



# BioUpdate

Biology Department • Middle Tennessee State University



*George Murphy*

**MIDDLE  
TENNESSEE**  
STATE UNIVERSITY

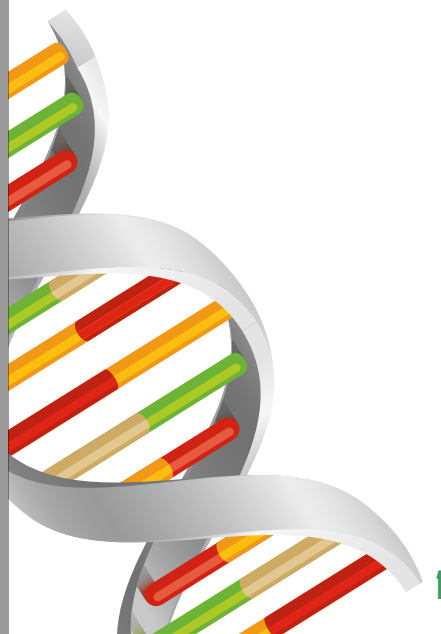
## Message from the Chair

Hello to all from the students, staff, and faculty of the Department of Biology. In this edition of BioUpdate, we note many of the accomplishments of 2010. As evidence of the quality of our students and faculty, our graduating class received many awards, including a Fulbright Fellowship, two Phi Kappa Phi scholarships, an honorable mention on the USA Today All-American Academic Team, and a runner-up for a Goldwater Fellowship. You'll find detailed accounts of their accomplishments in this newsletter.

We are still cautiously optimistic about funding for the new science building, which remains the number-one state building project. Articles detailing quality and quantity deficiencies of present facilities have appeared in newspapers recently, and I appreciate the numerous calls from alumni and parents of students saying they had contacted their legislators on our behalf. We will continue to make our case and hope that an economic upturn will lead to success in the near future.

Faculty continued to pursue external funding in support of research. Over \$7 million was applied for, and ten new grants/contracts worth over \$4 million were received. As we implement recently approved Ph.D. degrees (updates elsewhere in this issue), external funds for equipment and student support take on special importance. Faculty and students presented forty papers at national/international meetings, and authored/coauthored twenty-four national/international publications. A major goal for several years has been to involve more students in undergraduate research and internships. Forty-two undergraduates conducted research with fifteen faculty, and twenty students took internships for credit. Public service activities by faculty members and the Environmental Education Center were, again, outstanding.

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# Scholars Week Highlights

## Faculty and Student Research

The annual Scholars Week was March 22–26, 2010. The department had fewer presentations than in years past: only eighteen posters were displayed. Presenters included ten faculty members, five graduate students, and eleven undergraduates.

Awards were given to the top three posters presented by graduate students and undergraduate students from each of the five colleges. In the College of Basic and Applied Sciences, biology student winners were Shannon Roche and Nicole Porter (1st place) and Logan Key (3rd place). Tiffany Saul received a 2nd-place award in the College of Liberal Arts. Congratulations to all four student authors of these posters!

Faculty members involved in mentoring these students deserve credit for their time, effort, and expertise. The poster session was well-attended by the University community, and people from across campus were able to see the quality of research being done in the department. Congratulations to all authors for a job well done!

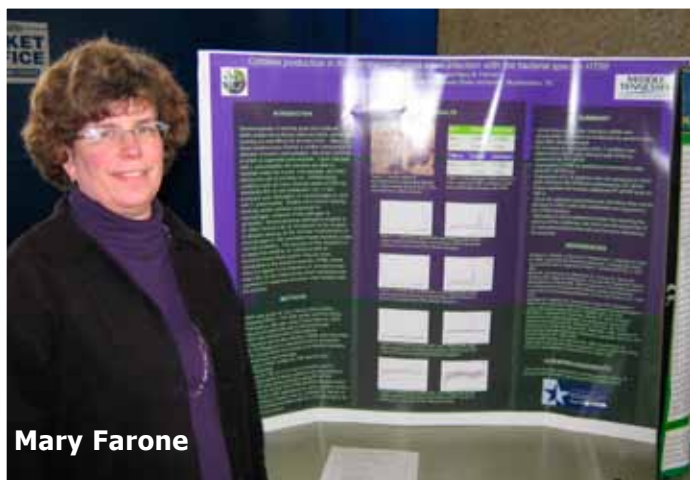
To see the entire Scholars Week program along with abstracts of all posters and presentations, visit [www.mtsu.edu/research/scholars\\_week.shtml](http://www.mtsu.edu/research/scholars_week.shtml). Poster authors and titles from the Department of Biology are given below.

## Faculty Presentations

**Matthew Klukowski** presented "Effects of Breeding Season, Testosterone, and ACTH on the Corticosterone Response of Fence Lizards."

**Anthony Farone, Mary Farone, and Kim Sadler** presented "TRIAD: Reforming (Graduate) Education by Integrating Teaching, Research, and Industry Applications."

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## from the chair...

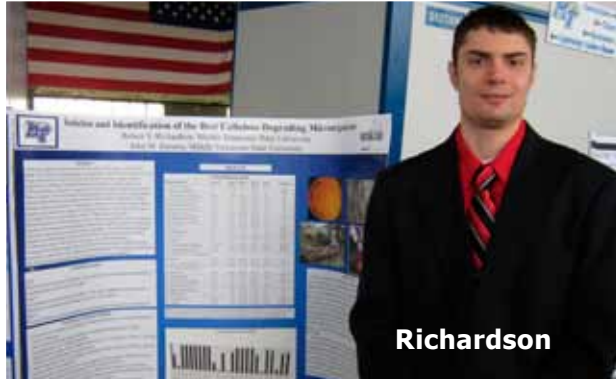
A final note on academics: the B.S. in Forensic Science received final approval from the Tennessee Higher Education Commission last spring, and we admitted the first students last fall. The degree is a collaboration between the departments of Biology, Chemistry, and Criminal Justice Administration and is already attracting students from Tennessee and surrounding states.

I hope you enjoy reading about the many positive accomplishments of students, alumni, and faculty. As always, I encourage you to stop by if you are in the area; I appreciate emails telling of your successes ([gmurphy@mtsu.edu](mailto:gmurphy@mtsu.edu)). Since this is MTSU's Centennial year, we hope to have a special event for Homecoming. Please keep this in mind—we will be posting specifics on the department website. Again, thanks for your support.

**George Murphy**

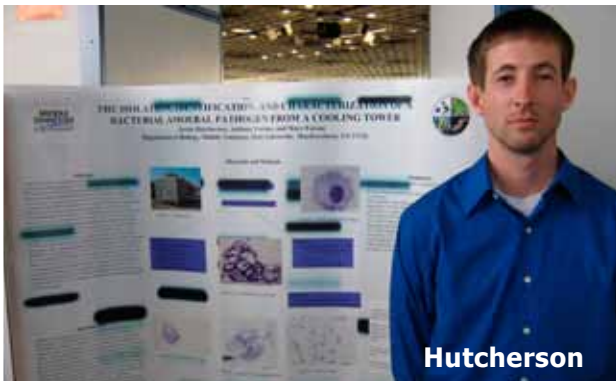
## Graduate Student Presentations

**Ryan Seddon** and **Matthew Klukowski** presented "The Effects of Short-term Stress in Male Southeastern Five-lined Skinks (*Plestiodon inexpectatus*)."



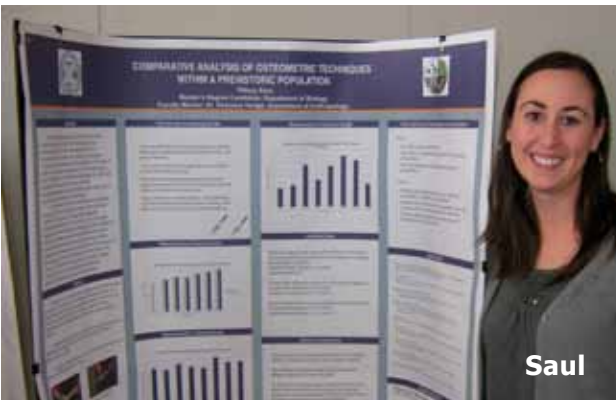
**Richardson**

**Robert Richardson** and **John Zamora** presented "Isolation and Identification of Cellulose-degrading Microorganisms."



**Hutcherson**

**Justin Hutcherson, Anthony Farone, and Mary Farone** presented "The Isolation, Identification, and Characterization of a Bacterial Amoebal Pathogen from a Cooling Tower."



**Saul**

**Tiffany Saul** and **Shannon Hodge** (Sociology and Anthropology) presented "Comparative Analysis of Osteometric Techniques within a Prehistoric Population."

**Natasha Vang** (Sociology and Anthropology), **Ali Jordan**, and **Hugh Berryman** (Sociology and Anthropology) presented "Uncovering History: The Civil War Union Soldier in Franklin, Tennessee."

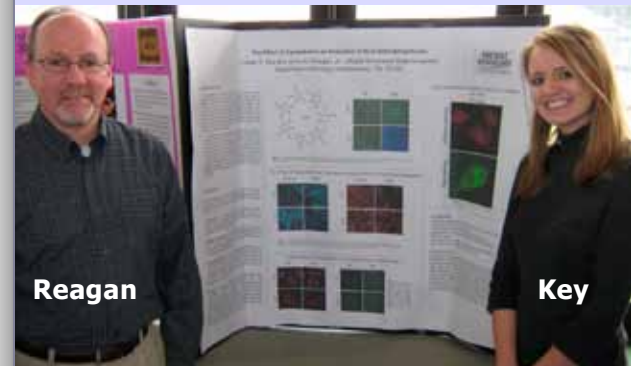
## Undergraduate Student Presentations



**Dunn**

**Sade Dunn** and **Bruce Cahoon** presented "Transformation of Tobacco Plants using Synthetically Replicated Antigenic Regions of *Shigella flexne*."

