

DEPARTMENT OF BIOLOGY NEWSLETTER

VOLUME 4.2 | Spring 2011

CHAIR'S CORNER



Dr. Mark Bolyard

Greetings from Union, Spring, 2011! Things are still busy here, as you will read about in this edition of our newsletter. First, we have just completed our four-year Academic Program Review. This is a chance for us to evaluate our program, make plans for the next four-year cycle, and gather important information, particularly about what our current and former students are doing! For many of you, our last point of contact was your entrance into a graduate or professional program, so we would love an update! Second, we have been involved in evaluating our curriculum, and in particular, we look forward to the start of our new Cell and Molecular Biology Major, which is set to begin this Fall. We also are excited about the development of an Honors program in Biology. We hope to have the details for this ironed out early this Fall. Third, we have hired Dr. James (Jim) Mahan to teach Gross Anatomy and Anatomy and

Physiology courses. Dr. Mahan has served as a visiting Professor on the Jackson Campus during this academic year. You will learn more about him as part of our "Research Update" in this issue.

We also have made two additional hires for Fall, 2011. In the Fall of 2007, Dr. Marc Lockett moved from the Germantown Campus to Jackson, meaning that we have not had a full-time faculty member in Germantown since his departure. We are blessed finally to have found a replacement, Dr. Faith Davis, who we will highlight in our Fall issue. We also hired a second instructional staff person. Dr. Tony Wamble, who worked for years as a veterinarian, will teach with Gross Anatomy labs and Survey of Microbiology, among others. Dr. Wamble also will assist in teaching workshops as part of the Center for Excellence in Healthcare Practice, located on the third floor of Providence Hall.

Please also continue to be in prayer for Mr. and Mrs. Smith. As was mentioned in our Fall Newsletter, Mrs. Smith fell and broke her kneecap, but the good news at this point is that she has made a full recovery, and was not in pain at any point during the process. Praise God! Continue to pray for Mr. Smith, as his recovery from his 2008 stroke has been very slow. We also look forward to having Mrs. Smith continue to teach Microbiology during the 2011-2012 academic year.

Our Greenhouse Campaign is now in full swing, although we have not yet been successful in hiring a plant scientist. We look forward to interacting with prospective greenhouse donors in the near future. If you or anyone else you know would be interested in helping with this project, please contact us! We have a new brochure describing the greenhouse that we would love to share with you!

We also are involved with a number of new partnerships. First, the School of Pharmacy is adjusting their curriculum, so we will be working with them to provide a new course called "Immune Response to Infectious Diseases," which will be offered this Fall as a course team-taught by Drs. Gruenke and Huggins. Second, as you will read about in this issue, we have developed a research partnership with the Tennessee Safari Park (www.tennesseesafaripark.com) located in Alamo, TN. Students involved in both independent and collaborative research projects have been hard at work with animals at that location. Third, a number of discussion groups have formed, both on and off campus, which are also highlighted in an article in this issue.

Finally, in this issue you will learn more about Dr. Andy Madison, as well as one of our recent graduates, Hannah Henson. Enjoy!

INSIDE THIS ISSUE

Faculty Profile

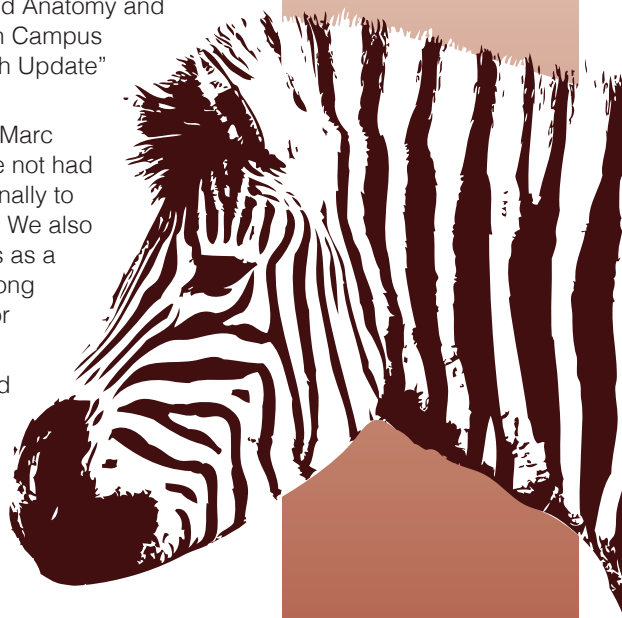
Dr. Andy Madison

Alumni Profile

Hannah Henson

Department News

Faculty Participate in
Discussion Groups
Research Update
Tennessee Safari Park



FACULTY PROFILE

by Beth Lee



Dr. Andy Madison

How many Union professors wear their mud boots to class? **Dr. Andy Madison** does, and the wardrobe is fitting, as his passion is field research. Dr. Madison is also the professor who saturates his lectures with

stories, jokes, and witticisms, then laughs at himself while the class joins in. In spite of his use of humor, he takes his professorial role seriously, and is a very effective teacher.

