BioNews

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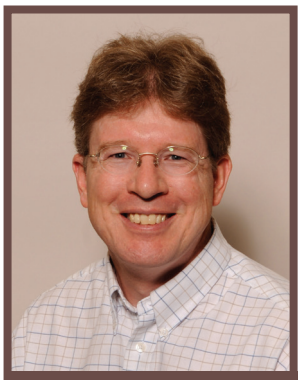
CHAIR'S CORNER



Dr. Mark Bolyard

Chair's Corner: Greetings from Jackson! A lot of things are happening this Fall, and we're are excited to share them with you. First, we want to welcome Dr. Jeremy Blaschke to our department, and to Union! Dr. Blaschke is our new Entomologist, teaching Zoology and Plant – Insect Interactions. He has recently completed his Ph.D. at UT-Knoxville and he and his family are getting settled in Jackson. As excited as we are for Dr. Blaschke's arrival, we are also excited for Dr. Weaver as she enters a new phase in her life. She will be retiring at the end of this semester, and she will certainly be missed. We're sure that she would love to hear from you (cweaver@uu.edu), so please send her a message. We have an article highlighting her career in this issue. In the Spring issue, we will be highlighting Dr. Wayne Wofford, who will be retiring at the end of the year. Combined, these two beloved faculty members have invested over 47 years of teaching to Union, not to mention their years here as undergraduates!

One of the more unusual projects that we've had at Union for awhile has been undertaken by Dr. Kerfoot and three research students. After much painstaking effort, and lots of permits, Dr. Kerfoot, through a collaboration with research partners in Louisiana, has brought 19 juvenile alligators to Union to do feeding research. This is just one of the many great research projects that we have had going on this fall!

We are also thrilled to be growing plants in our new greenhouse! We were excited to host the Open House and Dedication for our facility on Saturday, November 7. We are particularly thankful to the alumni of the Classes of 2009 and 2011, who are the major donors to the greenhouse! The Logos, which houses the Union Library, was also dedicated and opened that weekend, and it is spectacular. What a great two-for-one blessing!

Finally, our Graduate Certificate in Pre-Professional Biology program is up and running! We have two students enrolled this year, and are planning on moving to having classes of up to eight students per year, so if you or anyone you know is interested in a program designed for preparation for the health care professions, please contact myself (mbolyard@uu.edu) or the Program Director, Dr. Marc Lockett (mlockett@uu.edu), or visit our website (uu.edu/dept/biology/curriculum/graduate/) for more information.

Finally, if you have a chance to visit White Hall, you will notice some rearranging, as we have split the conference room into two offices, and made the Department Chair's office into the conference room. These are the challenges and opportunities that come with a growing department, so hopefully you will be able to find whomever you are looking for!

INSIDE THIS ISSUE

ATTENTION:
You might not receive the spring issue of BioNews!! The spring newsletter will be sent digitally by email, but we only have email addresses for approximately 45% of our alumni, and we might not have your correct email address!

So please STOP RIGHT NOW and send a quick email to **kfarrar@uu.edu** with your name as the subject. You don't want to miss a single issue of BioNews!

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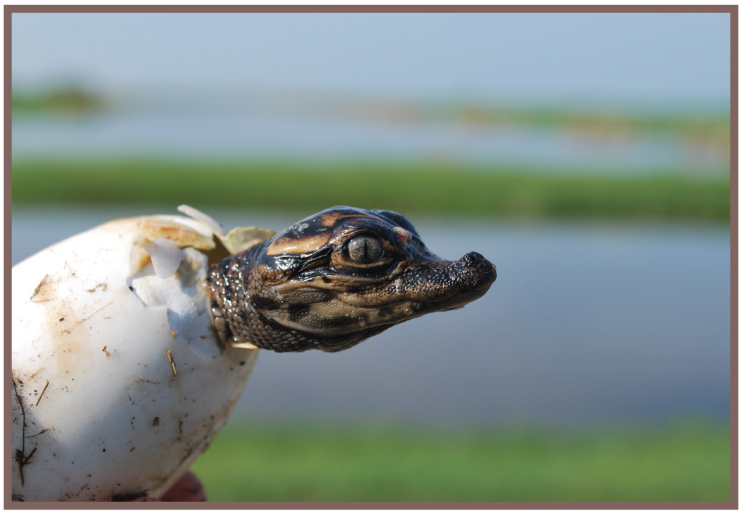
UNION UNIVERSITY
DEPARTMENT *of* BIOLOGY

