Clark Biology

Newsletter Spring 2021

A Note From the Chair

Welcome to the latest Biology Department newsletter, as we close out this pandemic-affected 2020-21 academic year. It has been a challenging semester; trying to teach, do our research and just live under these restrictions, but it's a pleasure to read here about about all the continuing successes of our current and former students.

The last six months have been a time of sadness, but also with great promise for the future. Early in the new year, we lost our former chair and Biology faculty member of 26 years, Susan Foster and just recently we lost fellow faculty member, Susan's husband and research partner, John Baker. A moving celebration was held in March, dedicated to them, highlighting their huge impact on the lives of their students, the department, University, and wider research community. Thanks to the generosity of two former PhD students, Bill Cresko and Cristin Hulslander, a fund was established in Susan and John's name that will support undergraduate student research, focusing on students underrepresented in STEM; a fitting and lasting testament to their impact on so many Clark students over the years.

On a happier note, the spring semester also saw a wonderfully successful conclusion to our search for a new evolutionary biologist. The pool of candidates was so deep that we were able to persuade the administration to hire two of them – Chandra Jack will be joining us in the fall, while Erin McCullough will delay a year and begin in the fall of 2022. We're very excited for them both to arrive for many reasons, but I want to highlight one in particular. Chandra's research – on plant fitness and community interactions – requires a greenhouse, something we have conspicuously lacked, and long coveted. As I write this at the end of May, the initial phases of the design work are under way, so we should see this become a reality in the near future.

Finally, on behalf of the department, I want to say a big "thank you" to Rob Drewell, who stepped down as chair in March. Under his leadership - since summer 2018 - the department has thrived; among the changes Rob oversaw were hiring some outstanding new staff members and a significant expansion in both the numbers and diversity of our faculty. The Biology Department is in a strong position to move forward into a vibrant, post-pandemic future in the fall.

Newsletter Content

Spotlight:
THE BERGMANN LAB

The Clark University Evolutionary Functional Morphology Lab, led by Dr. Philip Bergmann, utilizes an integrative approach to studying how phenotypes evolve and diversify. Bergmann Lab researchers integrate the measurement of organismal form, growth and performance, and kinematics both in the field and through lab experimentation, in addition to ecology using phylogenies and statistics. This research mainly focuses on lizards, snakes, and frogs. The Bergmann Lab research looks at how these animals engage in various modes of locomotion such as swimming, running, climbing, and jumping and relate the performance of these locomotor tasks to the underlying phenotypic traits.

The great diversity of lizards, snakes, and amphibians makes them a particularly fascinating research subject. With over 8400 species of snakes and lizards, and over 5000 species of amphibians, there is a vast diversity of shapes, phenotypes, and adaptations. There are a number of different research projects occurring in the Lab, including: how the head shape of burrowing lizards affects how well they can burrow in different substrate; how the vertebral number is involved in the evolution of snake-like forms; undergraduate student Biko Gayman is studying how vertebral number and shape influenced diversity in dinosaur body proportions; Ph.D. student Amy Cheu is studying how the performance of basilisk lizards while running, climbing, jumping, and swimming changes as they grow from neonate to adulthood; and new Ph.D. student Achyuthan Srikanthan is studying the evolution of microscopic skin structures in snakes and lizards, and how this correlates with the substrates that they move on in nature.

The Lab is the only one in the Biology Department studying evolutionary and ecological biomechanics. Students use high-speed/slow-motion video to study the movements of reptiles and amphibians. The integration of comparative, phylogenetic evolutionary and ecological perspectives to the study of locomotion and biomechanics is unique to this lab. There are several new projects that Lab members are excited about in the coming semester, including: utilizing

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HANNAH GUSS

Hannah is a junior majoring in Biology and minoring in Education. She has called Worcester and Saint Johnsbury, VT home. We asked her what initially sparked her interest in this field of research: "My love of reptiles and my curiosity towards the natural world drew me towards this field but also how international the field is." Hannah absolutely loves the hands-on approach in this lab as she gets to work closely with animals. As a child, Hannah spent many summers looking for snakes and lizards in her own backyard. HANNAH:"I have always wanted to be a herpetologist. When I heard about this Lab it seemed like fate as it perfectly aligns with my interests in animal body plans." In the lab Hannah has hands-on training on animal handling and has been able to learn more about programs such as R and MATLABS. Hannah looks forward to putting together a full research paper and presenting her work to her fellow researchers. Hannah is excited for the rest of her time at Clark. HANNAH:"All of the faculty genuinely want to help. When you get something wrong or mess up there is more of a focus on the learning." When not in the lab you can find Hannah having long picnics on the campus Green, playing Magic At The Gathering, or out on her yoga mat!