Dr. Madison received his bachelor's degree from the University of Tennessee in Wildlife and Fisheries Sciences. He then received a master's degree in Forestry from the University of Kentucky working on wildlife management and his PhD from Kansas State University, looking at quail survival rates in the presence of food plots.

Currently, Dr. Madison supervises several research projects on the Milan Arsenal. The first of these is a turkey population assessment. Arsenal management regulates the area's hunting frequency, and if the population of turkeys is larger than expected, more hunters will be allowed on the property. This is a potential revenue opportunity for the Arsenal. Second, deer hunters recently have been complaining about the invasive turkey population scaring away deer. Dr. Madison devised a plan to test the validity of this assumption using motion-triggered cameras mounted at several baited sites throughout the Arsenal. Essentially, if a camera yields a series of pictures with exclusively deer or turkey rather than a combination of the two, it suggests there is the potential for competition between the two species. Dr. Madison's final project at the Milan Arsenal deals with an increasing vulture population. Using the cameras from the deer and turkey projects, each area is baited with a deer gut pile, provided by the University of Memphis, and observations are made

regarding attracted predators, specifically the number of attracted vultures and specific locations where they appear more frequently.

Dr. Madison currently is awaiting the construction of a climate-controlled environmental simulation room. This addition is part of Union's plans for a greenhouse to be attached to White Hall. Once built, it will allow researchers to examine the effect of variations in climate (temperature, humidity, etc.) on a wide variety of organisms.

Students regard Dr. Madison as one of the most approachable professors. He takes time for any student who comes to his office, and always responds to emails in a timely manner. He cares not only about a student's academic performance at Union, but also about the future of each individual. He keeps up with many Union alumni via Facebook and email. Dr. Madison is truly an example of the high quality teachers for which Union is known.

ALUMNI PROFILE

by Julie Cobb



Hannah Henson

Hannah Henson is a 2009 graduate of Union University. As a freshman at Union, Ms. Henson took Dr. Weaver's Principles of Biology class. This class was very influential in Ms. Henson's decision to pursue

a degree in Biology. She remembers the class as fun and interesting, while also putting into perspective how studying biology was also the opportunity to study God's creation.

Now, she is a PhD student at the University of Tennessee Health Science Center in Memphis, Tennessee. When asked how Union prepared her for her current work, Ms. Henson goes back to her first year as a PhD student and remembers the class work she completed

as being very similar to work she completed at Union as an undergraduate. While these classes were fast-paced, she felt prepared because she had learned much of the information at Union. She says classes in Molecular Biology, Cell Biology, Genetics, and Developmental Biology were especially helpful in preparing her for her current work.

As part of the Integrated Program in the Biomedical Sciences at the University of Tennessee Health Science Center, Ms. Henson is on the Cancer and Developmental Biology track. Through this program she has the opportunity to conduct research at St. Jude Children's Research Hospital studying the blood-brain barrier and blood-cerebrospinal fluid barrier. She joined a lab at St. Jude last May in the Chemical Biology and Therapeutics Department and says that she really enjoys working in the lab. She says she is finally getting the chance to apply what she has learned in the classroom to everyday work.

Ms. Henson is especially appreciative of the faith-based education she received at Union. In fact, one of her best memories of Union was a GO trip to Honduras she had the opportunity to go on during spring break of her junior year. She remembers how well her teachers integrated faith and learning in the classroom and says that this type of education really prepared her for the challenges she has faced during graduate school as she has come to realize that the science community is its own mission field.

When asked about her future plans, Ms. Henson says she is open to all possibilities. For now she is enjoying the research involved with her PhD work. She does hope one day to go on to do post-doctoral research and later teach biology at the college level while still being involved in research.

FACULTY PARTICIPATE IN DISCUSSION GROUPS

by Dr. Mark Bolyard

One of the challenges for university faculty in any discipline is to make connections with other faculty members, both inside and outside of their discipline. Biology faculty and staff have been working hard to make connections in a variety of areas. For example, Mrs. Cathy Huggins, Dr. James Huggins, and Dr. Mark Bolyard serve on the Executive Board of the Friends of Cypress Grove Nature Park. Recently, a Scientific Advisory Board was initiated, consisting of scientists from Lambuth, Lane, Jackson State, TWRA, UT Extension Services, and others, who have an interest in the biodiversity at Cypress Grove Park. Drs. Kerfoot and Madison are part of this group, which met for lunch at Jackson's Discovery Museum. It was a great time of conversation and idea sharing.

A similar meeting was held among Union faculty interested in cell and molecular research projects. This included Drs. Lockett, Gruenke, and Bolyard, as well as colleagues from Chemistry and Pharmacy. It is our hope that this group can meet periodically to share ideas and perhaps enhance collaborations.

Drs. Gruenke and Bolyard participate in an interdisciplinary discussion group that meets once a week at Barefoot's Joe (a coffee shop in the Student Union Building). This group also consists of



faculty members from Physics, Engineering, Philosophy, Theology and Missions, Political Science, and the Library. The original organizing question for this group was "What does it mean to be human?" but they have discussed a wide range of topics, and even organized a seminar on liver transplantation.

