CrossLink

BIOMEDICAL ENGINEERING at the UNIVERSITY of FLORIDA // FALL 2019

BREAKING BARRIERS

Defining Leadership and Fostering Change
Transforming ENGINEERING EDUCATION TO BETTER RECRUIT, EDUCATE AND EMPOWER

INTRODUCING THE NEW DEPARTMENT OF ENGINEERING EDUCATION

The field of Engineering is unique due to its wide breadth of subject areas that incorporate an extensive study of fundamentals as well as a vast body of experiential learning.

Here at the University of Florida’s Herbert Wertheim College of Engineering, we are proud to fully establish the Department of Engineering Education starting fall 2019. Faculty in the department will teach general engineering courses, including a first-year design class, courses for a graduate certificate in Engineering Education, and conduct fundamental and applied research in Engineering Education.

WHAT WE TEACH
Preparing all UF students for success in the 21st century
We aim to create the digitally literate workforce necessary for society’s future.

HOW WE TEACH
Improving the student experience
We are using our own campus, community and state to serve as real-time living laboratories for the development of new technologies. This includes the development of the iClassroom, a 21st century educational sandbox.

WHO WE TEACH
Responding to the changing needs of society
We are working to meet the demand for engineers by recruiting from a wider array of demographics and ages, providing them with skills and information as their careers require them.
LETTER FROM THE CHAIR

Dear UF BME Friends & Family,

Welcome to the 6th issue of CrossLink, the annual magazine of the J. Crayton Pruitt Family Department of Biomedical Engineering at the University of Florida.

In this issue, we want to celebrate the innovative work being conducted by our women faculty and students and to highlight the importance of a diverse community.

At a time when the opportunity could not be greater, women are vastly underrepresented in the workforce, particularly engineering careers. Our mission is to create an environment welcoming to all.

The department’s goal is to continue to increase the recruitment, retention and graduation of students from underrepresented minority groups, and provide support for their inclusion and success in the academic environment.

Changing culture is hard and without support from the top, almost impossible. Read about Dean Cammy Abernathy’s vision on page 8.

Strategic hiring initiatives have enhanced the learning environment for students. Since 2013, we have recruited eight female faculty, increased women and underrepresented minorities in our students and hired 12 female personnel. In 2018 the department created the diversity and inclusion committee to continue to strengthen these engagements. You can read more about the fantastic leadership activities on pages 16 & 17.

Although there is still much to accomplish and our journey is ongoing, I would like to share with you some best practices based on our experience thus far.

Sincerely,

Christine E. Schmidt
Professor, J. Crayton Pruitt Family Chair and Department Chair

We hope this issue contributes to the discussion of the challenges we face to achieve equity in the workplace. At UF BME we honor our values by ensuring a diverse and inclusive department.

Sincerely,

Christine E. Schmidt
Professor, J. Crayton Pruitt Family Chair and Department Chair
Dr. Aysegul Gunduz received Presidential Early Career Award for Scientists and Engineers (PECASE)

The PECASE, established in 1996, is the highest honor bestowed by the U.S. government to outstanding scientists and engineers who are at the beginning of their independent research careers and are showing exceptional promise for leadership in science and technology.

Dr. Blanka Sharma received National Science Foundation (NSF) CAREER Award

For her research advancing the exploration of biomaterials to understand and direct immune cell responses in tumors.

Major Faculty Awards + Recognitions

- Dr. Mingzhou Ding appointed Specialty Chief Editor, Brain Imaging and Stimulation, Frontiers in Human Neuroscience and received UF Herbert Wertheim College of Engineering Doctoral Dissertation Advisor Award
- Drs. Ruogu Fang, Daniel Ferris and Parisa Rashidi elevated to Senior Members of the IEEE
- Dr. Ruogu Fang received NSF Information Integration and Informatics (III) Core Award, collaborative UF CT2 Pilot Award for Precision Medicine, and a collaborative UPI-SEED Award
- Dr. Aysegul Gunduz promoted to associate professor with tenure, Dr. Kevin Otto promoted to professor and Dr. Cherie Stabler promoted to professor (Fall 2018), Dr. Gregory Hudalla promoted to associate professor with tenure (Fall 2018)
- Dr. Aysegul Gunduz received the UF Research Foundation Professorship, Graduate Education Diversity Champion Award from UF Office of Graduate Diversity Initiatives and invited to serve on the Emerging Imaging Technologies for Neuroscience (ETN) Study Section
- Dr. Gregory Hudalla received Early Career Award from University of Wisconsin-Madison Engineering.
- Drs. Benjamin Kossowsky and Gregory Hudalla (Anchor Biologists) won 1st place Cade Prize from Cade Museum for Creativity & Invention
- Dr. Walter Lee Murfey elected president of the Microcirculatory Society
- Dr. Jennifer Nichols received UF CT2’s K22 Multidisciplinary Scholars Program Award, accepted to the Training in Grantmanship for Rehabilitation Research (TIGGR) Workshop and participated as a mentee in the United States Bone and Joint Initiative/Bone and Joint Canada Young Investigator Initiative (YI) Grant Mentoring and Career Development Program
- Drs. Kevin Otto, Cherie Stabler and Blanka Sharma received UF Term Professorship
- Dr. Parisa Rashidi awarded National Institute of Biomedical Imaging and Bioengineering (NIBIB) Trailblazer R2L Award and UF Excellence Award for Assistant Professor
- Dr. Cherie Stabler elected to the Society of Biomaterials Member at-Large and received UF Herbert Wertheim College of Engineering Teacher/Scholar of the Year
- Dr. Hans van Ostrum named inaugural chair, Department of Engineering Education at UF