QUINCY MILTON

Quincy, a 5th-year student, will leverage the skills he has learned at Clark to enter environmental consulting or fish/wildlife management. QUINCY: "I have a passion for climate change and I would like to make a mark in that throughout the course of my life. I like the idea of being involved in the science that is passed along to lawmakers and other administrators who implement change." The tight-knit support system in the Biology department made Quincy's time more immersive and fruitful. QUINCY: "Professors that I have only taken a single course with will stop me and ask how I am doing or offer to make connections for me." Quincy's involvement in the Bergmann Lab presented him with the opportunity to design a study centered around ecology and animal locomotion. QUINCY: "This project deals with the kinematic and performance determinants of a fish predator-prey interaction. We film the fish at high speed and are able to ascertain various variables that can tell us why the predator got a meal or why the prey escaped." The most interesting part of Quincy's research has been being able to get up close to see how little predators catch prey in a single interaction. QUINCY: "It points to the idea that there is a lot happening both largely and subtly that can change the outcome of the interaction." Although Quincy is graduating, he is excited about the possibility for others to continue research on his field of study. QUINCY: " There are plenty of directions that I think future students could take this project. Dr. Bergmann and I have brainstormed some ideas that I think would round out this work very well in the future." When not in the Lab, you can find Quincy on the lacrosse field or out fly fishing. QUINCY: "My passion for the environment and aquatic ecosystems manifest itself in my favorite activity of fly fishing. Fly fishing is all about respecting the environment and the organisms therein which creates a great allure for me."

MAYTE TORRES

Mayte is a junior majoring in Biology and she calls Orange, MA, Honduras, and Puerto Rico home. Mayte helps run boldness trials with guppies to assist in Quincy Milton's research. MAYTE: "My research interests include boldness in behavioral ecology and how different animals display 'personalities' and fall between a bold-shy continuum." Mayte was excited to join the Lab because it uses amphibians and reptiles to study animal locomotion and kinematics. Mayte chose Clark because her family has been coming to Worcester for years to shop at the local Latinx grocery stores, as well as Clark's small size. MAYTE: "All of the science courses here are challenging but being able to have 1:1 time with a professor is key and something that's not easy to get at a larger school." Mayte's passions involve medicine and animals and hope to find a route where she can work in conservation and aid veterinarians or go directly into the medical field as a physician's assistant. MAYTE: "Take any opportunity that comes your way. Even if you may think it will not benefit you at the moment or possibly in the future because you never know what connections you will make from those experiences or skills that you will learn."

BROOKE HARRIS

Brooke is an Environmental Science student researcher on the Conservation Biology track, with a minor in Global Environmental Studies and will be graduating with her Masters in Biology next year. Professor Kaitlyn Mathis's Ecology course expanded Brooke's interest in organismal and ecological biology. BROOKE: "It finally felt like I was doing something that I was specifically intrigued with." Brooke is researching how climate change may affect ant biodiversity through the impact of altered thermal tolerances due to increasing temperatures, the mechanisms and chemical ecology behind these tolerances, and effects on adaptability to environmental changes in different species. BROOKE: "Ants are ecosystem engineers and incredible indicators for environmental change, so I was able to fully intersect these two concepts in Professor Mathis' Lab." Brooke became part of the Myrmecology Lab because "working hands-on with organisms, while gaining experience in my lab and fieldwork, was too good not to be a part of." Brooke started off identifying ants and doing data collection for other student projects. After months of lab meetings, paper dissections, and hands-on practice, Brooke began developing her own research. BROOKE: "I have never felt more prepared to complete my first publishable paper." Brooke is going to miss the Clark community when she graduates but she is confident that the "relationships [she] formed with professors, TAs and classmates at Clark will be accessible for [her] lifetime".

BAILEY ROSS

Bailey is a senior Environmental Science major with an Earth System Science concentration, originally from Charlton, MA. Her love for science started at a young age, living near the South Charlton Reservoir. BAILEY: " I spent summers fishing and swimming and wondering what external factors could be impacting the water quality." Bailey's research involves modeling the encroachment of woody plants into grasslands and savannahs in the southwestern US by taking video data from the Santa Rita Experimental Range in Arizona and studying rodent and ant behavior. BAILEY: "I am passionate about understanding organisms and their role in ecosystem health, shift, and management. I thought that looking at ants, a tiny organism responsible for so many important ecosystem functions would be a great place to begin to understand ecology." Last year, Bailey was awarded the prestigious Steinbrecher Fellowship for her project, Seed Dispersal by Ants and Rodents and the Conversion of Grasslands to Woodlands at the Santa Rita Experimental Range, Arizona, USA. Bailey gravitated towards Clark because of the Biology department's close relationship with the environmental science/geography departments. BAILEY: "If this relationship between departments hadn't existed, I wouldn't have gotten the exposure to ecology!" Bailey loves to go scuba diving and teaches dance classes. BAILEY: "I just got SCUBA certified and I am obsessed!" Bailey will be continuing on to the University of Miami at the Rosenstiel School of Marine and Atmospheric Sciences where she will complete a Master's in Tropical Marine Ecosystem Management. BAILEY: "My passion for ecology fueled by Professor Mathis, and my study abroad program SFS Panama, led me to this career and I am so excited to learn more about the ocean and coastal ecosystem ecology!"

