



University of Central Oklahoma Department of Biology

Bioluminescence Newsletter ***2018-2019***

Chair's notes

The 2018-2019 academic year saw some significant changes and milestones in the Department. The grand opening for the Donald Betz STEM Research and Learning Center was held in November. This building, which has state of the art research and teaching space, is now home to seven of our faculty members. Renovations of Howell Hall provided additional office and research space for our students and faculty. Renovations also allowed us to expand space for our Natural History Museum collections and reestablish the Biology Conference Room. Special thanks to Mr. Will Unsell for keeping this all on track.

Dr. Brandt Cassidy, a molecular biologist, who holds a joint appointment with the Forensic Science Institute, joined our faculty in January. Ms. Katelynn Knick joined the department as our new Administrative Assistant III and Ms. Megan Ashby came on board as our new Administrative Assistant I. We are extremely excited to have these talented individuals as part of our team. Faculty member Dr. Troy Baird, a vertebrate zoologist, retired in June after 30 years of outstanding teaching, service, and scholarly activity. He leaves a legacy in scholarly activity and student-centered research that any faculty member would be proud of and want to model.

Dr. Beth Allan was elected President-Elect of National Science Teachers Association (NSTA) and Dr. Wayne Lord was the recipient of the 2019 Oklahoma Medal for Excellence (Regional University/CC) by the Oklahoma Foundation for Excellence. We congratulate them on these well-deserved honors. Dr. Carrie Bentley, along with our Career Development Center, organized and held our First annual Health Professions and Life Science Career Fair. More than 100 students attended. Thanks to Dr. Carrie Bentley for all her efforts to put this together.

Many of our undergraduate research students presented their work at various scientific meetings such as the Texas Society of Mammals meeting, Oklahoma Academy of Sciences Technical meeting, Oklahoma Research Day, and Southwest Partners in Amphibian and Reptile Conservation meeting. Seven graduate students (Matthew Nichols, Mariah Small, Rikki Curto, Pratiksha Kshetri, Sara Vrla, Erin Lehnert, and Kristy Meyer) successfully completed their M.S. degrees and are now moving on to the next stage of their careers. We are proud of them and wish them well.

Detailed information about all of the exciting things that our students and faculty are up to in the Biology Department can be found in this edition of Bioluminescence and if you haven't stopped by the Department in a while, come by and visit us soon.

"Democracy cannot succeed unless those who express their choice are prepared to choose wisely. The real safeguard of democracy, therefore, is education". Franklin D. Roosevelt

Meet the faculty and staff

Dr. Brandt G. Cassidy – Associate Professor

I moved a lot while growing up. Before I finished high school, I had lived in 13 different places. No, not military, but my father was an exploration geologist for Amoco International Oil Co. The 4 years I spent growing up in Tripoli Libya gave me a very different perspective of the world and I developed a love for travel. I completed high school in a suburb north of Chicago and went to the green pastures (corn and soybean fields) of Iowa to attend Iowa State University. I received my bachelor's degree in biology and fell in love with science. I took every lab class I could and especially enjoyed learning about Dr. McClintock's "jumping genes" in corn. A love for DNA must be in my epigenetics.

After 2 years as a technician in a lab at Baylor College of Medicine I received the opportunity to pursue a Ph. D. in Pharmacology there. In a brief 5 years, I got married and gave birth to a thesis entitled "In vitro analysis of the cis acting transcriptional elements of the rat ribosomal gene". I had become a gene jockey molecular biologist. I spent 3 years as a postdoctoral fellow at the University of California in Davis trying to genetically engineer good agronomic properties into bread baking wheat varieties. This was a challenge. I followed this with 9 years at the Samuel Roberts Noble Foundation in Ardmore, Ok trying to genetically engineer virus resistance in commercial peanut varieties. One day a few of my friends were talking about starting a DNA testing company to offer a service to perform DNA analysis for applications in human, plant and wild animal identifications. They asked who wanted to quit their job and I raised my hand. In 1998 I became President and CEO of Ardmore Biological Analysis. After 2 years the company was acquired by Dr. Thomas Kupiec in Oklahoma City and renamed, DNA Solutions. I was Laboratory Director and Technical Leader for this service/forensic laboratory until January of 2019. An opportunity presented itself to become a member of the Faculty as an Associate Professor



April 2019 trip to the National Fish and Wildlife Laboratory in Ashland Oregon.



July presentation to the National Wildlife Enforcement Officers

with a joint appointment between the Forensics Science Institute and the Biology department and I jumped at it.

I have always looked for opportunities to travel as a scientist. I had had the opportunity to teach courses in plant virus detection and identification at the University in Khon Kaen Thailand and Pretoria South Africa. I have had the opportunity to present in Hyderabad India and visited the Taj Mahal, Cairo and visited the Giza pyramids, Jerusalem and walked the streets of the Holy City, toasted scotch at meetings in Dundee and Edinburgh Scotland, and was invited to give a keynote address at the opening of a new Forensic Institute in Foshan China. Did I mention I love to travel? One of my favorite vacations was a cruise through the Galapagos Islands.



Helix among the flowers in my front garden

Having been settled in Oklahoma for the last 30 years I guess I am an Okie. I love being outdoors. I have been rowing on the Oklahoma River for the last 12 years as part of a corporate team. I have become an Oklahoma Master Gardener through the OSU extension office in Cleveland County. I love to fish and play with my toy Australian Shepard, Helix. She is great. I am looking forward to learning about all my new colleagues here at UCO.

Dr. Jenna Messick – Assistant Professor

Hello everyone! I am Dr. Jenna Messick and I am a plant nerd. I come to you from Norman, OK, but I've lived in Florida and Kansas in the past. Oklahoma is home, I have lived in a variety of places in Oklahoma but mostly in Norman.