**Jennie Hamilton** and **Stephen Wright** presented "Efficacy of Silver Ion-containing Antimicrobial Ink Pens."



**Reagan**

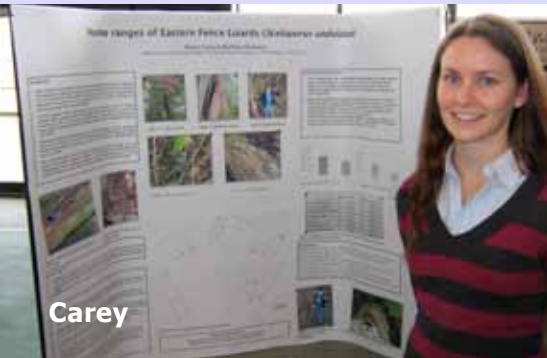
**Key**

**Logan Key** and **Jerry Reagan** presented "The Effect of Cyclodextrin on Activation of Acid Sphingomyelinase."

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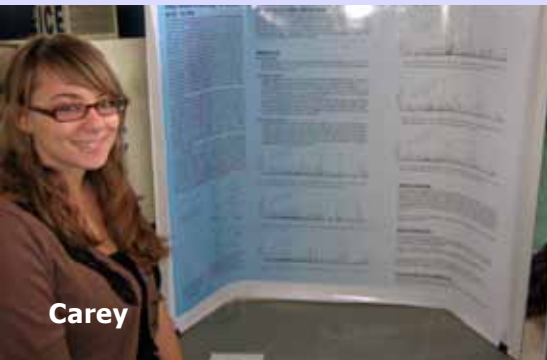


**Amanda Heape** and **Stephen Wright** presented "Detection of Anthrax-simulating *Bacillus* Endospores Using Capture Antibody."



Carey

**Alison Carey** and **Matthew Klukowski** presented "Home Ranges of the Eastern Fence Lizard (*Sceloporus undulatus*)."



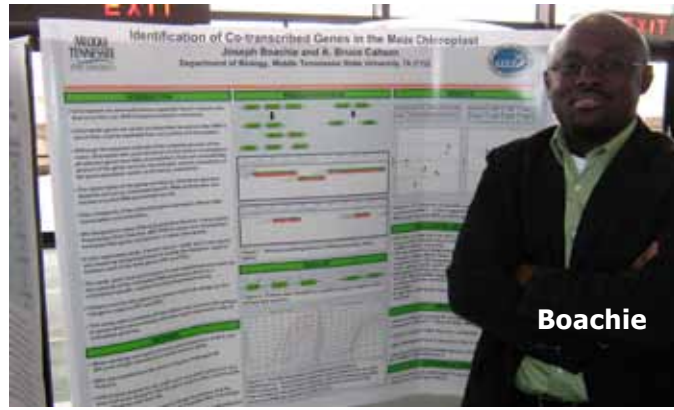
Carey

**Shannon Roche, Nicole Porter** and **Jeff Leblond** presented "Sterol Biosynthesis in the Marine Dinoflagellate, *Karenia brevis*."

**Nicole Porter** and **Mary Farone** presented "Cytokine Production in Human Macrophages upon Infection with the Bacterial Species HT99."

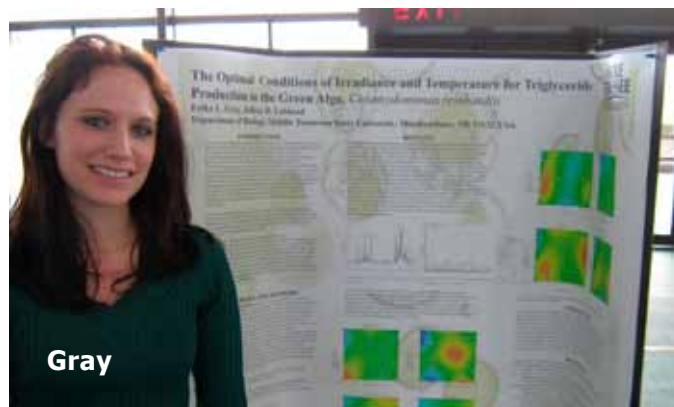
**Evan Swift** and **Rebecca Seipelt** presented "Developmental Alternative Gene Expression of the Longevity Gene SOD-3 in *Caenorhabditis elegans*."

cont.



Boachie

**Joseph Boachie** and **Bruce Cahoon** presented "Identification of Co-transcribe Operon in Maize Chloroplasts."



Gray

**Erika Gray** and **Jeffrey Leblond** presented "Optimal Conditions of Irradiance and Temperature for Triglyceride Production in *C. reinhardtii*."



Flanigan

**Noah Flanigan** and **Richard Pace** (Sociology and Anthropology) presented "ACAI: Facts and Fiction on Rainforest Conservation in the Brazilian Amazon."

# New Ph.D. Programs

## Fall 2010

**B**eginning in fall 2010, three new Ph.D. programs were fully implemented at MTSU. All three are interdisciplinary and involve substantial participation by the Department of Biology: Computational Science, Mathematics and Science Education, and Molecular Biosciences. BioUpdate contacted program directors for details. For more information, visit the respective websites.

### Computational Science

[www.mtsu.edu/graduate/cpsphd/index.shtml](http://www.mtsu.edu/graduate/cpsphd/index.shtml)

**Dr. John Wallin, Department of Physics and Astronomy, director**

Dr. Wallin reports that the program is off to a solid start. In September 2010, the program received full accreditation from SACS. In fall 2010, there were 14 students enrolled. Nine are on assistantships and two are working full-time while attending classes. There were approximately 50 applicants for those positions. Students on assistantships are teaching in the departments of Chemistry, Mathematical Sciences, and Computer Science. Several are split between two areas, including several with strong biology backgrounds.

This year, students have been selecting advisors and forming dissertation committees to guide coursework and supervise qualifying exams. The format for the exam will be a month-long computational research project this summer.

There are ongoing recruiting efforts to attract new students for next year.

### Mathematics and Science Education

[www.mtsu.edu/graduate/msephd/index.shtml](http://www.mtsu.edu/graduate/msephd/index.shtml)

**Dr. Ginger Rowell, Department of Mathematical Sciences, director**

The new Ph.D. in Mathematics and Science Education (MSE) is designed to prepare graduates to successfully pursue teaching and research careers in

academia, prepare America's next generation of K–12 mathematics and science teachers, and prepare graduates to assume leadership positions in education and policy settings. The program offers four concentra-

tions: Biological Education, Chemical Education, Mathematics Education, and Interdisciplinary Science Education. Twenty-four students were admitted in 2010, and three are pursuing the Biological Education concentration in which Drs. Rutledge, Sadler, Seipelt, and Smith-Walters are participating.

### Molecular Biosciences

[www.mtsu.edu/graduate/mbsphd/index.shtml](http://www.mtsu.edu/graduate/mbsphd/index.shtml)

**Dr. Elliot Altman, Department of Biology, director**

The interdisciplinary Molecular Biosciences Ph.D. is a rigorous, research-oriented program that seeks to teach students to understand biological patterns and processes at the molecular scale. It includes training and research opportunities in subdisciplines such as biochemistry, microbiology, cellular biology, structural biology, genomics, proteomics, and molecular systematics and evolution. The program initially engages students in bench research with faculty mentors and later requires them to design and conduct in-depth research as independent scientists who contribute original knowledge to the discipline and successfully complete a dissertation.

Molecular Biosciences admitted its first eight students in fall 2010. Karen Beasley, Bhawana Bhawana, Nick Chamberlain, Vernon Dodson, Manoj Khadka, Yohannes Mehari, Subathra Ramamoorthy, and Eric Vick are quickly adapting to the rigors of the Ph.D. program. New candidates are starting to apply, and the program expects to admit about the same number of students in fall 2011.



# Faculty Have Almost 600 Combined Years of Service

Over the years, the Department of Biology has had continued growth, not only in the number of students and majors served but also in the number of faculty. Last year, there were 37 tenured and tenure-track faculty members. Thirty-four hold Ph.D.s and two hold Ed.Ds. The most astonishing number is that at the end of the current academic year (2010–2011), these 37 will have 592 combined years of service! That is an average of 16 years per faculty member and a median of 14.5 years. At first glance, that may seem to indicate an aging faculty. However, 30 percent have been on staff for less than 10 years, a total of only 64 years of service. In other words, about one-third of the faculty have served just a little more than 10 percent of the total. So what does this mean for our students? With 27 percent having served 20 years or longer, continuity and stability are maintained. Yet, with approximately one-third on the job less than 10 years, the incorporation of new ideas and cutting-edge courses is apparent. In our rapidly changing field, it's important to stay current with new innovations and techniques. New faculty have been hired almost annually for the past 25 years. Even the lack of adequate facilities has not thwarted our ability to attract dynamic, well-qualified faculty to serve our ever-growing student population. This year, the department has had two active searches for faculty members. If both are successful, the full-time faculty count will be 39 (less retirements). That doubles the number on staff at the end of 1988–89.

The Biology faculty cover a vast diversity of fields and come from a large array of educational institutions. An analysis of doctoral degrees shows that our faculty have come from across the U.S. and Canada. Two (Dr. George Benz, University of British Columbia, and Dr. Chris Herlihy, Queen's University) received their degrees from Canadian schools. The map at right shows where faculty mem-

bers received doctoral degrees. It is interesting that only a few come from the same schools. Three graduated from Miami University (Ohio) and three from Mississippi State University; two each attended Indiana University, the University of Kentucky, and Clemson University. Although most doctorates came from schools east of the Mississippi, we have others from all four corners of the continental U.S. (Massachusetts, Washington, California, and Florida). This academic diversity benefits our students, especially those who plan to pursue graduate degrees. With respect to doctoral degree programs, faculty members have had direct involvement at 29 different schools. Including faculty alma maters, the number climbs to 58. Many faculty continued training with postdoctoral fellowships, adding another five universities to the list, plus the American Museum of Natural History, the National Museum of Natural History, and St. Jude Children's Research Hospital.

The faculty, of course, have a wealth of information for students, but they also have, collectively, contacts at 63 different colleges and universities in the U.S. and Canada: contacts that can be very useful for students considering graduate study in various fields. To learn more about our faculty and their schools, visit the department website at [www.mtsu.edu/biology/faculty/index.shtml](http://www.mtsu.edu/biology/faculty/index.shtml).





# Logo Shirts and More!

**S**hirts, backpacks, insulated lunch bags, coffee mugs, and water bottles sporting the department logo are available for purchase. 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. Faculty and students have been seen proudly wearing the shirts! The coffee mugs are white with the logo in blue on both sides. The stadium cups are 16-oz. blue plastic with a white logo. Key lanyards of blue-ribbed polyester cord with white letters spelling "MTSU Biology" are also available.