Key Research Advances + Innovation

- Dr. Wesley Bolch awarded $3M collaborative NIH HIBB grant, "MIBB4Lead: A Community for Developing and Reporting Data on Organ Ossis in Nuclear Medicine, Computed Tomography and Hybrid Imaging"
- Dr. Daniel Ferris awarded S000K NSF grant, "NCS-PD Electrocardiological Monitoring for the Real World"
- Dr. Daniel Ferris Co-Investigator on $5M award from the NIH National Institute of Aging, "Multimodal Imaging of Brain Activity to Investigate Walking and Mobility Decline in Older Adults"
- Dr. Gregory Hudalla awarded $1.5M NIH grant, "Glycosylation as a Structural Determinant in Peptide Fibrillation"
- Dr. Kevin Otto is Co-Investigator on $5M NIH award from the National Institute of Allergy and Infectious Diseases, "A 3D Tissue Map of the Human Lymphatic System"
- Dr. Cherie Stabler awarded $1.5M NIH grant, "Engineering a Human Microphysiological System for the Characterization of Inflammatory Interactions"
- Dr. Cherie Stabler awarded 11M JDRF grant, "Engineered Biocompatible Hydrogel Macromolecules for Islet Transplantation"

Select Student Awards

- Alexis Brake, Jonathan Charles, Fiona Cheung, Maximilian Diaz, Leyla Morros, Tran Ngoc, Van Carlos Pecheco, Guo Qian, Alexia Poulos and Julia Willert were selected as University Scholars
- Stephanie Cernera received NINDS T32 Fellowship in Movement Disorders and Neurorehabilitation and awarded Dr. Luca Foundation Research Scholarship
- Tamara Ordonez Diaz selected for the 2019 NextProf Pathfinder Workshop
- Shameen Farhadi received STAR Award from the Society for Biomaterials
- Margaret Fettlig, Angela Jimenez, Olivia Luseth, Bani Mahmodi, and Enrico Qyri received College Attributes of a Gator Engineer Awards
- Zhenhong Hu received UF Outstanding International Student Award
- Olivia Lanier awarded UF Association for Women NSF Emerging STEM Scholar Award
- Sarah Long and Kyle See awarded NIH CTU T11 Predoctoral Fellowships
- Marco Meiger and Max O特別 selection for presentation awards at the Annual Biomedical Research Conference for Minority Students
- Yashima Morales received Association of Cuban-American Engineers Scholarship

Distinguished Leadership Seminar Series

2018-2019 SPEAKERS

- JOSEPH M. DESIMONE, PH.D., CEO & Co-Founder, Carbon Inc. Chancellor’s Eminent Professor of Chemistry, University of North Carolina at Chapel Hill, William R. Kenan, Jr., Distinguished Professor, Chemical and Biomolecular Engineering, North Carolina State University

SUSAN S. MARGULIES, PH.D.

Wallace H. Coulter Chair, Georgia Research Alliance<br>Wallace H. Coulter Department of Biomedical Engineering, Georgia Institute of Technology and Emory University

Pediatric Cardiac Biomechanics: What We Need To Know

MARJOLEIN C.H. VAN DER MEULEN, PH.D.

James M. and Marsha McCormick Director and Swanson Professor, Nancy E. and Peter C. Maksim School of Biomedical Engineering, Cornell University

Mechanochore of Musculoskeletal Tissue

LEONARD PINCHUK, PH.D.

Founder and Chief Scientific Officer, InnFocus, Inc., a Santen Company, University of North Carolina at Chapel Hill, Institute of Allergy and Infectious Diseases, "A 3D Tissue Map of the Human Lymphatic System"

THOMAS C. SKALAK, PH.D.

Senior Advisor, Canada’s largest and Joe Tai Foundation, Vice President for Research Emeritus, University of Virginia, Biomedical Engineering for Life in a Rapidly Changing World

2019–2020 SPEAKER

JENNIFER H. ELISSEFF, PH.D.

