

BI FEEDBACK

Winter 2020-2021

Newsletter of the Andrews University Department of Biology

2020: the year of the coronavirus!

In case you haven't heard...

The world has had to adapt to a new normal. Face coverings and Zoom have become typical. Quarantines and social distancing (that is, physical distancing) are commonplace, and rather inconvenient!

Businesses have had to adapt through layoffs and furloughs as well. That has not escaped Andrews University, unfortunately (see page 3). However, in some ways the pandemic has forced us to think outside of the box in creative ways that we would not have considered before.

In Ecology. Well, that happens outside, in the fresh air (see photo below)! Some creativity was used in getting there - two busses instead of one, in order to maintain social distance. And masks were always worn - our students have done a superb job at this! But what about remote learners? Well, Zoom works even in the field, where Dr. Gonzalez incorporated remote students even in the out-of-doors.

In Foundations of Biology. Biology is a hands-on discipline, even the molecular stuff. How do you learn these techniques from home? Several approaches were used this semester to facilitate learning in a pandemic. Labs continued in person, with attempts to minimize contact by reducing student numbers in lab. Some new labs were considered, with some connections to the pandemic. For example, one new lab investigated what we know about the SARS-CoV-2 virus through bioinformatic analysis of real virus genomes! In other labs we considered how we can identify bacteria through gram staining and DNA sequenc-

ing, and we particularly enjoyed spending some labs outdoors, exploring our environment and our biological neighbors!

In Genetics and Systems Physiology, some labs went online through the use of virtual lab simulations. One obvious challenge presented in Systems Physiology was how to examine the respiratory system. Typically, this involved breathing into a system that monitors lung capacity and other parameters. However, with the need to limit the sharing of respiratory droplets, the setup of the equipment was completed in lab, while the practice happened through a virtual lab later on.

In Neurobiology, the ability to connect virtually with people around the world was embraced! In September, students from Dr. Navia's Neurobiology class had a guest speaker all the way from Australia. Miss Tsz Wing, a medical student at the University of Queensland with a Master of Research in Experimental Neuroscience from Imperial College London, spoke via Zoom about tissue clearing in post-mortem human brain tissue as a technique to learn more about the brains of patients who died of Alzheimer's disease. Students had the opportunity to ask questions and dialogue with Miss Wing. Students expressed their excitement about having the opportunity to listen to a research presentation from someone on the other side of the world with a common interest in neuroscience!

In Anatomy and Physiology, Dr. Wong used the COILL (Collaborative Online International and Local Learning) approach to connect his classroom with that of Dr. Nakajima Yoshihiro of the Faculty of Economics at Osaka City University in Japan. See page 8 for more on this creative approach to learning!



News and Events

Daniel Gonzalez-Socoloske receives Fulbright Scholar award

We were excited to receive news this spring that Dr. Daniel Gonzalez-Socoloske, associate professor of biology, was awarded a prestigious Fulbright Scholarship. Gonzalez plans to conduct research at the Mamiraua Institute in the state of Amazonas, Brazil, using sonar to detect and monitor the Amazonian manatee. This is the exciting part. The disappointing part is that this work has been put on hold for a time, as we deal with a worldwide pandemic. We will keep you posted on how this works out.

Biology students present their research

Many of our students here at Andrews have the opportunity to apply their understanding of biology to a real research problem. They diligently work in the lab or field through the semester, often leading up to a presentation of their work in front of other scientists. A number of our students were planning on traveling to the Michigan Academy of Science, Arts, and Letters annual conference this March. Unfortunately, COVID-19 arrived about that time, the conference was cancelled, and our semester was moved online. As students were moving out and goodbyes were said, the University opened up some classrooms for a “mini-MASAL” meeting. Several of our biology students presented their work.

Vespers moved outside to bonfire and Chipotle!

