BIOFEEDBACK

Winter 2018-2019

Newsletter of the Andrews University Department of Biology

A new chair takes the helm

Fall is a time of colorful foliage and cooler temperatures, a time of promise and fresh starts, a time of new beginnings. This Fall we began by welcoming our new and returning students and welcoming Dr. Robert Zdor to his new position as chair of the Department of Biology. Zdor has been a member of the faculty since 1991 and began serving as chair in July of this year. He is regarded as one of the master teachers here at Andrews University by both colleagues and students, and has provided mentorship and guidance to both.

He is actively engaged in research addressing plant-bacteria interactions, specifically, the use of bacteria to control weeds. As chair Zdor strives to faithfully represent the department both on and off campus and to partner with biology faculty to help them reach their full potential. His experience makes him well equipped to maintain the department's long-standing reputation of academic excellence. One of Zdor's immediate goals is to lead the department in the initial steps toward the online delivery of biological education. This will be accomplished via partnership in a STEM education course, expected to launch in the summer of 2019, which will be a hybrid course (with online and on-campus components) with the goal of providing STEM resources to K-12 teachers.

Zdor replaces Dr. Tom Goodwin who served as department chair for the last six years and who worked diligently to ensure a smooth transition. As chair, Goodwin's collaborative leadership style provided mentorship, support and advocacy for the department and its faculty. When asked what was most rewarding during his tenure as chair, Goodwin stated: "I think the most rewarding aspect of my time as chair was the opportunity to help shape the atmosphere of the department: to continue with our long-standing tradition as a collegial department focused on the growth of our students. We have a special environment in which to work, learn, and grow; and it was an honor to help foster this environment." Although retiring as chair, Goodwin plans to continue to focus on his "twin loves"- teaching and research.

A Greenhouse Revival - Over the past year, our biology greenhouse has had a few changes, and has been opened to the public on a number of Sabbath afternoons. Many have expressed appreciation for the chance to experience a tropical environment in the midst of a cold Michigan winter. We thought we'd share a few photos of the greenhouse and some of the surprises it has produced for us this year. Above, visitors explore the tropical room on one such Sabbath afternoon. See page 5 for a few more photos.

Andre Moncrieff discovers a new species of Antbird

Biology graduate Andre Moncrieff (BS '14), pursuing a PhD in ornithology at Louisiana State University, was the lead author on a paper describing a new species of antbird from Peru. "A new species of antbird (Passeriformes: Thamnophilidae) from the Cordillera Azul, San Martín, Peru" was published in *The Auk* in early 2018. Andre and his colleagues named the bird in honor of famed conservation biologist, E. O. Wilson. He describes the discovery in a short article that can be found online at http://www.lsu.edu/mns/news/2017/newantbird.php.

We were priveleged to have Andre come and share his research with our students this year in a departmental seminar. He spoke mostly about his dissertation research, which focuses on the genetic changes responsible for speciation in neotropical birds, specifically the blue-crowned manakin, and how geographic barriers impact this process. Andre also spent some time in our museum of natural history. In the 1960s, Asa Thoreson and other members of the Department of Biology were also exploring the jungles of Peru. Many specimens in our museum come from those trips to Peru in the '60s, and so are of keen interest to Andre.

In June of this year, Andre Moncrieff (BS' 14) and Daniel Gonzalez (BS '03 and current faculty member) were studying field notes from the 1968 Andrews University expedition to Peru. As they were doing so, they realized: The Andrews University team was "on the ground" in Peru exactly 50 years before, to the day!

