UNIVERSITY OF SOUTH CAROLINA BEAUFORT

USCB SCHOOL OF
# SCIENCE & MATHEMATICS
NEWSLETTER

Vol. 2 • No.1 — *The Official Newsletter of the USCB School of Science and Mathematics.* — SPRING 2019

# What's New in STEM@USCB

USCB recently received approval for a level change and is now offering a master's degree in Computational Science! Other master's programs are in the planning stages campus-wide, including education. Watch for new degree programs in the sciences.

USCB mailed offer letters to early applicants who applied to the honors program in December for the second-year cohort of Biology on the Beaufort Campus. With recruitment in full swing for Biology and Nursing, we added a third honors cohort in Lowcountry Studies. We are building new dorms on the Beaufort campus to accommodate growth in these three programs and the Department of Visual Art & Design.

*New dorms have broken ground behind those facing Boundary Street in Beaufort to accommodate the expanded second year of the Honors College and growing arts program.*

Recruitment for the Bluffton Campus is strong for the sciences and mathematics. Mathematics has grown in the last year; we recruited a number of Secondary Math Education majors. The first majors in the Secondary Education in Biology Program are starting this year. Computational Science continues to be strong. For the past eight years, the biology major has continued to grow. It is on track to have a banner freshman class with more than 100 more applicants than this time last year.

In addition, USCB has its first biology major participating in USCB's co-operative exchange program with HZ University of Applied Sciences in Vlissingen, The Netherlands. Mary Katherine Altman, a junior from upstate South Carolina, will spend this spring learning about the marsh intertidal ecosystems of the coastal Netherlands as our first Biology exchange student in the program, which began last year. Jazmin Palacios, Business Management major, joins Mary for the second year of this exchange program at HZ. If they are like the two hospitality students who attended HZ last spring, they will have many opportunities to travel throughout Europe on weekends, taking advantage of the excellent EU mass-transit system.

# MATH BOOTCAMP: Volkan Sevim and Davide Fusi

Mathematics is often the largest hurdle to overcome in any college discipline, from traditional STEM to the liberal arts. Professors Volkan Sevim and Davide Fusi developed a Math Bootcamp student workshop in response to this career bottleneck. The USCB Math Bootcamp is a week-long mathematics enrichment session that aims to strengthen foundational mathematics and algebra skills in participating students, thereby giving them a "leg up" on success in the required math for their respective majors. The mathematical content of the Bootcamp consists of all the essential building blocks of college mathematics, such as expressions, equations, inequalities, exponents, radicals, and fractions. Students work with practice exercises in each topic—more than 500 exercises in five days—where they explore a variety of strategies for solving problems. Students form small working groups that interact with USCB faculty members in a relaxed, non-stressful setting. Sevim and Fusi piloted the program in August 2017, with nine participants; since then, they have enrolled more than 45 students. Nearly four of five participants earned an A or B in their first mathematics course, and two of three earned at least a C+ in their second mathematics course. The next Bootcamp will be in August 2019.

*Dr. Volkan Sevim (left) and Dr. Davide Fusi (right) pictured with graduates (holding certificates) from Math Bootcamp.*

*Working in small groups with "hands-on" faculty direction from Dr. Fusi.*

# Beaufort Digital Corridor at USCB

The Beaufort Digital Corridor (BDC) hosted a two-part seminar in its series on Entrepreneurship: "What it Takes to Start up A Technology Company" at the Bluffton Campus and "Critical Success Factors for Building a Successful Business for Life" at the Digital Corridor BASEcamp in downtown Beaufort. BDC Chair Kevin Klingler led this two-part outreach event, sharing his experience and advice with University of South Carolina Beaufort (USCB) Association for Computing Machinery (ACM) students and other attendees.

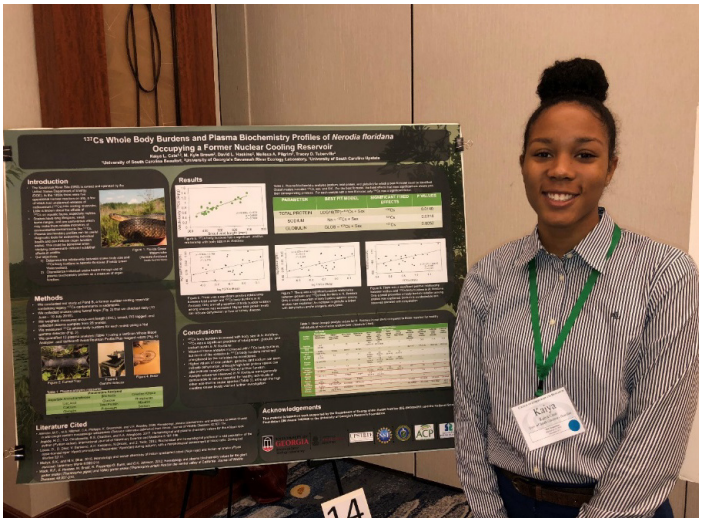
BEAUFORT DIGITAL CORRIDOR

The second part was a stand-alone presentation for the BASEcamp community; it was free to USCB students through our university partnership with them. This was a unique opportunity for young enterprising software developers to learn about the pathway and milestones to the successful launch of a new tech company from Klingler, who has created three distinct tech startups in his career in California prior to moving to the Beaufort area.


