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Progression Magazine, 2022 Spring

Coastal Carolina University

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COASTAL CAROLINA UNIVERSITY

progression

MAGAZINE

SPRING 2022

KEEPING UP WITH THE EDUCATIONAL MOMENTUM OF THE GUPTA COLLEGE OF SCIENCE

MICHAEL ROBERTS

and the Gupta College of Science

SCoRE

DISEASE
MODELING

LOS ALAMOS

progression

SPRING 2022



A message about this issue

A previous dean once said that change is a constant at Coastal Carolina University. Recent events in the Gupta College of Science certainly support this claim. In the past year, the Spadoni College of Education and Social Sciences was restructured, and the Department of Sociology, formerly in the Gupta College, joined that college. The Conway Medical Center College of Health and Human Performance will open in July. It will hold three of the departments currently in the Gupta College: health sciences, kinesiology, and recreation and sport management. Although the Gupta College of Science will be smaller as a result of these changes, it will also be more focused.

In concert with these structural changes, there are also significant personnel changes. Dean Michael Roberts is retiring, and this issue of *Progression* focuses on his accomplishments and impacts. Michelle Marken, a longtime fixture in the dean's office, is also retiring. You can read about her plans post-CCU. Undergraduate research has been and will continue to be a strong point of the Gupta College of Science, and this issue of *Progression* highlights some of the outcomes when students work with faculty on directed research.

Should you have any questions concerning our programs in science, you can visit the college webpage or call the Gupta College of Science at 843-349-2202.

James O. Luken, Ph.D.
Former Associate Dean, Gupta College of Science
joluken@coastal.edu
843.349.2235

ALUMNI INFORMATION

coastal.edu/alumni

ADVANCEMENT INFORMATION

coastal.edu/endowment

PROGRESSION MAGAZINE

James Luken, Ph.D.
Editor and Former Associate Dean,
Gupta College of Science

GUPTA COLLEGE OF SCIENCE AT COASTAL CAROLINA UNIVERSITY

coastal.edu/science

COASTAL CAROLINA UNIVERSITY

P.O. Box 261954
Conway, SC 29528-6054

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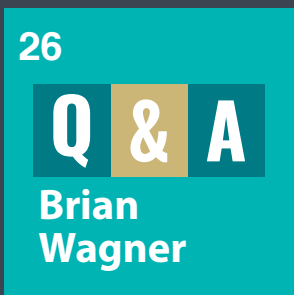
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DEPARTMENT OF BIOLOGY

John Hutchens, Ph.D.

Department Chair

The Department of Biology is home to about 500 undergraduate biology majors, 10 graduate students, 15 full-time faculty, and 10 lecturers. Undergraduate students earn a Bachelor of Science in biology. We also offer other programs of study that prepare students for entry into various health professions. Our department participates in the Master of Science in coastal marine and wetland studies and offers courses for graduate students in education.

Students have access to professors with expertise ranging from molecules to ecosystems. Faculty provide excellent opportunities for learning inside the classroom and out. Our faculty have varied research interests, and undergraduates can participate in that research.

Visit coastal.edu/biology.
John Hutchens can be reached at jjhutche@coastal.edu or 843.349.2169.

DEPARTMENT OF KINESIOLOGY

Gregory F. Martel, Ph.D.

Department Chair

The Department of Kinesiology is a dynamic unit of faculty, staff, and students who study and promote human movement (kinesiology) as applied to a variety of physical activity, sport, and therapeutic settings. The department houses a major in exercise and sport science (EXSS), minors in EXSS and sport coaching, Physically Active Living Skills (PALS) classes, and Community Fitness Testing program. Nationally, regionally, and locally, there has been an increase in demand for kinesiology-related services and programs; this is reflected in the rapid growth of the EXSS major since beginning at CCU in January 2008. The EXSS major is now the third largest on campus. Our role is to provide students with the knowledge, skills, abilities, and attitudes for effective leadership in the field of kinesiology. We excel by providing quality teaching and by engaging students in hands-on research, community service projects, and field-based learning and leadership opportunities.

Visit coastal.edu/knes.
Gregory Martel can be reached at gmartel@coastal.edu or 843.349.2957.

DEPARTMENT OF CHEMISTRY

Paul Richardson, Ph.D.

Department Chair

Our department offers two Bachelor of Science degrees: chemistry and biochemistry. Our students often work with faculty on various chemistry research projects. Whether you are here for a course in science as part of the Core Curriculum or you are interested in becoming a chemistry or biochemistry major, please contact us with any questions.

Visit coastal.edu/chem.
Paul Richardson can be reached at prichar@coastal.edu or 843.349.2598.

DEPARTMENT OF HEALTH SCIENCES

Fredanna M'Cormack McGough, Ph.D.

Department Chair

The Department of Health Sciences is home to programs that incorporate evidence-based best practices for disease prevention, health assessment, health management, quality care, and patient safety. Through community collaborations and diverse faculty research interests, students can participate in research activities that connect theory to practice. The department offers Bachelor of Science degrees in public health, health administration (completion program), and nursing (2+2 Nursing Residential program and RN-to-BSN completion program). The 2+2 Nursing Residential program is a collaboration between CCU and Horry-Georgetown Technical College and is for first-time freshmen only.

The nursing completion program is committed to advancing the education of registered nurses to meet the local and global growing health care needs. The health administration completion program builds on foundation courses in associate degree and other four-year degree programs. The public health program focuses on the art and science of promoting healthy communities and healthy behaviors.

Visit coastal.edu/healthsciences.
Fredanna M'Cormack McGough can be reached at fmcorma@coastal.edu or 843.349.2991.

DEPARTMENT OF COMPUTING SCIENCES

Jean French, Ph.D.

Department Chair

The Department of Computing Sciences offers three undergraduate degrees, serving roughly 400 actively enrolled majors in computer science, information systems, and information technology. The department offers minors in web application development, scientific computing, and computer science. Both the computer science and information systems major programs are accredited by the Accreditation Board for Engineering and Technology. The department also offers a completely online Master of Science in information systems technology, which has a dual concentration in both security and data analytics. The department supports the University Core Curriculum and other majors and minors of study, with course offerings in web development, programming, and business applications.

Visit coastal.edu/computing.
Jean French can be reached at jennis@coastal.edu or 843.234.3430.

DEPARTMENT OF MARINE SCIENCE

Will Ambrose, Ph.D.

Department Chair

The Department of Marine Science offers one of the largest undergraduate marine science programs on the East Coast. In addition to undergraduate studies, the department houses the coastal marine and wetland studies master's program and the marine science: coastal and marine systems science doctoral program. Lecture, laboratory, and field experiences are integrated to provide students with an outstanding and well-rounded education. With our ideal location near the coast and team of research-active faculty committed to undergraduate and graduate education, our strength is in providing individual attention and hands-on opportunities.

Visit coastal.edu/marine.
Will Ambrose can be reached at wambrose@coastal.edu or 843.349.2299.

DEPARTMENT OF RECREATION AND SPORT MANAGEMENT

Donald Rockey, Ph.D.

Department Chair

The Department of Recreation and Sport Management enrolls more than 300 students and houses a graduate program in sport management. Recreation and sport management professionals create, plan, market, implement, and evaluate leisure and recreational activities in both the private and public sectors, as well as in nonprofit and for-profit industries. In other words, our work is your play. The program works with the CCU Department of Athletics in several capacities and events, training students in specialized ticketing technology and sales techniques.

The faculty have a wide range of experience in the field, which they bring to the classroom to enhance students' abilities to connect theory and practices. In addition, faculty maintain very active research agendas in which students frequently assist.

Visit coastal.edu/rsm.

Donald Rockey can be reached at drockey@coastal.edu or 843.349.2989.

DEPARTMENT OF PSYCHOLOGY

Andrew Terranova, Ph.D.

Department Chair

The Department of Psychology enrolls more than 500 undergraduates. We offer a Bachelor of Science degree and emphasize the scientific nature of psychology and experimental research methods. Our 13 full-time faculty have expertise in a wide variety of areas, including experimental, social, developmental, cognitive, biological, school, and clinical psychology. Our faculty are excellent teachers and active researchers in the field, presenting at conferences, contributing articles and books to research literature, and sharing their findings and expertise with the media. Through our research methods sequence, students gain extensive knowledge and experience by designing and conducting research. Motivated majors may find additional opportunities to join faculty research labs as research assistants.

