

COASTAL CAROLINA UNIVERSITY

progression

MAGAZINE

Spring 2019

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



CCU SCIENTISTS
SHARE PERSPECTIVES
ON HURRICANE-
CAUSED FLOODING

**WOMEN'S
MARCH**

**HEALTHY
CHILDREN**

**COMPASSION
FATIGUE**

progression



A message from the dean

In this issue of *Progression*, we provide more information on the research and activities of the students and faculty in the College of Science at Coastal Carolina University. I hope that upon reading these articles you will fully appreciate the breadth of the knowledge, research and opportunities extant in our college.

If you have not visited our campus recently, we extend an invitation. Our science programs and science facilities are second to none and provide the opportunities where our more than 4,000 students, enrolled in one of our major disciplines, learn alongside our exemplary faculty. Our approach toward education is engaged and hands-on, providing the skills needed for 21st century careers.

Should you have any questions concerning our programs in science, or want more information on any of the articles, please do not hesitate to contact me or the specific authors—my phone number and email are listed below; you can also follow me on Twitter: @CCUScienceDean. Finally, if you wish to make a donation to our college to support the work that we do, please feel free to contact the major gift officer for the College of Science, Bryan Steros, at bsteros@coastal.edu.

Regards,

A handwritten signature in black ink, appearing to read "Michael H. Roberts".

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COASTAL CAROLINA UNIVERSITY**
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COASTAL CAROLINA UNIVERSITY

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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 in our department 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 in our department have access to professors with expertise ranging from molecules to ecosystems. Faculty in the Department of Biology 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 at CCU 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, the Physically Active Living Skills (PALS) classes and the 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 not only by teaching well, but by engaging students in hands-on research, community service projects, and field-based learning and leadership opportunities.

Visit coastal.edu/academics/colleges/science/departments/kinesiology. Greg Martel can be reached at gmartel@coastal.edu or 843.349.2957.

DEPARTMENT OF CHEMISTRY

David Evans, Ph.D.

Department Chair

Our department is home to two disciplines within the physical sciences: chemistry and biochemistry. Bachelor of Science degrees are offered in chemistry and biochemistry. 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 you may have.

Visit coastal.edu/chem. David Evans can be reached at devans@coastal.edu or 843.349.2209.

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 program nursing residential program and RN-to-BSN completion program). The 2+2 Nursing Residential program is a collaborative between Coastal Carolina University and Horry-Georgetown Technical College (HGTC) and is for first-time freshman 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 Inc. 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 and other majors and minors of study with course offerings in web development, programming and business applications.

Visit coastal.edu/academics/colleges/science/departments/cs. Jean French can be reached at jennis@coastal.edu or 843.234.3430.

DEPARTMENT OF SOCIOLOGY

Robert Jenkot, Ph.D.

Department Chair

This is an exciting time to explore the Department of Sociology. Sociology has a strong history of being student-centered in teaching and research. We offer our students a wide variety of educational opportunities to explore the social world and to take part in changing that world. In order to maintain our student-centered approach to education, all of our professors are active researchers. We bring our experience with various topics into the classroom so that our students get to see what sociology is, how it works, and what it can be used for in the world around them. Importantly, our students are invited to work with our professors on research projects that might interest them. Our students have access to professors who teach courses in: sexuality and gender; race and ethnic relations; social inequality; crime and deviance; religion; popular culture; social justice; health and medicine; sports; HIV/AIDS; juvenile delinquency; and the social relations of the South.

Visit coastal.edu/academics/colleges/science/departments/sociology. Robert Jenkot can be reached at rjenkot@coastal.edu or 843.349.2274.



DEPARTMENT OF MARINE SCIENCE

Jane Guentzel, Ph.D.
Department Chair

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

Visit coastal.edu/academics/colleges/science/departments/marine.
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DEPARTMENT OF PHYSICS AND ENGINEERING SCIENCE

Brian Bunton, Ph.D.
Department Chair

The Department of Physics and Engineering Science is a group of faculty and staff seeking to promote an atmosphere of scholarly endeavors that emphasizes the application of the scientific method in the generation of knowledge across its major and non-major curricula in a liberal arts context. 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 CCU's Core Curriculum through general education courses in physics and astronomy.

Brian Bunton can be reached at bbunton@coastal.edu or 843-349-2066.

DEPARTMENT OF PSYCHOLOGY

Terry F. Pettijohn II, Ph.D.
Department Chair

The Department of Psychology enrolls over 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 the 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/academics/colleges/science/departments/psych.
Terry F. Pettijohn II can be reached at pettijohn@coastal.edu or 843.349.6447.

DEPARTMENT OF COASTAL AND MARINE SYSTEMS SCIENCE

Rich Viso, Ph.D.
Department Chair

The Department of Coastal and Marine Systems Science houses CCU's marine and wetland graduate programs: a Ph.D. in marine science: coastal and marine systems science and an M.S. degree in coastal marine and wetland studies. Students in these programs focus on the complex and interconnected environments and processes found in the coastal zone. With the expanding coastal population and the increase in economies dependent on the world's coastal resources, there is a growing need to advance the understanding of these interconnected environments and processes to help society best manage coastal resources and economy. Our graduate program's focus on training students to advance understanding of complex systems and to work across disciplines to develop predictive capabilities for sound resource management.

Rich Viso can be reached at rviso@coastal.edu or 843.349.4022.

DEPARTMENT OF RECREATION AND SPORT MANAGEMENT

Colleen McGlone, Ph.D.
Department Chair

The recreation and sport management department currently enrolls more than 300 students as well as 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 both nonprofit and for-profit industries. In other words, our work is your play. The program works with CCU 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, the faculty maintain very active research agendas in which students frequently assist.

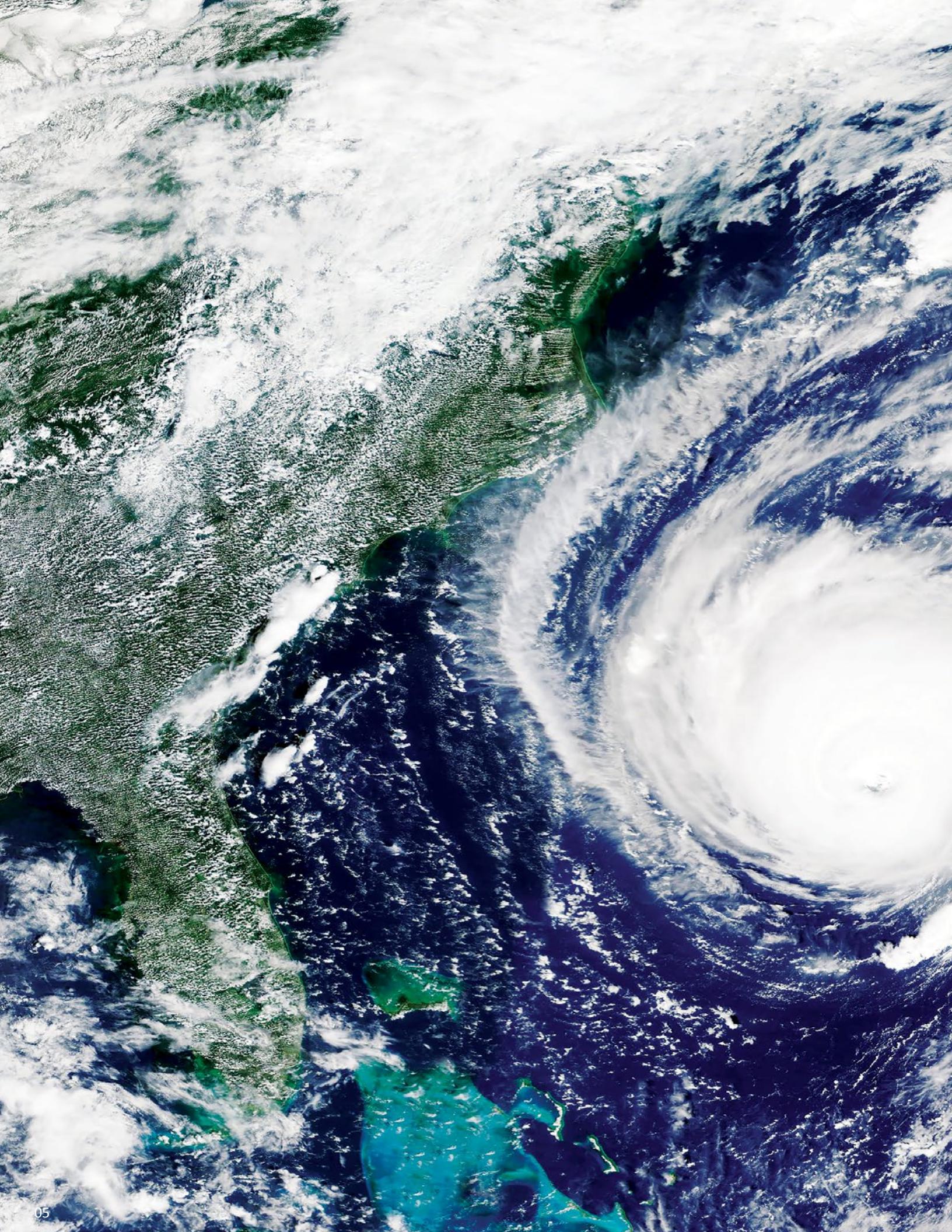
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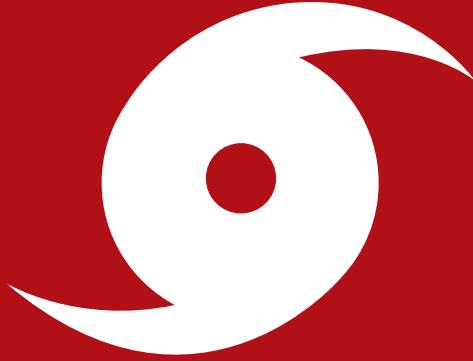
DEPARTMENT OF MATHEMATICS AND STATISTICS

Thomas Hoffman, Ph.D.
Department Chair

The goal of the Department of Mathematics and Statistics at CCU 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 degree program in applied mathematics is 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/academics/colleges/science/departments/math. Tom Hoffman can be reached at thoffman@coastal.edu or 843.349.2249.





CCU SCIENTISTS SHARE PERSPECTIVES ON HURRICANE-CAUSED FLOODING

Hurricane Florence from September 2018 will be remembered as a storm that released massive amounts of rain in North Carolina and eventually caused record-breaking flooding along the Waccamaw River in South Carolina. Coastal Carolina University was closed for two weeks during the floods, and the city of Conway is still recovering. The Waccamaw River is the focus of several ongoing research projects by College of Science faculty. We asked several faculty members how the flooding affected the Waccamaw River and their research on the river.

Q & A WITH



DEREK CRANE is an assistant professor in the Department of Biology.



PAUL GAYES is a professor and executive director of the Burroughs & Chapin Center for Marine and Wetland Studies.



JAIYE McCAULEY is an assistant professor in the Department of Sociology.

Q.

WHAT ECOLOGICAL IMPACTS WERE OBSERVED, OR MIGHT BE OBSERVED IN THE FUTURE, AS A RESULT OF THIS FLOOD?

A. “The short-term effects included a widespread fish kill in the Waccamaw River. Point samples of dissolved oxygen (by the Department of Natural Resources and Waccamaw Watershed Academy) in the water indicated that hypoxic conditions ($<2.0 \text{ mg/L}$) were likely throughout much of the river, and remained at these levels for several weeks. Although many fishes in the coastal plain can withstand hypoxic conditions for short durations, sustained hypoxia like what was observed during the flooding following Hurricane Florence is lethal to all but air-breathing fishes. Lack of access prohibited the SCDNR from conducting a standardized fish kill survey using the American Fisheries Societies’ protocols, but based on surveys at locations they could access, mortality was easily in the tens of thousands of fish (Jason Marsik, DNR, personal communication). A 30 percent decrease from the three-year average catch-per-unit-effort for fishes was observed during electrofishing by the DNR in November. Finally, the DNR observed that declines in catch rates were most noticeable for adult fishes, which suggest that they were disproportionately affected by the mortality event.”

- **Derek Crane**



Fish kill along the Waccamaw River. Photo by Jason Marsik.



Q.

HOW WERE YOUR ONGOING RESEARCH EFFORTS AFFECTED BY THE FLOOD?

