USCB
UNIVERSITY OF SOUTH CAROLINA BEAUFORT

USCB SCHOOL OF
SCIENCE & MATHEMATICS
NEWSLETTER

Vol. 5 • No. 2 — *The Official Newsletter of the USCB School of Science and Mathematics.* — FALL 2023/WINTER 2024

Notes from School Chairs:

This has been a banner year for USCB. Fall enrollments were up for the school, and initial spring semester reports show that, for the first time in our history, we retained a high percentage of students from the fall (>7% higher than last year), enabling us to claim one of the highest enrollment growth rates in South Carolina. We are excited about this trend and hope it continues. Acceptances for the fall semester are at an all-time high for USCB, which bodes well for the trend continuing.

Brian Canada,
Chair of Computer Science and Mathematics

Joe Staton,
Chair of Natural Sciences

Ritchie Named Director of Pritchards Island Research

Dr. Kimberly B. Ritchie has been chosen to head the new research initiative at Pritchards Island, overseeing and planning research projects for the island and organizing the Sea Turtle nesting program. Dr. Ritchie brings a career-long wealth of experience to the task at hand; she ran a large, grant-funded research program in coral reef biology at Mote Marine Lab, Sarasota, Florida, for 13 years prior to joining our faculty in 2016.

Dr. Ritchie, a native of Walterboro, SC, is engaged in a distinguished research career. She is leading the faculty in Marine Biology in planning research projects to better understand the unique treasure that is Pritchards Island. She will serve as the lead for a team of student interns and volunteers doing loggerhead sea turtle nest monitoring on the island, as well as looking at bacteria diversity on the eggs. She and her student teams have previously isolated and begun to characterize bacteria swabbed from sharks (with OCEARCH). Dr. Ritchie has pioneered exploring the bacterial epi-biome of many marine species to demonstrate that health in the marine realm is often directly a result of the health and vigor of their bacterial associations.

Pettay to Head Water Quality Lab

Last year, Dr. Daniel "Tye" Pettay became the head of USCB's Water Quality Research Lab. For the past few years, Dr. Pettay has worked in cooperation with the Town of Bluffton in creating molecular (PCR-based) assays to identify the source of fecal coliform contaminants in the local watersheds. Dr. Pettay's previous work with coral symbionts (the internal small "algae" that create food for corals) extended into work on harmful algal blooms in the Delaware Bay. From that background, Dr. Pettay was able to focus on multiple aspects of the health of the Port Royal Sound, looking at ways to monitor water quality automatically through sensors that upload their data to "the Cloud." By combining this work with periodic monitoring, Dr. Pettay has brought the entire spectrum of water monitoring and analysis under one roof and is working to expand the availability of these services possibly beyond Beaufort County.

Dr. Pettay grew up in Clinton, SC, and earned his undergraduate degree from Clemson, and his Ph.D. from Penn State University. However, he has a local connection by living in Bluffton as a teenager when his father had a veterinary practice there. Certainly, that experience helped him in his return and made him look twice at positions open here to make USCB his academic home.

USCB Student Opportunities Grow!

On 5 October 2023, Dr. Mercer Brugler was selected to participate in the Peerside Program (https://www.fio.usf.edu/peerside/), which focuses on broadening access to the ocean and increasing inclusivity in ocean STEAM careers. Peerside is based at the Florida Institute of Oceanography in St. Petersburg. Earlier this year, Peerside cohort members (including three USCB students) embarked upon a year-round career-development program, which includes a week aboard the R/V Western Flyer and a second week participating in remote science from a command center at FIO (i.e., building skills to be part of the New Blue Economy). After its initial success, the Peerside team has discussed increasing the numbers of USCB students it is willing to support!

Also, Dr. Brugler and his undergraduate team, Denia Lopez, Anneau Cappelmann and Zinia Hampleton, are participating in the deep-sea cohort of the Diversifying Ocean Sciences (DOS) Program, which is administered by Minorities in Shark Sciences (MISS).

