KEEPING UP WITH THE EDUCATIONAL MOMENTUM OF THE COLLEGE OF SCIENCE

EATING TO REDUCE INFLAMMATION

ANTARCTICA: HEADING SOUTH FOR THE WINTER

PREPPING THE NEXT GENERATION
In this edition we introduce our use of the Aurasma Augmented Reality app. If you download the Aurasma app* to your internet connected Android or iOS based smart device, you will be introduced to how augmented reality makes print media interactive. In later editions of Progression we will expand our use of this new medium to enhance your overall experience.

Until that time, as you read each of the articles, I would encourage you to engage with our faculty, staff and students. In many of the articles, information is provided so that you can contact us directly if you want additional information on a topic of interest. Of course, you are also welcome to contact me; my phone number and email are listed below.

Our College of more than 100 dedicated faculty and staff is fully committed to ensuring the success of our students as they pursue their academic careers at the undergraduate or graduate level. Our eight departments offer 20 major, minor and graduate programs ranging from biology to statistics. Our approach to education is current, engaged and hands-on, with learning taking place in the classroom, the laboratory and in the field.

Please take some time to read what is going on in each of our departments; by doing so you will gain an appreciation of the breadth of knowledge that is explored in our College by our faculty and students, as we seek to understand and explain the natural world.

Regards,

Michael H. Roberts, Ph.D.
Vice President for Research and Emerging Initiatives
Dean – College of Science
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*After installing and opening the app you will choose the icon shaped like the letter “A” in the lower section of the screen. This will give you access to the menu screen where you will choose the search icon. In the search window, type CCU Science. Select the CCU Science channel and subscribe to our channel by clicking follow. Once this is selected, go back to the viewing screen and select the small open rectangle on the bottom of your screen. Now aim your camera at my picture and watch augmented reality bring the page to life.
Two major national reports, the Pew Oceans Commission and U.S. Commission on Ocean Policy, have documented the critical importance of marine science to our national health and well-being and called for increased efforts in marine science education, research and funding. This is truly an exciting and dynamic time.

Please visit the Department of Marine Science website at www.coastal.edu/marine/. Jane Guentzel can be reached at jguentze@coastal.edu or 843-349-2374.

DEPARTMENT OF PSYCHOLOGY AND SOCIOLOGY

Susan Webb, Ph.D.
Department Chair

The 20 faculty members of the Department of Psychology and Sociology are active researchers publishing on a range of topics including: Alzheimer’s caregiving, stroke recovery, hypnosis, bullying, policing, drug and tobacco use, social justice, college success, effective teaching, aging in Russia, social conditions and popular music, masculinity, Southern culture, prison crowding, underdogs, environmental racism, infant development, tattoos, ADHD, and more. Students in the Department are encouraged to conduct original research and supported in presenting their studies at regional and national conferences and publishing work with faculty members.

As of Fall 2012 there are 461 psychology majors and 235 sociology majors taking classes, conducting research with faculty and community agencies, experiencing internships in multiple settings, and pursuing several degrees: Bachelor of Arts and Bachelor of Science in Psychology, and in Sociology, a Generalist Bachelor of Arts as well as concentrations in Criminology, Health and Aging, and Social Justice. The Department houses the Social Justice Research Initiative and the Gerontology Certificate Program.

For more information about the programs, and the many opportunities available, please contact Dr. Susan Webb, Chair, sewebb@coastal.edu, 843-349-2933, or the Department of Marine Science office, 843-349-2275.
DEPARTMENT OF HEALTH SCIENCES
John Yannessa, Ph.D.
Department Chair

CCU's health promotion major is one of only 21 programs in the nation and the first in South Carolina that has been awarded approval by the Society for Public Health Education and the American Association for Health Education. This prestigious designation is an indication of academic rigor, program quality and high academic standards in the field of health education.

Our health promotion program features four different areas of study that allow students to personalize their studies based on career or graduate school aspirations:
- Health promotion with general cognate (designed for students with general health interests or those seeking graduate work in allied health careers)
- Health promotion with a communication option
- Health promotion with an exercise science option
- Health promotion with a health services leadership option

Please visit the Department of Health Sciences website at www.coastal.edu/healthsciences/. John Yannessa can be reached at yannessa@coastal.edu or 843-349-6460.

DEPARTMENT OF MATHEMATICS AND STATISTICS
James Solazzo, Ph.D.
Department Chair

Welcome to the Department of Mathematics and Statistics at CCU. Our primary goal as educators 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.

A degree in mathematics opens up many exciting job opportunities in business, industry, government, actuarial science, technology and education. Furthermore, the mathematics degree lays a solid foundation for continued study at the graduate level in any of the mathematical sciences.

At Coastal Carolina University, we are committed to providing quality undergraduate teaching. In addition, 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. We also offer motivated students the opportunity to do research at the undergraduate level.

Please visit the Department of Mathematics and Statistics website at www.coastal.edu/math. James Solazzo can be reached at jsolazzo@coastal.edu or 843-349-2717.

DEPARTMENT OF KINESIOLOGY, RECREATION AND SPORT STUDIES
Gibson F. Darden, Ed.D.
Department Chair

The Department of Kinesiology, Recreation and Sport Studies at Coastal Carolina University is a dynamic unit of high-quality faculty who study and promote human movement as applied to current and emerging physical activity, sport, therapeutic and recreation settings.

The department is currently home to 15 full-time faculty and 700 undergraduate students who study within the academic majors of exercise and sport science or recreation and sport management.

Our mission is to provide students with the knowledge, skills, abilities and attitudes for effective leadership in today's physical activity, recreation and sport. Our faculty members engage students in hands-on research, community service projects and field-based leadership opportunities.

Please explore our programs and services, and we hope you decide to join us. We think you will soon discover why our programs are fast growing, cutting edge and first choice.

Please visit the Department of Kinesiology, Recreation and Sport Studies website at www.coastal.edu/hkss. Gibson Darden can be reached at gfdarden@coastal.edu or 843-349-2944.
The Department of Computer Science and Information Systems at CCU has recently been updating and expanding its curricular offerings. In addition to the two existing undergraduate degree programs, a BS in Computer Science and a BS in Information Systems, the department is working toward offering a third degree: a BS in Information Technology. The faculty are working closely with Horry-Georgetown Technical College in an effort to leverage its existing two-year program in Computer Technology as a natural feeder for the proposed four-year IT program here at CCU. The South Carolina Commission on Higher Education will review the complete proposal during the Spring of 2013. Assuming that the proposal is accepted, the IT program will get under way in the Fall of 2013.

In addition to improvements to the curriculum, the department has also been engaged in elevating the level of scholarly research conducted by its faculty. With more than 13 peer-reviewed publications in 2012 and more than 32 since 2009, the CSIS faculty have been successful in conducting research in a broad range of fields including: parallel and distributed systems, software engineering, image processing, multimedia classification and computer science education.

Please visit the Department of Computer Science and Information Systems website at http://cs.coastal.edu. Dr. Jones can be reached at wjones@coastal.edu or 843-349-4142.
ANTARCTICA

HEADING SOUTH for the WINTER

by Rick Peterson, Ph.D., Lecturer
Coastal and Marine Systems Science
IN DECEMBER, SCIENTISTS IN THE BURROUGHS & CHAPIN CENTER FOR MARINE AND WETLAND STUDIES TRADED THEIR WINTER COATS FOR SOME EVEN COLDER WEATHER GEAR. LEIGHA PETERSON, A STUDENT IN THE CMWS PROGRAM, AND BCCMWS RESEARCHERS RICH VISO AND RICK PETERSON TEAMED UP WITH COLLEAGUES FROM EAST CAROLINA UNIVERSITY FOR A RESEARCH TRIP TO ANTARCTICA.

The CCU team is assisting in a project funded by the National Science Foundation to ECU to examine the role that groundwater may play in delivering dissolved iron to the Southern Ocean — an area where a shortage of iron limits the growth of phytoplankton that helps regulate the Earth's climate. Palmer Station is a U.S. research facility located on Anvers Island, Antarctica, and the only transportation to and from the station is by ship. The science team boarded the research vessel (R/V) Laurence M. Gould in Chile for a four-day steam across the Southern Ocean. Once they arrived at Palmer Station, the team began a sampling cruise across the continental shelf before returning to Palmer Station.

(left to right) David Hawkins (ECU), Jared Crenshaw (ECU), Reide Corbett (ECU), Leigha Peterson (CCU), Rich Viso (CCU), J. P. Walsh (ECU), David Sybert (ECU) and Rick Peterson (CCU).
to drop off half the team for a 10-week field deployment at the station. Leigha Peterson, a graduate student in CCU’s coastal marine and wetland studies program was one of four team members staying behind in Antarctica through February to conduct land-based geochemical and geophysical sampling.

Though the trip occurred during summer in the southern hemisphere, the team expected freezing temperatures that make sampling more difficult. Limited transportation access and cold climate require a thorough medical pre-screening process before researchers are physically qualified to travel to Antarctica – a process the CCU team began months ago to be cleared for travel.

The chance to spend 10 weeks in Antarctica is an opportunity that Leigha Peterson could not pass up. Her master’s research uses geochemical and geophysical techniques to examine groundwater discharges into tidal creeks along the Grand Strand, so using these same techniques in the Antarctic poses some similarities – and some drastic differences – to her ongoing work in South Carolina. In her absence, Leigha prepared fellow students in the Center for Marine and Wetland Studies to continue her local sampling.

This project includes two sampling campaigns at Palmer Station, so CCU researchers hope to continue these efforts next year as well. The opportunity to represent CCU on an international research stage and to involve graduate students in that research is a critical mission of researchers in the Center for Marine and Wetland Studies.

*Rick Peterson’s email address is rpeters2@coastal.edu.*
The College of Science has a new favorite professional baseball player

TUCKER FRAWLEY

by Brian Bunton, Ph.D., Assistant Professor, Chemistry/Physics

Tucker Frawley graduated in May 2012 with a degree in applied physics, but he is putting a career in science on hold while he pursues his first love: baseball. In the 2012 Major League Baseball amateur draft, Frawley was chosen by the Toronto Blue Jays and has been playing for their farm team in Vancouver, British Columbia.

Since Frawley joined the CCU baseball team in 2007, it has won the conference championship every season. For the past two years, Frawley was the team’s starting catcher, noted for his excellent defensive skills. In his final year, he gained national acclaim, not just for his work behind the plate, but also for his achievements in the classroom.

Frawley came to CCU from Lexington High School, where he excelled both athletically and academically. He started his collegiate career majoring in mathematics but changed to physics in 2009 when he became interested in going to medical school. Throughout his tenure at CCU, he made the President’s List (for a semester GPA of 4.0 seven times and the Dean’s List (for a semester GPA of 3.0 or higher) twice. His final graduating GPA was 3.940 and he received magna cum laude distinction at commencement ceremonies, which he attended before playing in both games of a baseball doubleheader on campus.