<b>T-shirts</b>	Short-sleeve:	\$10
	Long-sleeve:	\$12
<b>Polo shirts</b>	Short-sleeve:	\$20
	Long-sleeve:	\$25
<b>Denim shirts</b>	Long-sleeve:	\$28
Heather gray pull-over <b>hoodie</b> (Printed like t-shirts)		\$25
<b>Insulated lunch bags</b>		\$8
<b>Drawstring backpacks</b>		\$5
<b>Coffee Mugs</b>		\$3
<b>Stadium Cups</b>		\$1
<b>Key Lanyards</b>		\$2

All items can be purchased in the Biology Department office.  
For more information or to purchase an item (or two), contact  
**Virginia McKnight** (615/898-2291 or email [mcknight@mtsu.edu](mailto:mcknight@mtsu.edu)).



# Welcome, Dr. Elliot Altman



**W**e are happy to welcome Dr. Elliot Altman to the faculty. Dr. Altman was born and raised in Texas and, thus, has always admired the great state of Tennessee (Remember the Alamo!). He received B.S. degrees in zoology and chemistry from Texas A&M University (*magna cum laude*) and earned his Ph.D. in biology from the California Institute of Technology in 1991. His dissertation title was "Characterization of the SecB protein, a chaperone that facilitates protein secretion in *Escherichia coli*."

Dr. Altman's research interests are in metabolic engineering and peptide therapeutics. His metabolic engineering research focuses on the augmentation of biochemical pathways via the overproduction and/or removal of key metabolic enzymes to produce important industrial biochemicals. His research on peptide therapeutics concerns the creation of peptide drugs by improving naturally occurring peptides and the discovery of new peptides via combinatorial libraries. Dr. Altman's impressive publication record includes work appearing in the *Journal of Industrial Microbiology and Biotechnology*, *World Journal of Microbiology and Biotechnology*, *Journal of Biotechnology*, *Biotechnology and Bioengineering*, *Applied and Environmental Microbiology*, *Biotechnology Letters*, *Journal of Biological Engineering*, *Journal of Peptide Research*, and *Plasmid*. He has also received several patents for methods and techniques, including "Methods for inhibiting immune complex formation in a subject," "Biotin-facilitated transport in gram negative bacteria," "Stabilized bioactive peptides and methods of identification, synthesis and use," and "Metabolically engineered *E. coli* for enhanced production of oxaloacetate-derived biochemicals."

His main reason for coming to MTSU was to serve as the director of the interdisciplinary Molecular Biosciences Ph.D. program, which began in fall 2010. Eight students enrolled as Ph.D. candidates in the program's first year. He has also been teaching the Molecular Genetics and Advancements in Molecular Genetics courses.

Dr. Altman lives in Murfreesboro with his wife, Ronni, who helps run his lab, and daughters Alyssa (a senior at the University of Georgia) and Sarena. ●



# What's Up at the Center for Environmental Education?

by Cynthia Allen and Cindi Smith-Walters

**"To cherish what remains of the Earth and to foster its renewal is our only legitimate hope of survival."**

**—Wendell Barry**

The Center for Environmental Education (CEE), along with National Project WET (Water Education for Teachers), has created a new publication called *Discover the Waters of Tennessee*. The booklet is another CEE effort to help increase stewardship by providing facts about Tennessee waters. Although targeted to a student audience, users will include formal and nonformal educators, storm water program managers, watershed groups, citizen organizations, parks and recreation personnel, and even those in the tourism industry and more. Since water quality experts were consulted and provided aid in the development and writing of the booklet, the CEE has strengthened and expanded its already diverse group of partners. Distribution of 75,000 booklets will be through the CEE's established and expanded network of partners.

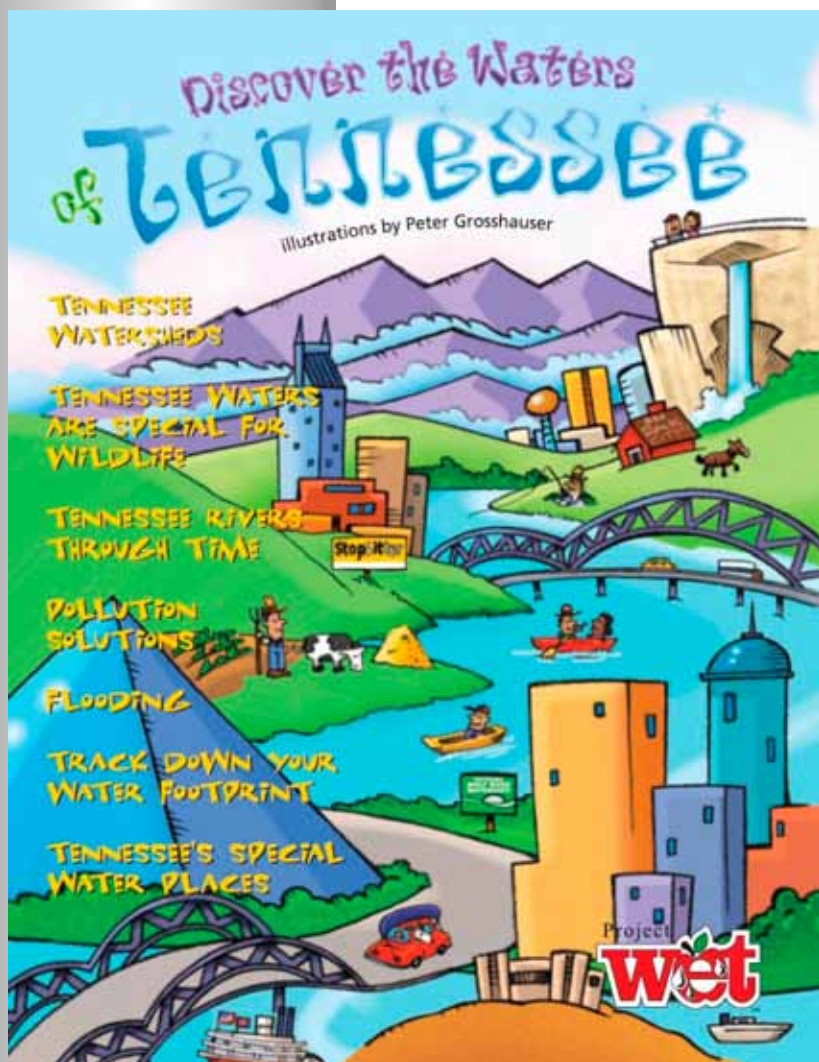
An added plus is that *Discover the Waters of Tennessee* is linked to the CEE websites [www.tennesseewaterworks.com](http://www.tennesseewaterworks.com) and [www.mtsu.edu/mtsucee](http://www.mtsu.edu/mtsucee)

and has been correlated to Tennessee Department of Education Standards in Science, Language Arts, Social Studies, and Mathematics. All of these ancillaries help to meet storm water permit goals for MTSU and the City of Murfreesboro.

The booklet fits well with the mission of the CEE. As a branch of the MTSU Biology Department, the CEE is dedicated to improving environmental education by raising awareness, imparting knowledge, teaching skills, and inspiring a commitment for the environment so citizens become equipped to make responsible decisions that conserve and sustain our heritage and resources.

A number of specific outreach programs and opportunities are housed under the CEE umbrella, and you can visit [www.mtsu.edu/mtsucee](http://www.mtsu.edu/mtsucee) to get more details. For additional information, call the center at (615) 898-2660. News of the past year's efforts, grants, available resources, staff activities, and happenings follow.

**cont.**



## CEE Grants/Projects

The center is funded entirely by soft money (grants and contracts). Our recent grant awards include

- **A \$120,000 grant from the Tennessee Stormwater Association (TNSA)** for the center's WaterWorks program ([www.TennesseeWaterWorks.com](http://www.TennesseeWaterWorks.com)) provided internal support services to storm water managers across the state who are part of the Municipal Separate Storm Sewer System (MS4) TNSA membership. WaterWorks also provided external educational resources geared toward a unified, statewide campaign focused on water quality protection. Education services included the development of resource materials, outreach services, and public service campaigns and development of a clearinghouse for storm water resources that will be housed at [www.tnstormwater.org](http://www.tnstormwater.org). This grant included a partnership/match from Tennessee Dept. of Transportation (TDOT) and the Tennessee Dept. of Environment and Conservation (TDEC).

- **A \$121,145 grant from the Tennessee Dept. of Agriculture** (and matching funds) for the development and production of the activity booklet *Discover the Waters of Tennessee*. The booklet is a partnership with National Project WET that highlights the unique watersheds and resources of Tennessee including environmental and regional influences. As part of the award-winning, copyrighted *Kids in Discovery* series developed by Project WET, the booklet targets youth and nonformal public education audiences and is distributed statewide.

- **A \$6,000 Amphibian Research Grant from Tennessee Wildlife Resources Agency (TWRA)** allowed continued research to assess the abundance of breeding populations of frogs and toads statewide for the Tennessee Amphibian Monitoring Program (TAMP). Data provide a better understanding of the distribution and relative abundance of each species and can be used to establish a baseline reference and help reflect the impact of growth and development on local amphibian populations.



The CEE also helped develop *A Guide to Traveling Tennessee's Watersheds* to educate Tennesseans about watersheds and their impact on our communities. The guide was developed by state agencies as a companion to watershed signs. The brochures will be distributed throughout the state at welcome centers and rest areas, in schools, at public events, and elsewhere. To find out more about the brochure, please visit <http://tn.gov/environment/watersheds/guide/>.

Last fall, the CEE began development of a children's booklet with a local illustrator.

## Recent Publications

**Dr. Cindi Smith-Walters** published an article in the November/December 2009 edition of the *Tennessee Conservationist* on using field guides, several articles for online sources on topics that include field guides, and articles about using the outdoors to teach youngsters in both formal and informal settings.

The online articles were published at [www.education.com](http://www.education.com) and were part of a "special edition" on Nature Deficit Disorder, which is not a medical condition but a description of our lack of connection to the environment. It hurts children, families, our communities, and our environment. Luckily, the cure starts in our own backyards! This special edition received over 50,000 visitors in 2010 and is among the most visited of all the special editions on the site (see [www.education.com/topic/nature-deficit-disorder](http://www.education.com/topic/nature-deficit-disorder)). Twenty-three essays were posted; Dr. Smith-Walters was the lead author on three of them.

