PhDiscovery:
SGSHS doctoral programs train biomedical and clinician scientists
LETTER FROM THE DEAN

I HOPE YOU ENJOY THIS ISSUE of the Graduate Report, the School of Graduate Studies in the Health Sciences’ magazine. Our goal is to give alumni and prospective students a picture of what’s happening within our school and our accomplishments over the past year.

The class of 2021 includes students earning masters and doctoral degrees. Among the latter group, our graduates are headed on to postdoctoral training at institutions such as University of California, San Francisco, St. Jude Children’s Research Hospital, Vanderbilt University and Brigham and Women’s Hospital. We also have graduates joining the health and science industry, including Charles River Laboratories. We have two joining the federal workforce through U.S. Army-affiliated research labs. In addition, three trainees graduated from our MD/PhD program, a record for our school. They are joining residency programs at UMMC, University of Michigan and Boston Children’s Hospital. Congratulations!

This year, the SGSHS established its first recruitment scholarship for an incoming student, named in memory of the late Dr. Julius Cruse, a longtime faculty member in pathology and eminent scholar. The first recipient is Alexandria Getchell, who joined the Department of Microbiology and Immunology this fall after graduating from Pennsylvania State University.

We currently offer eight PhD degrees. I want to thank all of our excellent program directors who lead these efforts in training our next generation of scientists. In this issue of the Graduate Report, you’ll get a snapshot of our doctoral offerings and meet several of our students and faculty, all of whom are doing outstanding work here at UMMC and in the SGSHS.

Thank you again for reading this issue of our alumni magazine. With the COVID-19 pandemic waning, I look forward to resuming large in-person activities such as Research Day and Honors Day, as well as the chance to meet with our alumni face-to-face once again.

Joey P. Granger (Ph.D., Physiology and Biophysics, 1983)
Dean, School of Graduate Studies in the Health Sciences
University of Mississippi Medical Center

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The University of Mississippi Medical Center offers equal opportunity in education and employment, and in all its programs and services, M/F/D/V.
The SGSHS’s newest degree program, the PhD in biomedical sciences, encompasses smaller programs.

Dr. Susana Salazar Marocho, associate professor in biomedical materials science, directs the joint program, and oversees the track in biomedical materials science. Dr. Candice Howard-Claudio, professor of radiology, leads the SGSHS’s newest track, bio-imaging (see the 2020 Graduate Report for an in-depth look at the program and its first student).

Students in the program’s most popular track, biomedical materials science, spend most of their time in the department’s physical home within the School of Dentistry building.

“While a lot of our faculty and research is engineering-based, this program isn’t only for engineers. It draws students from multiple disciplines: engineering, dentistry, biological sciences and trains them in an interdisciplinary model.

“We are here to prepare well-rounded researchers,” Salazar Marocho said.

The department prides itself in its ability to build collaborations. Within UMMC, faculty team up with other SGSHS faculty to conduct research. Outside UMMC, faculty pursue projects with institutions in Mississippi and around the world. However, what makes biomedical materials science unique is the opportunity to work on industry-sponsored research projects with various products.

“Our proximity and relationships with these manufacturers give students a chance to work with these materials at their bench tops,” Salazar Marocho said.

PhD student Kadie Parker studied bioengineering as an undergraduate at Mississippi State University. After the passing of her sister as a child, she became “interested in coming up with medical products through engineering,” she said, which she has pursued throughout her academic career.

Now at UMMC, she is conducting mechanical testing and modifying the surfaces of biomaterials to make them better at stimulating bone growth. She credits her mentor, Assistant Professor Dr. Scott Williamson (Biomedical Materials Science, 2014), with helping her explore all of her research options and creating a “helpful, enjoyable work environment,” she said.

Parker added that she joined the department because it has a really diverse group of students and professors working on different projects,” she said.

For instance, PhD student Jaccare Jauregui Ulloa trained and practiced as a dentist in her home country, Peru, before coming to the United States. Her research, working with Salazar Marocho, studies ways to debond ceramic crowns without breaking them.

“Jaccare tests biomaterials in the laboratory. Her work focuses on dental prosthetics such as crowns.”

“IT’s important to understand the properties of the materials that we work with,” she said. “When dentists remove a crown or veneer from a tooth, it also destroys that material. We want to study the ability of lasers to remove those crowns, but not destroy them.”

Jauregui Ulloa wanted a graduate program with a strong emphasis on biomaterials and a female research mentor. She found out about UMMC by reading scientific papers, and learned the department had a mentor who she said was a “perfect match” not only in expertise, but also in background: Salazar Marocho is also a dentist originally from Peru.

“This is a sign,” Jauregui Ulloa thought.

Another selling point for her was the SGSHS’s cost. Unlike other schools she considered, the SGSHS offers its stipend support to international students.

Jauregui Ulloa started her education at UMMC in January 2021, after the COVID-19 pandemic delayed her arrival by several months. Because of that, she was able to jump right into research opportunities while waiting to take the regular first-semester courses in the fall.

“I have the advantage of taking the responsible conduct in research course my first term in graduate school, and it’s been helpful to get that knowledge early,” she said.
Cell and Molecular Biology: Back to basics

BY KAREN BASCOM

Cell and Molecular Biology is all about the fundamentals. “Think of a pyramid with disease at the base and the cure at the top. There are so many steps and building blocks in between,” said Dr. Michael Hebert, program director and professor in the department. “Everyone wants to find the next Lorenzo’s oil – the cure -- but we need to understand these building blocks.

“Our department does research on all aspects of that pyramid. We cover a lot of ground.”

The department and its PhD program – formerly known as biochemistry – conducts basic and translational science with the funding it receives from National Institutes of Health and the National Science Foundation.

Under the leadership of Dr. Jane Reckelhoff, the Department of Cell and Molecular Biology is also home to UMMC’s Center for Excellence in Perinatal Research, an NIH Center of Biomedical Research Excellence. The department also hosts UMMC’s Confocal Imaging Core, a facility that lets researchers see deep into those building blocks of life.

“You can have a great idea sitting in your office, but you need institutional support to do the research,” Hebert said.

Hebert takes pride in the program’s selectiveness and the quality of students.

“Our current group of students is outstanding,” Hebert said. “We typically receive 13 or 14 applications each year, and admit two or three.”

In addition, he notes that a majority of the students are women, which mirrors national trends of women in biomedical sciences.

Alexandra Huffman started working at UMMC as a researcher in Dr. Damian Romero’s lab. Now, she’s a PhD student in the lab. Her work in the lab centers on miRNA-21, a “highly dynamic molecule” that regulates gene expression and is associated with cancers and heart disease. Now, she’s looking at how this RNA influences cell signaling in polycystic ovary syndrome, an endocrine disorder that can cause hypertension and renal disease.

In the classroom, Huffman said she’s had multiple professors from her department and beyond who do excellent work teaching the complex molecular biology of the cell, from histones to mitochondria.

“The professors come up with ways to enhance all of the knowledge that we learn,” she said. “They are true experts in what they do.”

PhD student Jacob Pruett chose UMMC not only because it’s the only academic medical center in Mississippi, but because it offered an MD/PhD, the SGSHS’s physician-scientist training program shared with the School of Medicine. He has completed the first three years of medical training, and is now finishing the three-year PhD portion before completing the fourth year of medical school.

Under the guidance of Assistant Professor Dr. Licy Yanes-Cardozo, he’s also studying PCOS.

“This is the most common endocrine disorder in women, but we have no FDA-approved medications for it,” Pruett said. So, he’s studying how a class of drugs called SGLT-2 inhibitors, designed to treat type 2 diabetes, might be used to manage the comorbidities associated with PCOS.

Pruett, who earned an F30 grant from the NIH to support his PhD research, said support from faculty has been critically important to him and his peers.

“They encouraged me to participate in regional and national meetings, even as a first-year student,” Pruett said.

“If they had not encouraged me, I might not have done it all,” he said.
Clinical Anatomy: A body of knowledge

The SGSHS’s Clinical Anatomy students are gaining a body of knowledge in order to impart knowledge about bodies. “We focus on instructing our students in three areas: anatomical knowledge, learning theory and pedagogy, and research methods and practice,” said Dr. Andrew Notebaert, the program director.

Compared to other PhD options at UMMC, clinical anatomy students receive a heavier emphasis on educational techniques. Notebaert, an associate professor of neurobiology and anatomical sciences, said the program’s classes cover learning theory, pedagogy and curricular design. This prepares students to enter classroom and teaching laboratories at medical and dental schools, undergraduate institutions, and community and technical colleges.

All clinical anatomy students start serving as teaching assistants during their second year. They gain this experience across multiple classes and UMMC schools. Currently, the students can assist in gross anatomy for graduate and medical students, dental anatomy, neuroanatomy and developmental anatomy. Notebaert said the program is also starting to get students into the School of Health Related Professions’ anatomy courses for occupational and physical therapy students.

Casey Boothe has been a teaching assistant for the SGSHS histology and gross anatomy courses for students in the Masters of Science in Biomedical Sciences program (MS-BMS). She’s turning her experiences in those classes into a significant portion of her dissertation research.

“I’m interested in student time management and self-regulated learning,” she said. “Specifically, I’m looking at our MSBMS students and using their assignments to track how they study over time.”

Boothe said clinical anatomy’s focus on learning how people learn has made her more introspective on campus and off. “It pushes you to reflect on why you think the way you do,” she said. “I expected it to apply to how we consider our teaching and research. I was not expecting it to impact how I go about my personal life.”

Clinical anatomy student Andrew Ferriby is incorporating threshold concepts into his dissertation. “It’s the idea that within a particular field, there are certain concepts a learner needs to fully understand before they can move from novice to expert,” he explained. “One example from the anatomy labs is telling the difference between an artery and a nerve. I can look at a structure and say, “that’s a nerve,” without having to think about it because I’ve put in the time to learn it, but the students can’t yet.”

He says that it is sometimes easy for educators and experts to forget what it takes to learn a concept and avoid hindsight bias, when learning or doing something was actually harder than you recall.

However, hindsight has also given Ferriby a chance to offer some advice to new PhD students. “When you’re struggling, whether it’s for academic reasons or health reasons, it’s better to do something about it sooner rather than later,” he said. “I had a situation that came to a boiling point, and as soon as I went to get help, I immediately noticed a positive change in my productivity and my happiness.”

Ferriby said the SGSHS’s annual PhD recruitment event helped solidify his decision to come to Mississippi from the Midwest to attend UMMC. “I didn’t feel stressed out when I came to visit,” he said. “Graduate school is stressful enough, and I wanted to go somewhere where I could feel comfortable.”

Casey Boothe, right, leads SGSHS masters-level students through the day’s anatomical lesson. Clinical anatomy PhD students like Boothe must serve as teaching assistants in multiple courses to complete their degrees.
Experimental Therapeutics and Pharmacology: The making of medicines

BY KAREN BASCOM

Medical science wouldn’t be where it is today without the solutions and pills that prevent and treat diseases. From over-the-counter remedies to the most specialized drugs, pharmacologists make it happen.

“Pharmacology is a unique discipline because it integrates into all of the other health science disciplines, whether it be medicine, dentistry, nursing or pharmacy,” said Dr. Jan Williams, professor of pharmacology and toxicology and director of the PhD program.

“Essentially, pharmacologists study how drugs act upon different biological systems, and how those systems react to drugs,” he said.

Pharmacology is a separate discipline from pharmacy, the clinical practice. However, the SGSHS’s program has trained multiple clinicians looking to make the move into research.

PhD student Ubong Ekperikpe is a pharmacist with several years of experience in clinical settings and medical writing, as well as some basic science work in drug discovery using African plants.

“I was originally searching for PhD positions in the United Kingdom, but realized that I could come to UMMC because the faculty are doing work in the areas where I was interested,” he said, including cardiovascular disease and diabetes. He’s now studying insulin resistance and kidney disease with Williams.

Ekperikpe said that the SGSHS and the broader UMMC community helped provide a “soft landing” as he moved from Nigeria to the United States.

“People are always willing to help if you ask,” Ekperikpe said. “When I first arrived in the laboratory, the postdoctoral fellows in the department helped me get my feet wet and helped me learn how to do western blots and other new assay techniques.”

PhD student Owen Herrock agrees.

“There are so many opportunities here for peer mentorship,” said Herrock, a Louisiana native who came to UMMC on the recommendation of fellow University of Louisiana-Monroe graduate Dr. Olivia Travis (Experimental Therapeutics and Pharmacology 2021).

His first work in the SGSHS was through SURE (Summer Undergraduate Research Experience), which brings students into faculty labs for a 10-week paid internship. He worked with pharmacology and toxicology faculty Dr. Richard Roman and Dr. Fan Fan (MS Biomedical Sciences 2013) on a project related to hypertension and aging.

Now, he’s doing his dissertation research with Department Chair Dr. Babbette LaMarca (Microbiology 2003) studying preeclampsia.

“I’m interested in how new-onset hypertension that occurs in preeclampsia may induce changes in cardiovascular health in the long-term,” he said.

Herrock says that all of the pharmacology and toxicology faculty that he has worked with have encouraged independence in the laboratory.

“My mentor likes to guide, but also gives you opportunities to succeed on your own,” he said.

After graduation, Herrock would like to pursue a postdoctoral fellowship on his way to a career in academia, a path several experimental therapeutics and pharmacology graduates have taken.

“Over the past ten years, a majority of our graduates have gone on to do postdoctoral fellowships, but we also have graduates who work in non-academic research or become teachers at undergraduate institutions,” Williams said.