I love science, especially researching about and growing plants! I like to focus on Oklahoma native plants but really, I love them all. In any of my research, I use a mix of field and herbarium specimens. I prefer being outside whenever possible, but when our Oklahoma weather just doesn't cooperate, there's always data to be collected from the herbarium. An herbarium is where we botanists archive plant history in the form of smashed, dried, dead plants.



This is me with a science button I found then promptly lost after taking a few photos with it.

My bachelor's degree is in Botany and Anthropology. While I was an undergrad, I worked in the Robert Bebb Herbarium at OU then for the Oklahoma Biological Survey. I mounted plant specimens for archival in the herbarium and helped database specimens into the Oklahoma Vascular Plants Database. I also worked as a student employee for the US Fish & Wildlife Service. This project created historic vegetation



Here's what Penstemon oklahomensis looks like. I love its weird flower shape.

maps of the Wichita Mountains National Wildlife Refuge from the original land surveys before statehood.

I stayed at OU for my master's in Biogeography. I researched the habitat and seed germination requirements for the Oklahoma Beardtongue (*Penstemon oklahomensis*). From both its common and scientific names, you can see it's an Oklahoma native wildflower! Prior to 2010, it had only been collected within our state! Because this wildflower is somewhat rare in the world, I also modeled its potential distribution within the state and used my model to successfully locate two new populations. The information generated from my research about this plant's needs is currently used by the Biological Staff at Tinker Air Force Base to manage their lands and preserve its habitat on base.

After finishing my master's, I went back to Florida for a short while but ended up back at OU for my Ph.D in Biogeography. One part of my dissertation research wrapped up a seven-year field-based budburst and leaf-out phenology project for two common species of oak trees: blackjack oak (*Quercus marilandica*) and post oak (*Quercus stellata*). At least during the study period, these trees are not changing their timing of budburst,

but I did determine that a combination of temperature, precipitation, and daylength trigger the onset of budburst. Also, warming temperatures and precipitation are what really get the leaf-out process going. The second piece of my research looked for potential changes in the flowering times of twenty plant species throughout the collecting history of our state using only herbarium specimens. I found some interesting results with this project. Some of the species I looked at were not just flowering either earlier or later, they were shifting or shortening their flowering periods! I had a third piece of Sassafras seed germination research going but some pesky non-native snails (*Cornu aspersum*) ate all my baby trees! Ah, but that is science I suppose, things like that happen. The



I think blackjacks in flower are really photogenic.



A nice patch of Salvia with some monarchs in northwest OK

positive note from my trees getting eaten was that a fellow researcher at the Oklahoma Biological Survey was already looking into how these snails got to Norman from the Mediterranean region of Europe. I brought her a sample of the snails and a full-scale survey project took off for her and her students. They were able to determine which house in my neighborhood was the epicenter of

plant destruction. Turns out, these snails are following the horticultural plant trade around the world!

While working on my Ph.D., I was the teaching assistant for the GIS labs where I taught students to use GIS software, to make informative maps, and perform basic spatial analysis. I like maps and making them is an interesting process! I also spent a year “traveling by map” to georeferenced tens of thousands of specimen records for an upcoming database of Oklahoma’s Biodiversity. These specimens included plants, birds, reptiles, bison, bats, and many more!

For the past two years, I have been in my Post-Doctoral research position in the herbarium at OU. It’s funny how I started there as an undergraduate and came back around there to wrap up my time in Norman. I have been studying the population genetics of the Blue Pitcher Sage (*Salvia azurea*) using next generation sequencing of freshly collected plant material and from herbarium specimens. This mix allowed me to sample far and wide at fraction of the cost to travel all over this species’ range! At home I have a bunch of “house” plants to tend to, from weird little cacti and succulents to a very large ficus tree that is over 50 years old! I love the challenge of growing something from seed and then waiting for it to grow up. All of my plants have names, the big ficus tree is Benjamin, the plumeria is Mary, the bird of paradise is Bird, the pereskia cactus is Pete and its cutting is Repeat... I never said they were all good names! Now that I have moved to Edmond, I will put in a vegetable garden for next year. When I’m not doing “plant stuff,” I like bird watching, going fishing, kayaking, rock hounding, and spending time with my dog, Maggie. She enjoys sleeping on the couch, chasing squirrels out of the yard, barking at nothing, and demanding her nightly walk around the neighborhood. When it’s too cold to be outside, I like to relax with a puzzle, work on my stamp collection, or watch a movie. I am excited to be here at UCO to share my love of plants and science with all of you!



This is Maggie sporting her OU jersey on game day.

Dr. Andrew Taylor – Assistant Professor

Hi UCO Biology! I am thrilled to start this semester as your new resident “fish guy” within the department. I was born and raised in the rolling hills of Rome, Georgia, where I quickly picked up the hobby of fishing as a youngster. Unbeknownst to me at the time, I grew up with one of the most biologically diverse river systems in North America – the Coosa River – right in my backyard! I try to make it back there often to visit my family and the waterways I loved to explore as a kid.



