



BioUpdate

Department of Biology, Middle Tennessee State University

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George Murphy

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Message from the Chair

As noted last year, we began BioUpdate in 1987 as a means of informing our constituents of current activities and accomplishments of students, faculty and alumni. The efforts of Drs. Mathis and DuBois in editing and writing a major part of the newsletters through the years are greatly appreciated. We have documented successes in teaching with faculty winning numerous awards, research and grant acquisitions, publications and presentations at the international, national, regional and state levels, and service at the national, regional, and community levels. We remain the only university department to have won MTSU Foundation Awards in Teaching, Research, and Service the same year. Successes of the past year were again impressive. Faculty received over \$2.7 million in external and internal grant and project funding, published twenty-six national/international refereed papers, presented thirty-eight papers at national/international meetings, and engaged in over four hundred public service activities. A major departmental goal has been student involvement, and students co-authored six of the refereed publications, seventeen of the presentations, forty-three engaged in undergraduate research projects, and thirty-seven completed internships during the 2010-11 academic year.

While the undergraduate and master's degree programs remain strong and continue to enroll outstanding students, the new Ph.D. programs in Molecular Biosciences, Computational Science, and Math/Science Education are off to a good start and are exceeding enrollment predictions. The interdisciplinary B.S. in Forensic Science (a collaborative effort between the departments of Biology, Chemistry and Criminal Justice) is proving to be an extremely popular program and currently has almost one-hundred majors in only its second year.

We remain hopeful that the new science building will be funded in the 2012 legislative session and appreciate the support that many alumni, parents, and community members have shown through the years in contacting their legislators on behalf of MTSU. If you have visited the campus over the past few months, you have seen that the dormitories that occupied the building site have been demolished and cleared for construction. We desperately need the new building if we are to adequately serve the needs of our current and future students. It would be difficult to over-estimate the impact such a building will have in preparing the next generation of students for careers that will benefit Tennessee's economy.

(continued...)



from the Chair...

On a final and personal note, I have announced my resignation as Biology Department Chair, effective 30 June, 2012. A search is underway for a new Chairperson and a hire may be made by the time you read this. When I assumed the chairmanship on 1 June, 1980, I agreed to serve for five years, but somehow that transformed into over thirty. I am very proud of the many accomplishments, honors, and awards departmental faculty and students have earned over the years, though my greatest contributions were probably in hiring good faculty and staff, and helping recruit outstanding students. As we celebrate the Centennial Anniversary, MTSU is well on its way to becoming a nationally recognized institution of higher education and, even in the face of diminishing state support, I am confident that trend will continue. I hope the faculty, students and alumni will offer the new chair the wonderful support that has been extended to me through the years and the department can continue to prosper.

George Murphy



New Faculty

James Brian Robertson was born in Memphis and grew up in Paris, TN. He attended Murray State University in Kentucky for his B.S. (1996) and M.S. (2000) degrees. Before beginning his Ph.D., Brian worked as a developmental cell biologist in the labs of Drs. David Bader and Ellen Dees at Vanderbilt University in Nashville. In 2005, he entered the Ph.D. program at Vanderbilt University and completed his degree in 2009. His doctoral dissertation was titled “Shedding Light on the Yeast Respiratory Oscillation: Using Luciferase and Visible Light to Investigate Rhythms in Yeast.” Brian then completed a two-year post-doctoral research project in the lab of Carl Johnson at Vanderbilt University.

The Robertson lab is investigating the timekeeping strategies and mechanisms of microbes, such as cyanobacteria, archaea, and yeast. Although these are relatively simple organisms, they are of great importance to industry as a source for biofuels and enzymes. Just as humans become more productive during certain parts of the day (and require rest/sleep at other times of the day), so too can microbes’ productivities be rhythmic. Understanding the mechanisms that underlie these biological rhythms offers a way for the biotech industry to increase productivity and yield from these organisms.

Because microbes are relatively simple in their shape and activity, detecting rhythmic behavior from them can be challenging. One solution to this problem is to introduce a bioluminescent gene from fireflies called luciferase that allows the microbes to glow in the dark depending on when certain rhythmic genes are activated or repressed. In this way, light emitted from the microbes becomes an easily detected and measured output of their genetic activity. The lab focuses on the development of these bioluminescent reporters in microbes and applies them to answer questions about genetic regulation and rhythmic behavior in microscopic life.

Brian has published in the journals, *Methods in Molecular Biology*, *Journal of Microscopy*, *Applied Biochemistry and Biotechnology*, *Proc. Natl. Acad. Sci. USA*, *Developmental Dynamics*, *Experimental Cell Research*, *The Anatomical Record Part A: Discoveries in Molecular, Cellular, and Evolutionary Biology*, and *Biochemical Genetics*. This past fall semester, he taught BIOL 1110 General Biology and BIOL 6660 Graduate Seminar. His specialty course will be BIOL 4550 Biotechnology.

Between family and the demands of a new assistant professor, Brian says there is not much time for outside interests. However, he enjoys woodworking and small building projects, which he put to good use while setting up his lab and apparatuses this year. Brian has been married for 14 years to Jessica Robertson from Louisville, KY and they have two daughters, ages 9 and 7.

Brian and Ashley Morris (another new faculty member this year - see p3) knew each other before both joined the department. Both were unaware that the other was joining the department. Brian and Ashley’s husband were good friends from high school that had lost touch over the years as their careers took them to different places. However, they once again are able to rekindle old friendships.

New Faculty



Iris Gao, born in China, received her B.S. in Virology from Wuhan University, China. Her Ph.D. is in Plant Molecular Biology from Peking University. Her thesis, "Study of Photomorphogenesis in *Arabidopsis thaliana*," was completed in 2004. From 2001 to 2004, Iris was a visit research scholar at Yale University.

Her research at MTSU is to identify active compounds from Traditional Chinese Medicine (TCM) herbs. Botanical extracts are prepared from herbs known to have uses in TCM, and the individual chemical agents are separated and analyzed with cellular assays to identify the active ingredient(s). The application of Chinese herbal medicines for the treatment of a variety of diseases is an ancient and respected tradition, and while widely accepted in the Asian countries, is arousing quite a lot of interests in Western cultures as well. As a research faculty member with the Tennessee

Center for Botanical Medicine Research at MTSU, she will have the opportunity to discover the mystery in medicinal herbs and experience the fusion of eastern and western medicine in a scientific way. Her previous work has been published in the journals *Plant Cell*, *Plant Molecular Biology*, and *Plant Physiology*. Iris is very excited about this position at MTSU and looks forward to working with several members of the department, including students.

Outside of research, Iris enjoys hiking and photography. Her enthusiasm in hiking has taken her to the summit of Mt. Kilimanjaro, 19,341 feet above sea level.



Ashley Morris was born in Mobile, AL and grew up in Alexander City, AL (located between Auburn and Birmingham). She received her B.S. from the University of the South in Sewanee, TN and M.S. degree from the University of Tennessee – Knoxville. In 2006, Ashley received her Ph.D. from the University of Florida. Her doctoral dissertation title was "Multi-pronged Approach to Eastern North American Biogeography: Phylogeny, Phylogeography, and Predictive Modeling of Temperate Woody Plant Species." After completion of her doctorate, she was appointed a tenure-track faculty position in the Department of Biology at University of South Alabama (Mobile, AL).

Ashley's research interests focus on molecular systematics, population genetics and phylogeography. Her work concentrates on plant species. Her publication record includes the journals *American Journal of Botany*, *Molecular Ecology*, *Journal of Biogeography*, *Systematic Botany*, *Southeastern Naturalist*, *Castanea*, *Conservation Genetics Resources*, *Journal of Botanical Research Institute of Texas*, *Journal of Crustacean Biology*, and *Brittonia*.

Last fall semester, Ashley taught a lecture section of Genetics (BIOL 3250), along with a couple lab sections. Her specialty courses include Molecular Ecology, Molecular Markers, and DNA Barcoding.

As for interests outside of her job, Ashley likes to read, hike and spend time with her husband, Chris and three children, Jackson (7), Olivia (5), and Samuel (1). She fell in love with the Middle Tennessee area as an undergraduate student at the University of the South (Sewanee) and says she is very excited to be back here. Ashley's husband, Chris, is a good friend of Brian Robertson, another new faculty member in the department (read about Dr. Robertson on page 2).

Old Offices...

...New

Research

Space



FISH
LABORATORY



MICROSCOPY



TISSUE
CULTURE



TENNESSEE
CENTER FOR
BOTANICAL
MEDICINE
RESEARCH

MOLECULAR
BIOLOGY
CLEAN ROOM



DATA
ANALYSIS



CENTRIFUGE
ROOM



Departmental Logo Shirts and More

The department is selling shirts, backpacks, insulated lunch bags, coffee mugs, and water bottles that sport the departmental logo. The drawstring backpacks and insulated lunch bags are new this year. The shirts come in five styles: a light tan short-sleeve or long-sleeve T-shirt with the logo on the upper right front and an enlarged color logo on the back; a dark green short-sleeve or long-sleeve polo shirt with the logo on the upper right front; and, a long-sleeve denim shirt with the logo on the upper right front. Several faculty and students have been seen wearing the shirts. The coffee mugs are white with the logo in blue on both sides (logo will be visible regardless if you are right- or left-handed). The stadium cups are 16 oz. blue plastic with a white MTSU Biology logo. The key lanyards are blue ribbed polyester cord with a white MTSU Biology logo. Prices are as follows:

T-shirts:	Short-Sleeve:	\$10.00	Heather gray pull-over hoodie:	\$25.00
	Long-Sleeve:	\$12.00	(Printed like t-shirts)	
Polo shirts:	Short-Sleeve:	\$20.00	Insulated lunch bag	\$ 8.00
	Long-Sleeve:	\$25.00	Drawstring backpack	\$ 5.00
Denim shirts:	Long-Sleeve:	\$28.00	Coffee Mugs:	\$ 3.00
			Stadium Cups:	\$ 1.00
			Key Lanyards:	\$ 2.00

All items can be purchased in the departmental office. For more information or to purchase an item (or two), contact Virginia McKnight (615-898-2291 or by email: mcknight@mtsu.edu).



Featured Faculty Member: **Dennis Mullen**

Dennis was born in Rawlins, Wyoming. He later attended and graduated from Kelly Walsh High School in Casper Wyoming. He still misses the wide open spaces and outdoor opportunities of his youth. He received his undergraduate degree in 1982 in Marine Biology from Oregon State University. After completing his undergraduate education, Dennis travelled across the United States to the University of Maine to work on his Master's degree in Zoology. Having received his Master's degree in 1985, he then travelled to East Lansing, Michigan to begin his doctorate in Ecology and Evolutionary Biology at Michigan State University. His dissertation, completed in 1991, is titled "Size Related Habitat Segregation in a Riffle Dwelling Fish."