ALLIGATORS AT UNION WITH THEIR GENTLY SMILING JAWS!

by Emily Easter and Dr. J. R. Kerfoot

"How Doth the Little Crocodile"
– L. Carroll

How doth the little crocodile
Improve his shining tail
And pour the waters of the Nile
On every golden scale!
How cheerfully he seems to grin
How neatly spreads his claws
And welcomes little fishes in
With gently smiling jaws!



While not a crocodile, another member of the scientific order Crocodylia is *Alligator mississippiensis*, the American alligator, and its display of power and cunning is equally magnificent. Utilizing their sharp teeth to seize and hold prey, they manipulate it towards the back of their throats, swallowing prey whole. Yes, it is very cool, and yes, the rumors are true, alligator research is being conducted on Union's Jackson campus!

Obtaining a research permit from the Tennessee Wildlife Resources Agency in the summer of 2015, Dr. James Kerfoot was able to travel with his research students to south Louisiana and bring 19 alligator hatchlings to Union's campus, ranging in snout-to-tail length from 50 – 65 cm. Hatchlings were acquired from Rockefeller State Wildlife Refuge's alligator hatchery, and are currently being used in three undergraduate projects to expand on research initiated by former Union student Micah Fern (right).

Understanding that alligator hatchlings feed on a wide range of prey items in the aquatic realm (i.e., fish and crustaceans), as well as in the terrestrial environment (i.e., birds, mammals, and frogs), undergraduate researcher Emily Easter was interested in determining the effect of feeding above water versus below the water on their ability to efficiently capture prey. Armed with a high-speed camera filming at 1,200 frames per second, Emily filmed hatchlings feeding in both of these environments and took measurements of attack velocity and the length of time the feeding took to complete. Interestingly, her research has indicated that there is similarity in feeding performance between feeding above and below the water surface and this could indicate that hatchlings have a conserved feeding behavior regardless of where they find their prey.

A second undergraduate researcher, Carl Chmielewski, is looking at the influence of temperature on the feeding performance of alligator hatchlings. External environmental temperature is known to influence the muscle metabolism of poikilotherms ("cold blooded" animals), and so Carl hypothesized that there will be a difference in feeding performance of hatchlings feeding in 20 versus 30 °C water. Temperatures included in his study are those that represent the average summer highs and the winter lows of the southern portion of the United States, where alligator occur naturally. Preliminary observations indicate that hatchlings are less active at the low temperature and only feed after prolonged periods of not eating, whereas at the higher temperatures, hatchlings are very active, and feed voraciously.

Alligator hatchlings are communal by necessity, for at their current size they could be a tasty prey morsel for other predators. As the alligator grows to sub-adult size and is not in danger of becoming food for another carnivore, individual alligators become more solitary and move away from a group. Undergraduate researcher, Ryan Grubb is investigating intraspecific competition for food between the hatchlings. Ryan aims to address the research question: is there a difference in feeding performance of an individual feeding alone compared with the same individual feeding with another alligator? Initial results indicate that size does matter in aggressiveness! Behaviorally, larger individuals tend be more aggressive to even slightly smaller individuals in the same tank when food is limited, seemingly setting up a hierarchy within the experimental tank. Feeding events are still being analyzed to see if there is a statistical difference in feeding performance in individual feeding alone versus with a competitor.

The goals of these research projects are to determine the influence of various biotic and abiotic factors on the feeding performance of these mythical reptiles, yielding a glimpse into the beauty of anatomical design and performance. As these projects are concluding, results are leading to the development of other hypotheses that no doubt will aid in determining an answer to the question: *how doth the little ~~crocodile~~ alligator?*

DR. CAROL WEAVER'S RETIREMENT

Dr. Carol Weaver will be retiring from Union University following the fall semester after 17 and a half years of service. She has had a tremendous impact on students over the years through courses taught and students advised. She came to Union as a professor in 1998 after graduating with her Ph.D. from St. Louis University, but she was not new to Union, having been a student at Union and graduating with a Bachelor of Science degree in biology.