### Great Field Guides for Young and Old

by Cindi Smith-Walters, Karen Hargrove, Hilary Hargrove, and Vera Vollbrecht

### Using Field Guides with Your Children

by Cindi Smith-Walters, Karen Hargrove, Hilary Hargrove, and Vera Vollbrecht

### Let's Go Wading: Taking the Worry Out of

**Getting Wet** by Cindi Smith-Walters and Bonnie Ervin

The coauthor of “Let’s Go Wading,” Bonnie Ervin, is married to Dr. Gore Ervin of the MTSU Biology Department. Bonnie is a naturalist and lead teacher at Murfreesboro’s Discovery Center at Murfree Spring.

The articles have been so well received that Cindi has been asked to write follow-up chapters for each article in a book to be published for parents, nonformal educators, and teachers.

This past year, Dr. Smith-Walters also cowrote book chapters with colleagues from several universities, including the University of Tennessee, and with Dr. Kim Sadler. One of the chapters was published in Chinese.

One of the chapters is in *The Inclusion of Environmental Education in Science Teacher Education*, edited by Alec M. Bodzin, Beth Shiner Klein, and Starlin Weaver (Springer 2010). This anthology begins with foundational knowledge of environmental education as it applies to the discipline of science education. The book examines pedagogical practices, case studies of environmental education teaching and learning strategies, and instructional practices in K–12 science classrooms. The book is a guide for both science teacher educators and K–12 science teachers on how to integrate environmental education with science teacher education. You can learn more at [www.springer.com/education+%26+language/science+education/book/978-90-481-9221-2](http://www.springer.com/education+%26+language/science+education/book/978-90-481-9221-2)

Smith-Walters’ chapter is chapter 19, “Using Environmental Education Project Curricula with Elementary Preservice Teachers,” and her coauthors were Adele C. Schepige, Patricia D. Morrell, Kim Cleary Sadler, Miriam Munck, and Donna Rainboth.

A second article, (published in Chinese), “Joining the Last Child in the Woods: An Argument for Environmental Education in Teacher Preparation,” was coauthored with R. Hagevik, C. Melear, E. Lunsford, and K. Sadler. It appears in *Improving Science Spirits and Building a Harmony Society* [P. Kurtz and Fujun Ren, eds., 2010, pp. 76–83. (Beijing: Chinese Science and Technology Press)].

## CEE Staff

**Dr. Smith-Walters** is serving on the Children’s Book Council, which is affiliated with the National Science Teachers Association (NSTA) and which chooses the top 50 children’s science trade books each year. Last year, Smith-Walters read nearly 400 books targeting kindergarten through high school students and helped choose the best of the best. Committee members collaborated on an article, and Smith-Walters annotated five of the books from the 2009 list in that article, which was published in several NSTA sources including *Science and Children*, *ScienceScope*, and *The Science Teacher* and was made available on the NSTA website, [www.nsta.org/publications/ostb/ostb2010.aspx](http://www.nsta.org/publications/ostb/ostb2010.aspx). Smith-Walters has also been working with local teachers (who are former students) and has their classes review books for the council as well. The *Daily News Journal* has published several articles in the past two years featuring local teachers and their students reviewing the trade books.

Smith-Walters presented a short course at the NSTA conference on using children’s literature to teach science. She also presented sessions, along with former students, at the national, regional, and state NSTA conferences.

Dr. Smith-Walters regularly presents at the Tennessee Environmental Education Association (TEEA) conference and at the Tennessee Outdoor Classroom Symposium (TOCS). This year, she did sessions on incorporating the study of sustainability into the science curriculum for the TEEA and on grant-writing for the TOCS.

Smith-Walters is a trained facilitator for Project WILD, Project Learning Tree (PLT), Project WET, Facing the Future, and Population Connection and conducts workshops upon request at conferences and for schools. In 2009, she conducted nearly 20 day-long workshops and short courses and was named the PLT Facilitator of the Year.



Dr. Smith-Walters also works with the following:

- The Tennessee Environmental Literacy Project (<http://www.enviroliteracy.org/subcategory.php/89.html>) and Every Child Outdoors Tennessee (<http://www.everychildoutdoorstn.org/>)
- The Tennessee Master Naturalist Program Steering Committee. She presented the session on Tennessee forests in March (see <http://www.owlshill.org/tnp> or <http://www.owlshill.org/tnpcourse>)
- Reviewer for Cengage Learning. Her most recent reviews were for a textbook manuscript, a web quest unit, and other ancillaries. The textbook is intended for courses in science methods and science content for undergraduate and graduate students who will be teaching K–8 science.
- The Keep Tennessee Beautiful Advisory Council. She has been meeting with the group three times each year and is now in her third Governor-appointed term.

**Dr. Padgett Kelly** served as conference cochair of the 2010 National Marine Educators Association conference, July 19–23, in Gatlinburg. He presented a workshop at the conference. He also presented a workshop at the 2010 Tennessee Science Teachers Association conference in Nashville. In the past year, Dr. Kelly has presented programs on whales for over 9,000 students in Tennessee.

**Cynthia Allen** has been busy with outreach services offered through the CEE's WaterWorks program, distributing materials to municipalities, citizen groups, teachers, and watershed groups. Many of these were the result of WaterWorks being chosen to facilitate the Tennessee Stormwater Association (TNSA) and to serve cities and counties statewide. As part of this effort, Allen coordinated a radio campaign through the Tennessee Association of Broadcasters to remind citizens about simple ways to protect water quality. Her presentations to teachers at the Tennessee Outdoor Classroom Symposium and with the Tennessee Department of Environment and Conservation (TDEC) at the East Tennessee Environmental Conference were opportunities to showcase community partnering. She served as an invited judge for TDEC's 2010 Governor's Environmental Awards. She spearheaded the development of the *Discover the Waters of Tennessee* book-

let and its community sponsorship and distribution. She served on the steering committee for the TDEC's fall 2010 Watershed Conference and presented a poster at the event as a board member for the Stones River Watershed Association. Most recently, she hosted a booth for TNSA at its joint conference in Nashville with the Tennessee chapter of the American Public Works Association.

**Bob English** is the state coordinator for the Tennessee Amphibian Monitoring Program (TAMP). TAMP volunteers continued to conduct amphibian listening surveys statewide in 2010. A total of five new county species records were submitted, approved, and assigned catalog numbers in 2010 by Austin Peay State University's Center for Excellence in Field Biology. All were submitted for publication in *Herpetological Review*. A TAMP workshop was conducted at the University of Tennessee October 29, 2010. TAMP has collaborated with the Biology Department at UT for a number of years now, and virtually all the data received from TAMP routes conducted in the eastern part of the state are a result of that partnership. Several new routes along the Mississippi River were run for the first time in 2010, and the Tennessee Wildlife Resources Agency supports virtually all the west Tennessee TAMP routes.

## Resources of Interest

Many resources and materials are available year round to educational groups in middle Tennessee. Some of these include

### Microscope and Resource Trunk Loan programs.

Recycled compound light microscopes, dissecting microscopes, microviewers, hand magnifiers, and related "Traveling Trunks" are loaded with teaching materials: curricula, videos, books, and resources to use for a teaching unit are available for loan.



**WaterWorks!** A public education and outreach program to improve water quality in Tennessee through a variety of public service announcements and initiatives; StreamSavers, a youth stewardship certification program; a series of storm water protection brochures; a

student survey showing attitudes and actions of Tennesseans related to water quality; a website that includes an interactive watershed map of the state; and related activities. The resources above are available for nonprofit use. ([www.tennesseeewaterworks.com](http://www.tennesseeewaterworks.com))

**Professional training.** Includes after-school workshops and in-services for educators. Opportunities range from field trips to workshops and seminars geared toward increasing content or technology knowledge of teachers, youth leaders, administrators, home schoolers, and the general public. Some examples of specific training using internationally recognized curricula include workshops for GLOBE (Global Learning and Observations to Benefit the Environment), Project WILD (Wildlife in Learning Design), WILD Aquatic and Flying WILD, Project Learning Tree, Project WET (Water Education for Teachers), Population Connection, and Facing the Future.

**Center for Cedar Glade Studies (CCGS).** The CCGS was formally established in 2005 to provide information and education about this unique habitat to both the public and scientists.

**Distance Learning Programs.** CEE programs with a studio audience are broadcast to outlying rural counties, local school channels, and out of state via a satellite system at MTSU.

**Vocalizations of Frogs and Toads of Tennessee CD.** Features distinct recordings of various calls from amphibian species across the state.

**The Online, Four-Season "Virtual Tree Trail."** Found at the center's website, [www.mtsu.edu/mtsucee](http://www.mtsu.edu/mtsucee).

We have also begun development of additional "**teacher totes**" with water educational materials. They will be available to be checked out by local teachers and educators.

If you want information on the CEE, any of our programs, or available environmental resources and literature, feel free to contact us at 615/898-2660. ●

## Dedicated Faculty Sacrifice for More Research Space

With the new Molecular Biosciences Ph.D. program coming online in fall 2010, we were in desperate need of more room for research. The new science building is still on hold as of this writing, so . . . what to do? Almost 1,000 square feet of extra space was created in the Davis Science Building in January, when six faculty members moved their offices to Jones Hall. Drs. Wright (JH 130A), Elrod-Erickson (JH 130B), DuBois (JH 134A), Rosing (JH 134B), Zamora (JH 138A), and Stewart (JH 138B) will move their offices yet again this summer, to the third floor of Jones Hall along with nine others, including more from Davis. Although inconvenient, these moves show the commitment of the faculty. Until the state appropriates funds for a new science building, we will continue to sacrifice and find new ways to accommodate our students. ●

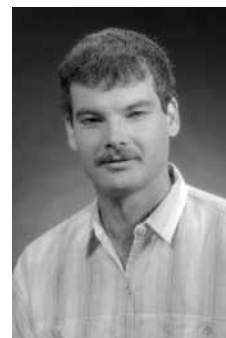
# Twenty-Five Years of BioUpdate!