“They have been very successful after leaving the program.”

The program graduated six PhD students at UMMC’s 2021 commencement, so the department is ready to bring in new, talented scientists-in-training.

“COVID-19 limited our ability to do in-person recruitment events, so we are looking forward to traveling to other institutions in our region with a major effort to recruit minority students,” Williams said. 

"Ubong Ekperikpe prepares reagents for an experiment. A pharmacist, he’s now studying metabolic diseases and potential targets for drug therapy."
Microbiology and Immunology: Small things, big impact

BY KAREN BASCOM

As Dr. Ritesh Tandon puts it, “It’s been an exciting year for microbiology.”

The emergence of the COVID-19 pandemic has put virology, immunology and infectious diseases research into the spotlight. But for decades, the SGSHS’s PhD program in microbiology and immunology has trained the scientists who will help discover, track and treat infectious diseases in the future.

Compared to other graduate programs in microbiology, “Our students get a fair amount of clinical exposure,” Tandon said. “Because we are based at a teaching hospital, we have more access to clinical samples, we have multiple clinicians on our graduate faculty. They are able to get more exposure where at other universities the focus might be more narrow.”

The Department of Microbiology and Immunology pulls funding from a diverse set of government agencies. There are the typical medical science sources, such as the National Institutes of Health and Centers for Disease Control and Prevention, but faculty and students have also received grants from the U.S. Department of Agriculture, National Aeronautics and Space Administration, and the National Science Foundation.

PhD student Mary Carr attended the Mississippi University for Women and did summer research with Dr. Justin Thornton (Microbiology 2005) at Mississippi State University. Thornton’s experience with UMMC encouraged Carr to apply to the program. She considered going out of state, but decided that the small program and the independence UMMC would grant were winning factors.

“I told faculty that I wanted to be able to develop my own research projects,” said Carr, who finished her second year of PhD study in May. Currently, she’s studying IgA1, a protease that helps prevent bacterial infection.

“I kept seeing this protease’s name in the literature, but there wasn’t much research on it,” she said. “I only found about 57 papers published since the 1970’s and I wondered, ‘why isn’t anybody studying it?’”

The National Science Foundation thought it was a good question as well. Carr applied for and received a Graduate Research Fellowship, the foundation’s flagship program for funding early-stage predoctoral research in the basic sciences. Most of her research will use in vitro models to understand the functions of IgA1. Later into her PhD work, she hopes to test her question in animal models used by her mentor, Dr. Mary Marquart, a professor in the department.

Down the hall, Dipanwita Mitra studies human cytomegalovirus with Tandon. She plans to defend her dissertation by the end of 2021.

“My research looks at ways to target specific proteins using peptides as potential therapeutics and ways to increase peptide bioavailability and enhance its therapeutic potential,” she said.

2020 provided more opportunities in virology research than expected, Mitra said. As the COVID-19 pandemic spread, the Tandon lab picked up coronavirus-related projects, including developing pseudotype SARS-CoV2 models for testing and a collaboration with the University of Mississippi School of Pharmacy for a heparin-based nasal spray.

“I’m proud to be directly involved in this novel research and to be part of these projects,” Mitra said.

Originally from India, Mitra started her PhD at another American university before transferring to UMMC. It was absolutely the right decision, she said, because the professors encourage students to learn broadly.

“Just because I’m in a virology laboratory doesn’t mean I’m not getting training in immunology or bacteriology,” Mitra said. “The students in our program take a good mix of medical school courses, which focus on the foundational knowledge, and also the graduate school courses, which focus on application.”

The Medical Center’s international community has also been helpful for her and other students from abroad.

“We are all coming to the United States from different educational systems, and the Office of International Services makes sure that we get the support we need,” Mitra said.
Neuroscience builds connections

BY KAREN BASCOM

When Dr. Douglas Vetter starts his presentations on the SGSHS’s Program in Neuroscience, he tells prospective students at UMMC, “There’s no such thing as neuroscience.” UMMC doesn’t have a department with that name, but it doesn’t need to, because neuroscience is everywhere.

“Neuroscience is really any branch of science that has to do with the nervous system. It can be biochemical, cellular, physiological, behavioral or mathematical,” said Vetter, an associate professor of neurobiology and anatomical sciences.

Faculty from about a dozen UMMC departments – from those focused on neurobiology or psychiatry to physical therapy – come together to form the program’s faculty.

“We have faculty doing research on topics such as spinal cord and traumatic brain injuries, sensory system dysfunction, behavioral sciences, substance abuse including opioids and alcohol, designing novel drug delivery systems and hypertension’s effects on fetal outcomes,” he said.

Vetter said one of the program’s strengths is its size: with three or four admissions each year, students get individualized attention.

“Sometimes prospective students take a step back when they learn this and ask ‘Is a small program a good program?’ and the answer is yes,” Vetter said. “You can’t really fall through the cracks here.”

Another one of the neuroscience program’s unique aspects is its research rotation schedule. During the first year, students spend five or six weeks in a research lab, instead of a full semester, before moving to a new lab. The program in neuroscience asks students to rotate through at least three before choosing their academic home.

“Most of our students know by about the middle of their first spring semester where they want to work, and move on to a more classical rotation length,” and spend the rest of the summer.

PhD student John Aaron Howell found his place in the laboratory of Dr. Lee Bidwell (Biochemistry, 2007), associate professor of neurology. He’s studying new ways to design therapeutic drugs to treat the inflammation in the brain after ischemic events.

“The goal is to find ways to reduced tissue loss after stroke,” he said.

Howell, a first-generation college student from Bentonia, Mississippi, said the combination of critical thinking and collaborative learning that the SGSHS faculty promotes encouraged him to pursue a career as a university professor. In addition to Bidwell, Howell says Dr. Eddie Perkins (Anatomy, 2006), associate professor of neurosurgery, has also had a large role in developing his laboratory techniques.

“They’ve really taken me under their wing,” Howell said.

“I genuinely feel that the faculty want me to succeed and go out of their way to help me be successful.”

Howell works in a more traditional wet bench laboratory setting, but the program in neuroscience has opportunities for PhD students to do more clinically-oriented work as well.

Originally from Pennsylvania, PhD student Elizabeth Gordineer was a laboratory technician for a pharmaceutical company before coming to Mississippi. She started doing rotations in UMMC’s basic science labs, but found the work didn’t quite fit her interests.

“That was the reason I left industry, that was the purpose of coming to graduate school,” – to do science in a new environment, Gordineer said.

She found that new environment through UMMC’s partnership with Methodist Rehabilitation Center, a hospital adjacent to campus. She’s working with Dr. Matthias Krenn, assistant professor of neurobiology and anatomical sciences, doing electrophysiology with human neurotrauma patients at MRC.

Vetter said Gordineer’s recruitment to the SGSHS is an example of how the program in neuroscience is growing its reputation beyond Mississippi.

“In the past ten years, we’ve become more visible nationally, recruiting from the western and northeastern United States,” Vetter said.
Nursing: A commitment to care and excellence

BY KAREN BASCOM

While nursing as a practice is thousands of years old, its history as a scientific discipline is much shorter. But for nearly 25 years, UMMC’s PhD in Nursing has trained nurse-researchers that are prepared to lead the discipline and educate the next generation of nurses.

A joint venture of the SGSHS and the School of Nursing at UMMC, “We’re Mississippi’s only research-intensive program rooted in nursing practice,” said Dr. Mary Stewart (Nursing, 2003), director of the PhD program.

“That means our students’ dissertation research is oriented around patients and outcomes. It doesn’t have to be bedside nursing, it can be through a systems approach or with populations and communities.”

The PhD prepares nurses for careers in administrative leadership and as nurse educators. The latter role is particularly critical right now: with increased enrollment in undergraduate tracks, nursing schools need to add credentialed and experienced faculty.

While some doctoral nursing programs are approaching the national nurse educator shortage through quantity, UMMC’s PhD in Nursing is going “against the grain,” Stewart said, by continuing its emphasis on quality.

“We are now reaping the benefits of growing our own,” she said, noting that several graduates are now faculty in the School of Nursing. “The faculty in our program took the time to do this work and are publishing academic research and gaining promotions in a way that may not have happened just ten years ago,” she said.

The strength of UMMC’s program lies in its small size, synchronous coursework and emphasis on maintaining faculty-student relationships, whether the coursework is in the classroom or online.

“Even when we’re not meeting face-to-face, we really yearn for connection, discussion and group problem-solving through dialogue,” Stewart said – all qualities that serve practicing nurses well.

That’s because most of the PhD students continue to work in clinical care as they pursue their degree. For instance, Gordon Gartrell has worked as a supervisor for the adult Emergency Department at UMMC and is now a nurse manager at Children’s of Mississippi.

“I want to be a resourceful and knowledgeable leader, and a PhD marks the pinnacle of education and leadership,” Gartrell said. “This degree will open a lot of doors quickly, and I’m excited about the opportunity to write, publish and do research.”

He recently finished his first year in the program.

“It’s completely changed how I think about nursing as a practice,” he said.

Student Sara Cartee is a pediatric nurse in the medical surgical unit at Children’s of Mississippi. She started to pursue a Master’s degree with an emphasis in nursing education, but her professors encouraged her to pursue a doctoral degree.

Both students are interested in doing dissertation research informed by their clinical experience. Gartrell wants to study new ways to manage and treat sexual assault victims who come to emergency departments to give them the dedicated care they need. Cartee is interested in peer mentoring-based interventions for pediatric patients and their caregivers to help them manage type 1 diabetes more effectively.

Cartee says some of the most valuable advice she has received during her PhD studies is about time and personal management.

“Your life is like a pie graph, and right now, everything is filled up,” she said. “You have to make adjustments in order to make time to study and meet your other obligations.”

Gordon Gartrell administers a COVID-19 vaccine as part of the Medical Center’s response to the pandemic.
Physiology and Biophysics: 
A powerhouse program in the U.S.

When it comes to academic physiology, there might be no other institution more associated with excellence than UMMC.

“We’re a world-renowned department known for our work in cardiorenal physiology and preeclampsia,” said Dr. Barbara Alexander (Biochemistry, 1997), professor of physiology and biophysics and PhD program director.

The Department of Physiology and Biophysics is in the top 10 for National Institutes of Health (NIH) funding for cardiovascular and renal research. The department, based on research that originated in the laboratory of Professor Dr. Joey Granger (Physiology and Biophysics, 1983), established the field of pre-clinical studies of preeclampsia research. To date, UMMC has the highest level of NIH funding for preeclampsia research, all of which originated with Granger and his trainees.

Likewise, the program’s students and graduates have plenty of success with funding, Alexander said.

“When our students leave this program, they have impressive CVs and a track record of obtaining pre-doctoral funding through the NIH and the American Heart Association,” she said.

The department’s graduates pursue careers in industry and government, and have particular success in breaking into academic leadership roles. Alexander says about 31 former department trainees, including graduate students and postdoctoral fellows, went on to become physiology department chairs.

In addition, the department’s faculty -- late Department Chair Dr. Arthur Guyton, and current Chair Dr. John Hall -- literally wrote the book on medical physiology (see story on page 34). The SGSHS’s physiology students use this text to prepare for their qualifying exam. Taken at the end of the second year of study, passing the exam moves students in the official PhD candidacy phase of the program.

“It’s an extremely difficult test,” said student Dr. Osvaldo Rivera Gonzalez. “There is a written portion, but there is also an oral exam where seven or eight physiology faculty ask you questions about anything in the Guyton physiology textbook.”

To prepare, Rivera Gonzalez and his cohort-mates met with almost all of their examining faculty one at a time first.

“For instance, we had a practice session with Dr. Joey Granger (Physiology and Biophysics, 1983) where he would ask us questions about renal physiology and then we would teach him to show that we knew the material.”

“I’m really glad we took that approach,” Rivera Gonzalez said. This process, as well as their daily interaction in classrooms, labs and elsewhere created bonds “forged by fire.”

“They [Kyle Moore and John Daseke] have been Instrumental to my success, and I couldn’t imagine where I’d be without them,” he said.

Originally from Puerto Rico, Rivera Gonzalez earned a master’s degree at the University of Louisiana-Monroe and knew he wanted to study metabolic disease as a part of a doctoral program. Rivera Gonzalez defended his dissertation in 2021, examining insulin resistance in diet-induced obesity, under the mentorship of Dr. Joshua Speed (Physiology, 2011).

Rivera Gonzalez says entering a PhD isn’t a decision one should make lightly. But for the right person, it can be exceptionally rewarding.

“I think it’s important to have a drive and a passion that allows you to pick yourself up,” he said.

BY KAREN BASCOM

Dr. Osvaldo Rivera Gonzalez studied obesity-induced insulin resistance as a PhD student. He defended his dissertation in June 2021.
In materials science, polymers are about as diverse a class as can be. Some are natural and elastic, like wool; others tough and synthetic, like PVC. Polymers can warm us, house us, entertain us and heal us.

It’s fitting that Dr. Jared Cobb’s research projects at the University of Mississippi Medical Center were as diverse as the materials he studied. With a PhD in Biomedical Materials Science from the School of Graduate Studies in the Health Sciences, he’s already using his skills in the workforce.

Then again, Cobb almost didn’t go to graduate school at all. His polymer science degree from the University of Southern Mississippi prepared him to do research for a private company. But Meredith Cobb – UMMC MD/PhD student and Jared’s wife – encouraged him to apply after meeting with SGSHS faculty during her orientation.

“Meredith said, ‘you have to meet this professor, you would really like him,’” Jared Cobb said. “So I did, and I thought, ‘This guy is awesome, and I want to work with him.’”