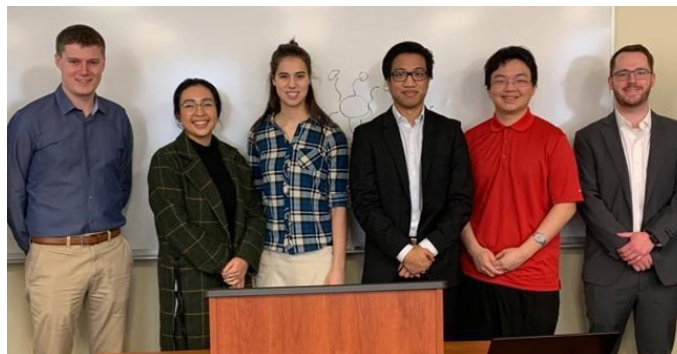
Trying to figure out how to hold social events in a pandemic can be challenging! Late this semester, the Department of Biology, together with our student-led biology club, Biophilia, held a vespers at the bonfire ring outside the Science Complex. Dr. Goodwin led us in some interactive activities and worship, and a prepackaged Chipotle burrito meal was provided for all. It was good to enjoy time with friends and colleagues in a non-academic setting as we welcomed the Sabbath.

SciFEST 2020 (SciFEST Comes to You)

SciFEST is an annual event for (typically 60-80) academy and high school students interested in the STEM fields. SciFEST 2020 was a two-week completely virtual experience through our Andrews LearningHub online platform. Over 300 students participated this year from across the country, including home-schoolers and students from 17 different schools, including one international student. Students were placed on teams and connected via Zoom, Google Hangouts, etc. They had to complete hands-on lab activities from home or their classrooms and submit their solutions, photos, and videos. We kicked off this year’s event with a STEM show that was livestreamed and advertised widely via churches. The final awards program was presented via Zoom on October 4, where we showcased some of the student videos. The top three teams were awarded medals, and scholarships were given to all those who participated. Due to the success of this event, we hope to host one on-campus SciFEST event and another remote SciFEST opportunity in future years. Our innovation in education was highlighted by our local PBS station on their website (<https://www.wnit.org/educationcounts/s/andrews-university-scifest.html>) and Facebook page (<https://www.facebook.com/wniteducationcountsmi-chiana>).



Dr. Gonzalez-Socoloske (third from right) poses with students (l-r) Mindy McLarty, Amanda Moore, Adam Weir, Nina Woodard, and Juli Johnson while attending the World Marine Mammal Conference 2019 in Barcelona, Spain.




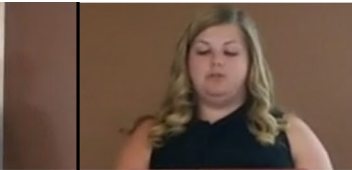
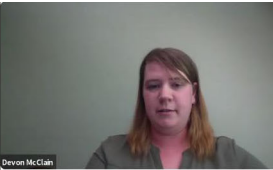










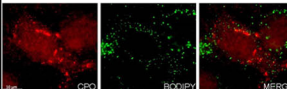
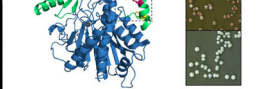
Kieran Taylor, Brianna Mendoza, DahEun Harning, Daniel Fajardo, Daniel Chi, and Bryan Ashley pose for a photo following their presentations.



Five graduate students successfully defend theses

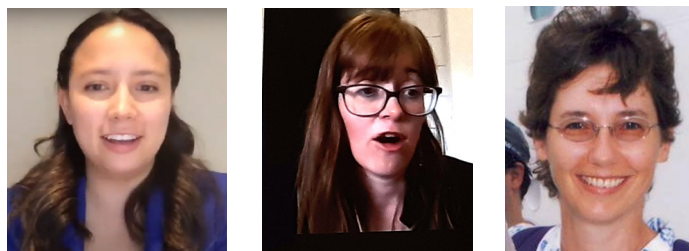
In March of this year, just ahead of the COVID-19 pandemic shutdowns, Jeremy McLarty defended his thesis, the product of many hours sitting at a microscope in order to identify microfossils of the Black Mountain turtle layer and others. As we entered the pandemic shutdown, Amanda Moore defended her thesis in which she investigated the sensory modalities used by Antillean manatees. This one was in-person, but with distancing precautions. Our remaining three graduates defended their theses via Zoom. Devon McClain considered what Glaucous-winged Gulls do at night, Erika Bauza Nowotny shared research on the expression pattern of an intestinal carboxypeptidase, and Christian McDonald investigated the biological and biochemical function of a pseudoenzyme in the baker's yeast, *S. cerevisiae*. You can see the variety of projects our students have had the opportunity to explore: from paleontology to animal behavior and enzyme biochemistry!