Morton Goldberg Professor, Wimberly Eye Institute and Biomedical Engineering, Departments of Materials Science and Engineering, Chemical and Biomedical Engineering, Director, Translational Tissue Engineering Center, Johns Hopkins University

U.S. News & World Report’s 2020 Rankings

#7 National Public Universities

#15 Graduate Program Among Public Universities

#16 Undergraduate Program Among Public Universities

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Fostering Change

By Laura E. Mize

Defining Leadership and Fostering Change

When Dean Cammy Abernathy, Ph.D., hired Christine Schmidt, Ph.D., to lead the J. Crayton Pruitt Family Department of Biomedical Engineering in 2013, the new chair became the department’s third female faculty member at the time. There were 14 men.

Abernathy’s selection was strategic. Schmidt’s research expertise in tissue engineering and her role in helping to establish biomedical engineering at the University of Texas, Austin made her an ideal candidate for developing the department. And as a woman, she fit well into the dean’s plan to diversify the college, from the top down.

Abernathy is especially fond of hiring or promoting highly qualified female and underrepresented minority candidates into key leadership positions, and asking them to make diversity a priority.

“Nothing happens in a college unless the department chairs make it happen,” she said. Abernathy also emphasizes the importance of accountability in diverse hiring, of developing a college “climate” that’s welcoming to women and helps them succeed; and of including diversity metrics in rankings such as those published by U.S. News & World Report.

Employing these and other methods has indeed increased the number of female faculty members within UF’s Herbert Wertheim College of Engineering. In 2018, women made up 22 percent of the faculty, up from 10 percent when Abernathy became dean in 2009. Currently, 30 percent of faculty hired each year are women. Before Abernathy, that number was lower than 10 percent.

But, there’s more work ahead. Her ambitions for greater inclusion of women in the faculty keep her working, still. Abernathy’s goal for the proportion of female faculty in the college is simple: She wants it to be 50-50.

Enticing Women to Stay

While Abernathy has been working at the college level, Schmidt has been busy creating an atmosphere meant to support all the faculty in the J. Crayton Pruitt Family Department of Biomedical Engineering — with the belief that it will be especially helpful for women.

She recognizes that having more women faculty requires a greater effort than just hiring women. The department’s representation of women among its faculty has improved to 10 in 25. Schmidt aims to make sure the women she has hired want to stay. Taking a “holistic view of our faculty,” one that encourages health and happiness in all areas of each employee’s life — not just in professional life — is critical, said Schmidt, who also serves as current president of the American Institute for Medical and Biological Engineering.

“We have a lot of people with families, and if they’re successful in their home lives and their personal lives, they’re going to be much more successful at work,” she noted. Family-friendly practices are helpful for men, too, but “definitely much more imperative for my female faculty,” Schmidt said.

Such practices include mostly restricting meetings to normal working hours in deference to childcare responsibilities, encouraging regular vacations and hosting workshops on work-life balance. In one-on-one meetings with faculty, discussions may turn to schedule or childcare difficulties. “Some of the time we’re just talking about things like nannies and daycares,” Schmidt said, noting that she is open about her own experiences juggling work and home life.

To further develop the growing climate of diversity and inclusion, Schmidt has established the new position of diversity officer within the department. Aysegul Gunduz, Ph.D., an associate professor, has taken on the role.

Gunduz also is a past president of the Association of Academic Women at UF, and is involved with the department’s Diversity and Inclusion Initiative. She believes that biomedical engineering, as one of the youngest engineering fields, has an opportunity that other fields with an already-established “glass ceiling” don’t.

“This is a great chance for us to allow everyone to grow without any preconceived ideas about what a biomedical engineer should look like,” she noted. “So, we need female representation to attract others. The downside to being a young field is that the general public might not know what a biomedical engineer does. Hence, it is our responsibility to educate the public, so that young women can form a more accurate picture of biomedical engineers in their minds.”

Personalized Student Recruiting

Attracting and retaining female graduate students takes work, too. Professor Cherie Stabler, Ph.D., recently ended her four-year term as the department’s associate chair for graduate education. In that role, she promoted what she calls “personalized recruiting.”

Often, prospective students, “especially women and underrepresented minorities, feel as if they don’t belong, or they feel as if they’re not good enough to go to graduate school,” Stabler said. “And sometimes all it takes is just that personalized encouragement. ‘Yes, you do belong and this is the place for you.”

Acknowledging the program’s demanding nature is also important in helping students — especially women and minorities — feel connected and confident. Stabler cited studies showing that when a lecture “doesn’t make any sense, if you are an underrepresented minority or a woman, you tend to think, ‘I’m the only person in the room who doesn’t understand this,’” she said.

That perspective discourages students from asking questions.

“You kind of isolate yourself because you feel like you’re the only one who doesn’t get it,” she explained. “Whereas the majorities in the room … tend to think, ‘If I don’t get it, nobody else does.’ And that means they build better peer networks.”