Visit coastal.edu/psych.

Andrew Terranova can be reached at terranova@coastal.edu or 843.349.4034.

SUBHASH SAXENA DEPARTMENT OF MATHEMATICS AND STATISTICS

Keshav Jagannathan, Ph.D.

Department Chair

The goal of the Subhash Saxena Department of Mathematics and Statistics is to improve students' mathematical understanding and competence. However, we also strive to illustrate the importance of mathematics, both as an interesting and challenging subject on its own, and as a tool that can be applied to other disciplines. Our two degree programs (applied mathematics and statistics) are designed to develop a high degree of mathematical proficiency, as well as extensive reasoning and problem-solving skills. We recognize the interdisciplinary nature of the modern mathematical world. Therefore, students may choose to concentrate their studies in analysis, applied mathematics, discrete mathematics, mathematics for secondary education, or statistics while still obtaining a solid mathematical background.

Visit coastal.edu/math.

Keshav Jagannathan can be reached at kjaganna@coastal.edu or 843.349.2249.

DEPARTMENT OF PHYSICS AND ENGINEERING SCIENCE

G. Wesley Hitt, Ph.D.

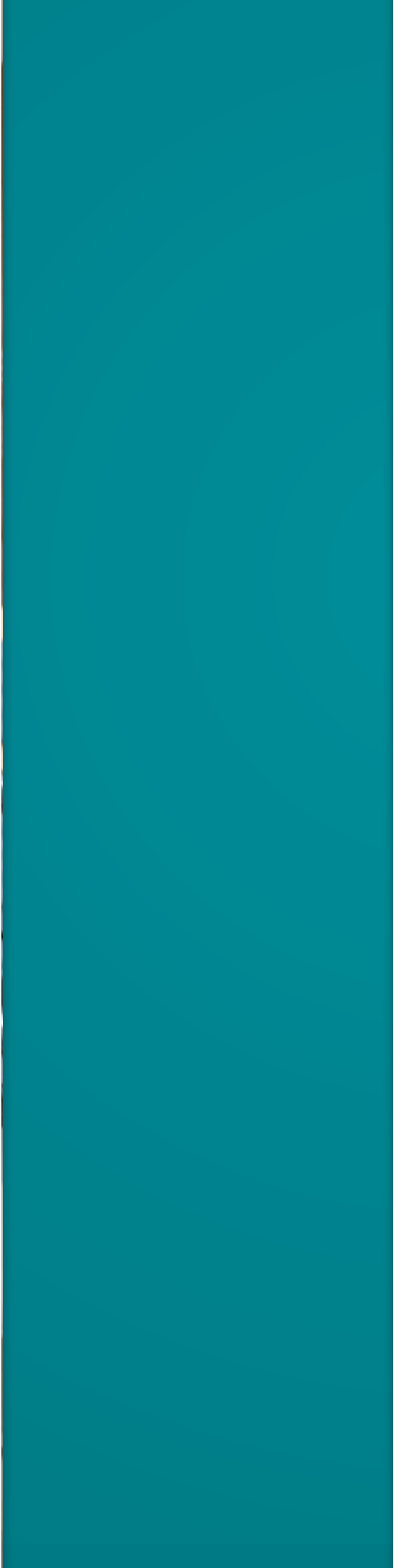
Department Chair

The Department of Physics and Engineering Science faculty and staff create an atmosphere of learning and scholarly work, applying the scientific method from a liberal arts approach. The faculty is committed to developing strong student competencies in physical and engineering science and its applications in a technology-rich, interactive, student-centered learning environment and to preparing students to successfully compete for employment or to succeed in graduate school. We take pride in our high-quality teaching, using current pedagogic techniques, our proactive mentoring and advising, and our outreach to the local community. We strive to be a focal point for disciplinary scholarship and expertise within the college, and to collaborate with our colleagues in the college to actively contribute to the advancement of science. The faculty supports the goals of the University's Core Curriculum through general education courses in physics and astronomy.

Visit coastal.edu/phys.

Wes Hitt can be reached at ghitt@coastal.edu or 843.349.4047.





MICHAEL ROBERTS

and the Gupta College of Science

by James Luken, Ph.D., former associate dean,
Gupta College of Science



| *During his tenure as dean, Mike Roberts most enjoyed graduation day and the handing of diplomas to students.*

After 15 years serving as dean of the Gupta College of Science, Mike Roberts will retire in June 2022. Such a long period of time as dean of a single college is unusual in higher education. But, when Roberts was hired in 2007, there was much that needed to be done. And indeed, after 15 years at the helm, much was accomplished.



Planning, construction, and completion of Swain Hall was a major accomplishment for the Gupta College of Science under Roberts' leadership.

“I wish Mike Roberts and family much happiness and good health in his retirement. I have valued his professional council and his friendship over the years of our service in the Gupta College of Science.”

— John Steen, former assistant dean,
Gupta College of Science

Roberts came to Coastal from New York. A biologist by training, he served as department chair at both Pace University and Clarkson University. His introduction to the job of dean was at Pace University, where he was both associate dean and acting dean. The search process that eventually landed him here in 2007 was watched carefully by all the science faculty, as the University was experiencing rapid growth and there was clear need for someone to manage the educational programs offered by the college.

He was eventually offered the job and accepted for several reasons. “Location was one of the initial attractions,” said Roberts, “but I also found through the interview process that the things that needed to be done at CCU matched well with the things I wanted to do, and could do.”

“‘Dapper’ Dean Roberts was always well-dressed at University galas in his grey suit with pink tie and hat to match, making him stand out in the crowd. Thank you, Dr. Roberts, for the privilege of working with you as associate dean, twice.”

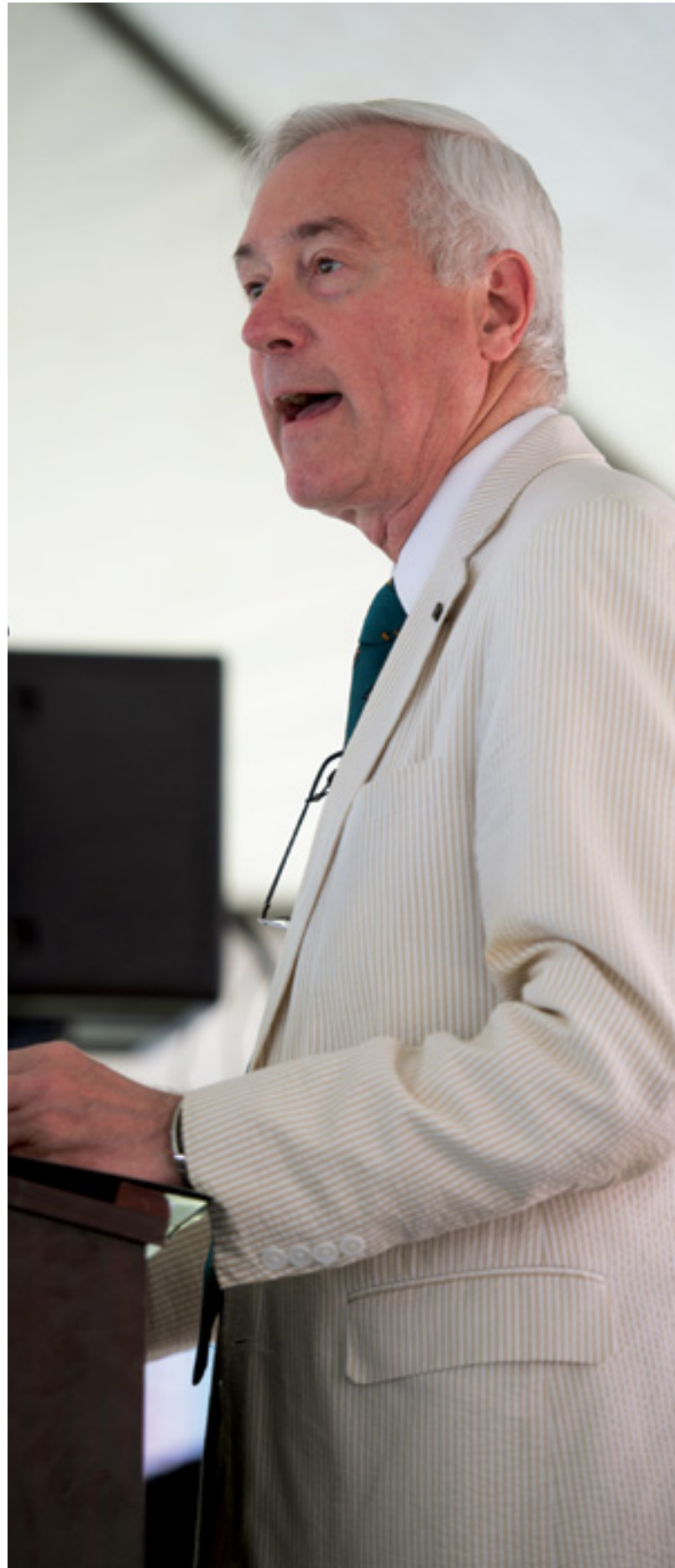
– Deborah Vrooman, *former associate dean,
Gupta College of Science*

