEMPLES, PH.D.
Senior Scientist, Cell Therapy, AstraZeneca
Ph.D., BME, 2021

Which lab were you a part of here? Dr. Blanka Sharma's lab

What motivated you to choose BME as your field of study? In high school, I was most interested in my Physics class, where we had mostly hands on projects, such as building cars out of mouse traps and CDs, which led me to engineering. Combining this with my interests in helping people and biology, brought me to Biomedical Engineering.

How did your education and training as an engineer prepare you to succeed in your new role(s)? I think the skills which helped me succeed in my current position are the ability to critically think and solve problems in new ways, thinking outside of the box, and being okay with but overcoming failure. Also, some soft skills which have helped me significantly are presentation skills and effective communication and collaboration.

Professionally and academically, what are you most proud of? I am most proud of the time I spend teaching, mentoring, and helping other along my professional/academic journey. I have had amazing mentors and colleagues who have helped me along my journey, so to be able to meaningfully mentor and teach others is very rewarding.

Any advice for current students? With about two years left in my Ph.D. program, I began looking at jobs I was interested in after graduation, and noticed I was missing a few of the desired skills. I changed my plan forward and incorporated these skills into my project, which propelled me to land my current position. Looking ahead to where you want to be next and doing this when you still have time to implement changes is critical for helping you gain the skills necessary for future positions.

Congratulations to alum, Michael Fenn!

Michael Fenn is currently Head of External Innovation at Dewpoint Therapeutics, where he leads search & evaluation of new technologies & assets, and as a member of the corporate development team focusing on partnerships, competitive intelligence and strategy. Michael is also part of the investment team at Iaso Ventures, helping source deals, leading diligence for making investment decisions, and stress testing new company concepts for innovative biotech startups. He is particularly passionate about bridging the gap between academic research and company creation, having worked extensively at this interface of business and science. Previously, Michael was Director of Healthcare & Life Sciences at Harvard Innovation Labs where he served as a pillar of Harvard's entrepreneurial ecosystem, overseeing startup incubation and advising Harvard-affiliated founders. He maintains a part-time appointment at Harvard as an ilab Innovation Fellow.

Michael was formerly an Assistant Professor of Biomedical Engineering at Florida Institute of Technology where his lab focused on the bio-nano interface with applications in drug delivery, biosensing, and regenerative medicine. He successfully oversaw the spinout of two companies from his lab, including a YC-backed, ML-driven diagnostic startup that was later acquired. Michael received his Ph.D. in Biomedical Engineering, M.S. in Materials Science & Engineering, and B.S. in Chemistry/Biochemistry, all from the University of Florida.

BME AT CAPITOL HILL

Rashidi Presents AI in Healthcare at AIMBE"S Congressional Briefing

Dr. Parisa Rashidi took the stage during AIMBE's Congressional Briefing Series on Capitol Hill, a forum designed to inform Congress members and staff about the role of federal science funding in shaping the landscape of medical engineering. This series aims to underscore the valuable contributions of AIMBE Fellows, spanning from innovative treatments to cost-effective healthcare solutions and disease diagnostics.

The most recent briefing concentrated on the potential of AI to reshape healthcare. In her presentation to congressional staff, Dr. Rashidi highlighted the capabilities of AI, focusing on its application in diagnostics, treatment personalization, and healthcare efficiency. She provided insights into her work and the achievements of the Intelligent Health Lab in harnessing AI's power.

Beyond her presentation, Dr. Rashidi and AIMBE representatives engaged in discussions with officials from the offices of Senator Rubio, Representative Neal Dunn, and Representative Frankel. These discussions aimed to cultivate awareness regarding AI's relevance in healthcare and to establish connections that contribute to well-informed policy making.

As a result of her diligent efforts, Dr. Rashidi secured a special session at the 2023 BMES Annual Meeting, dedicated to the theme of Artificial Intelligence in Biomedical Engineering Education. This acknowledgment underscores her expertise and influence in the field.

AI NEWS

STUDENT RESOURCES

The University of Florida is becoming the nation's first AI University with AI Across the Curriculum, providing every student, regardless of their major, an opportunity to learn about artificial intelligence. From the arts to engineering, courses have been created so students can learn how AI impacts their field of study.

AI Certificate
UF's artificial intelligence certificate program is where all undergraduate students, regardless of major, can learn how to apply artificial intelligence in their discipline. This university-wide certificate will prepare students to understand the fundamentals of artificial intelligence, its applications to real-world problems in various disciplines, and ethical and professional responsibilities of these technologies.

Discipline-Specific Certificates
- Artificial Intelligence and Data Analytics in Tourism, Hospitality and Event Management Certificate
- Geographic Artificial Intelligence and Big Data Certificate
- Public Health and Healthcare Certificate

AI Scholars
Undergraduate students who are interested in pursuing AI-related research with a UF faculty member are invited to apply for the AI Scholars Program through the Center for Undergraduate Research. The center manages the successful University Scholars Program that introduces UF undergraduates to partnerships with faculty in research endeavors across campus.

