It has been a historic year for the Department, with the uncertainty of the pandemic bringing changes to instruction and enrollment. We started fall 2019 as usual, but ended spring 2020 with social distancing and empty classrooms. Like most of our faculty, I spent the last month of the spring semester sitting in front of my computer, day and night, putting together virtual instruction modules. But as they say, if you have lemons, make lemonade! We now have the ability to conduct virtual instruction better than before; many more classes are online; this will allow anybody, anywhere to earn college credit. The most recent addition to our online curriculum is the Introduction to Microbiology hybrid course (BIO 2314) developed by Dr. Christina Hendrickson. The online courses are also being rolled-out as SPOC (self-paced online courses). More are planned for the future.

As with most institutions in our country, our enrollments have decreased over the last year. Some of this is due to the pandemic, but other factors may be in place, including declining birth rates (see US News and World Reports, 2018, Harvard Business Review 2019), and other factors (https://www.hppr.org/post/fewer-students-are-going-college-heres-why-matters). But it is not all bad news; healthcare is as important as ever, and our healthcare service courses are holding steady and are predicted to increase in enrollment. We hired a new Assistant Professor, Dr. Chris Goodchild, to join our team of Anatomy instructors. Dr. Goodchild brings to UCO a research program to study how birds are affected by environmental contaminants. He will have opportunities to collaborate both here and at Oklahoma State University, where he recently earned his Ph.D. Learn more about Chris on page 2 of this volume.

Our faculty have obtained funding, both internal and external, to provide our students research opportunities in the field and classroom; these are listed in the “Faculty Highlights” section. Because of the pandemic, Oklahoma INBRE was able to divert a portion of unused funding to UCO to purchase new equipment for biomedical research, including a high-tech microplate reader and gel imaging systems. More equipment requests were approved including a laser scanning confocal microscope in the coming year. Our faculty and students will benefit greatly from these acquisitions.

We love to hear from our alumni! Send us a picture and tell us where you are, and what you are doing. I hope you enjoy this volume of Bioluminescence, and even though we are social distancing, stop by sometime and see us!
Hi UCO Biology! I am Dr. Christopher Goodchild and am thrilled to join the department as an Assistant Professor. My career in science began at the University of Oklahoma, where I received my Bachelors of Science in Zoology. Initially, my plan was to pursue medical school, and as such, I was excited for the opportunity to teach Human Physiology and Human Anatomy labs. At the time, my only thought was about padding my application for medical school, but little did I know teaching Human Anatomy and Physiology would completely alter my career trajectory.

As an undergraduate Teaching Assistant at OU, I had the opportunity to teach with graduate students, and as all good graduate students do, they often spoke about their research at length. One day, after we finished teaching a Human Physiology, a graduate student invited me to check out his neurophysiology lab. I still remember walking into his lab--centrifuges whirring, gels running--and on the table there was a turtle with an exposed spinal cord. Now this, this is cool! This is what I want to do.

I continued to teach Human Anatomy and Physiology labs because I really enjoyed teaching, but I was no longer interested in medical school. I wanted to do research. I ended up in Maine at the University of New England, where I received a Masters of Science. I returned to Oklahoma for my Ph.D. at Oklahoma State University, then spent a year as a post doc at Virginia Tech. In broad terms, my research examines links between molecular responses to adverse environments and whole-organism traits that are important for fitness. I have mostly focused on how contaminants affect avian physiology and behavior, and currently I am investigating how embryonic exposure to contaminants affect avian development and metabolic scope after hatching.

Even after traveling to various universities (and somehow always ending up back in Oklahoma), I still remember that moment I first stepped into a research lab at OU. I often think: *How many students would be phenomenal scientists, but were never invited into a lab?* I also wonder: *How would our society view science if more students had the opportunity to see research first-hand, even if only for a semester?* Throughout my graduate career, I have worked diligently to include undergraduate researchers of diverse backgrounds in my research, and as a professor at UCO, I am extremely excited to be a part of UCO's commitment to excellence in undergraduate research. In addition to starting my lab, I am teaching Human Anatomy, and I feel an excitement similar to what I felt 11 years ago when I first introduced myself as an undergraduate lab TA to a room full of Human Anatomy and Physiology students. Go Bronchos!
By Ms. Lynda Loucks, UCONHM Collections Manager

**Current Museum Projects:**

The current projects include continuation of the digitization of the mycological collection housed in the Herbarium of Howell Hall. To access MycoPortal visit: [http://mycoportal.org/portal/index.php](http://mycoportal.org/portal/index.php) for more information. Paityn Bower, a senior undergraduate biology major, is currently working with Dr. Ovrebo in the mycological collections. To date over 4,200 fungal specimens have been added to MycoPortal. Specimen information including catalog numbers, specific location, and field notes are included as well as photographs of the specimens and associated documentation.