These dynamics, Stabler said, make it important for faculty to relay to students that, yes, the program is tough, and it is OK if they don’t always understand the material. Personally addressing obstacles specific to women is helpful, too. Stabler uses student exit interviews to discuss workplace issues, including the importance of women “realizing their power,” and negotiating for favorable positions and salaries.
Department faculty take this approach beyond UF, as well. Lakiesha Williams, Ph.D., an associate professor, is a mentor with ACADME. The workshop, which operates at a different campus each summer, coaches engineering postdocs and doctoral students who are women or members of other underrepresented groups, to help them jumpstart and succeed in academic careers.

Opening Doors For Everyone

The biomedical engineering department has not overlooked undergraduate students, or even younger learners. Sarah Rowlinson, Ph.D., a lecturer and the department’s undergraduate coordinator, leads the charge with these populations by organizing a variety of opportunities for females and underrepresented minorities (including opportunities for grade-school students) to engage with and progress further in engineering education and professional development. For kids, she hosts interactive laboratory activities that provide first-hand experience with the science of engineering. So far, hundreds have participated.

Rowlinson also advises several student organizations, in which she encourages female and underrepresented minority students to take leadership positions. Having these students in leadership roles, she says, provides them a greater sense of belonging and “creates a new cycle of underrepresented groups in role model positions to inspire younger students, further aiding in recruiting these populations.”

It also opens the door for the students in leadership roles to have more and better opportunities in the future. Such opportunities may include internships, for which Rowlinson seeks to prepare students by leading workshops.

The Importance of Allies

The department is making great strides. And, importantly, its progress in attracting and keeping women faculty members and students is not due solely to the efforts of women. Cultural change takes root most firmly when everyone invests.

In testament to this, Williams recalled two white, male mentors instrumental in her own education, and their advocacy for her in less-than-comfortable environments. She also praised the department’s male faculty members for their support, saying it overshadows what she’s seen elsewhere.

“The culture is outstanding here,” Williams said. “Our male faculty are our allies. They sympathize. They understand. No questions asked about things, and they’re allies for our students as well — just as much as we are.”

Meet the Women Transforming UF BME

Dr. Ruogu Fang
- National Science Foundation (NSF) CAREER Award, 2019
- Darla Denton Emerging Leader AIEEE Award, 2017
- National Science Foundation (NSF) CAREER Award, 2016

Dr. Aysugul Gunduz
- Presidential Early Career Award for Scientists and Engineers (PECASE), 2019
- ABIE Award, 2017
- National Science Foundation (NSF) CAREER Award, 2016

Dr. Jennifer Nichols
- UF Clinical and Translational Science Institute K12 Award, 2019
- Outstanding Researcher Award, NIH-funded Center for Simulation in Rehabilitation Research (NCSRR), 2016
- Young Scientist Post-Doctoral Award from the American Society of Biomechanics, 2016

Dr. Parisa Rashidi
- Excellence Award for Assistant Professors, University of Florida, 2019
- National Institute of Health (NIH) Trailblazer Award, 2019
- National Science Foundation (NSF) CAREER Award, 2018

Dr. May M ansy
- NextGen Undergraduate Researcher Award, Minority Access Inc., 2017
- National Role Model Faculty Researcher Award, American Institute for Medical and Biological Engineering (AIMBE), 2018

Dr. Cherie Stabler
- National Science Foundation (NSF) CAREER Award, 2016
- UF Clinical and Translational Science Institute Junior Faculty Award, 2017
- “20 under 40” Outstanding Young Faculty, American Society for Engineering Education, 2014

Dr. Blanka Sharma
- Fellow, National Academy of Inventors (NAI), 2018
- IEEE-USA’s Women in Engineering (WIE) Leadership Committee, 2018
- IEEE-USA’s WIE, Student Branch Chapter Mentor Award, 2018
- IEEE-USA’s WIE, Mentor of the Year Award, 2018

Dr. Lakiesha Williams
- CAREER Award, 2016
- UF Clinical and Translational Science Institute K12 Award, 2019
- Outstanding Researcher Award, NIH-funded Center for Simulation in Rehabilitation Research (NCSRR), 2016
- Young Scientist Post-Doctoral Award from the American Society of Biomechanics, 2016

Dr. Christine Schmidt
- Fellow, International Academy of Medical and Biological Engineering (IAMBE), 2019
- National SW Enginnering/Engineering (SWE), 2019
- Society for Biomedical Engineering (SBE), 2019
- National Institute of Health (NIH) Trailblazer Award, 2019
- Fellow, National Academy of Inventors (NAI), 2018

Dr. Sarah Rowlinson
- CAREER Award, 2018
- CAREER Award, 2019
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Transforming Engineering Education
Girls with Nerve
Middle School Summer Camp Empowers the Pursuit of Neuroscience

This summer, University of Florida researchers Daniel Ferris, Ph.D., and Rachael Seidler, Ph.D., teamed up to bring more than 20 middle school students to campus for a free, week-long summer camp aimed at empowering girls to explore neuroscience.