Congratulations to all of you and we wish you the best as you continue to grow in your careers! What does the future hold for these students? Well, Jeremy and Amanda have begun PhD programs in the Department of Earth and Biological Sciences at Loma Linda University. Erika has also gone to sunny California, to begin a PhD in Craniofacial Biology at the University of Southern California. Devon is currently working on plans to continue her education in biology, and Christian is merging his interests in science with his skills in information technology through a consulting service, McDonald Educational Technologies

				
 <p>Paleoenvironmental Implications of Small-animal Fossils from the Black Mountain Turtle Layer and Associated Layers, Eocene of Wyoming</p> <p>A Thesis Defense by Jeremy McLarty March 6, 2020 at 10:30 AM</p>	 <p>How Antillean manatees (<i>Trichechus manatus manatus</i>) locate food in their natural environments</p> <p>A Thesis Defense by Amanda Moore June 18, 2020 at 2:00 PM</p>	 <p>Investigating the nighttime behavior of glaucous-winged gulls (<i>Larus glaucescens</i>) and the role of social facilitation</p> <p>A Thesis Defense by Devon McClain July 2, 2020 at 2:00 PM</p>	 <p>Exploring the biological function of Carboxypeptidase O: analysis of expression and association with chylomicrons and lipid droplets</p> <p>A Thesis Defense by Erika Bauza Nowotny July 2, 2020 at 10:00 AM</p>	 <p>A study of inactive enzyme-homologues: The biochemical and biological function of <i>ECM14</i> in <i>Saccharomyces cerevisiae</i></p> <p>A Thesis Defense by R. Christian McDonald August 31, 2020 at 5:30 PM</p>
				

Departmental seminars from a distance

This year we had several seminar presentations from afar, thanks to Zoom! Dr. Kylynda Bauer (BS 2014) recently completed her PhD in Microbiology and Immunology at the University of British Columbia. She shared with us her recently completed research on the microbiome and its connection with nutrition and the brain. Dr. Jean Adams, statistician with the US Geological Survey and the Great Lakes Science Center, shared with us her research on the invasive sea lamprey and its hosts in the Great Lakes. Dr. Anna Kloc, from the University of New Haven, spoke with us about viruses and her work as a virologist.



Moving on...



Some changes were made in our department this summer, precipitated by the COVID-19 pandemic and projected enrollment decreases.

Dr. Denise Smith retired, while continuing for the current year in her role as instructor in the Berrien RESA Math and Science Center. We miss her involvement in many aspects of departmental labs and the bustling research lab that she coordinated. However, we expect that she is enjoying the greater flexibility in her schedule that retirement brings!

Ms. Angela Sonnenburg left her position in our department as Administrative Assistant. We miss Angela's constant help and guidance in a myriad of ways. She has since taken a position as administrative assistant in the CAS dean's office, so continues to bless Andrews University with her skills.



Thank you both for your many years of service to the Department of Biology!

Andrews Biology Expeditions to Peru: A Lost Gem by Kieran Taylor

The Department of Biology has always been a relatively large and active department for Andrews University standards, involving many students in research and travel. The research labs throughout the department are filled every year with students involved in a variety of projects. For many years now, students and faculty have gone to Protection Island in Washington State to study sea bird ecology with Dr. Hayward and Dr. Henson. In the 1970s, students and faculty helped excavate an Ice Age woolly mammoth, which now resides in the Andrews University Museum of Natural History (AUMNH). Few people realize, however, that in the 1960s the Department of Biology went on a number of field expeditions deep into the South American jungle, some lasting 2-3 months! A large portion of the mammal and bird specimens in the AUMNH originates from these expeditions, and it is these specimens that have been the focus of my research.