The ichthyology collection, housed in the wet storage museum room in Howell Hall, continues to grow as more fish lots are cataloged into the UCONHM vertebrate collection. To date, there are 1420 cataloged fish lots. Senior undergraduate, Briant Nguyen, has been working diligently for over a year accurately adding specimens to the collections. The OWRB continues to support our efforts in preserving and maintaining this important collection of Oklahoma fishes. Our ichthyology curator, Dr. Andrew Taylor, is currently teaching ichthyology and using some of these specimens to demonstrate Oklahoma fish diversity. Additionally, Briant is working on an Oklahoma fishes research project with Dr. Taylor.
Graduate student Gabriel Rucci has worked in two collections, terrestrial invertebrates and plants, in the UCONHM for over two years while completing his thesis work in pollination biology. To date there are over 16,500 accessioned plants in the UCO Herbarium and approximately 12,000 terrestrial invertebrates that have been organized and cataloged. We will miss him and all his hard work in the UCONHM after he graduates!

JT Neuzil, who worked in the aquatic invertebrate collections for the past two years has decided she was having too much fun to leave the collections and her research under curator Dr. Bass. JT is continuing her museum work as a graduate student and the UCONHM is better for it!
The UCONHM museum space mentioned last year has been completed! The herpetology collection, including turtle shells and various reptilian skeletal materials, was moved into a separate dedicated space for that particular collection. Dr. Stone, the herpetology curator, hired student worker Michael Richardson to help organize and maintain both the dry and wet specimens in the collection. Once our Biology Dept lab manager, Will Unsell, put the new cabinets together, Michael was able to organize and inventory everything so proper maintenance and preservation techniques could be addressed and continued for this invaluable collection of turtles and the like.

Gabrielle Lawhead helped with processing, cataloging and preservation techniques in the vertebrate collections (mammals and birds) in the fall 2019 and beginning of the spring semester 2020. An important part of the museum process is accessioning specimens and making sure all skeletal material is marked with the appropriate number.
Last but not least, Tim McSweeney, a new graduate student working with Dr. Haynie, is our most recent UCONHM student worker. Tim is organizing and curating the frozen tissue collection, currently comprised of close to 1000 cataloged frozen specimens. The frozen tissue collection is the only UCONHM collection in the STEM building, necessitated by the temperature requirements to maintain the integrity of the frozen tissues. The ultra-cold storage required is minus 80 degrees. Many of the frozen tissues are cross-cataloged with mammal specimens as well.

For more information about the Biology Department Curators and the UCONHM collections, please visit the link through the Biology Department website:
https://www.uco.edu/cms/academics/biology/natural-history-museum

**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 love bats and learning about these important and cute animals. Mrs. McBride, a friend of the Collections Manager, has become a huge fan of bats and loves to share her interest with her kindergartners, especially in the fall.
In October 2019, the UCONHM was invited to participate in the Yukon Public Library youth reading program. The theme was Bats! and included a presentation about natural history collections, conservation, and biodiversity of bats around the world, especially the 24 species found in Oklahoma. Over 45 participants enjoyed the event and some students even discussed their own exciting bat stories and interest. Several Yukon residents said they plan to attend college at UCO after they graduate from Yukon schools.

It is always exciting to see students from other departments on campus come visit our taxidermy collections in Howell Hall! Art students in Professor Rodriguez’s class sketched specimens from the Nick Collection located in the HOH atrium in January of 2020.

Health Professions Acceptances
For the 2019 application cycle, UCO had twelve students accepted into medical school, including both allopathic and osteopathic medical programs such as the University of Oklahoma, Oklahoma State University, Kansas City University, and Tufts University. There were also two students accepted into a graduate program in medical sciences at OSU. In the area of dentistry, UCO had four students accepted into dental school including University of Oklahoma and Creighton University. There were three UCO students accepted into physician assistant programs at the University of Oklahoma Health Sciences Center, the School of Community Medicine at OU Tulsa, Wichita State University, and the Franklin College PA program. Lastly, one UCO student was accepted into three different occupational therapy graduate programs, which included Gannon University, A.T. Still University, and the University of St. Augustine’s program. All of these acceptances were self-reported to the UCO Health Professions Office, and therefore, additional acceptances may not be included in this report cycle.
Aaron Kidd successfully defended his M.S. in Biology Thesis entitled, "Conduction of Biological Research and the Partial Implementation of Learned Scientific Practices into a Middle School Science Classroom " in March, 2020. His Advisory Committee included Drs. Mike Nelson (College of Education and Professional Studies), Vicki Jackson, and Beth Allan. Aaron is now pursuing a doctorate in Science Education at the Texas A&M, College Station


Cheyenne Heath successfully defended her M.S. in Biology Thesis entitled, "Planning and Carrying out Investigations in Science Education" in March, 2020. Her Advisory Committee included Drs. Mike Nelson (College of Education and Professional Studies), James Creecy, and Beth Allan. Cheyenne is a master teacher in Deer Creek Public Schools.