My academic career in biology began as an undergraduate at the University of Georgia (UGA; Go Dawgs!), where I earned a B.S. degree in fisheries management and aquaculture. My undergraduate training involved many field- and laboratory- based courses, as well as an emphasis on internship experiences during the summer months. As a summer intern for the Georgia Department of Natural Resources (GADNR) Stream Survey Team, I helped catalog stream fish assemblages across the state's waterways. This work really opened my eyes to the magnitude of man's impact on aquatic systems and the need for science-based conservation efforts. I also worked as a research technician in coastal Georgia performing mark-recapture studies on federally protected Atlantic and Shortnose sturgeons. In this position I also got to handle plenty of interesting marine and estuarine species, including sub-adult Bull Sharks. For my undergraduate capstone project, I worked in the Georgia Museum of Natural History to describe morphological variation within the "Redeye Bass complex" (*Micropterus* spp. cf. *coosae*), which led to the discovery of several described and tentative species including the "Bartram's Bass".

My interest in research led me to pursue my M.S. degree in fisheries at UGA, where I continued my research on native black bass species. In collaboration with GADNR biologists, I undertook a status assessment of what was thought to be one of the most robust populations of Shoal Bass (*Micropterus cataractae*) in the state. My studies combined mark-recapture, radio telemetry, and population genetics to get an overall assessment of the status of this population. I supported my time in graduate school via teaching assistantships in ichthyology and other ecology-based laboratory courses, and it was during this time I realized my passion for teaching and mentoring students. Upon finishing my M.S. research, I was hired as Assistant Hatchery Manager at GADNR's Lake Burton Hatchery, situated in the mountains of northeastern Georgia. There, I oversaw the day-to-day care and stocking of over 500,000 Rainbow, Brown, and Brook trout.



My passion for teaching and research eventually led me to Oklahoma State University (OSU; Go Pokes!), where I earned my Ph.D. in fisheries and aquatic ecology under the direction of Dr. Jim Long with the Oklahoma Cooperative Fish and Wildlife Research Unit. My dissertation research focused on the effects of habitat fragmentation (e.g., dams) on riverine black bass species. I was fortunate to work collaboratively with federal and state biologists from

across the central and southeastern US. Through the integration of species distribution models, population genetics, and population dynamics studies, my research has helped inform several management and conservation efforts for native black bass species including conservation stocking, dam removal, and watershed restoration.

I remained at OSU for two years as a postdoc, where I was able to branch out into many new and exciting research topics. I assessed the invasion extent of a cryptic invasive species, the Asian Swamp Eel (*Monopterus albus*), by applying next-generation sequencing and sibship reconstruction to estimate the number of breeding adults in the population. I also began research on several “big river” fishes in Oklahoma (e.g., Alligator Gar, *Atractosteus spatula*), as well as studying



how anglers and the general public perceive and interact with different fisheries across the state. During this time I also taught a course on species detection and distributions at OSU, and my students worked collaboratively to author a manuscript on estimating the distribution of American Paddlefish (*Polyodon spathula*) in the Arkansas River Basin.

My family and I are excited to become part of the UCO and Edmond communities. I hope to inspire interest in fisheries and ichthyology at UCO via engaging coursework, field excursions, and individual research experiences. As curator of the UCO Natural History Museum’s Ichthyology Collection, I plan to facilitate the use of this incredible resource in teaching and research. I am also excited to get students involved in professional societies like the American Fisheries Society, and with enough interest, I would love to spearhead the formation of a student subunit at UCO. I look forward to forging productive research collaborations with colleagues, students, and natural resource agencies. Roll ‘Chos!

Ms. Katelynn Knick – Administrative Assistant III

I grew up in Tulsa, Oklahoma, where my younger sister, Jamie, and I spent most of our time with my grandma, grandpa, and great-grandma “Grannie” who collectively shared with us their love for fine art, garage sale shopping, and comfort food. I spent many summers at Camp Tallchief, a girl scout camp nearby, where I got my first job as a dishwasher. I loved being there so much that I continued to work and live at camp every summer between 2007-2012. While working in the kitchen, I was able to participate in the Counselor-In-Training program, then worked as a Counselor and Waterfront Lifeguard for several years. I graduated from Booker T. Washington High School in 2011 and moved to Norman, OK shortly after to attend the University of Oklahoma. As an undergraduate, I studied painting and sculpture and held various art jobs and internship positions at the Fred Jones Jr Museum of Art,

Oklahoma Contemporary, and Oklahoma Visual Arts Coalition in education and art administration. I graduated in 2015 and was hired that summer to work in the art department at OU as an administrative assistant, where I oversaw building maintenance, student relations, and organized the annual student art exhibition held at the Fred Jones Jr. Museum of Art. In October of 2018, I accepted the Administrative Assistant III position and joined the biology department at UCO.



Currently, I live in OKC with my husband Shawn, who is a local chef and culinary artist. We have organized several pop-up dinners at galleries, houses, and alternative venues. One of the most adventurous projects we've done was turn our house in to an art gallery for a weekend – I created a giant inflatable sculpture that guests could get inside of, hung art on the walls, and Shawn served tacos from the kitchen!



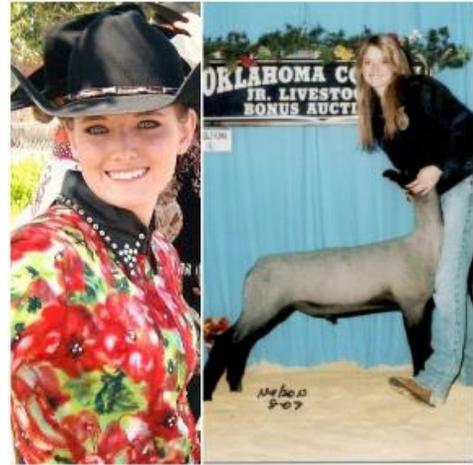
In 2016, I received several grants to study at the Anderson Ranch Art Center in Snowmass, Colorado with artist Holly Hughes, which pushed my work in to new directions as I started to experiment with site-specific installations and expanded painting practices. I started a local art collective,

Art Group, in November 2017 to encourage young, emerging artists to build community and share resources and ideas through monthly studio visits and drink and draws. I am also on the artist team of Factory Obscura, where we are creating permanent, immersive art in OKC and have contributed to *SHIFT (2017)*, *BEYOND (2018)*, and *Mix-Tape (2019)* experiences.