***BioUpdate* is celebrating in 2011! The first issue was printed in spring 1987, and the spring 2011 issue marks 25 years in print (although there was no issue in 2005). In the first issue, department chair George Murphy said that the two main objectives of *BioUpdate* were (1) to inform our alumni and current students of events taking place in the department and at the University and (2) to make known the accomplishments of past and current students. Over the years, the publication has not changed its intent or focus. The early issues (1987 to 2004) were edited by Dr. Philip Mathis. After his appointment as dean of the Honors College, his editorial duties were assumed by Dr. John DuBois in 2006. Last year, *BioUpdate* began looking back at previous issues to recount the activities of the department, faculty, and former students. This year we look back to the 1992 issue. We hope you enjoy this short trip down memory lane.**

The Curriculum was subject to major changes in 1992. The faculty passed (and TBR approved) a new curriculum for biology majors. A new, 22-credit core consisted of a two-semester sequence in general biology, genetics, microbiology, ecology, and physiology/molecular biology and a one-hour course in biological literature. In addition, biology majors were required to take a year of college mathematics and three semesters of chemistry. The new curriculum also offered three options—the precursors to the current concentration areas. Required total hours in biology went up to 33 credits. A review of the graduate curriculum was also completed that year. Changes in the graduate curriculum included discontinuing the nonthesis option for the M.S. degree, offering optional areas of emphasis, and raising standards for admission to at least a 2.80 undergraduate GPA and a GRE score of 800 or more. An interesting recommendation for the graduate program was to delay any request for a doctoral-level degree in biology until proper resources were available!

The 101st annual meeting of the Tennessee Academy of Science was held November 22, 1991 at MTSU. The Biology Department, along with mathematics other science departments cohosted the event. Members of the department who served on the local arrangements committee included Clay Chandler, George Murphy, Marion Wells, Sally Swain, and Mark Hodge. Over 200 professors, engineers, physicians, and students attended and presented more than 100 papers at the one-day meeting.

The department was saddened in 1991 with the loss of Dr. John A. Patten. Dr. Patten began teaching at Middle Tennessee State College in 1951 and retired in 1980. He became chair of the department in 1959. Wiser-Patten Science Hall was named in recognition of his many accomplishments and contributions to the University. Upon his retirement, Dr. Patten became the first person to be awarded the status of Professor Emeritus by the University.



The fall of 1991 saw three new faces added to the biology faculty. Dr. Padgett Kelly came to us after serving twelve years as director of environmental education programs for the State of Tennessee. Dr. Dennis Mullen joined MTSU after completing his doctorate in zoology at Michigan State University. Mrs. Joyce Miller came on board as the first coordinator of freshman biology laboratories. She is now at MTSU's MIMIC Center.

Dr. Kelly became the new director of the Environmental and Energy Education Center. During his first year, the center moved to the Haynes House on East Main Street. It has since relocated to the Fairview Building on Greenland Drive.

The department had three presidents in its ranks in 1991–92. Dr. George Murphy was president-elect of the Tennessee Academy of Science and served as president of the academy the following year. Dr. Patrick Doyle was elected president of the Faculty Senate, and Mrs. Sarah (Sally) Swain served as president of the MTSU chapter of the Association of University Professors.

Reita Nirankari Aggarwal completed her thesis project under the direction of Dr. Marion Wells. Today, she is a respected physician in Murfreesboro. Dr. Stephen Murphree (M.S. '84) joined the biology faculty at Belmont University in Nashville. ●



## Featured Faculty Member: Cindi Smith-Walters

Cindi was born in Gene Autry, Oklahoma, and grew up in north Texas and southern Oklahoma. Her interest in environmental biology began early. Being raised on a farm meant doing everything from bushhogging to working cattle. When her family worked, they worked outside; when they played, they played outside. From that style of life, her love of biology was born.

Cindi received her bachelor's degree in biology and secondary education from East Central State University in Ada, Oklahoma, in 1978. She earned an M.S. in curriculum and instruction and a Ph.D. in environmental science from Oklahoma State University. She was recognized as Outstanding Educator of the Year by the Oklahoma chapter of the Soil and Water Conservation Society in 1987 and received the State of Excellence Award in 1988 from Gov. Henry Bellmon.



Jobs in biology were few and far between when Cindi finished her bachelor's degree, so she reluctantly took a job as a secondary school science teacher in Dickson, Oklahoma. However, she discovered she loved teaching and sharing her knowledge of life science with youngsters. After three years at Dickson, she was offered a position at Okemah Middle School in Okemah, Oklahoma, teaching life and earth science and overseeing a 40-acre outdoor classroom site near Okemah Lake. From there, she was recruited to teach in Stillwater, Oklahoma, and received a graduate teaching assistantship while finishing her master's degree. While working on her M.S., she realized that her true interest was in environmental science, and she was fortunate to receive a scholarship to pursue a newly approved Ph.D. at Oklahoma State. She completed her doctorate while working for the Oklahoma Conservation Commission as director of education. She worked with the 96 conservation districts in the state and codirected the Project WILD and Project Learning Tree programs. In 1986, the American Forest Council named Oklahoma's Project Learning Tree the Outstanding New Program in the Nation.

After graduation, Cindi obtained a position with the Tennessee Department of Education as part of the CENTS (Conservation Education Now for Tennessee Students) program which, at that time, was directed by Dr. Padgett Kelly. CENTS trains Tennessee teachers in the use of resources such as Project Learning Tree, Project WILD, Project WET, and others to help educate Tennessee students about the environment and conservation and how to be good stewards of natural resources. Kelly was eventually lured to

cont.

MTSU's Biology Department, and Cindi was named director of CENTS. She and her CENTS colleagues were recognized for their valuable service to teachers and students across the state with an Earth Day Make a Difference Award (Tennessee Division of Forestry, District IV, 1990), Conservation Educator of the Year (Tennessee Conservation League, 1990), a 1991 SAMAB Award to conduct teacher forestry education training in Sweden, an Excellence in Environmental Education Award (Tennessee Environmental Education Association, 1993), and the Forest Resource Award (Tennessee Forestry Association, 1993). In 1992, Cindi and Project CENTS received the coveted President's Conservation and Education Award, which was presented by President George H. W. Bush.

Cindi came to MTSU in 1993 to teach a content-based course to elementary education majors and to work again with Dr. Kelly, this time as codirector of the Center for Environmental Education (CEE). Under their direction, the CEE has had as many as five employees, all paid with soft money (grants and contracts). The CEE now has two full-time staffers and one part-time employee. Over the years, the center has won several million dollars in grants, contracts, and donations from federal, state, and private sources. In 1999, Cindi received the MTSU Foundation Award for Outstanding Public Service and was recognized by the Tennessee Environmental Education Association for Outstanding Service to Environmental Education.

In the Biology Department, Cindi has been teaching the Life Science for Elementary Teachers course. This course is required for elementary education majors to be certified to teach in Tennessee. A content-based course that teaches the principles of biology, it also shows students ways to present material to their students through interesting and fun hands-on activities. In this capacity, Cindi is able to draw on her expertise with resources such as Project WILD and Project Learning Tree. Her students have consistently praised her for helping them not only to understand biology but also to be able to teach the subject in a way that's appealing to elementary students. In 1998, she was recognized as Science Educator of the Year/Higher Education by the Tennessee Science Teachers Association. In 2000, Cindi received the MTSU Foundation Award for Outstanding Teaching. She has also taught the nonmajors introductory biology course, environmental science, and, more recently, Inquiry in the Schoolyard and Classroom, a course specifically designed for middle-grade math and science teachers as part of the NSF-funded TEACH NOW program.

Cindi has also published several articles and resources on environmental education. In November 2009, she wrote online field guides and articles about using the outdoors to teach children in formal and informal settings. Some of those guides include *Great Field Guides for Young and Old* and *Using Field Guides with Your Children*, both cowritten with Karen Hargrove, Hilary Hargrove and Vera Vollbrecht, and *Let's Go Wading: Taking the Worry Out of Getting Wet*, cowritten with Bonnie

cont.

Ervin. These guides are part of a "special edition" on Nature Deficit Disorder at [www.education.com](http://www.education.com). Nature Deficit Disorder is not a medical condition but a description of our lack of a connection to the environment. It hurts children, families, our communities, and our environment. Luckily, the cure starts in our own backyards! This special edition has received over 50,000 visitors in 2010 and is among the most visited of all the special editions on the website (see [www.education.com/topic/nature-deficit-disorder/](http://www.education.com/topic/nature-deficit-disorder/)). Cindi has been asked to develop several chapters for a book dealing with Nature Deficit Disorder to be published in 2012.

In 2009, Cindi cowrote several book chapters with Dr. Kim Sadler and colleagues from the University of Tennessee. One was published in Chinese and a second was also published in Chinese in 2010: "Joining the Last Child in the Woods: An Argument for Environmental Education in Teacher Preparation" appears in *Improving Science Spirits and Building a Harmony Society* (P. Kurtz and F. Ren [eds.]).

Cindi has been a member of the Children's Book Council (affiliated with the National Science Teachers Association) since 2008. The council chooses the top 50 children's science trade books each year. Last year she read nearly 400 books for students in kindergarten through high school and helped choose the best of the best. Committee members collaborated on an article, and Cindi annotated five of the books from the 2009 list for the article, which was published in several NSTA sources, including "Science & Children," "ScienceScope," and "The Science Teacher." They are also available on the NSTA website ([www.nsta.org/publications/ostb/ostb2010.aspx](http://www.nsta.org/publications/ostb/ostb2010.aspx)).

Outside her responsibilities at MTSU, Cindi likes to read, garden, hike, and just be outdoors. Her husband, Dave, is also an outdoor person. He is a forester for the State of Tennessee and a Fellow with the Society of American Foresters. Their son, Smith, is an Eagle Scout and senior at Blackman High School in Murfreesboro. Last summer, she and her family hiked part of the Continental Divide. ●



# ALUMNI making their mark

**Bonny Butler Millimaki** (B.S. '03) successfully defended her Ph.D. in genetics and graduated from Texas A&M University in August 2010. She has two first-author and one second-author publications. Bonny is very grateful for her undergraduate education and feels that she was well prepared to enter and succeed in grad school.



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# From the labs of...

## Andy Brower

**P**ostdoctoral research associate **Dr. Eirik Rindal**, who was working with Dr. Brower on a pronophiline butterfly project, accepted a position as a curator at the Natural History Museum in Oslo, Norway, and departed at the end of November. Eirik was tremendously helpful and a great guy to have in the department, and he will be missed.



Graduate student **Jess Matz** took a trip to Europe to study holotypes and other specimens of the group of south-temperate pronophilines at the Natural History Museum in London and the Jagellonian Museum in Cracow, Poland.

Dr. Brower went back to his Ph.D. alma mater, Cornell University, to participate in a symposium in honor of his major professor, **Rick Harrison**. He had a great time there catching up with a bunch of old friends.