This academic recognition led Frawley to be named the Big South Baseball Scholar-Athlete of the Year, as well as a first team Academic All-American. But his accolades were not just academic. In March, Frawley was named as one of 10 finalists for the 2012 Johnny Bench Award, given to the nation’s top collegiate catcher at any level. His efforts were rewarded with an eighth-round draft pick by the Blue Jays in June. Frawley began playing for the Vancouver Canadians immediately, and was starting for the team during the team’s Northwest League-winning postseason run. He was even called the MVP of the postseason by his teammates.

While Frawley was finishing his physics degree, he completed a biophysics research project. The study investigated the ability of a person’s arteries to expand and contract while exposed to hot and cold temperatures. For his experiments, he corralled his teammates into volunteering as subjects. He wrote his findings in an article that is currently being considered for publication in the Journal of Undergraduate Research in Physics.

It’s been said that hitting a baseball is the hardest thing to do in all of sports. Physics is generally considered one of the toughest majors at any college campus. It’s rare to find someone who is able to excel at both, but CCU was lucky to find one in Frawley.

Contact Brian Bunton at bbunton@coastal.edu.
PUT OUT THE FIRE!

by Sharon H. Thompson, Ed.D., CHES
Professor of Health Sciences,
Department of Health Sciences
Many people may be surprised to learn that the body's defense attack, better known as inflammation, plays a role in both the swelling of the sprain and the damaging deposits in our arteries. The inflammatory response is our body’s response to invaders. Regulated inflammatory responses are essential for health and homeostasis. Unfortunately, inflammatory responses that become chronic can contribute to the initiation and progression of disease.

To better understand inflammation, it is helpful to briefly consider the types of inflammatory responses. Within our bodies, there are two types of responses – acute and chronic inflammation. In acute inflammation, the body produces a short-term immune response, such as in the case of trauma, infection or allergy, where the immune system turns on and then turns off when the threat is addressed. In contrast, the body’s inflammatory response is not turned off in chronic inflammation. One might think of it as a slow-burning fire that continues to stimulate pro-inflammatory immune cells and damage healthy tissues.

It is now believed that many diseases are flamed by chronic inflammation. In fact, inflammation has now been implicated as an underlying contributor to almost every chronic disease, including heart disease, stroke, Alzheimer's, cancer, rheumatoid arthritis and diabetes, to name a few. Even obesity is considered a low-grade systemic inflammatory condition due to increased levels of c-reactive protein, interleukin-6, Tumor necrosis factor-alpha, and leptin – all of these being markers for inflammation that increase the risk of type II diabetes, heart disease and other chronic diseases. Nearly 150 years ago Rudolf Virchow speculated that the chronic inflammatory infiltrates observed in tumors reflected the origins of cancer. In other words, chronic inflammation may play a role in initiating the DNA damage that may begin the cancer process. Furthermore, among those diagnosed with cancer, a chronic systemic inflammatory response has been shown to be associated with poor disease outcome.
THE MEDITERRANEAN DIET HAS BEEN DESCRIBED AS TRADITIONAL, BUT CONSISTING MOSTLY OF PLANT FOODS (GRAINS, BEANS, NUTS, FRUITS, VEGETABLES) WITH ANIMAL PROTEIN BEING MAINLY IN THE FORM OF FISH AND CHICKEN. OLIVE OIL IS THE PRINCIPAL FAT, AND MODERATE WINE CONSUMPTION IS ALLOWED WITH MEALS.
The way we eat is believed to play a role in the promotion or suppression of inflammation within our bodies. Some foods are believed to fuel the fire by escalating indicators of inflammation, such as C-reactive protein, which is one of the acute phase proteins that increases during systemic inflammation levels. These foods are high in trans or saturated fats, such as fried foods, fast foods, red meat or processed meat. Others include foods high in sugar and/or refined flour such as doughnuts, crackers, pastries, candy, cakes and sodas.

Perhaps the most practical and well-studied way to suppress inflammation is to adopt a Mediterranean-style diet. The typical Mediterranean dietary pattern was identified more than 50 years ago and was studied intensively by Ancel Keys. For more than a decade he examined the relationship between cardiovascular disease and diet in 12,000 men in seven European countries. His study was initiated by the fact that heart attack rates were especially low in Crete, despite a high fat intake. In particular, he examined the types of fats that these men ate. His research led to the term “Mediterranean diet” being formally named in the early 1990s. This diet has been described as traditional, but consisting mostly of plant foods (grains, beans, nuts, fruits, vegetables) with animal protein being mainly in the form of fish and chicken. Olive oil is the principal fat, and moderate wine consumption is allowed with meals.

How can the Mediterranean-style diet protect from inflammation? The typical American diet lacks the proper ratio of omega-3 and omega-6 fatty acids to promote human health, and the Mediterranean diet has a healthier balance between the two. The proper ratio of omega-3 to omega-6 fatty acids causes fewer pro-inflammatory mediators from reductions in omega-6 fat consumption. Specifically, the increases in omega-3 fatty acid consumption are believed to inhibit an enzyme called cyclooxygenase (COX) that produces hormones that spark inflammation. This action is similar to that of aspirin in disrupting the COX-2 signaling pathway to reduce inflammation and pain. Increases in fruits, vegetables and other plant foods will also reduce the production of damaging oxidants. In general, this diet also has a lower glycemic index, which is a positive factor for blood sugar regulation as well as satiety and fullness.

Researchers agree that further studies are needed to provide a greater understanding of the mechanisms of action involved in examining inflammatory disease processes and nutrition interactions. Until that time, many Americans have found that adoption of this diet is easily adaptable and promotes many markers of better health, such as reductions in weight, blood cholesterol levels and blood pressure.

In summary, adjusting your diet so that it is more “Mediterranean” and less “American” in increasing your consumption of plant-based foods and omega-3 fatty acids will help prevent and alleviate inflammation. Try eating Mediterranean-style to increase the quality of your diet and promote overall health and well-being.

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**Recommendations for a Mediterranean-style diet:**

**VEGETABLES:** Add 4-5 servings per day and strive for an array of colors. Cruciferous vegetables, such as broccoli, cauliflower, Brussels sprouts and cabbage, should particularly be part of your vegetable choices.

**FRUITS:** Keep fruit visible where you can see it, and aim for variety. Ideally, try to eat 3-4 servings a day from a spectrum of colors.

**WHOLE GRAINS:** Choose 3-5 one-half cup servings daily of whole grains. Look for the word “whole” as the first ingredient on the food label. Avoid white flour and other white processed foods.

**BEANS AND LEGUMES:** Add as a topping for salads, in soups or in dips such as hummus. Choose a wide variety of beans and legumes such as black beans, chickpeas, black-eyed peas or navy beans to eat 1-2 servings of one-half cup cooked per day.

**FISH AND SEAFOOD:** In order to boost omega-3 levels, aim for three 4 ounce servings a week (not to exceed 12 ounces per week), particularly cold water fish like salmon and tuna. Do not fry.

**HEALTHY HERBS AND SPICES:** Use an unlimited amount of anti-inflammatory seasonings such as curry, turmeric, basil, rosemary, thyme, garlic, ginger, cumin and others.

**HEALTHY SWEETS:** These might include plain dark chocolate (70 percent pure cocoa), fruit sorbet or unsweetened dried fruit.

**HEALTHY FATS:** Choose oils that are high in monounsaturated fatty acids, such as extra virgin olive oil or canola oil. Choose nuts, particularly walnuts, and avocado. Ground flax seeds can also be added to yogurt and cereal, or used in baking.

**TEA:** Choose 2-4 cups of white, green or black tea each day. Avoid adding sugar to sweeten.

**RED WINE:** It is optional, but women and men might consume 1 or 2 glasses per day, respectively.

**TIPS TO IMPROVE DIET QUALITY:** Avoid deep-fried foods, drink plenty of water, have fruits and vegetables cover one-half of your dinner plate, and avoid white starches and sugar.
Assessing what we do in Biology Education and addressing how to change.

by Karen Aguirre, Ph.D.
Chair and Associate Professor, Biology

"Innovation in life science will be the major driver of meeting four major societal challenges: challenges of climate, challenges of food, challenges of energy and challenges of health."

—Phillip A. Sharp, MIT, Co-chair, NRC Committee: A New Biology for the 21st Century
Every spring, the Department of Biology at Coastal Carolina University pushes 50 to 60 fledgling biologists out of the nest. The students will fly off in all directions, some bound for medical or graduate school, some for jobs with hospitals and clinical labs, some for employment by the Department of Natural Resources or the U.S. Forest Service, or for jobs with local companies and regulatory/watchdog agencies. Wherever each lands, the graduate brings fresh energy, talent and the training received at CCU to bear on the problems of our state, our country and the globe.

How can we care for an aging population? How do we track and defend against novel viruses that move too quickly around a shrinking planet? Can our farmers grow and distribute enough affordable, high-quality food to feed us and still have enough to share with people in drought and war zones, and do we have the energy and know-how to help them develop husbandry practices that are appropriate for their own situations? As we discover new sources of fuel in shale deposits, with an attendant chance for energy independence, can we monitor changes in the health of surrounding ecosystems and insist upon thoughtful, safe implementation of harvesting technologies? These are all questions that biologists can answer.

Another, much larger group of students leave CCU each spring who are not trained biologists. As part of their general education requirement, they have taken Biology 101 and its lab class. These CCU alums will become business people and writers and attorneys and teachers. They’ll be consumers, whose purchasing decisions drive the economy and much of public policy. They’ll be voters. It’s important for them to be even if they do not work directly on any of the challenges mentioned above, it’s important for them to be scientifically literate, which is to say that they understand key concepts in science, know how scientists work, and can intelligently interpret data presented in newspapers and magazines and via television and the Internet.

**ASSESSING–TEACHING BIOLOGY**

**So, how are we doing?**

If Coastal Carolina University biology students are like their peers graduating from other American universities, then the answer is “not so well.”

In the last few decades, educators and scientists have felt a growing sense of unease about the state of science education in the U.S. In 1989 and 1997, the documentaries “Private Universe” and “A Mind of Our Own” showed how Harvard graduates fail miserably to satisfactorily answer a set of rather easy questions about the cause for the change of seasons on earth (it’s the tilted axis, friends) and where the structural components of trees come from (please don’t forget photosynthesis right after the exam). In ensuing years, far too many such studies have found American students deficient in scientific concepts and knowledge, leading many to wonder, “What’s wrong with American science education?” Is today’s college student so different from college students of past generations? In 2000, the National Research Council published a white paper – How People Learn: Brain, Mind, Experience, and School.” The report summarized emerging research about human learning and pointed out that many current education practices are inconsistent with what research suggests could promote student learning through more effective teaching. More dynamic, versatile and learner-focused education would engage students who spend less time reading long texts, and more time scanning information in small bytes from an eclectic grab bag of sources, visual and verbal. Today’s CCU biology student may be a 30-year-old woman of color rather than an 18-year-old white man. How do we respect the cultural background of each and take what each brings to the table, then form a person who can do excellent work in science?