I started my current research with Dr. Daniel Gonzalez-Socoloske, associate professor of biology, in January 2020 as an undergraduate student. About 60 years earlier, in the early 1960s, an undergraduate student named Merlin D. Tuttle applied for a grant from National Geographic to go on a field trip to Peru to study the local mammal and bird biodiversity. His application was successful and in the summer of 1963 he undertook the expedition. When he returned to Andrews University to continue his degree, Dr. Asa Thoresen, chair of the Department of Biology at the time, heard about Tuttle's trip, and Thoresen along with Dr. Seidel, professor of biology, and Tuttle applied for a grant from National Geographic to conduct another expedition to Peru in 1964. They received the grant and traveled to Peru between June and August of 1964. The department subsequently participated in two additional expeditions to Peru, in 1965 and 1968. In all of these expeditions, the researchers focused on the mountainous tropical jungle slopes of Oxapampa in central Peru. Russell R. Ashton Jr., an undergraduate student who went on the 1968 expedition, drew a map of the locations visited in Peru (see Figure 1). The expeditions in 1964 were co-sponsored by National Geographic and the Department of Biology at Andrews University, while the 1965 and 1968 expeditions were sponsored

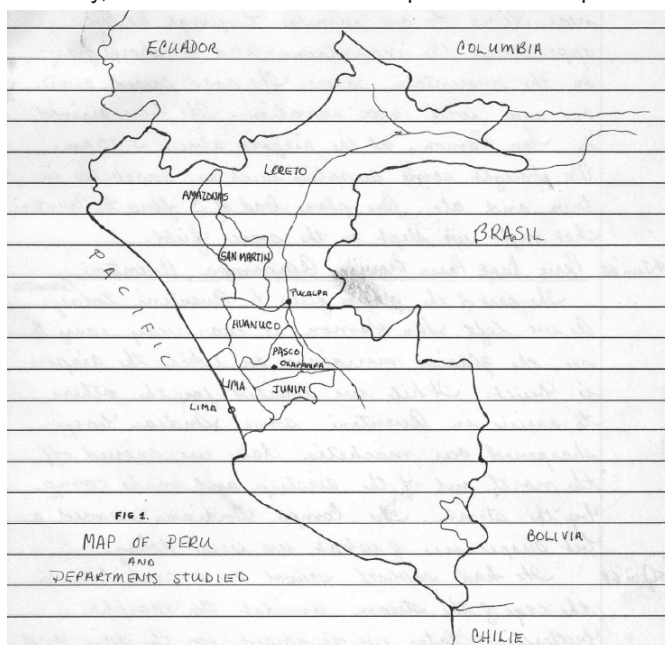


Figure 1. Hand-drawn map by Russell R. Ashton Jr. of locations visited in Peru by the 1968 expedition.

by the Department of Biology alone, as far as we know. The members of the expeditions consisted of Dr. Thoresen, Dr. Seidel, and a variety of undergraduate students who earned class credit for joining the field trip and who were rigorously trained in various techniques such as mammal and bird trapping and specimen preparation in the weeks prior to the expeditions.

The basecamp in Oxapampa, Peru, from which the expeditions radiated out into the jungle and mountains, was a Seventh-day Adventist field mission outpost called Nevati, which was originally established to minister to the local native Indian population, the Campa Indians. Fred Brown, from the 1968 expedition, drew a depiction of a Campa Indian hut (see Figure 2). The Campa Indians were an integral part of the expeditions, as they served as expedition guides and caught some of the mammals and birds which they gave or sold to the expedition participants. Without the efforts of the Campa Indians and the local Seventh-day Adventists who established the Nevati outpost, the expeditions would most likely not have been such a huge success.

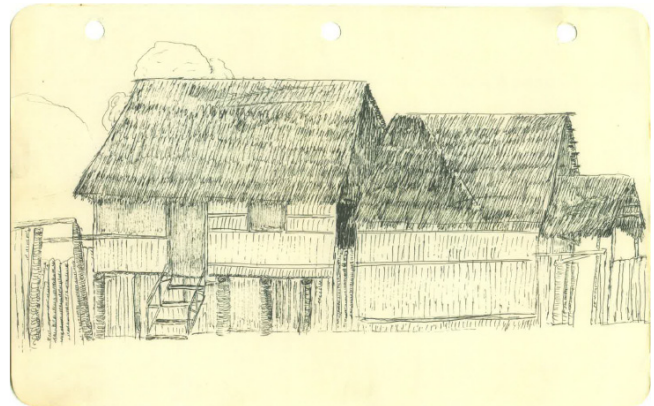


Figure 2. Drawing by Fred Brown, 1968 expedition, depicted a native Campa Indian hut.