A. “Storm and flood events are significant agents of change in our world. We frequently observe rather dramatic and sometimes catastrophic societal impacts from storms such as those that accompanied the hurricanes that visited the CCU community and broader southeast U.S. in recent years. The enhanced energy of water, wind and wave processes such as those that caused so much damage to property and disruption in our region this past fall also provide important episodic functions within the larger coastal system. Periodic flooding brings sediment and shapes flood plains that support rich sub-environments and provide important ecosystem services to the area. Similarly, storms and floods can result in gain, as well as loss, of sediment and coastal environments depending on storm tracks and character. They are lead agents of change in a changing world. Numerous research programs within the Burroughs & Chapin Center for Marine and Wetland Studies have focused on

better observing and measuring of storm processes. The results of these efforts are communicated to key decision makers in the disaster planning and management arenas. The recent events added to the long-term study of our coastal systems providing important windows into these energetic agents of change that historically affect the system infrequently.”

- Paul Gayes

A. “I’m currently working in partnership with Paul Gayes, Len Pietrafesa and Shaowu Bao in the School of the Coastal Environment to provide a social science perspective on flood risk modeling and communication research. The post-Florence flooding underscored the importance of this work and led me to think about the project in new ways. Because I live in a flood-prone area but did not evacuate as advised, I have a personal understanding of what may be going through the minds of others as they hear and respond to flood risk models and communication from county authorities.”

- Jaime McCauley

Q.

WHAT INSIGHTS MIGHT WE GAIN FROM STUDYING SUCH A FLOOD?

A. “Comparison of fish data from sampling over the next few years with sampling by the DNR during 2015-2017 will provide an indication about how fish assemblages respond to extreme disturbance events. For example, we could investigate questions such as: How long does it take the system to recover? Did the die-off reshuffle the species assemblage or result in new dominant species? Is compensatory growth observed? In the short term, floods can result in mortality of aquatic organisms; periodic disturbances such as flooding are important because they can increase species diversity by preventing dominance by highly competitive species, bring terrestrial nutrients into aquatic habitats, and can create new habitats. Although, periodic disturbances are typically viewed as being beneficial to ecosystems, sustained or frequently repeated intense disturbances prevent species from becoming established and lead to low levels of diversity. This leaves us with the question of: How will aquatic



Governor McMaster (right) appointed several CCU faculty to the South Carolina Floodwater Commission to explore the challenges and needs to better protect the state and coastal communities from the increased frequency and magnitude of storms and flooding. Coastal and Marine Systems Science professor Tom Mullikin (left), is the chair of the commission.

ecosystems respond to an increased frequency of heavy rain events or slow-moving tropical disturbances?"

- **Derek Crane**

A. "The center has partnered with the Institute for Sensing and Embedded Network Engineering at Florida Atlantic University to form the Southeast Atlantic Econet. Supported by funding from NOAA-The National Mesonet program and through extensive partnerships with county-level emergency and environmental managers from South Carolina to Florida, federal and state agencies, and the private sector the Southeast Atlantic (SEA) Econet now numbers about 100 environmental observation stations from the CCU campus to Puerto Rico. In addition to meteorological stations, we are also incorporating water quality measurements. This initial application focused on the Savannah River basin from the mountains to the sea. The technology has continued to be developed and some of the water quality sensors from the Intelligent River project are now being phased into the Waccamaw and Pee Dee rivers in concert with S.C. DHEC."

- **Paul Gayes**

A. "From a sociological perspective, there are so many insights! The ways that humans interact with each other and the environment are both important for sociological analysis. For example, human impacts on the environment can exacerbate natural disasters. In this case, both human-caused climate change and expansive housing and urban development made a natural disaster into a human one. Another sociological thread is examining human-to-human interaction. For example, how did individuals and communities come together to support each other before and after the hurricane and subsequent flooding? Or, how did people respond to evacuation warnings from authorities?"

- **Jaime McCauley**



DID THE FLOOD PROVIDE ANY UNIQUE RESEARCH OR EDUCATIONAL OPPORTUNITIES?

A. "Recently, Governor McMaster appointed several CCU faculty to the South Carolina Floodwater Commission to explore the challenges

and needs to better protect the state and coastal communities from the increased frequency and magnitude of storms and flooding that has occurred over the last decade. Tom Mullikin, who is a professor in coastal and marine systems science, is the chair of the commission. Three center staff (Gayes, center director, Len Pietrafesa, B&C research scholar, and Deborah Jane Stirling, researcher) were appointed to the commission, as were William Ambrose, Ph.D. (vice dean of the School of the Coastal Environment) and Rich Viso, Ph.D. (chair of coastal and marine systems science). The commission began its work in January 2019."

- **Paul Gayes**

A. "I'm working with a faculty member in interdisciplinary studies, Jennifer Mokos, to develop a flood history project. It's still very much in development stages, but our plan is to use community-based participatory action methods to collect flood history data from community members. These data will be used to analyze the impact of flooding on individuals and communities, as well as to chart the susceptibility of certain communities to flooding over time. In addition, we'd like to create multimedia 'story maps' combining text, images and



GIS data. This project would allow us to examine flood history in relation to other changes, for example, housing and urban development.”

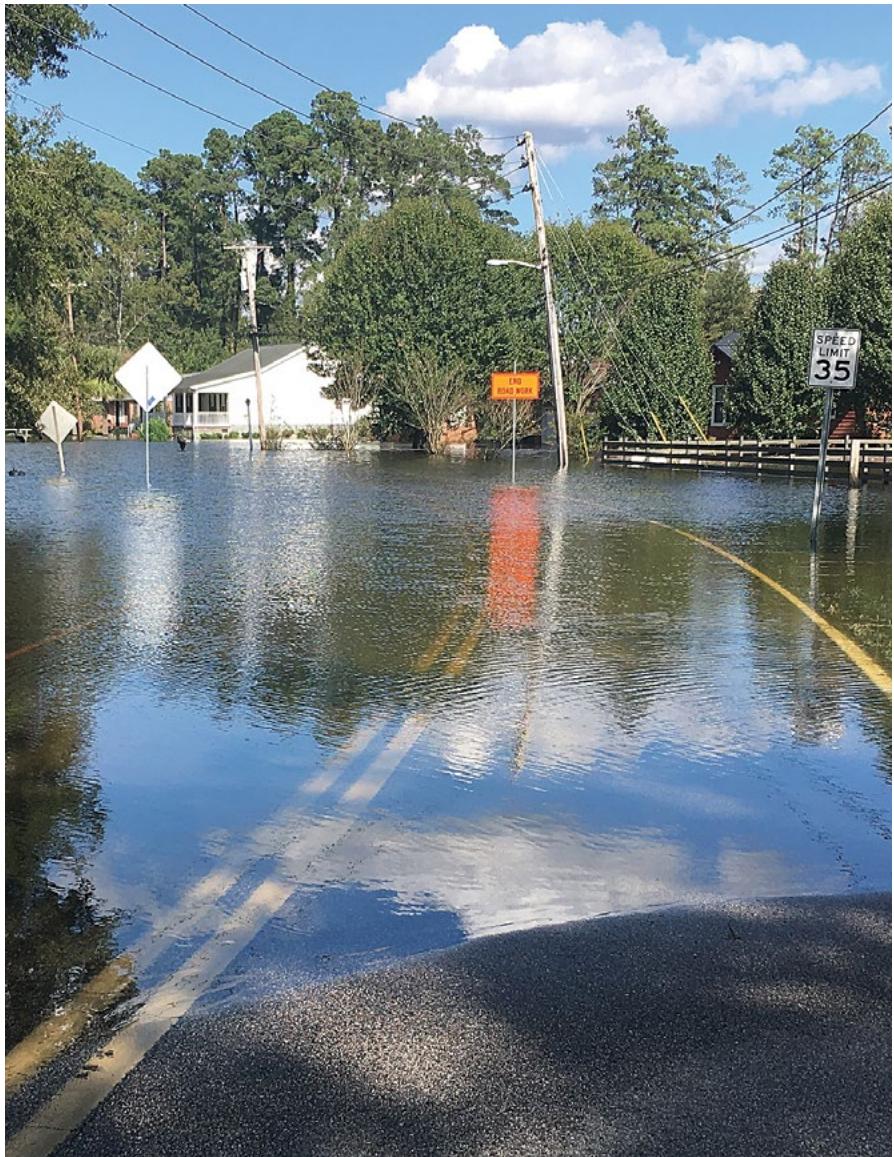
- Jaime McCauley



WHAT IS THE HUMAN IMPACT OF THIS FLOOD AND HOW HAS THE COMMUNITY RESPONDED?

A. “The human impact of the post-Florence flood cannot be overstated. A slow-motion natural disaster such as this may not result in a dramatic loss of life, but hundreds if not thousands of people in the Conway and Myrtle Beach communities have had their lives forever changed. Many people in the Socastee and Conway areas, for example, are still unable to return to their homes and may not be eligible for FEMA assistance. Folks forced to evacuate for long periods of time may have lost homes, cars, even jobs. Their lives are still hanging in the balance. While community support was strong in the immediate aftermath of the flood, many of those affected are beginning to feel forgotten by the larger community and ignored by county officials.”

- Jaime McCauley



Flooded Long Avenue in Conway following Hurricane Florence. Photo by Jim Luken.



AND THEIR AEROBIC FITNESS

In the United States, there is a well-documented and alarming prevalence of physical inactivity and obesity. Additionally, there is a greater prevalence of physical inactivity and obesity in children today than decades ago. These public health findings are now contributing to myriad adverse health outcomes. At this point, the extent of the impact on children is not fully understood, given the recent nature of the epidemic, but we are now seeing “lifestyle” and “preventable” diseases in children that were at one time only found in adults. Given the recent nature of the epidemic, it is thought that if public health trends continue, there will be massive stress on our future health care system. In order to change the course of these health trends to improve health and wellness in our children, stakeholders must work together to understand changes in overall health and wellness and effective interventions to develop lifelong healthy habits, such as physical activity.

AEROBIC FITNESS

One potential screening measurement to understand health and wellness is aerobic fitness. Aerobic fitness is the summation of a complex interaction among the cardiovascular, pulmonary, muscular and energetic systems of the body during exercise.

In adults and children, it is a good indicator of health because it gives a snapshot of how well the whole body is performing under stress.

More specifically, aerobic fitness is a measurement of the capacity of the pulmonary, cardiovascular and muscular systems to transport and use oxygen for exercise. The lungs must bring in oxygen from the air and transport it to the blood. The heart must pump blood rich in oxygen to exercising muscles. The exercising muscles must be able to extract the oxygen from the blood and use it to produce energy for exercise. The amount of oxygen transported and used every minute by this complex system is called oxygen uptake and is a direct measurement of aerobic fitness.

Oxygen uptake can be measured in the Smith Exercise Science Laboratory at CCU using specialized equipment that determines the amount of oxygen inhaled and exhaled. The difference between the inhaled oxygen (i.e., how much oxygen the heart pumps to muscles) and exhaled oxygen (i.e., how much oxygen left over when blood returns to the heart) is oxygen uptake. A higher oxygen uptake correlates to an individual being more aerobically fit.



by Justin Guilkey, assistant professor, Department of Kinesiology

In every person, there is a point where no more oxygen can be pumped to the muscles or the muscles cannot extract more oxygen from the blood. Either way, this point limits the maximal capacity for the muscle to use oxygen to produce energy for exercise, which corresponds to the maximal aerobic capacity. This maximal capacity can be determined by utilizing special treadmills or exercise bikes and measuring inhaled and exhaled oxygen (i.e., oxygen uptake) during exercise. During the exercise test, oxygen uptake steadily increases with increasing exercise intensity until fatigue or until the body has reached its maximal capacity. The highest measurement of oxygen uptake, which is sometimes referred to as V_O2max, is considered the gold standard measurement of aerobic fitness.

There is a wide range of V_O2max in adults and children. An elite marathoner can have V_O2max as high as 85 ml/kg/min! A healthy adult who regularly exercises could have a V_O2max in the range 30-40 ml/kg/min. Healthy, active children have a V_O2max that is greater than adults, usually in the range of 40-55 ml/kg/min. However, this range appears to be decreasing with the epidemic of physical inactivity in children.