In 2011, a document was published called “Vision and Change in Undergraduate Biology Education: A Call to Action.” It was the final report of a national conference organized in July of 2009 by the American Association for the Advancement of Science and supported by the National Science Foundation. Attending that conference were biology educators from all sorts of institutions of higher learning, from community colleges to national research universities. At the meeting a consensus was
reached — undergraduate Biology education needed not a tweak but a transformation. In order to produce creative scientists who could meet the challenges discussed above, we needed to engage a broader cross-section of students, to concentrate more on learner-focused pedagogical practices like problem-based learning and case study approaches, to get students into the lab and field and actually doing science earlier, to keep class sizes small and discussions interactive, to encourage personal mentor/mentee relationships between professors and students, and to cease relying on lectures as the primary engines of delivering content. Indeed, in lower division classes at least, we ought to worry less about minutiae of content and more about instilling deep understanding of concepts.

In the Vision and Change document were lists of “action items.”

- Introduce the scientific process to students early, and integrate it into all undergraduate biology courses.
- Define learning goals so that they focus on teaching students the core concepts, and align assessments so that they assess the students’ understanding of these concepts.
- Relate abstract concepts in biology to real-world examples on a regular basis, and make biology content relevant by presenting problems in a real-life context.
- Develop lifelong science learning competencies.
- Introduce fewer concepts, but present them in greater depth.
- Stimulate the curiosity students have for learning about the natural world.
- Demonstrate both the passion scientists have for their discipline and their delight in sharing their understanding of the world with students.
- Engage students as active participants, not passive recipients, in all undergraduate biology courses.
- Use multiple modes of instruction in addition to traditional lecture.
- Ensure that undergraduate biology courses are active, outcome oriented, inquiry driven and relevant.
- Facilitate student learning within a cooperative context.
- Introduce research experiences as an integral component of biology education for all students, regardless of their major.
- Integrate multiple forms of assessment to track student learning.
- Give students ongoing, frequent and multiple forms of feedback on their progress.
- View the assessment of course success as similar to scientific research, centered on the students involved, and apply the assessment data to improve and enhance the learning environment.
- Mobilize all stakeholders, from students to administrators, to commit to improving the quality of undergraduate biology education.

- Support the development of a true community of scholars dedicated to advancing the life sciences and the science of teaching.
- Advocate for increased status, recognition and rewards for innovation in teaching, student success and other educational outcomes.
- Require graduate students who are on training grants in the biological sciences to participate in training in how to teach biology.
- Provide teaching support and training for all faculty, but especially postdoctoral fellows and early-career faculty, who are in their formative years as teachers.

We can probably all agree that most of these action items were sound ideas. But how could we actually convert them from items on a page to real actions?

ADDRESSING HOW TO CHANGE—PULSE FELLOWS

In October of 2012, the National Science Foundation, the National Institutes of Health and the Howard Hughes Medical Institute, the nation’s three most prominent funding agencies for biological science, combined to select 40 PULSE fellows to gather at the HHMI campus just outside Washington D.C., and find ways to implement the transformation. I was extremely excited to be one of the fellows, and to have the Coastal Carolina University biology department’s experience inform a crucial national movement.
PULSE stands for Partnership for Undergraduate Life Sciences Education. The PULSE meeting was a four-day marathon of thinking, talking, strategizing and planning for transformation in undergraduate biology education. The fellows began by offering their hopes and fears about the outcome of the exercise. Next came rounds of discussions, focused on the obstacles we saw to implementing Vision and Change. We created the “Challenge Wall,” a post-it highway of ideas, gripes, goals and plans. We’d return to it time and again throughout the meeting, refining, grouping, discarding, voting, and just contemplating its themes. By the second full day, we turned our attention to planning a coherent set of activities that would comprise the PULSE initiative. Groups coalesced around themes and action plans were developed, presented to the group, vetted and re-drawn. By the third day, we had discarded dozens of plans, and selected four. The fellows chose their groups. We’ll work within them for a year.

I chose “Taking the Pulse.” My group will design a Vision and Change accreditation instrument for biology departments that are working to improve their delivery of biology education. We’ll then implement an accreditation pilot project for perhaps a dozen aspiring institutions. The “carrot”? Enhanced prestige that will be noted by highly qualified prospective students and parents, and funding agency consideration of V and C accreditation status when awarding grants.

A second group, “V and C Ambassadors,” will train and deploy a cadre of articulate and informed V and C educators who can give presentations at meetings, or deliver workshops for individual biology departments nationwide. The Ambassador group will produce seminars and programs and the trained ambassadors will go wherever they are invited – at no cost to the institution.

A third group, “Faculty Networks,” seeks to support and inspire faculty as they adopt the principles and recommendations of the V and C report by engaging existing teaching and learning centers at universities, creating repositories of V and C inspired coursework online and designing V and C grant programs to help biology departments implement departmental change.

The fourth group, “Raising the Pulse” is the public relations component of the PULSE initiative. Their job is to place pieces about PULSE activities in science journals and non-science venues, to run sessions at regional and national science meetings, send out position pieces and other mailers, and post information to the PULSE webpage and at other appropriate venues throughout the year.

The PULSE fellows continue to work together in webinars and in face-to-face meetings, and will do so throughout this year, as well as to regroup for a second large meeting in June of 2013. What happens after that? It’s up to biology departments across the country, and to those who care about the success of these departments, their faculty, and their students. The PULSE initiative is intended to provide the initial impetus for ongoing change. The PULSE fellows hope to catalyze, through an infusion of energy, talent, hard work, and with generous funding from HHMI, NSF and NIH, a sustained groundswell of excitement and change that will gradually transform American undergraduate biological education. For more information, please visit www.pulsecommunity.org.

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Public understanding of scientific terms and concepts: 2001

- How long does it take for the Earth to go around the Sun? (1 year)
- Does the Earth go around the Sun, or does the Sun go around the Earth? (Earth around the Sun)
- Radioactive milk can be made safe by boiling it. (False)
- The earliest humans lived at the same time as the dinosaurs. (False)
- Human beings, as we know them today, developed from earlier species of animals. (True)
- The continents on which we live have been moving their location for millions of years and will continue to move in the future. (True)
- Antibiotics kill viruses as well as bacteria. (False)
- Electrons are smaller than atoms. (True)
- Lasers work by focusing sound waves. (False)
- It is the father's gene which decides whether the baby is a boy or a girl. (True)
- The oxygen we breathe comes from plants. (True)
- All radioactivity is man-made. (False)
- The center of the Earth is very hot. (True)

SOURCES: National Science Foundation, Division of Science Resources Statistics, Survey of Public Attitudes Toward and Understanding of Science and Technology, 2001; and European Commission, Eurobarometer 55.2 survey and standard report, Europeans, Science and Technology, December 2001.

Science & Engineering Indicators – 2004


Dominance of Internet as source of science information for US public
THE SCIENCE OF SPORT AND RECREATION
Let's begin with the **BIGGER** part. In undergraduate enrollment, the Department of Kinesiology, Recreation and Sport Studies is now the largest academic department at Coastal, with enrollment in our two majors approaching 1,000 students (944 at this writing). The fact that approximately 12 percent of Coastal Carolina University undergraduate students declare kinesiology (the study of human movement) as their academic major is quite remarkable.

The rapid growth of kinesiology at CCU is both expected and surprising. On the expected side, kinesiology disciplines are experiencing high growth in university enrollments nationally. Our career tracks are among the recommended and high-growth careers cited in national publications. Student interest in studying physical activity, rehabilitation, sport and recreation disciplines is at an all-time high. Public interest in allied health professions (e.g., physical therapy) and sport professions has markedly increased in recent years. Many universities cite kinesiology majors as growing at a time when other program enrollments are slumping. At Coastal, our enrollment growth rate far exceeds that of an institution already in a growth mode. The appeal and growth of the university itself, coupled with the attraction of the kinesiology disciplines, suggests we should not be too surprised at our growth.

On the surprising side, the rapid growth has occurred despite some inherent challenges. The Recreation and Sport Management (RSM) and Exercise and Sport Science (EXSS) majors were approved by the state of South Carolina in 2005 and 2008, respectively. In institutional developmental years, this is equivalent to early infancy (the crawling years). Considering the relative youth of KRSS and its rapid growth spurt, one can safely assume some growing pains and challenges. One challenge has been administrative change and instability. In the last three to five years, KRSS experienced considerable administrative change within both the colleges of education and science. We now appear to have settled into a stable academic and administrative home in the College of Science in a unit with an explicit focus on kinesiology. A second growth-related challenge is that of academic facilities. Our EXSS program resides in an older multipurpose building ill-designed for contemporary, dynamic and large scale academic usage. Our RSM program currently resides in the College of Education building. I note (below) that we are making progress on this front, as we have recently gained additional academic space to house KRSS faculty and students. We have begun and need to continue to retro-fit these spaces for optimal academic use. A final challenge has been hiring new faculty to keep pace with our explosive growth. Providing an engaging and challenging academic experience for students remains the core of our mission, and it requires a positive student-faculty ratio. I note that we have made recent progress with some exceptional hires. Taken together, these challenges make our growth rate somewhat surprising. Sustaining the growth, maintaining excellence and continuing program development will depend on how well we navigate these challenges in the future. From an institutional perspective, the ability to effectively market KRSS to students, families and stakeholders will also depend on this navigation.

Now to the **BETTER** part. Our success is largely explained by the fact that our faculty and programs are better and continue to get better. I believe our first-class faculty to be the largest stimulant to the sustained enrollment growth and retention in KRSS. Our **Recreation and Sport Management (RSM)** faculty have been institutional leaders in experiential learning. Applying theory to practice in the real world is interwoven in the culture of the RSM program, whether it occurs in the student major club, a class experience/requirement or the capstone internship class. The result is a cadre of students who are engaged and prepared to enter the work force as leaders of sport and recreation. The program has a solid placement rate of its graduates and a multitude of success stories. You will see some of these in other areas of this magazine.
Our newer Exercise and Sport Science (EXSS) Program is currently meeting demand with very recent increases in faculty and academic space (see EXSS program coordinator Greg Martel’s comments in this magazine). With much of the athletics and campus recreation units moving out of the Williams-Brice Building, we now have academic spaces to support dedicated labs in body composition assessment, motor behavior/biomechanics, wellness/strength and sport/exercise psychology. These are integral elements of the student experience and in attracting top-notch faculty to EXSS. We continue to house a state-of-the art exercise physiology lab that supports student labs, research and our Community Fitness Testing outreach program.