Carmen Esqueda successfully defended her M.S. in Biology Literature Review Thesis entitled, “Forest History and Dendrochronology Studies for the Southern Great Plains Region: Kansas, Oklahoma, and Texas, USA.” Her Advisory Committee members included Drs. Chad King, Jim Bidlack, Gloria Caddell, and John Barthell.

Briant Nguyen (right) completed a paid internship over summer 2020 with the Oklahoma Department of Wildlife’s Stream Survey Program, sampling fishes across our great state.

Dr.’s Matthew Parks, Andrew Taylor, and Emily Hendryx (Mathematics) led a STLR-funded undergraduate research project during Spring 2020 in which six undergraduates were engaged in a study of stream litter accumulation in OKC metro streams. All six students participated in field data collection, data analyses, and all presented their research at
Oklahoma Research Day!

**Brooke Wiens** won the best undergraduate poster presentation of Oklahoma Academy of Science, Fall Technical Meeting, November 8th, 2019, with her presentation “Anti-proliferation Effect of Dandelion’s Extract on HeLa cells.” Brooke is shown with her faculty mentor **Dr. Christina Hendrickson**.

**Maria Nguyen** received an RCSA grant, “The Study of an Established Population of Mediterranean Geckos (*H. turcicus*) at the University of Central Oklahoma.” Faculty mentor – **Allyson Fenwick**.

**2019-2020 Department of Biology Student Awards.**
Academic Achievement Awards: **Samah Houman, Kinsey Huff, Kayley Pate, Lakota Sauceda**. Outstanding Biology Senior Award: **Emily Falcon**. Outstanding Graduate Student: **Sarah Vrla**. Ethyl Derrick Award: **Brock Archer**. Biology Education Award: **Jacob McGuire**. Lothar Hornuff Field Biology Award: **Marco Donoso**.

Marco Donoso (B.S. 2019) is a graduate student at Miami (OH) University in the Department of Biology. He is studying invasive plant species.
Club Activities

Pre-Medicine/Health Professions Club

Serving the Underserved is a club that focuses primarily on bringing awareness about the health care needs of communities living in underserved areas of Oklahoma. Though guest speakers and fund-raising efforts the club provides students the information and resources related to underserved communities.


The UCO Student Chapter continues to do volunteer work with the Oklahoma Department of Wildlife Conservation, Oklahoma City Zoo, and WildCare Oklahoma. In October 2019, TWS helped the Oklahoma City Zoo prepare for stomp and chomp, the zoo’s annual Halloween event, by making enrichment items for the animals. We had a number of guest speaker come to campus to discuss wildlife conservation and volunteer opportunities. Some students were able to attend the Oklahoma Natural Resources conferences in February, the joint TWS/AFS meeting in Reno, and various local scientific conferences. During the Spring Semester students raised nearly $350 for Bushfire Emergency Wildlife Fund to help with wildlife rehabilitation for animals impacted by Australia's wildfires. Several students travelled to Utah to attend the TWS Central Mountains and Plains Student Conclave.

Faculty Highlights

UCO hosted the 108th Oklahoma Academy of Science Technical Meeting on November 8, 2019. Approximately 350 science faculty and students representing 21 colleges and universities attended, making it the largest meeting ever of this organization. The meeting was coordinated by Drs. David Bass and Chad King.

Dr. Christina Hendrickson was funded by Oklahoma INBRE (Mini-grant and SMaRT) and UCO STLR for her research entitled "Investigating Anti-cancer Effects of Taraxacum officinale".

Parks, M., E. Hendryx, and A. T. Taylor (PI’s). Funding from U.S. Department of Education via the Student Transformative Learning Record program at the University of Central Oklahoma. Project entitled “Litter accumulation in Oklahoma metropolitan watersheds.” $3,800 over 1 year. Supported six undergraduates in research.
**Mr. Bob Melton** continues to serve as State Director of Science Olympiad. **Dr. Beth Allan** and **Dr. Allyson Fenwick** continue to serve as Director and Associate Director of the state tournament, held every spring at UCO.