Upon completion of his doctorate, Dennis again travelled, this time to Middle Tennessee where he began his career at MTSU in the fall of 1991. He has taught a variety of courses here in the Biology Department. These include the non-majors Topics in Biology (BIOL 1030), the majors introductory General Biology courses (BIOL 1110 and 1120); Anatomy and Physiology (BIOL 2030); General Ecology (BIOL 3400); Ichthyology (BIOL 4220); Limnology (BIOL 4250); and the graduate course Aquatic Ecology (BIOL 6120). In recent years, Dennis has been the faculty supervisor for the General Biology laboratories (BIOL 1111 and 1121). For the past several years, he has been teaching sections of the General Biology course offered through the Honors College. These sections afford the students a smaller class size, along with a faculty member teaching both the lecture and the laboratory. He has also been very instrumental in the design and implementation of the undergraduate curriculum in the department. For many years, Dennis has chaired the departmental Undergraduate Curriculum and Assessment Committee. This committee has the responsibility for overseeing the undergraduate biology major and the evaluation of our undergraduate program.

His research, along with that of his students, focuses on aquatic ecology, most of his research studies community level interactions in stream ecosystems and reservoir impacts on stream ecosystems. Dennis has published in the journals *American Midland Naturalist*, *Southeastern Naturalist*, *Canadian Journal of Zoology*, *Hydrobiologia*, *Water Research Bulletin* and *BioScene: The Journal of College Biology Teaching*. His former graduate students have researched topics such as spatial and temporal variation in riffle fish communities, the effects of logging on the invertebrate community of first order streams, interspecific resource partitioning in stream riffles, and the effect of waterfalls on the community structure of stream fishes. His travels did not stop after receiving his degrees. He has had the opportunity to visit sites in Central and South America, including Mexico, Costa Rica, and Peru.

When he is not teaching or conducting research, Dennis enjoys hunting, fishing, woodworking, and spending time with his family. His wife, Susan, was the founding conductor and music director of the Murfreesboro Youth Orchestra and currently teaches at the Webb School. They have two children, Bronwyn (who attends Oakland High School) and Finn (who attends Central Magnet School).



The Mullen Family in Machu Picchu

Another Great Year for the MTSU Center for Environmental Education!

By Cynthia Allen and Cindi Smith-Walters

Over the past 35 years, the last 25 under the Department of Biology, the MTSU Center for Environmental Education (CEE) has undergone many changes. Its humble beginning was through a grant from the Tennessee Valley Authority to the College of Education to conduct teacher training in energy and environment. At that time the CEE was simply a 'bookshelf' in a professor's office. When TVA funding ended, the CEE was 'adopted' by the Department of Biology in the College of Basic and Applied Sciences and productively trained teachers using the TVA materials, recycling information, and science content. Dr. Pat Doyle (now retired) and Dr. John DuBois worked together to continue outreach and education for mainly teachers. In 1990 Dr. Padgett Kelly was hired as Director and was soon followed by Dr. Cindi Smith-Walters. They currently share duties as Co-Directors.

Since 1993 the CEE has obtained funds for programs, outreach, education, and more. The currently staff of two, Amanda Sherlin (Grants Coordinator) and Cynthia Allen (Natural Resources Coordinator) work to keep the CEE responsive to the needs of teachers, youth leaders, students, and the general public. Bob English, a part-time staffer, directs the Tennessee Amphibian Monitoring Program (TAMP).

Projects over the years have included numerous teacher and youth leader workshops, a video with the U.S. Forest Service, an award-winning DVD done in partnership with the Tennessee Department of Environment and Conservation, a variety of audio, video, and print public service announcements played statewide, many award-winning publications including the most current, *Discover the Waters of Tennessee*, and an array of in-house curriculum projects and brochures on topics as diverse as green shopping, exotic species, water quality, and more. In addition, the CEE has teaching materials available for check out by teachers and youth leaders. These resources include a 'tree trunk', 'bat box', 'green shopping', microscopes, and various anatomy and physiology models.

Due to new Federal and State mandates, MTSU was classified as an MS4; a municipal separate storm sewer system this past year. Because the CEE has been involved with environmental and water quality issues statewide, the Center was asked by MTSU administration to work with the City of Murfreesboro, already classified as an MS4, and the campus community to assist in keeping the University in compliance. These new partnerships, both on and off campus, have not only changed the face of the CEE, but allowed it to expand programming. A number of the CEE's accomplishments this past year are detailed in the following sections.

WaterWorks!

A print opportunity this year included one through the CEE's WaterWorks program and partnered with the TN Dept of Agriculture and the TN Stormwater Association (TNSA) to provide low/no cost printing for water quality and water information. The brochures and posters are currently available statewide through local MS4s and target homeowners, farmers, and those in the construction industry.

The CEE developed an on-line clearing house for publications and videos on all six EPA recognized Best Management Practices for Clean Water. This clearinghouse is hosted on the WaterWorks! website [http://www.mtsu.edu/waterworks/clearinghouse.](http://www.mtsu.edu/waterworks/clearinghouse.shtml)

[shtml](http://www.mtsu.edu/waterworks/clearinghouse.shtml) and includes a digital list of public participation and public education resources. Maintenance will continue and new resources added to assist water quality efforts statewide.



The CEE coordinated discussions, invoicing and reporting of airtime for the *Waterworks!* radio public service announcements for TNSA and MS4 members, and worked with the Tennessee Association of Broadcasters to continue the water quality ad

CEE cont.

campaign statewide. You may have heard some of these ads played on local radio or TV stations. In the six month period of January to June of 2011 approximately 12,967 ads developed by *WaterWorks!* were played statewide at a value of \$366,971!

One hundred video masters of available generic water quality television public service announcements were also printed by the CEE and are currently being distributed statewide to our water quality partners for use on their local cable channels.

Current local *WaterWorks!* projects include coordinating cleanups on campus and within the Murfreesboro community. In September 2011, MTSU students helped collect 35 pounds of trash in the Sinking Creek area, and in October 2011 they helped remove trash and invasive plants in and around the Murfree Spring Wetland at the Discovery Center location.

Projects have also included a new printing of 80,000 brochures and fact cards for the Stones River Watershed, highlighting pollutants of concern for the Murfreesboro area and tips for protecting the local streams and tributaries. The printing was done as a result of a mailing survey among Murfreesboro residents and was done in partnership with MTSU staff (Dr. Cindi Smith-Walters, Dr. Angela Meritt, Shelia Knight, Amanda Sherlin, Cynthia Allen and the Publications Department) and the City of Murfreesboro Stormwater Department through funding from Middle Tennessee State University's Faculty Research and Creative Activities Synergy Grant.

The Tennessee Amphibian Monitoring Program (TAMP)

TAMP is a joint program of the CEE and the Tennessee Wildlife Resources Agency (TWRA). Accomplishments this past year include volunteer training workshops where participants are given a slide and sound presentation and trained to identify all 21 frog and toad species in Tennessee. In order to become certified they must also pass a quiz on their knowledge. The TAMP workshop presentation was

expanded this year to include modules on similar species and the TAMP and NAAMP (North American Amphibian Monitoring Program) protocols. Each new TAMP volunteer this year was given a copy of the CD "Vocalizations of Tennessee Frogs and Toads." This CD was a joint venture between TWRA and MTSU Public Service Committee and includes recordings of all species that occur in Tennessee, hypothetical species, a section on similar-sounding species and sound quizzes. This CD was also made available to educators statewide.

The MTSU Public Service Committee also provided funding to produce an additional 1000 copies of the TAMP CD. The CD is currently being revised and updated to reflect changes in the scientific names of a number of species. Changes to the jacket notes have been completed and Don King of TWRA has recorded the revised narration for the CD. The disc is now being mastered and will soon go to press.

We are happy to report that several new TAMP routes were established this year including one in the Reelfoot National Wildlife Refuge (NWR) and is being run by NWR personnel.

Lastly, as in previous years, all TAMP data are being entered both into the NAAMP database and a GIS based TAMP database.

Dr. Padgett Kelly:

In addition to teaching duties, his Biome Analysis classes, and travel, Dr. Kelly continues his long standing involvement as a board member and presenter for the National Marine Educators Association. This year he conducted both National and Regional presentations for the group. Locally he continues to present 'Whale of a Tail' programs and reached over 5,000 schoolchildren this past year.

Dr. Cindi Smith-Walters

For her outreach and education work in the local, state, regional, and national communities Dr. Smith-Walters was recognized by the MTSU Foundation for excellence in public service. She received an MTSU College of Basic and Applied Science award for excellence in service as well.



CEE cont.

She sits on over 15 state or national boards or panels and serves on the National Science Teachers Association's Children's Book Council. This group reads and selects the best children's trade books each year and this recommended list is published in *Science and Children*, *The Science Teachers*, and *Science Scope* each year.

Within the state Cindi serves as treasurer for the new Tennessee Naturalist Program (TNP). TNP is a corps of specially trained volunteers and provides education, outreach, and service dedicated to the beneficial management of natural resources and natural areas within their communities. Tennesseans interested in this program become Tennessee Naturalists through training and volunteer service. <http://www.tn.gov/environment/parks/tnnaturalist/>

Dr. Smith-Walters is also a part of TN-ECO; Tennessee-Every Child Outdoors. TN-ECO was created to promote and support opportunities that encourage the children of Tennessee to engage with and experience the outdoors. This group is concerned about youth detachment from the outdoors, lack of physical exercise and increased health risks, TN-ECO adopted the Tennessee Children's Outdoor Bill of Rights, a formal resolution supporting the work of the TN-ECO Coalition and the bill of rights was unanimously passed by the Tennessee General Assembly in 2010. To find out more about this effort in Tennessee and for information regarding research on the benefits of children experiencing the out-of-doors go to <http://eeintennessee.org/net/org/info.aspx?s=98786.0.1.37935>.

TN-ECO has a number of subcommittees including Healthy Children, School Gardens, Outdoor Classrooms, and Environmental Literacy (EL). This past year Dr. Smith-Walters has been part of a writing committee to develop a draft ELP for Tennessee. En

vironmental literacy involves an awareness and knowledge of the interrelationships among life forms and natural systems; understanding of ecological, social, economic and cultural processes and issues; and knowledge and skills needed to make informed decisions and to become environmental stewards. In 2009, TDEC finalized Tennessee's newest state recreation plan and that document calls for the development and implementation of a TN-ELP. This plan will ensure environmental literacy among elementary and high school students and provide Tennessee teachers the resources to integrate local environmental topics into every subject at every grade level. In short, it creates a framework for standards, achievement, professional development, assessment and leadership for individuals and organizations to thrive and achieve innovation in education. A draft TN-ELP is currently posted on-line and comments are being sought.

Committee work is not Dr. Smith-Walters' only educational effort this past year. Submitted and in print is a book chapter completed with Dr. Karen Hargrove a recent PhD graduate of MTSU, and Hilary Hargrove a local high school teacher. The chapter outlines how to select and use print and electronic field guides with children of all ages. This chapter will be a part of the book *Developing Environmental Awareness in Children*, Peter Lang publishers. Recently completed as well is a book chapter on the diversity of life for the new book, *Passing the State Science Proficiency Tests: Essential Content for Elementary and Middle School Science Teachers*.