Held in July, the camp brought sixth, seventh and eighth graders together for hands-on activities, field trips to multiple neuroscience labs and to hear from leading women researchers at UF.

Kristine Snyder, Helen Huang, and Julia Kline, three members of Ferris’ laboratory, started the camp at the University of Michigan in 2013 with the goal of providing girls the chance to see themselves at a university and hear from potential role models. The camp has since expanded to additional universities. This was the first time the camp was hosted at UF. Funding for the camp came from a grant to Ferris and Seidler from the National Science Foundation (NSF). Amanda Studnicki and Theresa Hauge, two UF doctoral students, led the camp this summer.

“We wanted to break the model of what TV and movies show as your typical scientist – boring and old,” said Seidler, professor in the Department of Applied Physiology and Kinesiology. “The camp allows girls to see scientists in another way.”

The curriculum ranged from the basics of muscle and brain physiology, learning about action potentials from the leg of a cockroach, and talking about historical women who made significant scientific and technological advances. Jennifer Nichols, Ph.D., assistant professor, J. Crayton Pruitt Family Department of Biomedical Engineering, led biomechanics activities with the girls using a model of yarn, paper, and straws to mimic how tendons function in the in hand. Aysegul Gunduz, Ph.D., associate professor, J. Crayton Pruitt Family Department of Biomedical Engineering, spoke with the girls about her experience as a woman in STEM and advice she would give her past middle-school self – she talked about the importance of trying new things, regardless of the chance of failure.

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The program also gives campers the chance to get to know the campus, travel from one lab to another and experience college.

On the last day, there was an activity called “If I were a neuroscientist” where the girls wrote down what kind of real-world problems they hope to solve in the future. Theresa Hauge, doctoral student in the Department of Applied Physiology and Kinesiology, who helped co-organize the event said, “It was so rewarding watching these girls start the week asking questions about basic brain anatomy and ending it asking questions about their own research ideas in neuroscience. There were campers interested in neuropathologies, prostheses, and neuroimaging to create real-world solutions to the problems around them.”

While girls are taught to be “perfect,” and boys are taught to be “brave,” it is important for more girls to be brave, Gunduz said.

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Machine intelligence for hacking into safer, more accessible care

By Laura E. Mize

If Ruogu Fang has her way, computed tomography scans of the future will emit about one tenth the radiation of today’s scans, and retinal imaging will one day use current diagnostic methods for Alzheimer’s and Parkinson’s diseases.

An assistant professor in UF’s J. Crayton Pruitt Family Department of Biomedical Engineering, Fang, Ph.D., has been at UF for two years. Previously, she was an assistant professor at Florida International University, where she contributed to efforts to better distinguish and classify the tens of thousands of different types of neurons in the brain. But FIU’s lack of a medical school made it tough to work hand-in-hand with physicians and patients to address practical challenges in patient care.

With UF’s Herbert Wertheim College of Engineering adjacent to UF Health, Fang has teamed up with neuroradiologists and medical physicists from UF Health - and from Weill Cornell Medical College and Northwell Health Systems - and is now focused on one of modern medicine’s most commonplace, and seemingly unavoidable, risks of treatment. “Fifty-two percent of the radiation people receive today is from CT imaging, because of the increasing number of CT scans,” Fang explained.

For stroke patients, who undergo numerous CT scans to evaluate both damage and recovery, the risks accumulate quickly. But anyone can face increased cancer risk and possibly also the risk of cataract development from repeated CT scans.

“We can just apply this network to the low-dose images,” Fang noted, “and the network will naturally output “high-quality images with reduced noise and artifacts, as well as superior spatial and temporal resolution. The resulting images match the clarity and quality of a high-dose scan, but with much less radiation exposure. For single-mode CT scans, the team has slashed exposure by 90 percent — for each scan performed. Now, their focus is on doing the same for multi-modal CT scans. This portion of the work is funded through a joint grant from the UF Informatics Institute and Clinical and Translational Science Institute.

Fang also works with UF Health’s Center for Movement Disorders & Neurorestoration in search of more accessible ways to diagnose Parkinson’s Disease, and to differentiate between subtypes.

Her robust research experience related to completely different health conditions — such as her work on early screening methods for diabetic retinopathy — makes her an especially strong collaborator, said Adolfo Ramirez-Zamora, M.D., a UF College of Medicine associate professor of neurology and the center’s director of clinical trials.

“This is a great example of how interdisciplinary collaboration can really expand and improve research,” he commented. “We had this hypothesis about maybe looking into patient’s brains through their retinas, but didn’t really have ways for us to do it.”

Fang knew how to approach the project. She and student assistants perform double retinal scans on consenting patients. Using artificial intelligence to analyze the scans, the team is hoping machine learning will uncover “hidden biomarkers” that could be combined with other data “to predict whether the patient has Parkinson’s or not.” This goal is based on recently published studies hinting that vascular, structural, and functional changes in the retina — including thinning of the retinal nerve fiber layer — may be indicators of Parkinson’s disease that are detectable before changes in the brain are.