PEERSIDE℠

New Assistant Professor of Cell Biology:
Dr. Emily Webb

Dr. Emily Webb, Ph.D., completed her doctorate from Virginia Tech in March 2022. Her work focuses on tackling new and overlooked mosquito-borne viruses. Dr. Webb explores the interactions among these viruses and their mosquito vectors and uses that knowledge to create new treatments and control strategies based on molecular approaches. Recently, she led a project to create genetically modified mosquitoes that are less likely to spread these viruses.

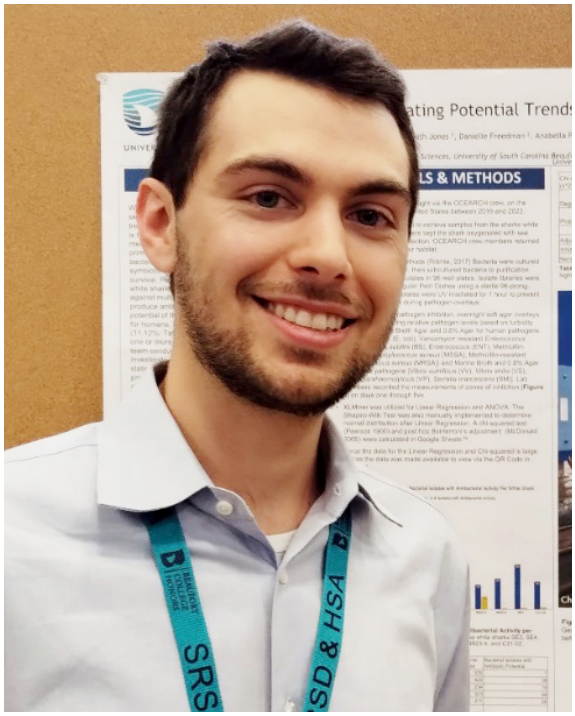
Dr. Webb answered a job ad for a visiting assistant professor and spent the last year teaching courses in our core curriculum for the biology major. In an official search for the tenure-track position, Dr. Webb was a resounding favorite with both her recent undergraduate students at USCB and the search committee.

No stranger to the area, Dr. Webb is a native Beaufortonian and a graduate of Battery Creek High School. She completed her undergraduate degree at USC Aiken, before leaving the state for graduate school. She has returned to Beaufort now to bring her studies in the molecular biology of mosquitoes back to where she began them, in the Lowcountry. We are happy to have her as a new member of our team!

New Physics Instructor:
Dr. Jon-Michael Hardin

We would like to welcome our "new" Physics instructor, Dr. Jon-Michael Hardin, to USCB, where he will start fall of 2024 teaching core courses for STEM majors, with additional expertise in Engineering to help support USCB's pre-engineering program. To call Dr. Hardin "new" is tongue-in-cheek, as he comes to us from a successful career as the head of the Engineering Program at Virginia Military Institute for many years. No stranger to the modern issues in STEM education, Dr. Hardin brings a wealth of experience helping undergraduates master the challenges of applying math skills to physics and engineering courses. He is also a leader in V.M.I.'s success in maintaining ABET accreditation of its Engineering program. We hope we can benefit from his breadth of experience as we move into the future. Welcome Dr. Hardin!

Matthew Holt Publishes Biomedical Review in Neuroscience



For the first time (to our knowledge), a USCB undergraduate has published first-authored paper with national/international collaborators from institutions; none of whom are at USCB. Mr. Matthew ("Matty") Holt, an undergrad collaborator with Dr. Kim Ritchie at USCB, published a recent article in Reviews in the Neurosciences with collaborators from Miramar, Florida; Chicago, Illinois; and Ankara, Turkey. Mr. Holt, a junior, entered USCB later, choosing to delay his academic career until after the pandemic waned. During his academic hiatus, Mr. Holt collaborated with medical researchers to systematically review the state of knowledge on "…intracortical brain-computer interfaces (iBCIs) applied to the motor cortex to improve function in patients with impaired motor ability." Clinic trials were launched to evaluate participants with tetraplegia that were implanted with microelectrode arrays. These iBCI-device implants can process neural signals from the motor cortex to improve motor-impaired patients with some enhanced return of function to treated patients. The paper reviews the device's ability to restore motor function in tetraplegic patients who have lost motor function due to amyotrophic lateral sclerosis, stroke, spinocerebellar degeneration without cerebellar involvement, and spinal cord injury, both positive and negative outcomes are based on limited sample sizes in these recent clinical trials. We commend Matty for this ground-breaking achievement!