That professor was Dr. Amol Janorkar, now chair of the Department of Biomedical Materials Science. His laboratory does research at the intersection of engineering and chemistry using elastin-like polypeptides, or ELP. These polymers, based on the structure of the ubiquitous protein in its name, have profound potential for use in drug delivery, tissue engineering and more-biologically relevant in vitro experiments.

While the lab’s work focuses primarily on using ELP for human applications, Cobb saw an opportunity to apply the technology to a buzzworthy cause.

“I went to Dr. Janorkar’s office one day and told him that I thought I had come up with an idea for a research project: drug delivery for bees,” Cobb said.

Scientists think the invasive Varroa mite parasite is involved in about 70 percent of U.S. honeybee colony...
losses. With bees responsible for pollinating more than 90 fruit, vegetable and grain crops that make up one-third of the American diet, bee health is human health.

However, Cobb said, current methods for Varroa control are also toxic to bees. Cobb’s idea was to find a way to use non-toxic ELP technology to target anti-parasitic drugs directly to the mites.

Janorkar recalls looking at Cobb “like he was a little bit crazy.” However, Janorkar felt confident that if his student could secure funding, he could make the project happen.

“He’s always coming up with new projects and new ideas and he’s able to execute them quickly and to completion,” Janorkar said. “And that’s what sets him apart.”

Cobb applied for and received a grant and fellowship from the U.S. Department of Agriculture to pursue the project. He and Janorkar also found collaborators at Mississippi State University who were also interested in the application.

“We were able to design particle for testing and monitor drug release and were able to get some of this work published,” Cobb said.

It’s just one reason why Janorkar describes his former student as “innovative”. The U.S. Patent and Trade Office also noted that quality as well. Cobb is the co-inventor on a provisional patent application, along with Janorkar, Dr. John Correia, professor of cell and molecular biology, and SGSHS alumna Dr. Valeria Zai-Rose (Cell and Molecular Biology, 2019).

In brief, Cobb and colleagues “developed a way to use a surface to form ELP particle instead of a [liquid] solution. With this method, we can control particle size by controlling salt and pH,” he said. This expands the toolkit scientists have for creating ELP-based therapeutics, a research area where UMMC scientists excel.

The interacting effects of hundreds of parameters affect how ELPs form. Scientists can work out the expected results beforehand, but those are slow, hard calculations for a human to do. For another part of his dissertation research, Cobb learned a new skill to help solve this challenge.

“One day he came to me and said he wanted to learn more about computer programming and machine learning because that’s where the field of polymer science is going,” Janorkar said. “So, I told him to make it an important part of the dissertation.”

Cobb has published two papers so far applying machine learning to ELP, devising ways to determine optimal conditions for controlling properties like size and transition temperature.

As he wrapped up his dissertation in 2020, Cobb shifted gears to apply some of what he learned to the COVID-19 pandemic. He used machine learning to examine the effects of the earliest shelter-in-place orders issued in the United States. The results predicted slower growth of cases in areas with shelter-in-place orders, as other studies have confirmed.

Beyond the science and engineering, Cobb improved organization and mentorship at UMMC. He had mentored junior lab members at USM, but the School of Dentistry’s summer UPSTART (Undergraduate and Professional Student Training in Advanced Research Techniques) and SGSHS’s SURE (Summer Undergraduate Research Experience) program provided even more opportunities.

One summer, Janorkar and Cobb took on several students, which can make it challenging to create an enriching and
productive environment for everyone in the laboratory. However, Cobb made it work.

“I planned out projects, gave them a roadmap for every step, taught them how to use the instruments and set the expectations for the summer up front and very clearly,” he said. “We also set up weekly meetings with the students so they could present on their research progress and prepare the final summer presentations as they went along.”

Because of that level of organization, Cobb said, “at least three or four of those students were authors on publications,” an accomplishment he’s quite proud of.

The SGSHS is also quite proud to call Cobb one of their alumni, bestowing him with the Robert A. Mahaffey Award from the SGSHS. Named for a late graduate student, this highest honor recognizes not only exceptional research potential, but also character.

“[Cobb] is sincere and honest, and you can trust what he says,” Janorkar said.

Cobb finished his graduation requirements in summer 2020. Since then, he’s worked at the U.S. Army Corps of Engineers Engineering Research and Development Center in Vicksburg. Just like his time at UMMC, Cobb has been able to apply his knowledge to multiple projects, one on “physics-informed machine learning” and another that explores the use of polymers for biosensors. At home in Fondren, he keeps busy as well: he and Meredith have two daughters: Elizabeth and Montgomery.

The key to success in graduate school? Cobb says his best advice is to find a supportive mentor and attempt new projects, but also to recognize when your energy might be better spent elsewhere.

“You can try a project for a month and if it works, great. If not, move on to a new task,” Cobb said. “Go accomplish something else.”
Meet the MD/PhD Class of 2021

Dr. Jason Engel, physiology and biophysics
Dr. Hannah Turbeville, experimental therapeutics and pharmacology
Dr. Subhi Talal Younes, physiology and biophysics

Give us the “elevator pitch” version of your dissertation

Engel: My dissertation work demonstrated the therapeutic efficacy of a novel kidney-targeted form of vascular endothelial growth factor (VEGF) to recover renal microvascular integrity and, subsequently, renal function in a swine model of chronic kidney disease. Furthermore, my work was the first to demonstrate a mechanistic role for pro-angiogenic M2 macrophage polarization in sustaining the beneficial effects of VEGF on renal microvascular integrity. These results support the use of renal-targeted therapeutic angiogenesis as a potential new treatment strategy for a patient population with limited clinical options.

Turbeville: I studied the long-term consequences of pre-eclampsia in mother and child using a rat model, primarily looking at blood pressure and kidney injury. I found that long-term maternal kidney injury might be related to persistent immune cell infiltration and activity and imbalances between nitric oxide and endothelin. I also found that sildenafil does not affect blood pressure or renal injury of offspring of pre-eclamptic pregnancies.

Younes: I studied the central role of the endothelium in understanding the pathophysiology and treatment of pre-eclampsia.

What are your post-UMMC residency plans?

Engel: Internal Medicine, UMMC, with possibility of specializing in hematology and oncology

Turbeville: Otolaryngology-Head and Neck Surgery, University of Michigan

Younes: Pediatrics, Brigham and Women’s Hospital/Harvard University

What accomplishments are you most proud of from your time at UMMC?

Engel: Receiving the “High Impact Paper – Basic Science” award from Hypertension for my first first-author paper published in 2019

Turbeville: I received the 2020 Robert Mahaffey, Jr. award from the SGSHS. This award recognizes a student with great potential in research. Receiving it was totally unexpected! It was so impactful because I saw it as an award not for what I had done already, but what I am capable of in the next phase of my career. Knowing that the faculty see potential in me made me really believe in myself and my future in research.

Who have been your most influential supporters during your time at UMMC?

Engel: My most influential supporters have been my parents, who raised me towards a love for science; my wife, who has been my rock these last ten years, and my mentor, Dr. Alejandro Chade, for always pushing me to be better.

Turbeville: My parents, my husband Patrick, my fellow MD/PhD students, my PhD mentor Dr. Jennifer Sasser, and my friends Elyse, Rebecca, and Emma. I would also be remiss not to mention the incredible support from the otolaryngology department at UMMC, particularly Drs. Scott Stringer, Jeffrey Carron, and Mark Reed.

What advice do you have for students considering MD/PhD training?

Engel: Strongly consider what you want your career to look like in the future, especially your balance of clinical-to-bench time. Make good use of your early lab rotations to identify a mentor who can help you acquire skills and experience to facilitate those career goals.

Turbeville: There are a lot of options for pursuing a career as a physician scientist. There are ways to do research without a PhD. Make sure this is truly the right path for your goals. The best way to do that is to talk to as many physician scientists and trainees as possible! Don’t be afraid to reach out and ask for the mentorship that you need.
Regions TEACH prize goes to microbiology “powerhouse”

BY KAREN BASCOM

A “saint.” A “gem.” A “true powerhouse in the profession of teaching.”

That’s a bit of praise University of Mississippi Medical Center students have heaped onto Dr. Stephen Stray, associate professor of microbiology and immunology. Now, he can add one more descriptor: 2021 Regions TEACH Prize winner.

Since 2013, the annual Regions TEACH, short for Toward Educational Advancement in Care and Health, Prize has recognized one faculty member with a $10,000 award and the knowledge that students had a say in selecting the person deemed the year’s most outstanding educator at UMMC. The award is presented in conjunction with the annual induction ceremony for the Nelson Order, which recognizes the Medical Center’s best teachers. This year’s ceremony took place Monday, May 10 in the School of Medicine and via livestream.

“It’s a genuine honor to be named alongside people I value as colleagues and as friends, and when I think about the people who have been selected [for the TEACH Prize] before, it’s strange to me that people think I’m on the same level as these folks,” Stray said.

It’s not a surprise for the students in the Schools of Graduate Studies in the Health Sciences and Medicine, who put his name forward for the honor. A six-time Nelson Order inductee, Stray directs the first year doctoral-level Microbiology and Immunology course, in addition to the equivalent courses in the Schools of Medicine and Dentistry.

Dr. Ellen Robertson (Clinical Anatomy, 2019), assistant professor of neurobiology and anatomical sciences, wrote in her recommendation letter that Stray might be underselling his skill.

“In many ways he is far too humble in regards to his teaching ability and insights,” wrote Robertson, who had Stray as a member of her dissertation committee. “He is engaged, and a leader, on campus in promoting student learning through active sessions.”

Whether he is in a lecture hall or a laboratory, Stray sees himself as a guide and encourager for his students.

“People sometimes need convincing that they know the material, and I want to be a cheerleader for them, because I know they can do it,” Stray said. “One of the most rewarding experiences is when there’s a student who is having a hard time with the material, and then I witness the moment the penny drops, when they see the implications and learn how to apply the knowledge. That’s an incredible feeling.”

Stray says he’s had too many cheerleaders of his own to name, including colleagues at UMMC, high-school instructors and his parents. However, only one elementary teacher makes the list: Tony Sestito, the leader of the one-room school Stray attended in rural Australia.

“There were about 24 of us, from 4 years old through sixth grade. One teacher basically covered everything and managed to do it in an age-appropriate manner for each student. It was astounding,” Stray said. “He opened the doors to a wide world of knowledge [in a place where] many of the students and their parents hadn’t ever gone more than 100 miles from their home.”

This experience, along with his parents and grandparents’ love of learning, helped encourage Stray’s desire to become a teacher. He studied biochemistry at the University of Melbourne before earning a PhD in microbiology at the University of Alabama-Birmingham. His research there focused on how influenza viruses infect cells and replicate. After a postdoctoral fellowship at the University of Oklahoma Health Sciences Center studying hepatitis B viruses, he joined the UMMC faculty in 2006.

Today, Stray brings an infective enthusiasm to the classroom.

“I’m quite lucky that I teach in the areas where I’m most interested,” he said. “I enjoy teaching about viruses, the cool things they can do and the tools we come up with to combat them.”

He teaches what medical students need to know for board exams, but also ensures they learn about cutting-edge advances that will benefit their patients in the clinic. For instance, Stray introduces students to new and emerging drug treatments for viral infections such as hepatitis B and hepatitis C.

“Students might say, ‘that’s not on the test.’ But, you may prescribe this to patients during your clinical rotations or as an intern, and that makes it valuable knowledge to have,” he said.

Stray has seen an uptick in student interest in virology, as well as an opportunity to add coronaviruses to the usual influenza and hepatitis-linked examples he uses in class. Even before the pandemic, Stray had, “at least three ways to approach any topic” – some of his own creation, others borrowed from colleagues.
Dr. Stephen Stray’s commitment to microbiology education has influenced graduate, medical, dental, undergraduate, and even high school students at UMMC for 15 years.
If something works, I’ll steal it,” Stray said.

Choosing the right techniques comes down to discovering the students’ learning styles, whether through direct communication or reading the room.

“I like having an audience because I can see student’s faces,” he said. A single furrowed brow in the crowd signals one person might need extra help, “but if 25 percent of the class looks lost, then I know I have to go back and try again.”

“He was so intuitive about which parts of the lab we were either struggling with or not completing with confidence and stepped in to teach us about them,” one student wrote in an evaluation. “Without fail, when he stepped over to show us something or ‘remind’ us about a detail it was something we didn’t know or actually needed help with but just hadn’t asked about yet.”

Stray also uses his laboratory as an active-learning space for students in research experience programs, most notably Base Pair, Murrah High School’s decades-long mentoring partnership with UMMC.

“Base Pair really has made a big difference in a lot of lives,” Stray said in 2019. “We’ve had students who’ve come through this program who are now practicing as dentists and as physicians and doing other things that they may have never even considered as career opportunities because they got this exposure.”

Stray and his students pursue a variety of projects clustered around virus evolution and the potential of virus-inspired particles as anti-cancer therapeutics.

“Viruses are exquisitely evolved to deliver cargo to specific cells. Most viruses are adapted to recognize very specific cell types by binding to a single or limited range of cell surface receptors,” Stray writes of his research interests. “We wish to enhance this toolbox for physicians to use by identifying additional viruses that may be useful in targeting glioblastoma and other cancer cells.”

While the COVID-19 pandemic limited possibilities for students to work physically in the laboratory, Stray found a way to incorporate the virus into an existing research module.