The focus of all three expeditions was specimen collection and exploration. The biodiversity of the region was, and still is, very unknown and therefore of high interest to the scientific community. The expedition's main goal in 1964 was to collect mammal and bird specimens. At the end of the trip they had collected approximately 1,800 mammal specimens and 500 bird specimens. In 1965 and 1968, the expeditions focused more on studying the plant and insect biodiversity of the region. Following the expeditions, the specimens collected were prepared, packaged, and sent back to Michigan. The Department of Biology sold almost the entire 1964 mammal collection to the American Museum of Natural History in New York. Some specimens from 1964 are also present in the Smithsonian Institute, but how these specimens arrived there is one of the mysteries to be solved. The rest of the specimens collected are present in our own Andrews University Museum of Natural History. We primarily have pairs of skulls and voucher skins from the individual animals, but we also have some fully preserved and taxidermized specimens and complete skeletons. The primary focus of my research is on mammals collected, mainly rodents, bats, and primates, although the occasional odd specimen such as an ocelot, peccary, or sloth skin was collected as well. Examples of the exciting specimens in our collection are shown in Figure 3 on the next page.

Unearthing and compiling the vast amount of historical and scientifically significant information from the Department of Biol-

ogy's expeditions to Peru in the 1960s is a huge undertaking. We have managed to find some specimen lists, journals, and letters from the trips but are missing a great deal. Most of the skulls found have to be properly cleaned and the specimens in general have to be properly taxonomically identified and labelled. Having worked on the project for almost a year, with a few other student workers and Dr. Gonzalez, we have only managed to scratch the surface.

Are you a graduate of Andrews University from the 1960s or 1970s? Do you have any information or stories relating to these expeditions to Peru? If you have any information regarding the 1964, 1965, and 1968 expeditions, please email professor Daniel Gonzalez-Socoloske at gonzalezd@andrews.edu or graduate researcher Kieran Taylor at kieran@andrews.edu. We would very much appreciate any stories, specimens, miscellaneous paperwork or photographs that you can provide which will help us in this exciting project!



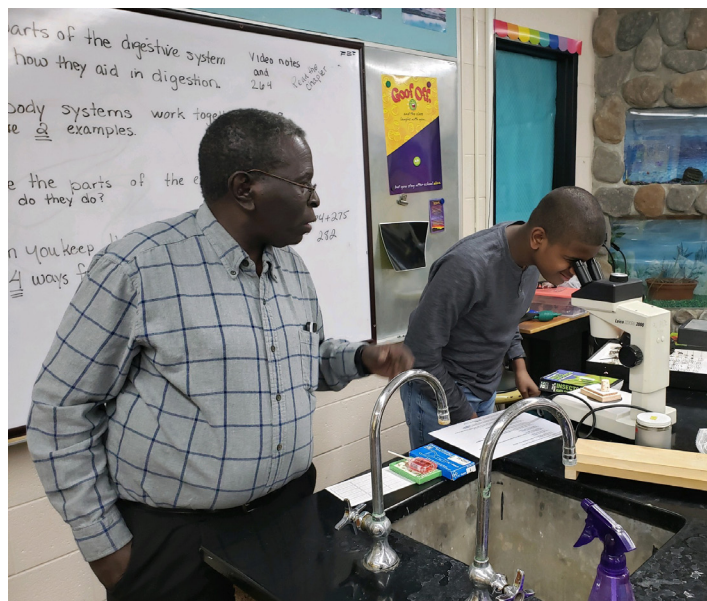
Figure 3. Examples of specimens in museum from expeditions to Peru in the 1960s. Top row (l-r): peccary skin, ocelot skin, three-toed sloth skin, rodent skin, bat skin, Squirrel monkey taxidermized skin; Bottom row (l-r): sloth skull, rodent skull, bat skull, and monkey skull.