Majors and Graduate Programs
As part of the AI initiative, a commitment has been made to incorporate AI in all undergraduate majors and graduate programs.

AI Courses
UF offers AI courses to prepare students for a career in the 21st century. Here are a few in Engineering:

- Fundamentals of Machine Learning
- Interactive Modeling and Animation 1
- Biomedical Data Science

Career Readiness
Transforming the Workforce Through AI Access for All

UF is becoming the leader in AI Workforce by creating an educational environment where AI and data science are infused into all academic endeavors. This investment in AI will transform Florida's workforce and economy to resonate globally and continue the university's rise into America's top-tier public university.

READ MORE AT: AI.UFL.EDU

If you would like more information on how to give to BME or become an industry partner, please contact Jeff Clarke at **352-294-7947** or **jclarke@eng.ufl.edu**.

BME PRIMARY FACULTY

Kyle D. Allen
Professor
Ph.D., Rice University

Novel strategies to diagnose and treat degenerative joint diseases

Wesley E. Bolch
Distinguished Professor &
UF Term Professor
Ph.D., University of Florida

Dosimetry, computational medical physics and dose assessment

Markia Bowe
Instructional Assistant Professor
Ph.D., University of Florida

Biomechanics of bone, 3D imaging, inclusive design and engineering education research

Mingzhou Ding
Distinguished Professor &
J. Crayton Pruitt Family Professor
Ph.D., University of Maryland

Cognitive neuroscience, signal processing and neural imaging

Xiao Fan
Assistant Professor
Ph.D., University of Alberta

Computational approaches to study genetic architecture of rare diseases and interpretation of genetic variants

Ruogu Fang
Associate Professor &
J. Crayton Pruitt Family Term Fellow
Ph.D., Cornell University

Artificial intelligence, brain dynamics and medical image analysis

Meghan C. Ferrall-Fairbanks
Assistant Professor
Ph.D., Georgia Institute of Technology

Quantitative systems biology, mathematical modeling, cancer heterogeneity and evolutionary dynamics

Daniel Ferris
Robert W. Adenbaum Professor
Ph.D., University of California, Berkeley

Biomechanics, neuromechanical control, locomotion, mobile brain imaging, robotic exoskeletons and bionic prostheses

Sarah Furtney
Instructional Associate Professor &
Undergraduate Coordinator
Ph.D., Clemson University

BME cellular engineering laboratory and engineering education research

Chis Geiger (Starts Jan. 2024)
Instructional Associate Professor
Ph.D., Northwestern University

Senior Design and engineering education research

Kuang Gong
Assistant Professor
Ph.D., University of California, Davis

Deep learning, medical imaging, and data science

Aysegul Gunduz
Professor, Fixel Brain Mapping Professor
& UF Term Professor
Ph.D., University of Florida

Human brain mapping, neuromodulation and neural interfacing

Gregory A. Hudalla
Associate Professor,
Integra LifeSciences Term Professor &
Graduate Coordinator
Ph.D., University of Wisconsin

Molecular engineering for immunotherapies and immune modulation

Benjamin G. Keselowsky
Professor
Ph.D., Georgia Institute of Technology

Biomaterials and controlled release systems for vaccines, immunotherapies and implants

Jamal Lewis
Associate Professor
Ph.D., University of Florida

Biomaterials, drug delivery, and immunoengineering

May Mansy
Instructional Assistant Professor
Ph.D., University of Florida

Bio-signals & systems, bio instrumentation lab and engineering education

Peter S. McFetridge
Associate Professor
Ph.D., University of Bath

Naturally inspired biomaterials for biologically functional implants and organ regeneration

Walter Lee Murfee
Associate Professor & Associate Chair for Undergraduate Studies
Ph.D., University of Virginia

Cell dynamics, microcirculation, angiogenesis, lymphangiogenesis and neurogenesis

Jennifer A. Nichols
Assistant Professor
Ph.D., Northwestern University

Biomechanics, musculoskeletal modeling, predictive simulation, medical imaging and machine learning

Kevin J. Otto
Professor
Ph.D., Arizona State University

Neural engineering, device-tissue interfaces and neurostimulation

Ivana Parker
Assistant Professor
Ph.D., Georgia Institute of Technology

Trained immunity, systems biology, HIV/TB, host-pathogen interactions and applied proteomics

Edward A. Phelps
Assistant Professor
Ph.D., Georgia Institute of Technology

Cell and tissue regeneration, islet biology, diabetes and immunoengineering

Ana Maria Porras
Assistant Professor
Ph.D., University of Wisconsin-Madison

Biomaterials & tissue engineering to study host-microbe interactions and inclusive science communication

Parisa Rashidi
Associate Professor,
UF Research Foundation Professor & IC3 Co-Director
Ph.D., Washington State University

Medical artificial intelligence (AI) and pervasive health

Carlos Rinaldi-Ramos
Dean's Leadership Professor & Chemical Engineering Depart. Chair
Ph.D., Mass. Institute of Technology