As children grow and mature, their bodies are able to exercise at higher intensities and utilize a greater absolute amount of oxygen. The reason for this is the natural growth of their organs that participate in the oxygen transport system (e.g. heart, lungs and muscles). However, when body size is taken into account, and relative oxygen uptake is calculated rather than absolute oxygen uptake, the maximal oxygen uptake remains relatively stable over childhood. In other words, children's aerobic fitness as measured by maximal oxygen uptake increases proportionally with their physical growth and could be a good baseline measurement to track increases and decreases throughout childhood.

While maximal oxygen uptake has not been shown to be affected by natural growth, it can be affected by body tissue composition (i.e., fat and muscle percentages). As exercise intensity increases, oxygen consumption by muscle also increases, while oxygen consumption in fat cells remains at low levels independent of exercise intensity. Therefore, when accounting for body weight, excess fat decreases maximal oxygen uptake and negatively impacts the aerobic fitness. On the other hand, physical activity and exercise training can increase maximal oxygen uptake and aerobic fitness by

decreasing the amount of fat mass (i.e., losing weight) and increasing the muscle bulk and capacity. This decreases the “dead weight” and increases the tissue that uses oxygen. Because this single measurement increases with positive health habits and decreases with obesity, tracking aerobic fitness could provide an objective snapshot and trends of lifestyle health for medical professionals, who may only see children once a year.

AEROBIC FITNESS AND CHILDHOOD HEALTH

In adults, aerobic fitness has been shown to be a good predictor of future diseases and early mortality. Moreover, research is starting to suggest that increasing aerobic fitness may be protective against the health-related consequences of obesity. Due to the high prevalence of childhood obesity, researchers

have started to study the effects of aerobic fitness on health in children. However, these studies can be less clear cut than adults because of the lower diagnosis of morbidities (i.e., diabetes, high blood pressure, high cholesterol) and the very low rate of mortality from non-lifestyle disease (i.e., children are more likely to die from accidents or violence than diabetes or heart attacks).

In children, health research must focus on risk factors for cardiovascular (e.g., heart attack and heart failure) and metabolic disease (type II diabetes), which could give insight into the potential for future cardio-metabolic disease and premature mortality. Specifically, researchers are currently examining the relationship between aerobic fitness and these risk factors. For example, cardiovascular disease risk factors such as insulin resistance (a precursor to diabetes), high cholesterol and fat blood levels (e.g., dyslipidemia), and high blood pressure have





Academic performance is one aspect of a child's life that is positively influenced by aerobic fitness.

a strong negative relationship with aerobic fitness. In other words, as insulin resistance, cholesterol and blood pressure increase, there is a similar observed decrease in aerobic fitness. In multiple large studies, children with greater aerobic fitness have fewer cardio-metabolic risk factors than their less aerobically fit peers. Some studies have compiled measurements of these risk factors into a “metabolic risk score.” A higher metabolic risk score would mean the child is at greater risk for developing cardiovascular or metabolic disease. In these large studies, there was a strong negative relationship between aerobic fitness and metabolic risk score (i.e., children with greater aerobic fitness had lower metabolic risk scores). More recent research is suggesting that aerobic fitness could also improve inflammation in children. Inflammatory markers are thought to be associated with obesity and cardiovascular risk factors in children and are markers of health in adults. While we currently believe that aerobic fitness protects children from future cardiovascular disease and mortality, more research is needed to confirm this.

Aerobic fitness does not just protect against obesity-related diseases in children, but also has a positive impact on many facets of health and wellness. For example, academic performance is one aspect of a child's life that is positively influenced by aerobic fitness. Children with greater aerobic fitness perform better academically, achieve higher grades and do better on standardized tests than less aerobically fit children. Fortunately, research has shown that less aerobically fit children who work to improve their fitness show improvements academically as well. Aerobic fitness also can increase a student's attention, time on task and executive function.

In addition to academics, exercise and increased aerobic fitness improve:

- Self-esteem.
- Bone health.
- Asthma.
- Sleep.
- Headaches.
- Healthy eating.
- Depression and anxiety.

While aerobic fitness cannot be used to diagnose children with any of these health problems, it can give progress reports and snapshots into a child's overall well-being. A measurement of aerobic fitness could give pediatricians an objective measurement that is related to a number of different common issues during childhood. Further inquiry could lead to a diagnosis of the specific issue or potentially start a conversation that leads to lifestyle changes that not only improve aerobic fitness but overall health and well-being.

MEASURING AEROBIC FITNESS

As discussed previously, the gold standard of aerobic fitness is measuring the amount of oxygen as it goes in and out as exercise intensity increases up to maximal exercise (V02max). This test is difficult for a few reasons:

1. A maximal effort is necessary to achieve a valid measurement of oxygen uptake, which can be difficult if a person is unaccustomed to intense exercise.
(Unaccustomed exercise could be the limit to V02max!)
2. Maximal oxygen uptake test requires specialized equipment and training to adequately perform the test.
3. Measuring V02max in an outpatient clinical setting is often prohibited by cost and time.

To avoid these pitfalls, a multitude of tests have been developed to give estimations of aerobic fitness. These tests measure the amount of time to run one mile (faster has greater aerobic fitness), the amount of distance walked in 12 minutes (greater distance has greater aerobic fitness) or a 20-meter shuttle run (greater amount of shuttles has greater aerobic fitness). However, many of these tests cannot be performed in a pediatrician primary care setting due to the amount of space needed. Working with local pediatricians, future research at CCU will attempt to develop a reliable test to measure aerobic



Children working out with CCU students. Photo by Justin Guilkey.

fitness that is feasible in a medical and/or school setting. Developing an aerobic test like this would provide medical professionals, school administrators and parents an additional insight into their child's health and wellness that can be tracked through childhood.

THE ROLE OF THE SCHOOL IN IMPROVING AEROBIC FITNESS

The current recommendation for physical activity in children is 60 minutes of moderate to vigorous physical activity every day of the week (compared to the adult recommendation of 30 minutes a day for most days of the week). While 60 minutes of physical activity should be the goal for all children, it is thought that the most important aspect of the recommendation in improving aerobic fitness in children is vigorous intensity. Vigorous physical activity is a heart rate that is greater than approximately 70 to 90 percent of maximal heart rate (heart rate between 150 to 185 in most children). Additionally, vigorous physical activity usually causes children to be out of breath and sweating at the conclusion of the activity. Most importantly, vigorous physical activity has been shown in multiple studies to improve aerobic fitness in children.

While these physical activity guidelines seem straightforward, very few children actually achieve these recommendations often due to time constraints. Children and their parents are busy with school and homework, activities and work.

As children spend a majority of their waking time in school and aerobic fitness can improve academic performance, schools could play a major role in improving aerobic fitness and potentially altering the health trajectory of their students. However, primarily due to academic demands from local, state and the federal government, the current trend is for decreasing physical activity time in school by cutting physical education and recess in lieu of more class time. To South Carolina's credit, daily recess, 60 minutes of physical education per week and 90 minutes of total physical activity per week are required in elementary schools. In middle school, some type of physical education for students is required, but there is no time requirement. There are no physical education requirements for high school. While these physical education requirements are a good starting point, they are still woefully short of the 60 minutes per day of physical activity recommended for children, and there are no requirements on vigorous physical activity in physical education classes.

In addition to providing more time, schools can improve the quality of the physical education sessions by understanding and reducing some of the perceived barriers to physical education. Research has shown that adolescents, especially female adolescents, do not participate in physical activity at school because they dislike physical education uniforms, boys often dominate in class, the classes are too competitive and the classes lack teacher support. Additionally, outside of class, adolescents are less likely to participate in physical activity because of negative experiences in physical education. Based on these barriers, it appears that the current structure of physical education class works for a portion of students, but could actually turn some students away from physical activity. Schools and physical education classes should understand the barriers to physical activity in children and adapt their policies to promote aerobic fitness and lifelong physical activity.

Researchers at CCU are interested in ways to promote physical activity and aerobic fitness in the schools. Faculty and students at CCU are currently developing a partnership with Horry County Schools to promote high-intensity exercise in physical education class. For this program, CCU students will assist the physical education teachers in promoting supportive and fun high-intensity and muscle strength activities in local middle schools. Because CCU students will assist the physical education teachers, there will be a favorable adult-to-student ratio. In addition, CCU students will attempt to identify and work with middle school students who are reluctant to participate in physical education. The program's goal is to educate and promote physical activity as a fun way to improve health in these students.

CONCLUDING THOUGHTS

1. Aerobic fitness gives insight into the health and well-being of children of all ages and should be regularly measured and tracked by parents and medical professionals.
2. There is a role for parents, medical professionals and schools to promote vigorous physical activity to improve aerobic fitness and future health.
3. Schools should not be solely responsible for providing time for all students to reach their recommended physical activity. However, they play an important role and should be utilized to provide physical activity opportunities to improve aerobic fitness in children and to promote future healthy physical activity behaviors.
4. Schools and physical education departments, in partnership with exercise scientists, should develop physical activity programs that encourage children to adopt healthy exercise habits.





PRACTICAL RESEARCH TO ASSIST CONWAY IN PLANNING ITS PARKS, RECREATION AND TOURISM

by **Donald Rockey, Ph.D.**, associate chair and professor,
Department of Recreation and Sport Management



In a previous *Progression* issue, faculty in the recreation and sport management (RSM) department wrote about how the RSM program works to assist student learning through experiences. Through those opportunities and the relationships that have been developed between the RSM department and the community recreation and sport providers, we were approached to work with the city of Conway parks, recreation and tourism department (PRT) to assist in the planning of their parks and recreation. The project also gave Colleen McGlone, Ph.D., and I the

opportunity to include two sport management graduate students, Tom Cocke and David Cummings, in the process.

The project had three purposes. The first was to examine the parks and recreation needs as identified by the residents and key stakeholders in Conway. The second was to determine which parks and recreation needs expressed were deemed to be priorities for Conway. Lastly, we hoped to use this information to develop a set of recommendations that would allow Conway to meet the priorities that were identified throughout the study.

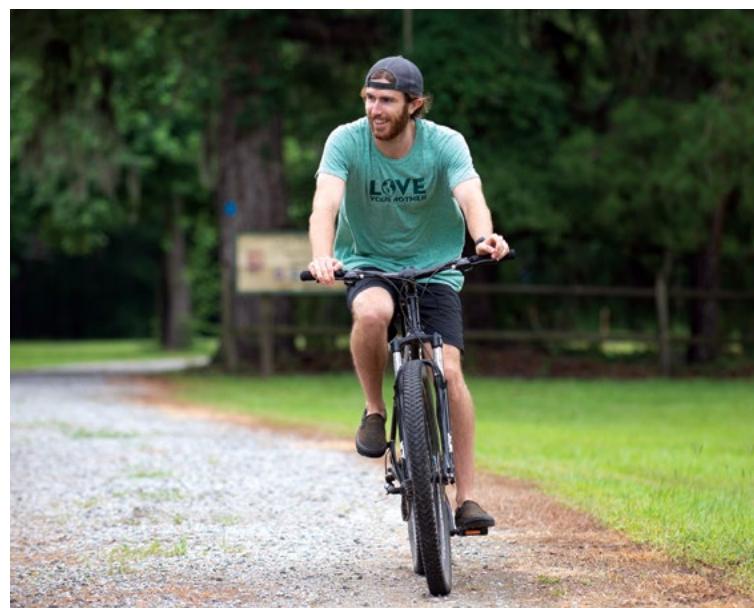


THE PROCESS

To assist us in learning more about Conway's PRT department, we had to review the department's current mission, vision and goals, as well as their current facilities, programs and services. We also had to review revenue sources, expenditures and staff/personnel structure. As a final means to gather data about Conway's department, we did a benchmark comparison by sending out a survey to the directors of parks and recreation of other cities or towns in South Carolina. The survey asked for information including budgeting, facilities, participants, programs/services, and employees which could help us compare Conway to these other communities. Conway's director of PRT, Foster Hughes, provided us a list of seven benchmark communities, but only five participated. The directors of parks and recreation for the cities of North Myrtle Beach, Myrtle Beach, Greer and North Augusta, as well as Greenwood County, participated in sharing benchmarking data.

The research team met with key Conway parks and recreation stakeholders throughout the process. We met with Hughes on several occasions, the first time in September 2017 when we discussed what he wanted to learn from our study and how we all could use the information we gathered. In February 2017, members of the research team attended a Parks and Recreation Advisory Committee meeting in which the team discussed the purposes of the study. The team also asked the committee and council members for input in their thought and opinions of the PRT department. A final meeting was held with the city planner in August 2017.