Today I create paintings, inflatable sculptures, and spatial work that explore humor, memory, and association through lyrical mark-making and color. Recently, my work has been exhibited at AHHA Tulsa, the Myriad Botanical Gardens, and MAINSITE Contemporary Art and has been featured in The Coastal Post, Art Focus magazine, Oklahoma Gazette, and Inspiring Conversations OKC Podcast. I'm very excited to be at UCO and to work with the diverse, incredibly talented faculty, staff, and students in our department!

Ms. Megan Ashby – Administrative Assistant I

Hi everyone! I started July 8th as the new Administrative Assistant in the Biology Department. I was born and raised on the outskirts of Edmond, OK. Growing up, we always had animals. We raised chickens, ringneck pheasants, horses, and I showed lambs in 4H and Edmond FFA Chapter. I enjoy hunting wild turkey and deer, both locally and on our Oklahoma WMA's.



After High School, I went to College at Redlands Community College in El Reno where I received my Associates in Equine Science. I then went on to obtain my Bachelor Degree in Equine Science at Oklahoma Panhandle State University.



While attending College I was a part of the Equestrian Team. My freshman year I qualified for IHSA Horsemanship Nationals, in Murfreesboro, TN. I went and came home with the 2009 IHSA National Champion title. One of the biggest accomplishments of my life. My sophomore year, I qualified for Semi-Finals in Pomona, CA. However, I drew a crummy horse and didn't place well enough to qualify for Nationals that year. However, it was still a great experience, and accomplishment to make it that far.

After College I came back to Edmond where I met my husband. We got married and moved to Cashion, OK in 2012. In June 2019, we moved onto 40 acres in north Edmond with our 4 kids, horses, heritage turkeys, and chickens. We live on Spring Creek that feeds into the Cottonwood. The property is heavily shaded with large, beautiful cottonwood and black walnut trees. We also have an abundance of wildlife including red fox, whitetail deer, bobcat, and wild turkey. I am so excited to start this new chapter of my life, and be back in my hometown.

Alumni News

Dr. Jaime Thomas, D.O.

I started the journey of my career at UCO majoring in biology. UCO brought me so many opportunities that I still look back at today and am thankful for. I attended OSU COM for medical school and chose the wonderful and rewarding field of psychiatry as my specialty. I am currently in Philadelphia in my 3rd year of residency and couldn't be happier!



Dr. Joanne Lykins Peterson (BA 1998, BSEd 2003, MS 2009) received a PhD from University of Oklahoma Health Sciences Center in 2013. She was an Assistant Professor of Biology for 4.5 years at Southern Nazarene University. She is currently an Assistant Professor of Anatomy at the Arkansas College of Osteopathic Medicine in Fort Smith AR, as well as, a

national faculty member for NBOME.

Nimmy (Varghese) Mathew (BS in Biology, 2012) continued education at OUHSC & obtained a Masters in Public Health in Health Administration & Policy degree (2014). She moved to Kansas City, MO to attend pharmacy school at UMKC & graduated in 2018. She is currently working as pharmacist at CVS Pharmacy.



Museum & Selman Living Lab

Natural History Museum Notes

By Lynda Loucks, UCONHM Collections Manager

One of the current projects includes continuation of the digitization of the mycological collection housed in the Herbarium of Howell Hall. Mike Raischel worked with Dr. Ovrebo in the mycological collections until graduating in May 2019.

To date, over 1250 Oklahoma fish specimens have been cataloged into the UCONHM vertebrate collection. The ichthyology collection is housed in the wet storage museum room in Howell Hall. This comprehensive fish collection was donated by the Oklahoma Water Resources Board two years ago and continues to be a work in progress as specimens are accessioned and moved into museum quality storage containers with labels. The OWRB continues to support our efforts in preserving and maintaining this important collection of



Oklahoma fishes. Our new ichthyology curator, Dr. Andrew Taylor, is excited to begin curating the fish collections this fall.

Graduate student Gabriel Rucci has been a real asset to the UCONHM for the past year and will continue his stellar work in the museum collections this fall. Studying pollination biology for his master's thesis topic, he has been a perfect fit for organizing, cataloging and digitizing both the plant collection and terrestrial invertebrate collection. To date there are over 15,000 accessioned plants in the UCO Herbarium and approximately 10,000 terrestrial invertebrates.



The museum is



expanding! The UCONHM was fortunate enough to have new museum space added this summer. The herpetology collection, including turtle shells and various reptilian skeletal materials, will be moved into a separate dedicated space for that particular collection. Although not officially completed yet, the collection will be moved this fall. Look for more information in the next newsletter.

Several new county records were recorded this past fall through collection of road kill scavenged mammals. This information is important in updating Oklahoma wildlife distribution and ecology records. Curators and the Collections Manager continue to renew their scientific collector's permits annually. Mikayla Lowery worked two semesters in the mammal collection before graduating and pursuing a physician's assistant degree. Museum duties included processing and accessioning specimens and completing inventory on





specific groups of mammals. Will Unsell, the Biology Department Lab Manager, assists in processing specimens for incorporation into the various vertebrate collections.

The Collections Manager was interviewed by UCO Mass Communications student, Chris Baker, for the Rabid Rabbit Hole podcast in the spring of 2019. Oklahoma bats and ecology were discussed and most of the 24 bat species were represented by a museum specimen during the filmed podcast.