“This year, the Base Pair students are using a molecular modelling freeware program to look at the variants of SARS-CoV-2 that have emerged in the United Kingdom, South Africa and other places. We’re able to look at the structure of their spike proteins and their mutations to learn what we can say about their potential effects,” Stray said.

Dr. Donna Sullivan, professor of medicine and long-time Base Pair co-director, wrote that Stray is of the program’s most valuable advisors.

“He is highly sought after as a mentor and many of them have volunteered their summers in Dr. Stray’s lab. Clearly, his love of research and excitement for science transfers to his students. Indeed, many continue to seek his counsel in their college careers,” she said.

“If there’s one thing I hope I can model, it’s that I can pass on my love of learning to my students and make it about them,” Stray said. “In turn, I’m hoping that this will pay forward to the next generation of researchers, educators, and practitioners who will be centered on the needs of their own students and patients.”
Alumni Spotlight: Dr. Quincy Moore

BY KAREN BASCOM

Dr. Quincy Moore (Microbiology and Immunology, 2007) is an associate professor of biology at Prairie View A&M University in Texas. As director of the University’s Honors Program, he has been involved in teaching, research and service over the course of his career. The Graduate Report caught up with Moore to learn more about his experience in the SGSHS and how it shaped his career:

What excites you most about the work you do today?
My job allows for discovery and creative innovation. I also work with a great group of students that are the future leaders of tomorrow.

What are you most proud of in your work?
The four years that I spend with the students to prepare them for their futures. I get the chance to congratulate them not only at the undergraduate level, but also to receive updates from them when they share the news that they have achieved their professional goals.

Why did you choose to attend UMMC for your PhD?
Dr. Larry McDaniel [currently professor and chair of the Department of Microbiology and Immunology] was working on translational research with DNA vaccines on pneumococcal infections and he gave me the opportunity to work as a research assistant for a year. After that year, I entered the PhD program to further pursue the research and obtain my doctorate.

Give us the “elevator pitch” version of your dissertation?
Streptococcus pneumoniae is the causative agent of many diseases that affect both the younger and older generations. The research sought novel therapies such as DNA and protein vaccines to offer a therapeutic option for the susceptible age groups. An investigation into pneumococcal proteins ability to protect against the pathogen was carried out using the established murine model of pneumococcal disease. Several publications from our study provided evidence for the potential of pneumococcal virulence factors as potential vaccine candidates.

How have your career plans shifted over time – what parts of your current work align with the expectation you had when you graduated, and what’s different?
Currently, I have an administrative appointment that allows for engagement with a more diverse student body outside of just the STEM majors. My research program has shifted to incorporate projects that have direct impact on society and answer questions relevant to the environment where I am located. I have learned how to become flexible and continue to stay productive. My training since 2000 has focused on host-pathogen relations and novel therapies. Since then, I have adapted to include environmental studies and COVID-19 impact studies.

What experiences or skills you picked up at UMMC do you still use in your work?
My current research incorporates bacteria and models from both my graduate and postdoctoral training at UMMC. The graduate courses helped me to prepare all of my students for professional school.

What skills do you wish you learned in grad school that you picked up later?
Grant writing is a skill set that is essential for all graduate students pursuing academic positions.

Who have been your most influential mentors?
In the SGSHS’s Microbiology program: Dr. Larry McDaniel, Dr. Mary Marquart, associate professor; and Dr. Bill Clem, former chair of the Department.

Beyond UMMC: Dr. Terrance Johnson, Dr. Clifford Houston at the University of Texas-Medical Branch and Dr. Willie Trotty at PVAMU.

How did the COVID-19 pandemic affect your day-to-day work?
COVID-19 led to a great disruption in our face-to-face activities but was offset with the use of the Zoom platform and Microsoft Teams for meetings. I offered my first hybrid class in microbiology, which presented its challenges, but also pushed an innovative approach for the students.

What advice do you have for current PhD students exploring their career opportunities, especially those considering careers similar to yours?
Formulate your research ideas into papers early in your program that will allow for more peer review experiences. Participate in writing grants with your major professor and submit a grant on your own before you graduate. Mentor future scientists and participate in interdisciplinary work. Find ways to teach to gain essential experiences for jobs in the academic settings.
In 1975, the Guardian Society was created to honor the University of Mississippi Medical Center’s most generous individual donors. During the last four decades, UMMC alumni and other gracious benefactors have helped the School of Graduate Studies in the Health Sciences maintain its standard of excellence by giving to the Guardian Society. Founding members have helped UMMC achieve unparalleled success in its threefold mission of providing exceptional patient care, training the next generation of health care providers and engaging in innovative research.

Active members contributing annually help sustain and ensure the future of research and education in the School of Graduate Studies in the Health Sciences. We are grateful to our Guardian Society members for their leadership and generosity.

All alumni and friends of the School of Graduate Studies in the Health Sciences are invited to join the Guardian Society by giving annually to the school. Guardian Society members will receive special benefits based upon the amount of their annual donation and corresponding membership level.

To learn more about how you can become a member of the Guardian Society, call the Office of Development at (601) 984-2300 or email dev-info@umc.edu. To join online, visit umc.edu/guardian-society.
New endowments honor Dr. Julius Cruse

BY KAREN BASCOM

Two new endowments at UMMC honor one of its most renowned faculty members and pave the way for the next generation of immunologists.

The “Julius M. Cruse, M.D., Ph.D., Pathology Endowment” will perpetuate the memory of the former Guyton Distinguished Professor of Pathology, Medicine and Microbiology. Cruse died Aug. 20, 2018, at the age of 81.

The fund honors Dr. Cruse’s contributions and commitment to the department and to UMMC, as well as his leadership in establishing the Division of Immunopathology and Transplant Immunology. Other admirers of Cruse are invited to donate to the fund as well.

In addition, the School of Graduate Studies in the Health Sciences has announced a scholarship endowment also named for Cruse, established with a $25,000 gift. The endowment fund will provide income for graduate student scholarships as a recruitment resource, with priority given to PhD students in the SGSHS who focus their research on immunology or pathology.

The scholarship’s first recipient is Alexandra Getchell, who graduated from Pennsylvania State University in 2021 with a BS in immunology and infectious diseases. She will enter the SGSHS’s PhD program in microbiology and immunology this year.

Cruse was also UMMC’s first distinguished professor of the History of Medicine. He was the editor-in-chief of three international medical journals, retiring in 2015 after a professional tenure of almost 50 years.

A 1958 graduate of the University of Mississippi with B.A. and B.S. degrees in chemistry, Cruse was a Fulbright Fellow at the University of Graz (Austria), where he received the D.Med.Sc. degree summa cum laude in 1960.

He received his MD/PhD in pathology from the University of Tennessee College of Medicine. He also completed a postdoctoral fellowship at UT Memphis.

Cruse became one of the most eminent immunologists of his time. His research centered on transplantation and tumor immunology, autoimmunity, MHC genetics in the pathogenesis of AIDS, and neuroendocrine-immune interactions. He received many research grants during his career and was an investigator of the Wilson Research Foundation, Mississippi Methodist Rehabilitation Center.

He authored or co-authored more than 40 books and more than 300 scholarly articles in professional journals. Among his best-known works were the Illustrated Dictionary of Immunology and the Atlas of Immunology.
Kimberly Jackson, center, a 2021 MS in biomedical sciences graduate, gets help with her hood from fellow biomedical sciences graduate Sydney Thomas and her father Dr. Christopher Jackson, prior to the commencement ceremony.

Newly-minted Experimental Therapeutics and Pharmacology graduate Dr. Bibek Poudel takes a photo of fellow EPT graduate Dr. Olivia Travis and Program Director Dr. Jan Williams after they exited the 2021 Commencement stage.

UMMC’s Associate Student Body planned a socially-distanced pumpkin-carving festival to celebrate Halloween 2020.
Hobbies and Haunts

The COVID-19 pandemic limited on-campus activities for students, so we asked about their favorite activities in and around Jackson when they’re not working or studying:

Girl Scout Troop leader
— Mary Carr

Running along the Natchez Trace trails
— John Aaron Howell

Exploring new restaurants
— Elizabeth Gordineer

Video games
— Jacob Pruett

Exercising at the gym—it’s an excellent stress reliever
— Osvaldo Rivera Gonzalez

Golfing with fellow students or with faculty
— Andrew Ferriby

Exploring nature and going on duck hunts in the Mississippi Delta
— Alexandra Huffman

Repairing old motorcycles
— Gordon Gartrell

Reading non-fiction, especially history
— Ubong Ekperikpe

Trivia: 1908 at the Fairview Inn when I want to feel good about myself; Finian’s for a reality check.
— Owen Herrock

Spending time with my kids
— Sara Carfee

Playing pick-up sports, like soccer and basketball
— Kadie Parker
In gymnastics, it was once thought impossible. In surfing, it’s considered rarely attainable. No matter the discipline, achieving a “Perfect 10” is a notable triumph. To repeat the feat is remarkable. Yet that’s just what scientists at the University of Mississippi Medical Center accomplished earlier this year when a National Institutes of Health review committee crowned a pair of its training programs with a Perfect 10 score.

“It is highly unusual to receive a score of 10, especially during first submission,” said Dr. Joey Granger, dean of the School of Graduate Studies in the Health Sciences, Billy S. Guyton Distinguished Professor and professor of physiology and medicine at UMMC. “I think such an achievement speaks highly of the quality of mentors and research training at UMMC for our graduate students and postdoctoral fellows and summer experience for our undergraduate students.”

The SGSHS received a $2 million NIH award - and perfect score - for the “Cardiovascular-Renal Research Center’s Hypertension and Cardiorenal Diseases Research (HCDR) Training Program, and a $414,000 NIH grant - and immaculate tally - for the “Mississippi Diversity in Hypertension and Cardiorenal Research Program.” Granger serves as principal investigator for the first; Dr. Joshua Speed, assistant professor of physiology and biophysics is the new PI for the second.

No less an authority than Dr. David D. Gutterman, Northwestern Mutual Professor of Medicine and senior associate director of the Cardiovascular Center at the Medical College of Wisconsin, described the Medical Center’s two “Perfect 10” NIH research grant scores as “an extraordinarily unusual achievement.”

“It signifies incredibly impactful, innovative and well-written grants with no weaknesses,” Gutterman said. “The best of the best rarely achieve this score, since each of the dozen or more members of the NIH review panel must be in agreement to allow for such an outcome.

“Receiving a score of 10 is comparable to pitching a perfect game in Major League Baseball, an amateur bowler scoring 300 or an NFL running back rushing for 200 yards in a single game. Having two grants from the same school simultaneously receive such a score is unprecedented, as far as I can tell.”

In its tenth year, the HCDR’s main objective, according to Granger, is to “recruit, train and mentor pre-doctoral and postdoctoral students in hypertension and cardiovascular renal research so that they become the next generation of researchers in this field.”

“To achieve this goal, the CRRC continues to provide a stimulating and productive mentoring environment for pre-doctoral and postdoctoral students,” he said. “The HCDR Training Program not only capitalizes on the expertise of a strong group of basic science and clinical investigators in the field of cardiovascular and renal research at UMMC, but also the resources provided by these established laboratories and the CRRC core facilities.”

“Receiving a perfect 10 is professional recognition of the incredible legacy of this program,” Gutterman said, “as well as its future potential for training effectiveness, recruitment, mentorship and development of the next generation of cardiovascular and renal scientists.

“As a member of the program’s External Advisory Committee, I am especially impressed, actually blown away, by the unparalleled success in recruiting outstanding trainees, including a high percentage of minority applicants. I know of no other program in the country that comes close to having such a rich pipeline of competitive candidates, especially minority candidates.”

The other “Perfect 10” awardee, the Mississippi Diversity in Hypertension and Cardiorenal Research Program, functions as a pipeline training grant for undergraduate students. The competitive renewal of the proposal was awarded for April 2020 through March 2025, which represent years 7 through 11 in the successful funding of the program.
Physiology professor to receive distinguished lectureship prize

BY KAREN BASCOM

Dr. Robert Hester, Billy S. Guyton Distinguished Professor and professor of physiology and biophysics, will be the 2022 recipient of the American Physiological Society’s Claude Bernard Distinguished Lectureship Award. First presented in 2018, the award is given to an established investigator with a history of excellence in education who is making outstanding contributions to teaching and learning.

Hester, a member of the UMMC faculty since 1985, is the primary architect of HumMod, a computer and mathematics-based tool for modeling human physiology. In addition to its expansive research utility, Hester uses the simulation to teach students how to apply physiologic principles and enhance their understanding of acute and chronic conditions throughout the body. Hester also developed a related education package, “Just Physiology,” based on HumMod.

The accomplishments make Hester an “innovator of educational materials for teaching and learning physiology,” said Dr. John Hall, Arthur C. Guyton Professor and Chair of Physiology and Biophysics, in a letter nominating Hester for the honor.

At UMMC, Hester is director of the medical physiology course’s respiratory physiology section and student laboratories. In addition to other courses he has taught through the years, Hester has mentored dozens of medical and graduate students, postdoctoral fellows and faculty at UMMC.

Hester has furthered the APS’s educational mission as a member of its Education Committee, co-chair of the refresher course for teaching muscle physiology, faculty for several professional skills courses and reviewer for the journal Advances in Physiology Education. The Claude Bernard Distinguished Lectureship awardee receives a $1,000 prize and presents the aforementioned lecture at the upcoming Experimental Biology Meeting, scheduled for April 2-5, 2022, in Philadelphia, Pennsylvania. Hester’s talk is expected to further interest in and enhancement of educational practices relevant to teachers of physiology.