If any of the materials for loan or programs of the MTSU CEE are of interest to you, or if you have questions or comments, don't hesitate to contact them at 615-904-8575.





The Soil

These tall trees do not know how
their roots came to be buried
in this fertile soil;
how their leaves came to embrace the sun;
or how their supple branches came
to sway with the wind.

They do not know what led
to their lordly status in this sylvan court
where life abounds and the wind
sings high among the limbs
that overarch feet, now anchored
in soil, both dead and alive.

They do not recall the Pleistocene ice
that scrubbed the bedrock bare,
before the first acorn;
how the barrenness welcomed
dynasties of lichens, grasses, and shrubs,
or how untold seasons passed
as time-weathered rock intermingled
with endless death and decay.

They stand in majestic splendor,
oblivious to the past.
They pay no homage to the soil,
for they do not know
that life is owed to predecessors
who can never be repaid .

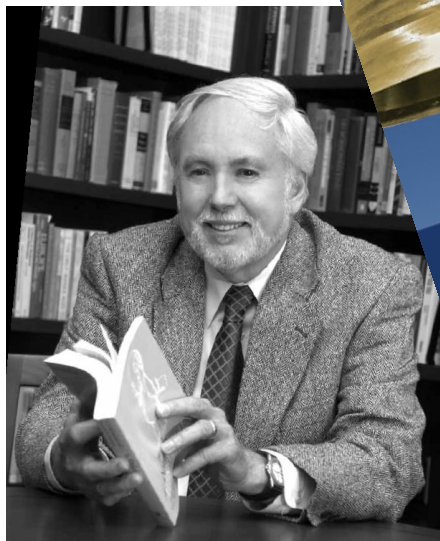
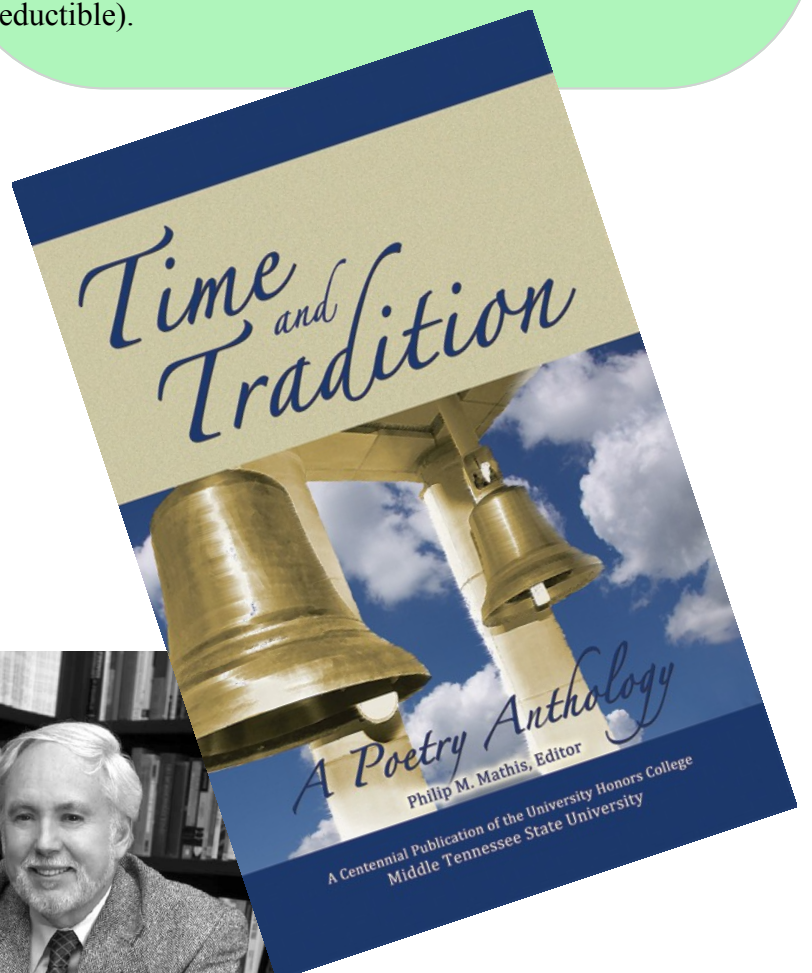
Philip M. Mathis



Time and Tradition: A Poetry Anthology

Time and Tradition: A Poetry Anthology was released on March 8, 2011 as the first of at least three books commemorating MTSU's Centennial Celebration this year. Published by Twin Oaks Press (Murfreesboro, TN), *Time and Tradition* is edited by Dr. Philip M. Mathis, Professor Emeritus of the Department of Biology. Dr. Mathis retired as Dean of the MTSU Honors College in 2008. He served in the Department for a total of 37 years.

The 100-page book includes 60 poems by students, professors, and former students or professors in the Honors College. Mathis contributed ten poems of his own. Purchases may be made through the Twin Oaks Press website (twinoakspress.com) or by contacting Dean John R. Vile in the University Honors College (jvile@mtsu.edu). The \$12.00 purchase price allows more than \$5/copy to be reserved to support Honors scholarships (the \$5+ portion is tax-deductible).



From the lab of Andy Brower

Andy Brower was promoted to Full Professor August 1, 2011. Shortly thereafter, he presented an invited talk at the International Conference of the Willi Hennig Society in São José do Rio Preto, Brazil, in a symposium on the history and philosophy of cladistics. Andy's publications have been cited more than 200 times each year since his arrival at MTSU.



Jess Matz received an NSF TRIAD fellowship and is sharing her time between mentoring school kids in science and wrapping up her research on the south temperate pronophiline butterflies. She will be presenting a talk at the Entomological Society of America, in Reno, in November.

Recent Publications:

Brower, AVZ. 2011. Hybrid speciation in *Heliconius* butterflies: a review and critique of the evidence. *Genetica* 139: 589-609; online version DOI: 10.1007/s10709-010-9530-4

Rindal, E. and AVZ Brower. 2011. Do model-based phylogenetic analyses outperform parsimony? A test with empirical data. *Cladistics* 27: 331-334; online version DOI: 10.1111/j.1096-0031.2010.00342.x

Brower, AVZ. 2011. Repeatability and reality. *Cladistics* online version DOI: 10.1111/j.1096-0031.2011.00354.x

Brower, AVZ and RI Vane-Wright. 2011. Anomalous areas and awkward ages: concerns about over-reliance on model based biogeographical and temporal inferences. *Systematic Entomology* (in press).

Brower, AVZ. 2011. The meaning of "phenetic". *Cladistics* (in press).

Former Students:

Eirik Rindal (former postdoc, now at the Norwegian Natural History Museum) had a daughter in September.

From the lab of Danielle Brown

Danielle recently completed her Ph.D in animal behavior at the University of California, Davis. Her degree was conferred on September 9, 2011. The title of her dissertation was "Activity Patterns and Space Use of Northern Tamandua Anteaters (*Tamandua mexicana*) on Barro Colorado Island, Panamá."

Recent Publications:

Brown D. (in press). Fruit-eating by an obligate insectivore: palm fruit consumption in Wild Northern Tamanduas (*Tamandua mexicana*) in Panamá. *Edentata* 12.



Recent Presentations:

Cathemerality in an ancient specialist: accelerometer-described activity of Northern Tamanduas. Poster presentation for Animal Behavior Society Annual Meeting, July 27, 2011; Bloomington, Indiana.

From the lab of John DuBois



Dr. DuBois continues to advise Ph.D. and post-doctorate students in the MentorNet Program. Currently, he is mentoring a post-doctorate research fellow at Baylor Institute for Immunology Research in Dallas, TX.

Graduate student, **Misty Griffith** is continuing her research on isolating Atrazine-degrading bacteria. To date, she had found a few candidates that show promise. Her research has also involved the help of Dr. Mary Farone in assessing the degradation of Atrazine in culture.

Graduate **Rebecca Davis** is completing her initial studies investigating the photosynthetic and stomatal activity of fescue with and without the fungal endophyte *Neotyphodium coenophialum*.

Recent Publications:

Trim RD, Skinner MA, Farone MB, DuBois JD, Newsome AL. 2011. Use of PCR to detect *Entamoeba gingivalis* in diseased gingival pockets and demonstrate its absence in healthy gingival sites. *Parasitol. Res.* 109:857-864.

From the lab of Matt Klukowski



The Klukowski lab has been focusing its efforts on the study of adrenal gland steroid hormones in squamate reptiles. Recent projects have involved the effects of arginine vasotocin and adrenocorticotrophic hormone on plasma corticosterone levels in male fence lizards (*Sceloporus undulatus*) during the breeding season and the effect of reproductive state on innate immunity

and corticosterone levels in female fence lizards.

They also collaborated with the Bailey and Cobb labs this past summer on a third cottonmouth (*Agkistrodon piscivorus*) project in Texas.

Recent Publications:

Klukowski M. 2011. Effects of breeding season, testosterone and ACTH on the corticosterone response of free-ranging male fence lizards (*Sceloporus undulatus*). General and Comparative Endocrinology 173: 295-302.

Recently Completed Theses:

Seddon, Ryan. 2011. The effects of acute stress on corticosterone, leukocytes, testosterone, and prostaglandin E2 in male southeastern five-lined skinks (*Plestiodon Inexpectatus*). 73p.

Former Students:

Julie B. Phillips (M.S. '06) is in her sixth year of a Ph.D. program in biology at the University of California Merced. Her research focuses on molecular misreading events in *Drosophila* and its relationship to lifespan and aging.

Kyle L. Sykes (M.S. '08) is teaching biology at Independence High School in the Thompson's Station community just south of Franklin, TN. In addition to teaching, Kyle is co-sponsor for the Science National Honor Society and the INDY outing club – the INDY club involves outdoor trips (e.g., camping, hiking, canoeing) for students that otherwise would not have the opportunity to experience nature.

Andrea Huff (M.S. '10) is working at the Nashville Zoo at Grassmere. She is also finishing up the final requirements to earn her teaching certificate in secondary education.



From the lab of Charles McGhee



Dr. McGhee supervised 14 student field projects in Entomology this past year. Also during the past year, he served as chairman of the Fellows Committee of the Tennessee Academy of Science.

Recent Publications:

Inganni E, McGhee CR, Shultz JW. 2011. Taxonomy of the Leiobunum calcar species group (Opiliones: Sclerosomatidae: Leiobuninae). Journal of Arachnology.

From the lab of Wayne Rosing

Dr. Rosing continues his research on the Myxomycetes of Singapore and Thailand. He is collaborating with Steve Stevenson at the University of Arkansas, currently working on corticolous (bark-inhabiting) myxomycetes of Thailand. Rosing hopes to follow with the myxomycetes of Laos and Myanmar.



Recent Publications:

Rosing CW, Mitchell DW, Moreno G, Stephenson SL. 2011. Additions to the Myxomycetes of Singapore. Pacific Science 65: 491-400.

Former Students:

Daniel Lawrence, one of Zamora's M.S. students just got his Ph.D. from the University of Arizona. His dissertation involved sequencing in fungi.