For more information about the Biology Department Curators and the UCONHM collections, please visit the link through the Biology Department website:

<http://sites.uco.edu/cms/biology/Facilities1/Museum.asp>

The Art Department, Library Archives, and Biology Department have participated in an educational collaboration for several semesters. In fall 2018 and spring 2019, drawing classes under the direction of Dr. Michael Litzau visited the UCONHM in Howell Hall. Continuing the UCONHM demonstrations for skin preparation, Brandon McDonald, Biology Department Lecturer, processed a cotton rat (*Sigmodon hispidus*) and graduate student Sarah Vrla gave the students a tour through the vertebrate and invertebrate collections. After this experience, students submitted drawings to display in the UCO Library accompanied by museum specimens also on display in the library.



Shikoh Shiraiwa, Library Archivist, facilitated the UCO collections exhibit that included pieces from collections across campus, including art and artifacts from the Melton Legacy, African Art, Oceanic Art, UCO History Museum, UCO Natural History Museum, and Oklahoma Fashion collections. Will Unsell and

Lynda Loucks moved specimens via golfcart to the library. The exhibit is displayed on the 2nd floor of the UCO Library.



Natural History Specimens Visit Local Community Groups:

Annually, specimens from the UCONHM visit schools around the state. In keeping with what has become an annual tradition, a trip was made to Centennial Elementary School in Edmond, OK, in October to discuss bats with all the kindergartners! These students and the kindergarten teachers (like Mrs. McBride) love bats and learning about these ecologically important and aesthetically cute animals.





In April 2019, the UCONHM was invited to participate in the annual STEAM and Urban League of Oklahoma City outreach program. This event was a special evening filled with excited and interested potential future UCO students and their parents! All participants and fellow exhibitors were eager to discuss natural history collections and biodiversity. *The Dead Zoo* was a success!

Student Highlights

Professional school applications: For the 2018 application cycle, 23 students applied to medical or dental school using the UCO Pre-Health Committee, and of those 14 were accepted. This 2019 application cycle, 30 students are applying to medical or dental school using the Pre-Health Committee. Also, one student, Cody Yelton, was accepted into the summer clinical program at Integris Deaconess Hospital of 13 that applied.

Marco Donoso, working with Dr. Chad King, was awarded the Botanical Society of America BSA PLANTS travel grant. Marco was awarded an all-expenses paid trip to the BOTANY 2019 annual conference in Tucson, Arizona.

Joseph Buck and Dr. Chad King published a manuscript entitled, "Characteristics of a bottomland hardwood forest at Arcadia Lake with special emphasis on green ash (*Fraxinus pennsylvanica*, Marshall) in the Oklahoma Native Plant Record.

Justin Cheek and Dr. Chad King, completed a research report for the Oklahoma Nature Conservancy entitled, "Fire history of Hottonia Bottoms Preserve and Boehler Seeps and Sandhills Preserve, Oklahoma."

It was a busy year for Tu Doan, undergraduate student working with Dr. Mel Vaughan. On March 26th Tu presented a poster at Research Day at the State Capitol and won 3rd place in the Regional/Community College category. In May, she presented her work at the Wound Healing Society meeting in San Antonio. In July, her work was published in the journal *Molecules*.



Theses Defended

Rikki Curto: A study of social rank development in captive African painted dog (*Lycaon pictus*) pups; Vicki Jackson (Chair), Rebecca Snyder, Tephillah Jeyaraj-Powell, Michelle Haynie. *Rikki completed a wildlife care internship this past spring at Wildcare and is now exploring lab opportunities as a manufacturing associate at a Bioservices company that specializes in cellular therapy products.*

Pratiksha Kshetri: The effects of *Staphylococcus aureus* secreted products on fibroblast lattice height and a correlated tension generation; Mel Vaughan (Chair), Robert Brennan, Hari Kotturi. *Pratiksha is currently a Research Tech II at USC.*

Erin Lehnert: Conservation status and threats to Rallidae: a global assessment; Chris Butler (Chair), Vicki Jackson, Auriel Fournier (external). *Erin is currently a biological services technician in Alaska's Tongass National Forest.*

Kristy Meyer: Reexamination of a pocket gopher (*Geomys*) contact zone in Oklahoma and hybrid identification using microsatellites and mitochondrial DNA markers; Michelle Haynie (Chair), Allyson Fenwick, Nikki Seagraves. *Kristy is currently a teacher at Epic Charter Schools.*

Matthew Dillon Nichols: Disease surveillance and projected expansion in climatic suitability for *Trypanosoma cruzi*, the etiological agent of Chagas disease, in Oklahoma; Wayne Lord (Chair), Robert Brennan, Vicki Jackson, Michelle Haynie. *Dillon is currently employed at the Oklahoma Department of Health.*

Mariah Small: Ticks and tick-borne pathogens of residential and non-residential parks in Edmond, Oklahoma; Robert Brennan (Chair), Sean Laverty, Chad King, Michelle Haynie.

Sarah Vrla: Genetic structure and the potential for hybridization in population of *Peromyscus spp.* f plateau regions in western Oklahoma; Michelle Haynie (Chair), Allyson Fenwick, Gregory Wilson. *Sarah is currently enrolled in a Ph. D. program at Texas Tech University.*

Club Activities

Pre-med/Health Profession Club



With a member base of over 250 students, UCO **Pre-med/Health Professions Club** achieved great success last year. Volunteering at events such as the Toby Keith Foundation, Walk to End Alzheimer's event, and Open Arms medical clinic just to name a few.



They enjoyed an opportunity to participate in a suture clinic courtesy of the U.S. Army and had some great guest speakers.