## Recent Publications

Wahlberg N, Leneveu J, Kodandaramaiah U, Peña C, Nylin S, Freitas ALV, Brower AVZ. 2009. Nymphalid butterflies diversify following near demise at the Cretaceous/Tertiary boundary. *Proc. R. Soc. London B* 276: 4295–4302.

Brower AVZ. 2010. Stability, replication, pseudoreplication, and support. *Cladistics* 25: 112–113.

Brower AVZ, Wahlberg N, Ogawa JR, Boppré M, Vane-Wright RI. 2010. Phylogenetic relationships among genera of danaine butterflies (Lepidoptera: Nymphalidae) as implied by morphology and DNA sequences. *Systematics and Biodiversity* 8: 75–89.

Brower AVZ. 2010. Should evolutionary theory evolve? *The Scientist* 24: 14.

Rindal E, Brower AVZ. (In press.) Do model-based



phylogenetic analyses outperform parsimony? A test with empirical data. *Cladistics*

Brower AVZ. (Accepted.) Alleviating the taxonomic impediment of DNA barcoding: names for ten species of *Astraptes fulgerator* (Lepidoptera: Hesperiidae: Eudaminae). *Systematics and Biodiversity*.

Brower AVZ. (Accepted.) Hybrid speciation in *Heliconius* butterflies: a review and critique of the evidence. *Genetica*

Brower AVZ. 2006–2010. Nymphalidae, Pieridae, Hesperidae, Riodinidae, Lycaenidae, Dioprinae [Notodontidae] (and many included taxa: 2,100+ pages), in the Tree of Life Web Project, <http://tolweb.org/>.

## Recent Presentations:

Seminar, Dept. of Biology, MTSU, Feb. 2010

Invited symposium in honor of Rick Harrison, Cornell University, July 2010

Seminar, Dept. of Biology, MTSU, Oct. 2010



## from the lab of... John DuBois

**T**he DuBois lab has begun research looking at photosynthesis in plants.

John has started a project investigating the photosynthetic characteristics of genetically dwarf corn. The dwarf plants are typically darker green and show greater photosynthetic activity per unit area than their normal counterparts. However, considering that the normal plants typically have more photosynthetically active leaf area, the overall photosynthetic activity per plant is about the same.



New to the lab is graduate student **Rebecca Davis**. Her thesis project is investigating the photosynthetic activity of tall fescue with and without the fungal endophyte *Neotyphodium coenophialum*.



Graduate student **Misty Griffith** is continuing her research on the isolation of bacterial and fungal species capable of degrading the herbicide atrazine. To date, she has isolated 28 organisms able to grow on minimal salts agar plus atrazine. Her research is looking at the ability of these organisms to degrade the atrazine.

Now in his eighth year in the MentorNet Program, the E-Mentoring Network for Diversity in Engineering and Sciences, DuBois is mentoring **Mizuho Hasegawa**, a postdoctoral fellow at the University of Michigan in the Department of Microbiology and Immunology.

## from the lab of... Tony and Mary Farone

**T**he Farone laboratory has completed a U.S. EPA study on amoeba-resistant bacteria but is continuing to characterize organisms isolated as part of the study. The lab is also part of a DHS-SERRI study focusing on the comparison of carcass decomposition materials and the prevention of environmental contamination by potentially pathogenic microorganisms.



### Recent Publications

Farone A, Farone M, Khaliq A, Kline P, Quinn T, Sinkala Z. 2010. A practical approach for computing the active site of ribonucleoside hydrolase of *E. coli* encoded by *RihC*.

*Advances in Experimental Medicine and Biology*, 1, Volume 680, "Advances in Computational Biology," Part 4, pages 437-443.

### Recent Presentations

Farone MB, Berk SG, Vu T, Friesen J, Gardner C, Jacobs T, Choate B, Gendron C, Gunderson G, Farone AL. 2009. Occurrence of Legionella-like amoebal pathogens and other amoeba-associated microorganisms in cooling towers and municipal water systems. Seventh Annual International Legionella Conference, Paris, France.

cont.



Berk SG, Willeford WG, White JA, Lowe MC, Farone MB. 2009. Long-term survival of novel amoeba-associated bacteria compared with *Legionella pneumophila* under conditions of hydration and desiccation. Seventh Annual International Legionella Conference, Paris, France.

## Recently Completed Theses (M. Farone)

**Joshua Youssef.** 2010. Identification, Isolation, and Characterization of a Bacterial Amoebal Pathogen from a Cooling Tower Biofilm

## News about Former Students (M. Farone)

**Jason Hayes** (M.S. '05) is completing his Ph.D. in microbiology at Miami University, Oxford, Ohio.

**Kris Young** (M.S. '06) is a corporate microbiologist at Sun Products Corp., Bowling Green, Kentucky.

**Heather Hensley** (M.S. '09) works at Biomimetic Therapeutics, Nashville, Tennessee.

**Joshua Youssef** (M.S. '10) works at Aegis Corporation, Nashville, Tennessee.



## from the lab of Matthew 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 food restriction on baseline corticosterone and nutrient levels in water snakes (*Nerodia sipedon*) and the effects of acute stress on corticosterone and leukocyte numbers in five-lined skinks (*Plestiodon inexpectatus*). Graduate student Ryan Seddon is writing up his thesis on five-lined skinks.

## Recent Publications

Sykes KL, Klukowski M. 2009. Effects of acute temperature change, confinement, and housing on plasma corticosterone in water snakes, *Nerodia sipedon*. *Journal of Experimental Zoology*, 311A:172–181.

## Recently Completed Theses:

**Huff, Andrea.** 2010. Behavior of captive giant anteaters (*Myrmecophaga tridactyla*) in response to novel food enrichment. (57 pages)



cont.

## Former Students

**Julie B. Phillips** (M.S. '06) is in her fifth 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 Thompson's Station, Tennessee (just south of Franklin). In addition to teaching, Kyle is cosponsor of the Science National Honor Society and the INDY outing club, which involves students—who otherwise would not have the opportunity—in camping, hiking, canoeing, and other nature experiences.

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



## from the lab of Jeff Leblond

### Recent Publications

Leblond, JD, Roche, SA, Porter, NM, Howard, JC, Dunlap, NK. Sterol biosynthesis in the harmful marine dinoflagellate *Karenia brevis*: identification of biosynthetic intermediates produced during exposure to the fungicide fenpropidine. *Phycological Res.* (In press.)

Roche, SA, Leblond, JD. Mono- and di-galactosyldiacylglycerol composition of raphidophytes: a comparison of brown- and green-pigmented taxa. *J. Phycol.* (In press.)

Roche, SA, Leblond, JD. Betaine lipids in chlorarachniophytes. *Phycological Res.* (In press.)

Leblond, JD, Timofte, HI, Roche, SA, Porter, NM. 2010. Mono- and di-galactosyldiacylglycerol composition of glaucocystophytes (Glaucophyta): a modern interpretation using positive-ion electrospray/mass spectrometry/mass spectrometry. *Phycological Res.* 58:222–229.



## from the lab of... Charles R. McGhee

**D**r. McGhee's research has centered on spider identification and classification. He recently completed an inventory of the American Museum of Natural History phalangid collections. In addition, he has been collaborating with **Dr. Jeffery Schultz** from the University of Maryland on a taxonomic revision of the genus *Leioleptus*. He and Dr. Schultz recently met at Virginia Polytechnic Institute to discuss revisions of *Leioleptus* and *Hadronychia* species. He continues to update and curate the MTSU entomology collections.



In addition to his research efforts, Dr. McGhee has been active in Murfreesboro and Rutherford County identifying various invertebrates and helping educate residents on how to identify and control various insect and spider pests. He has been consulted on termites, ants, brown recluse spiders, planarians, and carpenter moths over the past year.

Throughout his career, Dr. McGhee has been active in the Tennessee Academy of Science. He continues to serve as chair of the Fellows Committee.

## Recent Presentations

Ingiani E, Shultz JW, McGhee CR. 2010. Taxonomy and genitalic diversity of the *Leioleptus nigropalpi* species group (Opiliones: Sclerosomatidae). American Arachnological Society Meeting.

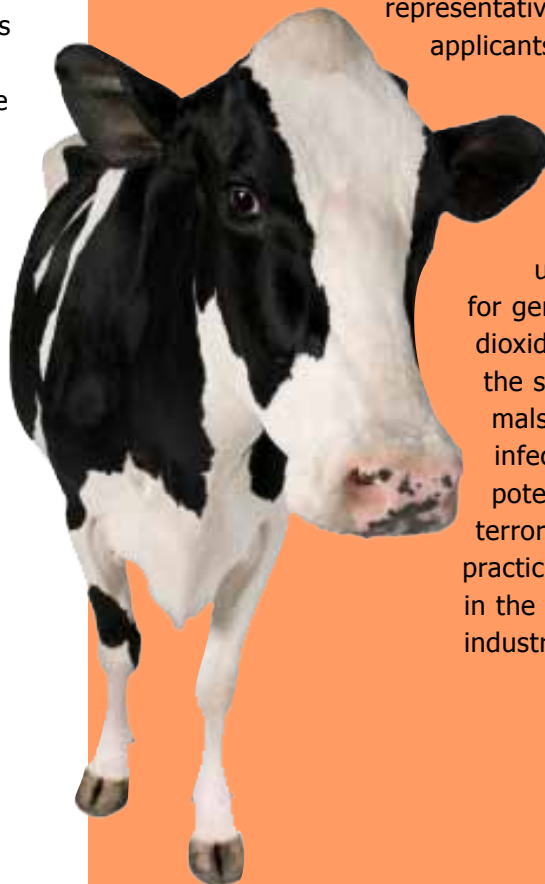
## from the lab of... Anthony Newsome

**U**ndergraduate student **Jeannie Stubblefield** was busy in April when she went to Washington, D.C., and presented her research results. She has been working through a federally funded award to write "Aerobic Decomposition—Alternative Method for Managing Large-scale Animal Fatalities." Dr. Hugh E.



Berryman (director, Forensic Institute for Research and Education) is a coprincipal investigator for the study. Jeannie first learned that her expenses would be covered to present her research at the fifth annual U.S. Department of Homeland Security University Network Summit, held in Washington March 28–April 1. She then learned she was one of 74 applicants (out of over 700) invited to present research at the Posters on the Hill at the Rayburn Office Building in Washington on April 13. Senators and representatives from the chosen

applicants' states are invited to attend and meet with the student presenters. Jeannie's research has centered on potential use of a novel system for generation of chlorine dioxide to decontaminate the surface tissue of animals exposed to harmful infectious agents. This has potential for use in a bio-terrorist event and also has practical applications for use in the food preparation industry.





