

BIOFEEDBACK

Winter 2024-2025

Newsletter of the Andrews University Department of Biology

Lyons and Wong awarded equipment grant by the Department of Defense

The DoD Research and Education Program for Historically Black Colleges and Universities and Minority-Serving Institutions awarded \$139,581 to Professors Lyons and Wong for the acquisition of "instrumentation for purification and analysis of proteolytic enzymes". Broadly speaking, these funds will equip the Department of Biology with modern instruments for the study of proteins, including their expression, biological function, and breakdown.

Proteins play key roles in all biological systems. They are the machines, building blocks, and transporters of the cell. Proteins are the signals used to message other cells and are also responsible for receiving those signals. Proteins are often structural molecules, and form a seemingly endless array of biomolecules that are essential for life. A knowledge of the mechanisms that guide the actions of these proteins and biomolecules is central to an understanding of our biological world.

The awarded grant funds will allow for the purchase of a fast protein liquid chromatography (FPLC) system from BioRad, used in medium-pressure chromatography for the purification of proteins and other biomolecules. In addition, the grant will fund the purchase of a ThermoFisher general-purpose chromatography refrigerator to house the FPLC system and related equipment and supplies, a LI-COR system for scanning and analysis of protein blots and DNA gels necessary for the analysis of proteins, and a general-purpose Eppendorf centrifuge capable of centrifuging a wide range of samples and volumes at speeds up to 20,130 x g.

The equipment will enable a variety of molecular work within the Department. For example, the Lyons Proteolysis lab explores the structure and function of a specific family of proteolytic enzymes, the carboxypeptidases. These enzymes play important roles in neuropeptide synthesis, coagulation and fibrinolysis, and microtubule function, to name just a few. Such enzymes are of interest to the Department of Defense because many toxins that have the potential to be used in biological warfare are proteins. While understanding the synthesis of these molecules is crucial, and understanding what they do is important, understanding how they are broken down and eliminated is also valuable. This awareness can have applications in bio-defense mechanisms to avert the action of toxins before they cause harm. The Lyons lab looks forward to all of this equipment in the study of this family of enzymes.



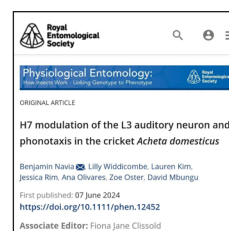
The Wong lab studies the effect of medicinal herbs on the growth of cancer cells. Wong is interested in the impact of extracts from *Scutellaria barbata* and *Oldenlandia diffusa* which have been used in traditional medicine for treating liver, lung, and rectal cancers and are included in most herbal cancer treatment formulas in Taiwanese hospitals. Wong and students investigate the modulation of anti-apoptotic and pro-apoptotic proteins of prostate, breast, and pancreatic cancer cell lines; their work will be facilitated by the LI-COR scanning equipment. (Continued on the bottom of p. 2)



Also in this issue



Biology represented at Gillette International Pathfinder Camporee



*Research
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Research from the Department



Benjamin Navia, Professor of Biology, and David Mbungu, Associate Professor of Biology, published a research paper in *Physiological Entomology*, "H7 modulation of the L3 auditory neuron and phonotaxis in the cricket *Acheta domesticus*," in which they implicate a protein kinase in the regulation of the spiking rhythm of the L3 interneuron. This paper was coauthored by recent Andrews graduates Lilly Widdicombe, Lauren Kim, and Jessica Rim, current Andrews student Zoe Oster, and Adventist University of Chile student Ana Olivares. Ana received a scholarship that enabled her to travel to the US to spend 10 weeks last year doing research in the Cricket Lab. Benjamin Navia also participated in the XV International Congress of Neuroethology in Berlin, Germany, July 28 – August 2, 2024, where he presented the latest research from the Cricket Lab.



Daniel Gonzalez-Socoloske, Professor of Biology, coauthored three research papers in the past year.