Additional data that may be considered in a new diagnostic process could include visual acuity and other vision information, demographic information, and drug and medical history. Fang believes such a process could be much more accessible than current diagnostic scans, which cost $2,000–$3,000 each and require a trip to an imaging center — an inconvenience patients in cognitive decline may resist.

Fang, Ramirez-Zamora and Nikolaus McFarland, M.D., Ph.D. (also from UF’s Centers for Movement Disorders & Neurorestoration), use portable scanners — the most accurate being the size of a book. This opens the possibility for scans to be done in physicians’ offices, including non-neurology offices, and other sites.

If such a method has merit, the team intends to expand their work to diagnosis of other neurodegenerative disorders.

Fang Focuses on Scientific Approaches to Bridge Data and Medicine

- Research Interests:
  » Personalized medical imaging and robust brain hemodynamics modeling
  » Early detection of Alzheimer’s and Parkinson’s Diseases through retinal imaging
  » Early screening methods for diabetic retinopathy using artificial intelligence
  » Biology- and cognition-inspired deep learning and AI-inspired neuroscience

**CROSSLINK**
Celebrating Our Differences

FOSTERING A CULTURE OF INCLUSION

By Olivia Lanier

While the statistics are rising and many more women and underrepresented minorities are receiving degrees in engineering, it is no secret that prejudice still exists and the road for success is paved with obstacles.

The J. Crayton Pruitt Family Department of Biomedical Engineering (BME) is dedicated to helping students, staff and faculty navigate these obstacles. In this pursuit, Dr. Aysegul Gunduz, associate professor and J. Crayton Pruitt Family Term Fellow, was appointed as the diversity and inclusion officer for the department in Fall 2018. As an international student herself, she is a fierce advocate for diversity issues. She credits her success in research to these concepts and challenging similarities, we hope our BME community will gain a deeper appreciation for one another.

“Diversity and inclusion is our greatest asset - we are at our strongest when we support each other. Our goal is to create a safe and welcoming environment where everyone can thrive,” Gunduz said.

During the same semester as her appointment, Gunduz, and recent BME Ph.D. graduate, Olivia Lanier, met with Herbert Wertheim College of Engineering leadership to discuss concerns regarding sexism, harassment, and discrimination.

Since this meeting, the college has implemented numerous policies to increase awareness of resources for women and minorities. The administration also created a diversity and inclusion board for the college, with representatives from every department.

Supporting this momentum, Gunduz, Lanier and undergraduate student, Camryn Lewis created a Diversity and Inclusion Initiative within the BME department. The goal of the initiative is to promote equity and social justice and to enhance the education experience by exposing students and faculty to these concepts and challenging them to bring more inclusive actions to the community.

At monthly student body meetings, the organization participates in diversity training activities, which help promote healthy relationships among people and increase understanding of others’ backgrounds and multicultural perspectives. In addition to these meetings, the organization has hosted numerous events to celebrate diversity.

For Black History Month, the organization hosted a Black History Celebration that included a special talk from Dr. Curtis Taylor, associate professor and associate dean for undergraduate student affairs at the Herbert Wertheim College of Engineering, commemorating numerous black scientists/engineers. Taylor celebrated the work of black historical figures to an overflowing audience of engaged faculty and students. His presentation was followed by a black history trivia event.

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For Women’s History Month, the organization also hosted an interactive panel discussion with BME professors on a variety of topics challenging women today. The group also attended the annual Equality Florida Gainesville Gala to support LGBTQ+ rights.

For her efforts with this organization, Gunduz received the 2019 Graduate Education Diversity Champion Award, a joint honor bestowed by the UF Multicultural Association of Graduate Students and the UF Graduate School’s Office of Graduate Diversity Initiatives.

Looking forward to next year, the organization aims to recruit more members and expand the number of events supported in achieving their full potential. “Our focus is to continue to create events and programs that focus on cultural competency and student success stories,” Gunduz said. “By celebrating differences and similarities, we hope our BME community will gain a deeper appreciation for one another.”

UF BME FACTS & DATA

<table>
<thead>
<tr>
<th>Faculty</th>
<th>18% URM</th>
<th>40% WOMEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graduate</td>
<td>13% URM</td>
<td>52% WOMEN</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>34% URM</td>
<td>58% WOMEN</td>
</tr>
</tbody>
</table>

HERBERT WERTHEIM COLLEGE OF ENGINEERING FACTS & DATA

#2 Producer of doctoral engineering degrees to African American students

#6 Producer of engineering degrees to Hispanic students

#3 Black Faculty

#7 Hispanic Faculty

#13 Female Faculty

“Diversity and inclusion is our greatest asset - we are at our strongest when we support each other. Our goal is to create a safe and welcoming environment where everyone can thrive,” Gunduz said. “By celebrating differences and similarities, we hope our BME community will gain a deeper appreciation for one another.”

