USCB
UNIVERSITY OF SOUTH CAROLINA BEAUFORT

USCB SCHOOL OF
SCIENCE & MATHEMATICS
NEWSLETTER

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Notes from School Chairs:

The past year has been a whirlwind experience. As the pandemic has abated and vaccines have become widely available, USCB has been able to bring our classes back to "near" normal. We offered many of our classes last year on a modified "face-to-face" basis. Students had a hybrid experience of in-person learning and online classes to reduce the overall classroom contact to six-foot distancing. We are proud to report that we recorded no classroom transmission of the SARS-CoV-2 virus in the classroom between students or students and faculty. With the new CDC guidelines this fall, we increased our classroom capacities to 75 percent of regular attendance and kept a mandatory mask policy. Thus far, we have again had a COVID-free campus learning environment. We have hopes that even with new strains appearing and our relatively high vaccine-compliance rate, we can get closer still to traditional teaching norms, while keeping COVID-free. The students and the faculty look forward to the possibility of a regular graduation!

The School of Science and Mathematics managed to have a productive year, accomplishing many goals that served to foster the success of already strong programs. The Biology degree program graduated the first student in the Marine Biology program, and our faculty engaged in summer research with students at a record level. Computer Science has established a co-op program with Gulfstream Aerospace in Savannah' the program already as its first student, Ms. Sage Hollis, who has been accepted to start in spring 2022. The department has also secured multiple internships with the office of Fourteenth Circuit Solicitor Duffie Stone, thus helping to add data science to the large volume of legal work necessary for the successful prosecution of cases in the judicial circuit office.

We are looking forward a great spring 2022 semester, with enrollments up more than 8 percent over last spring.

--Drs. Brian Canada, Computer Science and Math, and Joe Staton, Natural Sciences

First USCB Summer Math Camps: *BRINGING MATH TO LIFE*

Prof. Morgin Jones Williams, right, works with attendees (L to R) Johnniya Busby, Jontae' Jenkins and Leslie Cervantes.

Professors Volkan Sevim, Davide Fusi and Morgin Jones Williams hosted the first set of "Math Camps" at USCB over the summer. The two summer overnight camps gave 25 Ridgeland-Hardeeville High School students a practical kickstart to their understanding and appreciation of mathematics. The camps were funded by grants from the Community Foundation of the Lowcountry, a Block 3 Family Fund (CFL), and support from USCB Academic Affairs. Transportation was provided by the Jasper County School District.

"It was more fun than I thought it would be," said Emely Camargo. "I thought they were being a little sarcastic saying it would be fun. But it actually has been fun." Camargo attended the second of two camps in July across the university's three campuses in Beaufort County. Each camp, spanning 10 days, was planned and coordinated by the USCB faculty team, along with teaching assistant Jennifer Oveido.

The goal of the camp was to have hands-on, fun experiences involving math in the "real" world, all while providing students with a sample of what life on a college campus was like. The program was designed to break down math barriers for the students, to build their confidence in pursuing a college education, and perhaps to encourage them to pursue a degree in a STEM field.

Students also experienced other aspects of a college program. They received expert training on computer coding to write a program that would calculate the thickness of the pizza on the menu that evening. "Computer programming… it's all about developing the skills you have [and practicing] until it becomes second nature," said Dr. Ron Erdei, assistant professor of Computational Science. "There's a lot of overlap in computer science and math."

Dr. Joe Staton (L) and Dr. Mercer Brugler (R) with students from the summer Math experience 2021-first cohort.

Students also got to engage in marine coastal biodiversity on a trip on Port Royal Sound aboard the "Tammy Jane," a shrimp trawler with Vagabond Cruises of Hilton Head Island. For several, it was their first time on a boat, despite growing up in the Lowcountry. For all students, it was their first hands-on research experience. Students surveyed bird life, censused dolphin in the area, and recorded the ocean life they observed, including identifying the fish and invertebrate species hauled up in the ocean trawler's nets. They learned under the guidance of Professors Jena Chojnowski, Mercer Brugler and Joe Staton of USCB's Natural Sciences Department.

Dr. Paula Murphy, college and career coordinator for Ridgeland-Hardeeville High School, is already planning how to continue the camps in 2022. Students who attended the first camp were already asking USCB to visit their schools. The camp had an impact on those attending the second camp at the end of July. "This wasn't what I thought it would be," said participant Ariel Monge. "I find that math is more interesting to me than it has been in a while."