Of respondents who participated in the survey, approximately 77.2 percent were Conway residents, while 22.8 percent were nonresidents who participated in Conway parks and recreation programs. Approximately 96 percent of the respondents viewed their Conway home as their primary residence. Many survey respondents were between the ages of 30 to 44 (43.6 percent) and the highest percentage of respondents were in the 30 to 34 age range (24.3 percent), followed closely by the 40 to 44 age range (19.3 percent), which is consistent with the median age of the population. Many of the respondents were female (71.9 percent), and the majority of respondents (75.2 percent) were very satisfied or satisfied with the recreation programming. A large percentage of respondents reported that they believe well-maintained parks and open space were important or very important (89.5 percent) and 66.3 percent of the respondents felt like the arts were important but not being covered adequately. Respondents generally supported fees for facility improvements and program expansion (75.2 percent), and more than half (66.8 percent) said that they thought tax dollars should be used to support recreation programs.



(top) The City of Conway Recreation Center, (middle) a former CCU student enjoying the view on the Conway River Walk, and (bottom) a CCU student riding on a Conway bike trail.



CCU students hiking at the Waccamaw National Wildlife Refuge.



During the community input sessions, the following list of key ideas and themes were made by the participants:

- **Small-town atmosphere**

Conway is a tight community with a small-town feel. When residents go out into the community, they usually see at least one person they know and/or recognize. Conway has a rich historic background of which residents are proud. Utilizing the historic locations around the city would be another great use for recreation.

- **Recreation**

Recreation programming was an element of discussion in all the focus groups. Groups talked about the maintenance of the facilities; they were confused about why the PRT department is not in charge of this aspect. Good suggestions came about for the current and future sites. Some suggestions included utilizing the areas near the river more, using the historic riverfront and downtown area, more movie nights, an ADA-accessible park, using the community building at Collins Park for either programming or renting it out, and engaging the younger adults in the community as well as the teenagers.

- **Facility**

All the groups really liked the facilities offered to them, particularly the Conway Recreation Center (CRC) and surrounding parks. There is a strong association between the Conway Recreation Center and Conway PRT department. Many people did not seem aware of other opportunities and facilities offered by Conway PRT. It became apparent in the focus group discussions that the participants did not know what recreation facilities existed. More open space was wanted, but more knowledge of what is available to them would be valuable. The staff are friendly and knowledgeable at the CRC, which makes the experience more enjoyable.

- **High school**

There was a concern for the teenagers in the community. While high school sport programs and activities attract some teens away from PRT programs, there is concern that there is not much programming for the other teens not involved in high school activities. There were thoughts of wanting to open the CRC on a night for the teens to come in and have an open space to play basketball or use the facility in other available ways. It was suggested that PRT should take the lead in provision of adolescent activities.

- **Programs**

The programs that are offered are good. This was the consensus from the group, although lack of participation in these programs appears to revolve around time and instructor preparation. Not all classes are offered during the best times. Adult sport leagues lack participation with the competition between church, North Myrtle Beach and Grand Park leagues, so consider partnerships to allow for Conway teams to compete in these other leagues.

- **Bike trail**

Future bike trail expansion was mentioned and really liked by the groups with connections to neighborhoods and parks. Use of the current spaces is high, but there is no loop and each trail stands alone.

- **Adult sports/age groups**

Knowledge of the programs/sports available for each age group came up in all groups. Concerns about coaching and timing of practices/games came up with most groups. It is tough for some families to have kids participate based on times of leagues/practices with other leagues and work/school schedules. High competition with the North Myrtle Beach Sports Complex, Grand Park, Ripken, other large events in the area, and a few others were mentioned.



Conway has a rich historic background of which residents are proud. Utilizing the historic locations around the city would be another great use for recreation.

Currently, Conway's PRT department successfully contributes to the overall quality of life of resident and nonresident participants. Based upon the activities associated with this project, which included background research and observation, stakeholder focus groups, meetings with PRT staff, and an online resident household survey, a list of recommendations was created to assist the city in its continual planning. At this time the list has not been discussed with the city leaders, so we are not going to share it in this publication.

To help provide us with more information about the community's view on PRT, the research team led six focus groups for the residents of Conway from May 13-15, 2017. Additionally, a PRT department employee-based focus group also was held in March 2017. During the focus groups, five open-ended questions were asked. The questions were:

- What gives you pride to say you live in Conway?
- When it comes to PRT, what is the best aspect?
- What areas do you think need to be improved?
- What new opportunities would you like to see pursued by PRT?
- What challenges does PRT have that need to be handled?

The focus groups were recorded and transcripts were written. The voice recordings were reviewed by the three researchers and trends were recognized and then triangulated through the three.

As a final means to learn more about the community's view on PRT, an online survey was created and administered to the residents of Conway. The survey was available from April through May 2017 and measured recreation and park needs of the citizens of Conway. The survey was administered through SurveyMonkey and was publicized in the Conway water bills. The survey was made available on the Conway PRT department website and 351 citizens completed the survey.

The results and recommendations based upon the findings of the research were compiled into a technical report and presented to the City of Conway in October 2017. While the team's expertise in parks and recreation planning played a role in the final recommendations and discussion, all recommendations were based upon the data gathered during the extensive research and public input process.



Collins Park in Conway.

BRIEF OVERVIEW OF FINDINGS

The town provides a range of recreation programs for citizens, including youth sports, instructional programs, community festivals, swimming lessons, day camps and adult programs. Past planning efforts show that park and recreation facilities and programs are popular with Conway residents, and in fact, the town's programs are popular with residents of surrounding towns as well. In fact, the park and recreation department's service area extends through other towns, and 46 percent of the recreation participants are not residents of Conway. The parks, recreation and tourism department has also been successful generating revenue from its recreation programs, facilities and special events.

Through the benchmarking process, several points became apparent. Conway PRT is slightly below the average of the peer communities in terms of recreation general fund allocations and parks and outdoor recreation maintenance budget. The level of staff support or full-time equivalent employees (FTEs) for parks and recreation in Conway is below the average but higher than all the other communities except for Myrtle Beach and North Myrtle Beach, which skew the results. Conway offers the second highest amount of acreage but receives the second least amount of funding compared to its peers. When it comes to sport tourism, Conway only made \$20,000 last year, which is well below the average among its peers of \$248,000. It is tough to compete for sport tourism dollars when one's neighbors are North Myrtle Beach and Myrtle Beach.

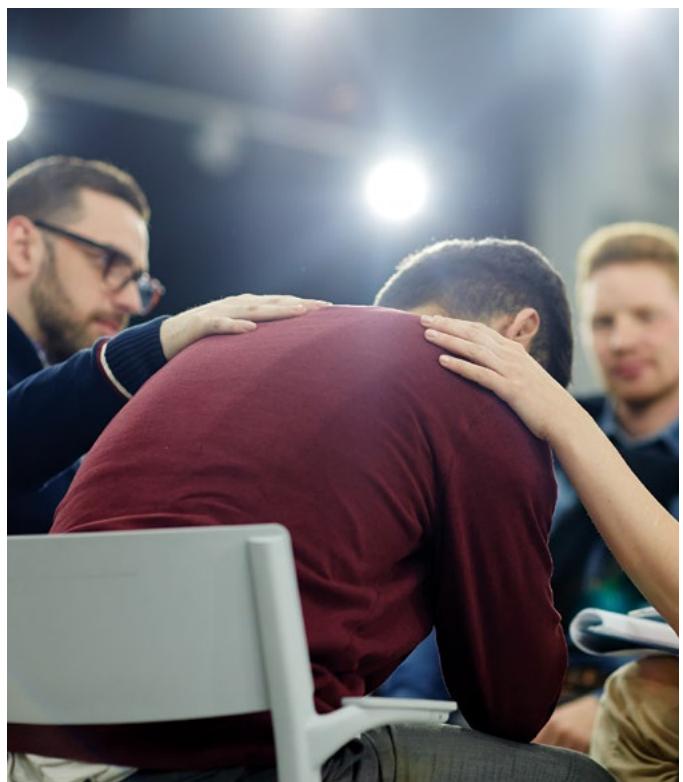
compassion **FATIGUE**

The high cost of caring



by **Kerry A. Schwanz, Ph.D.**, professor of psychology

When asked why they choose to study psychology, many of our students say it is because they want to help others. Aspiring to enter a profession that focuses on helping others is a noble endeavor. Our society values and applauds those who engage in selfless acts of compassion and care toward others. We admire social workers, nurses, first responders, doctors, veterinarians, animal shelter workers, foster parents and others who often neglect their own needs and welfare to help those around them. We share stories about people we know who do not sleep for days, take on extra shifts, or give up time with family to give and care for others too often at the detriment of their own self-care. We tend to admire and revere such noble acts. If we hear that someone took a day off for themselves or took time off to get a massage, we do not applaud their acts of self-care. Instead, many may secretly judge individuals who engage in self-care as being selfish and perhaps not caring or compassionate toward others. Those of us in helping roles may also feel guilty and “beat ourselves up” when we take time to do something for ourselves. Unfortunately, there is a downside for individuals who do too much to help others while unintentionally neglecting themselves. Decades of research on people in caretaker roles has found some helpers pay a high cost for caring, labeled compassion fatigue.





What is compassion fatigue?

Different conceptualizations and definitions of compassion fatigue can be found in literature, but the common components refer to helpers experiencing stress from helping or caring for others who are under stress or who have experienced some sort of trauma. Compassion fatigue subsumes burnout, cumulative stress and secondary traumatization. According to Figley (1995, 2002), compassion fatigue can occur when a helper or caregiver repeatedly engages empathetically with clients and “takes on” some of their suffering. When people neglect their own self-care to attend to the needs of others, it may result in a high cost to the caregiver. Compassion satisfaction, on the other hand, refers to the positive feelings and experiences that people derive from helping others (Stamm, 2005). Compassion fatigue and compassion satisfaction have predominantly been studied in professionals—such as nurses, doctors, mental health professionals, veterinarians, emergency responders and others—who work with patients or clients who are in distress.

Compassion fatigue warning signs:

- Physical and emotional exhaustion.
- Depression and/or hopelessness.
- Nervous system arousal.
- Anxiety and/or sleep problems.
- Bottled-up emotions, isolation and loss of morale.
- Diminished sense of career or job enjoyment.
- Increase in mistakes.
- Substance over use and abuse.
- Poor relationships with co-workers.
- Avoidance of clients.
- Physical ailments.
- Intrusive thoughts or nightmares.
- Hypervigilance.
- Lowered frustration tolerance.
- Increased outbursts of anger.
- Feeling overwhelmed.
- Depleted as a helper.



Self-care is a positive form of coping that can help caregivers deal with stress and the symptoms associated with compassion fatigue while increasing compassion satisfaction. According to Chow and Kalischuk (2008), self-care is a primary prevention for illness and promotes personal well-being. Self-care includes any activity where individuals devote time to focus on their own well-being, partaking in activities like taking a bath, meditating or engaging in recreational sports. These types of positive coping strategies help to reduce stress across diverse populations, regardless of the stressor (Myers et al., 2013; Potter et al., 2015).

Despite the well-established benefits of self-care, many individuals do not understand the benefits and meaning of self-care. Additionally, some people find it difficult to relax or feel guilty when they take time for themselves instead of helping others; in other words, their beliefs about self-care may drive their self-care behaviors (French, Wade and Farmer, 2013). An analogy that is often used to explain the importance of self-care to caregivers is the one about oxygen masks on airplanes: People are told to **put on their own oxygen masks first** before helping others put on theirs.

How did I become passionate about this topic?

I have been teaching psychology at CCU for more than 13 years, and before coming to CCU, I worked as a school psychologist. As a school psychologist, I was engaged in a profession that very much focused on helping others, particularly children with disabilities, their families and other professionals who worked with them. At one time, I was even one of those students at CCU who decided to major in psychology because I wanted to help others. Surprisingly, it was not through my teaching and research in psychology that I first became interested in compassion fatigue; it was through my volunteer work at Grand Strand Humane Society, a local animal shelter here in Myrtle Beach. In 2013, a close friend of mine took a part-time job at the humane

society as the volunteer coordinator and urged me to give volunteering there a try. I didn't think I could handle it because I have always been a sensitive person and have had a tendency to be overly compassionate and empathetic at times. I was worried that I would become upset or depressed by seeing all of the homeless and abandoned animals at the shelter. In spite of my fears, I decided to get out of my comfort zone and give it a try. I am so glad I did because despite some of the heartbreak and emotional pain I've experienced through my volunteer work, the love, joy and appreciation that I have been shown by the animals, staff and fellow volunteers are gifts beyond any I could have anticipated.