From the lab of Jeffrey Walck

In August 2011, Dr. Jeffrey Walck was an invited speaker in a symposium entitled "Restoration seed banking – seed science to meet the challenges of landscape scale restoration." The symposium was held in conjunction with 4th World Conference on Ecological Restoration held in Merida, Mexico. In addition to attending talks, he and his family also participated in the meeting's field trip to the Mayan ruins of Uxmal.



Jeff Walck, Edwin, and Siti Hidayati at the Mayan ruins of Uxmal.

From the lab of Marion Wells (retired)

Marion Wells remains active even after retirement. He has collaborated with Terry McGauley (Tracking Judge for the American Kennel Club) on a study investigating the effects of electromagnetic fields and electric fields on dog tracking.

Recent Publications:

McGauley T, Wells M. 2011. Effect of electromagnetic fields and electric fields on dog tracking. Dog News 27(34): 50, 78, 84, 88, 90.

Graduate Teaching Assistants for 2011-2012

For the 2011-2012 academic year, the department is providing support to 27 M.S. level and nine Ph.D. level graduate students who serve as Graduate Teaching Assistants (GTA). Twenty of these students have received undergraduate degrees from colleges and universities other than MTSU. Ten of this year's assistants hold baccalaureate degrees in subjects other than biology (anthropology, biotechnology, chemistry, environmental science, medical technology, microbiology, natural resource management, psychology, wildlife and fishery science, and zoology). The department is supporting nine student assistants who are pursuing the Ph.D. degree. Three of these assistants have received baccalaureate or master's degrees from universities outside the United States. All have the requisite training in biology to serve as departmental teaching assistants. Without these GTAs, the department would be unable to offer the numerous sections of the non-majors biology course (BIOL 1030) and the majors freshman courses (BIOL 1110/1120), along with some sophomore and junior level laboratories. The Department is very pleased to have them with us.

Michael Anderson, B.S., Biology, 2009, Middle Tennessee State University

Chris Bowman, B.S., Biology, 2008, Middle Tennessee State University

Jacob Campbell, B.S., Biology, 2009, Tennessee Tech University

Steven Crosby, B.S., Biology, 2002, Union University

Griffin Cumming, B.S., Biology, 2011, Middle Tennessee State University

Tracy Ervin, B.S., Biology, 2000, Middle Tennessee State University

Noah Flanigan, B.S., Biology, 2010, Middle Tennessee State University

Dallas Flickinger, B.S., Zoology, 2010, Southern Illinois University Carbondal

Jennie Hamilton, B.S., Biology, 2010, Middle Tennessee State University

Carrie Ann Hester, B.S., Natural Resource Management, 2004, University of Tennessee-Martin

Continued ...



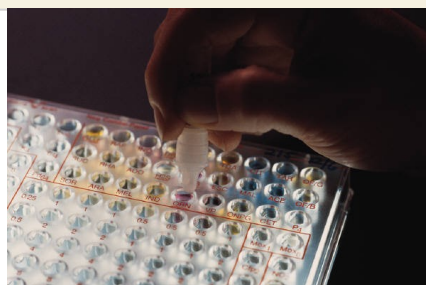
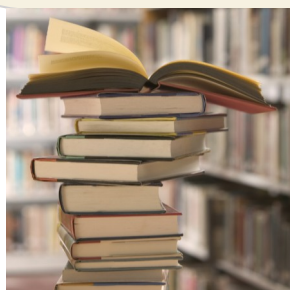
Graduate Teaching Assistants for 2011-2012

Suzanne Hicks, B.S., Biology/ Psychology, 2009, Middle Tennessee State University
Tyler Hill, B.S., Biology, 2011, Middle Tennessee State University
Brian Huber, B.S., Environmental Sciences, 1995, Middle Tennessee State University
Olukemi Jolayemi, B.S., Biology, 2009, Tennessee State University
Alison Jordan, B.S., Anthropology, 2005, Middle Tennessee State University
Cody Keating, B.S., Biological Sciences, 2007, Louisiana State University, Baton Rouge
Kerri Kluting, B.S., Biology, 2010, Middle Tennessee State University
Robert Newby, B.S., Biology, 2005, Middle Tennessee State University
Eric Nordberg, B.S., Wildlife and Fishery Science, 2010, Pennsylvania State University
Colbett Ouelette, B.S., Biology, 2011, Middle Tennessee State University
Hyo Park, B.S., Biology, 2009, Middle Tennessee State University
Margaret Pitt, B.A., Biology, 2006, Saint Mary's College, MD
Billy Plant, B.S., Chemistry, 1995, Tennessee Tech University
Matthew Rodgers, B.S., Biology, 2009, Tennessee Tech University
Daniel Simpson, B.S., Biology, 2010, Middle Tennessee State University
Michael Whitaker, B.S., Biology, 2009, Tennessee Tech University



PhD GRADUATE TEACHING ASSISTANTS

Karen Beasley, B.S., Biology/ Psychology, 2006, Martin Methodist College, M.S., Professional Science, 2009, Middle Tennessee State University
Bhawana, B.S., Biotechnology, 2006, Utar Pradesh Tech University, M.S., Professional Science, 2009, Middle Tennessee State University
Jeff Bonner, B.S., Biology, 2002, University of Georgia, M.A.E., Education, 2010, Cumberland University
Nicholas Chamberlain, B.S., Biology, 2009, Middle Tennessee State University
Vernon Dodson, B.S., Biological Sciences, 2009, University of Tennessee, Knoxville
Daniel Estabrooks, A.S., Science, 2003, Roane State Community College, B.S., Biology, 2006, University of Tennessee, M.S., Biology, 2010, Middle Tennessee State University
Manoj Khadka, B.S., Microbiology, 2004, Tribhuvan University, M.S., Microbiology, 2008, Tribhuvan University
Yohannes Mehari, B.S., Medical Technology, 2005, University of Asmara, M.S., Microbiology, Jilin University, China
Erik Vick, B.S., Biological Sciences, 2009, University of Tennessee, Knoxville



Scholars Week Highlights Faculty and Student Research

Middle Tennessee State University held its annual Scholars Week April 4 - 8, 2011. The Department presented twenty-three posters, an increase over the number presented at the 2010 Scholars Week. Authors on these posters included 16 faculty members, 19 graduate students and 13 undergraduate students.

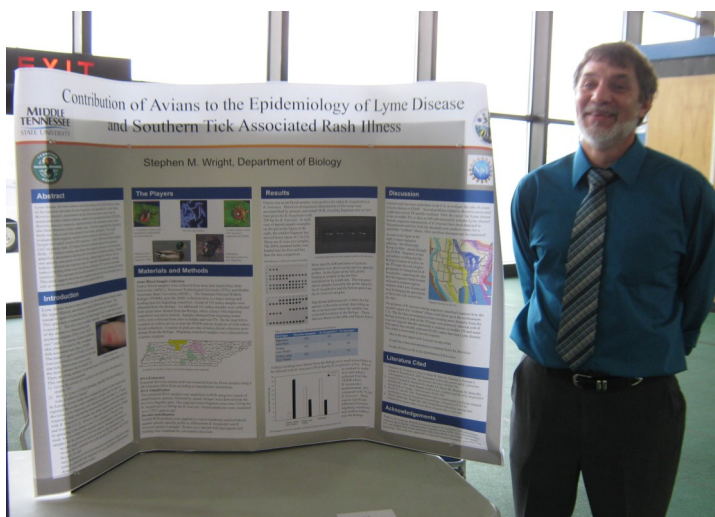
Awards were given to the top three posters presented by graduate students and undergraduate students from each college. Jeanne Stubblefield (Anthony Newsome, advisor) received third place in the undergraduate student category. Michael Anderson, Eric Salmon (George Benz, advisor) and Jerrod Shipman (Vince Cobb, advisor) all tied (with others) for first, second and third in the graduate student category.

The faculty members involved in mentoring these students deserve credit for their time, efforts and expertise in these research projects. The poster session was very well-attended by the university community. A large number of people from across the campus were able to see the quality of research being conducted in the Department. Congratulations to all authors for a job well-done!

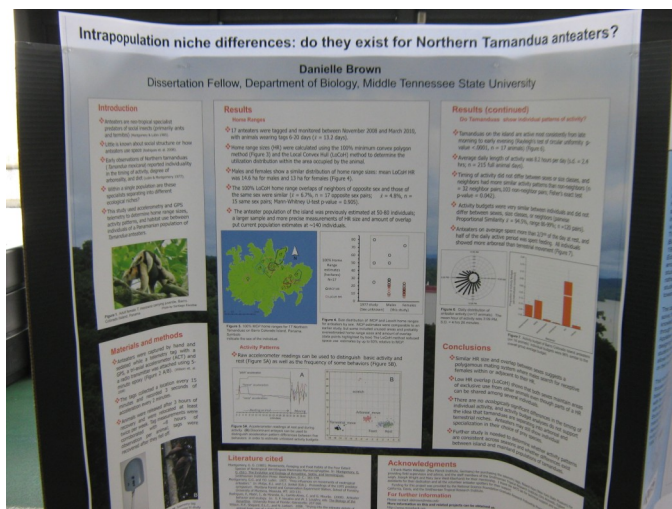
To see the entire Scholars Week program, along with abstracts from all posters and presentations, visit http://www.mtsu.edu/research/scholars_week.shtml. Poster authors and titles from the Department of Biology are given below:

Faculty Presentations

Stephen Wright presented "Contribution of Avians to the Epidemiology of Lyme Disease and Southern Tick Associated Rash Illness." Dr. Wright was the 2009-2010 MTSU Foundation Distinguished Researcher.

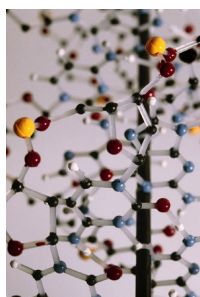


Danielle Brown presented "Intrapopulation Niche Differences: Do They Exist for Northern Tamandua Anteaters?"



Matthew Klukowski presented "Reproduction and Plasma Corticosterone Levels in Free-Living Female Fence Lizards."

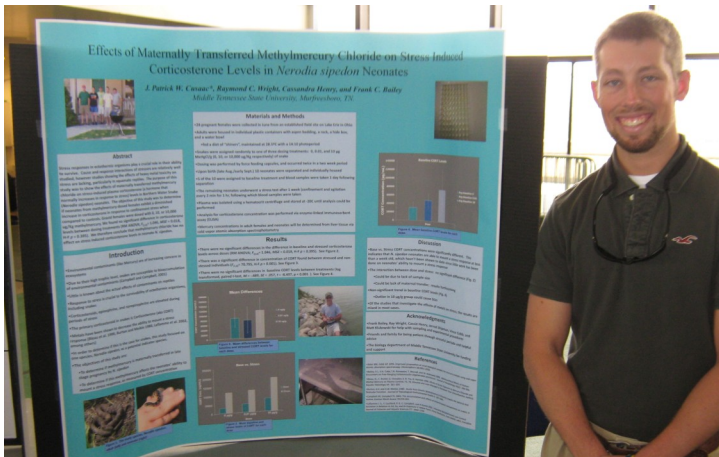
Alexis Schaible (undergraduate student), **Frank Bailey**, and **Rebecca Seipelt** presented "ASN362 Increases Zinc Affinity of Leukotriene A4 Hydro-lase."