Mbungu and Lyons visit Ruth Murdoch Elementary School

Just before the COVID closures in March, both Dr. Peter Lyons and Dr. David Mbugu, associate professors of biology, visited Mrs. Rosemary Bailey's junior high science class at Ruth Murdoch Elementary School. Dr. Lyons did some 'pop bead' biochemistry! He led the students in constructing a portion of the amino acid sequence of insulin using pop beads as amino acids, and considered the function and importance of a small

protein like insulin in health and wellness. The students hopefully learned something about biochemistry, but likely at least enjoyed playing with beads!

Dr. Mbugu brought some bugs to class! Students had the chance to observe the details of some insects through a dissecting microscope as he shared about entomology.



And in research...

The faculty and students of the Department of Biology continue to make new discoveries in their respective fields, working together here at Andrews and with scientific colleagues across the country and the world. The following is a summary of what we have done over the past two years since we last shared such things with you.



The Seabird Ecology Team has published three papers: In “Predator-prey dynamics of Bald Eagles and Glaucous-winged Gulls at Protection Island, Washington, USA” (*Ecology and Evolution*), Shandelle Henson (professor of mathematics and ecology), James Hayward (professor emeritus of biology), and four additional co-authors use mathematical modeling to demonstrate that Bald Eagle predation strongly impacts nesting Glaucous-winged Gull numbers on Protection Island, and that over time this impact could result in extirpation of the gull colony.

In “Nocturnal copulation in Glaucous-winged Gulls *Larus glaucescens*” (*Marine Ornithology*), Floyd Hayes (Pacific Union College) and James Hayward used infrared trail cameras to demonstrate that nearly a quarter of Glaucous-winged Gull copulations occur at night.

In “Taphonomic assessment of material generated by an arboreal nesting colony of Great Blue Herons (*Ardea herodias*)” (*Historical Biology*), Ashley McGrath, David Varricchio (both of Montana State University), and James Hayward provide the first characterization of taphonomic factors that influence the fossilization of biological materials generated by tree-nesting birds.

Tom Goodwin, professor of biology, together with colleague James Farlow (Purdue University, Fort Wayne, IN), described a new fossil ground squirrel from a location in Indiana. This was published in the *Proceedings of the Indiana Academy of Sciences*. Dr. Goodwin also continues his work at the intersection of science and faith, presenting a talk entitled “The friendship metaphor for the relations of science and faith” at the 15th Annual Seminary Scholarship Symposium in February, 2019.



Daniel Gonzalez-Socoloske, associate professor of biology, and colleagues have recently authored several papers. In one study, initiated at Duke University and published in the *American Journal of Physical Anthropology*, the gait patterns of marsupials were examined to better understand the environmental circumstances necessary for a diagonal sequence, which all primates exhibit, versus a lateral sequence, which most other placental mammals have. They found that marsupials can exhibit both patterns, with arboreal marsupials tending to use diagonal gaits. This work was coauthored with scientists from Boston University, the University of New Mexico, the University of California Los Angeles, and North Carolina State University.

In “Manatee habitat characterization using side-scan sonar,” published in the *Journal of the Marine Biological Association of the UK*, Mindy McLarty (BS 2015, MS 2017) and Daniel Gonzalez-Socoloske, together with colleagues from Centro de Investigaciones Marinas in Havana, Cuba, and Eckerd College in Florida, demonstrated that side-scan sonar can be used to characterize bottom topography and benthic habitat and create detailed maps that can be used to better understand these systems.

In “Food choice by a wild free-ranging Antillean manatee *Trichechus manatus manatus* in Tabasco, Mexico,” published in the *Journal of Marine Animals and Their Environment*, Daniel Gonzalez-Socoloske and David Olivera-Gomez (Universidad Juarez Autonoma de Tabasco) looked at the plant species selected and rejected by a wild Antillean manatee in a seasonally flooding wetland system. This study added more than a dozen species previously unknown as food items.