In "Systematics and biogeography of *Bacopa* (Plantaginaceae)," published in *Plant Systematics and Evolution*, Tippery, Gonzalez-Socoloske, Leliaert et al. describe their collaborative analysis of molecular and morphometric data from members of the plant genus *Bacopa*, which contains about 60 species. They updated sectional divisions and proposed a new section *Bacopa* sect. *Conobea* to accommodate species formerly in the genus *Conobea* that were found to be monophyletic with *Bacopa*.

In a collaborative work (20 authors) entitled "What's in a Name? Standardization of vernacular names for *Trichechus manatus*," published in *Caribbean Naturalist*, Dr. Mignucci-Giannoni and Gonzalez-Socoloske led a proposal to update and standardize the vernacular name used for *Trichechus manatus*, the manatee species distributed from the US to coastal Brazil. The new proposed name for the species is American manatee. The subspecies found in the US retains the name of Florida manatee (*T. m. latirostris*), and the subspecies found in Central and South America is renamed Wider Caribbean manatee (*T. m. manatus*) to better encompass its full range.

"Density and abundance estimation of West Indian manatee, *Trichechus manatus*, between the states of Ceará and Piauí, north-east Brazil, using active acoustics" was published in the *Latin American Journal of Aquatic Mammals*, the result of collaborative work led by Katherine Choi Lima of Brazil as part of her PhD dissertation where she estimated the abundance of the West Indian manatee (now American manatee) in a coastal region of Northeast Brazil using active sonar.

Additionally, Gonzalez-Socoloske wrote an editorial for the *Latin American Journal of Aquatic Mammals* (Vol. 18, Issue 2) in which he presented the papers in the new issue and talked about an unexpected mass mortality event of close to 300 river dolphins in the Amazon, where he conducted his Fulbright/National Geographic research.



Peter Lyons, Professor of Biology, published a review article in *Frontiers of Molecular Biosciences* entitled "Inactive metallopeptidase homologs: the secret lives of pseudopeptidases." In this paper, Lyons reviews members of the metallopeptidase family of enzymes that are inactive, playing biological roles in the absence of enzymatic activity. Recent years have seen the rise of these inactive enzymes from prior obscurity.

Jim Hayward, Research Professor Emeritus, and Shandelle Henson, Professor of Biology and Mathematics, together with Jim Cushing (University of Arizona) published a monograph in *Interdisciplinary Applied Mathematics* (Springer Nature) summarizing their collaborative work in ecology and mathematics since 2001. In 13 chapters, "Modeling Behavior and Population Dynamics: Seabirds, Seals, and Marine Iguanas" surveys what the team has learned about animal behaviour and its prediction using dynamical systems modeling.



Tom Goodwin, Professor of Biology, published a short invited article in the *Adventist Review*, entitled "Research. Why do it?" In this article, while not a research article, Professor Goodwin gets to heart of research - why spend time on this most-difficult, often frustrating, task. The answer: research is a high-impact educational practice, it often has practical implications and enriches our understanding of the creation, and it leads to opportunities to be a witness as we interact with the community of scientists.



Equipment grant, continued from p.1

In addition to use in research labs, this equipment is also expected to be used within some of our course-associated student labs, both in the Department of Biology and the Department of Chemistry & Biochemistry. For example, the development of a course-based undergraduate research experience (CURE) in a molecular biology class is proposed that will be enabled by this equipment. Laboratory classes in Biochemistry will also see new techniques and capacities through this equipment.

Altogether, the acquisition of instrumentation through this funding mechanism will capitalize on the educational strengths of Andrews University and its diverse student body to advance the education and career goals of underrepresented minorities in STEM disciplines. This equipment will strengthen and provide new research opportunities that will better prepare our students for research positions, including positions in the Department of Defense (DoD), and assist our faculty and students in their research interests, including investigations into the nature of proteins.

Gonzalez-Socoloske in the news, at Andrews and abroad

In the Spring of this year, Dr. Daniel Gonzalez-Socoloske was awarded the J.N. Andrews Medallion. The John Nevins Andrews Medallion is awarded “to recognize significant achievement in the advancement of knowledge and education by Seventh-day Adventist teachers, scholars, writers, and administrators who exemplify the spirit and service of the pioneer Seventh-day Adventist scholar after whom the medallion is named.”