Nanomedicine and magnetic nanoparticles

Christine E. Schmidt
Distinguished Professor & J. Crayton Pruitt Family Endowed Chair
Ph.D., University of Illinois

Biomaterials for neural tissue regeneration and neural interfacing

Blanka Sharma
Associate Professor
Ph.D., Johns Hopkins University

Nanomedicine, biomaterials, targeted drug/gene delivery and immunoengineering

Cherie Stabler
J. Crayton Pruitt Family & UF Foundation Preeminence Professor and Department Chair
Ph.D., Georgia Institute of Technology

Biomaterials, controlled release, regenerative medicine and diabetes

Brittany Taylor
Assistant Professor
Ph.D., Rutgers University

Musculoskeletal tissue engineering, bioactive biomaterials, tendon injury and repair

Lakiesha N. Williams
Associate Professor & Associate Chair for Graduate Studies
Ph.D., Mississippi State University

Traumatic brain injury, soft tissue mechanics, bio-inspired design and materials characterization

NATIONAL FACULTY AWARDS:

12	Professional Societies w/ Fellows
11	AIMBE Fellows
7	NSF CAREER Awardees
2	PECASE Awardees

OUR NEXT CHAPTER

A CONVERSATION WITH NEW CHAIR DR. CHERIE STABLER

Interviewed by BME Ph.D. candidate, Jessica Aldrich

J. Crayton Pruitt Family & UF Foundation Preeminence Professor and Department Chair

Dr. Cherie Stabler became the third chair at the J. Crayton Pruitt Family Department of Biomedical Engineering in May. Stabler is a J. Crayton Pruitt Family and UF Foundation Preeminence Professor in Biomedical Engineering and has been at UF since 2015. Her research expertise is world-renowned, centering on diabetes and engineering. In particular, she focuses on developing novel bioactive materials and devices for cellular implants that target immunological responses and improve cellular function and survival.

After graduating with a bachelor's degree from Florida State University (FSU) in 1998, Stabler earned her doctorate from the Georgia Institute of Technology and Emory University.

Stabler sat down with Ph.D. candidate Jessica Aldrich to talk about her goals and plans as chair:

What are you excited about in this new role as chair?
I love academia because I enjoy watching people grow and find their path. And now, getting to do the same thing at all levels, that's so joyful. It's amazing watching people find their passion; that feels so cliché, but supporting and helping someone navigate their academic path and find what they are invested in is incredibly rewarding.

How has the transition into this role gone for you?
It has been a lot to learn. But our staff is so wonderful and helpful. They have shown so much grace in helping me navigate everything and figure things out. I really couldn't be more grateful for them. My first goal is to gain an understanding of everything. I have my ideas and what we should do, but I'm excited to listen and learn what other people think before jumping in.

In the first three months as chair, what have been your priorities?
My current plan is two parts: first, support the team and then support the students. I started by meeting with each staff member 1:1. Those meetings further validated what a special place this is, where people feel comfortable showing who they are. I see our staff's passion for what we do and how much they love the students. The students really inspire everyone around here.

What are some of your goals as chair?
I want to dig into the academic programs; I loved being the Associate Chair (for graduate studies) and working on systems to serve students better, for example, figuring out ways to encourage and support students applying for external fellowships. I'm a big systems person, so updating and refining our systems is something that I look forward to tackling as departmental chair.

What are you excited about in this new role?
I'm excited to help others find what fulfills them because, in BME, you can do so many things. I want to keep refining and building our academic programs to provide more opportunities for students to explore these various paths. For example, how can we expand internship programs and other connections so our students know what's out there—creating those opportunities that feed everything.

What do you need from us (students, faculty, staff, alums, stakeholders)?
Communicate. How can we do better? What creative thoughts do you have? I'm open to ways that we can pursue crazy ideas. We need to know what is working, what our bottlenecks are, and how we can streamline them.

Aside from your professional life, what should we know about you?
I'm married with two kids. I love investing time with my family; they are the coolest people I know, so I really enjoy hanging out with them, taking trips, and having adventures. My perfect vacation is time on the boat; I love to fish and the water.

What are your hopes for the future of your research group?
Honestly, I hope nothing changes in terms of productivity and my mentorship. Research is such an important part of my job. I strive to balance supporting my team while taking on this more significant administration role. I am taking a break from teaching, which I will miss, but I hope to return to it once I am more settled into this role.

Is there anything else you want us to know?
I want to give a really big shout-out to all of the amazing people; I am continually reminded that everyone is invested here, and they are so amazing. I'm so lucky to be here. I'm excited to listen, learn, make changes, and grow. I'm thankful for Christine (Schmidt) and her mindful and strategic leadership in developing and growing this establishment. I want to keep asking, 'How can we get better?' and to continue down this road of continuous improvement.

> "My goal is to gain an understanding of everything. I have my ideas, and what we should do, but I'm excited to listen and learn to see what other people think before jumping in."

UF UNIVERSITY of FLORIDA

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