John Steen, a former assistant dean in the Gupta College, worked closely with Roberts to facilitate student degree progress. “I remember awaiting the arrival of a new dean. Everyone was both excited and, at the same time, anxious. But he quickly relieved concerns of the office and set a course of action that eventually turned the Gupta College of Science into the largest college at Coastal Carolina University.”

The position of dean can be a difficult one, constantly requiring a balance between the needs of students and concerns of faculty. Roberts successfully struck this balance by virtue of his personality. “He was willing to listen to others and consider their positions before taking actions,” said Steen, “while at same being a friendly and compassionate person.”

Deborah Vrooman, a former associate dean in the college, said that Roberts “proved to be easy to work with, and, although he had his own ideas, he was always willing to listen.”

While Roberts modestly described that rapid student population growth of the college as one of his most significant accomplishments, there were many other successes along the way. He was instrumental in landing the Swain Scholars program, which offers students the opportunity to work



“I have always appreciated his leadership in that he is not a micromanager, he is very open and candid, and he is an avid supporter of student research. Dean Roberts, your passion for the Swain Scholars, supporting their research, and involving them with the Gupta College of Science board of visitors is much appreciated. Your leadership will surely be missed.”

— Sharon Thompson, Distinguished Professor Emeritus,
Department of Health Sciences



(Above) Dean Roberts welcomes incoming freshmen at last year's New Student Convocation. (Left) Leigha Peterson '11, '14, '19 was the first student to complete CCU's Ph.D. program in marine science.



with faculty and community agencies on health-related issues and community health programs. “Mike was always a strong supporter of the Swain Scholars program. He was eager to learn about the scholars, to get to know the students personally, and to provide support when their research was accepted at national presentations,” said Sharon Thompson, director of the program.

Roberts also oversaw the planning and design of two new buildings: Science Annex II and Kenneth E. Swain Hall. There was also a complete renovation of the existing R. Cathcart Smith Science Center. With these new buildings came a significant upgrade in lab equipment and teaching technology, which greatly improved both the teaching



Acquisition of the Coastal Explorer helped to start the first Ph.D. program in the Gupta College of Science.

and research capabilities of the college. These large accomplishments occurred in concert with the following: establishment of the first Ph.D. program, reorganization of departments, deployment of a large crew of professional advisors, expansion of student research activity, and, of course, the annual college gathering at a Myrtle Beach Pelicans baseball game.

At the beginning of every semester, there was always a college meeting. Here, the faculty got a glimpse of Roberts the philosopher. He gave well-crafted speeches about the importance of science to society, the danger of politics in science, and the value of a liberal arts education. When reflecting on his 15 years at Coastal Carolina University,

“Although Mike Roberts always rejected my repeated offers to take him fishing, he made up for this serious transgression of Southern norms by brewing excellent beer and mixing killer martinis. Best wishes for the future.”

– Jim Luken, former associate dean,
Gupta College of Science

“ I would like to wish Dr. Roberts the very best in retirement. When he applied for the dean’s position, he listed ‘deck-building’ as one of his hobbies, which caught my eye as a new homeowner. Dr. Roberts did lead the college through an extensive building boom, including an astronomy deck, and for that I am grateful. I hope you and Mary Jo enjoy many new adventures!”

– John Steen, former assistant dean,
Gupta College of Science



(Above) Mike Roberts and his wife Mary Jo. (center) The Roberts family riding a vintage motorcycle. (left) Mike Roberts during his retirement celebration this May.



Roberts remained philosophical and said, “I am now even more convinced of the value of a liberal arts education – as opposed to simply training and credentialing for a job.”

Although Roberts managed to avoid both golf and fishing while serving as dean, his plans for retirement are clear. “Mary Jo and I purchased our condo on the beach three years ago.” From that retirement base, he plans to walk on the beach, read books that have stacked up over the years, and travel to visit his daughters and extended family.



ROBERTS' BREWHOUSE

One of Dean Michael Roberts' passions is craft beer and techniques used to brew it. "Brewing is applied microbiology," he said. "It's great to take things that may have been learned in a dry, formal environment and then being able to do something fun."

As a longtime homebrewer, Roberts has an interest in the local microbreweries around the Grand Strand. He has been a supporter of one particular brewery, Tidal Creek Brewhouse, which has had strong ties with Coastal Carolina University since opening in 2020. Students from the University's CoBE Institute in the Wall College of Business worked directly with owners Dara and Adrian Sawczuk to assist in developing a business plan, with emphasis on customer experience, before the brewery opened its doors. Today, Tidal Creek's staff is made up mostly of Coastal students, "...which brings vitality to our brewhouse," said brewmaster Patrick Gibson.

Gibson, who is also a marine scientist, knows the importance of science to brewing, commenting, "Beer has been inspiring science for a long time, and science has inspired brewing as well." Gibson was more than willing to sample some of the homebrews Roberts shared with him. One recipe, named Almost Autumn, caught his attention. The spiced pale ale was brewed with coriander, whole oranges, and funky mosaic hops. "It was nice and malty, but still light and drinkable with a great spice component," Gibson said.

The tasting led to a collaboration between Roberts and Tidal Creek. The partnership challenged the brewery with a fun recipe that incorporated some new techniques that they don't usually employ. About 31 gallons of Almost Autumn were brewed for the pilot introduction. Roberts points out that it has been an experience to see how a recipe for a homebrew is scaled up and is excited about the opportunity for everyone on the Grand Strand to enjoy his beer, as he imagines a patron saying, "That's Dean Roberts' beer. Give me a pint."



Scan the above QR code to see video of Mike Roberts brewing beer.

SUMMER COASTAL RESEARCH EXPERIENCE

[SCORE]

by Bryan Wakefield,
associate professor,
Department of Chemistry



(Back row, left to right) *Olivia Shirley, Madison Gentilo, Gavin Ockert, Sasha Bronovitskiy, Andres Castillo, Michael Yan.*
(Front row, left to right) *Anna Park, Shana McSweeney, Caroline Ennis, Klea Hoxha, Nicole Ward.*



The Summer Coastal Research Experience (SCoRE) program provides college and high school students with the opportunity to conduct biomedical research during the summer with a CCU faculty member. Each research team consists of one faculty member, two to three college students, and one high school student. Our college participants were from CCU, Clemson, and the University of South Carolina, and our high school students were from the Scholars Academy at CCU. The research teams were each led by faculty members: Paul Richardson, Ph.D., and Brian Lee, Ph.D., from the Department of Chemistry; and Fang-Ju Lin, Ph.D., and Chiara Gamberi, Ph.D., from the Department of Biology. The students worked for up to 10 weeks on projects to tackle difficult questions related to treating and understanding human diseases.