Gonzalez and Roshelle Hall, Assistant Curator of the Museum of Nature and Science, were also featured in the Languages of God podcast produced by Biologos. They specifically contributed to three episodes of a series on Extinction: *Knowing Our Neighbors, Will There Be Wild Things Out There?*, and *Creatures Here and Gone*.

Finally, Gonzalez traveled to Madagascar in March where he shared his research on sonar techniques for tracking manatees, along with the natural history of sirenians, with a group at the Odysseo Oceanarium.



Welcoming our new administrative assistant!

Marshley Stewart comes to us from Florida, where she recently completed an MS in Biochemistry and Molecular Biology at the University of Miami Miller School of Medicine. Her research for that degree focused on environmental sampling and occupational carcinogen exposure in firefighters. She used molecular biology techniques to examine epigenetic modifications of the O6-methylguanine methyltransferase gene that are connected to carcinogen exposure.

Marshley finds herself at Andrews because her husband, Evron, is now studying in the SDA Theological Seminary. Previously, Evron was Associate Pastor of the First Seventh-day Adventist Church of West Palm Beach.

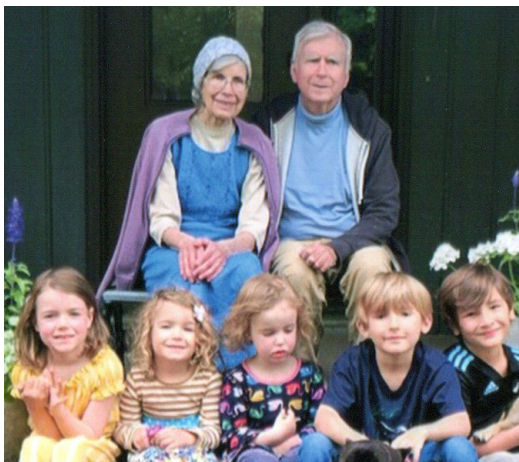
Although we share Marshley with the Department of Physics, her organizational skills and background in the biological sciences are highly valued.

Welcome, Marshley, to our department and thank you for all you do for each of the faculty and students in the Department!



Alumni calling songs

Mary Ann Kimmel-McNeilus (BA 1966) and husband Marnelle live in Lanesboro, Minnesota, where they are actively involved in the local Amish community through their Mercy Valley Farm. Recently, Loma Linda University Alumni Association produced a brief video on this Amish ministry. The video can be found on YouTube. They hope that you will be blessed by viewing this video, as they have been blessed by working with their Amish friends and neighbors over the past thirty years. Included is a photo of Mary Ann and Marnelle with their grandchildren on Mercy Valley Farm.

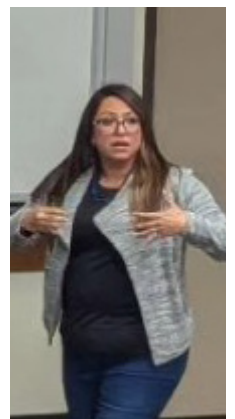
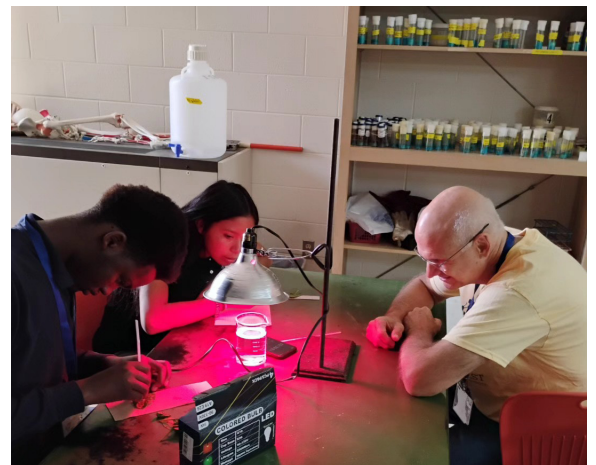
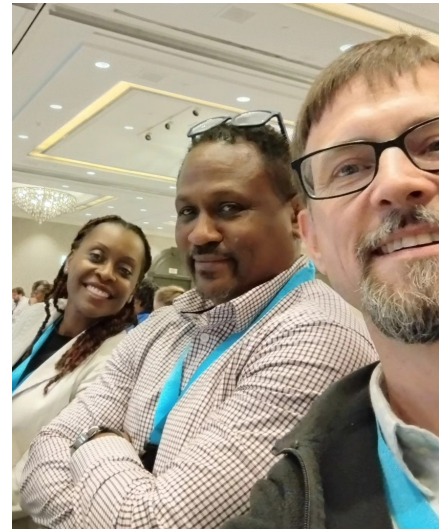