## from the lab of... Wayne Rosing

**D**r. Rosing is moist-chambering tree bark from Thailand in collaboration with a colleague (Steven L. Stephenson) at the University of Arkansas. Myxomycete (plasmodial slime mold) species are identified as they develop and sent to Arkansas as part of the Planetary Biodiversity Inventory of Eumycetozoans.



### Recent Publications

Rosing WC, Mitchell DW, Moreno G, Stephenson SL. 2011. Additions to the Myxomycetes of Singapore. *Pacific Science* 65(3). (In press.)



## from the lab of... Becky Seipelt

**T**he Seipelt lab is excited to report that the 2009–2010 academic year was very busy and productive with two national presentations at the American Society for Biochemistry and Molecular Biology in Anaheim, California. These involved the work of present and past students Alex Winfrey, Evan Swift, Nick Saïtes, Varuna Mohan, Erin Archer, and Courtney Thompson. Swift also presented his work at MTSU's Scholars Week and completed his Honors thesis: "Developmental Alternative Gene Expression of SOD-3 in *C. elegans*." McKenna Rhea also completed her Honors thesis: "The Distribution and Mechanism of Fish Oil Antibacterial Effects." Graduate students Jessica Ford and Suzanne Hicks are working on their research on B cell transcription regulation and DISC1 protein-protein interactions, respectively. Karen Maynard (formerly Beasley) joined the lab as its first Ph.D. student and is working on further characterization of metalloprotease RNPEPL1.



### Recent Publications

Thompson MW, Beasley KA, Schmidt MD, Seipelt RL. 2009. Arginyl aminopeptidase-like 1 (RNPEPL1) is an alternatively processed aminopeptidase with specificity for methionine, glutamine, and citrulline residues. *Protein and Peptide Letters*. 16(10):1256–66.

Seipelt RL, Bailey FC, Schaible A, Thompson MW. 2010. Tryptophan<sup>356</sup> and asparagine<sup>362</sup> are essential for the peptidase reaction of *Saccharomyces cerevisiae* leukotriene A<sub>4</sub> hydrolase. *Biochim Biophys Acta*. 1804(10):2070–6



## from the lab of... Jeffrey Walck

**D**uring summer 2010, Jeff attended the Seed Ecology III meeting in Utah while Siti Hidayati headed for Indonesia and Malaysia to discuss research endeavors with various colleagues. She (along with their son, Edwin) visited the Bogor Botanic Garden in Java and went to the orangutan and sun bear rehabilitation center and tropical tree canopy walk in Borneo.

In October 2010, Jeff and Siti were invited by the South Korean government to give seminars at the Korean National Arboretum and to set up a seed research collaboration for establishing an Asian-wide *ex situ* seed bank facility. The Korea National Arboretum was established about 10 years ago and now houses the national herbarium and insect collection, seed biology facilities, a tropical research center, molecular biology laboratories, and a forest museum. The Walcks had a delightful time seeing temperate deciduous forest, mostly consisting of oak-maple, in Asia during autumn. With their South Korean colleagues, they collected seeds atop Mt. Balwang (about 5000-ft. elevation). They also toured

many places: Changdeok Palace and the Secret Garden, Korea Botanic Garden, Woljeongs Temple, Konjiam Arboretum, Hantaek Botanic Garden, the tomb of King Sejo, Namsangol Traditional Korean Village, the War Museum, and the Seoul Tower. Jeff and Edwin experienced a traditional Korean medical check-up: Jeff was told he was in great health and Edwin was given medicine (tea) to help him grow. The food was terrific and once, for lunch, they had "san bibimbap," made of mountain herbs collected in the wild.

The Walcks spent a good part of the year working on a major review called "Climate Change and Plant Regeneration from Seeds" with colleagues from Australia, Germany, and England. The paper was accepted for publication in *Global Change Biology*, one of the top journals in climate change research. They also had papers published over the year in *Plant Species Biology*, *Annals of Botany*, and *Australian Journal of Botany* and currently have two papers submitted.



Jeff, Edwin, and Siti with South Korean colleagues Jae-hyeun Kim, Ji Suk Lee, and Ki Cheol Lee.

# BIOLOGY CLUB

## Officers for 2010–2011

Rebecca Houser, president  
Trey Cokerof, vice president  
Evan Cartabiano, secretary

Club activities this past year included a trip to the Tennessee Academy of Science Annual Meeting and a 5K run. The Biology Club had a joint picnic with the Chemistry Club, and it was well attended. The club has been gathering at selected restaurants and other places in order to foster more informal meetings.

## News about former club members

**Rick Kurtz** is working at MTSU's James E. Walker Library.

**Brian Long** is working as a legal assistant in Nashville.

**Melanie Messina Wilk** is a project manager for clinical trials in Virginia.

**Kerolos Yousef** is enrolled in a postbaccalaureate medical science program.

**Wais Folad, Jesse Carter, and Rebecca McWhirter** are working at Vanderbilt University as research assistants.

**Justin Sadd** is working on his Ph.D. in molecular biosciences at Montana State University.

**Josh Hurley** is working on his Ph.D. at Vanderbilt University.

Club advisor **Dr. John Zamora** was Tennessee Academy of Science section chair for microbiology last year and will serve in the same capacity for the coming year.

# Theses Completed (2009–2010)

The Biology Department had a total of nine M.S. graduates in December 2009 and May and August 2010. Nationwide, Middle Tennessee State University is a leader in producing master's-level graduates. Students, their graduation year, thesis titles, and faculty advisors are listed below. A complete list of all biology theses completed to date can be found at [www.mtsu.edu/~jddubois/3230/theses.html](http://www.mtsu.edu/~jddubois/3230/theses.html).

**Danikas, Lacy N.** 2010. Variations in locomotor performance of a geographically widespread species, *Nerodia sipedon*. (Vince Cobb, advisor)

**Estabrooks, Daniel B.** 2010. Range, density, and habitat preference of Tennessee populations of the Streamside Salamander (*Ambystoma barbouri*). (Brian Miller, advisor)

**Foster, Nicole Y.** 2009. Antibacterial, antifungal, antiviral, and allelopathic effects of *Eriodictyon californicum* Torr. (John Zamora, advisor)

**Jones, Mark.** 2010. Investigation of CITED 1 phosphorylation sites by mass spectrometry. (Jerry Reagan, advisor)

**Landry, David R.** 2010. A survey of the turtle community at Murfree Spring Wetland and Lytle Creek in urban middle Tennessee. (Brian Miller, advisor)

**Reed, Elizabeth.** 2010. The effects of aquatic, rooted vascular plants on the availability of metals to benthic macroinvertebrates. (Frank Bailey, advisor)

**Roden, Colleen M.** 2009. The effects of intracellular growth of the novel bacterium CC99 on protozoan and human host cells. (Anthony Farone, advisor)

**Shaikh, Sana K.** 2009. Comparing methods for the assessment of *Salmonella* contamination in poultry. (John Zamora, advisor)

**Willoughby, Jeffrey A.** 2010. Influence of morphometry on mixing depth during thermal stratification. (Dennis Mullen, advisor)

# Biology Department Scholarship Winners, 2010

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 faculty congratulate each and every award winner.

## **Clay M. Chandler Outstanding Freshman Award**

Robin Gilliland, Will Shelton

## **Ralph E. Sharp Outstanding Sophomore Award**

Lauren Rigsby

## **Philip M. Mathis Outstanding Junior Award**

Mary Katherine Messick

## **Peter I. Karl Outstanding Senior Award**

Kaitlen Howell

## **C. W. Wiser Medical/Allied Health Award**

Chris Moulton

## **George G. Murphy Research Scholarship**

Jacob Campbell, Shannon Murphy, Kenneth Tucker

## **John M. Zamora Graduate Research Scholarship**

Tiffany Saul, Kenneth Tucker

## **Sarah F. Barlow Scholarship**

Michael Anderson

## **John A. Patten Scholarship**

Ryan Seddon, Raymond Wright

## **J. L. Fletcher Graduate Scholarship**

Michael Anderson

## **Charles Holland Biology Club Scholarship**

Michael Anderson, Ryan Seddon

## **Marion R. Wells Graduate Research Scholarship**

Ryan Seddon

## **Dennis Mullen Vertebrate Biology/Aquatic Biology Research Scholarship**

Raymond Wright

## **Brian Miller Graduate Research Scholarship**

Ryan Seddon, Joshua Campbell

## **Padgett Kelly Research Scholarship**

Alison Carey, Raymond Wright

## **Sarah H. Swain Undergraduate Research Scholarship**

Alison Carey, Erika Gray, Merranda Holmes, Shannon Murphy, Shannon Roche

## **Stephen M. Wright Research Scholarship**

Merranda Holmes, Shannon Murphy

## **Kurt E. Blum Botany Research Scholarship**

David Adams

## **William H. Butler Jr. Graduate Research Scholarship**

Tiffany Sauls

## **Thomas Hemmerly Graduate Research Scholarship**

Joshua Campbell, Patrick Cusaac

## **John D. DuBois Scholarship**

Erika Gray, Merranda Holmes, Shannon Roche, Ryan Seddon

## **Freeman P. Jordan Jr. Scholarship**

Merranda Holmes, Shannon Murphy

## **David Sanborn Ecology Scholarship**

Jessica McDonald

## **Wayne Rosing Biology Scholarship**

Emily Brown

## **Charles R. McGhee Scholarship**

Rachel Lytle

## **James R. Kemp Scholarship**

Bruce Trey Cokerof

## **Eugene F. Strobel Scholarship**

Rachel Lytle

## **Major Field Test High Score**

Fall 2009: Alexis Burgess

Spring 2010: Daniel Simpson

## **Incoming Freshman Scholarships 2010-2011**

### **Mary C. Dunn Freshman Scholarship**

Peter Schwartz

### **Patrick J. Doyle Freshman Scholarship**

Logan Smith

### **Ellis Rucker Freshman Scholarship**

Jordan Dodson

# Full-Time Temporary and Adjunct Faculty Playing Major Roles

**T**he combination of increased enrollment and decreased funding makes assigning instructors a real challenge. This challenge is met primarily by full-time temporary and adjunct faculty members. This academic year, the department has rehired six full-time temporary faculty and hired four adjunct faculty. Five of the ten hold doctoral degrees and four hold master's degrees.