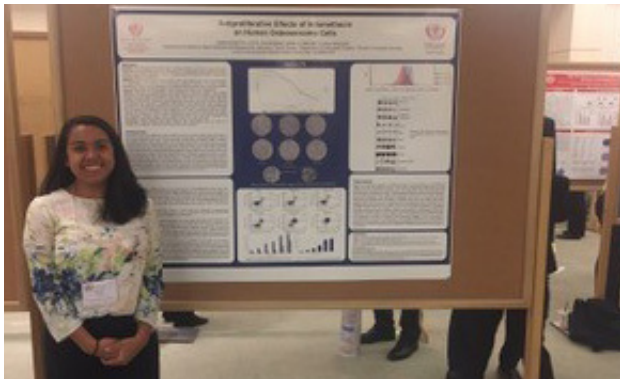
Alumni Homecoming Weekend 2018

Alumni weekends are always a good time to reminisce. This year, we took the opportunity to consider the past 50 years of our MS in Biology graduate program, begun in 1965, with the first students graduating in 1968. Happy Anniversary!

Getting Involved in Summer Research!

Several of our students participated in research this past summer. These experiences are vital for the development of analytical thinking skills and for learning how to "do" science. We are excited when we hear of students pursuing these opportunities!

Annie Moretta, senior biology major, participated in the Undergraduate Training Program at the Loma Linda University Cancer Center. She worked in the lab of Dr. Saied Mirshahidi, where she used an osteosarcoma cell line to study potential cancer treatments using non-steroidal anti-inflammatory drugs. She had the opportunity to present at a research symposium with other students in many other programs (see top photo).



Shekinah Dosunmu, senior biology major, also participated in the Undergraduate Training Program at Loma Linda University. The program she participated in was coordinated by the Center for Health Disparities and Molecular Medicine. Shekinah worked in the Neurosurgery Lab where she investigated the role that copper and copper transporters play in the onset of Alzheimer's disease. In the photo to the right, Shekinah (left) enjoys a meal out with her lab.

Trey Lawson, senior biology major, attended the Summer Health Professions Education Program at Howard University. There, he was able to take classes in the medical school, shadow physicians, and work in the W. Montague Cobb Research Laboratory. At the lab, he compiled a biohistory of an African American woman through studying her remains. Her bones told a story of mistreatment in a mental health facility during the period of Reconstruction in America. The photo shows Trey (6th from left, back row) together with fellow participants in this program.

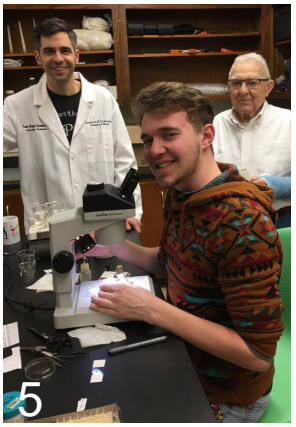
Paola Bayona, senior biology major, participated in the Summer Undergraduate Research Training Program at Baylor College of Medicine. Paola worked in the lab of Dr. Debananda Pati, where she created a number of Rad21 mutants with the goal of producing a stable recombinant Separase-Rad21 complex. As this complex is involved in the segregation of chromatids, it has implications in aneuploidy and tumorigenesis. Below, Paola (4th from the right) poses with other members of the lab.

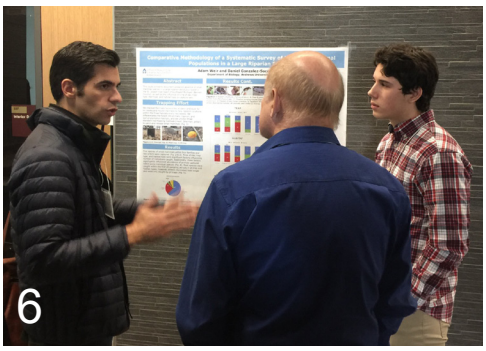
Adam Weir had the opportunity to travel to Puerto Aventuras, Mexico, with his research adviser Dr. Gonzalez-Socoloske, where they spent one week studying West Indian manatees at the Dolphin Discovery facilities. The staff were very accommodating and allowed them to get in the water with the manatees to collect data. Overall, it was a fantastic trip both academically and personally. Adam comments that "Dr. Gonzalez is a great biologist and an even better Christian; it's a research experience that an undergrad can't get at most schools."