At the shelter, I helped start a cat socialization program, volunteered at adoption and fundraising events, and also assisted with grant writing. I felt energized and excited every time I went to volunteer. However, particularly during the summer or during breaks from school, I found myself going to the shelter more days than not and then spending more and more hours there at a time. I became extremely attached to the cats I helped socialize and lost sleep thinking about them being stuck in cages for so many hours during the day. I turned down offers to go to dinner with friends and to play tennis (something I love!), and spent more time away from my own family than I intended because of the time I spent playing with the cats at the shelter. I was becoming burnt out by helping the animals and the staff who cared for them. I also became friends with many of the staff at the shelter and noticed the amount of stress and emotional strain some of them experienced as a result of caring for animals who were often sick, abandoned, scared and sometimes abused when they came to the facility. Therefore, I was also concerned about some of the staff becoming overwhelmed and burnt out. About that same time, I was invited to attend a workshop with the shelter director about compassion fatigue in the animal care community. It was eye-opening for me and a light bulb went off during that workshop. I realized two important things that day:



- 1). If I wanted to continue to volunteer with the shelter and feel good about it rather than burnt out, I needed to find a healthy balance between volunteering and taking care of myself.
- 2). I had the potential to make a real difference and possibly help others who were struggling by focusing on compassion fatigue and self-care for my research and community service in my role as a psychology professor at CCU.

Current research and service projects

I wanted to explore compassion fatigue as a new area of research for myself because it would allow me to combine my teaching, research, service interests and expertise, and also involve undergraduate students in the projects. During spring and summer of 2017, I began researching the topics of compassion fatigue and self-care and taught an independent study for two students (Jen VonSchondorf and Alexa Medd) to work with me on the research. Through our literature searches, we did not find any studies that investigated the constructs of compassion fatigue and compassion satisfaction in college students. Therefore, for the first phase of our research we planned to investigate these constructs in CCU students piloting a set of assessments we compiled. We believe that our study is unique in the sense that we will specifically study these variables in college students and perhaps be able to identify potential risk factors for developing compassion fatigue and burnout. These discoveries could lead to education and prevention efforts in the field of psychology. The main research question is: Do college students experience compassion fatigue and/or compassion satisfaction as a result of being involved in “helping roles” at their jobs through volunteer or internship experiences, and/or in their personal relationships with friends, family members or classmates? Additionally, we are interested in the relationship of self-care activities, self-care beliefs and self-esteem with compassion fatigue and compassion satisfaction in college students.

One of my students (VonSchondorf) from the original independent study continued to work with me (Medd graduated and moved away) and three new students (Casey Rossano, Colleen Piparo and Ally Nelson) joined our research group. During Fall 2017, we began collecting data. We administered a set of anonymous surveys asking college students to report about their levels of compassion fatigue and compassion satisfaction related to any experiences they’ve had through a “helper role,” the types of activities they engage in for self-care purposes, their beliefs about self-care and their self-esteem. It is predicted that students who engage in more self-care activities and believe that self-care is important will have lower levels of self-reported compassion fatigue, higher compassion satisfaction and higher self-esteem than students who engage in less self-care activities and hold negative beliefs about self-care. We plan to disseminate results through

conference presentations and publications in peer-reviewed journals. The students in my research group really stepped up to quickly score all of the instruments and enter the data so we could submit research proposals for a conference by the fall deadline. Additionally, I am fortunate to have a new colleague in our department, Melissa Paiva-Salisbury, Ph.D., joining the research project. Paiva-Salisbury is a clinical psychologist who recently graduated from the University of Vermont. She has a keen interest in the dissemination of mindfulness-based approaches to stress management and wellness promotion. In her post doctoral clinical internship at Connecting Cultures in Vermont, Paiva-Salisbury worked directly with refugees who experienced torture and trauma. Awareness of compassion fatigue and self-care was an essential component of her training, and she feels this awareness is important for the healthy development of everyone in the helping professions.

In our future research, we would like to take what we learn about both the assessments and knowledge of compassion fatigue in college students and expand this knowledge to additional groups of people who serve in a care-giving capacity, such as parents of children with disabilities, veterinarians and shelter workers. We could additionally expand this to health care workers and family members who care for individuals with physical and/or mental illnesses.

Another important component for me is being able to actually apply research in order to help others so we have developed a service component into our work on compassion fatigue and self-care. For local organizations and groups who could benefit from learning about stress, we are designing workshops about the warning signs of compassion fatigue and how to increase self-care and compassion satisfaction.

Final thoughts

Being able to collaborate with a colleague in my department and involve students in the research has reignited my enthusiasm and passion for conducting research and mentoring students through the process. I am also especially excited about being able to provide a service to the community by offering free workshops to organizations in order to spread awareness about compassion fatigue and ways to increase self-care. Personally, I am trying to apply what I’m learning through this work to my own life. Almost four years later, I am still volunteering with the Grand Strand Humane Society. However, I am not spending as much time every week going to the shelter to work with the cats. I have taken a step back and go about twice a month. I continue to help at events but not every single event, and I try not to feel so guilty when I remember to engage in self-care. It is all still a work in progress that I take one day at a time and I remind myself about the importance of balance and putting on my own oxygen mask first before helping others.

Editor’s note: References cited can be obtained from the author.



Rear view of the R/V SONNE while in the port of Montevideo, Uruguay. Photo by JT Durica.

STUDENT PERSPECTIVES ON RESEARCH

Canyon Cores or Bust

by John "JT" Durica

How many 19-year-old students can bundle a major research opportunity aboard a foreign vessel and their first experience leaving their native country in one adventure? For me, this inconceivable opportunity recently became a reality. My name is JT Durica, and I am a junior marine science student at Coastal Carolina University. I recently joined a new venture aboard a research vessel as a part of a team of scientists from the U.S., Germany, Italy, France, Brazil, Uruguay and Argentina.

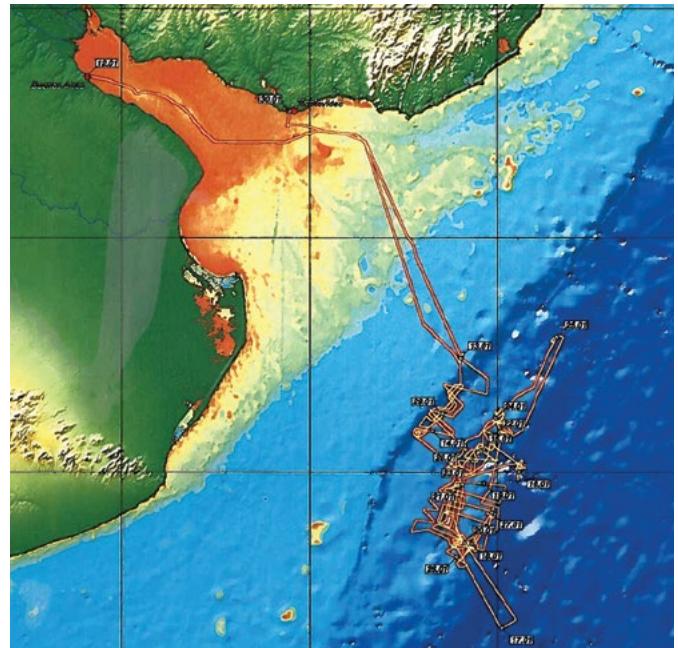
After spending more than 24 hours in numerous airports, it was a relief to be outside again after traveling to our first destination. However, instead of treading on U.S. soil, I was in Buenos Aires, Argentina, and a short taxi ride away from my home for the next month. For 33 international scientists, our home away from home was the R/V SONNE, a 390-foot German deep-ocean research vessel that is usually stationed in the Pacific and Indian oceans, but it was in the southeastern South America region for our venture! A few days later, we departed from port and bid our final farewells to land for the next four weeks. Our target was a collection of submarine canyons along the upper continental slope in both Argentinian

and Uruguayan waters, with a primary focus on the Mar del Plata Canyon. The intention of this project was to learn more about the hydrodynamic and sedimentary processes in and around the canyons which are under a regime of extreme slope-parallel oceanic bottom currents. After the initial introduction to the project, the head scientists began discussing their groups' interests and then planning the following days of seismic/multibeam surveying and sediment sub-bottom sampling.

Specifically, I was a part of the on-deck and lab geology/sedimentology/paleoceanography team which was headed by Till Hanebuth, Ph.D., from CCU and consisted of CMSS Ph.D. student Josh Long and eight others. Personally, my job onboard was to assist in the transport of various tools and core tubes, some sampling when needed, cleaning of the devices and work spaces, as well as the cutting and splitting of the cores. I also got the chance to help with the CTD and water column sampling which took place during the night where, under the moonlight, schools of fish and even a shark came to investigate. Our group worked with four different sampling devices, including a 12-meter long Gravity Core (GC) with a

1.5 ton weight, a Multi Core (MC) with 12 short tubes, a Giant Box Corer (GBC), which is essentially a box with a scoop under it, and a Grab Sampler (GS), which is like a giant claw machine. However, we collaborated with the geochemistry, geomagnetic, micropaleontology and geophysics groups to find interesting locations, to collect the cores, and then distribute the cores among the various groups for initial sampling, which included pore water analysis, magnetic susceptibility, and much more. Personally, I believe we had the best lab to work in because it came with fresh air and a constant view of the blue waves. The only problem: cleaning all of the sediment off the devices and the deck, which seemed to hide in every nook and cranny of our workspace.

Usually, each station began with surface sampling using a MC, GBC or the GS, which often carried a variety of treasures including numerous stones, creatures of the deep, and piles of living and dead deep-water corals. Afterward, the GC would receive its final checks and the cranes would help it on its voyage to the deep, hopefully bringing back some of its secrets to the



Cruise map.



(left to right) CMSS student Josh Long, MSCI student JT Durica, Chauncey and Till Hanebuth from CCU finally arrived at the R/V SONNE. Photo by JT Durica.

SONNE's deck. When the coring devices were about to come back on deck, there was always a frenzy of scientists waiting in the hanger to get their respective samples.

Our days may have been full and laborious, but our group always found some time to sneak in a few matches of foosball. Whether it was during transits from one station to another, during seismic and multibeam surveys, or when the GC had to go up and down for a couple thousand meters before it was back on deck, we almost always were found around that foosball table.

In addition to the immense scientific experience, this cruise was a cultural journey for me. It was a huge culture shock going from a place where I could understand every conversation around me to hearing conversations in German, English, Italian, Spanish, Portuguese and French. Everything from the food in the mess room to the casual conversations gave me new insights and experiences which I know I could not get anywhere else. Even though all these different people had such diverse backgrounds, we collectively came together in pursuit of greater scientific understanding, which truly is an amazing thing. Although this may not be my last expedition aboard a research vessel, this cruise has been one of the most eye-opening and memorable experiences I have had. The only thing I regret ... not bringing my hammock to set up on deck!



Chauncey with his diving gear getting ready for a deep-water adventure aboard the gravity core. Photo by Till Hanebuth.

I would also like to give a great thanks to those who helped in various ways to make my participation in this expedition possible: the marine science department (J. Guentzel, Ph.D.), the coastal and marine systems science department (R. Viso, Ph.D.), and the Center for Coastal Marine and Wetland Studies (P. Gayes, Ph.D.). Most of all, I would like to thank Till Hanebuth for asking me to join him on this amazing and life-changing experience.



The deck crew crowded around the gravity core (middle) to remove and cut the inner tube into one-meter sections. The multicore (left front) and the box core (middle right) are also ready for their next venture. Photo by Till Hanebuth.