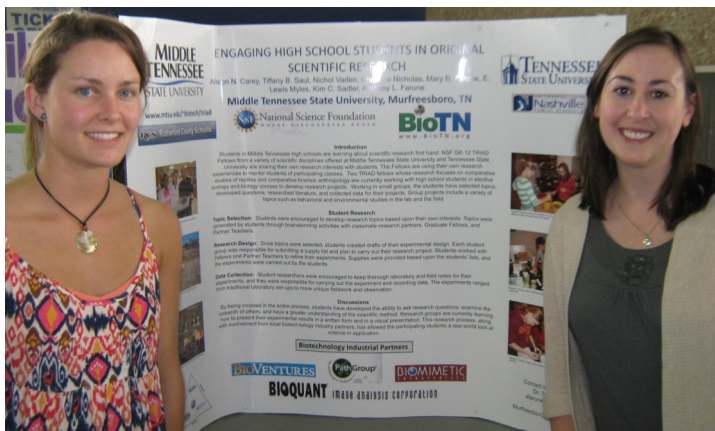
Scholars Week cont.

Graduate Student Presentations

Patrick Cusaac, Raymond Wright, Frank Bailey (faculty), and **Cassandra Henry** (undergraduate student) presented "Effect of Maternally Transferred ME-HGCL on Stress Induced Corticosterone in *Nerodia sipedon* Neonates."



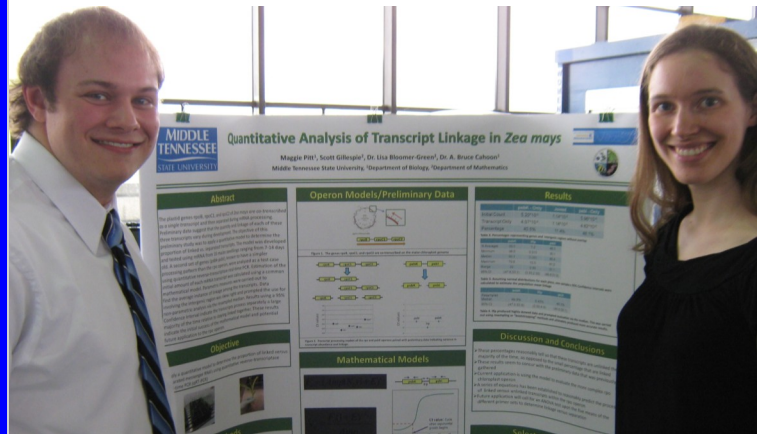
Alison Carey, Tiffany Saul, Nichol Vaden (high school faculty), **Christina Nicholas** (high school faculty), **E. Lewis Myles** (Tennessee State University), **Kim**



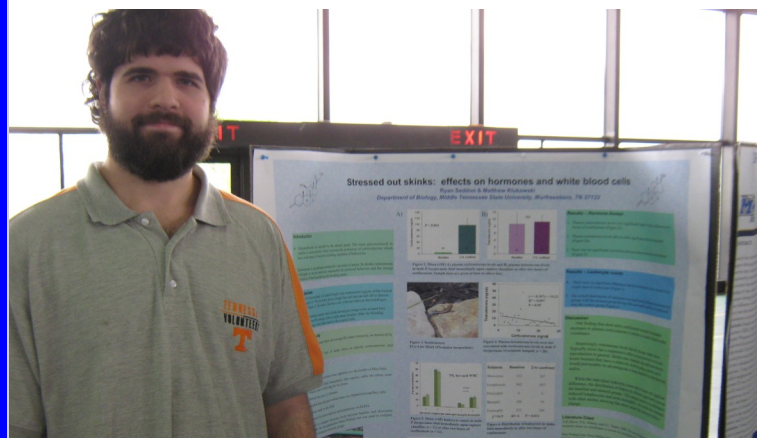
Sadler (faculty), **Anthony Farone** (faculty), and **Mary Farone** (faculty) presented "Engaging High School Students in Original Scientific Research."

Alison Carey and Matthew Klukowski (faculty) presented "Effects of Food Deprivation on Plasma Corticosterone and Nutrient Levels in *Nerodia sipedon*."

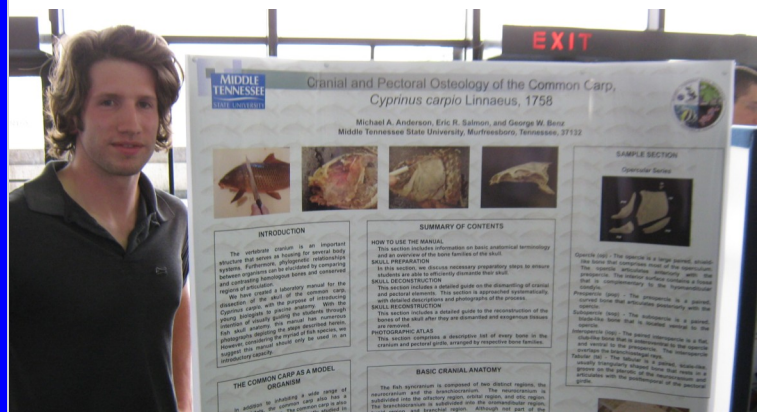
Margaret Pitt, Scott Gillespie (Mathematical Sciences), **Bruce Cahoon** (faculty), and **Lisa Green** (Mathematical Sciences) presented "Quantitative Analysis of Transcript Linkage in *Zea Mays*."



Ryan Seddon and Matthew Klukowski (faculty) presented "Stress-out Skinks: Effects on Hormones and White Blood Cells."

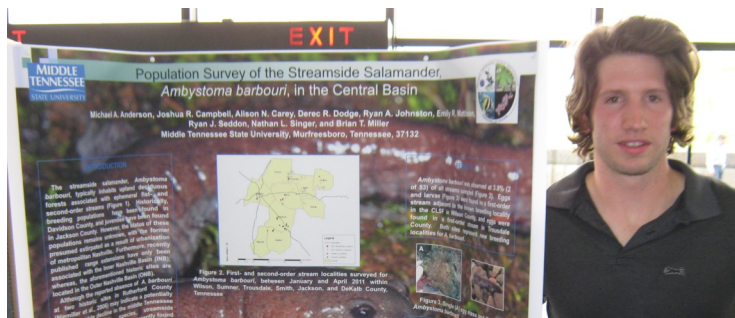


Michael Anderson, Eric Salmon and George Benz (faculty) presented "The Cranial and Pectoral Osteology of the Common Carp, *Cyprinus carpio* Linnaeus, 1758."

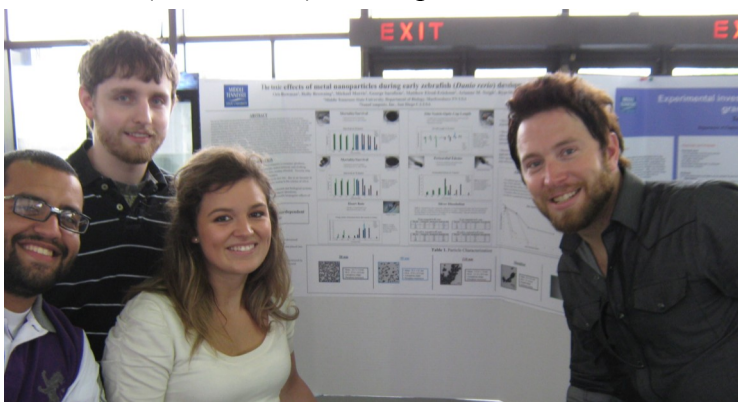


Scholars Week cont.

Michael Anderson, Joshua Campbell, Alison Carey, Derec Dodge, Ryan Johnston, Emily Mattison, Ryan Seddon, Nathan Singer, and Brian Miller (faculty) presented "Population Survey of the Streamside Salamander, *Ambystoma barbouri*, in the Central Basin."

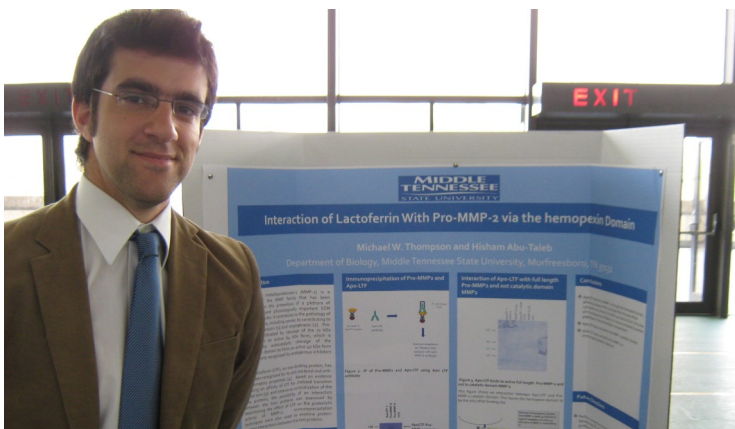


Chris Bowman, Ryan Otter (faculty), **Michael Morris** (undergraduate), **Holly Browning** (undergraduate), and **Matthew Elrod-Erickson** (faculty) presented "The Toxic Effects of Metal Nanoparticles During Early Zebrafish (*Danio rerio*) Development."



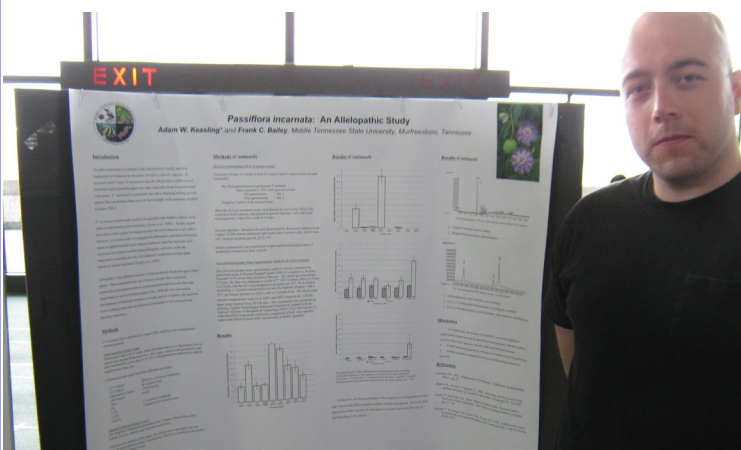
Hisham Abu-Taleb presented "Apolactoferrin Binds the Hemopexin Domain of Pro-Matrix Metalloproteinase-2."

Hisham Abu-Taleb presented "Interaction of Lactoferrin with Pro-MMP-2 Via the Hemopexin Domain."



Hisham Abu-Taleb and Jon Johnson presented "Protein Apoceruloplasmin."