Spotlight:
THE MATHIS LAB

The Clark University Mathis Lab uses a combination of observational studies, manipulative field experiments, chemical ecology techniques, and lab experiments to examine the dynamics of complex species interactions and how they impact managed systems. The Lab began its work in 2019 with Dr. Kaitlyn Mathis' appointment to the Biology Department. The diverse research interests of the Lab members range from complex species interactions, chemical ecology, social insects to agroecosystems. The Lab currently has ten researchers made up of Ph.D., master's, and undergraduate students.

The members of the Mathis Lab has published numberous papers in several prominent scientific journals. In 2020, they published research on, "Our current understanding of Commensalism" for the Annual Review of Ecology, Evolution and Systematic, an annual scientific journal. In 2021, they published an article entitled,"Impacts of invasive ant-hemipteran interaction, edge effects, and habitat complexities on the spatial distribution of ants in citrus orchards," for the Agriculture, Ecosystems & Environment an international peer-reviewed scientific journal.

The Mathis Lab investigates questions that will advance our basic understanding of ecological principles while also providing insight into real-world issues. Professor Mathis: "I'm excited about some of the student projects that are coming out of the lab in the next year. In particular, Brooke Harris, Josh Canning, Amelia Curry, and Christina Kopacz are all working on aspects of the projects listed below."

Current Lab projects include:

- A collaborative project with the University of Arizona looking at ant communities and seed dispersal in woody plant encroached grasslands.
- A collaborative project with the University of California looking at the dynamics of invasive ant-psyllid interactions in citrus groves.
- A local project examining how ant diversity, community composition, and behavior change across an urban to rural gradient and an agriculture intensification gradient.

You can find more information on the exciting research that the Mathis Lab is conducting on the Mathis Lab Website.

Undergraduate Student Spotlights

Undergraduate students are an integral part of Clark's Biology Department and our research labs. Students are able to collaborate closely with faculty and others to contribute to the greater body of knowledge in a variety of ways. Here are what a few of our current students have to say about thier experiences.

JENNY CHUNG

Foster/Baker Lab & Dept. Associate

Jenny is a sophomore from South Korea and Boston, who is studying Biochemistry and Molecular Biology. She has also worked with Biology Program Assistant, Lauren Cardello, for the past two years. Jenny knew that the sciences were a field that she wanted to venture into and fully immerse herself in. JENNY: "Natural sciences always interested me the most. I like connecting real-life situations to the smallest matters we can study/analyze." Jenny is on the pre-med track and following her time at Clark she plans to become a medical doctor. Clark's small size, its facilities, and the support networks are what solidified it as a top choice for Jenny. JENNY: "I love that everyone in the department is always so supportive, you get to know a lot of people through connections, and more intimately. I also love the sunset light in the afternoon when I am in the lounge area of the Lasry building." Jenny's favorite spot to relax and work is the fuller music room in the library. JENNY: "The view is amazing to look at while doing work. It is also very quiet."

Tabima Lab

KELSEY JOYCE

Kelsey is a senior finishing up her degree in Biology. The Leominster, MA native has been working in the Tabima Lab, where she studies the fungi, Basidiobolus. She is currently working to isolate this fungus from environmental samples, extracting its DNA and analyzing the genome using bioinformatics. Kelsey was introduced to the research when she first took Professor Tabima's Intro to Bioinformatics course, where she learned about analyzing and interpreting biological data using a combination of computer science, statistics, mathematics, and engineering. KELSEY: "In the lab, I can practice culturing with different types of media and extracting DNA while learning how to use bioinformatics to analyze the data we gather." Through labs and classes, Kelsey has been able to practice techniques such as culturing, extracting DNA, and running gels. KELSEY: "I am learning new techniques such as using a 3D printer, a nanopore, and a nanodrop. Having the freedom to perform my own experiments in the lab also allows me to problem solve on my own when things don't go as planned."