Here on campus, many students and faculty also engage in research during the summer months. We have a hard-working group of graduate students, making steady progress toward their graduate theses in cancer biology, paleobiology, and molecular biology and genetics. Undergraduates also make an important contribution to our research in the summer months. This summer we all met on a weekly basis, spending an hour to share our successes, and inevitable failures. This was valuable time to share ideas and observe the process of science as it works out in a variety of disciplines. In coming issues of *Biofeedback* we will share more details of our research here in the Department of Biology, and continue to celebrate with our students who participate in exciting summer research.

Some events of the year...

1. The Tribeta society inducted a number of budding biologists into their membership this year. 2. Members of our Biophilia biology club (l-r, Brandon Shin, Nina Woodard, Shekinah Dosunmu, and Taejun Ok) led out in a worship service at SciFest, the yearly STEM program for high school students. 3. Biophilia held a vespers program this fall, which attracted many students, both biology majors and friends. 4. Dr. Benjamin Navia had the opportunity to visit a number of our alumni currently attending Loma Linda University. 5. Dr. Robert Husband (back right) is a mite expert from Adrian College. He visited our department where he helped Dr. Daniel Gonzalez (left) and Max Dilzer (front) search for mites in our museum collections. 6. Dr. Daniel Gonzalez (left) and Adam Weir (right) describe their research during the Michigan Academy of Science, Arts, and Letters annual meeting. 7. We had a large class in *Genomics, Proteomics, and Bioinformatics*. The final project was a poster in which students shared their efforts to use genomics tools to identify the prokaryotes present in soil. Almost 30,000 different 'species' (operational taxonomic units) were identified in just a few soil samples! Here the class poses for a photo.





Publications

Peter Lyons, associate professor of biology, together with Gifty Barfi (B.S. 2015) and a group from the Universitat Autonoma de Barcelona, Spain, co-authored a paper describing the X-ray crystal structure of a proteolytic enzyme, carboxypeptidase O, and showing the mechanism by which this and related enzymes exhibit precise substrate specificity: Garcia-Guerrero, M. C., Garcia-Pardo, J., Berenguer, E., Fernandez-Alvarez, R., Barfi, G. B., Lyons, P. J., Aviles, F. X., Huber, R., Lorenzo, J., and Reverter, D. (2018) Crystal structure and mechanism of human carboxypeptidase O: Insights into its specific activity for acidic residues, *Proc Natl Acad Sci USA* 115, E3932-E3939.

Just this November, another publication from the Lyons group was published in *PLoS ONE*, this time comprised solely of data collected here at Andrews. The paper was co-authored by Linnea Burke (B.S. 2018) , Hazel Ezeribe (B.S. 2016) , Anna Kwon (B.S. 2014), Donnel Dockery (B.S. 2013), and Peter Lyons, and entitled “Carboxypeptidase O is a lipid droplet-associated enzyme able to cleave both acidic and polar C-terminal amino acids.” This paper implicates carboxypeptidase O in cellular lipid metabolism.

Two papers from the Department of Biology this year have addressed aspects of teaching. To address recent advances in biological technologies and our increasing ability to modify life, Lyons wrote an article published in the April-June 2018 issue of the *Journal of Adventist Education*. This article is entitled “Editing life: modern biology and biblical principles.” Some ideas for discussing these topics in the classroom, elementary through college, are shared.

Benjamin Navia and David Mbungu, associate professors of biology, have written an article expected out in an upcoming issue of the *Journal of Christian Education*. In this paper, Navia and Mbungu investigate student perceptions regarding the study of evolutionary concepts in their Foundations of Biology class here at Andrews. It is known that student interest in the subject is influenced by several factors, including prior exposure to the material, students’ belief system, and the instructors’ attitudes towards the subject. These factors also determine the ability of students to understand, discuss, and analyze evolutionary arguments. The results of this study showed that students are interested in the material, think it is important to study, and value discussing these issues in a supportive Christian environment. The authors discuss the implications of this for strengthening the faith and intellectual growth of students.