Hester

AHA council pays tribute to biology chair’s HTN research excellence

BY KAREN BASCOM

Dr. Jane Reckelhoff, UMMC professor and chair of the Department of Cell and Molecular Biology, has received the 2021 Excellence Award for Hypertension Research from the American Heart Association’s Council on Hypertension.

The award recognizes researchers who have had a major impact in the field of hypertension and whose work has contributed to improved treatment and greater understanding of high blood pressure.

“This award is a tremendous honor for me, but it would not have been possible without the hard work of all of my postdoctoral fellows, students and collaborators with whom I have worked over the years,” Reckelhoff said.

Reckelhoff’s research focuses on the mechanisms responsible for the sex differences in blood pressure control and renal disease, postmenopausal hypertension and polycystic ovary syndrome. She is founding director of the Mississippi Center of Excellence in Perinatal Research, which studies health conditions associated with pregnancy and childbirth through basic, clinical and population science methods.

A faculty member in the Department of Physiology and Biophysics since 1991 and chair of cell and molecular biology since 2017, Reckelhoff was a Billy S. Guyton Distinguished Professor, the university’s highest faculty honor, in 2010 and 2015.

Reckelhoff has received numerous awards for her research, including the Harry Goldblatt Award in Cardiovascular Research from the AHA, the Young Scholar Award from the American Society of Hypertension/Monarch Pharmaceuticals, the Lewis K. Dahl Award for Hypertension Research from the AHA Council on Hypertension, and the Ernest Starling Lecture Award from the American Physiological Society. She was also the University of Mississippi’s 2018 Southeastern Conference Faculty Achievement Award winner.

Reckelhoff will give a presentation during the Hypertension 2021 Scientific Sessions. She shares the 2021 award with Dr. Alan Johnson of the University of Iowa and Dr. Daniel Levy of the National Institutes of Health.

“The Excellence Award is the highest recognition that can be achieved in the field of hypertension research,” said Dr. Joey Granger, dean of the School of Graduate Studies in the Health Sciences at UMMC and former chair of the AHA’s Council on Hypertension. “Dr. Reckelhoff was a trailblazer in the field of sex differences in cardiovascular disease. She was there when the field emerged and is now a world leader.”
UMMC had a near-record year for research funding in Fiscal Year 2020, despite the financial challenges related to the COVID-19 pandemic.

The last fiscal year, which spanned July 1, 2019 to June 30, 2020, included 347 extramural awards totaling $82,340,623.

Dr. Richard Summers, associate vice chancellor for research, says the only prior year where UMMC received more funding was 2011. However, 2020’s 347 awards is the highest the Medical Center has ever received.

The majority of these funds go towards research projects at the Medical Center, ranging from HIV in aging populations to the effects of space radiation. They include continuing funding for marquee projects like the Jackson Heart Study, as well as small grants that support new lines of inquiry and doctoral student dissertation projects.
“We do cherish the big grants we received, but if we really want to develop a robust research infrastructure, we need grants that support individual scientists,” Summers said. “More individual grants means a greater matter of diversity in subject matter.”

Dr. Jussara do Carmo, associate professor of physiology and biophysics, received an R01 grant from the National Institutes of Health to study the long-term consequences of parental obesity in their offspring’s heart, kidney and metabolic health.

“We are seeing higher rates of obesity in women and men of reproductive age, and we want to understand how that affects their offspring, the next generation,” do Carmo said.

For example, offspring that eat a healthier diet than their high-fat-diet-fed parents are more likely to be obese or have hypertension than the offspring whose parents do not. In their current project, do Carmo and her research team are studying how parental obesity affects the production of a protein that may contribute to kidney injury and high blood pressure in their offspring. Ultimately, this work could help researchers develop therapies that limit the risk of metabolic diseases in these offspring.

“These are time-consuming experiments that require a lot of care, and you need to have a large research group to make these experiments work,” said do Carmo, who works with other UMMC faculty, fellows and research assistants on the projects. That’s why research funding from the NIH and other organizations is so critical for scientists: it allows laboratories to not only buy supplies for experiments, but also pay wages for those conducting that work.

Outside of the basic science laboratories, UMMC also activated 100 clinical trials, a 35 percent increase from the previous year. Many are part of industry-sponsored research agreements, where the funds come from companies that are testing new drugs or devices. There is also more funding coming from the Centers for Disease Control and Prevention and the Department of Health and Human Services for various kinds of human health research.

“We always want to support our basic scientists, but we also want to invest in clinical research that has a more immediate impact on patients,” Summers said.

Dr. James Galbraith, associate professor of emergency medicine, is leading the UMMC portion of an NIH-funded study to determine the best ways to identify who should be tested for hepatitis C infection in emergency department settings.

“The question is whether we offer testing to patients based on select self-reported risk factors or whether we offer hepatitis C testing to everyone – similar to current HIV testing recommendations,” he said.

Hepatitis C is curable with as little as an eight-week course of medication, but about 40 percent of the more than 2 million Americans with the infection aren’t aware they have it. “There are no new scientific tools or advances needed to eliminate hepatitis C in our communities,” he said. “By raising infection awareness through testing, we reduce one of the significant health care barriers to treatment.”

By the end of December 2019, UMMC had received about $50 million in extramural funding, on pace for a $100 million fiscal year. Summers said COVID-19 “may have disrupted” some of the funding streams they were anticipating for 2020 and pushed investigators and clinicians to shift gears towards COVID-19 projects and priorities.

UMMC received several extramural awards to support health care operations during the pandemic, including a $1 million award from the Federal Communications Commission the Center for Telehealth. The Medical Center also activated at least 14 COVID-19 clinical studies and trials during FY20 and has listed at least five more for the current fiscal year.

“We know we will have more COVID-19-related funding coming in the next fiscal year,” Summers said.

UMMC’s banner year for funding also included high numbers of publications. UMMC researchers authored more than 1000 peer-reviewed papers during the year, up from the typical 700-800 occurring in recent years. In addition, the Intellectual Property and Commercialization Office reported 17 invention disclosures, 17 patent applications, and one U.S. patent.

“We are continuing to see high productivity,” Summers said, which helps drive further research funding.

“You go into research to explore ideas, make discoveries about the world and create your own hypotheses,” Summers said. “Our goal at UMMC is to build a deep research culture where people are excited to work.”
Dr. Babek Alibayov first learned he had earned a Fulbright grant to study in the United States in November 2019. While he started planning for his 6,800-mile journey west from Azerbaijan to Mississippi, strange pneumonia cases started popping up 4,600 miles to his east in China. After a six-month delay, Alibayov made it to Jackson in January and the University of Mississippi Medical Center welcomed its first scholar through the Fulbright Program.

Founded in 1947, this U.S. Department of State initiative is a series of fellowships designed to boost international relations through teaching, training and research. Alibayov was selected for Fulbright’s Visiting Scholar program, which awards international postdoctoral researchers with grants that allow them to pursue projects at American universities.

“The main aim of my research while here is to study the epidemiology and evolution of antimicrobial resistance in bacteria,” said Alibayov, who will spend six months at UMMC.

He is particularly interested in studying the molecular evolution of virulence, or a microbe’s ability to cause illness, in bacteria such as Escherichia coli and Clostridium perfringens. It’s a topic that ties in well with his previous work in Azerbaijan.

“I mainly work with bacteria and studying the risk of food-borne diseases,” said Alibayov, who served as head of quality control for the Supply and Procurement Division of his country’s Ministry of Agriculture.

Alibayov said that antibiotic resistance and microbial food-borne diseases are global issues that affect people in the United States, Azerbaijan and elsewhere. In 2015, The World Health Organization published a report detailing the global burden of disease related to food- and water-borne illness. The WHO also considers antimicrobial resistance – the development of “superbugs” – one of the world’s most pressing public health issues.

Interested in math and science as a child, Alibayov earned bachelor’s and master’s degrees in biology in Azerbaijan, a Eurasian country once part of the former Soviet Union. He then went to Czechia (the recently renamed Czech Republic) to earn a PhD in microbiology and do postdoctoral
research at the University of Chemistry and Technology in Prague, where he studied Staphylococcus aureus and the enterotoxins it produces. Since 2018, he has worked for Azerbaijan’s equivalents of the U.S. Food and Drug Administration and Department of Agriculture.

“The Fulbright fellowship is also an opportunity to learn to do scientific work with new kinds of machines, assays and reagents and bring those skills back to Azerbaijan,” Alibayov said.

While at UMMC, he will work with Dr. Jorge Vidal, associate professor of microbiology and immunology.

“Babek contacted me during my transition from Emory University to UMMC, asking if we could work together on a project,” Vidal said. “He’s a smart, brilliant guy, and early on in our conversations, it was clear what he wanted to do with his project.”

Vidal had met other Fulbright scholars while working in Atlanta, but had not hosted one in his own laboratory.

“The goal of the Fulbright program is to bring brilliant people to the United States, but also to create a collaborative exchange and form strong relationships between different countries,” Vidal said.

The Vidal lab conducts basic and translational research including studies on how bacteria like Streptococcus pneumoniae become pathogenic and resistant to drug treatments.

“While I was considering applying for the Fulbright grant, I spent lots of time reading [Dr. Vidal’s] publications and found that his research interested me,” Alibayov said. He added that this was the most important factor in selecting a faculty sponsor for the program.

“When you choose a laboratory, that decision should be dependent on the specialization of your mentor. Who you study with is more important than where you study,” he said.

While UMMC’s late Dr. Julius Cruse, a Guyton Distinguished Professor and professor of pathology was a Fulbright Fellow at the University of Graz in Austria in 1958, Alibayov is the first Fulbright scholar to come to UMMC.

“The fact that we are hosting a Fulbright Scholar is an evident reflection of the maturity and quality of our research programs here at UMMC,” said Dr. Richard Summers, associate vice chancellor for research.

The 2020-2021 cohort of Fulbright Visiting Fellows includes 850 scholars from about 100 countries. The highly competitive application process involves submitting a proposal through the U.S. Embassy in the applicant’s home country.

“The Fulbright Scholars are a special community,” Alibayov said.

The emergence of the COVID-19 pandemic delayed Alibayov’s fellowship, originally planned for summer 2020. However, that didn’t stop him from joining the Vidal lab for virtual meetings, academic reading and planning his research for the upcoming semester.

Alibayov says people at UMMC and in the community have been very helpful in getting him settled in Jackson. He spends his free time catching up on Netflix films and exploring his neighborhood by foot. He also enjoys basketball and volleyball, but COVID-19 has limited his chances to play. His American roommates have also taken the time to introduce him to new cuisine: Louisiana Cajun-style.

“I don’t remember what it was called, but it tasted good,” he said.

As the pandemic subsides, he hopes to find more opportunities to collaborate in person with other UMMC scientists and engage with UMMC’s international community. Both Alibayov and Vidal hope that they can extend the research stay for another six months through other forms of funding.
On the day "The War on Cancer" officially started, Dr. Nita Maihle, then a teenager, was huddled with her family around her father’s sickbed. The signing of the National Cancer Act in December 1971 by President Richard Nixon came too late for Maihle’s father, who died 18 months after he was diagnosed with lymphoma.

But for decades now, the war “has led us to all types of discoveries about something we once knew virtually nothing about,” Maihle said. And, in a way, it motivated the enlistment of a soldier in that conflict: Maihle herself; today, she is a professor of medicine and associate director for basic research for the Cancer Center and Research Institute at the University of Mississippi Medical Center.

Throughout her career, Maihle has targeted, in particular, one of the most heartbreaking forms of the scourge, ovarian cancer, with a determination that has earned her national renown and, lately, the renewal of the U.S. Department of Defense’s Ovarian Cancer Academy Leadership Award, a $2.7 million weapon against “the disease that whispers.”

The biomedical research grant comes directly to UMMC and Maihle who, as academy dean, will split it with the assistant dean, Dr. Douglas Levine, a gynecologic oncologist at New York University. It also supports a program coordinator at UMMC, Dr. Leslie Robinson.

The funds are most welcome, Maihle said. “There is a huge need. Not a lot of people have worked on this disease.”

For cancer deaths among women, it ranks fifth; among cancers of the female reproductive system, it ranks first, reports the American Cancer Society, which had forecast that ovarian cancer would kill around 14,000 women this year.

It usually strikes older women, often age 63 or older, and does so long before it’s noticed – thus, “the whispering disease.”

“About 75 percent of the time, some cancers, including ovarian, are discovered when there is little we can do for these patients,” Maihle said.

A patient’s survival usually depends on a combination of chemotherapy and surgery.

“It’s one of the worst cancers,” Maihle said. “We don’t know how to detect it early. And we have no biologically-targeted silver-bullet type drugs for it.

“So, one of the goals of this academy is to build a community of practitioners – scientists and physicians – who really understand this disease and can make a significant impact on treatment and early detection.

“The keys are collaboration and mentorship,” Maihle said. Those qualities flourish in the OCA, created in 2009 and funded by a Department of Defense program. The academy teams the next generation of young scholars with prominent scientists, who boost their careers, research and professional progress.

Part of this crusade against cancer is the OCA’s Leadership Award, underwritten through October 2025 and paying for workshops, webinars, consultant fees, operating expenses and more.

Because academy scientists are scattered across the country, network meetings mostly occur online. “We were meeting virtually before it was trendy,” Maihle said.

But there is also an annual workshop, held in tandem with a national symposium that brings attention to these early-career researchers as they ponder news of cutting-edge discoveries. The 2021 retreat, planned for Seattle, is, of course, pandemic- and vaccine-dependent.