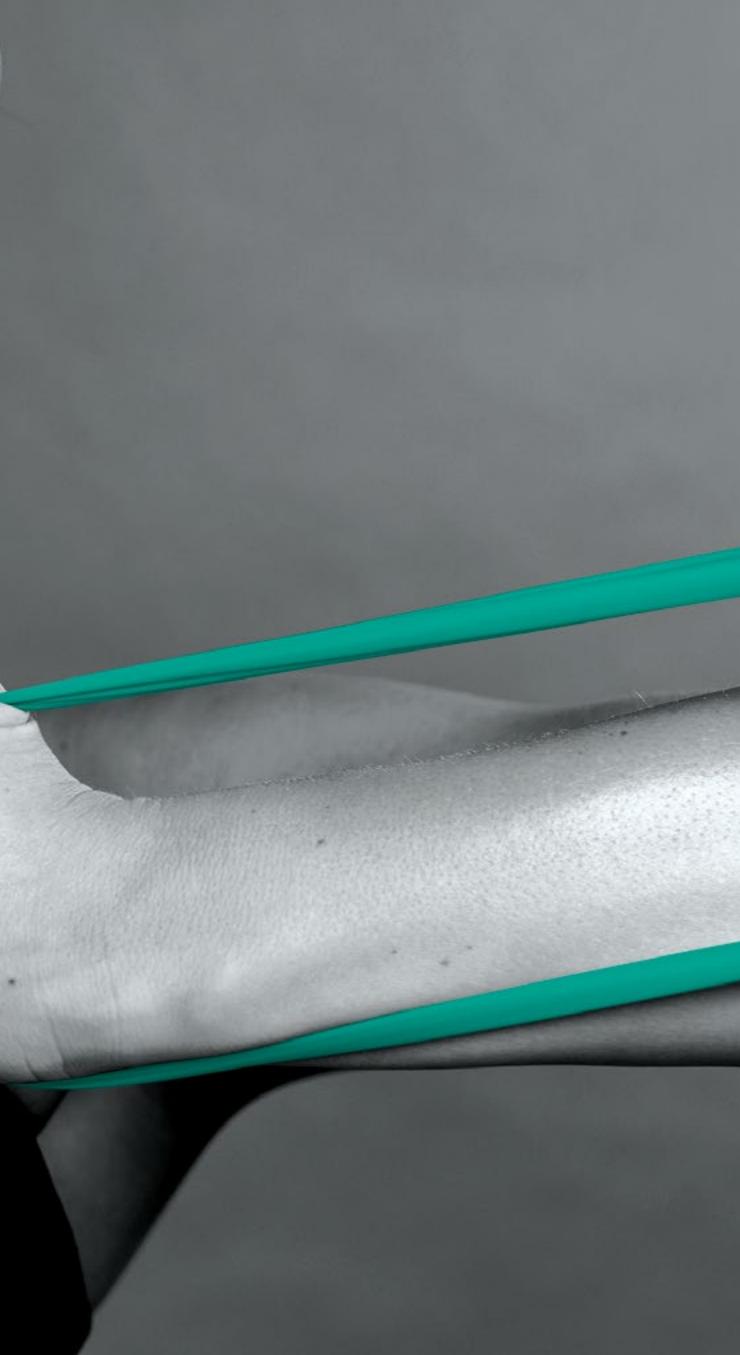
A quick snapshot into the hanger where (left to right) Brit Kockisch, Janina Bösche, Josh Long, JT Durica and Grit Warratz are all hard at work preparing the sediment cores before they are split and sent to the various groups. Photo by Till Hanebuth.



Chauncey overlooks his new home for the next month. Photo by Till Hanebuth.



THE LOW OF IT:
**A POTENTIAL AND
TO HIGH-INTENS**



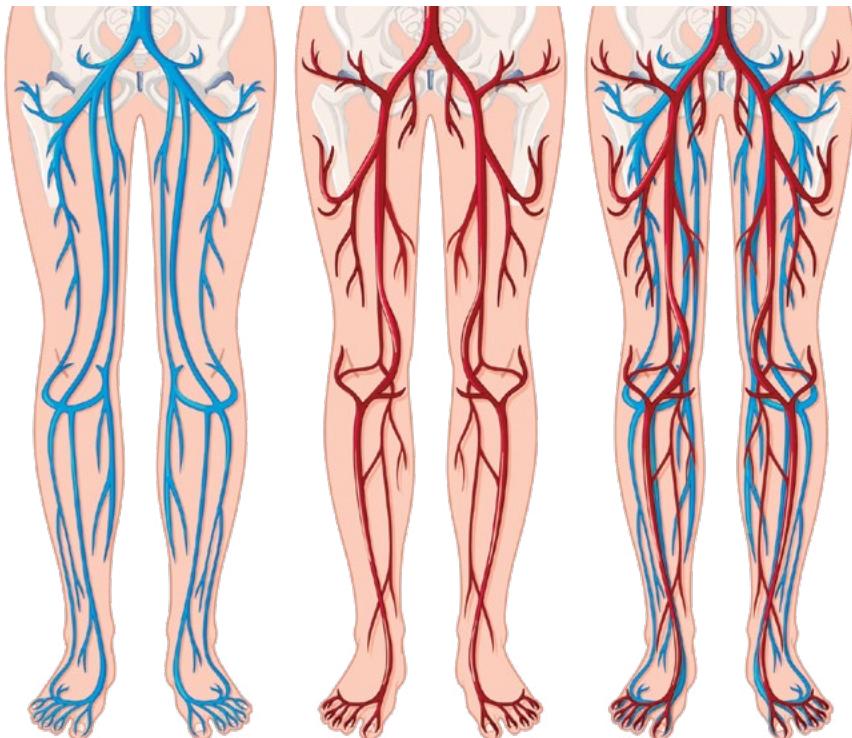
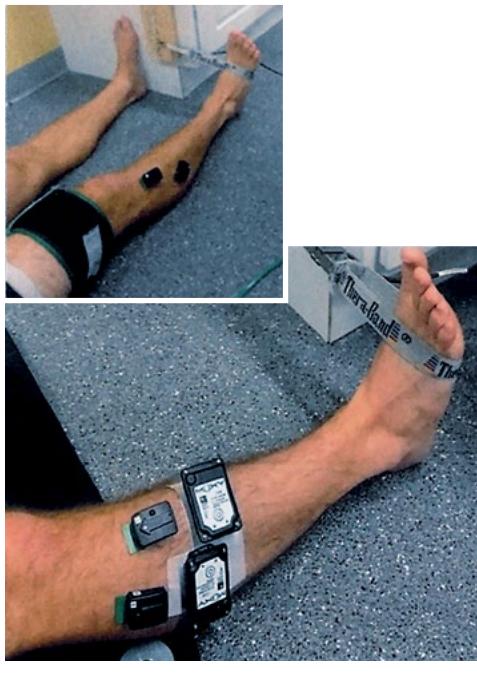
When we traditionally think of resistance or weight training, we often think of lifting very heavy weights with hope of getting stronger and gaining muscle mass. In fact, the American College of Sports Medicine (ACSM) recommends exercising at an intensity of 70 percent of one repetition maximum or greater for optimal improvements in muscle mass and strength. That means someone participating in a resistance training program with the goal of getting stronger would have to lift at least 70 percent of the most they could possibly lift for each exercise.

There are several populations or groups of individuals who may not be able to complete a high-intensity exercise program but would benefit from improvements in muscle mass and strength. These populations may include individuals who are recovering from musculoskeletal injuries, such as ligament injuries of the knee (e.g., anterior cruciate ligament, ACL) or ankle, as well as bone fractures. In addition, populations with more chronic injuries (i.e., injuries that develop over time) such as knee osteoarthritis, which occurs when the cartilage or the cushioning between the joint is damaged or breaks down leading to pain, can benefit. In many of these populations, heavy resistance training is contraindicated due to the risk of further injury. Heavy resistance training is poorly tolerated in these populations often due to the exacerbated pain or discomfort, leading to further inactivity and wasting away of the muscle. However, resistance training is critical in these populations as it can result in improved mobility, reduction in pain, and a decreased risk of reinjuries. For example, greater quadriceps strength is linked to reduced pain and positive changes in physical function in those with knee osteoarthritis.

Interestingly, several recent studies have found positive improvements when utilizing a much lower intensity! These studies used low-intensity resistance training (20 to 30 percent of maximal) combined with a novel training technique

ALTERNATIVE INTENSITY EXERCISE

by Jakob Lauver, Ph.D., RCEP, CSCS,
assistant professor, Department of Kinesiology



Visual representation of the experimental setup illustrating the placement of the blood flow restriction cuff and sensors to measure muscle activation. The cuff cuts off circulation for both the arteries and veins going and coming from the muscles.

called blood flow restriction (BFR) and found significant improvements in muscle mass and strength despite the relatively low intensity utilized. Blood flow restriction training has historically been referred to as KAATSU training, which in Japanese means “added pressure.” Regardless of the term used, this training method involves decreasing the blood flow to a muscle by the application of a wrapping device, such as a pressurized cuff, while performing various exercises. These cuffs are generally applied to either the arms or legs being exercised and are typically placed close to the trunk on the limb (i.e., either close to the hip or shoulder joint). While various types of wrapping devices have been used, including elastic straps and bands, most commonly a pressurized cuff, like a cuff that is used to measure blood pressure, has been utilized. When the pressurized cuff is inflated, it causes mechanical compression of the underlying tissues which includes both the venous (going toward the heart) and arterial (going away from the heart) blood vessels. The increase in pressure causes an occlusion of venous outflow and a reduction of arterial inflow because arterial blood vessels have a higher pressure than venous blood vessels. This results in more blood being trapped in the exercising muscle and less blood flowing into the muscle.

Two primary factors that affect the adaptations to resistance training are mechanical tension and metabolic stress. During

traditional high-intensity resistance training, the high mechanical tension placed on the muscle by the heavy loads lifted plays a more dominant role. While the exact mechanism or mechanisms responsible for the observed adaptations after blood flow restriction training are not completely understood, several mechanisms have been proposed as the main contributors and include increased metabolic stress, reduced oxygen availability (hypoxia), and alterations in the type and amount of muscle being recruited.

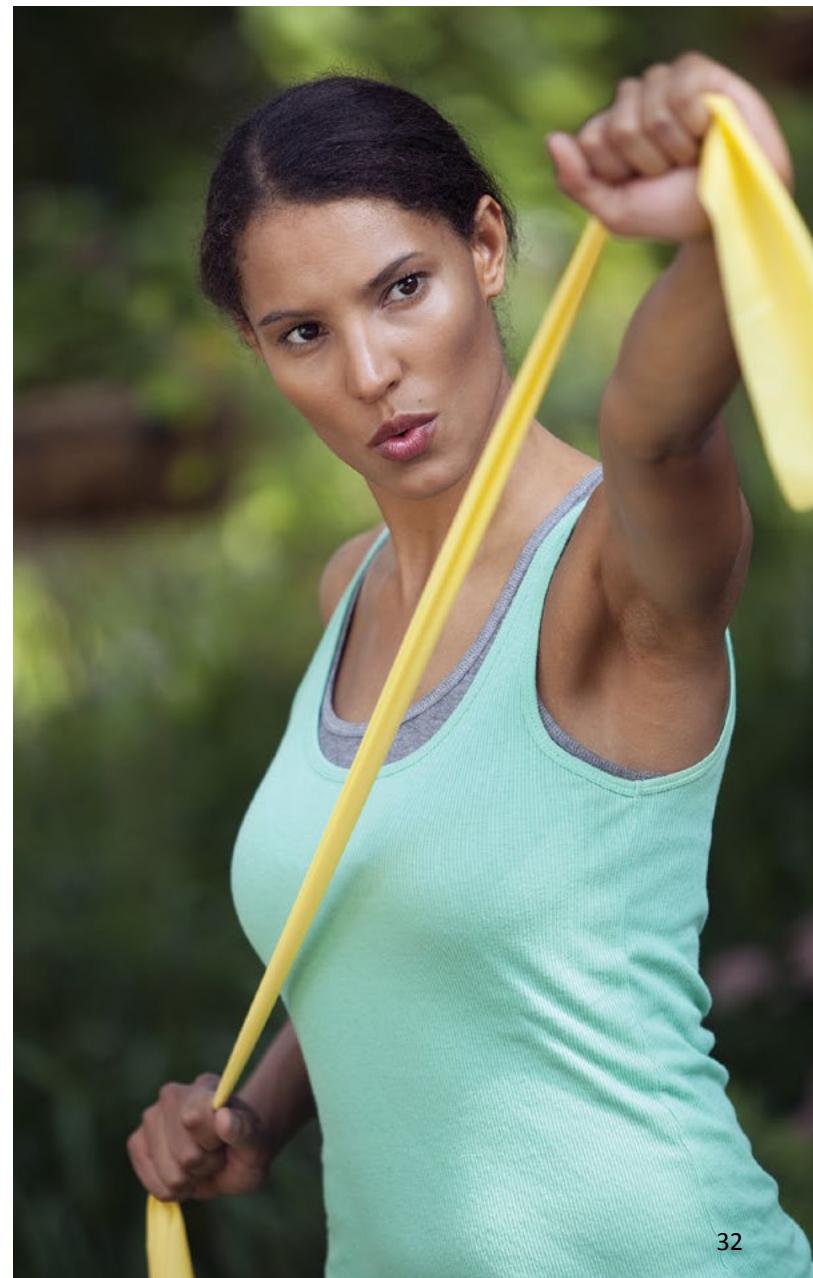
When a muscle contracts during exercise, it results in the production of some waste or metabolic byproducts. These byproducts are a result of the metabolic processes necessary for a muscle to continue to contract. One metabolic byproduct that you may have heard of is lactic acid. A common misconception about lactic acid is that it causes fatigue during all kinds of exercise ranging from a marathon to a 100-meter dash, but this is not the case. Lactic acid typically undergoes a constant turnover during which the production of lactic acid is matched by the clearance of lactic acid so the level in the muscle does not change. However, during brief high-intensity exercise, lactic acid can accumulate within the muscle. During high-intensity exercises, lactic acid production becomes faster than lactic acid clearance, thus resulting in accumulation in the muscle. However, the accumulation of lactic acid itself does not cause fatigue; it is what happens next that leads to fatigue.