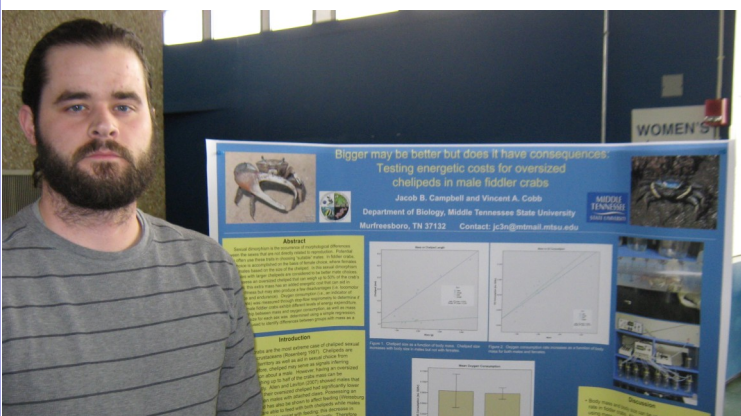
Adam Keasling and Frank Bailey (faculty) presented "*Passiflora incarnate*: An Allelopathic Study."



Raymond Wright, Patrick Cusaac, Cassandra Henry (undergraduate), and **Frank Bailey** (faculty) presented "Fecal Samples as an Indicator of Mercury Absorption in Dosed Northern Water Snakes, *Nerodia sipedon*."

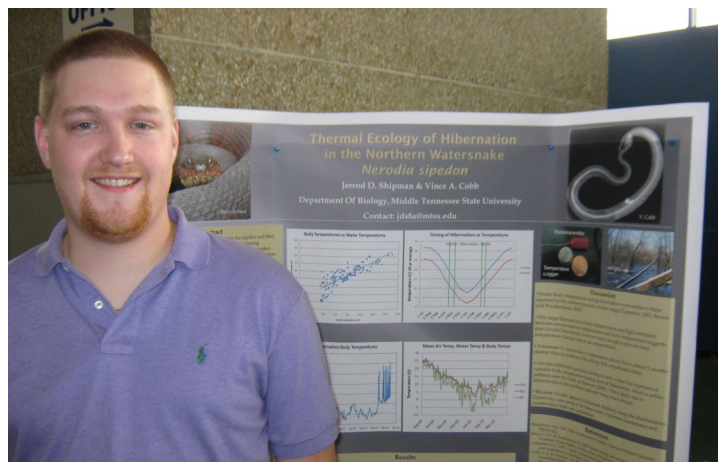


Jacob Campbell and Vince Cobb (faculty) presented "Sexual Dimorphism and Its Energetic Cost for Oversized Chelipeds in Male Fiddler Crabs."

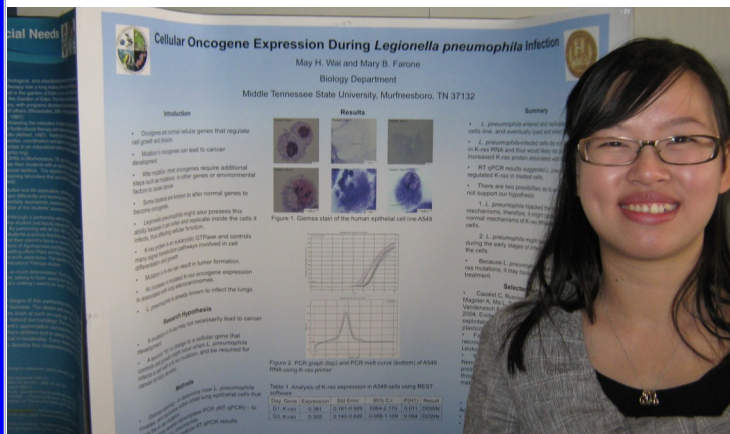


Scholars Week cont.

Jerrold Shipman and Vince Cobb (faculty) presented "Thermal Ecology of Hibernation in *Nerodia sipedon*."

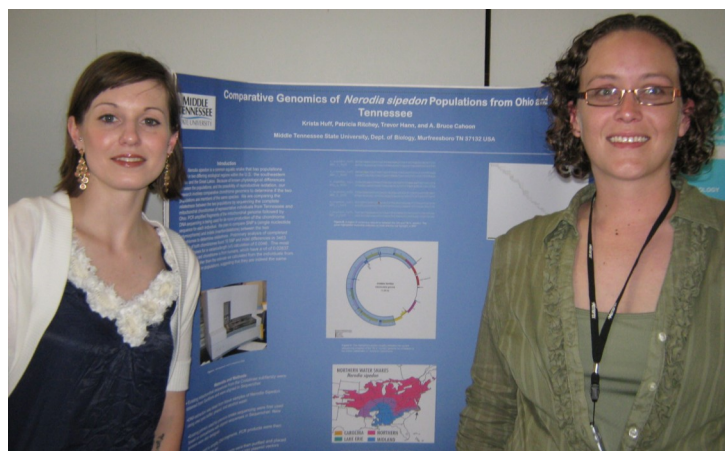


May Wai and Mary Farone (faculty) presented "Cellular Oncogene Expression During *Legionella pneumophila* Infection."

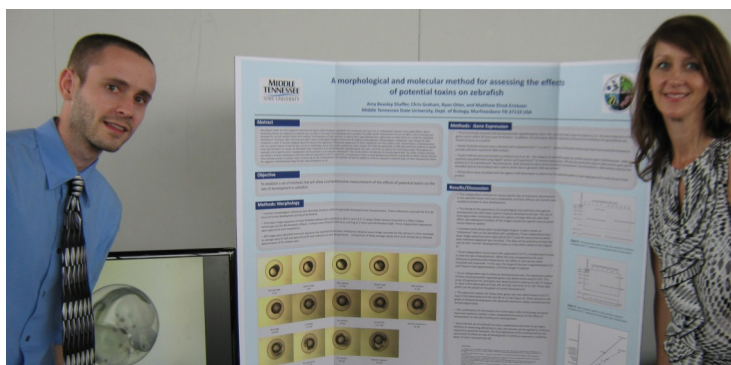


Undergraduate Student Presentations

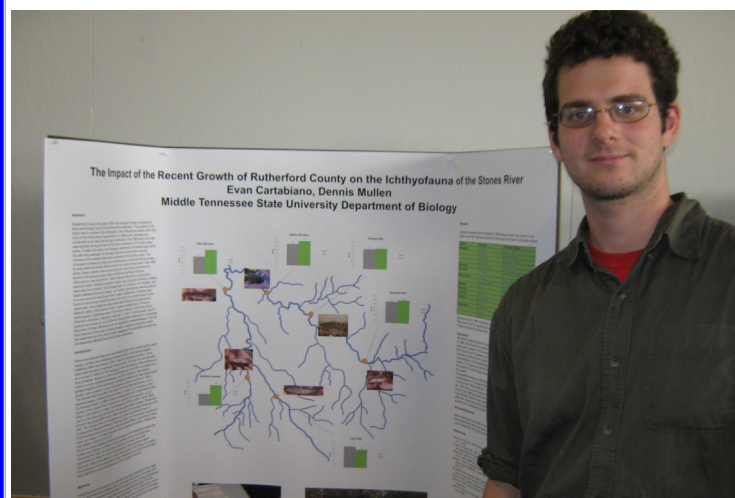
Krista Huff, Patricia Ritchey, Trevor Hann, and Bruce Cahoon (faculty) presented "Comparative Genomics of *Nerodia sipedon* Populations from Ohio and Tennessee."



Amy Shaffer, Chris Graham and Matthew Elrod-Erickson (faculty) presented "A Morphological and Molecular Method for Assessing the Effects of Potential Toxins on Zebrafish."



Evan Cartabiano and Dennis Mullen (faculty) presented "The Impact of the Recent Growth of Rutherford County on the Ichthyofauna of the Stones River."

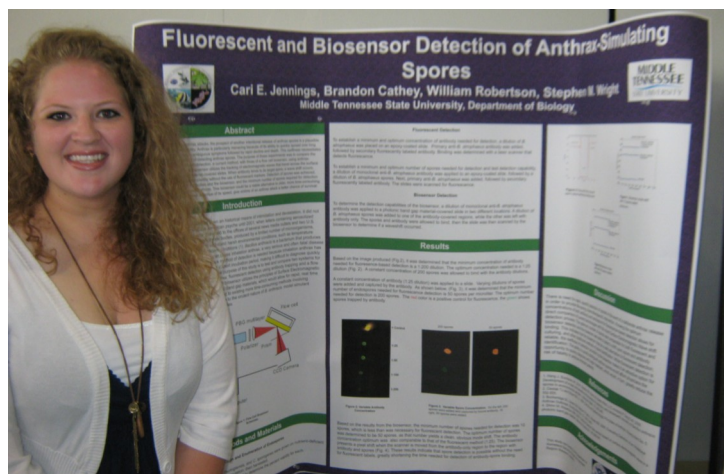


Brandon Cathey (Physics and Chemistry), **Bart Morris** (Physics and Chemistry), **Evan Wise** (Physics and Mathematical Sciences), **Cari Jennings, Stephen Wright** (faculty), and **William Robertson** (Physics and Astronomy) presented "A Surface Electromagnetic Wave Biosensor for the Detection and Study of Biological Compounds."

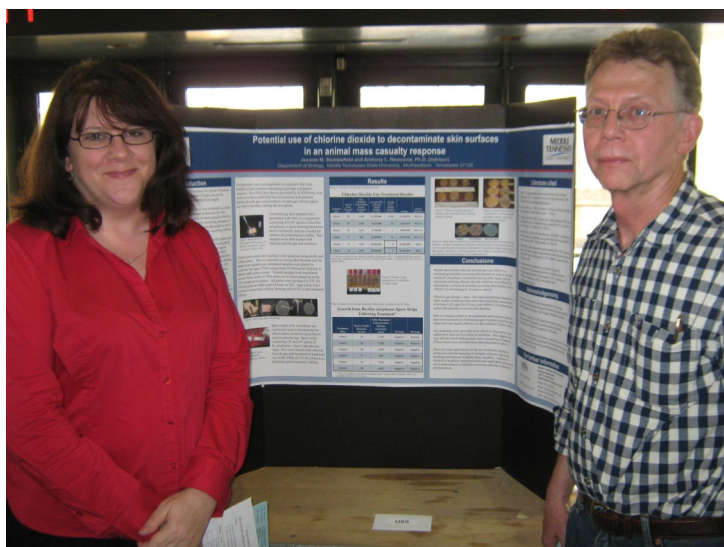


Scholars Week cont.