Dr. Weaver has taught multiple classes over the years and has recently been teaching Principles of Biology for majors, Genetics, and Biology Seminar. She developed a number of courses in what is now the Cell and Molecular Biology major, including Cell Biology and Molecular Biology, and was instrumental in the creation of Special Topics in Cell and Molecular Biology, which she taught during Fall semester under the topic of Epigenetics.

Dr. Weaver has been an exemplary educator and has challenged students to develop intellectually and personally. Previous students frequently comment on how important these courses, and her guidance, have been for their future success. Dr. Weaver's role as faculty advisor of pre-med students has also been a great service to the department and to her advisees. She often advised over 60 students per year and took great joy in seeing her advisees succeed, both personally and professionally.

Her research interest is in the area of genetics, and she has been involved in a variety of projects throughout her academic career including her dissertation work studying the transmission of Histoplasmosis, an infectious disease, caused by the fungus *Histoplasma capsulatum*. She has also mentored many undergraduate research students on projects such as the screening of American beaver for the bacterium *Francisella tularensis,* investigating the frequency of delta 32 deletion of the *CCR5* gene, and determining plant relationships through DNA barcoding.

Following her retirement, Dr. Weaver plans to move to the St. Louis area to be closer to family. She will be greatly missed, and her retirement will create a void which will be difficult to fill.

ALUMNI PROFILE: DR. KELLY WALKER

by Brooke Meadows

After graduating from Union, Dr. Kelly Walker pursued her podiatric medical training at Barry University in Miami Shores, Florida. She then earned her Doctorate in Podiatric Medicine (DPM) and completed residency training at the Department of Veterans Affairs Medical Center in West Roxbury, Massachusetts and HealthSouth Surgery Center in Mesquite, Texas. In 2010, she opened Walker Foot and Ankle, her own podiatry practice in Ennis, Texas.

Which professor had the biggest impact on your experience at Union?

I believe it would be a close tie between Dr. Charles Baldwin and Mrs. Elsie Smith. Dr. Baldwin taught me to persevere the path to a medical career, while Mrs. Smith encouraged me to explore the field of podiatry.

What influenced you to choose this career path?

The encouragement of Mrs. Smith to have me learn more about the field of podiatric medicine. I shadowed a local podiatrist and learned the diversity of clinical and surgical treatment options for various foot and ankle conditions. I also appreciated the fact that most patients walk out of the office feeling better than they did when they came in. It is a rewarding specialty.

What was the hardest part about getting to where you are now?

Of course, long days and nights of preparing for exams, boards, and residency interviews were challenging. When I graduated from podiatry school, there were more students than residency positions available. This was an extremely stressful and competitive time in my education and early career. Once I had secured my residency positions in Massachusetts and then in Texas, I had to prove my competency as a resident. I arrived early to the hospital or surgical center to prepare the patient and the surgeon for surgery. I interviewed the patient, reviewed their medical history, examined the patient, prepared the paperwork, then discussed the case with the surgeon. Sometimes, other residents from other programs showed up for the same case. The surgeon would quiz us as we scrubbed in, and the resident who was quickest on their feet with knowledge of the condition/procedure was allowed to assist the surgeon.

Do you have any advice for current undergraduate students?

Be diverse in your education, and take more than just the pre-requisite courses for the pre-med program. Take business, psychology, and sociology courses and anything else you may be interested in. Medicine certainly encompasses all of these areas, but they are not often covered while you are in medical school. Stay true to your Christian beliefs, morals and ethics, as they will be challenged quite frequently.

Marine Biology & Ornithology Class

Students are once again looking forward to the trip to Georgia and Florida this coming January.

THE NEW GREENHOUSE IS UP AND RUNNING!