*BDC Chair Kevin Klingler warming up for the second presentation in his guide to entrepreneurship series.*

## Cain attends National NSF Undergraduate Research Meeting

Last summer, the Savannah River Ecological Laboratory (SREL) hosted nine interns through an NSF "Research Experiences for Undergraduates" grant—three of whom were students in USCB's Biology Program (see Science & Mathematics Newsletter, Fall 2018). Each federal lab has the option of nominating a top student to attend a nationally sponsored undergraduate research meeting in Washington, D.C., during the fall semester. This year, the SREL nominated USCB student Kaiya Cain, whom the NSF selected to attend the national NSF Counsel for Undergraduate Research (http://www.cur.org/what/events/students/reu/) and present her poster entitled "Cs-137 Whole Body Burdens and Plasma Biochemistry Profiles of *Nerodia floridana* Occupying a Former Nuclear Cooling Reservoir." Ms. Cain is completing her junior year in biology, and we expect more great things from her as she pursues her goal of becoming a researcher in marine biology.




*Ms. Kaiya Cain with her poster presentation at Counsel for Undergraduate Research meetings in Washington, D.C.*

# Crowd-Sourcing Science:

## *Early-Stage Drug Discovery for Chagas' Disease*

*The "kissing" bug—a triatomine insect host for T. cruzi.*

Dr. Edward D'Antonio took an alternative approach to normal funding routes when he got a small grant for lab testing of new potential enzyme inhibitors to treat Chagas' disease parasites *(Trypanosoma cruzi)* and possible cross-affinity for skin parasites *Leishmania amazonensis.*

D'Antonio purchased 13 compound analogues of a scaffold from a lead hit on a molecule of his design. The same compounds were shipped to a collaborator at New York University School of Medicine where she will perform biological testing in a mouse model system.

Originally, the lab planned to test both glucose kinases (i.e. hexokinase and glucokinase) in *Trypanosoma cruzi* parasites. However, hexokinase was eliminated as a candidate for this particular project. Instead, his team expressed and purified *T. cruzi* glucokinase and is now expressing and purifying human hexokinase IV *(HsHxKIV)*. The photo at below shows the over-expression work where they have recently grown *HsHxKIV* clones in the lab for testing assays. This change of focus to one enzyme target was made to see how well a compound could target the enzyme in both parasite species *(T. cruzi and L. amazonensis)* without impacting the similar human enzyme, both crucial to the survival of each species.

# Alumni Highlights

## BRANDON HUGHES

Brandon Hughes is working on his Ph.D. at MUSC in Neurophysiology. Brandon is interested in understanding the regulatory mechanisms involved in shaping the ability of synapses (nerve junctions) to strengthen or weaken correlated with their use over time, especially during memory consolidation and drug exposure. As a Ph.D. student in the Cowan lab at MUSC, Brandon is using cutting-edge molecular tools and transgenic mice to understand the fundamental mechanisms of this plasticity in neuronal behavior underlying learning and memory of drug reward. Brandon returned to USCB this past year to talk to faculty and students about his current research, and the path he took to achieve his current research program Ph.D. studentship. Brandon co-authored five papers associated with his master's research at Claflin University. He has already co-authored a paper in Neuron from his Ph.D. research.

## MARCOS CISCA, JR.

Marcos Cisca is completing his first trimester toward his Doctor of Physical Therapy degree at Northwestern University's Feinberg School of Medicine. Marcos graduated in the spring of last year and was accepted directly into this prestigious program. Congratulations, Marcos!


## VICTORIA SUTTON

Victoria Sutton, a USCB alumnus who was a very dedicated researcher with Dr. Ed D'Antonio's lab, has graduated with a master's degree in Public Health from Georgia Southern University.

At USCB, Victoria's work centered on a multifunctional enzyme known as dehaloperoxidase A (DHP A) from the marine worm *Amphitrite ornata*. The research project involved field collections of *A. ornata* worms from the mudflats on Hilton Head Island followed by the DNA barcoding taxonomic approach using the specimen's 16S ribosomal DNA. From confirmed samples, she isolated DHP A in-house and ran enzymatic assays that followed typical Michaelis-Menten behavior. Way to go, Victoria!