On one occasion they were even able to view a human brain because of their speaker Dr. Steve Cagle, a neurosurgeon!

Tri Beta National Honor Society and Biology Club:

Tribeta Biology Club had an eventful year with speakers from the department as well as the UCO Center for Counseling and Well-being and Dr. Caleb Marlin program director of the University of Oklahoma



Graduate Program in Biomedical Sciences (GPiBS). We had many events including the 5th Annual STEM Faculty and Student Appreciation Banquet (AKA Stem Shindig). Faculty from three departments attended and many students enjoyed a meal and entertainment. Our Psi Mu Chapter honor society members attended the South Central regional Meeting of the Beta Beta Beta Biological honor society held April 5-7, 2019 in Cedar hill, TX, with six students presenting and two students won awards. 3rd Place Outstanding Oral Presentation- Jailene Canales



and 2nd Place Outstanding Poster Presentation- Rebecca Woods. The following students presented their research: **Emily Falcon**, Poster presentation of her work with Dr. Allyson Fenwick on the Invasion of



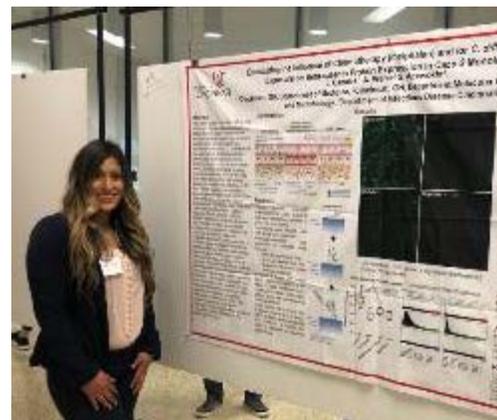
Mediterranean Geckos (*Hemidactylus turcicus*). **Rebecca Wood**, Poster presentation on her project at OMRF on Systemic Lupus Erythematosus. Four students working on Maternal PKU with Dr. Nikki Seagraves; **Kayley Pate**, Poster Presentation of her work on cell proliferation and migration; **Kayle Patatanian**, poster presentation of the role of the focal adhesion pathway in chick embryos; **Jailene Canales**, Oral Presentation on developmental defects in chick; **McKayla Muse**, Oral presentation on cell proliferation and migration.

Summer REU



Two chapter members, Kayley Pate and Jailene Canales (historian) were selected for summer research opportunities out of state. Kayley was accepted and into the Boston University School of Medicine Summer Training as Research Scholars Program (STaRS). She conducted a project funded by the American Heart Association SURE program. Jailene was

accepted into the Summer Undergraduate Research Fellowship (SURF) program at the University of Cincinnati College of Medicine. She studied the interactions of cells in the gut and the bacterium *Clostridium difficile* and how chemotherapy can affect the interaction.



Student Chapter of The Wildlife Society at University of Central Oklahoma

President Kaitlin Flores reporting

The student chapter of The Wildlife Society at UCO has been working incredibly hard this past year. Last October, TWS helped the Oklahoma City Zoo prepare for stomp and chomp, the zoo's annual Halloween event, by making enrichment items for the animals. TWS also raised money for the Wildcare Foundation for wildlife rehabilitation's spring baby shower that provides supplies for newborn animals. Some TWS members also volunteered their time to the Toby Keith Foundation and taught children with medical needs about wildlife. This upcoming school year, TWS plans to continue their hard work! TWS will continue their work volunteering for the Oklahoma City Zoo and Wildcare Foundation, along with other wildlife related organizations. TWS also hopes to collaborate with other student chapters and UCO clubs this upcoming year. TWS has a very exciting and eventful year ahead!



Student RCSA Grants Awarded: (\$500)

Natthapume Attamakulsri, "Determining the Effects of Myosin Light Chain Kinase and Myosin Light Chain Phosphatase in Caffeine Treated Collagen Matrices by use of Optical Coherence Tomography and Western Blot." Faculty mentor – Vaughan.

Micah Byrne, "Isolation of bacteriophage infecting the host bacterium *Mycobacterium smegmatis*." Faculty mentor - Kotturi

Savannah Pittman, "Isolation of bacteriophage infecting the host bacterium *Corynebacterium Xerosis*." Faculty mentor - Kotturi

Laura Powell, "Isolation and Characterization of *Gordonia* Bacteriophages." Faculty mentor - Kotturi

Umar Sahi, "The isolation of bacteriophages infecting the host *Mycobacterium abscessus*." Faculty mentor - Kotturi

Elaine Sawyer, "Cinnamon Oil Nanoemulsion as an Antimicrobial Treatment for Mung Bean Sprouts." Faculty mentor - Kotturi

Russell Smalley, "Survey of Ticks and Tick-Borne Pathogens from *Odocoileus virginianus* at Lake Arcadia in Edmond, Oklahoma." Faculty mentor - Brennan

Shelbie Weaver, "Comparing Community Structure and Distribution Patterns of Aquatic Macroinvertebrates in a Tall Grass Prairie Stream Ecosystem Following Restoration Practices." Faculty mentor - Bass

Jailene Canales, "Retinoid Gene Expression in Chick MPKU." Faculty mentor - Seagraves

Peace Ezinne Chinedu, "Testing Oklahoma soil for *Arthrobacter* sp. ATCC 21022 bacteriophages." Faculty mentor - Kotturi

Khue Tu Doan, "Determining the Effects of Glycated Chitosan on Fibroblast Proliferation and Differentiation using Laser Scanning Confocal Microscopy." Faculty mentor - Vaughan