“I’m very happy to say that all this is working. In my career studying women’s cancers, I’ve brought in about $1 million a year over a period of about 30 years to support cancer research,” Maihle said. “But these kids in the academy have already brought in about $50 million over the past five years to support cancer research.

“They are just on fire; if you can’t get research funding, chances are you are not going to make substantial contributions to the field. And they’ve already made some incredible contributions,” Maihle said.

“About a dozen of these researchers, who are chosen by the Department of Defense, are part of the academy at any one time,” Maihle said. They are working on their first research project, funded for four or five years each, at about $200,000 per year.

“They are the cream of the crop,” Maihle said. “They are quickly becoming leaders in the field of women’s cancer research.”

The fact that Maihle has been picked to head up this effort “is a reflection of the strength of the Cancer Center and Research Institute,” said Dr. Richard Summers, associate vice chancellor for research.

“There is a need to recruit more young investigators into the field of cancer research, and I believe this academy and this award provides a clear mechanism to do that.
In leading the basic science arm of the Cancer Center, Dr. Maihle has done a great job. Now, her mentorship has been recognized nationally; this Leadership Award is an honor.

Maihle helped create the model for early detection of ovarian cancer nationally which has been adapted for other cancers including breast and lung cancer.

The rate at which women are diagnosed with ovarian cancer has been falling over the past 20 years, reports the American Cancer Society. And, since the mid-1970’s, the survival rate for all of the most common cancers has risen, except those attacking the cervix and the endometrium (the inner lining of the uterus), according to the ACS.

Medicine has made inroads as well in the treatment of the disease that ravaged Maihle’s father, a former World War II soldier who had been stationed in North Africa when he was apparently infected with a virus that eventually led to the development of lymphoma decades later, she said.

“When you’re a scientist, it’s like you’re doing a giant jigsaw puzzle. When my dad was sick, we didn’t even have the edge pieces. Now we have some corner, and even middle pieces.”

Today the five-year survival rate for non-Hodgkin Lymphoma, for instance, is 72 percent, depending on the type and stage of the disease.

“By comparison, the rate for ovarian cancer is dismal, but the work to find treatments is encouraging,” Maihle said. “Some scientists are working on the use of our own immune system to fight the disease.”

“Being able to bring what I’ve learned through the years to this academy, and the notion that we can have a lasting legacy in the fight against this disease, are all very energizing for me.”
Dr. Matthew Kutcher, right, makes rounds in the surgical intensive care unit at UMMC. His experience as a Mississippi Center for Clinical and Translational Research trainee prepared him for success as a clinician-scientist.
MCCTR grantee Kutcher receives NIH K-award

BY BRUCE COLEMAN

Dr. Matthew Kutcher (MS in Clinical Investigation, 2021), assistant professor of trauma and critical care surgery and graduate faculty member in the SGSHS, received a five-year NIH award, “Mitochondrial DNA in the Pathogenesis of Post-injury Coagulopathy,” in 2020. The grant explores underlying mechanisms of - and some potential therapies for - patients who become hypercoagulable during their recovery from injury, which puts them at risk for certain complications like deep vein thrombosis or pulmonary embolism.

According to Dr. Joey Granger, Kutcher’s grant exemplifies the early successes of the National Institute of General Medical Sciences IDEA Program-supported Mississippi Center for Clinical and Translational Research.

“This is a major accomplishment for Matt as he is one of a few clinician scientists with NIH funding at UMMC,” Granger said. “He also represents a success for the MCCTR since the center supported his development as a new investigator and provided funds and salary support until he received his own NIH funding.”

Kutcher said the study originated from his clinical experience of taking care of injured patients.

“There have been tremendous advances in the surgical and ICU care of patients who are injured in the last 10 years,” Kutcher said. “Despite these advances in strategies to control bleeding, I think most trauma surgeons carry around the memories of certain patients who had bleeding that they just couldn’t stop.

“In some cases, we just needed to be faster . . . but in many cases, the problem we needed to fix isn’t with physics, it’s a problem with biology. We just don’t have a complete biological understanding of what makes some patients’ blood fail to clot normally when it should, or to become too prone to clot formation when it shouldn’t.”

He began working on the project as a research fellow during his general surgery residency training at San Francisco General Hospital.

“Since coming to UMMC, with the support of early funding from MCCTR, I’ve been able to start building our own trauma-focused surgical research laboratory to continue and expand this research.”

The study aims to understand whether the release of small DNA fragments into the bloodstream after major traumatic injury leads to abnormalities in blood clotting. It includes three arms:

- Researchers collect blood samples and information from healthy volunteers. Platelets are isolated from the blood samples to test the effects of exposure to DNA.
- An animal model of orthopaedic injury is used to test potential treatments for DNA-related clotting abnormalities that may one day be developed for use in humans.

“Usually, DNA belongs safely inside of our cells,” Kutcher said, “but when it ends up in the bloodstream, it can directly trigger clot formation and can bind to and activate cells like platelets and neutrophils. Since this circulating DNA can float freely around the body, it can lead to blood clot formation that isn’t located at the site of the actual injury.

“Early after injury, we think this can inappropriately use up necessary blood clotting factors required for clot formation where it’s actually needed. Later after injury, we think this can lead to abnormal blood clot formation, for example, in the legs or in the lungs.”

Kutcher said the MCCTR’s Investigator Development Program played an instrumental role in his successful NIH grant application.

“None of my work here would have been possible without the support of the program,” he said. “The early funding and protected research time allowed me the resources to design and implement the three major arms of the study. As many young investigators can attest to, early support in this work is critical.

“Using preliminary data gathered as part of MCCTR-funded work, I was able to obtain two other pilot grants that allowed us to expand the scope of our coagulation studies to focus specifically on circulating DNA and on platelet function. MCCTR’s Investigator Development Program provides longitudinal funding support and mentorship for young investigators for the several years that it takes to build the infrastructure, develop the collaborative networks, generate and analyze the data, and submit the additional grants needed to transition towards independent funding.”

While this first NIH award will support the study through 2025 in the amount of $162,800 annually, Kutcher has his scientific sights set for the long haul.

“My honest hope is that we can continue to write grants and find other sources of financial support to fund this study for as long as injured patients come here to UMMC for their trauma care,” he said. “There is always something we can learn to do better.”
Father-son duo update world’s most important physiology book

BY GARY PETTUS

The book that has attracted rave reviews for decades, drummed up crowds of autograph seekers, been translated into about two dozen languages, and remained in demand in this country and several others around the world since its first printing in 1956, is now in its 14th edition. It’s about bodily functions.

More precisely, the Guyton and Hall Textbook of Medical Physiology, published by Elsevier this summer, breaks down the physical and chemical processes associated with living in the human body.

Over the years, the authors have updated and enhanced the tome of 1,000-plus pages, but perhaps the most visible change in this latest edition is expressed by the names of the editors/writers printed on the front cover: Dr. John E. Hall and, for the first time ever, Dr. Michael E. Hall.

“I was glad to get some help,” said John Hall, Arthur C. Guyton Professor and Chair, Department of Physiology and Biophysics at the University of Mississippi Medical Center. “It’s a lot of work.”

That help came from his son; Dr. Michael Hall is associate professor of cardiology, and associate vice chair for research in the UMMC Department of Medicine.

“I have been doing this for a while, and I asked him if he would be interested in this,” said John Hall, whose many honors include the Southeastern Conference’s 2014 Professor of the Year.

“I thought it would be a good opportunity for him, as well as an opportunity to add some of his clinical insights to the text. He contributed to the chapters on the heart, which is really his area of expertise.”

In the beginning, and for years, the sole expert, author and editor of the textbook was Dr. Arthur C. Guyton, whose name graces the endowed chair now held by John Hall, Guyton’s former postdoctoral fellow, then colleague, for nearly three decades.

“He was a tremendous role model,” John Hall said. “No one has had a greater impact on my career.”

Guyton’s name has also graced the Medical Center in general, and still does. He is a legendary figure whose research helped revolutionize the treatment of hypertension, heart failure and other cardiovascular diseases.

He was known for his courage in coping with paralysis from polio contracted as an adult, overcoming skepticism about his health and stamina to become the chair of the Department of Physiology at the University of Mississippi in Oxford before Guyton and the department relocated to Jackson in 1955 to the newly-opened Medical Center.

The following year, his physiology textbook was published for the first time; it remains the best-selling volume on the subject in the world.

“It’s impossible to overstate the importance of this book,” said Dr. Javed Butler, professor and chair of the Department of Medicine, Patrick H. Lehan Chair of Cardiovascular Medicine at UMMC.

“This is the book that medical schools around the world use to teach students how to become doctors.

“Anatomy and physiology together are the basics that inform the practice of medicine. And this is the most important book in the whole world on physiology,” said Butler, whose own medical student training included the Guyton and Hall textbook.

“There is nothing you do in medicine where you don’t use the principles described in it.”

A big reason for the volume’s soaring status is stated in the preface to the current edition: “[Guyton] wrote the book to help students learn physiology, not to impress his professional colleagues.”

“Dr. Guyton pointed out early on that a lot of the available physiology books had a lot of detail and a lot of material that was really above the heads of medical students in general,” John Hall said.

“This book has been used not only by medical students, but also by nursing students, dental students, veterinary medical students as well as graduate students and PhD candidates and other health care professionals.
“Dr. Guyton pointed out early on that a lot of the available physiology books had a lot of detail and a lot of material that was really above the heads of medical students in general.”

— Dr. John Hall
“It has to be written in a way that’s easily understood, so that a wide variety of students can use it effectively. We have tried to keep to that principle, and make it even more useful for students.”

One of its salient features sets it far apart from most medical textbooks, Butler said. “When these books are written on whatever specialty, the editors may invite a hundred subspecialists to write specific chapters.

“That’s not what this book is; this book, which is about the entire human body, is now written by Dr. John Hall and Dr. Michael Hall. They don’t ask others to write the chapters. So there is the consistency in language and the almost unbelievable mastery of the topic, and they keep doing it year after year.

“It started with Dr. Guyton, and Dr. [John] Hall assumed the mantle.”

Guyton wrote and edited the first eight editions. John Hall joined him afterward, authoring parts of the ninth and 10th editions. After Guyton’s death, in a traffic accident that also took the life of his wife Ruth Weigle Guyton in April 2003, John Hall has been revising the book since around 2006, alone. Until now.

As Guyton’s successors, John Hall and Michael Hall have produced an atlas of the human body in 80-plus chapters.

“I played a small role,” Michael Hall said. “This is something Dr. Guyton built from scratch. My dad had been doing it by himself for many years, but I hope to be more involved in the future.

“I believe the writing style is the reason it’s been popular with students. I believe they enjoy reading it compared to other textbooks. The format is comprehensive, but easy for a busy medical student to understand. I actually used the book myself in undergraduate and medical school.”

While the textbook is well-regarded in the United States, it is practically a cultural icon in some countries, particularly in Latin American nations, as well as in India.

“Last year Michael and I were in Brazil,” John Hall said. “There were two medical schools in the city we were in, and students had lined up to get autographs and photographs. They really appreciate the book.”

The more recent editions, including this one, offer features to nourish that level of appreciation. For instance, the work is accompanied by two ancillary books. One is a pocket companion, “a condensed version we hope the student can call up on a computer, smart phone or electronic tablet.

“You can click on a hyperlink that will take you to the sound of a beating heart,” John Hall said. “You may even see the EKG. The animations illustrate, for instance, nervous reflexes, lung mechanics or other body functions.

“We want to do more of that, and will in the future.”

The last, previous edition of the textbook came out in 2015, Michael Hall said. “But editing it is ongoing. I’ve learned from my dad that as soon as one edition is written, you’re accumulating material for the next one.

“But the focus is not always on adding information.”

Students in a multitude of foreign countries have also explored this trove of physiological insights for years now; since 1996 it has been available in about 22 languages, counting English. There is also an international English version which is sold in such countries as India, John Hall said.

“The content is essentially the same, but printed on cheaper paper to make it more affordable.”

It is quite possible that the Guyton-Hall work is available in several more languages; apparently, some translations have emerged, minus official permission.

“The book has been translated into some languages I didn’t even know existed,” John Hall said.

Whatever the language, whether it’s Spanish or Hindi, the interpretation always comes down to the same thing: Un triunfo. Saphalata. A triumph. A success.

“It’s a once-in-a-lifetime book,” Butler said. “There are only two medical textbooks that I know of that have become the standard globally: Gray’s Anatomy and this one.

“I would say the University of Mississippi Medical Center should be incredibly proud that we are the home of this textbook.”

“Things are changing, and we’re trying to evolve,” John Hall said.

This evolution includes, depending on the nature of the material, text in one of two different font sizes; one size, for instance, may be a signpost to new developments in the field or information that may be useful for students who wish to study physiology more deeply.

And, for the last three or so versions, an e-edition, has been available with hyperlinks that make it easier to navigate the book, including links to additional content, along with video animations and self-assessment questions the student can call up on a computer, smart phone or electronic tablet.

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“But the focus is not always on adding information.”

As John Hall said, they don’t want the book to get any bigger. “If we add something, we have to take something out, something that is now less important to include or no longer relevant.

“Otherwise, it can get too large, and it can’t be used in classes. Even 1,000 pages for an entire course is a lot for students.”

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UMMC recognized the following SGSHS faculty, staff and students during the 2020 Excellence in Research Awards.

Usually, the Office of Research hosts a ceremony honoring the awardees. Because of the COVID-19 pandemic, they shifted to a video format, distributed through the Medical Center’s research listserv.