If not cleared, the lactic acid dissociates and converts to lactate and hydrogen ions resulting in an accumulation of hydrogen ions in the muscle. This accumulation of hydrogen causes a decrease in muscle pH, which will cause the metabolic process to slow down which can lead to fatigue. This is one example of the metabolic stress that can be experienced during high-intensity exercise and potentially during low-intensity exercise with blood flow restriction.

The reduced oxygen availability caused by the arterial restriction may influence the muscular adaptations observed after blood flow restriction training. When we look at a whole muscle, it is made up of many different muscle fibers. We can think of a muscle as one big cable and the muscle fibers as the small individual cables that makeup the big cable. These fibers have different physiological makeups and therefore have different requirements to work effectively and can accomplish different things. The first type is Type I muscle fibers, which we think of as our slow twitch muscle fibers. These muscle fibers are good at using oxygen and can produce force for a long time; however, they cannot produce a great amount of force. Someone who goes out for a long walk would be relying more on this Type I muscle fiber. Then there are Type II muscle fibers, which we think of as our fast twitch muscle fibers. These fibers do not use much oxygen and can produce a lot of force for a short time. Someone who is doing a high-intensity activity, such as running a 100-meter dash, would be relying more on these Type II muscle fibers. When we do any exercise, we will recruit Type I muscle fibers first then Type II muscle fibers as we need to produce more and more force to do whatever exercise we are trying to complete.

During low-intensity exercise with blood flow restriction the arterial inflow to the muscle is reduced resulting in reduced oxygen availability. This may result in Type I muscle fibers (which will be recruited first) becoming fatigued, which reduces the amount of force they can produce. However, the same level of force needs to be produced so the exercise can continue. For example, if you are trying to lift 20 pounds, you need to produce the same amount of force to continue to lift that 20 pounds. Therefore, to maintain that level of force production, we recruit Type II muscle fibers. This increased recruitment of muscle fibers may contribute to the augmented improvements in muscle mass and strength observed following blood flow restriction training. While these mechanisms appear to be among the most significant explanation responsible for the improvements in muscle mass and strength observed following blood flow restriction training, it is important to remember that the process is a complex cascade of biological events and that there are many mechanisms responsible for the observed adaptations from resistance training.

While various types of wrapping devices have been used, including elastic straps and bands, most commonly a pressurized cuff, like a cuff that is used to measure blood pressure, has been utilized.





In accordance with these proposed mechanics, we examined the effect of low-intensity eccentric (e.g., a muscle contraction that occurs as the muscle lengthens) exercise with and without blood flow restriction on microvascular oxygenation and muscle activation. For this study, participants were randomly assigned to either low-intensity or low-intensity with blood flow restriction groups.

Participants in both groups performed a bout of low-intensity eccentric exercise with the lower extremities. During the bout, both muscle activation and microvascular oxygenation of the lower extremities were monitored. The results of this study demonstrated that the addition of blood flow restriction to low-intensity eccentric exercise resulted in a significant increase in the metabolic stress response as well as muscle activation. Therefore, the addition of blood flow restriction to low-intensity eccentric exercise may alter muscle recruitment. These results and others seem to suggest that the addition of blood flow restriction “tricks” the muscle into thinking it is working much harder than it really is. The results of the investigation were recently published in the European Journal of Applied Physiology.

In collaboration with John Goetschius, Ph.D., and Brian Killinger from Adrian College, we are examining the potential of strengthening and balance exercises with blood flow restriction to elicit greater muscle activation compared to exercises without blood flow restriction in patients with chronic ankle instability (CAI). The most common ankle sprain suffered during physical activity is a sprain to the lateral or outside part of the ankle. The mechanism of injury of lateral

ankle sprains is inversion of the ankle, which is the movement of the sole of the foot toward the midline of the body. Ankle sprains account for about 15 percent of all sports injuries, occurring in six out of 100 athletes, resulting in a significant loss of competitive time. The instability following the initial ankle injury commonly produces re-injury to the ankle at a rate as high as 80 percent, meaning once an individual suffers that first injury the chance of suffering another injury is great. Many individuals report recurrent sprains, episodes of ankle joint “giving way,” pain, swelling, and decreased function following an acute ankle sprain resulting in diagnosis of chronic ankle instability. Ankle sprains can lead to major health concerns, such as lack of physical activity which may lead to obesity and cardiovascular disease.

Impairments in neuromuscular function (i.e., the ability to effectively recruit the muscle) following an ankle sprain, such as deficits in strength and postural control, may contribute to the development of chronic ankle instability. Damage to ligamentous structures may cause an altered sense of joint position (proprioceptive) and neuromuscular control of the ankle, which exposes the ankle to occurrences of chronic ankle instability. Comprehensive rehabilitation protocols for the acute ankle sprain emphasize proprioceptive, neuromuscular control, and balance training to reduce the risk of recurrent ankle sprains. However, the presence of chronic underlying neural deficits during rehabilitation may limit the effectiveness of these protocols. Conservative treatment of chronic ankle instability is currently accepted as the primary means of managing the condition and preventing reinjuries. When considering treatment for chronic ankle instability, no single

factor such as laxity, muscle weakness or postural control can be targeted. Rather, chronic ankle instability has been found to be associated with all these residual symptoms. As such, strengthening and conditioning of weakened muscles is essential to rapid recovery and prevention against reinjuries. It is recommended that manual resistance be used during rehabilitation so the desired maximal contraction of the muscle groups can be attained. Therefore, the use of blood flow restriction could provide an alternative training method to improve muscle function in individuals with chronic ankle instability.

The results of our previous work and several other investigations have demonstrated both the acute effects of blood flow restriction on skeletal muscle, as well as the chronic effects of training with blood flow restriction on muscle mass and strength. Despite these exciting results, it is important to consider the potential limitations and safety considerations with blood flow restriction training. The most commonly reported side effect reported with blood flow restriction is subcutaneous hemorrhage or bruising. In addition, in some very rare cases rhabdomyolysis, which is associated with severe muscle damage has been reported. However, several studies have demonstrated that when implemented correctly, blood restriction results in minimal muscle damage flow. In addition, it is important to realize that blood flow restriction training is not safe for everyone. Individuals with deep vein thrombosis, varicose veins, cardiac diseases, uncontrolled hypertension, or those who are pregnant should not utilize blood flow restriction training as it could cause adverse side effects.

Finally, there are no definitive recommendations for training programs with respect to duration, intensity and/or volume of training when utilizing blood flow restriction. In addition, it is important that the restriction pressure applied by the cuffs be individualized. The use of standardized restriction pressure may not restrict blood flow to the same extent in individuals across different populations. The potential difference in blood flow could not only influence the effectiveness of blood flow restriction training, but also potentially cause adverse cardiovascular incidents if the pressure utilized is too high, resulting in complete occlusion of blood flow. While blood flow restriction training has been evaluated in several clinical populations, it has not been demonstrated to be safe and effective in all clinical populations. There is a need for further investigations to determine, not only the optimal training program recommendations, but also the effectiveness and safety of blood flow restriction in different clinical populations before it can be implemented as a training modality. And, it is important that blood flow restriction training be conducted in a controlled environment by trained and experienced personnel to ensure safe and effective use.

We can think of a muscle as one big cable and the muscle fibers as the small individual cables that make up the big cable.





- ▶ **Shaowu Bao, Ph.D.**, of the Department of Coastal and Marine Systems Science, received a \$9,000 grant from the S.C. Sea Grant Consortium. The project titled "The Impacts of Future Sea Level Rise on the Flood Vulnerability of South Carolina and the Function of Storm water Management Ponds" is a preliminary assessment of how the projected sea level rise (SLR) and more rainfall due to climate change, which increases coastal flooding, might impact the state's 10,000 residential-based storm water ponds.
- ▶ **Shaowu Bao, Ph.D.**, of the Department of Coastal and Marine Systems Science, **Paul Gayes, Ph.D.**, and **Leonard Pietrafesa, Ph.D.**, of the Department of Coastal and Marine Systems Science and Burroughs & Chapin Center for Marine and Wetland Studies, received a \$99,395 grant from the National Science Foundation. The project titled "RAPID: Collaborative Research: Sensing and Modeling Infrastructure for Storm Surge Monitoring and Forecasting in Coastal Zones" seeks to address the critical need to improve monitoring and forecasting of storm-induced coastal flooding by developing a low-cost, rapidly deployable network of wireless sensors.
- ▶ **Shaowu Bao, Ph.D.**, of the Department of Coastal and Marine Systems Science, received a \$208,345 grant from the National Oceanic and Atmospheric Administration. The project titled "Using Satellite Data to Evaluate the Connections Between the Radiation, Cumulus Convection, and Microphysics Parameterization Schemes and Their Scale Sensitivity for FV3-GFS" seeks to reach the goal of Weather-Ready Nation, the National Weather Service's Research to Operation (R2O) initiative which aims to upgrade the current operational global forecast system (GFS) to the Next Generation Global Prediction System (NGGPS).
- ▶ **Michelle Parker, Ph.D.**, of the Department of Biology, received a \$9,958 grant from the South Carolina IDeA Networks of Biomedical Research Excellence (SC INBRE). The project titled "Protein-Protein Interactions of a Chloroplast Maturase and the Link to Nuclear Spliceosome Evolution" seeks to develop novel treatments and prevention of human diseases such as cancer through the examination of protein-protein interactions.
- ▶ **Paul Gayes, Ph.D.**, of the Department of Coastal and Marine Systems Science, received a \$5,000 grant from the Regents of the University of California. The project titled "American Jobs Project" allows Coastal Carolina University to have an academic partnership with the American Jobs Project at UC Berkeley, an initiative that will build on national clean energy and advanced manufacturing initiatives to construct state specific roadmaps to create good-paying, sustainable jobs in clean energy economic clusters.
- ▶ **Paul Gayes, Ph.D.**, of the Department of Coastal and Marine Systems Science, received two grants totaling \$82,325 from Horry County and North Myrtle Beach. The projects titled "Grand Strand Beach Nourishment Project 2017" will study beach erosion patterns and volume change to establish rapid and inexpensive techniques to capture changes across the full active beach system.
- ▶ **Till Hanebuth, Ph.D.**, of the Department of Coastal and Marine Systems Science, received a \$85,352 grant from the County of Georgetown. The project titled "Feasibility Study - Developing a Strategy to Overcome Georgetown Harbor Silting" seeks to find a lasting and sustainable solution to address the massive silting issue off the downtown Georgetown waterfront by producing a simulation tool.
- ▶ **Till Hanebuth, Ph.D.**, and **Joshua Long** of the Department of Coastal and Marine Systems Science, received a \$9,481 grant from the S.C. Geological Survey and the S.C. Department of Natural Resources. The project titled "South Carolina BOEM Core Description and Integration Project" seeks to provide an integrated dataset consisting of descriptions of sediment cores and high-resolution sub-bottom profiles to produce a high-resolution picture of all existing data on a single page per sediment core.
- ▶ **Chris Hill, Ph.D.**, of the Department of Biology received a \$18,687 grant from the S.C. Department of Natural Resources. The project titled "Reproduction and survival in a population of Loggerhead Shrikes (*Lanius ludovicianus*) breeding in a commercial and urban landscape in coastal South Carolina" informs range wide estimates of population parameters of loggerhead shrikes to gain a better understanding of their reproduction and survivorship in South Carolina.