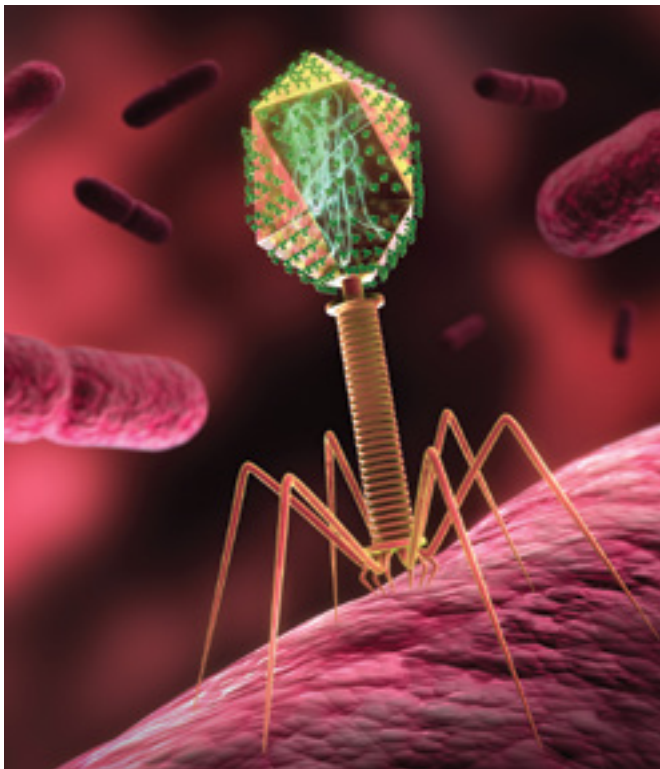
CCU students Olivia Shirley and Madison Gentilo worked with Scholars Academy student Gavin Ockert on three projects to find novel means to detect, prevent, and inhibit diseases that plague our community, under the direction of Richardson. These projects required students to learn how to collect environmental samples, then conduct analyses on those samples in the lab. The first project had students isolate and purify naturally-occurring bacteriophages, which are viruses that attack bacteria. Students collected these bacteriophages from our water systems to study their ability to control bacterial blooms and ecological diversity. They also monitored arboviruses, which can be transmitted from insects to humans by collecting mosquitoes and detecting the viruses that live inside them. Finally, the team worked on developing a polymerase chain reaction (PCR) to detect papillomavirus using genomic material. PCR is a molecular biology technique which increases the amount of genetic material in a sample, so it can be characterized and measured. Overall, these students participated in a wide range of research activities both inside and outside a classic laboratory setting.



Mosquitos and larvae in dirty water.



Illustration of a bacteriophage virus attacking a bacterium.



The bacterium *Streptococcus pyogenes* can cause a range of infections, from the common strep throat to more severe necrotizing fasciitis, which is better known as flesh-eating disease. Klea Hoxha and Corey Oakes from CCU and Nicole Ward from the Scholars Academy worked with Lee to determine what triggers the bacterium to cause a mild or more severe disease. They searched for a regulatory small RNA (sRNA) in probiotic lactic acid bacteria that shares gene structure with any of the sRNA genes that have been described in the pathogenic bacterium, *Streptococcus pyogenes*. They identified a potential sRNA called “AsdS,” which appears similar to “MarS” sRNA, a gene known to regulate the expression of virulence factors that help determine the type of infection caused by the bacterium. Once they identified this structure, the students used computational methods to construct a 3D model of the sRNA. They were able to design DNA that would allow other safer bacteria to express large amounts of AsdS so they can experimentally determine its structure. The hope is that by understanding the structure of AsdS, they will be better able to understand how and why *Streptococcus pyogenes* becomes more dangerous.



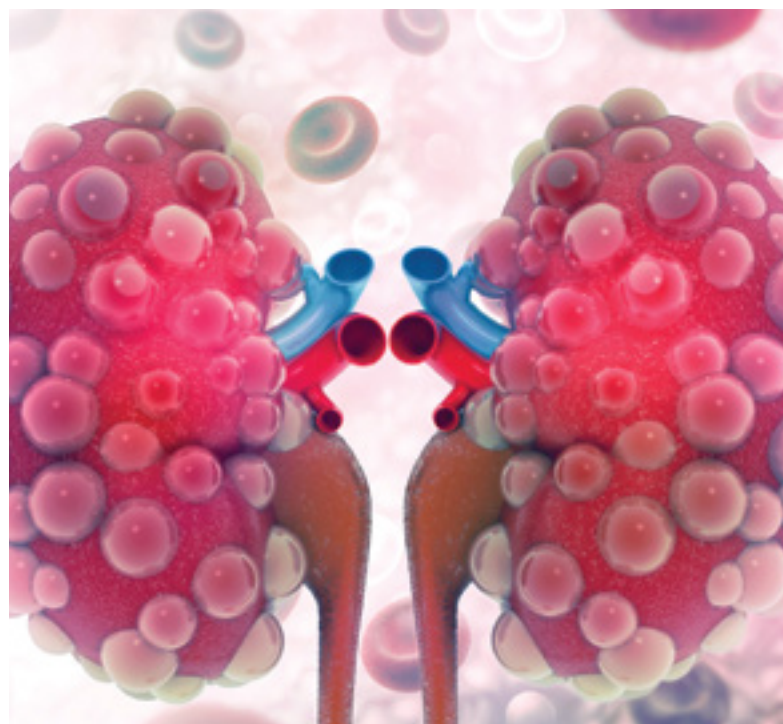
Fruit fly *Drosophila melanogaster*.

The Lin Lab conducted research on Alzheimer's disease progression using the fruit fly *Drosophila melanogaster*. These transgenic flies display cognitive and motor defects comparable to those seen in humans. Andres Castillo from CCU, Michael Yan from USC, and Sasha Bronovitskiy from the Scholars Academy carried out research projects to test the learning and memory of Alzheimer's flies. They designed and 3D printed a device for olfactory conditioning memory, as well as a mating chamber to test flies' courtship-suppression memory. They also performed experiments such as immunohistochemistry and Western blot analysis to detect human amyloid beta proteins from the transgenic flies. In addition to hands-on lab experiences, students gained valuable skills through extensive online research and analyzing scientific papers, which will prepare them for future research and careers.



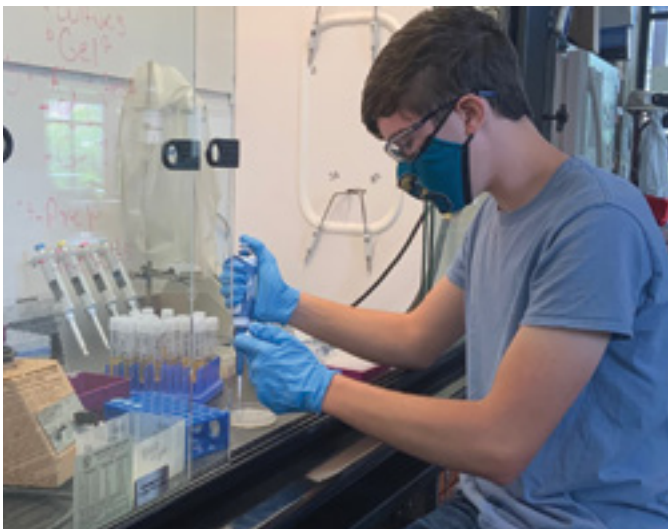
Polycystic kidney disease (PKD).

Shana McSweeney and Jurnee Jamison from CCU, Caroline Ennis from Clemson, and Anna Park from the Scholars Academy worked with Gamberi, using model organisms to understand kidney disease in humans. They employed fruit flies to decipher the mechanism of disease and find new treatments for incurable polycystic kidney disease (PKD). This disease affects 12.5 million people globally. PKD is characterized by unregulated cell growth of the renal tubule, damage to the surrounding tissues, progressive loss of kidney function, and need for dialysis or transplantation. The students examined how RNA-binding proteins contribute to renal cystic pathology. They did this by raising fruit flies that exhibited PKD, treating them with drugs, and then determining the impact of the treatment. During the summer, the students were able to discover several candidate cyst-reducing molecules, which are currently being characterized for their drug potential.



RESEARCH IS A KEY PART OF A STUDENT'S EDUCATION IN SCIENCE.

• • • •



Scholars Academy student Gavin Ockert pipetting at the hood.



(Left to right) Caroline Ennis and Jurnee Jamison doing dissections.

In addition to hands-on research experience, the SCoRE program provides students other training as well. During the summer, there is a faculty-led professional development series that helps students prepare for the next step in their careers and become better scientists. We discuss topics such as preparing a resume, writing cover letters, preparing scientific presentations, and citing literature references. To end each summer, there is a poster presentation where students can discuss their work. Due to COVID-19 concerns, this year's presentations were done virtually.