“COVID-19 has given us the opportunity to recognize the recipients of this year’s awards in new and innovative ways,” said Dr. Richard Summers, associate vice chancellor for research.

Summer praised the “innovation” and “flexibility” demonstrated across campus in 2020.

“I have never been more proud of the research community here at UMMC,” he said.

The medallions are based on the cumulative amount of extramural funding received for an investigator’s original research. This year, the Office of Research also granted COVID-19 Research Hero Awards, recognizing the unique contributions of faculty, staff and students during the pandemic.

UMMC received near-record levels of funding and the most individual grants and awards in its history in fiscal year 2020, despite the challenges of the past several months.

“In a time of great uncertainty, our scientists have stepped up to ensure Mississippians are taken care of during this pandemic and have shown the importance of a strong research mission to an academic medical center,” Summers said.

**Platinum Medallion – $5,000,000 total**

**Dr. Michael Garrett, professor of pharmacology and toxicology**

Garrett studies the genetics of complex yet common diseases, such as kidney disease, hypertension and diabetes, in order to find new targets for future drug treatments. He also leads UMMC’s Molecular and Genomics Core Facility.

**Dr. Celso Gomez-Sanchez, professor of pharmacology and toxicology**

Gomez-Sanchez studies primary aldosteronism, a common cause of hypertension. Last year, he licensed a series of monoclonal antibodies he developed for diagnosing this condition to a biotechnology company.

**Dr. Jason Griggs, professor of biomedical materials science**

Serving as the associate dean for research in the School of Dentistry, Griggs studies the breakage patterns in ceramic and metallic dental implants to find new ways to construct these materials.

**Gold Medallion – $1,000,000 total**

**Dr. Denise Cornelius, assistant professor of emergency medicine**

**Dr. Sally Huskinson, assistant professor of psychiatry and human behavior**

**Dr. Jose Miguel-Hidalgo, professor of psychiatry and human behavior**

**Dr. Rob Rockhold, deputy chief academic officer**

**Dr. Damian Romero, professor of cell and molecular biology**

**Dr. Kedra Wallace, associate professor of obstetrics and gynecology**

**Dr. Junie Paula Warrington, assistant professor of neurology**

**Silver Medallion – $500,000 total**

**Dr. Yingjie Chen, professor of physiology and biophysics**

**Dr. Ritesh Tandon, associate professor of microbiology and immunology**

**Dr. Zhen Wang, assistant professor of physiology and biophysics**

**Bronze Medallion – $250,000 total**

**Dr. Yuanyuan Duan, associate professor of biomedical materials science**

**Dr. Barbara Gisabella, assistant professor of neurobiology and anatomical sciences**

**Dr. Erin Taylor, instructor of physiology and biophysics**

**Dr. Jorge Vidal, associate professor of microbiology and immunology**

**COVID-19 Research Hero Awards**

**Testing:** Internal COVID-19 testing and validation

**Dr. John Bates, assistant professor of microbiology and immunology**

**Dr. Sarika Jain, assistant professor of pathology**

**Dr. Patrick Kyle, professor of pathology**

Internal COVID-19 test kit assembly and volunteering on the front lines

**UMMC Students**
The following SGSHS faculty received some of the largest new extramural grants and awards during the 2020-2021 academic year. The dollar values shown are for the first year of funding, unless otherwise indicated:

**Hong Zhu**, professor of otolaryngology and communicative sciences, received a five-year, $2.65 million award from the National Institutes of Health for the project, “Mechanisms of blast-induced vestibular injury.”

**Dr. James Rowlett**, professor of psychiatry and human behavior, received a five-year, $2.34 million competitive award renewal from the National Institutes of Health for the project, “Anxiolytic effects and abuse of BZ receptor ligands.”

**Dr. Joshua Speed**, assistant professor of physiology and biophysics, received a five-year, $2 million grant from the National Institutes of Health for the project, “Endothelin-1 in obesity and insulin resistance.”

**Dr. Ashley Robinson**, professor of microbiology and immunology, received $410,833 from the U.S. Department of Health and Human Services and the Mississippi State Department of Health for the project, “Enhancing genomic surveillance of SARS-CoV-2 in Mississippi.”

**Dr. Jorge Speed**, associate professor of microbiology and immunology, received $246,625 from the NIH for the project “Hemoglobin-induced virulence in Streptococcus pneumoniae.”

**Dr. Daniela Ruedi-Bettschen**, instructor of psychiatry and human behavior, received $232,500 from the NIH for the project, “Consequences of fentanyl self-administration during pregnancy.”

**Dr. Lais Berro**, instructor in psychiatry and human behavior, received a $128,617 grant from the NIH for the project, “Role of orexin receptors in the abuse-and sleep-related effects of methamphetamine.”

**Dr. John Clemmer**, instructor of physiology and biophysics, received $103,817 from the NIH for “Improving hypertension treatment in African Americans using computational modeling and predictive analytics.”

**Dr. Eva Bengten**, professor of microbiology and immunology, received a $101,414 grant from the United States Department of Agriculture for the project, “Defining a subset of leukocyte immune-type receptors induced by TLR stimulation.”

**Dr. Craig Stockmeier**, professor of psychiatry and human behavior, received a $100,000 grant from the American Foundation for Suicide Prevention for “Epigenetic risk factors for suicide in comorbid depression and alcoholism.”

### Graduate Student Awards

**Adesanya Akinleye** (Experimental Therapeutics & Pharmacology) American Physiological Society Martin Frank Diversity Travel Award

**Esinam Attipoe** (MS Biomedical Sciences) Steven M. Horvath Professional Opportunity Award; Martin Frank Diversity Travel Award

**Mary Carr** (Microbiology & Immunology) NSF Graduate Research Fellowship

**Graham Casey** (Neuroscience) Association for Research in Otolaryngology Poster Blitz Finalist

**Jonathan Crider** (Microbiology & Immunology) National Institute of Food and Agriculture predoctoral fellowship

**Amanda Criswell** (Nursing) Mississippi Nursing Foundation Ph.D. Research Award

**Ubong Ekperikpe** (Experimental Therapeutics & Pharmacology) American Society of Nephrology Kidney STARS Award; Phi Kappa Phi Honor Society; Martin Frank Diversity Travel Award

**Xing Fang** (Experimental Therapeutics & Pharmacology) American Heart Association New Investigator Travel Award for Hypertension Scientific Sessions

**Sarah Fitzgerald** (Experimental Therapeutics & Pharmacology) Water & Electrolyte Homeostasis Research Recognition Award

**Ashley Griffin** (Neuroscience) Young Investigator’s Award for Early Career Kidney Conference; Trainee Appointment on NHLBI Training Grant; Steven M. Horvath Professional Opportunity Award

**Ezekiel Gonzalez-Fernandez** (Experimental Therapeutics & Pharmacology) National Institutes of Health F30 Fellowship

**John Aaron Howell** (Neuroscience) APS Central Nervous System Research Recognition Award; APS Graduate Student Ambassador Award

**Alexandra Huffman** (Cell & Molecular Biology) APS Caroline tum Suden/Frances Hellebrandt Professional Opportunity Award; Virenda B. Mahesh Award of Excellence in Endocrinology and Metabolism; Endocrine Society Outstanding Abstract Award

**Jeanne Ishimwe** (Experimental Therapeutics & Pharmacology) AHA Council on Hypertension Top Trainee Advocacy Award; American Foundation of Heart Research and Education Travel Grant for Support of Underrepresented Minorities; ASN Kidney STARS Award; Young Investigator Award, Basic Science Forum for Emerging Kidney Scientists

**Maria Jones-Muhammad** (Neuroscience) APS Central Nervous System Research Recognition Award
Melissa Klamm (Nursing) Mississippi Nursing Foundation Ph.D. Research Award; poster presentation for the STTI Region 8 Conference; Phi Kappa Phi Honor Society

Dipanwita Mitra (Microbiology & Immunology) Millsaps Business Advantage Program Else Scholarship; Presenter for Winter Glycoscience Center for Research Excellence Symposium

Dr. Abedulnaasseer Mohammedelamien (MS Clinical Investigation) Fellow of American Medical Informatics Association; Alpha Omega Alpha Honor Society Bibek Poudel (Experimental Therapeutics & Pharmacology) AHA Hypertension Trainee Advocacy Committee New Investigator Award; APSelect - article selected for distinction in scholarship: AJP; Top Trainee Advocacy Committee Award, Council on Hypertension; APS Renal Section Research Recognition Award; Experimental Biology 2021 Oral Presentation

Jacob Pruett (Cell & Molecular Biology) NIH F30 Fellowship; Nathan Solomon & Irene Oransky-Solomon Medical Student Award; APS Endocrinology & Metabolism Section Research Recognition Award

Iftekhar Rafiquallah (Microbiology & Immunology) Future Science Diplomats in South Asia: Global Young Academy

Megha Satpathy (Biomedical Materials Science) Phi Kappa Phi Honor Society; Group on Women in Medicine and Science Emerging Star Award; Invited presenter at GWIMS Ignite Symposium

Anna Scasny (Microbiology & Immunology) Phi Kappa Phi Honor Society

Dr. Juliana Sitta (Biomedical Sciences-Biomedical Imaging) SAFMR/SSCI Trainee Research Award; RSNA Certificate of Merit for Education Exhibit

Kendra Stansak (Neuroscience) Association for Research in Otalaryngology Poster Blitz Finalist

Dr. Eliot Varney (Biomedical Sciences-Biomedical Imaging) Phi Kappa Phi Honor Society

Jamarius Waller (Experimental Therapeutics & Pharmacology) APS Water & Electrolyte Homeostasis Section Portland Press Predoctoral Research Recognition Award Finalist

Shaoxun Wang (Experimental Therapeutics & Pharmacology) Phi Kappa Phi Honor Society

Yvonne Zuchowski (Cell & Molecular Biology) APS Water & Electrolyte Homeostasis - Regulatory, Integrative and Comparative Physiology Trainee Award; ASN Kidney TREKS and Kidney STARS travel award; Invited Speaker EB/APS Featured Topics

Postdoctoral Fellow and Instructor Awards

Dr. Babek Alibayov (Microbiology & Immunology) Fulbright Scholarship

Dr. Lais Berro (Psychiatry & Human Behavior) NIH K99/R00

Dr. Randi Cheatham-Johnson (Pediatrics) American Psychological Association Minority Fellowship, Mental Health and Substance Abuse Services program

Dr. Evangeline Deer (Pharmacology & Toxicology) Steven M. Horvath Professional Opportunity Award

Dr. Noha Elsayed (Cell & Molecular Biology) Young Investigator Abstract Award from the Basic Research Forum for Emerging Kidney Scientists

Dr. Edward Florez (Radiology) Clinical Science Young Investigator Award Finalist at the Southern Regional Meeting of the Southern Society for Pediatric Research; SAFMR/SSCI Trainee Research Award, Southern Society for Clinical Investigation 2021; MIM Software’s User Showcase Award

Dr. Sumana Ghosh (Neurobiology & Anatomical Sciences) American Otological Society Research Grant

Dr. Chris Kelly (Psychiatry & Human Behavior) Invited Oral Presentation, Mississippi Psychological Association Annual Convention, UMMC DEI Community of Scholars Program

Dr. Roselin Nittala (Radiation Oncology) American Association for Cancer Research Scholar in Training Award; Presented at AACR Conference on the Science of Cancer Health Disparities in Racial/Ethnic Minorities and the Medically Underserved; Top-rated scientific research abstract at American Society for Radiation Oncology Conference; GWIMS Ignite Symposium; NIH targeted training workshop of cancer health disparities; Ranked 2nd in ASTRO leaderboard; Fellow of the Royal Society for Public Health

Dr. Samar Rezq (Cell & Molecular Biology) APS Renal Section Research Award; Oral Presentation, ENDO 2021; Oral Presentation, EB 2021

Dr. Noha M. Shawky (Cell & Molecular Biology) Kidney Council New Investigator Travel Award

Dr. Erin Taylor (Physiology & Biophysics) UMMC Excellence in Research Bronze Award

Dr. Zhen Wang (Physiology & Biophysics) UMMC Excellence in Research Silver Award
New Faculty

Dr. Thales Barbosa  
Instructor  
Physiology and Biophysics

Barbosa received his B.B.S. in scientific research in physiology and pharmacology in 2010, his M.S. in cardiovascular sciences in 2013 and his Ph.D. in cardiovascular sciences in 2016 from Fluminense Federal University, Brazil. He then had a postdoctoral fellowship at the Human Neural Cardiovascular Control Laboratory, Department of Kinesiology, at the University of Texas at Arlington from 2016-20. An active member of the American Physiological Society and a trainee member of the American Heart Association, Barbosa is the author or coauthor of 26 articles published in peer-reviewed journals. He has given one invited presentation at UMMC and has contributed to 53 abstracts and conference presentations internationally. He also serves as a manuscript peer reviewer for the American Journal of Physiology, the Journal of Applied Physiology and Experimental Physiology. Barbosa’s primary research goal is to understand the mechanisms regulating the cardiovascular system in human health and disease at rest and during exercise and other stressors, aiming at identifying alterations that occur in pathological conditions and assist in the development of interventions to prevent adverse events and improve quality of life.