ELANA MATULIS

Foster/Baker Lab

Elana is in her final year at Clark as a Biology major and her natural propensity for the sciences was cultivated at a young age. ELANA: "Because of my love for animals I always knew that I would do something related to biology, but I chose Clark because I felt like I could really be myself here. The openness and kindness of the community was the deciding factor for me." The Canton, MA native supports Ph.D. candidate Anika Wohlleben in the Foster-Baker Lab. Elana researches how the immune system gene expression of the stickleback fish is affected by the number of parasites found in their environment. ELANA: "I've learned a lot about troubleshooting protocols, data collection, microscopy and RNA extractions." When not studying stickleback, Elana is volunteering at Rose Monahan Hospice, drawing portraits, and playing electric guitar. ELANA: "I am very into heavy metal and love going to The Palladium! It might look a bit run-down, but they have lots of great shows and the community there is very kind and welcoming." Elana plans to pursue her master's in genetic counseling. ELANA: "Through this work, I hope to more accurately represent the experiences of people with disabilities in healthcare education by bringing social aspects and personal narratives into the knowledge pool."

Foster/Baker Lab

ANNELIA OTTEY

Annelia is a Junior studying Biology with a concentration in Health Science and Society. Annelia calls Maine, Virginia Beach, and Jamaica home. Annelia's research involves investigating the different parasitic rates in Alaskan lakes. She currently works with Ph.D. candidate Anika Whollenben, dissecting stickleback fish, checking for different parasites. ANNELIA: "I've always loved dissection and I saw it as a way to get back into something I liked doing in previous biology labs. I also found it interesting that we were looking for parasites, which I found super interesting." Annelia's favorite part about the Biology Department is the staff and the various opportunities for research in all variants of biological fields. ANNELIA: "I feel as though they genuinely want to see everyone be successful in anything they pursue." When not in class you can catch Annelia watching Netflix or hanging out with her friends exploring parks and restaurants. ANNELIA: "I have been to Cascade's park and Green hill park. I loved both". Annelia's advice for prospective students is that ANNELIA: "Don't be afraid to put yourself out there. Also, don't limit yourself to one thing, try different things because you might find you like it." After Clark, she plans to go to graduate school and become a Physician's Assistant.

Foster/Baker Lab

ISABELLA REICHEL

It was it's interconnected and collaborative environment that drew Isabella to Clark and she is completing her BA in Biology this year. Isabella calls the Washington D.C. area and Shepherdstown, West Virginia home. Isabella has been involved in research since her first year and currently works in the Foster-Baker Lab. Her research focuses on the morphological plasticity of the Threespine Stickleback, specifically how the morphology changes when exposed to predator cues in its habitat. Isabella has been able to refine her scientific writing skills and now she says she has a much more holistic understanding of the research process. ISABELLA: "Spending all this time in labs has shown me that patience, grit, communication, and trust in my skills and education." Isabella was recently hired as an Analytical Chemist at an environmental testing company and eventually plans to apply to medical school. It was in Isabella's first research lab that she was able to complete a paid summer fellowship and attend a conference at Harvard. ISABELLA: "With these cumulative experiences, I am now working on my first-ever publication!" In her free time, Isabella enjoys exploring Worcester, including The Crompton Collective where you can find her favorite restaurant (Birch Tree Bread Company) and great small local shops.

DOREEN SAMPEUR

Foster/Baker Lab & Dept. Assistant Lab Technician

Doreen is a junior Biology major, concentrating in Health Science and Society, who calls Southeastern, Pennsylvania home. She works hard as both a Deparment student worker and a researcher in the Foster-Baker Lab, where she dissects fish to determine the levels of parasitism in 4 Alaskan lakes. DOREEN: "Originally, I thought that the opportunity to study stickleback evolution and their relationships with other organisms in their home lakes was interesting, I quickly realized I really like to dissect the stickleback and observe them in that way. As both a researcher and student worker, I have been able to be a part of an amazing learning community in Lasry. I can learn from all of the professors, Ph.D. students, and staff that I've built a relationship with and that has been really invaluable to me." What initially drew Doreen to Clark was the welcoming and friendly environment. DOREEN: "There are so many different types of research going on so there is something for almost everyone and because Clark is a small institution, individualized attention is a guarantee." When not dissecting stickleback or studying Doreen can be found exercising in the Kneller, planning events for the Caribbean African Students Association, or finding new local eats. After graduation, she plans to go into nursing.

Meyer Lab

DEANNA SCAHILL

Deanna is a senior majoring in Biochemistry and Molecular Biology. Originally from Rochester, New Hampshire, she was drawn to Clark by its size. During her undergraduate career, Deanna has been able to work on exciting scientific research projects and is currently working on a project that involves using the drug IWR-1-endo to block the Wnt pathway in the annelid Capitella teleta. Wnt is involved in brain formation and neural tissue in Capitella teleta. IWR-1-endo stabilizes the Axin protein which leads to β-catenin degradation and blocks the Wnt pathway. Deanna tests different concentrations of IWR-1-endo to see the effects it has on neural tissue formation in Capitella teleta. DEANNA: "Over the last couple of semesters I have been able to learn more about antibody staining, PCR, and imaging and how to interpret and write scientific papers. The project I am working on allows me to practice chemistry with the drug treatment and signaling pathways as well as biology with the animal care and imaging developmental changes." Deanna hopes to leverage skills that she has learned into a career as a physician assistant. When not researching, she works as a member of the covid/quarantine response team on campus and stays active with fun activities such as tennis or golf.