Biology faculty also participate in several interdisciplinary book discussion groups organized by the Center for Faculty Development. We are excited about the opportunities that Biology faculty have to discuss a broad range of topics with faculty from other disciplines and institutions.

RESEARCH UPDATE

by Kayla Hauss



Dr. James Mahan

Dr. James Huggins and **Dr. James (Jim) Mahan** are currently collaborating on a project to identify the microbial flora present in the throats of captive raptors. This involves optimizing the

sample collection, DNA purification, and polymerase chain reactions that will be used to identify microbial species. Dr. Mahan commented that the "characterization of the species of bacteria and fungi that are present in [these] Raptors [should] be of value in the care and rehabilitation of these magnificent animals that God has created and entrusted to our care." Mrs. Cathy Huggins and senior biology major Laura Finley also have been involved in this research. Ms. Finley states, "I was really excited about working [with rehab birds] because it could have a significant impact on speeding up diagnosis of invasive fungal infections. I also worked with Mrs. Huggins on culturing bacteria from the samples. I wish we had more time to go in depth on that aspect [of

the project]. I think that both parts of my project set up a great foundation for many future research students."

Dr. Huggins has been a member of the Union Biology Department for 24 years. He received both a Bachelor of Science in Agriculture and Master of Science degrees from Arkansas State University, and his PhD at the University of Memphis. This research has developed out of his love for raptors as a licensed raptor rehabilitator, and through his role in overseeing Union's Wildlife Rehab Center (www.uu.edu/dept/biology/wildliferehab.cfm).

Dr. Mahan joined the Biology Department as a Visiting Associate Professor in February 2010, and continues as an Associate Professor for Fall, 2011. While completing his PhD in Cell & Molecular Biology at the University of Memphis, he worked in the Pathology Department at Methodist Hospital. From there, he joined the Anatomy & Neurobiology Department at the University of Tennessee Health Science Center and conducted NIH-funded research on epidermal wound healing, along with teaching Head & Neck Anatomy and

Gross & Microscopic Anatomy. Dr. Mahan then worked jointly in Gastroenterology at UTHSC and the Veterans Affairs Medical Center in Memphis, conducting NIH & VA funded research on the absorption of triglycerides by intestinal epithelial cells.



After many years in research, he began to question whether that was what God wanted him to continue doing for the rest of his career. "For me it was not hard to be patient and wait on God's

answer since I knew in my heart that God always knows our needs and provides for us. And God once again proved to me that He is faithful to his promises." Dr. Mahan was led to Union and has enjoyed his role here. "Being part of a rigorous academic environment that is Christ-centered has been an absolutely incredible experience for me. I thank God for the opportunity He has given me to be part of this Christian community." We are blessed to have Dr. Mahan here, and we look forward to seeing the ways in which God uses him at Union for years to come.

TENNESSEE SAFARI PARK

by Jared Littlejohn

Biology students at Union University have the unique opportunity to visit, interact with, and conduct research on animals that many people never get to see in their lifetime. This opportunity does not require long travel overseas, nor does it require large amounts of money. Located within a 35-minute drive from campus in Alamo, TN, the 200 acre Tennessee Safari Park is abundant in its diversity of animals. Ranging from kangaroos to camels, the park is home to over 400 animals that represent 80 different species.

Recently, Union students have been conducting research on animals at the park, as part of the newly established Collaborative Research class led by Dr. JR Kerfoot. One group of researchers investigated the influence of a diet supplemented with diatomaceous earth on the endoparasite levels in zebra. If this method proved efficient, it would be a more economical



alternative to traditional vaccinations. Results indicated that feed containing diatomaceous earth seemed to cause a reduction in the endoparasites load of zebras compared to those fed a diet without diatomaceous earth. Knowing this, owners could incorporate this type of feed into the diet of the zebras in order

to reduce the number of endoparasites in an economical and easily accessible way.

A second research group was interested in examining relationships among common water buffalo (*Bubalus bubalis*). Understanding the relatedness among individuals within a population is important in reducing the influence of inbreeding and the loss of genetic variation that could increase deleterious alleles. This is of great concern for species where only a small population of individuals exist. Relatedness was investigated by analyzing genes from purified mitochondrial DNA. The techniques developed for this project

will be utilized in the future to examine relatedness of this species at other facilities to aid in developing breeding programs that incorporate genetic information to increase the heterozygosity within populations.

Future projects at the park include investigating the variability in the gait of hoofed species using high speed videography and the exploration of species-specific soil pathogens affecting herding species. Students who have taken part in the research opportunities at the Tennessee Safari Park have enjoyed the chance to conduct research on these exotic animals. Many universities do not have access to this large variety of species without going to a zoo, and the Biology Department is fortunate to have developed a collaboration with this facility. Students now have another set of research subjects on which to conduct exceptional scientific research.