On Saturday, November 7, we held our open house and dedication ceremony for the new greenhouse! The event was well attended and was complete with some great food. The process for bringing this greenhouse to reality took more than 6 years, but during the dedication process, we were privileged to hear from Dr. Wofford who let us know that when the biology classrooms in the Penick building were built in the early 1970's, one was built with a door to lead to a future greenhouse. So, the dream of a greenhouse actually had been simmering on the back burner for 40 years! In addition to this story, we also heard from Dr. Schiebout regarding how the greenhouse is already being used for teaching and research. He also provided a vision for a future teaching/sensory garden that is being planned for the north side of the greenhouse. This proposed garden is to be anchored by a pavilion, surrounded by a variety of plantings representing different taxa covered in various plant classes.

The most important thing that happened at the dedication service, however, was the prayers of praise and thanksgiving offered to God, and the recognition of the donors, particularly the Union Classes of 2009 and 2011, which provided much of the funding for the greenhouse through their class gift. Special thanks was also given to John and Nancy Freeman, Bill and Elsie Smith, Wal-Mart Stores, and many other donors, who have made the greenhouse a reality. We hope that when you are in the area, you will stop in for a tour!

FACULTY PROFILE: DR. JEREMY BLASCHKE

by Chance Mattox

Dr. Jeremey Blaschke was hired this summer to teach zoology and similar courses. He is an entomologist by practice. He recently earned his Ph.D. from the University of Tennessee in Knoxville, so working for Union's Biology Department is his first teaching job. Dr. Blaschke was attracted to Union because of the seamless integration of faith and science. He loves being able to be open about his love for God along with his love for biology. Since joining the department, Dr. Blaschke has enjoyed working with the faculty and the students.

His primary courses are currently Zoology and Invertebrate Zoology. Additionally, he is co-teaching Plant-Insect Interactions with Dr. Schiebout. Since research is a key aspect of biology education, Dr. Blaschke would like to do research projects with students in the future. Since his favorite area of biology is phylogenetics, the focus of research would primarily be in insect biodiversity, species discovery, molecular phylogenetics, and insect parasitoid behavior. Dr. Blaschke would love to talk to anyone who is interested in working on these projects with him.

Dr. Blaschke grew up in New Mexico. He married his zoology lab partner, Ally, after they graduated from Bryan College in East Tennessee. Ally has several siblings who have attended Union. They have been married for five years and have one son, Jack, who is one and half years old. Dr. Blaschke's hobbies include camping, hiking, and collecting insects. He also enjoys playing the piano, soccer, and football, as well as discussing how faith and science should influence one another. Dr. Blaschke is a great addition to Union's Biology Department because of his expertise in phylogenetics and entomology, as well as his interests in faith and science.

ARBORETUM AND HERBARIUM

by Kierra Joy

The Union University arboretum has been continuously growing since its first launch on June 24, 2013. Currently, there are approximately 47 different species of trees planted right here on the Union University campus. In the past year, four additional trees have been planted and included in the arboretum database including Paw paw (*Asimina triloba*) and Thornless honeylocust (*Gleditsia triacanthosinermis*). The honeylocust was adopted by current Union students in recognition of the retirement of Dr. Carol Weaver. We are in the process of labeling a number of trees with the goal of becoming a Level 1 Certified Arboretum through the Tennessee Urban Forestry Council, which requires that at least 30 trees be labeled. We will soon have an arborist visit campus to let us know what we need to do in order for our arboretum to become certified.

In the future, we expect to add more trees to the arboretum and plant more trees on the campus, with the goal of becoming a Level 2 Arboretum (at least 60 labeled trees). It is our hope that any trees that are added to the arboretum are not currently represented, in order to create diversity within the arboretum. We are also trying to add trees that are not present in other area arboreta (http://www.uu.edu/arboretum/jaac/). However, this is a challenge because there is a possibility that those trees may not grow well in this area.

For teaching purposes, the herbarium in the Botany Laboratory, established from plant collections made by previous botany students dating back to 1962, is now overseen by Dr. Michael Schiebout. The collection has been rapidly increasing through plant collections made by recent Botany, Plant Taxonomy and research students. Many previously unrepresented species have been collected and mounted and are being alphabetically organized by plant families in storage cabinets. Nearly all of the plant specimens that are kept in the cabinets have been collected by Union University students, and represent over 30 different plant families. Due to the abundance of recent plant specimens collected, we plan to add several additional herbarium cabinets to the laboratory so that our collection can continue to grow.