Where do we go from here? We will likely continue to get bigger, though I am uncertain as to when enrollment will begin to plateau. What I do know is that we will continue to get better, regardless of size. Our RSM program will soon move to join the rest of KRSS under one roof. This program is currently getting better as a result of contemporary curriculum revision, to be implemented in 2013. As well, exciting new proposals are under way to introduce a cross-disciplinary emphasis in sport coaching and a graduate program in athletic administration. You will likely be hearing more about these new initiatives in 2013. RSM faculty members are busy hatching plans to even further extend the learning environment to new community-based projects and initiatives. Our EXSS program will continue to focus on the development of laboratory, clinical, teaching and research spaces. As well, collaborative studies are currently under way that better utilize our new faculty and emerging facilities (e.g. balance training in older adults). These activities will also engage EXSS students and allow them to develop essential skills and experiences. With continued faculty hiring and well-developed facilities, we anticipate more projects that excite and engage students and faculty, and make us all better.

Finally, KRSS is getting bigger and better in its service mission as well. Our Physically Active Living Skills (PALS) courses have seen record enrollments, and the program offers not only a plethora of courses in personal fitness and physical activities, but also in areas indigenous to our geographic region, such as surfing, scuba, sand volleyball and golf. Our unique “Exergaming” lab allows students to explore personal fitness development through technology applications, and provides valued outreach to community groups. PALS set a record by serving more than 1,000 CCU students last semester. Our EXSS 122 Lifetime Fitness and Physical Activity course provided a high of 14 sections to the core curriculum. And our Army ROTC program, in its fourth year, has matriculated a full cycle of officer candidates through the program, which is well known for its leadership development.

I encourage you to stay tuned for further developments in KRSS. Let us know if you would like to be involved in any way as we continue on our path toward not only bigger, but more importantly, BETTER.
By Greg Martel, Ph.D., Exercise and Sport Science Program Coordinator and Research Coordinator for the Smith Exercise Science Laboratory

Yes, the title is a play on words. The Exercise and Sport Science major began in 2008 to prepare students to assess, design and implement exercise programs for healthy individuals as well as those with chronic disease. Students are prepared to enter the workforce in community, corporate and/or commercial fitness settings as well as graduate programs for more advanced study in allied health professions (i.e., physical therapy and cardiopulmonary rehabilitation). Given the challenges the nation faces with the prevalence of cardiovascular disease, obesity and cancer and their connections to physical inactivity, it's not surprising that the EXSS major would be an attractive option for CCU students. However, no one predicted that the program would grow so quickly, rising to more than 500 students in just a few years and quickly outpacing our ability to hire faculty. Finally, the program is starting to achieve better balance with regard to student/faculty ratio, as two faculty members have joined the program this fall.

Cathryn Dooly, Ph.D., arrived at CCU from Lander University, bringing a great deal of teaching, research and administrative experience. She teaches in the areas of exercise physiology, cardiopulmonary rehabilitation and nutrition, among others. Her research interests include the reliability of body composition assessment techniques and the impact of exercise on older adults. In addition, Chad Smith, Ph.D., joined the faculty from Youngstown State University, also bringing much teaching and research experience. He teaches biomechanics.
and strength and conditioning, and has research interests including the effect of stretching and fatigue on muscle function. The program is glad to have them aboard.

Also with regard to balance, the Allison Sloan Smith Exercise Science Laboratory had seen a number of structural modifications over the past few years to accommodate increases in student numbers, classes and research projects. However, only so many walls could be removed, and the limits of a single lab’s ability to meet the needs of numerous additional lab sections, presentations and increased faculty research quickly became apparent. With the relocation of Campus Recreation Services to the new HTC Center, the EXSS program was lucky to gain much needed space to allow for improved teaching and research areas. Some of the former campus recreation areas have been converted to “new” research and teaching spaces for body composition assessment, motor learning, balance, psychological assessment, and exercise testing and training.

EXSS faculty have already begun taking advantage of these new spaces, with a number of research projects already under way or being proposed, making use of these new lab areas. For example, two EXSS majors in the CCU Honors Program, Caitlin Carroll and Stephanie Taylor, began collecting data regarding balance performance and fall history in CCU cheerleaders and cross country runners. Although you would think that college-aged women wouldn’t have issues with balance, participation in athletic endeavors such as these expose young women to a high risk of falls. (Imagine sprinting into a series of cartwheels or flips, standing on someone’s shoulders with nothing to hold on to, or running down a gravelly hill at top speed!) Caitlin and Stephanie thought it would be interesting to test balance ability in these groups while also obtaining a recent history of falls and lower extremity injuries that resulted from participation. It was found that 76 percent of the 17 athletes tested had fallen and almost 60 percent had experienced a lower extremity injury related to participation in their activities within the past year alone! From their research, three research abstracts were developed, and the students presented them at the southeast regional American College of Sports Medicine meeting in February 2013.

Another study that was developed and approved in August 2012 involves balance ability in older adults. Although many studies have examined the impact of strength training and traditional balance exercises on fall risk and occurrence, there is a need for study of the possible benefits of a recent trend in balance intervention involving participation in multisensory game playing (also referred to as “exergaming”). Few studies have directly compared different brands of multisensory games on balance ability and fall risk; also, few have compared the effects of playing multisensory games to the effects of traditional balance training. Thus, EXSS faculty plan to compare the effects of a traditional balance exercise training program to two different brands of multisensory gaming, the Xbox Kinect gaming system and the Wii Fit Balance Board. We will soon be looking for volunteers aged 65 and older from the local community to participate in this study. We will be looking to measure balance performance on a computerized balance testing system, physical performance during functional activities involving sitting, standing and walking, aerobic capacity, cognitive function and perceived balance confidence. Greg Martel can be reached at gmartel@coastal.edu or 843-349-2957.
This statement credited to Sophocles highlights the belief in education held by the Recreation and Sport Management (RSM) program faculty at Coastal Carolina University (CCU). The faculty members try to get students involved in the field from the first class they take in the RSM program. In the Introduction to RSM class, students are required to work with three different agencies in the field of recreation and sport. The hands-on experience continues through the student’s final course, Internship in RSM, which requires the student to work for 12 weeks and 480 hours with one agency.

Traditional education has been focused on knowledge and skill development based on communication between the teacher and the students, often in verbal and written forms. This is often viewed as lateral or horizontal education. In today’s competitive job market, it is not enough to have knowledge; students need to know what to do with the knowledge and skills they have developed. The RSM program faculty believe that while the horizontal education is important, attention should be focused on the vertical learning, which suggests that learning occurs when the students are required to test, rethink, and expand upon their knowledge. The students get to see the actual implementation of the theory to real world settings and make decisions.

Since the beginning of the Recreation and Leisure Services Management emphasis under the Physical Education major, the core value of the program has been experiential education. Alan Case started the program in 1994 with the belief that it is more beneficial to the students if they learn by doing. When he was called to active military duty in 2003, I took over the program and continued to build the program with the same underlying core value. Student’s can learn more and get a competitive edge in the job market if they get practical experience from the classes offered at CCU. Even with the large growth that the program went through as the name changed and it became a stand-alone major, the faculty continued to work hard to provide the students real world experiences from which they could learn about working in the field. Now under new leadership with professor Colleen McGlone and an expanding faculty, the program will continue to apply the same core values. The following programs highlight a few of the experiences that are provided by the RSM faculty.

**Sports Operation Education Program (SOEP)**

The SOEP, which was started in Spring 2007, offers a selected group of students the opportunity to run the day-to-day operations of CCU baseball and softball. Students who are interested in working in this program have to apply and interview to be accepted. Seven to 10 students are selected every spring to work in many of the aspects of college athletics operation including marketing, promotion, video streaming, sales, maintenance and concessions. The program allows students to immerse themselves in the field and learn by actually doing the tasks required by an employee of college athletics. They get to actually see the classroom concepts and theories discussed in a real world setting.

**Howl O’Scream**

Howl O’Scream is a Halloween event that was started in 2006 with the City of North Myrtle Beach Parks and Recreation Department. The purpose was to provide a safe, family-oriented environment for children to enjoy Halloween. Since its beginning, the program has grown to serve approximately 3,500 participants per year. While working with Callie Jean Wise, program supervisor, students enrolled in the Program and Event Planning class plan, implement and evaluate the event to get the experience of planning a large event. The students develop skills such as budgeting, promoting, marketing, goal and objective setting, evaluating, managing risk, recruiting and managing volunteers, and scheduling.
**Waccamaw Sport Classic**

Since 2009, students in the spring semester Recreation and Sport Leadership class have led senior adults from Williamsburg, Georgetown and Horry counties in recreation and sport activities as part of the Waccamaw Sport Classic. The event, a collaboration among many senior adult-serving agencies in the three counties, requires the students to apply the three stages of direct leadership to lead the seniors through social as well as competitive activities throughout the day-long event. The students get to use leadership concepts discussed in class such as leadership style, verbal communication, nonverbal communication, problem solving, decision making, motivation, as well as preparation, priming the group, and delivery to lead approximately 350 seniors.

**Southeastern Regional Games**

For two years (2011 and 2012), the Sport Tourism class worked with the City of North Myrtle Beach Parks and Recreation Department and the Sport Mobility Network to plan and implement the Southeastern Regional Games. This event serves people with ambulatory disabilities and offers them competitive sport activities including archery, power lifting, tennis, track and field, and swimming. Again the students used classroom concepts such as marketing, promotion, risk management and event management that they learned in sport tourism to assist with making this event a success.

All these programs and others not discussed in this paper integrate the classroom concepts discussed throughout the RSM curriculum into tangible experiences that teach the students what it is like to work in the field. The experiential learning opportunities also line up with the new vision of CCU that is verbalized and operationalized in CCU’s Quality Education Plan (QEP). According to the Office for Experiential Learning, the QEP is “a university-wide initiative to improve student learning” designed to transform our educational culture in exciting and meaningful ways by making experiential learning the centerpiece of our educational mission.” The purpose of the QEP is the very core value that has woven its way through the CCU RSM program. **Don Rockey can be reached at drockey@coastal.edu or 843.349.4040.**
Helping Prevent Sudden Cardiac Death in Horry County Student-Athletes

New EXSS Faculty Member uses mini-grant to initiate cardiovascular screening

Sudden cardiac death (SCD) is the leading cause of death in young athletes. It is estimated that more than 100 young athletes die each year in sports-related incidents, according to the National Athletic Trainers’ Association (NATA), and close to half of these deaths are attributed to SCD.