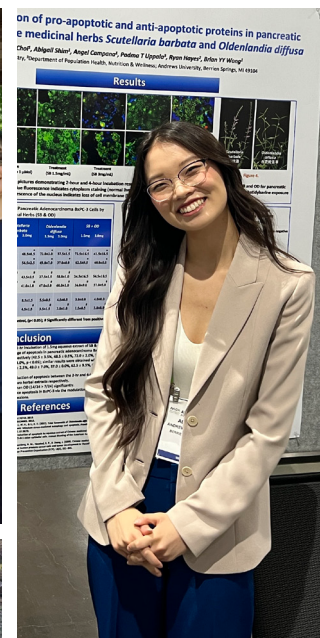
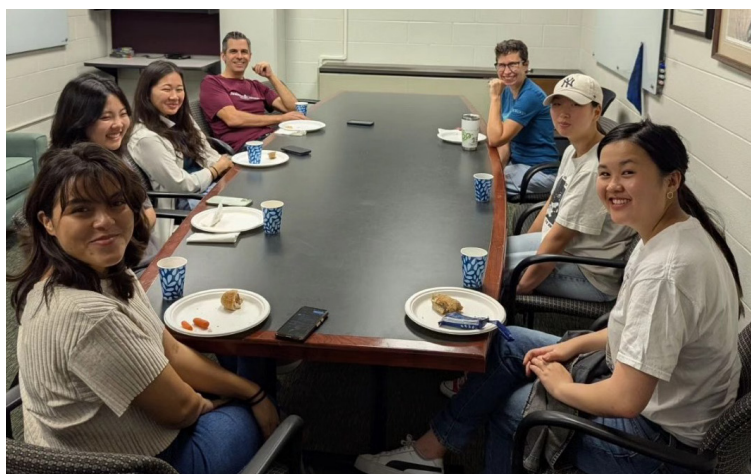
Andre Moncrieff (BS 2014), postdoc at the Louisiana State University Museum of Natural Science, was recently awarded the prestigious American Ornithological Society Kessel Fellowship! This means he'll be diving deep into how river rearrangements shape biodiversity in the Amazon rainforest.





2024
in
Pictures





Left page, clockwise from top left: Gabriel, Jordan, and Katherine show off their paintings in the Conservatory. A group of students and faculty join Ron Baik to learn of his research at the Sloan Kettering Institute. In July, Dr. Marlene Murray, Carlisle Sutton, and Dr. Peter Lyons attended the Department of Defense HBCU/MI Opportunities Workshop in Arlington, VA. Dr. Rob Zdor assists academy students during

SciFest in September, where the theme was “light”. Dr. Ana Lidia Flores-Mireles, the Hawk Assistant Professor of Biological Sciences at the University of Notre Dame, shared with us her research on catheters and the urinary-tract infections often associated with them. Dr. Brian Wong, Dr. Tom Goodwin, and Marshley Stewart enjoy a fall bonfire social in October. A haystack supper was enjoyed following a rousing game of volleyball in early September. When the holiday season comes around, the Botanical Conservatory is decked out in lights for all to enjoy. Biophilia organized a painting event in the Conservatory.