DAVIN TAFURI

Larochelle Lab

Davin is a junior from Bridgton, Maine right near New Hampshire. DAVIN: "If you're a fan of author Stephen King you might know it as the setting of The Mist." He is majoring in Biochemistry and his research is centered on finding the cellular function of the enzyme DNA methyltransferase 2 (Dnmt2). DAVIN: "Many organisms have analogs of the enzyme, and it's known to be involved in tRNA methylation. I'm supporting the research of Zaza Gelashvili, a graduate student, under the guidance of Dr. Larochelle." Davin will pursue Clark's 5th-year program, and then plans to pursue a Ph.D. in Biochemistry. DAVIN: "Right now I'm taking the Chemistry and Biology of Medicine course, and the discussions have gotten me interested in cancer research." It was Clark's small size that solidified it as his top choice. DAVIN: "Everyone is also so welcoming!" Davin particularly enjoys Biochemistry because of the wide range areas of research. When not in the lab Davin enjoys supporting local Worcester restaurants. DAVIN: "In Worcester, there's a Mediterranean restaurant called Aladdin that has the best hummus and bread I've ever eaten." Davin's most important advice for prospective students is to utilize the faculty, who are always excited to discuss their research and hearing from undergraduates.

CONGRATS TO THE UNDERGRAD CLASS OF 2021!

BIOLOGY: Ariana Afshar, Sarah Asseraf, Sarah Bibeau, Madison Buckler, Hoang Chenh, Catherine Crowley, Diva Dreyer-Maruyama, Hannah Everhart, Michael Fenn, Dyujae Gayman, Sabrina Hallal, Koki, Hayashi, Lucas Hoffner, Joan Hurle, Kelsey Joyce, Jason Kan, Sophia Kaplan, Jeanne Kim, Kayla Kupstas, Makiya Lloyd, Campbell MacKenzie, Elana Matulis, Emily Maynard, Ivette Mendoza, Morgan Mooney, Isaac Nugent-Faverman, Hannah Olech, Deirdre Pedersen, Isabella Reichel, Kaitlyn Savage, Lia Scala, Jacklyn Smith, Tara Stein, Karlie Stockford, Joseph Teng, Mariana Torres, Zhuoyun Wan, Kayleigh Watson, Jenna Wattu, Kelly Zdanuczyk. **BIOCHEMISTRY:** Sarah Berube, Elizabeth Bosia, Samantha Brown, Jue Chen, Hannah Evers, Matthew Finnegan, Samuel Hartley, Conor Khung, Elaine LaBarbera, Phuong Le, Rafael Levin, Wentao Li, Chi Nguyen, Tarishi Pathak, Deanna Scahill, Slesha Shrestha, Kendyll Smith, Tyler Vincent, Victoria White. **ENVIRONMENTAL & CONSERVATION BIOLOGY:** Christopher Aulbach, Erik Boquist, Carley Cascione, Amelia Curry, Meghan Davinroy, Duncan Drapeau, Allison Dubick, Juliana Fetkewicz, Katherine Flesher, Brooke Harris, Ethan Manley, Emily Michelfelder, Galen Oettel, Christopher Radovic, Bailey Ross, Aandishah Samara, Olivia Yeager.

Graduate Student Spotlights

NICOLINA BRACCIO - Drewell Lab

5th-year Biology Masters student Nicolina, received the prestigious 5th year 2019 Beavers Summer Research Fellowship going into her senior year and later received a 5th-year research stipend from the Biology Department during summer 2020. The Nashua, NH native has had the opportunity to conduct a summer research project involving the Twin of Eyeless (TOY) gene, which controls eyesight, in fruit flies. This particular gene is important since it is homologous to a gene in humans that, when mutated, causes issues with eye development. During her research, Nicolina was determining which cis-regulatory modules (CRMs), (which are small sets of DNA sequences), bind to and regulate this gene.

Nicolina's search for a summer research fellowship began when she wanted to advance her research in her 5th-year master's program for her thesis in "Identifying putative cis-regulatory modules that regulate the Twin of Eyeless gene in Drosophila melanogaster embryos." Nicolina's journey at Clark began in Fall 2016, where during her undergrad years Nicolina fell in love with Biology and was fascinated by the interdisciplinary nature of the subject matter. NICOLINA: "During my undergrad, I also minored in Management. I found management useful since it provides you with leadership and communication skills that are important in any work setting." At Clark, Nicolina has been able to research in Professor Rob Drewell's Lab which focuses on molecular genetics, developmental biology and computational biology. In the lab, she performs experiments like situ hybridization and maintaining fly lines. Nicolina was able to learn how to image embryos on slides under the microscope. When not in the lab she trades in her white lab coat for a pair of running shoes. NICOLINA: "I love running! I ran cross country all four years at Clark and run every day." After Clark, Nicolina will pursue a career as a medical scientist.