Cathryn Dooly, Ph.D., assistant professor of exercise science, recently received one of CCU’s internal Performance Enhancement Grants. The grant will fund her work with Horry County Schools and a local cardiologist to include cardiovascular screening (EKG) as a complement to the mandatory pre-participation screening required of all high school athletes. Evidence-based studies report that adding an EKG dramatically increases the sensitivity of screenings by as much as 50 percent. Most professional teams include EKG as part of the screening process. Some colleges routinely include it, with fewer physicians including it for high school athletes. Professor Dooly’s grant implements a pilot program titled “Young Hearts for Life.” The program, to be implemented through the coordinated efforts of the Department of Kinesiology, Recreation and Sports Studies at Coastal Carolina University and a local cardiologist, aims to make cardiovascular screening more readily available to Horry County high school athletes. It provides a course of action for the early detection of possible underlying pathological cardiac conditions in young athletes. Using this model in the community will permit additional study on the value, accuracy of the testing, and cost effectiveness of EKG as a routine addition to pre-participation screening. If the “Young Hearts for Life” pilot program proves beneficial, continuation of the program will afford an opportunity for longitudinal data. Even though a resting EKG may not be the magic bullet or panacea to completely eliminate SCD, the program can better identify at-risk athletes to ensure that organized sports are as safe as possible for participants. “Young Hearts for Life” aims to meet that objective.

EXSS Faculty to Begin Physical Activity Intervention Study for Seniors

Faculty members in the Exercise and Sport Science Program will soon implement a physical activity intervention study for eligible seniors at The Lakes at Litchfield Inn Pawleys Island. The project is led by Cathryn Dooly and Greg Martel, and Will Lyerly will assist in the project, which will recruit seniors who are living independently but are considering transitioning to assisted-living due to physical deconditioning.

The objective of the physical activity intervention study is to improve seniors’ physical parameters such as muscular strength, muscular endurance, aerobic capacity, body composition, balance and cardiovascular risk factors so that they are able to maintain independence and a better quality of life. Dooly and interested exercise science interns will meet seniors by appointment twice weekly for personal training sessions, while seniors pursue a third session each week on their own in activities such as water exercise, line dancing, yoga or one of the many exercise classes already offered by the senior community at The Lakes at Litchfield. Dooly expects to recruit at least 15 seniors for this initial intervention study, with the expectations that seniors complete the study in approximately four months. Pre and post testing of physical parameters will be administered by the faculty as well as EXSS internship students.
Bacteriophages, also referred to as phages, are a class of viruses that only infect bacteria. Bacteriophages have been used as indicators to predict the presence of pathogenic bacteria in drinking, waste and recreational waters. They have also shown the potential in limiting the aquatic bacteria population through their ability to destroy bacteria. Water quality issues are important concerns for coastal South Carolina. More than 60 percent of the nation’s estuaries experience water quality problems. This poor water quality may favor the phytoplankton blooms (including harmful algae) and occasional hypoxic/anoxic events (fish kills) that affect our beaches and estuaries. The treatment of bacterial outbreaks in fresh water systems with phages (phage therapy) has been shown to be effective. One of the advantages of using phages is that they only attack a specific bacteria, which prevents harm to beneficial, naturally occurring microflora in the ecosystem.

Our current study builds on previous student projects sponsored by Professor Paul Richardson. These previous projects developed a simple laboratory method for identifying bacteriophages in water samples from environmental samples (real world conditions). While phages have excellent potential as bacterial pollution indicators in drinking and wastewater settings, little is known about the survival and persistence of bacteriophages in the harsher saline environments of seawater. Last year we began to test our identification method in seawater. Based upon these results, Professor Richardson received a grant from the Belle Baruch Foundation and was named as a Harry M. Lightsey Jr. Visiting Scholar Fellow. Our new research evaluates whether the properties of seawater (salinity, pH and dissolved oxygen content) affect the sensitivity of this method used to identify bacteriophages. The study also looks at the effect seawater (salinity, pH and dissolved oxygen content) has on bacteriophage levels in an estuary.
Water quality issues are important concerns for coastal South Carolina. More than 60 percent of the nation’s estuaries experience water quality problems.

Joe Cannon, a nontraditional student who enrolled in Coastal’s marine science program after his retirement, performed both the sample collection and lab analysis for the project last year. He was joined this year by Nick Thurn, a junior majoring in biochemistry. This has allowed them to split up the responsibilities. Cannon, a professed pluff mud lover, collects soil and water samples from various estuary sites at Hobcaw Barony. He also tests the collection sites for water temperature, air temperature, sunlight, salinity, pH and dissolved oxygen content.

Once environmental samples are collected and recorded, they go to Thurn in the Biochemistry Lab to be prepared for bacteriophage detection. This involves digestion of the proteinaceous shell of the bacteriophage that surrounds viral DNA. Specific sequences on the viral DNA that are highly conserved in many different bacteriophages are then targeted and amplified using a technique known as PCR amplification. After amplification, bacteriophage presence in the sample is determined by a method of separating molecules by their size and charge known as electrophoresis.

Participating in undergraduate research is an invaluable opportunity that not only provides us with benefits pertaining to scientific techniques, but also helps us develop important qualities that will impact our futures for the better, as many of these skills carry over to other areas of life. By being part of the research team with Professor Richardson and other members of the Richardson Research Group, we are given the opportunity to associate ourselves with individuals who have the desire to gain knowledge for betterment of ourselves and the advancement of humanity.

Paul Richardson, Ph.D., Associate Professor of Biochemistry, can be reached at prichar@coastal.edu or 843-349-2598.
DEPARTMENT OF BIOLOGY

Daniel Williams, Ph.D.
Assistant Professor
Williams earned a B.S. degree in biology from Gonzaga University and a Ph.D. in biology from the University of Utah. He conducted postdoctoral research at Yale University and held a lecturer position at Gonzaga prior to coming to CCU. Williams' research is aimed toward an understanding of the cellular and molecular pathways involved in response to reactive oxygen species induced neurodegeneration. He is teaching genetics and introductory biology.

Mary Wilkerson, Ph.D.
Assistant Professor
Wilkerson earned a B.S. degree in applied mathematics and psychology, a master's degree in mathematics and a Ph.D. in mathematics from Virginia Polytechnic Institute. Wilkerson's research is in complex dynamics, and she uses combinatorial methods to examine topological gluing of quadratic functions on the two-sphere. She taught as a graduate assistant at Virginia Tech and is teaching Calculus I at CCU.

Victoria Hoffman
Lecturer
Hoffman earned a B.S. degree in applied mathematics and a master's degree in teaching with a concentration in mathematics from the CCU. She taught mathematics at Socastee High School and has been a teaching associate with the CCU department of mathematics for many years. Hoffman is teaching College Algebra and Basic Concepts of Contemporary Math.

Melanie Vining
Lecturer
Vining earned a bachelor's degree in Spanish and a bachelor's degree in applied mathematics from CCU. She received an M.A. degree in mathematics from Arizona State University. Vining taught as a graduate teaching assistant at Arizona State University and is teaching College Algebra.

Sarah Swartzel
Lecturer
Swartzel earned a bachelor's degree in education (secondary mathematics), another B.S. degree in mathematics and an M.S. degree in applied mathematics from Western Carolina University. She taught college algebra as a graduate teaching assistant at Western Carolina University. Swartzel is teaching Introduction to College Algebra lab, College Algebra and Math Early Childhood and Elementary Education Majors I and II.

Michael Baron
Lecturer
Baron earned a bachelor's degree in mathematics and philosophy from John Carroll University; a J.D. degree at Case Western Reserve University School of Law in Cleveland, Ohio; an M.S. degree in mathematics from John Carroll and an M.A. degree in mathematics from Indiana University. He taught a Business Core course in mathematics, calculus and algebra at various universities. He is teaching College Algebra, Calculus for Business and Social Science and Precalculus.

Ariane Ross
Lecturer
Ross earned a B.A. degree in mathematics from Spelman College in Atlanta, Ga., and an M.S. degree in mathematics from Iowa State University. She taught Business Calculus, Discrete Math Algebra, and Calculus II at both Spelman and Iowa State. She is teaching College Algebra at CCU.

DEPARTMENT OF PSYCHOLOGY AND SOCIOLOGY

Miranda Brenneman, Ph.D.
Lecturer
Brenneman comes to CCU from Baylor College of Medicine and Rice University, where she was a postdoctoral fellow and research coordinator in neurology and rehabilitation. Brenneman's Ph.D. is from Northern Illinois University, and her dissertation examined the "Effects of amphetamine on recovery from hemi-spatial neglect in rats." Her recent publications are in the Journal of Neuroscience Research; the Journal of Cerebral Blood Flow & Metabolism; Experimental and Translational Stroke Medicine; and in Behavioral Brain Research.

C. A. (Cynthia) Meyersburg, Ph.D.
Assistant Professor
Meyersburg earned an M.S. degree in developmental psychology from Johns Hopkins and a Ph.D. in psychology at Harvard University, where she just completed a postdoctoral fellowship. Meyersburg's dissertation and current research investigate, "Why do some people believe they have memories from past lives? Who believes this? What are the correlates and consequences of this belief?" Meyersburg is lead author for recent publications in the Journal of Abnormal Psychology, and the Journal of Personality and Individual Differences. She led workshops and authored guidelines for teaching writing in psychology.

Andrew Terranova, Ph.D.
Assistant Professor
Terranova joins us from a teaching position at Austin State University after a postdoctoral fellowship at Rutgers University. His M.S. and Ph.D. in applied developmental psychology are from the University of New Orleans. Terranova studies peer relationships, bullying, aggression and development of school age children. His recent publications, some examining effects of Hurricane Katrina, include articles in Psychology in the Schools; Journal of Applied Developmental Psychology; Journal of Abnormal Child Psychology and the Journal of Aggression, Conflict and Peace Research.
Donald Rockey, Ph.D.
Associate Professor

Rockey returns to CCU as an associate professor of recreation and sport management after spending the 2011-2012 academic year at the University of Mississippi. Prior to his years of service on the CCU faculty, he earned his Ph.D. from the University of Mississippi and was on the faculty at Shepard College, Southwest Texas State University and Missouri Western State. His current research interests are in recreation and tourism impacts and recreation in collegiate settings.

Chad Smith, Ph.D.
Assistant Professor

Smith is a new assistant professor of exercise and sport science. He was most recently at Landen University where he served as department chair and director of the human performance laboratory. She held earlier faculty positions at the University of Illinois, Ball State and Slippery Rock University. She completed her Ph.D. at the University of Maryland, and her current research interests are in senior fitness, fall prevention and body composition.

Drew Czekanski, Ph.D.
Assistant Professor

Czekanski is an assistant professor of recreation and sport management. He recently completed his Ph.D. from Ohio State University. His research interests are in organizational behavior, the social exchange theory and coach-athlete relationships in collegiate athletics. His research is complemented by his highly successful career as a soccer student-athlete at Virginia Tech and Ohio State.

Cathy Dooly, Ph.D.
Assistant Professor

Dooly is an assistant professor of exercise and sport science. She was most recently at Landen University where she served as department chair and director of the human performance laboratory. She held earlier faculty positions at the University of Illinois, Ball State and Slippery Rock University. She completed her Ph.D. at the University of Maryland, and her current research interests are in senior fitness, fall prevention and body composition.