Campers explore science at USCB summer YMCA program

Campers from the Beaufort-Jasper YMCA spent July 12-16 immersed in nature, learning from USCB faculty who are experts in the fields of ecology, biochemistry, zoology and more. Lead Professor Jena Chojnowski *(pictured above)* and members of the USCB's Natural Sciences department, showed boys and girls ages 7-11 how to use hydrogen peroxide to make "elephant toothpaste." They also cultured bacteria, tested water, and observed animals commonly found in coastal environments.

One of many highlights of the week came when Jim and Teri Pohorsky of Beaufort Kayak Tours led a paddling trip on the Beaufort River; the students saw bottlenose dolphins and sea birds, including oyster catchers and ospreys. Afterwards, USCB biologists Kathryn Madden and Mercer Brugler led the kids in making plankton nets out of water bottles, gathering water samples and filtering them.

The students were also fascinated by baby alligators introduced to them by Tony Mills, host of the television series, "Coastal Kingdom," who brought native animals of the Lowcountry to "meet and greet" the campers, who didn't think twice about asking to touch them.

Inspiration for the camp came from local school leaders visiting the Bluffton campus, Dr. Chojnowski said. An Assistant Professor of Biology at USCB, she was the director of the science camp. "Administrators said that kids need to know what college is like. Most have never been on a campus and don't know any college professors. I decided right then that I would make it happen."

Chojnowski reached out to department chair Joe Staton and her colleagues, who responded enthusiastically and offered help to plan and lead activities. Then Chojnowski contacted the Beaufort-Jasper YMCA, where her proposal was received with equal enthusiasm.

"They really enjoyed it," said Shirley Faulcon, the YMCA's lead specialty counselor, who accompanied the campers to USCB. "The faculty provided a lot of good answers to very scientific questions."

Campers used microscopes to observe swimming tadpoles, dissect starfish and examine owl pellets (the undigested parts of owl food). Campers and their mentors discussed cause and effect, when learning how pesticides, fertilizers and "dog poop" affect water quality. Chojnowski said her favorite moment came Tuesday during a recap of the day. As the kids were lining up to leave USCB, Sophia Cazares, 9, said, "I learned that girls can be scientists!"

DebRoy collaboration at University of Alabama at Birmingham

This summer, Dr. Swati DebRoy visited collaborator Dr. James Hill, the internationally recognized expert in weight management and chair of the University of Alabama at Birmingham Department of Nutrition Sciences, and director of the NIH-funded UAB Nutrition Obesity Research Center (NORC). Dr. DebRoy is collaborating on research data from the International Weight Control Registry (IWCR) and the Lifestyle Wellness Score development.

The IWCR is a global collaborative research project to learn more about how to reduce obesity in the population. Researchers are collecting large amounts of data, and Dr. DebRoy is collaborating on a complex analysis of these data. The project, supported by NIH, has the potential to change the way we treat and prevent obesity.

The Lifestyle Wellness Score is a new tool for measuring wellness. While wellness is an important and popular concept, it is not well-defined, and is therefore difficult to measure. NORC is leading an effort to define and measure lifestyle wellness, which contributes to improvement of wellness through lifestyle modification. Dr. DebRoy has been credited by collaborators with making important contributions to the project; she will continue to play a leadership role in improving this tool.

Dr. DebRoy is a mathematical modeler with extensive knowledge in quantitative obesity research. She recently completed a certification in Medical Statistics from Stanford University to strengthen her skills to fully participate in planning, executing and analyzing data in projects like this.

USCB Marine Biology students dominated the virtual stage during the 2021 POSea Conference

Jicayla Johnson-Rosemond, Lesha Whittaker and Yessenia Bledsoe-Becerra presented their research at the 2021 POSea Conference. The virtual event provided networking and professional-development opportunities for participants while showcasing the work of Black, Indigenous, and People of Color (BIPOC) marine scientists from around the world. The conference was a large and diverse collaboration between **Minorities in Shark Sciences, Latinx in the Marine Sciences, Black in Marine Science, Black Women in Ecology, Evolution and Marine Science,** and **Minorities in Aquarium and Zoo Science** with **BIPOC in Ocean Sciences** organizing the conference for the marine science BIPOC community.

USCB Biology alumna Jicayla Johnson-Rosemond presented her research entitled, "*Bioinformatically mining next-gen capture libraries for black coral mitogenomes*," and won the Best Presentation Award in the 5-minute lightning talk category.

USCB Biology students Yessenia Bledsoe-Becerra and Iesha Whittaker presented their work on "*Elucidating the black coral microbiome using amplicon sequencing*" and "*Assessing the biodiversity of oyster reefs using eDNA*," respectively.

"It was such an enriching opportunity," Yessenia said. "I learned so much about diversity in science and felt such a great sense of community. POSea was a great opportunity to get the word out about what USCB has to offer in the field of [marine] research."