Marco Donoso, “Quantifying Beaver Damage to Trees in a Bottomland Forest at Arcadia Lake, Oklahoma.” Faculty mentor - King

Kaitlyn Hickey, “Using Mitochondrial DNA to Assist in Wildlife Forensic Cases.” Faculty mentor - Creecy

Samah Houmam, “Documentation and Genetic Analysis of a Population of Mediterranean Geckos (*Hemidactylus turcicus*) at the University of Central Oklahoma and Surrounding Buildings.” Faculty mentor - Fenwick

Carlie Jennings, “Identification of Factors Impacting Population Persistence and Genomic Diversity In a Changing Environment: A Small Mammal Mark-recapture Model.” Faculty mentor - Haynie

Bailey Kephart, “Analyzing Ultraviolet Reflectance in Plumage to Determine Variations of Sexual Dimorphism in Avian Species in Correlation with Mating Behavior.” Faculty mentor - Butler

Matthew Larson, “Modeling the Projected Changes in Distribution of Five Palm Species as a Direct Effect of Changes in their Climate Suitability.” Faculty mentor - Butler

Amber Lemons, “Search for *Angiostrongylus cantonensis* in Oklahoma Terrestrial Snails.” Faculty mentor - Lord

Makayla McGuire, “Biomedical Assay Screening Using a Unique Sponge Collection.” Faculty mentor - Vaughan

Briant Nguyen, “Evaluating environmental factors influencing the distribution of Mediterranean geckos (*Hemidactylus turcicus*) at the University of Central Oklahoma.” Faculty mentor - Fenwick

Kayley Pate, “Investigating the effect of phenylalanine (PHE) on the cardiac and cranial transcriptome using quantitative PCR (QPCR).” Faculty mentor - Seagraves

Brooke Savoy, “Assessment of Population Status of Sonoran Mud Turtles (*Kinosternon sonoriense*) at Deer Creek Tank, Galiuro Mountains, Arizona.” Faculty mentor – P. Stone

Austin Segrest, “In vitro aging effects on myofibroblast phenotypes.” Faculty mentor - Vaughan

Gary Thomas, “Formatting Illumina Hi-Sequenced Data of Five Diatom Monocultures for Graphical Interpretation.” Faculty mentor - Parks

Faculty Grants Awarded:

Dr. Vicki Jackson, Mammal Survey for the Nature Conservancy-OKC Zoo Property, Nature Conservancy, \$3,060.00

Dr. Chris Butler, Evaluation of Black Rail Occupancy and Habitat Associations on the Texas Coast, USFWS - Tex Coast, \$75,000.00

Dr. Bob Brennan, Marshalling Diverse Big Data Streams to Understand Complexity of Tick-borne Diseases in the Southern Great Plains, EPSCoR (KU), \$133,944

Dr. Nikki Seagraves, Molecular Mechanisms of Cardiac Teratogenicity in Avian Maternal PKU, INBRE SMaRT, \$5,934.00

Dr. Nikki Seagraves, Role of Retinoids in Maternal Phenylketonuria, INBRE mini, \$28,547.00

Dr. Mel Vaughan, Glycated Chitosan effect on Collagen Compaction, INBRE summer ROA, \$2,200.00

Dr. Hari Kotturi, Isolation of antibiotic producers from Oklahoma soil, INBRE SMaRT, \$4,661.00

Dr. Paul Olson and Mr. Mark Walvoord, Composting – Natural Decomposition Performed by Microorganisms, Association for Biology Laboratory Education (ABLE) Roberta Williams Laboratory Teaching Initiative Grant, \$1,244.00

Other Faculty & Staff Highlights (with photos and captions if available)

Dr. Paul Olson

- Participated in the McGraw-Hill Education Non-Major Biology Symposium in Atlanta, GA and attended the National Council for Science and the Environment (NCSE) 2019 Summer Meeting at the University of Arkansas as well as the American Association for the Advancement of Science (AAAS) “Science in the Classroom” workshop held at AAAS Headquarters in Washington, D.C.
- Presented the talk “Simple Metacognition Strategies That Improve Student Learning” at the 20th Annual Collegium on College Teaching Practice at the University of Central Oklahoma, August 14, 2019

Dr. Mel Vaughan

- Presented a seminar entitled, “Caffeine effect on fibroblasts: It blocks leading the horse to water but can’t stop it from drinking” for the Biological Sciences Seminar Series at Wichita State University and became a member of the Wound Healing Society’s Membership Committee in 2019.

Drs. Chad King, Brandt Cassidy, and James Creecy

- Traveled to Ashland, Oregon, along with two students in April 2019 to meet with professionals at the U.S. Fish & Wildlife Service Wildlife Forensic Science Laboratory to discuss collaborations, internships, and research projects that would benefit UCO students and the USFWS Wildlife Forensic Science Lab

Dr. Chad King

- Interviewed for the article “Half Prairie, Half Forest” in the Oklahoma City/Edmond Outlook magazine and taught a new course during Spring 2019 called “Fire & Disturbance Ecology”

Dr. Allyson Fenwick

- Elected to the board of directors of the Society for the Study of Amphibians and Reptiles

Dr. Jim Bidlack

- Recognized by Multimedia Educational Resource for Online Teaching (MERLOT) for his contributions to the organization’s Biology Editorial Board with the MERLOT House Cup

Dr. Bob Brennan

- Gave an invited presentation entitled, “Microbiology of Waterborne Pathogens”, to Inframark and was interviewed by the Daily Oklahoman for an article about ticks and tick-borne illness in Oklahoma

Link to this year’s list of publications and presentations [here](#).

Faculty Awards

Dr. Wayne Lord received the 2019 Oklahoma Medal of Excellence award for outstanding educators in Oklahoma’s primarily undergraduate universities.