Dr. Kristin Shirey Edwards  
Assistant Professor  
Cell and Molecular Biology

Edwards received her B.S. with highest honors in biology and chemistry from Jacksonville State University in 2011, Edwards earned her Ph.D. in biochemistry in 2017 at UMMC, where she had a postdoctoral research fellowship from 2017-18. She joined the Jacksonville State University faculty as an assistant professor of chemistry and geosciences in 2019. An active member of the American Physiological Society; the American Heart Association; the American Society of Biochemistry and Molecular Biology; and the American Chemical Society, Edwards is the author or coauthor of 10 articles in peer-reviewed professional publications and 31 abstracts for scientific presentations. A dean’s scholar at UMMC, she has received numerous academic awards and has served on several educational committees.

Dr. Lais Berro  
Instructor  
Psychiatry and Human Behavior

Berro received her B.Sc. in biomedical sciences with highest honors in 2011 and her M.Sc. in psychobiology in 2014 at Universidade Federal de Sao Paulo, Brazil, Berro was an exchange Ph.D. student at Yerkes National Primate Research Center, Emory University, from 2014-16 and earned her Ph.D. from Universidade Federal de Sao Paulo in 2017. She then came to UMMC for her postdoctoral research fellowship, which she completed in 2020. She also served as an adjunct professor of health sciences at Universidade Estadual de Santa Cruz, Brazil, since 2017. An active member of the College on Problems of Drug Dependence and the American Society for Pharmacology and Experimental Therapeutics, Berro serves on the Mississippi Sleep Society Board of Directors. She is a member of the editorial board of Pharmacology, Biochemistry and Behavior, and has given 26 presentations at scientific meetings throughout the world. She is the author or coauthor of 52 articles in peer-reviewed publications, four book chapters and 30 scientific abstracts. She received an Alkermes Pathways Research Award in 2018 and a K99/R00 award from the NIH/NIDA in 2020. Her research interests focus on sleep medicine, neuroscience and drug abuse, with emphasis on the relationship between sleep and drug addiction.

Dr. Lance Keller  
Assistant Professor  
Microbiology and Immunology

Keller received his B.A. in biology from Southwestern University, Georgetown, Texas, in 2009, Keller earned his M.Sc. in biomedical science in 2012 and his Ph.D. in microbiology in 2015 at UMMC, where he was a dean’s scholar and recipient of the 2015 Outstanding Young Researcher Award. He then had postdoctoral research training at the University of Groningen, Netherlands, from 2015-17 and at the University of Lausanne from 2017-20. The author or coauthor of 13 articles in peer-reviewed publications, Keller has given 10 presentations at scientific conferences in the U.S. and abroad.
We Value Your Feedback!

We would love to hear your opinion of our alumni magazine. Please scan this QR code with your camera phone to complete a 5-minute survey.

We appreciate your time.
Dr. A.P. “Pete” Shepherd (Physiology and Biophysics, 1971) has been retired from practice for eleven years and has been updating and creating computer programs for teaching and learning cardiovascular and respiratory physiology. The Life Science Teaching Resource Community makes them available at no cost after a peer-review process. He has also been learning how to use YouTube and has his own channel that includes news reports and interviews about his inventions as group discussions of Laser-Doppler blood flowmetry and computer simulations of bidirectional cardiovascular shunts.

Dr. Justin A. Cobb (Neuroscience, 2012) is an instructor of General Biology and Anatomy and Physiology in the Department of Natural Sciences at John Wood Community College in Quincy, Illinois. He also chairs the Faculty Senate Committees on Academic Assessment and Professional Development, as well as the Faculty Senate Executive Committee and the JWCC Center for Excellence in Teaching and Learning (CETL). He was recently awarded the Bronze Level Professional Development Completion Award through CETL Faculty Academy and is currently working on a Silver Level award project.

Dr. Lauren “Nikki” Beloate (Neuroscience, 2016) completed a postdoctoral position with Dr. Peter Kalivas at the Medical University of South Carolina and went on to join the Department of Developmental Neurobiology Behavioral Core at St. Jude Children’s Research Hospital in Memphis. She is currently an assistant research professor at Pennsylvania State University, and is utilizing rsfMRI, chemogenetics and optogenetics to study the mechanisms behind changes in neural connectivity in the context of social behavior and drug addiction.

Dr. Rana El Feghaly (Masters in Clinical Investigation, 2017) is a pediatric infectious diseases physician at Children’s Mercy Kansas City and associate professor at the University of Missouri-Kansas City. She is also the current director of quality improvement of the infectious diseases division, and the director of outpatient antimicrobial stewardship in the ambulatory settings (SHARPS-OP), and engages in multiple local and national committees with strong engagement in education and quality improvement.

Dr. Christina “Tina” Ferrell (Nursing, 2017) is an assistant professor of nursing and director of the RN to MSN Program at UMMC. As director, she serves as the academic advisor for students in the program, provides leadership and oversight for the success of the program and facilitates the RN to MSN Early Entry program. As an assistant professor, she teaches in the graduate and doctoral nursing courses.

Dr. Matthew Gibson, FACHE (Clinical Health Sciences, 2017) was named President and CEO of Siskin Hospital in Chattanooga, Tennessee, in January 2020. Siskin Hospital is the largest acute rehabilitation hospital in Tennessee with 196 inpatient beds. It is the only not-for-profit rehabilitation hospital in Tennessee offering an all-inclusive campus, as well as off-campus locations, dedicated to providing a wide spectrum of rehabilitation needs through our inpatient, outpatient and fitness center programs. Siskin Hospital has specialized treatment programs in brain injury, amputations, stroke, spinal cord injury, orthopaedics, neurological disorders, and major multiple trauma, among other illnesses and disorders, including their new post-COVID recovery program. He and his wife Sarah, along with children Mary Eleanor and Ann, welcomed baby Katherine into their family in October 2020.

Dr. Sutton Williams (Clinical Anatomy, 2018) is an assistant professor in the Department of Radiology at Michigan State University College of Human Medicine. His primary appointment is to teach neuroanatomy and gross anatomy to medical students at their Grand Rapids campus. He also teaches neuroanatomy and gross anatomy in the College of Osteopathic Medicine and undergraduate courses as well. He is currently leading their integration of virtual reality into their medical anatomy curriculum, and was the recipient of the 2019-2020 College of Human Medicine Green Apple Award, given by the students to the faculty member who most positively impacted their learning.

Dr. Angela Benton (Microbiology and Immunology, 2019) is finishing her postdoctoral fellowship at Virginia Polytechnic Institute and State University with Dr. Clay Caswell. She has been studying the metabolism and pathogenesis of Brucella during macrophage infections. Recently,
she accepted a position as an assistant professor of medical microbiology at the Lake Erie College of Osteopathic Medicine campus in Bradenton, Florida. She is very excited for the move and the start of this new phase of her career.

Alexandra Ferguson (Masters in Biomedical Science, 2019) is currently in her second year of dental school at Creighton University School of Dentistry in Omaha, Nebraska, and will graduate in May 2023.

Jody Morgan (Masters in Biomedical Sciences, 2019) is the project manager for the STRIDES Study, partnered with the Mississippi State Department of Health and the National Cancer Institute, which focuses on discovering the causes and eliminating the health disparities faced by Mississippi patients with from cervical cancer. STRIDES collects data and test specimens from 30,000 patients at the UMMC School of Nursing before being sent to the NCI. He will begin medical school at UMMC in August 2021.

Jamie Riggs (Masters in Biomedical Sciences, 2019) is completing her first year of medical school at William Carey University College of Osteopathic Medicine. She is a Mississippi Rural Physicians Scholar with future plans to practice in a medically underserved community in Mississippi.

Dr. Erika Williams (Physiology and Biophysics, 2019) is an assistant professor of physiology at the College of Human Medicine. She works with first- and second-year medical students in case-based learning sessions, integrative biomedical laboratories, patient simulations and large group lectures. Because of her background at UMMC and her passion for all things cardio-renal, she is involved in modifying and teaching most of the blood pressure regulation, cardiovascular and renal curriculum.

Christian Yu (Masters in Biomedical Sciences, 2019) finished his second year of Ph.D. studies in the Microbiology and Immunology program at UMMC. He recently joined Dr. Ritesh Tandon’s lab to study immune evasion of human cytomegalovirus through anti-necroptotic mechanisms. He is also helping to develop SARS-CoV-2 viral neutralization assays as part of their lab’s response to the ongoing COVID-19 pandemic.

Dr. Xiao Zhang (Neuroscience, 2019) is currently a postdoc in the Department of Biochemistry and Institute for Protein Design at University of Washington. His research is about creating genetically encoded actuators. He contributed to the development of red-light switchable actuators last year and is listed as the co-inventor for our filed patent “Red Light-Controlled Protein Dimerization Systems.” He is currently working on creating biosensors for opioids, which can be used as a research tool for study of opioid addiction.

2020s

Dr. Kimberly Douglas (Nursing, 2020) is currently working at the University of Mississippi Medical Center as an assistant professor. She serves as the nurse educator track director.

Dion Kevin (Masters in Biomedical Sciences, 2020) is in his first year of medical school at UMMC. He will be researching retinitis pigmentosa and other retinal diseases at the University of Illinois-Chicago College of Medicine during summer 2021.

Chris Glasgow (Masters in Biomedical Sciences, 2020) will begin his first year of medical school at UMMC in August 2021. He credits the MS-BMS program in helping him boost his overall MCAT score, assisting him in shadowing in numerous departments across campus as well as giving him multiple opportunities for volunteer work.

Dr. Sydney Vita (Neuroscience, 2020) is working as a Postdoctoral Fellow in the Physiology labs of Drs. Patricia Molina and Nick Gilpin at the Louisiana State University Health Sciences Center in New Orleans. Her current project seeks to investigate the combined effects of binge alcohol exposure and repeat mild traumatic brain injury during adolescence.

Dr. Shaoxun (Chris) Wang (Experimental Therapeutics and Pharmacology, 2020) is currently in Dr. Rong Wang’s lab in the Department of Surgery at the University of California, San Francisco. He is studying functions and mechanisms of molecular signaling in arterial venous specification during normal and disease vascular processes, using mouse genetic, imaging, and other molecular approaches. His long-term goal is to understand the mechanism of arteriovenous malformation and to discover novel therapeutic approach to treat this devastating disease.
Dr. Thomas G. Coleman, UMMC professor emeritus of physiology and biophysics who Dr. Richard L. Summers, UMMC associate vice chancellor for research, described as a “revolutionary thinker” in biomedical research, died Feb. 27. He was 80.

Summers said Coleman, who spent his entire career working and teaching at UMMC, was one of the first in the world to use computer models and simulations to perform physiologic systems analyses.

“His work greatly facilitated the ideas of Dr. Arthur C. Guyton, and their partnership resulted in worldwide acclaim for the University of Mississippi Medical Center,” Summers said. “Later in his career, he and I worked together to provide a foundation for the NASA Digital Astronaut and were able to provide important insights into many perplexing problems associated with astronauts’ physiologic adaptations to the spaceflight environment.

“He was a true mentor and great friend to me and had a huge impact on my career and development as a scientist.”

Dr. John E. Hall, Arthur C. Guyton Professor and Chair of Physiology and Biophysics at UMMC, said everyone in the department is indebted to Coleman for his many contributions to science and medicine.

“Tom was at the center of the fundamental cardiovascular research and mathematical modeling that brought world acclaim to the department and to UMMC,” Hall said. “Tom was a brilliant scientist. Many people do not realize that the famous ‘Guyton’ mathematical model of the cardiovascular system was really the ‘Guyton-Coleman’ model, resulting from the synergistic work of Arthur Guyton and Tom Coleman. Without the work of Tom, the model would never have been developed to become the world’s largest and most important mathematical model of the cardiovascular system, consisting of about 400 variables when it was published in 1972.

“Tom tested the model with rigorous experimental studies and always viewed the model as an ever-evolving ‘theory’ that required continuous updating and validation. He
continued to develop the model throughout his life, adapting it to run on personal computers in different computer languages and expanding it to incorporate many other physiological systems. Today, Tom’s mathematical model of human physiology includes over 10,000 variables and is used throughout the world by educators and scientists.”

A native of Rochester, New York, Coleman earned his electrical engineering degree at the University of Rochester in 1962 and his M.S. in electrical engineering at Mississippi State University in 1964. The Ph.D. in biomedical engineering he achieved in 1967 was the first joint degree awarded by the engineering school at MSU and the graduate school at UMMC. He had postdoctoral training at the London Hospital Medical College in London, England.

Coleman authored more than 150 articles in books, periodicals and medical journals during his long, distinguished tenure, and his research has been referenced thousands of times by other scientists. A pioneer in computer-based simulation, he had a longstanding interest in mathematical models of complex biomedical systems with an emphasis on human physiology.

Coleman retired from UMMC in 2013 but continued his contributions to the Medical Center as professor emeritus of physiology and biophysics until shortly before his death. His human physiology models live on in educational and commercial applications.

“Tom leaves a legacy that laid the foundation for a large body of research on cardiovascular and renal physiology, hypertension, heart failure and other disorders,” Hall said. “He was a soft spoken and kind person who was extremely supportive, professionally and personally, to all of us who worked with him.

“Tom never sought recognition for his many accomplishments, but those of us who had the privilege of knowing him certainly recognize his greatness as a person and as a scientist.”

Donations in Coleman’s memory may be made to the School of Graduate Studies in the Health Sciences at UMMC.

“Tom was at the center of the fundamental cardiovascular research and mathematical modeling that brought world acclaim to the department and to UMMC.”  

— Dr. John Hall
School of Graduate Studies in the Health Sciences graduates, from left, Bobby Cavett Jr., Sydney Reaves, Kayla Patterson and Lucy Taylor pose for a photograph prior to UMMC commencement ceremonies May 28 at the Mississippi Coliseum.