# USCB acquires a new boat and service truck

USCB purchased a new boat for marine research, as part of a recent Community Foundation of the Lowcountry grant written by Dr. Eric Montie. We also acquired a new truck to haul it, as part of an USC ASPIRE III grant awarded to Drs. Montie and Steve Borgianini. ASPIRE III is a funding competition that helps researchers develop the necessary infrastructure to enhance their research programs. The truck saves faculty and students from using personal vehicles to travel to field sites as well as serving as a towing vehicle for the new Carolina Skiff, which is outfitted with a new, 115-h.p. Suzuki 4-stroke outboard engine and trailer. Funds remaining in both grants will go toward purchasing another boat and truck to enhance marine fieldwork at USCB.

*The new Carolina Skiff purchased with funds from a recent Community Foundation of the Lowcountry grant. The new boat is pictured here with Ms. Aga Monczak (Ph.D. student, University of Aberdeen) and Ms. Alyssa Marian (M.S. candidate, College of Charleston)*


*USCB purchased a new truck as part of a recent ASPIRE III grant from the University of South Carolina awarded to Drs. Eric Montie (pictured here) and Steve Borgianini.*

## Recent publications from the SCHOOL OF SCIENCE AND MATHEMATICS:

Beatty, DS, Valayil JM, Clements CS, Stewart FJ, Ritchie KB, Hay ME. (Accepted) Local management enhances a coral's defense against a thermally-regulated-bleaching pathogen. Science Advances.

Braun DR, Chevrette MG, Acharya D, Currie CR, Rajski SR, **Ritchie KB**, Bugni TS (2018) The Complete Genome of *Dietzia* sp. WMMA 184, a Marine Coral-associated Bacterium. Genome Announcements 6(5): e01582-17. Published online 2018 Feb 1. doi: 10.1128/genomeA.01582-17

**Buechner GS, Millington ME**, Perry K, **D'Antonio EL** (2019) The crystal structure of glucokinase from *Leishmania braziliensis*. Molecular and Biochemical Parasitology 227:47-52. ISSN 0166-6851, https://doi.org/10.1016/j.molbiopara.2018.12.002.

**Debroy, S** (2018) Presentation 'Infectious disease modeling applied to childhood obesity' and hands-on workshop on creating in-silico subjects using statistical software R to test models. First Indo - U.S. Workshop on Modeling Dynamics, Statistical Inference and Prediction of Infectious Diseases organized by Arizona State University and Shri Satya Sai Institute of Higher Learning, Anantapur, India. August.

**Debroy, S** (2018) Quantitative modeling for childhood obesity. International Conference on Advances in Interdisciplinary Statistics and Combinatorics, UNC, Greensboro. October.

Muehleman V, Breland L, Hughes B, **Warren A, Debroy S** (2018) Association between BMI, race, age and gender to food choice in South Carolina's "Corridor of Shame." Annual Meeting of the Obesity Society and American Society for Metabolic and Bariatric Surgery in Nashville, TN. November.

**Monczak A, Mueller C, Miller ME, Ji Y, Borgianini SA, Montie EW** (2019) Sound patterns of snapping shrimp, fish, and dolphins in an estuarine soundscape of the southeastern USA. Marine Ecology Progress Series. 609:49-68.

**Monczak A, Ji Y, Soueidan J, Montie EW**. Automatic detection, classification, and quantification of sciaenid fish calls in an estuarine soundscape in the Southeast United States. PloS one. 2019 Jan 16;14(1):e0209914.

**Sevim V, Catma S** (2018). An analysis of students' understanding of supply and demand graphs in economics education: A qualitative multi-case study. Paper presented at the 41st Annual Meeting of the Southwest Educational Research Association (SERA), New Orleans, LA.

**Sevim V** (2018). Research on higher education: Session T7.2 Chair and Discussant at the 41st Annual Meeting of the Southwest Educational Research Association (SERA), New Orleans, LA.

**Staton JL, Canada BA, Borgianini SA**, Barkel KM. 2019. Colonization of coastal and estuarine environments, in G. Poole & M. Thiel (Eds.), The Natural History of Crustacea, Volume VIII, Ch. 10. New York: Oxford University Press. [in press]

**Thomas, N, Erdei, R**. Stemming Stereotype Threat: Recruitment, Retention, and Degree Attainment in STEM Fields for Undergraduates from Underrepresented Backgrounds. To be presented at, and included in Proceedings of, the Collaborative Network for Engineering and Computing Diversity (CoNECD) 2018 Conference, Crystal City, VA, April 2018. (correction from last newletter, Dr. Thomas is a professor of Human Services at USCB)

(**bold** indicates USCB author)