Publications, Grants and Presentations:

SCHOOL of SCIENCE and MATHEMATICS

PUBLICATIONS:

Carey, S. M., Kearns, S. P., Millington, M. E., Buechner, G. S., Alvarez, B. E. J., Daneshian, L., Abiskaroon, B., Chruszcz, M., and D'Antonio, E. L.* (2024) At the outer part of the active site in Trypanosoma cruzi glucokinase: The role of phenylalanine 337. Biochimie, 218, 8-19.

D'Antonio, E. L. and Mercaldi, G. F. (2023) Tetrazolium-based colorimetric assay. Filed with the USPTO.

D'Antonio, E. L. (2023) Methods for inhibiting parasitic glucokinase and/or hexokinase. Filed with the USPTO.

Gonski, S.F., Ullman, W.J., Pettay, D.T., Booksh, K.S., Martz, T.R., Luther III, G.W., Cai, W.J. (2023) Understanding the dynamic response of Durafet-based sensors: A case study from the Murderkill Estuary-Delaware Bay system (Delaware, USA). Estuarine, Coastal and Shelf Science 283: 108247.

González-Pech, RA, VY Li, V Garcia, E Boville, M Mammone, H Kitano, KB Ritchie, M Medina (2024) Evolution, Assembly, and Dynamics of Marine Holobionts. Annual Review of Marine Science 16(1). 443-466.

Holt, MW, Robinson EC, Shlobin NA, Hanson JT, Bozkurt. (2024) Intracortical brain-computer interfaces for improved motor function: a systematic review. Reviews in the Neurosciences, 35(2): 213-223. https://doi.org/10.1515/revneuro-2023-0077

Horowitz H, Quattrini AM, Brugler MR, Miller DJ, Pahang K, Bridge TCL, Cowman PF, 2023. Bathymetric evolution of black corals through deep time. Proceedings of the Royal Society B (Biological Sciences) 290: 20231107. https://doi.org/10.1098/rspb.2023.1107 (Impact Factor [IF]: 4.7).

Molodtsova TN, Opresko DM, O'Mahoney M, Simakova UV, Kolyuchkina GA, Bledsoe YM, Nasiadka TW, Ross RF, Brugler MR, 2023. One of the deepest genera of Antipatharia: Taxonomic position revealed and revised. Diversity 15(3): 436. https://doi.org/10.3390/d15030436 (IF: 2.4)

Sevim, Volkan. "Diving Deep into the Ocean Through Skillful Problem Posing| Solving Experiences." Constructivist Foundations 18.2 (2023): 315-317.

Tessler M, Cunningham SW, Ingala MR, Warring SD, Brugler MR, 2023. An environmental DNA primer for microbial and restoration ecology. Microbial Ecology 85: 796-808. https://doi.org/10.1007/s00248-022-02168-5 (IF: 3.6)

Transue L, Monczak A, Tribble C, Marian A, Fair P, Ballenger J, Balmer B, Montie EW. (2023). The biological and anthropogenic soundscape of an urbanized port – the Charleston Harbor estuary, South Carolina, USA. PLoS One 18(4): e0283848

Tribble C, Monczak A, Transue L, Marian A, Fair P, Balmer B, Ballenger J, Baker H, Weinpress-Galipeau M, Robertson A, Strand A, Montie EW. (2023). Enhancing interpretation of cetacean acoustic monitoring: investigating factors that influence vocalization patterns of Atlantic bottlenose dolphins in an urbanized estuary, Charleston Harbor, South Carolina, USA. Aquatic Mammals, 49(6):519-549.