Rebecca Grouchy
Lecturer

Grouchy graduated from the University of Alabama. She spent two years as a National Science Foundation fellow at the Paris Observatory followed by a stint teaching at LSU. Her research focuses on galaxy morphology and evolution through observations and computer simulations.

Erin Hackett, Ph.D.
Assistant Professor

Hackett earned a Ph.D. in physical oceanography from Johns Hopkins University. Since then, she has been working as a scientist at the Naval Surface Warfare Center, Carderock Division in Bethesda, MD. for the navy. Her research is focused on experimental fluid dynamics and emphasis on the fluid dynamics of the coastal ocean and other environmental applications. She also specializes in instrumentation development and design for fluid measurements.

Kathleen Kuhler, Ph.D.
Visiting Assistant Professor

Kuhler earned a Ph.D. from the University of North Dakota. She previously taught at Berea College in Berea, Ky. She has taught at the college level for some time now, but she also worked several years at Eli Lilly and Company doing basic research in antibiotics and in the anti-allergy group. She has more recently worked on code development for degenerate systems as well as experimental work on the effects of solvent composition on reaction rates and equilibrium.

Amber McWilliams
Lecturer

McWilliams graduated from Iowa State University with an M.S. in inorganic chemistry. Her research focused on the use of cyanobacteria as a biosorbent for removal of mercury (II) from aqueous solution. She spent several years in industry before starting her academic career at Truman State University where she taught general chemistry for several years.

Bryan Wakefield, Ph.D.
Assistant Professor

Wakefield earned a doctoral degree in organic chemistry at the University of Pittsburgh, where his thesis work focused on synthesis of natural product analogues for the treatment of various diseases. In 2008, he moved to a post-doctoral position at Emory University and worked to develop new reaction methods involving metal scaffolds. His academic career began at Delaware State University, where he began his independent research career and focused on the development of new reaction methodologies to construct bioactive natural products. He plans to expand his research now that he is at CCU in hopes of developing new compounds to better the understanding and treatment of malaria.

Rachel Whitaker, Ph.D.
Assistant Professor

Whitaker completed her master's and Ph.D. degrees in biochemistry from the University of Illinois in Urbana. She completed her postdoctoral training at Judson College. Her research interest is in understanding the protein-RNA interactions that allow for RNA processing and export within the nucleus of a mammalian cell.
Faculty from the College of Science often team up with our local school districts to help them do their job. It’s important that we have a strong public education system in order to have capable and informed citizens. But guess what else? We know that’s where our own students come from, and we want good ones! So we all keep trying.

South Carolina public school teachers follow the S.C. Academic Science Standards. These, like many other state science standards, were based on the National Science Education Standards from the National Research Council and Benchmarks for Science Literacy from the American Association for the Advancement of Science, both of which were published more than a decade ago. Our state gets high marks on the content and rigor of our standards, but in this era of accountability where students (and their teachers) are held to these standards based on their performance on standardized tests, it’s been every state for itself. Every state has its own set of standards, its own tests and its own definition of student proficiency on those tests. This means that students moving from one state to another may or may not be prepared for the level of material in their new curriculum. It also means that student performance state-to-state can’t really be compared. For example, an “exemplary” student (based on test scores) in South Carolina may or may not have mastered the same material as an “exemplary” student in Maryland. And so a CCU science professor really has no clue what a freshman in introductory science might already know. This professor may safely assume, however, that this freshman probably doesn’t know as much science as he or she should, regardless of the home state. Test scores in science nationwide demonstrate a general lack of understanding of what science is and how it works, never mind the actual content. The Trends in International Math and Science Study 2007 ranks our eighth-graders 11th worldwide in understanding of science (new rankings will be out late 2012). Meanwhile, in The Gathering Storm, Revisited (2010), the National Academy of Science concluded that a primary driver of the U.S. economy is and will continue to be innovation resulting from advances in science and engineering.

To address these issues, the S.C. Department of Education is in the process of adopting the “Next Generation Science Standards” (NGSS), pending legislative approval. (There is some controversy over the evolution and climate change portions. Unfortunately, although the science behind this is quite well established at this point, the politics are not.) These standards follow similar common standards in English and math, and the first draft for public review came out this past summer. These NGSS emphasize the process of science as a way of learning the content of science, and include a focus on engineering and applied problem solving. The idea is that students don’t need to memorize lists of facts as much as they need to learn to think critically and apply that thinking to solve problems. For example, instead of telling

“...there is some controversy over the evolution and climate change portions. Unfortunately, although the science behind this is quite well established at this point, the politics are not..."
middle school kids why the moon appears to change shape over the course of a month, have them go out and look at it, and then work with models of the sun, moon and earth to try to recreate what they're seeing. They are working like scientists and constructing their own understanding of a process. They're more likely to understand and remember this than if they just memorize moon phases based on pictures in a book.

A teacher in this scenario, though, has a slightly different job. He or she does not just spout facts to be memorized, but acts as a coach while the students work out the problem themselves. This shift requires some training and practice, and CCU has partnered with Horry County Schools to facilitate this through a S.C. Department of Education Math Science Partnership grant, 2010-2013. We assist the school district with professional development workshops for local science teachers during the summer. Biology faculty members Scott Parker and Michelle Barhet-Parker have taught biology, and math faculty members Keshav Jagannathan and Nick Pritchard have taught statistics. Rather than just lecturing, they taught by having the teachers do activities and projects, just as the teachers will be expected to do with their students. The teachers then develop their own activities based on the content reflected in their own grade standards. I have been coordinating the workshops and following up to evaluate how well the teachers are adapting to this new style of teaching. We hope this helps teachers develop more thoughtful and creative students because that's who we'd like in our own classrooms.

Sharon Gilman can be reached at sgilman@coastal.edu or 843-349-2248.
Several research scientists, graduate students and undergraduate students have recently participated in a large ongoing National Science Foundation Long Term Ecological Research (LTER) study at Sapelo Island, Ga. The role of CCU's Burroughs & Chapin Center for Marine and Wetland Studies in this project is to better understand groundwater processes in the tidally controlled Duplin River and surrounding estuary. Principal investigators Rick Peterson and Rich Viso make field trips to Sapelo Island at least once a year to collect geochemical and geophysical data designed to quantify and image groundwater systems. These data help physical modelers, ecologists and biologists from other institutions understand processes such as marsh tidal inundation, effects of sea level rise, biological zonation and marsh erosion. In prior years, technical staff from the Center have also generated detailed bathymetric maps of the Duplin River system, revealing the shape of the sea bed and lending insight into the processes forming the river channel.

During field operations, CCU scientists travel to Darien, Ga., where they launch a boat and load their scientific gear and personal luggage for the trip to the remote Sapelo Island. Some of the science team may also ride the ferry that shuttles Sapelo's few residents between the island and the mainland. With very little infrastructure and no stores or restaurants on the island, scientists must plan accordingly with provisions to last the duration of the trip.

There are some basic dormitory facilities and vehicles available for travel around the island at the University of Georgia Marine Institute, located on Sapelo.

Once on the island, the science team unloads its luggage at the dorms and heads straight out to the river to begin deploying equipment that measures temperature, salinity and water level of surface and groundwaters. In addition, wells are installed for groundwater sampling, and measurements of the tidally controlled Duplin River and surrounding estuary. Principal investigators Rick Peterson and Rich Viso make field trips to Sapelo Island at least once a year to collect geochemical and geophysical data designed to quantify and image groundwater systems. These data help physical modelers, ecologists and biologists from other institutions understand processes such as marsh tidal inundation, effects of sea level rise, biological zonation and marsh erosion. In prior years, technical staff from the Center have also generated detailed bathymetric maps of the Duplin River system, revealing the shape of the sea bed and lending insight into the processes forming the river channel.

Under the direction of Rick Peterson, radon measurements are conducted in order to determine variability in groundwater discharge to the Duplin.

Preliminary results suggest that the salinity structure of the upper few kilometers of the Duplin is largely controlled by groundwater inputs. The river is entirely contained within a salt marsh, and there is no source of upland recharge other than through the ground along the shorelines of Sapelo Island and the surrounding marsh. This has many important implications for understanding the geological evolution of the marsh and the biological assemblages that live within.

This study has been an amazing opportunity for those involved. There are more than 20 principal investigators from a variety of universities including University of Georgia, University of Florida, University of South
Carolina, Georgia Tech, Creighton University, Ohio State University and Skidaway Institute of Oceanography, among others. Financial support for CCU’s involvement comes from National Science Foundation and, in addition to supporting scientific efforts, provides support for students to participate in the field work and data reduction. The students always seem to enjoy spending the week working at Sapelo. Undergraduates are inspired as they engage in firsthand application of theories learned in the classroom setting. Graduate students broaden their backgrounds by helping with logistics and application of methods in field areas other than those of their own studies. One former CCU undergraduate, Jon Ledoux, has benefited directly from involvement in this project as he was recruited for graduate studies at the University of Georgia.

Finally, students who participate in the field studies have the opportunity to travel to Athens, Ga. the following January and participate in the annual meeting for the entire study group. This meeting is typically attended by 40-50 principal investigators, technicians, students and other interested parties. Members of the CCU team prepare and deliver oral and poster presentations during the two-day meeting. This year, two graduate students, Sarah Chappel and Leigha Peterson, will attend the meeting and present results from data collected during the first week of April 2012.

Please direct further questions or comments to Rich Viso (rviso@coastal.edu; 843-349-4033).

Rick Peterson (foreground) assists graduate students Sarah Chappel and Leigha Peterson as they recover an electrode array extending from shore through the intertidal zone along the edge of the Duplin River, Sapelo Island, Ga.

(below) Sapelo Island on the coast of Georgia.
Thanks to support from the II-VI Foundation, students in the Department of Chemistry and Physics pursued summer research under professors Chris Moore in Physics and John Goodwin in Chemistry in 2012. (The II-VI Foundation gets its name from the groups II and IV on the periodic table, which can be combined to create semi-conducting materials.)

In Professor Goodwin's lab, undergraduate students Johnathan Simmons and Robert Kimble investigated a new cobalt compound, (nitro)(pyridyl)cobalt-perfluorophthalocyanine, on graphite electrodes as a substitute for platinum, which is commonly used in the oxygen-reduction reaction in hydrogen fuel cells. Platinum is a very expensive metal, and although it does catalyze the electrochemical reduction of oxygen, it's not as efficient as it could be in this catalysis.

This project in Professor Goodwin's lab involved making the compound for the first time, testing it by electrochemical techniques and modeling the electrochemical reaction thermodynamics using computer simulations. The research indicates that the new compound does catalyze the electrochemical oxygen reduction reaction, though the mechanistic details are still being worked out. Simmons presented a poster about this work at the Southeast Regional Meeting of the American Chemical Society in Raleigh, N.C., on Nov. 16, 2012.