Research is a key part of a student's education in science. It allows them to learn how science is conducted, and it helps them determine where they want to see themselves in the field. The SCoRE program has been training students in biomedical research for more than seven years. Students from this program have gone on to pursue their doctorate degrees at schools like Duke and Emory universities, attend professional school at MUSC, and join the workforce. This program is also a valuable recruiting tool for CCU. Shirley and Hoxha are seniors who both participated in this program as high school students, chose to attend CCU due to their experience, and have been active in research since their freshman year. The students from this summer are well on their way to success in their chosen careers because of the experiences they received in this program.


Scan to watch student
presentations from this year.



DISEASE MODELING

AT COASTAL CAROLINA UNIVERSITY

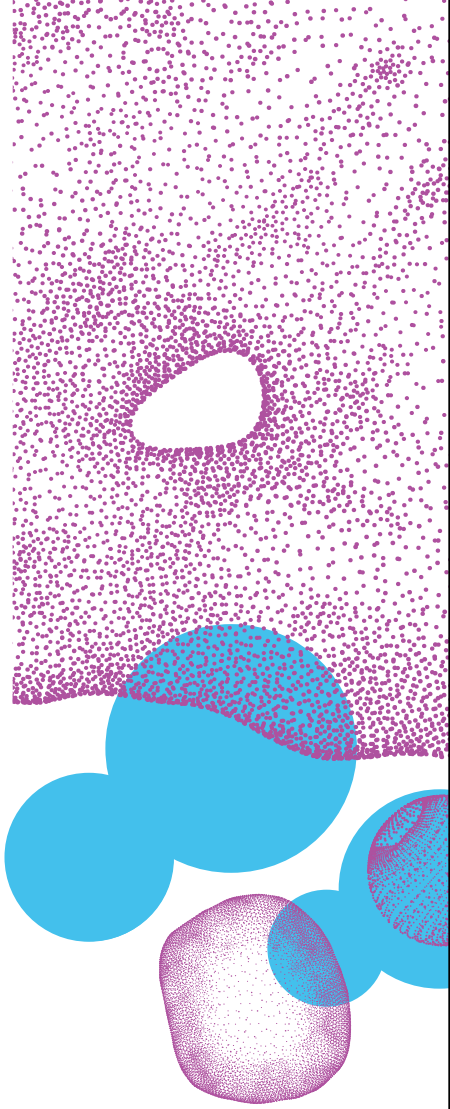




by Chiara Gamberi, Ph.D., assistant professor,
Department of Biology

Science focused on human pathologies has tamed infectious diseases such as rabies, plague, and poliomyelitis by applying microbiological knowledge to improve hygiene, contain disease spread, and implement pharmacological practice through antibiotics, antivirals, and vaccination. Deciphering how genetic inheritance and gene expression work improved our understanding of genetic disease and spurred therapeutic and pharmacological discoveries. In the complexity of a living organism, disease is seldom an isolated compartment; rather, it causes changes reverberating throughout the entire body. Understanding such adjustments is important theoretically. Practically, it is also crucial for diagnostics and therapy design, to understand drug mechanism of action, and anticipate side effects.

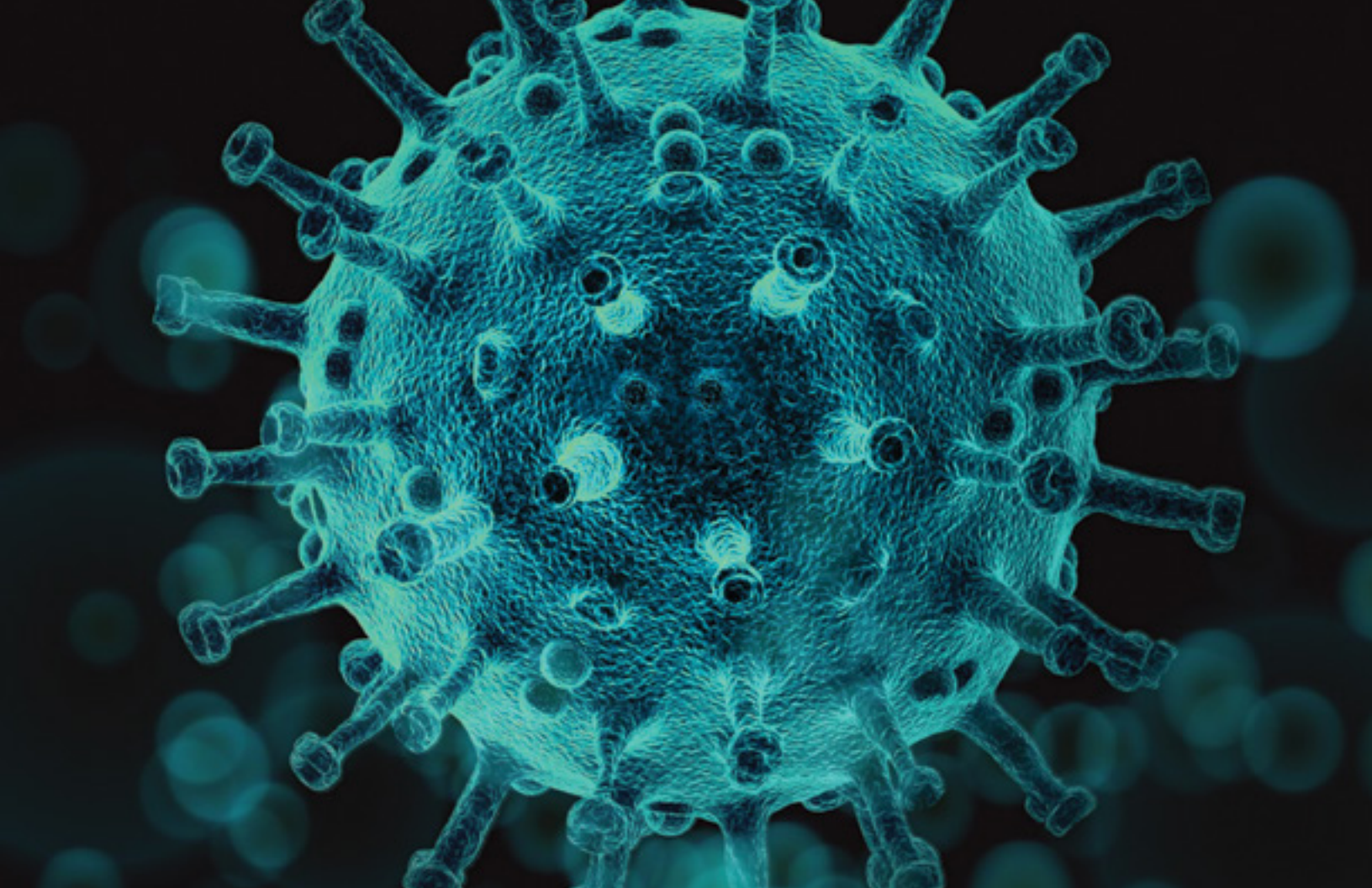
The ability to study model organisms, which are non-human species employed as embodiments of normal human physiology and disease pathology to experiment on a variety of biological phenomena, has been instrumental for modern medicine. Mice, zebrafish, fruit flies, and round worms are among the animal model organisms recognized by the National Institute of Health. Data and models drafted from model organism studies are used to decipher more complex situations such as the human, by using a “compare



THE DISEASE MODELING RESEARCH CENTER AT CCU PROVIDES AN EFFECTIVE MEANS TO IMPROVE THE DRUG DISCOVERY PIPELINE, TO DISCOVER POINTS OF INTERVENTION, TO ENHANCE HEALTH, AND TO TRAIN THE NEXT GENERATION OF SCIENTISTS AND HEALTH PROFESSIONALS.

and contrast” approach. The choice of an appropriate model to tackle a specific biological question is delicate. The fruit fly *Drosophila melanogaster*, for example, is especially well suited to genetic and mechanistic studies of both normal and diseased, or mutated, conditions. Despite physical differences, *Drosophila* and the worm *C. elegans* display crucial similarities with humans at the molecular level. Miniature whole animals with streamlined organs, compartments, and circulation, flies and worms effectively reproduce key disease properties. We owe it to flies and worms the knowledge of chromosomes as the base of inheritance, how innate immunity functions, sleep-wake cycle regulation, and RNA interference, among others. Humans, mice, and rats offer comparable anatomical complexity suited, for example, to study drug metabolism. However, rodent genetics are cumbersome, whereas flies and worms are ideal genetic models: small and easily and economically cultured in the laboratory, they reproduce fast and have short life spans. Such features enable the experimental iterations needed to untangle biological mechanisms and study of hundreds of animals for robust statistics. Alongside research, historically, these traits have made flies and worms popular in genetics teaching laboratories. Recently, flies have been used successfully in drug discovery. Drug discovery is commonly carried out by screening large collections of chemicals in cultured cells to identify “lead” compounds to be tested in rodents within specialized, expensive containment facilities. Because a whole animal is much more complex than cultured cells, most lead compounds fail in vivo, commonly because of toxicity, metabolic breakdown, and off-target effects, which contribute to the high costs of drug development. Thus, using fly models as cost-effective whole animals for drug discovery could improve efficiency, reduce costs, and enhance safety and effectiveness.