CATHERINE CROWLEY - Ahlgren Lab

Katie is a senior who graduated early with a major in Biology and a concentration in microbiology. She is now on her way to complete her Master's and is originally from Bolton, MA. KATIE: "Bolton is a small farm town which is very famous for apple growing!" Katie is currently a member of the Ahlgren Lab and is completing her research on the microbiome of echinoderms (sea stars and sea cucumbers). KATIE: "I am comparing the microbiome across three species." Dr. Ahlgren's Microbiology course peaked her interest in marine microbiology. Overall, Katie has enjoyed her time at Clark. KATIE: The professors and people are great! They will provide you the resources to succeed and they are very encouraging." During her time here Katie has been awarded several prestigious awards such as the SURE and the SURP summer research awards. KATIE: "I have been working in a lab since my 1st year. First in the Foster/Baker Lab and then the Ahlgren Lab. I have also conducted field research in Alaska. Research doesn't work out because of how 'good' of a scientist you are. Things come together with grit and tenacity. I have to remind myself that when I hit roadblocks." Even when COVID-19 changed the operations of the lab and limited the number of Lab members, Katie encouraged students to get involved. KATIE: "Reach out to professors and ask about opportunities. Campus research has been the highlight of my college experience." In her free time, Katie can be found enjoying Green Hill Park, studying outside, going on runs, hiking, or playing field hockey. Following her time at Clark, Katie plans to pursue a Ph.D. in Marine Science. She believes that Clark has prepared her success and encourages other Clarkies to be themselves and go after thier interests. KATIE:"If there is one thing I learned at Clark it is that the community is wonderful and you will find a good direction."

CONGRATS TO THE GRADUATE DEGREE RECEIPENTS IN 20/21!

Justine Bohl (M.S. – Biochemistry)
Hector Bucaro-Molia (M.S. – Biochemistry)
Skyler Duda (M.S. – Biology)
Zaza Gelashvili (M.S. – Biochemistry)
Saadman Islam (M.S. – Biochemistry)
Valerie Ivancic (Ph.D. – Biochemistry)
Emily Ladda (M.S. – Biochemistry)
Young Sun Lee (M.S. – Biochemistry)
Ashley Renfro (M.S. – Biology)
Kayla Rich (M.S. – Biochemistry)
Rylee Simons (M.S. – Biochemistry)
Qurrat (Anny) Ul-Ain (M.S. – Biochemistry)

Faculty Highlights

Nathan Ahlgren:
Published - Thompson, A. W., Kouba, K., & Ahlgren, N. A. (2021). *Niche partitioning of low-light adapted Prochlorococcus subecotypes across oceanographic gradients of the North Pacific Subtropical Front.* Limnology and Oceanography. https://aslopubs.onlinelibrary.wiley.com/doi/full/10.1002/lno.11703

Philip Bergmann:
Published - Bergmann, PJ, Morinaga, G**, Freitas, ES**, Irschick, DJ, Wagner, GP, Siler, CD. 2020. *Locomotion and palaeoclimate explain the re-evolution of quadrupedal body form in Brachymeles lizards.* Proceedings of the Royal Society B 287: 20201994. The article recieved mentions in multiple publications, including The New York Times: https://www.nytimes.com/2020/11/10/science/skinks-lizards-legs.html
Presentation - Cheu, A. Y., & Bergmann, P. J. (2021, January). *Choose your own adventure: Performance and kinematics of multiple climbing and swimming strategies in lizards.* Annual Meeting of Society for Integrative & Comparative Biology. Virtual: Society for Integrative & Comparative Biology.

David Hibbett:
Published - Sánchez-García, Marisol, Martin Ryberg, Faheema Kalsoom Khan, Torda Varga, László G. Nagy, and David S. Hibbett. 2020. F*ruiting body form, not nutritional mode, is the major driver of diversification in mushroom-forming fungi.* Proceedings of the National Academy of Sciences USA, December 22, 2020 117 (51) 32528-32534; DOI: 10.1073/pnas.1922539117

Alicia Knudson:
Visting Professor and PhD alumni, Alicia Knudson has accepted a tenure-track position at Millikin University in Decatur, Illinois.