Turnham, K.E., Aschaffenburg, M.D., Pettay, D.T., Paz-García, D.A, Reyes-Bonilla H., Pinzón, J., Timmins, E., Smith, R.T., McGinley, M.P., Warner, M.E., LaJeunesse, T.C. (2023) High physiological function for corals with thermally tolerant, host-adapted symbionts. Proceedings of the Royal Society B 290: 20231021.

GRANTS:

Mix Family Research Endowment for USCB Marine Biology Concentration. $50, Pettay, DT. South Carolina Sea Grant – "Determining bacteria and turbidity sources to inform management and outreach across the Edisto Island Watershed." ($159,000 with subaward of $51,528 to USCB – Funded, Spring 2023, PI: Amy Scaroni – Clemson University, Co-PI – Stefanie Whitmire – Clemson University)

Montie, EW. Port Royal Sound Foundation (PRSF) (2023-2024). ($15,087). "Bottlenose Dolphin Monitoring in the Port Royal Sound Area (PRSA)".

Montie, EW. NOAA IOOS/SECOORA (2021 – 2026). (Total subaward to Montie $420,000). "Estuarine Soundscape Observatory Network in the Southeast". PI – Debra Hernandez (SECOORA); Coinvestigators – Eric Montie (USCB) et al.

Montie, EW. U.S. Department of Transportation Maritime Administration (MARAD) / UNCW (2022-2024). (Total subaward to Montie $206,861). "Testing a Novel Strategy to Measure Underwater Radiated Noise of Vessels in Shallow Coastal Oceans". PI – Lynn Leonard (UNCW), CO-PIs – Eric Montie (USCB), Xuemei Chen (UNCW), Mark Lammers (UNCW), James Winebrake (UNCW), Collaborator – John Gebbie (Metron, Inc.).

Pettay, DT. Spring Island Trust – "Expanding the Environmental Monitoring Capabilities for the Port Royal Sound Estuary." ($10,000, Funded Fall 2023)

Pettay, DT. Beaufort County ($170,000 per year) – Yearly renewal as part of accepting leadership of USCB's Water Quality Lab (2023 – 2025)

Pettay, DT. Town of Bluffton ($185,000 per year) – Five-year renewal as part of accepting leadership of USCB's Water Quality Lab (2023 – 2028)

Pettay, DT. Town of Bluffton – "Microbial Source Tracking of Fecal Contamination in the May River." ($50,000, Summer – Yearly renewal)

Zhang, X. Computational Science, USC Magellan Scholar mini-grant to support Sierra Barbee, an ISAT undergraduate, on a project entitled "Analyzing User Behavior and Speech Patterns: A Comparative Study of YouTube Communities through Community and Sentiment Analysis."

PRESENTATIONS:

Dr. Ronald Erdei, Computational Science, served as the pedagogy expert for the Beaufort County School District (BCSD)'s GenCyber program in summer 2023. funded by a grant from the U.S. National Security Agency (NSA), is designed to help teachers integrate cybersecurity instruction into their courses.

Dr. Davide Fusi, Mathematics, attended the invited workshop "Around Symmetries of K3 Surfaces" at the Banff International Research Station for Mathematical Innovation and Discovery in Banff, Alberta, Canada, in winter 2023.

Dr. Kim Ritchie, Natural Sciences "From beneficial bacteria to barrier islands: Research Opportunities at USCB," at Ft. Johnson Seminar Series November.

Dr. Kim Ritchie, Natural Sciences presented "Benefits of sharks, great and small: and how "Hilton" helped describe the life history of the great white shark in the Atlantic northwest. March 15; at Port Royal Sound Foundation.

Dr. Kim Ritchie, Natural Sciences presented "Antibiotics from White Sharks." at Vinegroup, August. Biotech Introductions with Atterx Grants.

Dr. Volkan Sevim, Mathematics, presented "Exploring function graphs in different axis orientations: The case of quadratic functions" at the 46th Annual Meeting of the Southwest Educational Research Association (SERA), San Antonio, Texas February 2023.