They are teaching Human Anatomy and Physiology I and II, Exploring Biology (nonmajors biology), Microbiology, Genetics, Radiation Biology, and Comparative Anatomy of Vertebrates. Considering the expertise of each of these instructors, their students are obviously offered a great education. Their service to the department not only helps fill instructor roles in an ever-increasing number of course sections but also takes up the slack for research faculty who 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 grateful for the service of temporary and adjunct faculty members.

## Full-Time Temporary Faculty

**Steve Edwards**, B.A., 1973, Ph.D., 1980; University of California–San Diego. Anatomy and Physiology Labs.

**Christopher Brian Manning**, B.S., 1996, M.S., 1998, MTSU; Ph.D., 2003, University of Vermont. Anatomy and Physiology Labs and Microbiology Labs.

**Amy Massengill**, B.S. 1993, Stetson University; D.V.M., 1997, University of Florida. Anatomy and Physiology Lab and Comparative Anatomy of Vertebrates Lab.

**Mary Matthews**, B.S., 1992, M.S., 2002; MTSU. Anatomy and Physiology Labs.

**Teresa Stegall-Faulk**, B.S., 1997; M.S., 2000; MTSU. Anatomy and Physiology Labs.

**Michael Thompson**, B.S., 1993, University of Louisville; Ph.D., 2000, University of Kentucky. Anatomy and Physiology Labs and Genetics.

## Adjunct Faculty

**Bipin Agarwal**, B.Sci. 1975, Bareilly College (Agra, India); M.E., 1981, University of Virginia. Radiation Biology.

**Danielle Brown**, M.S. 2006, University of California–Davis. Exploring Life.

**Christopher Garner**, M.S. 2008, MTSU. Anatomy and Physiology.

**Siti Hidayati**, Ph.D., 2000, University of Kentucky. Exploring Life.



# Graduate Teaching Assistants for 2010-2011

In 2010–2011, the department is supporting 24 M.S.-level and nine Ph.D.-level graduate students who serve as graduate teaching assistants (GTAs). Twenty-four of these students received undergraduate degrees from colleges and universities other than MTSU. Fifteen hold degrees in subjects other than biology (animal sciences, anthropology, chemistry, environmental sciences, international relations, professional studies, water resources, and environmental biology). For the first time, the department is supporting nine student assistants who are pursuing the Ph.D. degree. Three of those have bachelor's or master's degrees from universities outside the U.S. All have the requisite training in biology to serve as teaching assistants. Without GTAs, we would be unable to offer the many sections of the nonmajor freshman biology course, the major freshman courses, and some sophomore and junior laboratories. These people are especially important considering the current hiring freeze due to budget limitations. We are very pleased to have them with us.

**Michael Anderson**, B.S., biology, MTSU

**Jacob Campbell**, B.S., biology, Tennessee Tech University

**Steven Crosby**, B.S., biology, Union University

**Patrick Cusaac**, B.S., biology, Western Carolina University

**Noah Flanigan**, B.S., biology, MTSU

**Julie Folks**, B.S., international relations, MTSU

**Brian Huber**, B.S., environmental sciences, MTSU

**Ryan Johnston**, B.S., biology, University of Tennessee–Martin

**Christie Kaliamani**, B.S., biotechnology, SRM University (India)

**Justin Lee**, B.S., animal sciences, University of Tennessee–Martin

**Emily Mattison**, B.S., integrative biology, University of Illinois

**Christy McClain**, B.S., biology, Tennessee Tech University

**William Monroe**, B.S., water resources and environmental biology, Heidelberg College

**Robert Newby**, B.S., biology, MTSU

**Billy Plant**, B.S., chemistry, Tennessee Tech University

**Angela Ray**, B.S., professional studies, MTSU

**Matthew Rodgers**, B.S., biology, Tennessee Tech University

**Ryan Seddon**, B.S., biology, University of Tennessee–Knoxville

**Dan Simpson**, B.S., biology, MTSU

**Suzanne Staley**, B.S., biology, Lipscomb University

**Zena Tenenbaum**, B.S., biology, MTSU

**Kenneth Tucker**, B.S., biology, Athens State University

**Raymond Wright**, B.S., anthropology, University of Florida

**Derek Young**, B.S., biology, Trevecca Nazarene University

## Ph.D. Graduate Teaching Assistants

**Bhawana Bhawana**, B.S., biotechnology, Utar Pradesh Tech University; M.S. professional science, MTSU

**Jeff Bonner**, B.S., biology, University of Georgia; M.A.E., education, Cumberland University

**Nicholas Chamberlain**, B.S., biology, MTSU

**Vernon Dodson**, B.S., biology, University of Tennessee–Knoxville

**Daniel Estabrooks**, A.S., science, Roane State Community College; B.S., biology, University of Tennessee; M.S., biology, MTSU

**Manoj Khadka**, B.S. and M.S., microbiology, Tribhuvan University

**Karen Maynard**, B.S., biology and psychology, Martin Methodist College; M.S., professional science, MTSU

**Yohannes Mehari**, B.S., medical technology, University of Asmara; M.S., microbiology, Jilin University (China)

**Erik Vick**, B.S., biology, University of Tennessee–Knoxville

# TAS holds 120th Annual Meeting

The 120th annual meeting of the Tennessee Academy of Science was held November 18–19, 2010, at Tennessee Technological University in Cookeville. The Biology Department presented an unusually low number of student and faculty offerings (eight oral presentations and three posters) again this year. However, the department continues its strong support of the academy: a number of faculty members serve as officers, committee chairs, and committee members.

The plenary lecture, "Next-generation Climate and Biomass Research: From Molecular Biology to Earth System Models and Back," was presented by Dr. Martin Keller, associate laboratory director, Biological Environmental Sciences Directorate, Oak Ridge National Laboratory.

Dr. M. Gore Ervin served as past president and chair of the Nominating 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. Dr. Michael Thompson moderated the Cell and Molecular Biology section.

The 121st annual meeting of the Tennessee Academy of Science will be at Union University in Jackson. Papers and posters presented at the 2010 meeting are listed below with student authors or coauthors designated with asterisks (\*).

## Papers Presented

Michael W. Thompson, Alexis Schaible\*, Frank C. Bailey, Rebecca L. Seipelt, "Asparagine<sup>362</sup> Increases Zinc Affinity of Leukotriene A4 Hydrolase through Interactions with Zinc-binding Residues."

Kim Cleary Sadler, "The More Things Change, the More They Stay the Same: A Collaborative Invasive Pest Plant Education Project."

Michael A. Anderson\*, Brian T. Miller, "Early Iron Deposition in Teeth of the Streamside Salamander *Ambystoma barbouri*."

Ryan Seddon\*, Matt Klukowski, "The Effects of Short-term Stress on Corticosterone, Leukocytes, Testosterone, and Prostaglandin E2 in Male Southeastern Five-lined Skink (*Plestiodon inexpectatus*)."

Alison Carey\*, Matthew Klukowski, "Effects of Food Deprivation on Plasma Corticosterone and Triglycerides in Water Snakes (*Nerodia sipedon*)."

J. Patrick W. Cusaac\*, Raymond C. Wright\*, Cassandra Henry\*, Frank C. Bailey, "Effects of Maternally Transferred Methylmercury Chloride on Stress Induced Corticosterone Levels in *Nerodia sipedon* Neonates."

Raymond C. Wright\*, J. Patrick W. Cusaac\*, Cassandra Henry\*, Frank C. Bailey, "Mercury Concentration in Fecal Samples as an Indicator of Methylmercury Absorption in Dosed Northern Water Snakes (*Nerodia sipedon*)."

Jerrold D. Shipman\*, Vince A. Cobb, "Thermal Ecology of Hibernation in the Midland Water Snake."

## Posters

Adam W. Keasling\*, Frank C. Bailey, "Allelopathic Activity of *Passiflora incarnate* Extracts as Measured by *Hordeum vulgare* and *Raphanus sativus*."

Alison Carey\*, Mary B. Farone, Kim Cleary Sadler, Anthony L. Farone, "Engaging High School Ecology Students in Biodiversity Lab Activities through the NSF TRIAD GK-12 Program."

Jerrold Shipman\*, Mary B. Farone, Kim Cleary Sadler, Anthony L. Farone, "Here's the Poop About the Process of Science in a High School Biology Classroom: Making Science Real in the NSF TRIAD GK-12 Program."

# Internships: Valuable, Practical Training

The department continually emphasizes learning outside the classroom, and internships are an important part of that emphasis. Internships allow students to get practical, on-the-job, experience while still in school. The student intern earns credit and sometimes is paid. 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.

## Fall 2009

### Neelima Chukka

SUNY, Stonybrook,  
New York

## Summer 2010

### Kimberley Perry

Elsohly Laboratories,  
Oxford, Mississippi

### Bill Smith

TMSTEC, Murfreesboro

### Michael Cozart

Computational Biology,  
Vanderbilt University,  
Nashville

### Vikram Ghorpade

Computational Biology,  
Vanderbilt University,  
Nashville

### Ko Maung

Vanderbilt University, Nashville

### Bahareh Tahriri

Vi-Jon, Smyrna

## Fall 2010

### Anushadevi Mohan

Sarah Cannon Cancer Institute,  
Nashville

### Hadi Sayeed

University of Agricultural Science  
GKVK, Bengaluru, India

## Spring 2011

### Ning Bougharath

Vi-Jon, Smyrna

### Asra Gilani

Vanderbilt University DNA  
Resources Core Facility, Nashville

### Ryan Mills

Vanderbilt University  
Medical Center, Nashville

### Rachel Klapper

GenHunter, Nashville

### Lori Rhoten

GenHunter, Nashville

### Christie Kalaimani

Insight Genetics, Nashville

### Ankiekan Udoku

Meharry Medical College,  
Nashville

### Tim Fusco

Tennessee Biotechnology  
Association, Nashville

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## BioUpdate

George G. Murphy,  
department chair

John D. DuBois, editor

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### Key contributors to this issue:

Cynthia Allen

Elliot Altman

Virginia McKnight

Becky Seipelt

Cindi Smith-Walters.

# 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 \_\_\_\_\_

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

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**Send contact information and updates to:**

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