HERBERT WERTHEIM COLLEGE OF ENGINEERING BRONZE LEVEL AWARD FOR THE INAUGURAL ASEE DIVERSITY RECOGNITION PROGRAM

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Every year, more than 5.7 million adults are admitted to intensive care units (ICU) in the United States, costing the health care system more than $67 billion per year. A wealth of information is recorded on each patient in the ICU. Their electronic health records include high-resolution physiological signals, various laboratory tests, and a detailed medical history.

Today, nurses build an index of a patient’s status in terms of function and reaction to environmental factors in the ICU by periodically observing the patient and asking a battery of questions. The process is time-consuming and often incomplete due to the patient’s condition. Two researchers at the University of Florida are looking toward tomorrow, where indices may be constructed from real-time autonomous observations and analyses of data based on artificial intelligence (AI).

Parisa Rashidi, Ph.D., an assistant professor in the J. Crayton Pruitt Family Department of Biomedical Engineering at the Herbert Wertheim College of Engineering, and Dr. Azra Bihorac, M.D., the R. Glenn Davis professor of medicine in the UF College of Medicine, are collaborating to improve the assessment process for hospital staff and patients. They recently completed a pilot study, in which they examined the feasibility of using pervasive sensing technology and AI for autonomous and highly detailed monitoring in the Intensive Care Unit (ICU).

The opportunity for our engineering faculty to collaborate in multidisciplinary studies such as this one enables us to develop and test innovative solutions much more quickly and comprehensively.

During the study, the researchers collected the data and subsequently analyzed it using algorithms developed by Rashidi and her engineering students. “AI technology could assist not only in administering repetitive patient assessments in real-time, but also in integrating and interpreting these data sources with electronic health record (EHR) data, thus potentially enabling more timely and targeted medical interventions,” Rashidi said. “We were also able to determine that facial expressions, functional status involving extremity movement and postures, and environmental factors, including visitation frequency, light and sound pressure levels at night, were significantly different between the delirious and non-delirious patients,” Bihorac added.

The results of this research project were recently published in Nature’s “Scientific Reports.” The paper characterizes the seven different sensing and monitoring mechanisms that were used in the research, which resulted in the most wide-ranging study of autonomous critical care monitoring to date.

For future work, the researchers and their team hope to incorporate real-time analysis of the data from the sensors and be able to provide immediate feedback directly to physicians and nurses as indicators of patient status and even point to possible treatment outcomes.

Artificial Intelligence adds detail to health assessments in hospital intensive care units

Rashidi, Bihorac and their research team performed the study on delirious patients and controls in a hospital critical care unit. They employed wearable sensors, light and sound sensors, and a camera to collect data on patients and their environment. Their results showed that granular and autonomous monitoring of critically ill patients and their environment is feasible using a noninvasive system, and they demonstrated its potential for observing and describing critical care patients’ status and their surrounding environmental factors that contribute to sleep disruption and ICU delirium, such as loud background noise, intense room light, and excessive rest-time visits.

The co-location of medicine and engineering colleges on a single campus at the University of Florida has continued to provide an enhanced setting for researchers to perform interdisciplinary studies at an accelerated rate. “The opportunity for our engineering faculty to collaborate in multidisciplinary studies such as this one enables us to develop and test innovative solutions much more quickly and comprehensively,” said Dr. Forrest Masters, Associate Dean for Research and Facilities at the Herbert Wertheim College of Engineering. “The deep relationship our biomedical engineering program has established with our College of Medicine is evidenced by the remarkable work that was done in this study.”
**UF BME FACULTY SNAPSHOT**

**New Education Specialists**

- **Eric Fuller**
  - Lecturer, Ph.D., University of Florida
  - Dr. Eric Fuller joins the department as a lecturer this fall, focusing his expertise on engineering design and biomedical education research.

- **May Mansy**
  - Lecturer, Ph.D., University of Florida
  - Dr. May Mansy joins the department this fall, focusing her expertise on biomedical signals and systems and diabetes.

**Faculty Snapshot**

- **Blanka Sharma**
  - Assistant Professor, Ph.D., Johns Hopkins University
  - Nanomedicine, stem cells, biomaterials, tissue engineering and targeted drug/gene delivery.

- **Cherie Stabler**
  - Professor, Ph.D., Georgia Institute of Technology
  - Biomaterials, cell encapsulation, regenerative medicine, controlled release systems and diabetes.

- **Hans van Oostrom**
  - Associate Professor & Engineering Education Department Inaugural Chair, Ph.D., Eindhoven University of Technology
  - Human physiologic simulation to enhance noninvasive patient monitoring and education.

- **Lakesha N. Williams**
  - Associate Professor, Ph.D., Mississippi State University
  - Traumatic brain injury, soft tissue mechanics, bioinspired design & materials characterization.