- ▶ **Louis Rubbo, Ph.D.**, of the Department of Physics and Engineering, received an \$8,000 grant from the S.C. Space Grant Consortium. The project titled "Assessing and Improving the Support for South Carolina FIRST LEGO League Coaches" seeks to collect and evaluate coaches' needs supporting the FIRST LEGO League (FLL) goal of STEM inspiration through a mobile coach training workshop.
- ▶ **Zhixiong Shen, Ph.D.**, of the Department of Marine Science, received a \$49,704 grant from the National Science Foundation. The project titled "Collaborative Research: P2C2: Extreme Floods on the Lower Mississippi River in the Context of Late Holocene Climatic Variability" will provide data for the lower Mississippi River that will be used to reconstruct flood regimes over the last millennium.
- ▶ **Zhixiong Shen, Ph.D.**, of the Department of Marine Science, received a \$12,000 grant from the National Science Foundation. The project titled "RAPID: Collaborative Research: Sediment and Contaminant Mobilization by Extreme Flooding Associated with Hurricane Florence" seeks to investigate the lateral and longitudinal patterns of sediment and associated contaminant deposition immediately following flooding caused by a land falling hurricane.
- ▶ **Zhixiong Shen, Ph.D.**, of the Department of Marine Science, received a \$26,859 grant from the National Science Foundation. The project titled "2018 Hurricane Season RAPID Collaborative Research: Utilizing the Hurricane Michael Event Layer for Developing a Paleo-Tempestite Archive in Strandplain Swales, St. Vincent Island, Florida" seeks to develop a new type of sedimentary archive (strandplain swales) of paleo-hurricane frequency, intensity, and possibly detailed information about wind fields (direction of storm approach).
- ▶ **Lisa Swanger** of the Burroughs & Chapin Center for Marine and Wetland Studies, received a \$5,500 grant from the National Marine Sanctuary Foundation. The project titled "Grand Strand Cigarette Litter Reduction Project" seeks to reduce or eliminate a region-specific debris issue in two regions as a result of increased awareness.
- ▶ **Rich Viso, Ph.D.**, of the Department of Coastal and Marine Systems Science, received a \$763,008 grant from HIS Markit Inc. The project titled "Kingdom Suite Software System License Renewals" provides for the network licenses for geophysical interpretation and analysis software to be used in classroom and independent study sections for both undergraduate and graduate students in the School of the Coastal Environment (SCE) at CCU.
- ▶ **Rich Viso, Ph.D.**, of the Department of Coastal and Marine Systems Science, and **Angelos Hannides, Ph.D.**, of the Department of Marine Science, received three grants totaling \$26,623 from Briarcliffe Acres, Horry County and North Myrtle Beach. The projects titled "Water Level and Water Quality Monitoring" will determine the impacts of changes in channel trajectory across the beachface of the Whitepoint Swash, a tidal creek in North Myrtle Beach, S.C., linking the ocean and an estuary surrounded by commercial and residential development.
- ▶ **Ryan Yoder, Ph.D.**, of the Department of Psychology, received a \$110,701 grant from the National Institutes of Health. The project titled "Otolith-Dependent Brain Functions in Mice" seeks to understand the brain mechanisms that contribute to disorientation (occurs in many pathologies, including dementia, Alzheimer's disease, drug abuse, etc.) to advance the ability to treat or prevent this component of these disorders.
- ▶ **Robert Young, Ph.D.**, of the Department of Marine Science, received a \$4,957 grant from Texas State University. The project titled "Dolphin Stranding Technician Services" is funding for a stranding technician to provide dolphin teeth/aging analysis services.
- ▶ **Robert Young, Ph.D.**, of the Department of Marine Science, received a \$96,560 grant from the National Oceanic and Atmospheric Administration. The project titled "South Carolina Marine Mammal Stranding Network: Stranding Response and Enhanced Diagnostic Testing" provides response resources and diagnostic testing on marine mammals that strand alive or die and wash up on beaches in South Carolina.



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Reflections from the Women's March on Washington

by Deborah G. Perkins, Ph.D.,
associate professor and director
of the Social Justice Research
Initiative, Department of Sociology

2017 began with a bang for some CCU students! In collaboration with the College of Science, the Social Justice Research Initiative (SJRI) organized and co-sponsored a CCU bus trip to Washington, D.C., for the Women's March. Jaime McCauley, Ph.D., assistant professor of sociology, and Ina Seethaler, Ph.D., director of women's and gender studies, along with 24 students across academic disciplines, participated in this historic event. The Women's March (womensmarch.com) was designed as a catalyst for larger grassroots organization and activism, and is based on the belief that "women's rights are human rights, and human rights are women's rights." The Women's March created a platform for bringing diverse women together and harnessing their political power to dismantle systems of oppression and create transformative social change.

On the evening of Jan. 20, the two faculty advisers along with some excited and anxious students, some who had never been to the nation's capital before and most who had never participated in a protest or march before, departed for an eight-hour bus ride to a metro station in Virginia where they would then take a train into D.C. Little did they know when they set out from the parking lot behind Baxley Hall in the late evening of Jan. 20 that they would be part of one of the largest protest movements in U.S. history, or should I say, "herstory." The following account is derived from an analysis of reflective journals written by 13 CCU students who were on the bus and participated in the Women's March. Some

students slept soundly throughout the long night, while others tossed and turned to get comfortable, despite their pillows and blankets. "It was hard to get comfortable to sleep but I had expected that I wouldn't get a lot of sleep that weekend." Other students used the journey to bond and to discuss thoughts, views and ideas. "The journey was long. I met my new friend on the bus and we sat together. We talked, laughed, and made sure to look out for each other. The whole group had such a positive energy and outlook."

When the bus arrived at the metro station in Virginia, there was a sense of heightened energy as scores of people from across the country began to flood through the turnstiles. "I met people from New York, California and Louisiana." It took several hours for our group to purchase their tickets and board the train. As one student recalls, "I have never been around so many people and everyone was a pleasure to talk to. As we made our way through the train station we all chanted and cheered." The train into the city became more crowded with each additional stop along the way. "We were touching bum to bum for an hour ride, so we decided to make the best of it. The train was full of pink hats, posters, and so many women." CCU students and faculty finally arrived in D.C. around 11:30 a.m. One said as soon as she took a step off the train, "Everyone was whooping, screaming and chanting. The only way our group was able to find each other every time we got lost was by putting our chants up, so we took a little bit of Coastal with us." Another said, "It was not until I found myself perched on a wall overlooking the sea of pink pussy hats that I realized how many truly came out. The sea overtook the streets, leaving no spots open. It was amazing. You could literally feel the passion in the crowd."

Our students experienced the "art of resistance" that day. They joined thousands of others in chanting, "No justice, no peace!" and learned the words to the historical social movement song, "We Shall Overcome." A student said, "I spent most of the time marching around, learning chants, and video recording everything as part of my activism project. People were chanting for equal pay, fighting against the bigotry Trump has been endorsing, and declaring that everyone's voice needs to be heard." People were practically outnumbered

The march has taught me how strong and powerful women are.

I met a lot of new people and made some new Coastal friends. I can truly say that my first trip to D.C. was remarkable!



Ina Seethaler giving instructions to students prior to departure.

by creative and inspiring posters that protesters brought to the event. One featured a picture of Rosie the Riveter with a baby in her arms that read, “A woman’s place is in the revolution,” and another that said, “We are all immigrants.” When one of our students asked a woman about the poster she was carrying the woman said, “This poster I have in my hand, those are all of my grandchildren’s hand prints. I am here for them. I want to make this world great for them, and I will do anything to give it to them.”



Our students were greeted by vendors selling T-shirts, buttons and posters, and they were treated to many excellent speakers and musical artists throughout the day including among dozens of others, Janet Mock, Angela Davis, Alicia Keys and Gloria Steinem. One student reflected on the message of the popular recording artist and actress, Janelle Monae: “The most emotional part for me was hearing the speaker Janelle Monae and how she brought out the mothers of Trayvon Martin, Eric Garner, Dontre Hamilton, Mohamed Bah, and Jordan Davis [whose sons were victims of police-related deaths or racially charged killings]. When the mothers said their son’s name three times and the crowd chanted back “say his name” it made me feel every pain the mothers felt.

“That moment made me realize WE all have to stand as a nation, march as a nation, and protest as a nation.” Another student reflected on the words of Erika Andiola, former congressional staffer and co-founder of the ORM Action Coalition, who “used her voice to fearlessly say that she is undocumented and unafraid.” The message was particularly powerful and inspiring for our students who attended that face many of the same challenges as Andiola.

Needless to say, after an overnight bus ride to D.C., followed by a full day of protests, speeches and music, and the long and reflective journey home, our students were exhausted, yet exhilarated, by what they had been a part of that historic day. When asked in retrospect about their takeaway from the experience, student comments were all quite positive.



CCU students at the Women's March on Washington.

One student said, “I am so happy that I went on this trip.” Another said, “I met a lot of new people and made some new Coastal friends. I can truly say that my first trip to D.C. was remarkable!” Moreover, students expressed sincere gratitude to CCU, the College of Science and the Social Justice Research Initiative for supporting and sponsoring the trip.

Many students remarked that the experience was eye-opening for them; some were “woke” for the first time and felt empowered by the experience. As one student said, “This was definitely the most empowering thing I have ever done in my life. I also got to be surrounded by such empowering individuals.” Another reflected, “What I have achieved is finding my voice to stand for human rights. I never fully embraced having a political voice and using it so loudly before the march.” A third concluded, “I am incredibly proud of myself and my peers for participating in something so great.” Other students indicated they were more hopeful than they had been in a long time: “Honestly, this has been an altering experience for me. Being in an all-inclusive area around so many open-minded people filled me with an unimaginable amount of hope.” Also in retrospect, students reflected on what they learned as a result of their participation in the Women’s March. Most comments focused on the power and responsibility we have as change agents to transform the injustices and oppression in our world. A student reflected, “The march has taught me how strong and powerful women are.” Another said, “The march made me realize that change starts with each of us as individuals.”

A primary goal of the Women’s March was to serve as a catalyst for action. “The point of the trip wasn’t for the march

itself. The point of the endeavor was to spread the word after it. I value the importance of speaking up and not standing down...” Based on reflections from our students, it appears that the Women’s March definitely sparked something within them as revealed in the following comments:

- “Going to the march only accelerated my want and drive to promote not just women’s rights but human rights as well.”
- “It reignited the fire inside of me to continue my fight for what is right: all-inclusive love and rights for everyone.”
- “I will not be silent. I will continue to march for others both alike and different. I will be proud of my identity. I will stand for others who cannot stand for themselves, and I won’t be alone.”
- “...it is time to take a stand.”
- “Let our voices be heard. I am so excited to make my mark on the world, and the march has also opened up my eyes to the world of social justice activism. It just blows my mind that I will be able to share this opportunity with my future children and grandchildren. The march was only the beginning.”

*Going to the
march only accelerated
my want and drive to
promote not just women’s
rights but human
rights as well.*

On behalf of the SJRI, I would like to express sincere gratitude to the faculty advisers and the 24 social justice warriors who made the trip to Washington, D.C., in support of the ongoing recognition and struggle for women’s rights. As for your commitment to social justice activism, I say, “March on,” for the journey continues and the road is long.

IN MEMORIAM



ROCCO J. "ROCKY" CARTISANO

Rocco J. "Rocky" Cartisano, 86, passed away Tuesday, Feb. 6, 2018, at Embrace Hospice House in Myrtle Beach. He was the founder, editor and publisher of *Progression*, the College of Science magazine, and will be very much missed by all of the people he involved in that publication. Rocky came to Coastal Carolina University in 1997 and initially served on the board of the CCU Lifelong Learning program that eventually changed to the Osher Lifelong Learning Institute (OLLI) program. Most recently, he was a research associate with Lifespan Studies in the College of Science. In addition to editing *Progression*, he also edited a newsletter titled "Prime Times," the official publication of the Lifespan Studies program.

Those of us who knew and worked with Rocky will remember his sense of humor, his high level of energy and the way he consistently but politely reminded us to make publication deadlines. His enthusiasm and positive outlook on the world made him a welcomed visitor to many offices on the CCU campus.



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