John Goodwin can be reached at jgoodwin@coastal.edu.

The mission of the II-VI Foundation is "to encourage and enable students to pursue a career in engineering, science and mathematics while maintaining a standard of excellence in that pursuit."

To learn more about the application process, contact the Foundation at info@ii-vifoundation.com
Swain Hall is a 40,000-square-foot building housing 20-22 labs and supply spaces and 30-35 offices. Occupying Swain Hall will enable the R. Cathcart Smith Science Center to convert back to classrooms. A new state-of-the-art science building is also planned to integrate all science instruction, including marine science and computer science.

The Swain Scholar Program, which began in 2009, continues to be a very sought-after scholarship, and Kenneth Swain follows all of the scholars’ experiences with interest. During a recent campus visit to view
building progress and talk to the scholars, Swain stated, "It is astonishing to witness the academic and extra-curricular accomplishments of the students and areas of the local community in which they serve. Their continued commitment will broaden their field of choices for their future careers. It is my wish for their continued success, and when the time comes and they settle in a community, they will understand and act upon community service and health needs." He went on to say, "I really want to thank everyone who makes Coastal Carolina University the special place that it is: Dean Mike Roberts, Professor Sharon Thompson, Bryan Steros, the College of Science faculty for their dedication and especially the Swain Scholars. I am always impressed with the selection of students chosen to be part of the Scholar Program."

The Swain Scholars always express their interest in Mr. Swain and his contribution and enjoy sharing with him their experiences in the health oriented projects and learning as indicated in their statements in this article.

"Mr. Swain's generous gift will be transformative for our college. In addition to being a visible and public declaration of the value of a Coastal Carolina University education, and our increased offerings in the health sciences, the Swain Scholar Program will provide opportunities for our students and faculty to expand their efforts into the community through health-related outreach activities."

—Michael Roberts, Ph.D.
Dean, College of Science

Swain Hall is the first phase of CCU’s plans to meet expanding requirements of the College of Science. The $15 million building will house biology, chemistry and health promotion programs.

The 2012 Swain Scholars (bottom row, left to right) Iesha Wade, Janel Reeves, Kenneth E. Swain, Katie Roach, Christine Po, (second row) Jessica Otten, Sharon Thompson, Kayla Liland, Kaity Essel, Michael Roberts and Ina Troutman.
Janel Reeves  
*Exercise & Sport Science*

The two years of being a Swain Scholar at CCU is something that I will forever be grateful for. The opportunities I’ve been given, the new perspectives I’ve gained, the friendships I’ve made and the countless connections I’ve acquired with different members of the community have helped mold me into the person I am today.

During my first year as a Swain Scholar, we planned and implemented an after-school program with children at Palmetto Bays Elementary School. We taught the children about physical activity, hygiene and nutrition. That experience made me realize how intense planning and carrying out a community outreach program can be, especially when young children are involved.

The skills learned during my first year have carried over to my second year and helped me to plan my own program within the community. This semester I work closely with the dietitian at Conway Dialysis Center. I am spending my time exploring dialysis patients’ perceptions regarding dietary behavior. I enjoy talking to the patients waiting in the lobby for the treatments. I also posted healthy nutritional information and baked dialysis-friendly snacks for the patients to try.

This year I have gained a better appreciation of how blessed we all are. Dialysis patients are forced to go to the dialysis clinic for hours every single day in order to maintain their health. Some pray constantly that they will finally get that kidney they have been waiting for. Others are transported via ambulances because they can’t function well enough to sit in a car and drive themselves. Seeing these wonderful patients every week walk in with a smile on their faces in the midst of such crisis reminds me to be thankful for so many things!

I’ve learned many new things and how to do them in a very efficient manner. This, combined with my newfound appreciation for the many things that we have no right to take for granted, has helped mold me into a better person. My attitudes and knowledge have greatly changed in a positive manner due to having the honor of being a Swain Scholar.

Kaity Essel  
*Health Sciences*

I enrolled at CCU in August of 2010 after graduating from high school in Media, Pa. As a sophomore, I applied to be a Swain Scholar and was chosen along with three others to work together in order to positively impact the community. The scholarship attracted my interest because it involved science majors who had an interest in making a real difference through community outreach programs. I love doing community service, planning events with Phi Sigma Pi National Honors Fraternity, and influencing people to make healthy life style changes.

In addition to my scholarly hobbies I enjoy going to music and art festivals, practicing yoga and meditation, and being outdoors playing anything!

As a Swain Scholar, I get to plan and implement a program of our creation that encompasses several aspects of these interests. Our program this year involves working with children at the local elementary school, Palmetto Bays. We are going to teach them the importance of respect by reviewing topics of communication, bullying, manners, acceptance of others, and ways to express their feelings positively.

Along with the educational message, we are tying in a healthy snack at each of the six sessions and incorporating a physical activity. We hope to encourage, inspire and positively benefit the children we work with throughout the program. At the end we will evaluate the effectiveness of our program with pre and post surveys, and we will hold an award ceremony for the students and their parents or guardians.

This program is a great real world application of what I’m learning in my classes. I will gain experience in the field of health promotion, as well as working with children. In the future, my ultimate goal is to own and operate a healthy lifestyle camp for children that will encompass all aspects of health.

The importance of nutritious meals and physical activity in an outdoor environment, learning about sustainability, companionship, and self-respect are the values I hope to instill in the camp and its attendees.

The opportunities presented to me now are benefitting me greatly in achieving my future goals.

Kayla Liland  
*Biochemistry*

While sitting at a table near the science computer lab between classes, a teal and bronze Swain Scholar brochure caught my eye, and the name sounded so familiar. I took a moment to read it through, and found myself intrigued by the idea of a scholarship that was also a community outreach program. An application, interview, and subsequent acceptance into the program has changed my undergraduate career in an unimaginable way.

My first semester as a Swain Scholar has not only presented me opportunities in community service, but has also enhanced many aspects of my character. My fellow Swain Scholars and I have spent the fall semester planning a respect program for elementary school students. We will implement our program in the spring and evaluate our success in changing students’ behavior.

Planning our program has improved my ability to work cooperatively in a group now that I have been exposed to a more professional style, I find myself enjoying group work! I am so excited to implement our program in the spring; I truly believe that we will be able to help students in need. The evaluation portion of our program creates a huge tie to my love of science; we will be able to quantitatively evaluate the success of our program and organize it in a way that will aid others.

I have been able to take advantage of the Swain Scholar program in a way that will prepare me for my future in pharmaceuticals. At a CCU football game, I had the fortunate opportunity to meet Mr. Swain. Mr. Swain is a retired pharmacist, and was more than willing to share his experiences in pharmacy with me. The Swain Scholars attended an etiquette class, and I will be able to use these skills on my pursuit of acceptance into pharmacy school. I was invited to speak in front of an audience at Coastal Carolina University’s Discovery Day, which nearly diminished my fear of public speaking. I have the Swain Scholar program to thank for all of the stimulating experiences I have had this year. I am in awe of everything I have learned so far, and can only imagine what is in store for my next three semesters as a Swain Scholar.
Jessica Otten  
Exercise & Sport Science  
I am a junior exercise and sport science major from the little town of Bluffton, S.C. You could consider me a country girl, born and raised right here in the South. I enjoy spending time with my family, partaking in any kind of physical activity, and just having a good ol’ time. My future aspirations include becoming a physician’s assistant and possibly coaching a high school softball team on the side. I was chosen to be part of the Swain Scholar program the spring semester of my sophomore year. I consider myself extremely lucky to be part of such a wonderful and helping program.

Each year four new Swain Scholars are selected. Their task is to develop a health program that will benefit the community. This year, the program we created focuses on improving various aspects of respect in elementary school children. Some of the topics we will focus on are communication, acceptance and manners (just to name a few). We all thought this was an important topic because so many people, not just children, do not show proper respect to each other these days. This program will have healthy snacks and activities to keep the students active while also learning. Each person in the Swain group is responsible for creating a lesson based on the topics we have chosen. This project gives us an opportunity to plan a program, implement it, and then evaluate if we were effective at meeting our goal.

I consider myself extremely lucky to have the opportunity to be a part of the Swain Scholar program. I have been granted the opportunity to work closely with classmates and staff members in order to improve the community. I love working with children and making a difference in people’s lives. The Swain Scholar program has given me the opportunity to do just that. I am so thankful for Mr. Swain who created the program. He is always eager to hear about how our project is going and just hear about our lives in general. He is a wonderful man, and I am thankful to have the opportunity to work with him and gain some of his knowledge. I am also thankful for the Swain Scholar Director, Professor Sharon Thompson. I consider her someone I can go to anytime I need help or have a problem. I am so fortunate to be able to work with her and gain some of her professional knowledge. This is a wonderful program, and I am proud to call myself a Swain Scholar.

Ina Troutman  
Biochemistry  
Swain Scholar is not just a title; it is a title of individuals who have been provided the opportunity to further their education while implementing a meaningful community health outreach program. The goal of this experience is to positively impact the community through the introduction of this program. I am enthralled to begin the education sessions with the participants, and cannot wait to see what unfolds. Not only will this experience allow me the ability to make a difference in our community, but it will also give me the opportunity to expand my education, interact with others and improve overall as an individual.

I know that all the knowledge and skills I have gained will enhance my experience as an undergraduate here at Coastal Carolina University. Additionally, it will give me a better understanding of health-related careers, which I intend to pursue after graduating from CCU as a biochemistry major. I have always wanted to work in the medical field, and this scholarship and the opportunities that follow will prepare me for what awaits after graduate school. This opportunity will give me the chance to make a difference in our community and so much more, and for that I am grateful. None of this would be possible for me and the other Swain Scholars if it were not for the caring and generosity of Mr. Kenneth Swain. I am thankful for everything he has done for us, and all the opportunities he has allowed us to experience.

Interested Swain Scholar applicants should contact Sharon Thompson, Professor of Health Promotion, College of Science at 843-349-2635 or email: thompson@coastal.edu

Katie Roach  
Biochemistry  
Being a Swain Scholar has offered countless opportunities and opened many doors. With future plans to attend graduate school for speech pathology, I dedicated my second year Swain Scholarship to working with a local elementary school speech therapist. Together we targeted students in kindergarten who are missing some important functional vocabulary they need in their everyday life. Functional vocabulary can not only improve student communication but also improve future skills needed to begin to read.

The speech therapist had conducted the same research two years prior because she had noticed that students often could not follow directions or ask for things because they did not know the right word. Based on this need, we developed several areas of study including: zoo animals, farm animals, nature, classroom, clothes, fruits and vegetables, treats, toys, vehicles and carriers. To test knowledge of their functional vocabulary, we conducted a one-on-one session showing a series of pictures from each category. Students would be simply asked to name what they know. The speech therapist and I, prior to collecting data, made specific answer sheets, which tells us what words can and can’t be accepted. For example, one picture shown to students is a hamburger; many students can identify what a hamburger is, but they call it a happy meal instead.