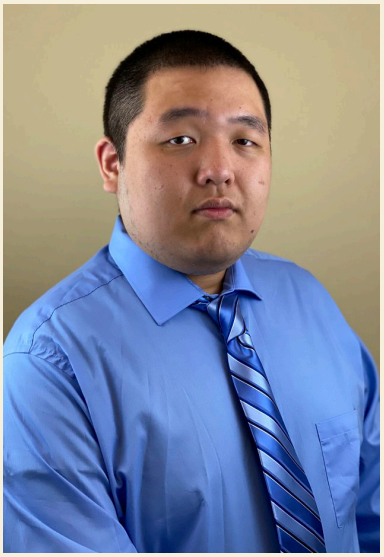
Dr. Mercer R. Brugler, associate professor of Marine Biology at USCB, mentored these outstanding young researchers in their work. Funding for the projects was provided by a NOS/NOAA/DoC award (#NA18NOS429021609), the Port Royal Sound Foundation, and the Spring Island Trust.

For more information about the conference, please check out this great resource: https://blog.ucsusa.org/science-blogger/posea-2021-conference-beyond-the-hashtag/

USCB's POSea presenters (L to R): Jicayla Johnson-Rosemond, Iesha Whittaker and Yessenia Bledsoe-Becerra

To see Yessenia, Jicayla, and Iesha's research, please visit this link: https://drive.google.com/file/d/1LklX-pq8U0GsjNlQRPiesIDcM79JyTHZ/view

USCB's Lingtao Chen chosen for prestigious SULI research program



University of South Carolina Beaufort double major Lingtao Chen (Computational Science and Mathematics, Spring 2021) was selected for the U.S. Department of Energy's (DOE) prestigious Science Undergraduate Laboratory Internship (SULI) program. Chen is an intern with the Oak Ridge National Laboratory in Tennessee. The SULI program encourages undergraduates and recent graduates to engage in focused, in-depth research at one of 17 participating DOE laboratories. SULI interns work under the guidance of laboratory staff scientists or engineers on projects for the DOE.

Chen's success is even more impressive as he is originally from Hujiang, a small island in Fujian province in southeast China. His family brought him to the U.S. as a high-school freshman. Landing in Massachusetts, Chen's family soon relocated to the South Carolina Lowcountry, where he graduated from Beaufort High School. He is the first in his family to attend college. He elected to study locally at USCB because his parents also rely on his skills in English.

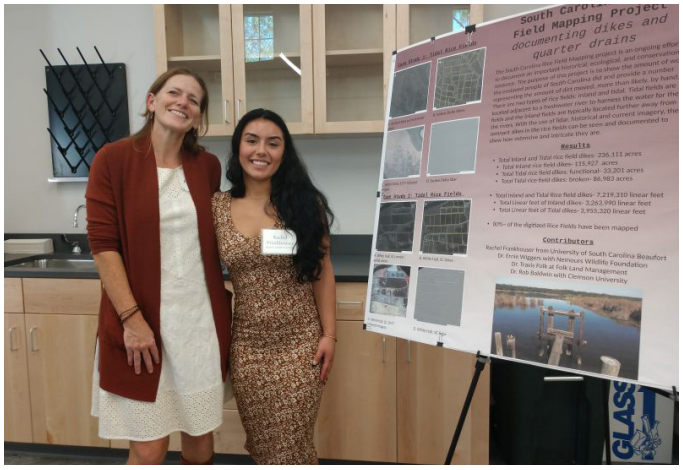
For Chen, the SULI internship is the reward for years of study in math and computers. "I loved math and solving math problems from a very young age," he said, "so I first pursued a math degree at USCB. I got interested in computer science when I took a course about MATLAB. I found that I love to write code."

At USCB, Chen credits the entire faculty of Computer Science and Mathematics with preparing him for this opportunity through their excellent teaching. He gives special thanks to Drs. DebRoy and Canada, who recommended him for the SULI program. He hopes to apply for graduate school after his internship at ORNL this spring.

Rachel Frankhouser's research highlighted at fall Nemours Plantation open house

USCB Class of 2021 alumna Rachel Frankhouser presented at the fall Nemours Plantation open house and lab dedication last October 23. Rachel presented the results of her summer internship on GIS mapping and measuring of hand-excavated canals in historic South Carolina rice fields. Her digitized mapping effort estimated, as of the day of presentation, approximately 1.7 million linear miles of canals, collectively. "It was an impressive feat of construction, but it is sad to think of the slave labor required to complete this vast network system," Frankhouser said. Nemours Foundation has been in a cooperative collaboration providing research internships for the past several years. The new laboratory was dedicated that day to retiring Nemours Plantation Director Dr. Ernie Wiggers, who has led the conservation research at Nemours, a former Dupont family, for 23 years. Rachel's work stood out among that of the graduate students being presented that day. Her strong showing during her summer internship led Nemours to offer her a full-time position!