Publications

*Denotes undergraduate student; **denotes graduate student

*Ahmed K. Ali and **H. Kotturi**. 2018. Isolation of Four Mycobacteriophages from Oklahoma Soil and Testing their Infectivity against *Mycobacterium abscessus*. 2018. Proc. Okla. Acad. Sci. 98:112-117.

*Rachael Baalman, Y. Shang, *J.R. Johnston, M.K. Fakhr, and **R. Brennan**. 2018. Nasal Carriage of *Staphylococcus aureus* and Methicillin Resistant *Staphylococcus aureus* (MRSA) in students at the University of Central Oklahoma. Proc. Okla. Acad. Sci. 98:118-126.

David Bass, Bobbie Gaskin, and **Kinsey Tedford. Macroinvertebrate Community Structure and Physicochemical Conditions of Northwestern Oklahoma. Proc. Okla. Acad. Sci. 98:6-13.

Caire, W., L. Samanie Loucks, J.B. Shaw, J.W. Evans, K.E. Gillies, M.A. Caywood. 2018. Variation in the number of hibernating Cave Myotis (*Myotis velifer*) in Western Oklahoma, and NW Texas Caves prior to the arrival of White-Nose Syndrome. Southwestern Naturalist 63 (2): 124-132.

Joseph P. Connor, **V.L. Jackson**, J.R. Mittelhauser, and W.S. Faribanks. Anthropogenic Influence on American Black Bear Diet in the Western Ozark Mountains in Eastern Oklahoma. Proc. Okla. Acad. Sci. 98:37-45.

Góis JS, Cruz RHF, **Ovrebo CL** and Baseia IG. 2018. *Cyathus tenuicorticalis* (Agaricales, Basidiomycota), a newspecies from La Selva Biological Station, Costa Rica. Studies in Fungi 3(1): 256-263. Doi 10.5943/sif/3/1/26.

*Doan KT, **Kshetri P, **Attamakulsri N, *Newsome DR, Zhou F, Murray CK, Chen WR, Xu G, **Vaughan MB**. 2019. The Effect of Chitosan Derivatives on the Compaction and Tension Generation of the Fibroblast-populated Collagen Matrix. Molecules 24(15): 2713-2726.

*Matheny, A. M., **L. B. Kimmel, **P. A. Stone** and **A. M. Fenwick**. 2018. Comparative population genetics of red imported fire ants (*Solenopsis invicta*) at the University of Central Oklahoma and Lake Arcadia, Edmond, Oklahoma. The American Midland Naturalist. 180(2): 246-257.

James H. McNeill and **J.E. Bidlack**. 2018. Modifying the Redlich-Kwong-Soave Equation of State. Proc. Okla. Acad. Sci. 98:127-138.

Freitas-Neto, J. F., J.O. Sousa, **C.L. Ovrebo**, and I. G. Baseia. 2019. *Geastrum echinulatum* and *G. rusticum* (Geastraceae, Basidiomycota) – two new records for Central America. Studies in Fungi 4(1): 7-13. Doi 10.5943/sif/4/1/2

Ovrebo, CL, Hughes, KW, Halling, RE. 2019. Three new species of *Tricholoma* from Costa Rica. Phytotaxa 392(1): 33-44.

Mariah M. Small, Sean M. Laverty, Chad B. King and **Robert E. Brennan. Tick species establishment in Oklahoma County, Oklahoma, U.S.A., identified by seasonal sampling in residential and non-residential sites. 2019. J. Vector Ecol. 44 (1): 105-111. doi.10.1111/jvec.12334.

Vaughan MB, Xu G, Morris TL, **Kshetri P, *Herwig JX. 2019. Predictable fibroblast tension generation by measuring compaction of anchored collagen matrices using microscopy and optical coherence tomography. *Cell Adhesion and Migration* 13(1):303-314.

Varga, T., K. Krizsán, C. Földi, B. Dima, M. Sánchez-García, S. Sánchez-Ramírez, G.J. Szöllősi, J.G. Szarkándi, V. Papp, L. Albert, W. Andreopoulos, C. Angelini, V. Antonín, K.W. Barry, N.L. Boughe, P. Buchanan, B. Buyck, V. Bense, P. Catcheside, M. Chovatia, J. Cooper, W. Dämon, D. Desjardin, P. Finy, J. Geml, S. Haridas, K. Hughes, A. Justo, D. Karasiński, I. Kautmanova, B. Kiss, S. Kocsubé, H. Kotiranta, K.M. LaButti, B.E. Lechner, K. Liimatainen, A. Lipzen, Z. Lukács, S. Mihaltcheva, L.N. Morgado, T. Niskanen, M.E. Noordeloos, R.A. Ohm, B. Ortiz-Santana, **C. Ovrebo**, N. Rácz, R. Riley, A. Savchenko, A. Shiryaev, K. Soop, V. Spirin, C. Szebenyi, M. Tomšovský, R.E. Tulloss, J. Uehling, I.V. Grigoriev, C. Vágvölgyi, T. Papp, F.M. Martin, O. Miettinen, D.S. Hibbett and L.G. Nagy. 2019. Megaphylogeny resolves global patterns of mushroom evolution. *Nature Ecology & Evolution*. Doi.org/10.1038/s41559-019-0834-1. Published online 18 March 2019.

Vrla, S. C., **B. K. McDonald, and **C. J. Butler**. 2019. Distribution and status of mule deer (*Odocoileus hemionus*) in Oklahoma: An updated analysis of harvest data in Oklahoma. *Southwestern Naturalist* 63(2):148-152.