Right page, clockwise from top left: The cricket neurobiology lab of 2024-25. A light meal was provided students early in the semester where they could get to know the faculty. Abby Shim attended the annual meeting of the AACR in San Diego, presenting her research from the Wong lab on the anticancer properties of two Chinese medicinal herbs. A number of faculty, students, and family members gathered for a bonfire social in October. The September volleyball gathering before a good haystack meal.

While it seems like our year is all fun and games, a lot of serious studying happens behind the scenes!!

The Andrews University Museum of Nature and Science

Highlights Endangered Species at the International Pathfinder Camporee

This past summer, the Andrews University Museum of Nature and Science and the Department of Biology proudly represented Andrews University at the International Pathfinder Camporee in Gillette, Wyoming, which attracted over 60,000 attendees from around the globe. Specifically showcased was the Endangered Species honor in an interactive and innovative way, developed collaboratively by a dedicated team of students and faculty.

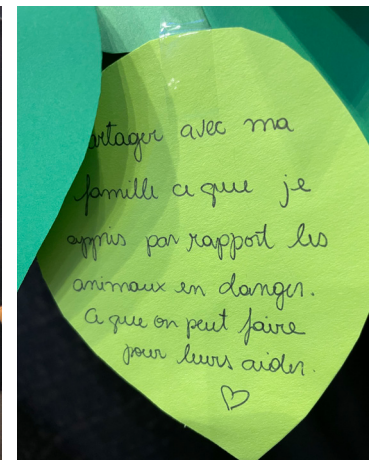
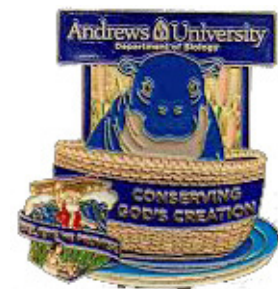
In preparation for this significant event, a group of 12 students from various campus programs worked throughout the Spring semester of 2024 and into the summer to design and plan the displays. The team created informative panels that guided attendees through critical aspects of wildlife conservation (see *photos to right*: (top) Rheo Hendrickson, Sofia Navia, Roshelle Hall; (second photo) Jonathan Lumbu, Dana Husana, Ken-suke Okawara). Displaying original artwork by students, and engaging activities, the booth aimed to educate participants about the importance of protecting endangered species and allowed visitors to complete all of the requirements of the Endangered Species honor.

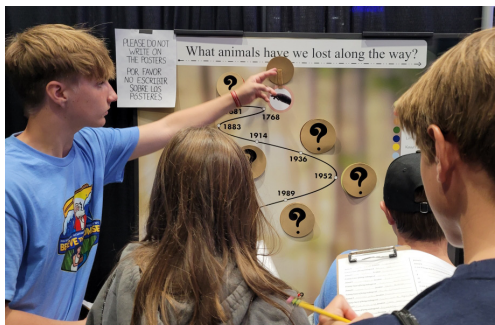
At the camporee, a team (shown to right: (l-r) Evelyn Cummins, Dr. Daniel Gonzalez-Socoloske, Roshelle Hall (MS '19), Dr. Kenley Hall, Dana Husana (MS '24)) set up the display and engaged with visitors throughout the week. Attendees walked through eight interactive stations, each focusing on key topics such as causes of extinction, conservation efforts, endangered species worldwide, and actions individuals can take to help endangered animals (see photos on next page). The booth culminated in a pledge tree, where over 650 Pathfinders wrote commitments on leaves made from recycled paper and finally learned about manatee conservation through a short video featuring Dr. Daniel Gonzalez-Socoloske, Professor of Biology. Since we used the acronym HIPPO (Habitat loss, Invasive species, human Population, Pollution, and Overharvesting) to teach about the plight of endangered species throughout the world, we decided upon a pygmy hippo mascot. Some of the artwork included this hippo, which we named "Cory". A pin was also designed by Dana Husana to sell at the

camporee to help alleviate costs of the booth and travel to the Camporee. A few are still available if you are interested. A life size hippo mascot greeted everyone at the camporee, and he was a big hit with all ages.