Kaitlyn Mathis:
Published - Anastasio, O., Mathis, K. A., & Rivera, M. J. (2021). *Impacts of Invasive Ant-Hemipteran Interaction, Edge Effects and Habitat Complexities on the Spatial Distribution of Ants.* Agriculture Ecosystems & Environment.

Néva Meyer & Javier Tabima:
This spring Professor Meyer and Professor Tabima led a collaboration with an afterschool program through Recreation Worcester (RecWoo). The a team of Clark professors, graduate and undergraduate students presented six weeks of workshops on topics ranging from animal body plans to neuroscience to the structure of DNA for elementary school students.

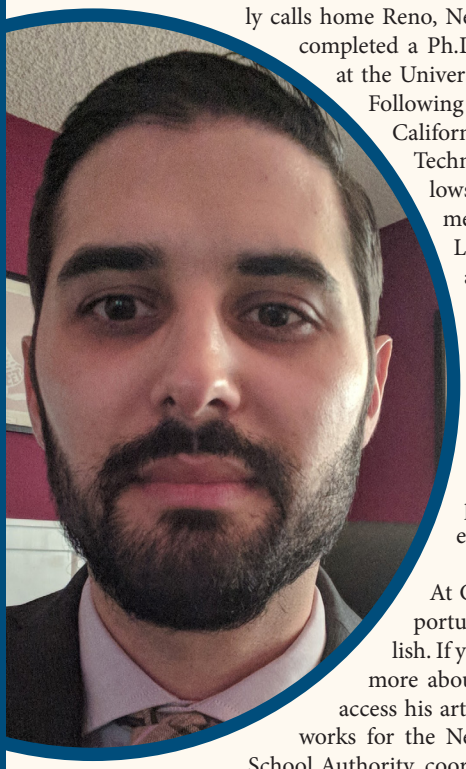
Deborah Robertson:
Deb is currently serving Vice-President/President-Elect of the Phycological Society of America (PSA). PSA is an international scientific society dedicated to research and teaching about all aspects of phycology (the study of algae). The society also publishes the Journal of Phycology, the leading journal in algal research.

Javier Tabima:
Javier is the Faculty advisor for new student club, *Lantix in STEM*, focused on enhancing and promoting STEM for Latinx students at Clark.

Javier Tabima & Kali Brandt:
Published - Brandt, K. M., Chen, X., Tabima Restrepo, J. F., See, D. R., Vining, K. J., & Zemetra, R. S. (2021). *QTL Analysis of Adult Plant Resistance to Stripe Rust in a Winter Wheat Recombinant Inbred Population.* Plants, 10(3), 572. https://doi.org/10.3390/plants10030572

Alumni Spotlights

BRANDON GAYTON '07 & '08



Brandon Gaytan completed his B.A. in Biology and Computer Science in 2007 and later finished his M.A. in Biology. Brandon currently calls home Reno, Nevada. Post Clark, Brandon completed a Ph.D. in Molecular Toxicology at the University of California, Berkeley. Following that, he participated in the California Council on Science and Technology Science Policy Fellowship, where he worked with members of the California Legislature in Sacramento to analyze and pass legislation on topics such as energy, the environment, public safety, and education. BRANDON: "I moved to Reno, NV and have been working for various state government agencies in positions related to K-12 educational data".

At Clark, Brandon had the opportunity to research and publish. If you are interested in learning more about Brandon's work you can access his articles here. Today, Brandon works for the Nevada State Public Charter School Authority, coordinating many data-related topics such as assessments, reporting, and school ratings. BRANDON: "After working on the policy creation side, it is interesting to see policy implementation at a state agency".

At Clark, Brandon immersed himself not only in Biology and Computer Science classes - but also classes like, French. BRANDON: "I was able to have fun with my assignments, like writing a description of my favorite superhero in French. My favorite Biology class was Microbiology, taught by Tom Leonard."

Brandon recalls the first time the Lasry Center opened. BRANDON: It was so exciting to have new classrooms and lab space, and I am in the picture that I believe still hangs in the entry". At Clark, Brandon played the violin in the Clark Sinfonia, which is a small chamber orchestra led by Peter Sulski. BRANDON: "We held many public concerts and even went "on tour" to places like London and Cyprus". During his years at Clark, Brandon would enjoy exploring Worcester's restaurants. BRANDON: "I miss eating at Dalat—I hope it still exists"!

Although not currently employed in a "science field" Brandon says that "the skills I acquired during my training have been applicable to my current and prior jobs. I think and contribute differently than my colleagues, which contributes to the ever-important diversity in a workplace. I still use my skills in various hobbies, such as hiking/backpacking (plant/wildlife identification), homebrewing (yeast and aseptic technique), and woodworking (safety/calculations)!"

BRANDON: "Don't insist on or feel you have to stick to one career outcome—be open to all possibilities and most importantly, take care of yourself along the way!