Several publications have been produced by the Seabird Ecology Team, led by Jim Hayward, professor emeritus of biology, and Shandelle Henson, professor of ecology. Kelly McWilliams, (M.S. 2010) and Amanda Sandler (M.S. 2013), together with Gordon Atkins, adjunct professor of biology, Shandelle Henson, and Jim Hayward, co-authored “Courtship and copulation in Glaucous-winged Gulls, *Larus glaucescens*, and the influence of environmental variables”, published in the *Wilson Journal of Ornithology*. This paper combines thesis work by two of our former graduate students with additional contributions of data, analysis, interpretation, and writing by the three faculty authors. It provides the first quantitative assessment of mating behaviors in Glaucous-winged Gulls, along with an assessment of environmental influences on these behaviors.

Shandelle Henson co-authored several additional papers this past year: Gallos, D., Gallos, C., Watson, W., and S. M. Henson 2018. “A note on synchronous egg laying in a seabird behavior model.” To appear in the J*ournal of Difference Equations and Applications*; Cushing, J. M., and S. M. Henson 2018. “Periodic matrix models for seasonal dynamics of structured populations with application to a seabird population.” *Journal of Mathematical Biology*; Robertson, S. L., Henson, S. M., Robertson, T., and J. M. Cushing 2018. “A matter of maturity: to delay or not to delay? Continuous-time compartmental models of structured populations in the literature 2000-2016.” *Natural Resource Modeling*.

Marlene Murray, associate professor of biology, co-authored a publication in the *Journal of Global Engagement and Transformation* together with members of the Department of Graduate Psychology & Counseling here at Andrews. The article was entitled “Analysis of endocrine response to perceived difference in cross-cultural interactions,” by authors Woolford-Hunt, C., Murray, M., Guerra, T., & Beenken-Johnson, K.

Alumni Calling Songs

RJ Tenga (MS ‘13) and her husband, Rashid, with their daughter, Bella, visited from Thousand Oaks, CA in November of 2017. RJ teaches science at Newbury Park Academy.

Bryson Ahlers (BA ‘64; LLUSM MD ‘68) shared with us some memories of his time in our department:

Having just received the winter issue of BIOFEEDBACK, the photo on page 1 brought back a flood of memories. First, I readily identified Mr. Heidtke – he appears the same [in this photo] as when I took Zoology from him in my freshman year. In order to help defray my college expenses I worked at the mill. After I took the first semester’s exam, Mr Heidtke offered me a job as Lab Assistant, a position that I held for the next 3½ years, 3 years as Head Lab Instructor.

During those 3 years I also worked with Dr. Hare, making batches of agar for his fruit flies in his genetics class. Sometime during those years Ariel Roth retired and Dr. Asa Thoreson took his place; from him I took Biological Photography which started me on the way to becoming an avid nature photographer although one of my favorite subjects is lighthouses. Over the years, I have personally photographed most West Coast lighthouses from the Mexican border up into Alaska.

At the Thanksgiving break in 1963, rather than visit our families, Asa Thoreson took a few biology majors to northern Lower Michigan to obtain study skins for the department museum. This may have been his first field trip for collections. I recall skinning several small animals in the museum, including a skunk which I picked up as roadkill, but in good condition. Fortunately, I was able to avoid the scent glands!

Tracy Tacket (Wilson) (BS ‘84) now works as a family physician at Lakeland Family Medicine in Niles, MI. In her free time she enjoys studying Daniel and Revelation, and training her lab puppy!

Toby J Imler (BS ‘74), dentist, retired following a 23+ year career working for the US Public Health Service in Alaska and Minnesota. He followed this “retirement” with 10 years teaching, as clinical instructor at Minnesota State University Mankato and as secondary teacher at both Maplewood Academy (MN) and Ouachita Hills Academy (AR). He currently lives in Arkansas, where he enjoys growing a large garden, working with a local church plant, and studying the Bible, especially prophecy.

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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