**Meet the Department’s New Education Specialists**

- **Aysegul Gunduz**
  - Associate Professor & J. Crayton Pruitt Family Term Fellow, Ph.D., Rice University
  - Human brain mapping, neuroimaging and neural interfacing.

- **Gregory A. Hudalla**
  - Associate Professor & J. Crayton Pruitt Family Term Fellow, Ph.D., University of Wisconsin
  - Molecular engineering for immunotherapies and immune modulation.

- **Benjamin G. Keselowsky**
  - Professor & Associate Chair for Graduate Studies, Ph.D., Georgia Institute of Technology
  - Biomedical materials and controlled release systems for vaccines, immunotherapies and implants.

- **Peter McFetridge**
  - Associate Professor, Integra Lifesciences Term Professor & Graduate Coordinator, Ph.D., University of Bath
  - Naturally inspired biomaterials for biologically functional implants and organ regeneration.

- **Walter Lee Murfee**
  - Associate Professor, 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 and medical imaging.

- **Kevin J. Otto**
  - Professor, Ph.D., Arizona State University
  - Neural engineering, device-tissue interfaces and neurostimulation.

- **Ruogu Fang**
  - Assistant Professor, Ph.D., Cornell University
  - Big data analytics, brain informatics and medical image analysis.

- **Daniel Ferris**
  - Robert W. Adenbaum Professor & Senior Associate Chair, Ph.D., University of California Berkeley
  - Biomechanics, neuromechanical control, locomotion and prosthetics.

- **AYSEGUl GUNDuZ**
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  - Naturally inspired biomaterials for biologically functional implants and organ regeneration.

- **Sarah Bowlinson**
  - Lecturer & Undergraduate Coordinator, Ph.D., Clemson University
  - BME cellular engineering laboratory and engineering education research.

- **Christine E. Schmidt**
  - Professor, J. Crayton Pruitt Family Chair & Department Chair, Ph.D., University of Illinois
  - Biomaterials for neural tissue regeneration and neural interfacing.

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UF BME Alumnus, Dr. Philip Barish, named in UF’s 40 under 40

M.S., Biomedical Engineering, 2008
Ph.D., Biomedical Engineering, 2011

The annual Outstanding Young Alumni awards program was established in 2006 to recognize alumni under the age of 40 whose achievements positively reflect The Gator Nation. 40 Under 40 will continue the tradition of honoring Gators who are reflecting leadership and innovation in their communities and professions.

Criteria for the competitive award include making a significant impact on the candidate’s industry and having civic or professional accomplishments at the state, national or international level.

Philip Barish, Senior Vice President of Operations and R&D for AbSci has over 17 years of experience in bioengineering research, with expertise in bioprocessing, cellular biology, biochemistry, protein expression and gene therapy. At AbSci, Barish is responsible for managing research and development activities as well as overseeing business development and strategic partnerships.

His own days as a UF engineering student were filled with exciting opportunities. Barish recounts, “During the first year of graduate school, I worked on a group project utilizing an EEG that allowed people to control a video game with their minds. Through combining an EEG and basic signal processing algorithms, our team created a program that allowed us to navigate a beginner level of a first person shooter game. It was a fascinating engineering project that combined elements of neuroscience and software development to provide a window into brain-machine interfacing.”

Things he learned at UF helped Barish take the lead in innovating for success. He said, “AbSci collaborates with leading pharmaceutical companies to enable step-changes in productivity to their bio-pharmaceutical R&D and manufacturing. One of the exciting things about working in startups is that you’re often called onto projects where you lack specific expertise. As our company grew, we had a need to develop a fermentation process for protein production, but we had no one with those credentials in-house. Optimizing fermentation is primarily an exercise in process development, precisely the things you are taught as an engineer, so I volunteered to take on the task. I was able to build out and lead an entire team dedicated to fermentation, which ultimately led me to my current position.”

UF BME Welcomes New Industry Partner

KLS Martin Group develops and markets medical technology solutions such as implant systems, electrosurgery units, surgical laser systems, sterilization containers, OR lights, surgical instruments as well as individual OR solutions.

The KLS Martin Group’s success throughout the world is due to innovative, high-quality products, as well as excellent customer service and local sales consultants. The feedback and partnership with their customers and educational groups within cranio-maxillofacial surgery, neurosurgery, cardiothoracic surgery and small bone orthopedics are critical to developing products that have advanced the field of surgical reconstruction.

Thank you to all of the UF BME Industry Partners!

If your company or organization would like more information on how to give to BME or become an industry partner, please contact Ryan Litzinger at 352-294-7947 or rlitzinger@eng.ufl.edu.
DIVERSITY DRIVES INNOVATION

DIVERSE MINDS SHAPE THE FUTURE.

OUR STUDENTS, FACULTY AND RESEARCHERS COLLABORATE ACROSS DISCIPLINES TO SOLVE THE WORLD’S GREATEST CHALLENGES.