DR. KARISSA LEAR '13

Based in Perth, Western Australia Clark University Alumni Karissa Lear graduated from Clark in 2013. KARISSA: "After Clark, I applied for 30 different jobs or internships, heard back from exactly one, and moved to Florida to begin an internship at Mote Marine Laboratory in a group using electronic tagging techniques to study behavior and physiology of sharks". Karissa decided to stick around at the Mote Marine Laboratory and later got hired as a full-time employee. Karissa worked at Mote until a Ph.D. opportunity came up in Australia.

KARISSA: "I had always wanted to live abroad for a while, and I got a few scholarships which made it difficult to say no, so I moved over to Western Australia". Karissa's Ph.D. work focuses on how climate change and water resource development affect the behavior, physiology, and survival of a Critically Endangered sawfish in remote nursery habitats. Karissa completed her Ph.D. and decided to stay in Australia as a postdoctoral research fellow at Murdoch University. Karissa's work involves tagging techniques, including accelerometry, biologging, and acoustic tagging, as well as traditional research survey techniques to study how land/water resource developments, climate change, and fishing affect threatened sharks and ray fauna, including sawfishes and wedgefishes. Many elasmobranch species, and sawfishes and wedgefishes in particular, are highly imperiled in most of the world, but still have healthy populations present in northwest Australia, in part because much of the area is not developed and there are still many pristine habitats left untouched.

KARISSA: "My work looks at how sharks and rays use these habitats, and how potential developments, in combination with other pressures such as climate change and fishing, are likely to affect these species.Karissa's most memorable classes were Animal Behaviour taught by Dr. Foster, Biology of Symbiosis by Dr. Hibbet, and Ecology of Atlantic Shores by Drs Robertson and Livdahl. KARISSA: "These classes were challenging and fulfilling – I know these classes prepared me well for being able to critically read scientific literature and write well". Her most memorable experiences in the lab was her honors project where she investigated the genetic diversity of seagrasses. KARISSA: "I have firmly ingrained in my memory many hours spent grinding up eelgrass and running hundreds of PCRs in the lab, trying to get PCR black magic to work in my favor." KARISSA: "I also studied abroad in the Turks and Caicos Islands on a marine field studies program".

If you are interested in learning more about Karissa's work and research check out her Google Scholar profile.

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JACOB STEENWYK '15

Originally from Pasadena, CA - Jacob had come to the East Coast to complete his B.A. in Biochemistry and Molecular Biology. Jacob later did his 5th-year master's program in Biology. During his 5th year program Jacob worked with Drs. John Gibbons and Robert Drewell. At Clark, Jacob was involved in the Emergency Medical Services (EMS) program; where he served as the secretary and co-director of the group Following his 5th year, Jacob went to Nashville, TN to pursue a Doctor of Philosophy in Biological Sciences at Vanderbilt University. Today, Jacob is a Howard Hughes Medical Institute James H. Gilliam Fellow conducting predoctoral studies in the field of Biological Sciences. His research blends the fields of evolution, genomics, bioinformatics, and software development to study the evolution of fungi important for human welfare including those that cause disease or those used in food production. Jacob's time at Clark has consolidated and informed his work today. JACOB: "My favorite graduate course was in mycology, taught by Professor David Hibbett. Dr. Hibbett had a major impact on my career trajectory. I admired his dedication to student learning and high impact research on complex polysaccharide degradation in fungi." Jacob recalls conducting bioinformatic experiments for the first time. JACOB: "It was a really exciting time and opened my world up to a diverse array of questions."

Outside of the lab Jacob fondly looks back on working with Clark University's Emergency Medical Services (EMS). JACOB: "There were times when we really impacted the patient's outcome positively." At Clark, Jacob learned about the importance of community. He was also able to cultivate his love for art. JACOB: "It takes a village to raise a scientist and I thank the Biology department for being a fantastic village to start my scientific career in. I also maintain a strong interest in art. I have opened up an art store wherein 100% of profits are donated toward wildlife conservation." The store can be accessed here: https://www.etsy.com/shop/JLSteenwyk.

Jacob has been able to publish 40+ scientific articles. JACOB: "Among these, I would like to share ClipKIT, an alignment trimming algorithm I developed." Jacobs's research group was able to discover a pathogenic hybrid filamentous fungi and also discover a lineage of budding yeast that lost numerous cell-cycle and DNA repair genes. Jacob advises students to find a career path that you wake up every day excited to do.

If you are interested in learning more about Jacob's work follow him on Twitter and check out his website.

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a scanning electron microscopy to study the microstructure of reptile skin and to test if this microstructure has evolved convergently in burrowing forms; and a study of body shape and vertebral evolution in amphibians.

For more information on cutting-edge research, you can check out the Evolutionary Functional Morphology Bergmann Laboratory website.