Dr. **Allyson Fenwick**, Faculty Grant, UCO Office of Research and Sponsored Programs. Evaluating Mediterranean gecko winter ecology across multiple years.

Bhargava, K (PI), **Kotturi, H.** (Co-PI). Improving Pre- and Post Harvest Safety of Sprouts. This proposal is a fundamental research project which addresses food safety in sprouts and alfalfa. USDA NIAF, $149,727.00

Haleem, A (PI), **Kotturi, H.** (Co-PI), M. Khandaker (Co-PI). 3D Printed tissue-engineered nanofiber scaffold with mesenchymal stem cells for the treatment of articular cartilage osteochondral defects. OUHSC Presbyterian Health Foundation Team Science Grant, $100,000.

**Kotturi, H.** (PI). Incorporation of mycobacteriophages in electrospun nanofiber. NBRE Mini-Grant, $31,389.00.

**Kotturi, H.** (PI). Antimicrobial activity of Mycobacteriophage loaded PCL/collagen electrospun nanofiber against mycobacteria. INBRE Release Time Grant. This is a release time grant that gave 5 hrs of release time, spring 2020. Release time is being used to prepare for NIH R21 application. $27,677.00

**Kotturi, H.** (PI). Mycobacteriophage loaded polycaprolactone/Collagen Electrospun nanofiber against Mayobacteria. UCO Interdisciplinary Grant, $5,000.


Dr. **Troy Baird** was a consultant for filming burrow construction and reproduction of sand tilefish at Glover’s Reef, Belize. “Planet Earth III”, in production by the BBC. Ms. Georgie Ward, Researcher. December, 2019.

**Dr. Jim Bidlack** is continuing as Co-author (with Dr. Shelley Jansky at University of Wisconsin) of *Stern’s Introductory Plant Biology*, now in its 15th Edition, as well as *Stern’s Introductory Plant Biology Laboratory Manual* (both with a publication date of 2021). Dr. Bidlack has been Co-authoring this textbook, along with the lab manual since the late 1990s, with about 275,000 copies being sold throughout the world.
**Faculty and Student Presentations**

*undergraduate student, **graduate student


**Baird, T.A.** 2020. Behavioral Diversity and Fitness: Field studies on Oklahoma Collared Lizards. Invited seminar to the Department of Biology, California State University, Fresno, 24 January.


**King, C.** 2019. Dynamics of a bottomland hardwood forest at Arcadia Lake, Oklahoma County, Oklahoma. The Oklahoma Academy of Science Technical Meeting, November 8, University of Central Oklahoma.


Stillwater, OK, 26 October.


**Sawyer, E., **S. Pamula, K. Bhargava, & **Kotturi, H.** Inhibition of *Listeria* spp and *Salmonella* spp on Sprouting Mung Bean Using a Cinnamon Oil Nanoemulsion. Oklahoma Research Day, Weatherford, OK, March 6, 2020.


*Chinedu, E. P., & **Kotturi, H.** Isolation of arthrobacteriophages from Oklahoma soil. Transformative Learning Conference, Oklahoma City, OK, April 9, 2020 (abstract was accepted, but the event was cancelled).

*Yoon, E., *L. Sauceda, & **Kotturi, H.** Isolation of antibiotic producers from Oklahoma soil. Transformative Learning Conference, Oklahoma City, OK, April 9, 2020 (abstract was accepted, but the event was cancelled).

*Kedy, C., & **Kotturi, H.** Testing the host range and sensitivity of Microbacteriophages isolated from Oklahoma soil, water and compost. American Society for Virology 39th Annual Meeting, Fort Collins, CO, June 13, 2020. (abstract was accepted, but the event was cancelled).

**Pittman, S., & **Kotturi, H.** Isolation and sequencing of an Arthrobacteriophage Thunderclap from Oklahoma soil. American Society for Virology 39th Annual Meeting, Fort Collins, CO June 13th, 2020. (abstract was accepted, but the event was cancelled).


*Cole, A., B. *Archer, E. Hendryx, M. Parks, and **A. T. Taylor.** 2020. Evaluating methods to quantify stream litter accumulation in urban streams. Oklahoma Research Day held at Southwestern Oklahoma State University, Weatherford, OK.


How to Donate to the UCO Department of Biology

The UCO Biology Department is excited about its future and you can help move the department forward. To find out more about how you can contribute towards UCO, the College of Mathematics & Science, and the Biology Department, go to: https://broncho2.uco.edu/foundation_givenow/index.html