Finally, in a paper entitled “Why nature matters: Seventh-day Adventist education in the Anthropocene” in the *Journal of Adventist Education*, Dr. Gonzalez presents a case for why taking care of the planet is in our best interest as humans. Written to educators, he makes the case that teaching environmental ethics is just as important as teaching our other ethics. Dr. Gonzalez has recently given interviews on this topic for AdventNext and Adventist Peace Radio.



Benjamin Navia, professor of biology, coauthored a paper published in *Physiological Entomology* and entitled “Nanoinjection of neurotransmitters into the prothoracic ganglion of female cricket *Acheta domesticus* changes phonotactic selectivity.” In this study, a number of neurotransmitters known to bind chloride channels were injected into the prothoracic ganglia of female crickets. The phonotactic activity of these crickets (their response to the calling song of a male) was affected by histamine and octopamine. This paper involved many individuals, including Gordon Atkins (adjunct professor of biology and Camp Au Sable naturalist), Daniel Gonzalez-Socoloske (associate professor of biology), and students James Yoon (BS 2011), Kristin Lee (BS 2009), Rachel Koo (BS 2011), Kristin Chung (BS 2013), John Zdor (DPT 2017), Darley Magno (BS 2017), Eun Byeol Cho (BS 2018), and Cassie Kim (BS 2019).

Peter Lyons, associate professor of biology, coauthored a paper with Christian McDonald (BS 2014, MS 2020), Matthew Schott (MS 2014), and Temitope Idowu (BS 2017), published in *BMC Molecular and Cell Biology*. Entitled “Biochemical and genetic analysis of Ecm14, a conserved fungal pseudopeptidase,” this paper explores the function of a yeast pseudoenzyme—that is, a protein that looks like an enzyme but doesn’t function as an enzyme. This paper was the result of 15 years worth of part-time dabbling, along with some serious focus by



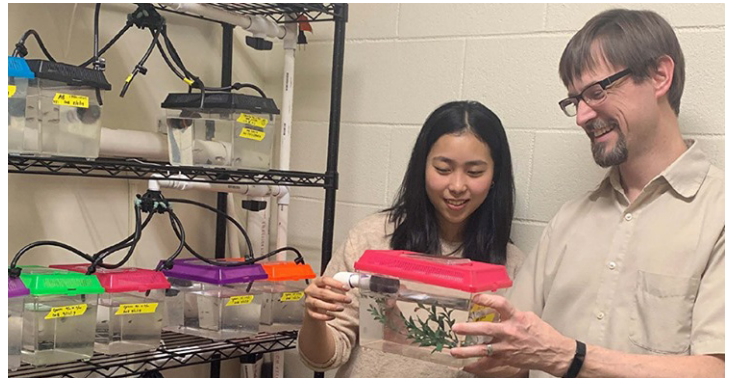
Research, continued

Matthew Schott and Christian McDonald!

In another short article published in *ASBMB Today*, the member magazine of the American Society for Biochemistry and Molecular Biology (<https://www.asbmb.org/asbmb-today/opinions/033020/research-on-a-budget>), Dr. Lyons shares some tips for biochemists on how best to do research on a budget. This included mention of the zebrafish system that he built from



hardware store supplies for \$500, a real savings from the \$10,000 price tag a commercially-available system would cost. Shown in the photo is student Atalia Atmadja and Dr. Lyons as they examine some zebrafish.

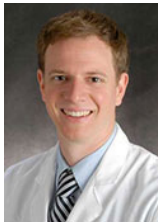


Rob Zdor, professor of biology, wrote a paper for *The American Biology Teacher* entitled "Visualizing nutrient effects on root pattern formation." This article targeted biology teachers wanting to include plant developmental biology in their curricula. The basis of the article was a lab that he does in his Developmental Biology class.

Alumni Calling Songs



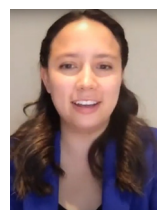
Libby Megna (BS 2010, MS 2012) assumed a tenure-track position this fall as Assistant Professor of Biology at Union College, Barbourville, Kentucky. She is a PhD candidate at the University of Wyoming where her dissertation research involves a study of reproductive isolation in passerine birds. Libby was an active member of the Seabird Ecology Team for more than six years. We wish you well, Libby, in this new adventure!