This significant effort was spearheaded by Assistant Curator Roshelle Hall and Curator and Professor of Biology Dr. Daniel Gonzalez-Socoloske, who guided the students in the initiative. The collaborative spirit and hard work of the team brought awareness to the urgent issue of biodiversity loss and fostered a commitment to wildlife conservation within the Pathfinder community worldwide.

The Andrews University Museum of Nature and Science is excited to continue its mission of educating the public about endangered species and inspiring future generations to take action for our planet's wildlife. We invite everyone to visit the museum and explore the display, which now resides in our exhibit space. Together, we can make a difference in the fight to protect endangered species for years to come and take seriously our call as disciples of Christ to creation care.





Above left, one of the many Pathfinder groups that came through the display, together with the Andrews team. Above right, groups walking through the display, noting the HIPPO panel (Habitat loss, Invasive species, Population of humans, Pollution, Overharvesting). Each panel could be moved left or right to visualize a primary factor in extinction. Left, visitors engaged with the extinction timeline by lifting up each question mark to find out when the extinct animal disappeared.

Facilities and equipment additions

The past year has seen additions to our department in facilities and equipment.

1. A donation of two large shaking incubators and a large biological safety cabinet was made to us by Pro Farm Group, a biotechnology company with manufacturing facilities in Bangor, Michigan. The shaking incubators have been a fabulous addition and have been used on a regular basis by the Lyons Proteolysis lab. In the photo to the right, these items are arriving at the loading dock.

2. Equipment purchased through the Lyons/Wong Department of Defense grant has begun arriving. We have been enjoying the use of a modern Eppendorf centrifuge (Andy Zhao is inspecting it in the photo at bottom right), and the LI-COR imager for DNA gels and protein blots has been installed. The remaining equipment will be arriving in the coming months.

3. A significant change to our Museum of Nature and Science has happened: a room on the third floor of Price Hall was renovated as a collections room for the Museum of Nature and Science. In addition, 22 large voucher specimen boxes were donated to us by the University of Kansas. This has enabled a separation of specimens for research purposes from those for public display which remain in the museum. In the photos below, Juliana Payne, a freshman at Andrews Academy, assists Roshelle Hall, Assistant Curator, in the collections room.



Caring for God's Creation

A theme is emerging on our campus this year. Creation care. This is exciting for biologists, as many became biologists because they cared about creation. This theme has become visible in three ways:

1. President John Wesley Taylor V has presented a vision for creation care on our campus, one that is rooted in Scripture. You can read about it at: <https://www.andrews.edu/administration/president/fromtheheart/creationcare.html>. In this statement, the president provides four pieces of evidence for the importance of creation care. First, God is the Creator, and we are made in His image. Second, God remains connected with and protective of His creation. Third, God instructs human beings to care for His creation. Fourth, God is distressed when His creation is desecrated and exploited. Based on these points, he suggests that there are three implications for us personally and corporately at Andrews University. We should become informed, be an example of environmental stewardship, and educate others in environmental literacy.

2. A Creation Care Council has been developed, and is actively involved in finding ways for our campus to be more energy efficient, reduce waste, and promote conservation, amongst other ideas. Andrews biologists involved in this Council are Daniel Gonzalez-Socoleske and Roshelle Hall (Biology), Kathy Koudele (Agriculture), and Padma Uppala (Public Health).

3. The Andrews Autumn Conference this year was focused on Creation Care. This conference brought together individuals from Andrews, Burman, and AdventHealth Universities, as well as special guests Jessica Moerman from the Evangelical Environmental Network, William Miller, Assistant Professor of Biology at Calvin University, and Sigve Tonstad, Research Professor of Religion at Loma Linda University. Presentations ranged from theology (Tonstad, the status of animals highlighted in Jonah; Davidson, reverence for life throughout Scripture) to biology (Hall, an endangered snake; Campbell, malaria distribution and interventions), behavioural sciences (Saugh, community gardens and wellbeing; Bailey, McBride, and Trecartin, Adventist beliefs on creation care), and others. Many insights were gained from these presentations and resulting discussions.



We'd love to hear from you! Send us an email or letter to let us know what is new in your life. 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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