Congratulations, Rachel!



Ms. Rachel Frankhouser (R) standing with Professor Kathryn Madden, both of USCB at the recent open house at Nemours Plantation

Recent publications from the

SCHOOL of SCIENCE and MATHEMATICS:

PUBLICATIONS:

Ahmed, K, S Tasnim, and K Yoshii (2020) Energy-efficient heterogeneous computing of parallel applications via power capping. In: 2020 International Conference on Computational Science and Computational Intelligence (CSCI) (pp. 1237-1242). IEEE.

Banister, RB, M Schwarz, M Fine, EM Muller, **KB Ritchie**. (In Press) Variations in stability among the microbiome of seagrass leaves, roots, and nearby sediments within a natural pH gradient. Microbial Ecology

Hoadley, KD, **DT Pettay**, A Lewis, D Wham, C Grasso, R Smith, DW Kemp, T LaJeunesse, and ME Warner (2021). Different functional traits among closely related algal symbionts dictate stress endurance for vital Indo-Pacific reefbuilding corals. Global Change Biology, 27, 5295–5309.

McFadden, CS, AM Quattrini, **MR Brugler**, PF Cowman, LF Dueñas, MC Kitahara, DA Paz-García, JD Reimer, and E Rodríguez (2021). Phylogenomics, origin and diversification of anthozoans (*Phylum Cnidaria*). *Syst. Biol.* 70(4): 635–647 https://doi.org/10.1093/sysbio/syaa103

Mercado, WR, GM Morales and **R Erdei** (2021). [Work in Progress] Iterative development of an IT solution supporting Early Learning Standards. In 2021 Fall ASEE Middle Atlantic Section Meeting. Available at: https://peer.asee.org/work-in-progress-iterative-development-of-an-it-solution-supporting-early-learning-standards

Morales, GM, **R Erdei** and WR Mercado (2021). Language Impacts of Early Child Education. In 2021 Fall ASEE Middle Atlantic Section Meeting. Available at: https://peer.asee.org/language-impacts-of-early-child-education

Newton, AL and **KB Ritchie**. (In Press) Book Chapter In: Biology of Sharks & Their Relatives, Edition 3. Disease, Pathology, Microbiological Impacts.

Opresko, DM, M Bo, DP Stein, A Evankow, DL Distel, and **MR Brugler** (2021) Description of two new genera and two new species of antipatharian corals in the family Aphanipathidae (Cnidaria: Anthozoa: Antipatharia). *Zootaxa*, 4966(2), 161-174.

Perry, CT, ZA Pratte, A Clavere-Graciette, **KB Ritchie**, RE Hueter, AL Newton, C Fisher, EA Dinsdale, K Bassos-Hull, ADM Dove, L Hoopes, and FJ Stewart (2021) Elasmobranch microbiomes: emerging patterns and implications for host health and ecology. Animal Microbiome 3:61 https://doi.org/10.1186/s42523-021-00121-4

Sevim, V (2021). Problem Posing|Solving as Enactive Metaphorizing. *Constructivist Foundations*, 16(3), 287-289. https://constructivist.info/16/3/287

Staton, JL (2021) Homology in character evolution. *Encyclopedia of Life Sciences on Wiley Online Library*: https://onlinelibrary.wiley.com/doi/book/10.1002/047001590x

Zhang, X and G Cao (2021) Event Attendance Prediction in Social Networks (SpringerBriefs in Statistics). 62 pp. ISBN: 978-3030892616

GRANTS:

Ahmed, Kishwar (2021) "CRII:CNS: Auction Mechanism Design for Energy-Efficient High Performance Computing." National Science Foundation (NSF) $174,770

Montie, EW (2021) "Estuarine Soundscape Observatory Network in the Southeast (ESONS)" $420,000 five-year sub-award (7/1/21 to 7/31/26) from the Southeast Coastal Ocean Observing Regional Association (SECOORA).

Ji, Y., **Erdei, R**., Allen, A., Yousuf, A. (2021). *S-STEM Research Hub of the Southeast: Enabling Advanced Digital Fluency for the Growing Innovation Economy* (Proposal: 2138239). NSF Scholarships in STEM Network (S-STEM-Net) Grant Application (Program Solicitation: NSF 21-569) $2,481,659 (submitted but not funded)