Coastal Carolina University has long cultivated interests in model organism research. Biology students routinely experiment on several nonhuman species during the genetics, developmental biology, cell biology, and anatomy teaching laboratories. Research on neurodegenerative disease and drug testing is performed in the laboratories of professors Fang Ju Lin (*Drosophila*) and Daniel Williams (*C. elegans*). In 2021, my own laboratory joined the Department of Biology in bringing a first-in-kind *Drosophila* model for polycystic kidney disease and drug testing technology. Teaching undergraduates valuable research and data analysis skills, molecular, behavioral, and environmental studies, as well as drug discovery, are performed to shed light on unresolved disease aspects from complementary perspectives. Professor Megan Cevasco’s students probe how diatoms in coastal waters may affect neurodegeneration. The laboratory of Professor Paul Richardson investigates viruses to achieve better human diagnostics and combat microbial disease “in kind.” The molecular basis of bacterial pathogenicity and probiotic



function are the research focus of the laboratories of professors Gabriela Perez-Alvarado and Brian Lee. Organic chemistry is used by Professor Bryan Wakefield's group to synthesize new drugs, natural compound derivatives, and new biological probes. Professor Fredanna Duro McGough works to interface genetics, biology, and public health for effective monitoring of infectious and chronic disease, disease prevention, and equitable access to health resources. As the ongoing COVID-19 pandemic is demonstrating, new pathogens can rise and spread quickly, wreaking havoc in our society. Researchers worldwide have applied their combined expertise toward finding cures and vaccines. Scientists can respond

effectively to such emergencies when foundational knowledge has been gained and integrated. Proper research support and training of the new generation of scientists are urgently needed to guarantee continuity of the "knowledge capital."

Critical mass in disease modeling has been reached at CCU in a uniquely collegial atmosphere. A shared vision for an integrated approach to disease and education has inspired the foundation of a Disease Modeling Research Center (DMRC) to train highly qualified personnel in the interdisciplinary study of disease pathology, treatment, and prevention. Targeted on the discovery of effective cures, the DMRC unites faculty in biology, chemistry, biochemistry, and health science to identify the molecular causes of disease and mechanisms of therapeutic action toward improving therapy and minimizing side effects. By combining molecular modelling and genetics with whole animal in vivo assays for drug discovery, the DMRC is poised to improve identification and knowledge of disease pathology. Improved therapy with minimized side effects and better knowledge of disease causes and mechanisms would have direct benefit in reducing morbidity and expanding life expectancy. The DMRC at CCU provides an effective means to improve the drug discovery pipeline, to discover points of intervention to enhance health, and to train the next generation of scientists and health professionals.



Computing Research at

Los Alamos National Lab

by **Will Jones**, Ph.D., professor,
Department of Computing Sciences



In early 2013, I began collaborating with a friend and colleague, Nathan DeBardeleben, Ph.D., at the Los Alamos National Laboratory (LANL) in New Mexico, on work related to the reliability and performance of large-scale computer systems.

Our federal government uses these systems to help solve complex scientific problems such as wildfire prediction, modeling the spread of viruses, and efforts to help detect the proliferation and testing of weapons of mass destruction, just to name a few. At the time, with the help of Rusty Davis, a talented undergraduate student from Clemson University who is now a full-timer at LANL, I was able to secure some initial external funding for CCU. The scope of the work and the associated funding grew over the years as more CCU students became involved and produced high-quality output that the lab valued. To date, the contracts have totaled over \$650K through FY2024 and have helped pave the way for multiple paid research-based internships at CCU, as well as several on-site at LANL during the summer. Our collaboration targets high-performing



(Left to right) Nicklaus Przybylski (CCU student), and Will Jones (CCU professor)
Los Alamos, N.M., October 2021.



(Left to right) Will Jones, Cannon McIntosh (former CCU student), Rusty Davis (former CCU staff), Terry Grové (former CCU student), Stephen Penton (former CCU student), Dylan Wallace (former CCU student), Dakota Fulp (former CCU student), Brian Atkinson (former CCU student), Nathan DeBardleben (LANL employee).



(Top) Nicklaus Przybylski and Will Jones, Los Alamos, N.M., October 2021. (Middle): Former CCU students Alex Poulos and Terry Grové at the 2016 Supercomputing Conference. (Bottom): Former CCU student Cannon McIntosh presenting at the 2019 Supercomputing Conference.

Thus far, the relationship between CCU and LANL has had numerous positive outcomes for our students.

undergraduates in computer science in the following ways: First, we aim to identify students that have the potential to help immediately contribute to the mission of the research. Secondly, and perhaps more importantly, our collaboration provides a vehicle for undergraduates to obtain valuable training outside the classroom from CCU faculty as well as from external mentors at our government's largest, and arguably, most prestigious national laboratory.

Thus far, the relationship between CCU and LANL has had numerous positive outcomes for our students. For example, many of these undergraduates have gone on to pursue graduate education in computer science and computer engineering, both at the master's and doctorate levels. Others have acquired gainful fulltime employment at LANL or other government facilities. Additionally, our collaboration has resulted in 11 peer-reviewed scholarly publications at regional, national, and international conferences. In fact, prior to the pandemic, each year several students attended a well-known supercomputing conference with me where they had the opportunity to present their work. These experiences help bolster our students' marketability in both the private and public sectors, and they also help our graduates stand out when applying to graduate schools. I look forward to continuing to nurture this effort and efforts like these at CCU well into the future, as we continue our mission of effectively preparing our students for the next steps in their lives.



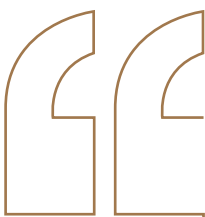
Check out computing sciences at CCU:
coastal.edu/computing

KENNETH E. SWAIN HALL



UNDERGRADUATE RESEARCH *in the* GUPTA COLLEGE OF SCIENCE

by Rob Young, Ph.D.,
professor and
associate provost for research



**ALL STUDENTS WORK WITH
DEDICATED FACULTY MEMBERS,
AND MANY FORGE LIFELONG
FRIENDSHIPS AND PROFESSIONAL
RELATIONSHIPS WITH THEIR
RESEARCH MENTORS.”**

Undergraduate research is a way of life in the Gupta College of Science. Every year, hundreds of students representing all majors in the college enroll in undergraduate research courses or participate in field and laboratory research experiences. All students work with dedicated faculty members, and many forge lifelong friendships and professional relationships with their research mentors. Many also work alongside graduate student researchers, gleaning whether a graduate program may be the next step for them. At least a hundred or so each year complete projects substantial enough to result in an external conference presentation, a publication, or a presentation at Coastal’s annual Undergraduate Research Competition. Science students account for about two-thirds of the presenters at that competition, a number that is down from a half dozen years ago. Oddly enough, that is a good thing – not because the number of science participants have declined (they have increased), but because more students have joined each year from non-science disciplines. Students across campus are discovering what the science majors knew all along: that undergraduate research is good stuff.

The undergraduate research programs for two outstanding faculty are highlighted in this issue. Will Jones, Ph.D., professor of computing sciences, has mentored numerous CCU students in research internships at or in collaboration with the prestigious Los Alamos National Laboratory; and

Bryan Wakefield, Ph.D., associate professor of chemistry and director of the SC INBRE program grant for CCU, has facilitated multiple faculty-student research teams conducting biomedical research on campus. These two faculty members are just the tip of the iceberg, as the Gupta College is full of faculty who are passionate about training and developing student researchers. For most faculty in the college, the line between teaching and research is a blurry one. Outstanding teaching and faculty-mentored student research are complementary and integrated components of the exceptional educational experience they provide for CCU students.