After collecting data from all kindergarten classrooms, the speech therapist and I will analyze the data and determine which areas to focus on. A program will then be designed to educate students on the functional vocabulary by hands-on and interactive ways. After the program is implemented, students will again be tested in areas of functional vocabulary to determine if knowledge of functional vocabulary has increased. Overall, our goal is to provide the students with functional vocabulary in an early setting that will help them communicate well, follow directions and build foundations to read.
Christine Po
Health Sciences

Without the careful planning and wonderful teamwork that Katie, Janel, Iesha and I contributed to our first Swain project, "Positive Beings at Palmetto Bays," we wouldn't have had such amazing results. Our health education project resulted in children learning more about nutrition and hygiene habits, and they now have more confidence when asking for healthier options at home.

Because of our positive results, Iesha and I were able to present at the American School Health Association (ASHA) conference in San Antonio, Tx., this past October. All of us were so ecstatic when our abstract was accepted to be presented through a roundtable discussion at the conference. During the discussion, many health educators from all over the country talked to us about our program and what we did to make it a success. Iesha and I were amazed because health professionals were asking us questions in order to better their practices! We were so honored to share aspects of our program, especially as undergraduate students. Being at a professional conference provided many opportunities for us to meet other professionals in the industry through networking sessions and research presentations. I learned about many aspects of the school health industry and am willing to participate in other school health-related volunteer opportunities in the future.

This year, we have the chance to work independently on our own projects as second-year Swain Scholars. I am spending time at the Cardiac/Pulmonary rehabilitation center at a local hospital. The patients who participate in cardiac rehab have either suffered a heart attack, have lung disease or other heart-related disorders. They are referred by their physicians to participate in this program to get their heart and lungs back in normal condition. I am researching the correlation of increased exercise habits in cardiac rehab patients and their depression before and after their participation in the rehab program. I'm really excited to start analyzing this data because I hope to see an increased mental health status due to exercise. Even from observation, it is evident that cardiac rehab patients benefit from exercise and being in a positive environment. With the results of this data, I will present this to the staff and director of the cardiac rehab program so they will be able to use these results to make improvements to the quality of care.

In addition to conducting research, I am able to see firsthand what it is like working at a cardiac rehab center. Through shadowing, volunteering and conversing with healthcare professionals, I learned that many aspects of health education and promotion are so important in a clinical setting. A respiratory therapist is there to prescribe exercises to these patients, and a registered nurse provides supervision and education when it comes to their various types of medication. I was able to sit in on a nutrition class taught by a registered dietician and learned that she tailors her lessons based on age and to our specific region since Southern foods are fattier. I have really enjoyed my time at cardiac rehab so far, and I like conducting research, helping others in need and getting to know the hospital system. This is all beneficial to my education and gives me great insight to career possibilities. All these opportunities are all due to Mr. Swain and the Swain Scholar Program, and I couldn't be thankful enough.

Iesha Wade
Exercise & Sport Science

Last year as a first-year Swain Scholar, I did not know what to expect from this program; I just knew it would be very beneficial to my life. Not only was this program beneficial, but it also took my communication, leadership and professional skills to an entire new level. The community outreach program we planned and developed was a great experience. It allowed us to work with other professionals and actually implement a program that we desired.

The program that we implemented was Positive Beings at Palmetto Bays, a local elementary school with children from third to fifth grade. We met with the parent coordinator, school principal and cafeteria manager to discuss the goals and objectives we had developed, and they loved our ideas. The topics they thought would be beneficial to the children were nutrition, physical activity and hygiene. We developed six educational sessions that discussed each topic and also included a skill-building activity, physical activity and healthy snacks. We did a pre- and post-survey and anthropometric measurements on the children that included height, weight, blood pressure and triceps skin fold. This program was conducted once a week for six weeks, and we learned so much and enjoyed our experience. We determined that none of us wanted to consider a career in teaching since we are not education majors, and it was definitely a challenge when we taught the children at Palmetto Bays.

After our program ended, our work was not over. We decided to take our program a step further by writing a manuscript with the help of the director of the Swain Scholar program, Professor Sharon Thompson. She guided us through the entire process and submitted our article for publication. Writing this abstract gave me and Christine Po the opportunity to attend the ASHA conference in San Antonio, Tx. This experience gave us the opportunity to network and meet professionals from all over the country. It made us feel good that we were the youngest presenters at the conference, and others could not believe we had actually developed a program and implemented it. We received a lot of great feedback and others wanted to know how they could possibly do something similar at their schools.

Currently as a second-year Swain Scholar, I am doing my community health outreach project and research at Anderson Oaks Assisted Living. Thus far, my experience has been wonderful and a definite eye opener. After I graduate from CCU in May, I plan to pursue a career in physical therapy. This project at Anderson Oaks has allowed me to interact with a population that will always need physical therapy. I have been working with the activity director. When I met with her she wanted to see the attitudes that the staff members had toward the recreational activities that are done with the residents. She felt as if they did not see the importance of the recreational activities and the positive impact they can have on the residents. I developed a survey for the staff members, and cannot wait to see the results.

The Swain Scholar program is the best thing that has happened to me in my college career and it has given me confidence as I get ready to pursue my dreams and career after I graduate from CCU.
In Memoriam

RICHARD DAME

ichard Dame, Distinguished Palmetto Professor Emeritus, died on Feb. 5, 2013. Dame joined the Coastal Carolina University faculty in 1971 and founded our marine science program. He taught the first classes in marine biology at CCU and was chair of the Department of Marine Science from 1981 to 1991. He was named South Carolina's first Palmetto Professor in 1991.

A native of Charleston, S.C., Dame was widely recognized for his research on the importance of oysters and other mollusks to coastal ecosystems. During his 35-year career at CCU, he also coached the men's tennis team (1972-1977) and the women's tennis team (1980-1982). Dame was named the CCU Distinguished Teacher-Scholar Lecturer in 1999. He retired in 2006.
The 55 percent growth of College of Science enrollment since 2006 largely reflects the increasing viability of STEM education and careers. STEM stands for Science Technology Engineering Math. The growth is due to the shortage of qualified people to fill STEM type jobs. As reported in Education News, STEMwire, Jobs Council, and from other sources, recent economic estimates place the number of unfilled STEM jobs at 3.5 million and predict that 150,000 STEM jobs will be created every year through 2020. By 2020, there will be 1.5 million too few college graduates compared with employer demand. COS faculty are aware of the situation and are dedicated to INSPIRE students to pursue and maintain their STEM studies through graduation and ASPIRE to successful, well-paid STEM careers.

Universities, colleges, community colleges and high schools have become accustomed to seeing, and perhaps anticipating, U.S. News and World Report's annual rankings of "Best Colleges." The rankings and related articles have brought wide attention to the problems
presented by the increasing shortage of qualified STEM graduates.

In 2012 U.S. News decided to launch a special project to examine why so many jobs were going unfilled and concluded that many American workers lack the necessary skills for these jobs. The decision was made to do more than just report on the problem, and the project became known as “STEM Solutions.” There was significant indication that the lack of skills in the subject areas is the reason for many of the nation’s vacant jobs and that the situation would likely continue. U.S. News decided that in the absence of a national forum, the magazine would host a meeting for groups and businesses that need STEM skilled workers. The magazine shares the ideas about addressing the problem.

The meeting took place in Dallas in June 2012. The attendance at three days of workshops and discussions was more than double the expectations with more than 1,600 people participating, representing hundreds of organizations. The interest and participation was such that “STEM Solutions 2013” will be held in June in Austin, Texas.

The event inspired a good deal of comment by organizations including IBM, Intel, Boeing, AT&T, Microsoft, Science Journal, FIRST, universities, community colleges and school superintendents of K-12. Some of the outstanding themes of these writings and meetings focused on:

- STEM education is getting worse, not better.
- At the college level, too many capable students are being washed out of STEM majors; better teaching methods could increase retention.
- More must be done to get K-12 students interested in math and science and made aware of good paying careers.
- Employers must communicate with the education system the skills they need now and will need in the future.
- Projections indicate that by 2020, we will have 1.5 million too few college graduates as compared with employer demand.
- Only 1/4 of America’s 52 million K-12 students are performing on par with the average student in Singapore, Hong Kong, Finland, Taiwan or South Korea, while 25 percent of our high school students fail to graduate.
- STEM workers typically earn 26 percent more than those in non-STEM positions.
- Not enough math college graduates are going into high school education positions, replacing retiring teachers.

COS faculty and staff, through classroom work, availability to students, advising, counseling, one-on-one explanation/clarification, promoting student research grants, and other means, are committed to having well-educated students graduating and being prepared for their future careers.

**COLLEGE OF SCIENCE FACULTY DEDICATED TO INSPIRE = ASPIRE!**

In January and March 2012, the Bureau of Labor Statistics published data on the fastest-growing occupations between 2010 – 2020 and the percent growth. Occupations of COS majors include:

<table>
<thead>
<tr>
<th>OCCUPATION</th>
<th>% GROWTH 2010-2020</th>
<th>MEDIAN SALARY</th>
<th>COS MAJOR</th>
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<tbody>
<tr>
<td>Athletic Trainer</td>
<td>30.0%</td>
<td>$41,600</td>
<td>RSM, KRSS, ESS</td>
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<td>Biochemists &amp; Biophysicists</td>
<td>31.0</td>
<td>79,300</td>
<td>Chem, Bio Physics</td>
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<td>Biomedical Engineers</td>
<td>62.0</td>
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<td>Computer Systems Analysts</td>
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<td>100,000</td>
<td>HP, Phys, Math</td>
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<td>Diagnostic Medical Sonographers</td>
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<td>CSIS, Math</td>
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<td>Dieticians and Nutritionists</td>
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<td>53,200</td>
<td>HP, Bio, Chem</td>
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<tr>
<td>Epidemiologists</td>
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<tr>
<th>OCCUPATION</th>
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<th>MEDIAN SALARY</th>
<th>COS MAJOR</th>
</tr>
</thead>
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<tr>
<td>Fitness Trainers &amp; Instructors</td>
<td>24.0</td>
<td>$31,100</td>
<td>ESS, RSM</td>
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<td>Forensic Science Technicians</td>
<td>19.0</td>
<td>51,500</td>
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<td>Health Educators</td>
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<td>51,000</td>
<td>KRSS</td>
</tr>
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**Presidents' Honor List 2012**

**BIOCHEMISTRY**
- Aleksandar Dimkovikj
- Kayla M. Liland
- Alexander B. McElwee
- Ina R. Troutman
- Lucia J. Troutman
- David S. Walling

**BIOLOGY**
- Courtney N. Akins
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