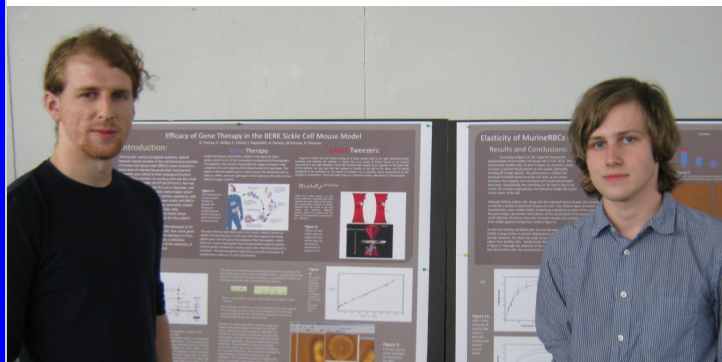
Cari Jennings, Brandon Cathey (Physics and Chemistry), William Robertson (Physics and Astronomy), **Stephen Wright** (faculty), and presented "Fluorescent and Biosensor Detection of Anthrax-Simulating Spores."



Jeanne Stubblefield and **Anthony Newsome** (faculty) presented "Potential Use of Chlorine Dioxide to Decontaminate Skin Surfaces in an Animal Mass Casualty Response."



Daniel Erenso, Keaton Holley, George Carter, Ian Hajizadeh (Physics), **Anthony Farone**, **Mary Farone**, and Derek Persons (St.Judes Hospital) presented "Efficacy of Gene Therapy in the BERK Sickle Cell Mouse Model."



Mark Your Calendar:
The Next
Scholars Week
is
March 26-30,
2012

BioUpdate

George G. Murphy, department chair
John D. DuBois, editor

Key contributors to this issue of *BioUpdate* are Cynthia Allen, Elliot Altman, Virginia McKnight, Dennis Mullen, Cindi Smith-Walters

Produced by MTSU Department of Biology

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Tennessee Center for Botanical Medicine Research at MTSU

by Elliot Altman

The application of Chinese herbal medicines for the treatment of a variety of diseases is an ancient and respected tradition, and while widely accepted in the Far East, is becoming quite popular in Western cultures as well. There has also been an increasing interest in isolating and characterizing the active chemical ingredients in Chinese herbal medicines to develop conventional Western pharmaceutical agents based on numerous recent successes. The two most prominent examples are Taxol (Paclitaxel), used to treat various cancers, and isolated from *Taxus brevifolia* or the Yew Tree, and Artemisinin, used to treat malaria, and isolated from *Artemisia apiacea* or the Sweet Wormwood Herb.

Although the development of novel pharmaceutical agents from botanical sources is quite complex, it nonetheless follows a straightforward process. Botanical extracts are prepared from herbs known to have uses in traditional Chinese medicine (TCM), and the individual chemical agents are separated and analyzed to identify the active ingredient. The promising pharmaceutical agents are next assayed to ensure that they have no toxicological issues and tested in animal models for the diseases they are intended to treat before initiating human drug trials.

MTSU and the Guangxi Botanical Garden of Medicinal Plants (GBGMP) in Nanning, China have entered into a collaborative effort and developed a novel approach to accelerate the development of Western medicines from botanical extracts based on their respective strengths and expertise.

GBGMP has developed an extraction process, which utilizes a series of chemical separations to prepare five extracts from each plant or herb of interest. Each extract represents 20 – 100 independent compounds. Instead of isolating each independent com-

pound from these extracts, a tedious process that entails years of work, MTSU will utilize their expertise in high content analysis systems using specialized cell lines to screen the five extracts from each plant or herb of interest and search for extracts that show promise for the treatment of cancer, AIDS or other viral infections, and other important diseases.

GBGMP has identified and grown 500 plants or herbs that have been shown to have the potential to treat a variety of diseases via TCM. The 2,500 extracts that have been prepared represents a library of 50,000 – 250,000 individual compounds. Once MTSU identifies extracts that show promise for the treatment of Cancer, for example, the individual compounds from each extract will be isolated and rescreened to identify the specific active ingredient. Protocols for the extraction or synthesis of the active ingredient will then be developed so the compound can be tested further. Between MTSU and GBGMP, the required expertise is available to carry out the complex processes required to develop pharmaceutical agents from botanical sources.



Full-Time Temporary and Adjunct Faculty Play Major Roles

The combination of increased enrollments and decreased funding brings a challenge when it comes to assigning instructors to the ever-growing number of course sections. This need is met primarily by full-time temporary and adjunct faculty. This academic year, the department has rehired six full-time temporary faculty and hired four adjunct faculty. Five of the ten temporary/adjunct faculty hold the doctoral degree and four hold Master's degrees.

These faculty are teaching Human Anatomy and Physiology I & II, Exploring Biology (non-majors biology), Microbiology, Radiation Biology, Seminar on Environmental Problems, Non-Flowering Plants, Economic Botany, Plants and Man, and Comparative Anatomy of Vertebrates. Considering the expertise of each of these instructors, their students are obviously getting a great education. Their service to the department not only helps fill instructor roles in an ever-increasing number of course sections, but, also they fill in for research faculty that have received grants and/or contracts that include release time. A few of these instructors are using some of their out-of-class time to conduct their own research, often involving graduate and undergraduate students. The department is forever grateful for their service.

Full-Time Temporary

Danielle Brown, B.S., 2001, Cornell University; M.S., 2006, Ph.D., 2011, University of California, Davis. Teaching: Biology 2011 Anatomy and Physiology Labs

Christopher Brian Manning, B.S., 1996; M.S., 1998; MTSU; Ph.D., 2003, University of Vermont. Teaching: Biology 2011 Anatomy & Physiology Labs, Biology 2231 Microbiology Labs

Amy Massengill, B.S., 1993, Stetson University; D.V.M., 1997 University of Florida. Teaching: Biology 2011 Anatomy & Physiology Lab, Biology 3021/5021 Comparative Anatomy of the Vertebrates Lab

Mary Matthews, B.S., 1992; M.S., 2002, MTSU. Teaching: Biology 2011 and 2021 Anatomy & Physiology Labs

Teresa Stegall-Faulk, B.S., 1997; B.S., 2000, MTSU. Teaching: Biology 2010 Anatomy & Physiology and Biology 2011 and 2021 Anatomy & Physiology Labs

Adjunct Faculty

Dustin Diez, B.S., 2004, Rhodes College; M.S. 2006, Vanderbilt University. Teaching: Biology 4150 Radiation Biology

Matthew Dodd, B.S., 1999; M.S., 2001, MTSU; Ed.D., 2008, Tennessee State University. Teaching: Biology 1030 Exploring Life

Steve Edwards, B.A., 1973; Ph.D., 1980, University of California, San Diego. Teaching: Biology 2011 Anatomy and Physiology Lab

Cecil Monte Halcomb, B.S., 1969; M.S., 1974, MTSU. Teaching: Biology 1030 Exploring Life and Biology and Biology 3070 Biology Seminar on Environmental Problems

Siti Hidayati, B.S., 1986, University of Gadjah Mada; M.S., 1993; Ph.D., 2000, University of Kentucky. Teaching: Biology 3030 Nonflowering Plants

Thomas Hemmerly, A.M., 1955; Ed.D., 1964, Peabody College. Teaching: Biology 4070 Economic Botany and Biology 6070 Plants and Man



Where is Everyone?

Efforts to free up more research space in Davis Science Building have required several faculty members to relocate their offices. Offices for Biology faculty are now located in six different building across campus. Those include Davis Science Building (DSB), Strobel Biology Annex (SBA), Jones Hall (JH), Haynes House (HH), Fairview Building (FAIR), and Kirksey Old Main (KOM). In addition, the Department continues to maintain a presence on the third floor of Wiser-Patton Science Hall, where lab coordinator, David Powell has his office. The Departmental office is still located in DSB 128. Below is the current location for offices of Biology faculty.

Altman, Elliot	JH 155	Leblond, Jeff	DSB 120E
Bailey, Frank	SBA 126	McGhee, Charles	DSB 110
Benz, George	HH 3	Miller, Brian	SBA 129
Bergemann, Sarah	JH 335	Morris, Ashley	SBA 132
Blum, Kurt	DSB 115	Mullen, Dennis	SBA 124
Brower, Andrew	HH 5	Murphy, George	DSB 128
Butler, William	SBA 125	Newsome, Anthony	JH 111
Cahoon, Bruce	JH 332	Otter, Ryan	SBA 130
Cobb, Vincent	SBA 127	Reagan, Jerry	KOM 121B
DuBois, John	JH 113	Robertson, Brian	JH 334
Elrod-Erickson, Matt	JH 336	Rosing, Wayne	JH 338
Ervin, Gore	JH 110	Rutledge, Michael	SBA 128
Farone, Anthony	DSB 112	Sadler, Kim	FAIR 202D
Farone, Mary	SBA 133	Seipelt, Rebecca	DSB 120D
Herlihy, Chris	HH 1	Smith-Walters, Cindi	FAIR 202B
Howard, Steve	JH 337	Stewart, William	JH 106
Jetton, Amy	JH 108	Walck, Jeffrey	DSB 120C
Johnson, Sandra	DSB 120A	Wright, Stephen	JH 330
Kelly, Padgett	FAIR 202B	Zamora, John	JH 340
Klukowski, Matt	DSB 120B		



TAS holds 121st Annual Meeting

The 121st annual meeting of the Tennessee Academy of Science was held October 28-29, 2011 on the campus of Union University in Jackson, Tennessee. The Biology Department showed an unusually low number of student and faculty papers (6 oral presentations and 5 posters) again this year. However, the Department continues its strong support of the Academy with a number of faculty members serving as officers, committee chairs, committee membership, and session chairs at annual meetings.

The plenary lecture, entitled "A Tale of Two Oceans" was presented by Dr. Michael Gibson, Department of Geology, Geography & Physics, University of Tennessee – Martin. Dr. M. Gore Ervin served on the Nominating Committee and Electronic Communications Committee, Dr. Kim Cleary Sadler chaired the Education Committee, Dr. Cindi Smith-Walters served on the Education Committee and Nominating Committee, Dr. Charles McGhee chaired the Fellows Committee, and Dr. George Murphy chaired the Necrology Committee. At the meeting, Dr. John Zamora chaired the Microbiology session, Dr. Kim Cleary Sadler chaired the Science and Math Teaching session and Dr. Vincent Cobb chaired the Zoology session.

The 122nd Annual Meeting of the Tennessee Academy of Science will be November 16, 2012 at Vanderbilt University in Nashville, Tennessee. Tentative future annual meeting sites are Motlow State Community College in 2013 and Walters State Community College in 2014. Papers and posters presented at the 2011 meeting are listed below with student authors or coauthors designated with an asterisk (*).

Papers Presented

- Kim C. Sadler, Leigh Gostowski, Linda Gibert, Emily Newton*, David Green*, "Thinking Inside and Outside of the Box: Club Neutron after School Science Club."
- Jacob Campbell*, Vincent Cobb, "Comparing Metabolic Rates of Fossorial and Terrestrial Snakes."
- Matthew Klukowski, Frank Bailey, Thomas Rainwater, Timothy Worrall, Jake Pruett, Vincent Cobb, "The Stress Response of Cottonmouths."
- Patrick Cusaac*, Raymond Wright*, Cassandra Henry*, Frank Bailey, "Maternal Transfer of Methylmercury Chloride in *Nerodia sipedon*."
- Raymond Wright*, Patrick Cusaac*, Cassandra Henry*, Frank Bailey, "The Effects of Maternally Transferred Methylmercury Chloride on the Locomotor and Feeding Performance of Neonate Northern Water Snakes, *Nerodia sipedon*."
- Michael Anderson*, Eric Salmon, George Benz, "Cranial and Pectoral Osteology of the Common Carp, *Cyprinus carpio* Linnaeus, 1758: A Laboratory Approach."