The value of an undergraduate research experience is well-established. It allows students to investigate whether they are truly cut out for careers in research. It allows them to learn and develop research skills and techniques, strategies for solving problems, and habits of mind for reasoning and critical thinking. It shows them the value of diving deep into a focused subject and then stepping back to apply the lessons learned to a broader context. It teaches discipline, organization, and resilience. It develops communication skills and produces a true network of useful and valuable contacts and colleagues. It is the access gateway of choice for graduate programs and research-related careers. It is the reason that many students in the Gupta College of Science chose to come to Coastal Carolina University, and it is a big reason why they graduate full of praise for their time as Chanticleers.

Michelle Marken

HAS
SEEN
IT
ALL

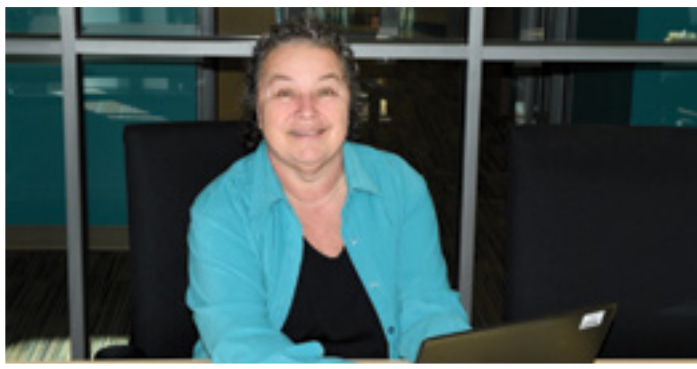


As far as the Gupta College of Science is concerned, Michelle Marken has seen it all. Her first job in the college was as a temporary receptionist in 2005.

Over time, her position changed and her responsibilities expanded, culminating in her current position as business manager for the college. While at CCU, she has worked for three different deans: Doug Nelson, Joan Piroch, and, most recently, Mike Roberts. And now, Michelle plans to retire in 2022.

When asked about what types of changes in the college she observed and, in many instances, helped facilitate, she lists the following: the addition of new departments, rapid growth in the student population, construction and occupation of new buildings, and two college name changes. When Michelle started, she worked in the College of Natural and Applied Science, which then changed to the College of Science, and is now known as the Gupta College of Science.

While she admits that helping students is her favorite part of the job, it is clear to everyone that her willingness to help is regularly experienced by faculty, the dean, and the associate deans. She also serves as that important link between the college and entities outside the college. After retirement, Michelle plans to “enjoy each day and perhaps travel a bit.” And, of course, she will continue her hobby of making homemade greeting cards. Thank you, Michelle, for your contributions to the college, and we wish you well in the years to come.



“

I met Michelle in August 2014 when I was a new advisor at CCU. She was always busy, zipping around the dean’s office; her presence was intimidating at first! From the start, I could tell that Michelle knew the ins and outs of CCU, and she was the person [to go to] if I needed help getting something done. A couple of years later, our department moved into a new building, where the academic advisors and dean’s office combined into one office suite. During the past few years, we have worked very closely together, and I have so much respect for Michelle. I coordinate our first-year experience course [UNIV 110S], and Michelle is an enormous help with the process. UNIV 110S alone is a huge job, with room assignments and changes, instructor assignments, and managing course capacities. I know that what I see is only a tiny fraction of what Michelle does. I’m sad to see her go, but I am so excited for her to start this next chapter and to enjoy more time with loved ones, especially her wonderful husband, Ralph. We will miss you greatly, Michelle.”

- Denise Sanata,
professional advisor

“Michelle Marken has played an integral role in the daily operations within the Gupta College of Science. She has been very helpful over the many years I have known her. Michelle’s retirement will be a loss to the University. However, I would like to wish her all the best in her new adventure.”

- Melanie McKeefery,
administrative specialist



BRIAN WAGNER

Academic advisor in the Gupta College of Science



Q. What is your current position in the Gupta College of Science?

A. I currently serve as one of the professional academic advisors in the Gupta College of Science, working primarily with first-year students as they acclimate to the rigor of college life and adjust to living on their own. Unlike faculty advisors, our role is to not only help students navigate their academic programs, but also to assist them in adapting to the social and emotional challenges of being an adult.

Alongside my colleague, Denise Sanata, I also coordinate the first-year experience course for the Gupta College of Science. This course was designed to help students feel connected with the University while also helping develop habits for college success. As staff, I feel as though this course is a great opportunity to see the challenges both our students and our instructors face within the classroom environment. I also enjoy working with individuals who decide to teach this course as they explore different ways to connect with students and help them be successful.

Q. What background led you to this position?

A. For my undergraduate degree, I attended a very large public institution in hopes of taking advantage of opportunities both inside and outside the classroom. Despite all these opportunities, I struggled socially to find my place within the larger culture of the university, which correspondingly impacted my academics. Deep down inside, I was hoping that someone at the university would reach out to me and offer advice about how to overcome the issues I was facing. It took me two years before I felt as though I understood how to be successful in college.

When I graduated, I went straight into a graduate program. During that time, I served as a teaching associate. As I interacted with students, I found that I enjoyed helping students adjust to the college classroom and giving advice on future classes within their majors. I enjoyed the work more so than knowledge I was gaining in my program, so I decided to switch my graduate studies towards learning more about the development that occurs within college students. I find that my experiences within both my undergraduate and graduate careers have helped me empathize with first-year students as they tackle the many obstacles that come with meeting new people and grasping a new set of expectations.

Q. In a “typical” semester, what does your job entail?

A. A typical semester starts with helping students adjust to their new schedules. At the beginning of the semester, we work with students to adjust their course schedules to what is most conducive to their comfort levels. After attending the first few days of class, some will find that maybe a professor is not favorable to their learning style or that the time of one of their classes would work better either earlier or later in the day. During the year, we meet with students to discuss how their current semester is progressing and talk about coursework for next semester. When discussing the current semester, we might need to have some difficult conversations about the student’s participation or attendance in one or more of their courses. Although challenging, these conversations can be the first steps toward turning a poor semester around for a student or having a meaningful conversation about what the student is looking for from the college experience.



THE STUDENTS THAT I SEE GETTING THE MOST OUT OF THE ADVISING PROCESS ARE ENGAGED IN THE COLLEGE EXPERIENCE, HONEST ABOUT THEIR LIMITATIONS, AND WILLING TO PUT FORTH THE EFFORT TO OVERCOME OBSTACLES.

– Brian Wagner

Q. How has COVID-19 affected your job?

A. At the start of the pandemic, I think that switching to an online format was very difficult for most students, especially in that first semester, because of the suddenness of the switch from in-person to an online format. It affected all students in a variety of ways, but I feel like it adversely impacted the students who were already struggling academically, whether they were coping with the normal adjustment issues of college or the process of taking difficult courses towards their science degrees. It was challenging for me and other advisors because those students were already less inclined to ask for help. We learned new methods to reach students in trouble and helped them overcome the obstacles they were experiencing in the remote learning environment.

Today, I think students are more flexible with change and understand online learning can be beneficial. I still think the preference for everyone is to take classes and hold meetings in person, but it is not scary if we need to do these things in an online format. Regardless of the environment where learning is happening, we professional advisors who primarily work with first-year students will continue helping students process how to adapt to the college environment and how to successfully navigate their programs.

Q. How can a student get maximum benefit from the advising process?

A. The students that I see getting the most out of the advising process are engaged in the college experience, honest about their limitations, and willing to put forth the effort to overcome obstacles. When I say engaged in the college experience, these students are passionate and excited about their classes. They understand that they may be expected to take classes that they are challenged by, or they find little connection with, as it relates to their major, but they still find ways to discover value in the knowledge they are gaining from all their classes.

As someone who went into college studying one academic discipline and then completing a program in another, I appreciate when a student recognizes that their strengths and aptitudes might not lie in the areas they once thought, and they either do everything in their power to overcome those limitations or decide they need to move in a different direction. In many of these instances, I see a great deal of strength in students who actively seek out the assistance of experts at the University to overcome the struggles they are facing in order to pursue a dream or eventual career.