Brent Sherwin (BS 2011) finished his general surgery residency at Mount Carmel in Ohio and is preparing to deploy as a doctor to Malamulo Hospital in Malawi, Africa. Blessings to you as you serve in Malawi!



Jemma McLeish (MS 2017) has begun a PhD program at the University of Tennessee Knoxville. All the best, Jemma!



Kylynda Bauer (BS 2014) recently completed her PhD in Microbiology and Immunology at the University of British Columbia, and is now transitioning from UBC to the NIH to pursue an iCURE postdoctoral fellowship in liver cancer and the microbiome. Dr. Bauer recently gave a presentation during the

Global Celebration of Andrews weekend entitled "The Gut Microbiota Influences Health: A Malnutrition Report," which can be found on *YouTube*.



Ehren McLarty (BS Animal Science 2011) attended Andrews University from 2007-2011, earning a BS in Animal Science with a minor in Chemistry. She relates her journey at Andrews and since graduating:

"Despite not being a biology major, I spent a lot of time in the biology department taking Foundations of Biology, Cellular and Molecular Biology, Histology, Parasitology, Microbiology, and Immunology. I also worked in the biology department as a teaching assistant for the Foundations of Biology class for two and a half years and joined one of Dr. Atkins upper peninsula winter birding trips. I thoroughly enjoyed my biology classes and being a teaching assistant is still one of my favorite jobs I've ever had. The professors I had in the biology department were fantastic - they were not only good teachers, they were mentors and even friends. They really showed how much they cared for their students.

After leaving Andrews I attended UC Davis School of Veterinary Medicine from 2011-2015, earning my Doctor of Veterinary Medicine degree. During my first year of vet school I actually had a professor ask where I had done my undergraduate work because she was impressed by how well-prepared I clearly was, ahead of many of the other students in the basic sciences. I was more than happy to testify to the excellent education I received at Andrews.

Following veterinary school I moved to the University of Minnesota for a one year rotating small animal internship (a clinical internship in their veterinary medical center). During that year I applied to radiology residency programs around the country and was ultimately accepted back at UC Davis. I completed my four-year residency in July 2020, having passed my board-certifying examination in fall of 2019. The residency program is primarily focused on clinical practice, but I did complete a research project in a developing field in veterinary medicine, positron emission tomography, which was presented at the annual scientific meetings of the American College of Veterinary Radiology (ACVR), as well as our university resident research symposium where it won an award in the small animal section.

In the spring of 2020 I accepted a position as Assistant Professor of Clinical Diagnostic Imaging at UC Davis and started in this position in September 2020. This position involves a 70% clinical appointment in the veterinary hospital, overseeing the daily clinical service as well as clinical training of students and residents. Other components of the position include research and other creative scholarship, as well as involvement in university committees and national veterinary organizations, such as the ACVR.

I feel incredibly blessed to have received such an excellent education, as well as a firm spiritual foundation throughout my youth and to have such an amazing opportunity to use that education and skill now."

Congratulations, Ehren, on your new position, and we wish you the best as you serve in this new capacity!

International travel during a pandemic: COILL style!

Dr. Brian Wong has taken an international approach to his teaching. While he has done this in previous years, it certainly fits into a year in which remote learning is commonplace. Using the COILL (Collaborative Online International and Local Learning) approach, he worked with Dr. Nakajima Yoshihiro from the Faculty of Economics at Osaka City University in Japan, to connect their classes along the topic of "The impact of COVID-19 on education, restaurants, and supermarkets." Students collected scientific data through reading scientific literature and by performing surveys to better understand these topics. Shown here are Dr. Wong with two of his students (Abbigail Hough and Elizabeth Bates; left) as they interact with Dr. Yoshihiro's students in Osaka (right). These non-masked photos were taken pre-pandemic.



We'd love to hear from you! And we'd love to share important events in your lives with other alumni via this newsletter. Send us an email or letter to let us know what is new in your life. Below are some suggestions if you don't know what to say! Photographs are great too.

Name: _____

Address: _____

Year you graduated from AU _____ AU degree _____

Other degrees since graduating from AU _____

Your current employment _____

Your current interests and activities _____



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