Posters Presented

- Samuel Mitchell*, Adrienne Friedli, Stephen Wright, "Comparison of Tagged Protein-Antibody Binding in Mesoporous and Porous Silica Via Fluorescence Microscopy."
- Cari Jennings*, Brandon Cathey*, William Robertson, Stephen Wright, "Fluorescent and Biosensor Detecting of Anthrax-Simulating Spores."
- Alison Carey*, Christina Nicholas, Mary Farone, Kim Sadler, Anthony Farone, "Teaching Scientific Research Through Cedar Glade Ecology in the NSF GK-12 Program."
- Amber Sutphen*, Jerrod Shipman, Vincent Cobb, "Body Temperature Patterns of Midland Watersnakes in Middle Tennessee."
- Michael Anderson*, Joshua Campbell*, Alison Carey*, Derec Dodge*, Ryan Johnston*, Emily Mattison*, Ryan Seddon*, Nathan Singer*, Brian Miller, "Population Survey of the Streamside Salamander, *Ambystoma barbouri*, in the Inner and Outer Nashville Basins of Middle Tennessee."

Biology Department Scholarship Winners, 2011

Each Year the Biology faculty is honored to be able to work with outstanding students who excel in the classroom, conduct independent research, attend courses at field stations, present papers at scientific meetings, and perform exceptionally well on national standardized tests. To help defray the costs of these activities and to recognize these students, the department is pleased to offer a number of scholarships. Although these scholarships include monetary awards, their intention is to recognize students for efforts above and beyond the expected. The Biology faculty congratulates each and every student recipient.

Clay M. Chandler Outstanding Freshman Biology Award and Scholarship—Awarded annually to an outstanding student in general biology classes.

Aubrey Boyce

Joel Finley

Ralph E. Sharp Outstanding Sophomore Award and Scholarship—Awarded annually to a Biology major of sophomore standing.

Jordan Dodson

Philip M. Mathis Outstanding Junior Award and Scholarship—Awarded annually to a Biology major of junior standing.

Will Shelton

Peter I. Karl Outstanding Senior Award—Awarded to a Biology major of senior standing who will graduate in May or August, or who graduated in December.

Mary Crouse

Mary Ann Harrison McClary and Richard E. McClary Scholarship – Awarded every third year to an outstanding Biology major who is at least of sophomore standing.

Rachel Lytle

George G. Murphy Research Scholarship—Awarded to an undergraduate or graduate student to purchase supplies or support travel associated with research projects.

Griffin Cummings

C.W. Wiser Medical/Allied Health Award and Scholarship—Awarded to a graduating student who will continue studies in the medical sciences at a school of medical technology, or other allied health field.

Cassandra Warren

Ashley Wise

John M. Zamora Graduate Research Scholarship—To provide support for expenses associated with thesis research.

Jacob Campbell

Misty Griffith

John A. Patten Scholarship - Awarded to a Biology major of sophomore or above (including graduate) standing for research support or summer study.

Griffin Cummings

Patrick Cusaac

Chris Graham

Cassandra Henry

Margaret Pitt

Eric Salmon

Amber Sutphen

Ashley Wise

J.L. Fletcher Graduate Scholarship—Awarded to a beginning Biology graduate student.

Michael Anderson

Charles Holland Biology Club Scholarship—Available to students enrolled in the graduate program

Margaret Pitt

Mary C. Dunn Graduate Scholarship – Awarded to support research efforts.

Jennie Hamilton

Padgett Kelly Research Scholarship – Awarded to an undergraduate or graduate student to support summer studies of field research in ecology or conservation biology.

Eric Salmon

Biology Department Scholarship Winners, 2011

Sarah H. Swain Undergraduate Research Scholarship – Awarded to purchase supplies or support travel associated with research projects.

Griffin Cummings Peter Schwartz

Kurt E. Blum Botany Research Scholarship – Awarded in support of graduate research in botany.

Margaret Pitt

William H. Butler, Jr. Graduate Research Scholarship – To provide support for expenses associated with thesis research

Eric Salmon

Thomas Hemmerly Graduate Research Support Fund – To provide travel and/or supplies necessary for thesis research

Misty Griffith

Freeman P. Jordan, Jr. Scholarship – Awarded to a Biology major in support of research in Microbiology or Molecular Biology.

Chris Graham

David Sanborn Ecology Scholarship–Awarded to an outstanding junior who has shown interest in the area of field biology.

Evan Cartabiano

Elliott Dawson/BioVentures Biotechnology Scholarship – Awarded to a Biology major of junior standing or above who has taken, or currently enrolled in Biotechnology.

Patricia Ritchey

Charles R. McGhee Scholarship–Awarded to a Biology major of junior, senior, or graduate standing seeking licensure to teach Biology.

Bruce Cokeroff Rachel Lytle

James R. Kemp Scholarship–Awarded to a Biology major of junior or senior standing (minimum of 85 hours earned) minoring in secondary education.

Bruce Cokeroff Rachel Lytle

Major Field Test High Score:

Fall 2010:

Casey Chansler, Kelsey Umbarger

Spring 2011:

Rebecca Houser, Adam Battles

Incoming Freshman Scholarships 2010-2011

Mary C. Dunn Freshman Scholarships–Awarded annually to an incoming freshman Biology major. Given to the first place scorer on a departmental exam given in April each year.

Mary Alaina Ferrell Zach Grimes

Patrick J. Doyle Freshman Scholarship–Awarded annually to an incoming freshman Biology major. Given to the second place scorer on a departmental exam given in April.

Emily Smith

Ellis Rucker Freshman Scholarship–Awarded annually to an incoming freshman Biology major. Given to the third place scorer on a departmental exam given in April each year.

Tara Blanton



***BioUpdate* 1998: A Look Back**

In the fall of 1997, two of our faculty members were recognized through MTSU Foundation Awards. Dr. Stephen Wright received the Outstanding Teacher Award and Dr. Padgett Kelly received the Outstanding Public Service Award. The Biology faculty numbered thirty-three full-time positions, with thirty-one of these individuals having the doctorate degree. Today, the department faculty numbers 39 full-time positions.

Drs. Deborah Clark and Philip Mathis created BioUpdate On-Line, an electronic version of the departmental newsletter. Dr. George Murphy (Chair) suggested the idea to then editor Mathis. With Clark's experience in creating web sites, the idea became reality a short time later. Today, the online version of BioUpdate has been replaced with the current pdf version of the newsletter.

Due to the efforts of Dr. Anthony Newsome, MTSU and the Biology Department hosted the Eighth International Conference on the Biology and Pathogenicity of Free-Living Amoebae May 27-June 2, 1998. Past meetings of the conference has been held in London and Brussels. The group meets once every three years.

In 1997, the department lost one of its long-time members, Dr. Ralph Sharp. Dr. Sharp had recently retired after serving the department for nearly thirty years. Dr. Gore Ervin joined the department in August of 1997 as an associate professor after spending the past twelve years as a faculty member in the UCLA School of Medicine.

The student-run e-journal *Scientia* was launched in 1997 under the supervision of Drs. Philip Mathis, Deborah Clark, John DuBois, and Judith Hankins (Computer Science). *Scientia* is still in operation today, but has moved to the Honors College. It was the first student-operated electronic journal in the state of Tennessee and among the first in the nation.

In May, 1997, Dr. Philip Mathis was commissioned by Governor Paul E. Patton (Kentucky) into the ranks of the Honorable Order of Kentucky Colonels, the highest award given by the state of Kentucky. Mathis expressed his deep appreciation for the honor noting that it is something special to native Kentuckians.

Theses Completed (2010-2011):

The Biology Department graduated seven students with the Master of Science degree in Biology during the December 2010 and May and August 2011 ceremonies. As of the August, 2011 ceremony, the Biology Department has produced 326 master's theses. Nationwide, Middle Tennessee State University is a leader in producing master's level graduates. Students, their graduation year, thesis titles, and faculty advisors are recognized below. A complete list of all theses completed to-date in the Biology Department can be found at www.mtsu.edu/~jddubois/3230/theses.html or on the Biology Community section of D2L.

Drumwright Abby. 2010. Survey and DNA barcoding of grass species in Flat Rock Cedar Glades and Barrons State Natural Area, Murfreesboro Tennessee. (Bruce Cahoon, Advisor)

Huff, Andrea. 2010. Behavior of captive giant anteaters (*Myrmecophaga tridactyla*) in response to novel food enrichment. (Matt Klukowski, Advisor)

Keasling, Adam. 2011. Allelopathic activity of *Passiflora incarnate* extracts on germination and growth of *Hordeum vulgare* and *Raphanus sativus*. 81p. (Frank Bailey, Advisor)

Nicholas, Christina. 2011. The effects of impervious surface cover on the water quality of the Stones River in Middle Tennessee. (Frank Bailey, Advisor)

Seddon, Ryan. 2011. The effects of acute stress on corticosterone, leukocytes, testosterone, and prostaglandin E₂ in male Southeastern Five-Lined Skinks (*Plestiodon inexpectus*)

Shipman, Jerrod. 2011. Thermal ecology of hibernation in the Northern Watersnake, *Nerodia sipedon* (Linnaeus). (Vince Cobb, Advisor)

Youssef, Joshua. 2010. Identification, isolation and characterization of a bacterial amoebal pathogen from a cooling tower biofilm. (Mary Farone, Advisor)

Internships: Students Receive Valuable Training

The department continually emphasizes learning outside the classroom. Internships allow students to get practical, on-the-job, types of experience while still in school. The student intern earns credit and sometimes is paid for their work. Interested students should contact Dr. Murphy or Dr. Seipelt for more information. Student interns for Fall 2009 through Spring 2011 are listed below, along with the locations for their internships.

Summer 2011

Hisham Abu-Taleb

Advanced Bio Healing, Nashville

Amir Kashef Mobarekeh

Vi-Jon, Smyrna

Zar Min

Vanderbilt University, Nashville

Kristen Panter

Industrial Microbiological Labs, Inc.,
Cleveland, TN

Fall 2011

Mohammedali A. Gangardiwala

Vanderbilt University Medical School,
Nashville

Shauna Webb-Parker

Virginia Commonwealth University,
Richmond, VA

Let us hear from you...

BioUpdate wants to feature the accomplishments of alumni, and we encourage you to update us often!

Name _____ MTSU degree/year _____

Address _____ City/state/zip _____

Telephone _____ E-mail _____

Professional/job information _____

Personal news of interest (Example: Names of children, honors received, etc.)

Send contact information and updates to: Biology Department, MTSU Box 60. Murfreesboro, TN 37132,

Fax: 615-898-5093, E-mail: John.Dubois@mtsu.edu.