Q. Do you have any tips or suggestions for students as they navigate life at CCU?

A. Whether in my advising sessions or teaching first-semester students in UNIV 110, I try to convey the lessons that I took for granted as a first-year college student. I encourage students to get involved in campus activities and organizations. With many of our students coming from out-of-state, it is extremely important that they connect with other students on campus and feel as though they are part of the larger University community.

I also encourage students to do at least one activity that takes them outside of their comfort zone, whether it is to study in another country or take a class that exposes them to new experiences or perspectives. While preparing for graduate school, I made a conscious effort to say to myself that I was going to take advantage of opportunities that exposed me to new ways of thinking and the larger world around me. I think that, increasingly, jobs and graduate programs are looking for individuals who can solve problems from a variety of perspectives. By exposing yourself to new ideas or uncomfortable situations, you can learn a lot about others, but also about the resiliency that lies within you.



GUPTA COLLEGE OF SCIENCE ADVISING CENTER

SCIENCE ANNEX II 210
107 CHANTICLEER DRIVE

OFFICE HOURS
M-F: 8 A.M. TO 5 P.M.



CCU FACULTY RESEARCH PROJECTS

Paul Gayes, Ph.D.
*Burroughs & Chapin Center for
Marine and Wetland Studies*

Keith Walters, Ph.D.
Department of Marine Science

Together received a grant from The Nature Conservancy for \$192,509 for a project titled Boyd Living Shoreline Monitoring.

Paul Gayes, Ph.D.
*Burroughs & Chapin Center for
Marine and Wetland Studies*

Received \$66,736 in funding from Horry County and the City of North Myrtle Beach for 2021-2022 Beach Erosion Studies.

Received a \$100,000 NOAA award from the Southeast Coastal Ocean Observing Regional Association (SECOORA) for delivering actionable coastal and ocean information from high-quality science and observations for the Southeast.

Received \$25,000 from the Horry County Higher Education Commission for Amplification of BCCMWS Observation-Modeling-Technology Initiatives in Support of University and Community Interests and Needs.

Roi Gurka, Ph.D.
*Department of Physics and
Engineering Science*

Received a grant for \$258,344 from the National Science Foundation and the U.S.-Israel Binational Science Foundation to study the biomechanics of long-distance flight in large beetles: do smaller individuals fly better?

Nicholas Harmon, Ph.D.
*Department of Physics and
Engineering Science*

Received \$97,513 from the National Science Foundation for a project titled RUI: Investigating Spin Currents from Nuclear Field Gradients.

Wes Hitt, Ph.D.
*Department of Physics and
Engineering Science*

Received a \$1,500 award from NASA through the College of Charleston for the Space Grant Campus Director program at CCU.

William Jones, Ph.D.
Department of Computing Science

Received an additional \$54,322 for an expanded scope of work for HPC Scheduler Resilience research at the Los Alamos National Laboratory.

Varavut Limpasuvan, Ph.D.
Department of Marine Science

Was awarded \$215,139 from the National Science Foundation for a third year of funding through the Intergovernmental Personnel Act (IPA) Assignment.

Matt Lykins, Ph.D.
*Department of Physics and
Engineering Science*

Received a grant for \$3,999 from NASA through the College of Charleston for REAP 2021: Opening Astrophysics Career Paths for Underserved Groups at CCU.

Prashant Sansgiry, Ph.D.
Gupta College of Science

Received a grant from the South Carolina Department of Education in the amount of \$12,257 for the 2021 AP Institutes for Teachers.

Lauren Stefaniak, Ph.D.
Department of Marine Science

Received a \$662,905 award from the National Science Foundation for the RUI project: Development and application of genomic resources for ascidian taxonomy and holobiont evolution.

Keith Walters, Ph.D.
Department of Marine Science

Received \$15,609 in EPA funding through an award from the City of North Myrtle Beach for Phase 1 of DHEC 319 Hog Inlet Watershed Management-Oyster Reef Construction.

CCU FACULTY RESEARCH PROJECTS

Daniel Abel, Ph.D.
Department of Marine Science

Received a \$4,000 Professional Enhancement Grant for a project on heart function in Great White and other sharks.

Michelle Barthet, Ph.D.
Department of Biology

Received \$5,955 in Professional Enhancement Grant funds for a project on the identification of a novel intron splicing complex in the chloroplast of rice.

Derek Crane, Ph.D.
Department of Biology

Received a \$6,000 Professional Enhancement Grant for a project on the use of oxytetracycline in fisheries science: we are still learning after nearly 60 years.

Justin Guilkey, D.Phil.
Department of Kinesiology

Received a \$5,999 Professional Enhancement Grant for a project on the hemodynamic responses during aerobic blood flow restriction exercise at different percentages of limb occlusion Pressure.

Juliana Harding, Ph.D.
Department of Marine Science

Received \$4,868 in Professional Enhancement Grant funding to study fish growth rates as a tool to evaluate warming water effects in southeastern estuaries.

Paul Richardson, Ph.D.
Department of Chemistry

Received a \$5,603 Professional Enhancement Grant for research on perceived stress levels and its impact on bacteriophage presence in the human population at Coastal Carolina University.

Brianna Thomas, Ph.D.
*Department of Physics and
Engineering Science*

Received \$3,998 in Professional Enhancement Grant funds for a pilot study on the effects of color on students' interpretation and retention of multiple representations in introductory mechanics.

CCU FACULTY AND STUDENT PUBLICATIONS

Banovetz, M. T., Lake, R., Blackwell, A. A., Osterlund, J. R., Schaeffer, E. A., **Yoder, R. M.**, and Wallace, D. G. 2021. Effects of acquired vestibular pathology on the organization of mouse exploratory behavior. *Experimental Brain Research*. doi: 10.1007/s00221-020-06032-1 (Department of Psychology)

Coleman, N.C., **Burge, E.J.** 2021. Association behavior between sand tiger sharks and round scad is driven by mesopredators. *PeerJ* 9:e11164 <https://doi.org/10.7717/peerj.11164> (Department of Marine Science)

Johansen, C., Macelloni, L., Natter, M., Silva, M., Woosley, M., Woolsey, A., Diercks, A.R., Hill, J., **Viso, R.**, Marty, E., Lobodin, V.V., Shedd, W., Joye, S.B., MacDonald, I.R., 2020, Hydrocarbon migration pathway and methane budget for a Gulf of Mexico natural seep site: Green

Canyon 600. *Earth and Planetary Science Letters*, 545, <https://doi.org/10.1016/j.epsl.2020.116411> (Department of Marine Science)

Kong, X. 2021. Identifying geomorphological changes of coastal cliffs through point cloud registration from UAV images. *Remote Sensing*. 2021; 13(16):3152. <https://doi.org/10.3390/rs13163152> (Department of Physics and Engineering Science)

Millet-Boureima C., Le T-B.U., He S. and **Gamberi C.** 2021. Modeling neoplastic growth in renal cell carcinoma and polycystic kidney disease. *International Journal of Molecular Science* 2021, 22(8), 3918. <https://doi.org/10.3390/ijms22083918> (Department of Biology)

Sparapani S., Millet-Boureima C., Oliver J., Kalostian T., Mu K., Hadavi P., ... 72 authors, and **Gamberi C.** 2021. The biology of vasopressin. *Biomedicines* 9(1), 89. <https://doi.org/10.3390/biomedicines9010089> (Department of Biology)

Taube, J.S., **Yoder, R.M.** 2020. The Impact of Vestibular Signals on Cells Responsible for Orientation and Navigation. In: Fritzsche, B. (Ed.) and Straka, H. (Volume Editor), *The Senses: A Comprehensive Reference*, vol. 6. Elsevier, Academic Press, pp. 496–511. (Department of Psychology)

Wallace, D., **Jones, W.M.**, Robey, R., Monroe, L., Grové, T., and DeBardeleben, N. 2020. Impact of Contextual Error Correction Techniques in CLAMR. 2020 IEEE Southeast Conference. doi:10.1109/SoutheastCon44009.2020.9249734 (Department of Computing Sciences)

–CCU authors in **bold**.

–CCU student *****.





Gupta College of Science
P.O. Box 261954
Conway, SC 29528-6054

coastal.edu/science



Great and snowy egrets foraging in a tidal creek, part of the Anne Tilghman Boyce Coastal Reserve on Waites Island, owned and operated by Coastal Carolina University.