



Bio Update

Biology Department, Middle Tennessee State University, Spring 2008



Chair's Message

As I reflect on the past year, I am impressed by the many accomplishments of faculty and students and confident that the future of the department will continue to be guided by the mission statement of teaching, research, and service. A major step in fully achieving that mission was taken this year: we finished the major planning details for the long-awaited new building. The planning process, though filled with much effort and uncertainty, revealed a tremendous spirit of cooperation and dedication among our faculty members. As we moved through the process, decisions were made in a timely manner as space needs were considered, configurations altered, and details redefined to come within budget. Dr. Steve Wright, our "building shepherd," kept us focused, and the leaders of subgroups helped set priorities. The process has truly been a united effort to plan a building that will accentuate and accelerate the evolution of the department. You will want to read the interview with Steve in this issue of *BioUpdate*.

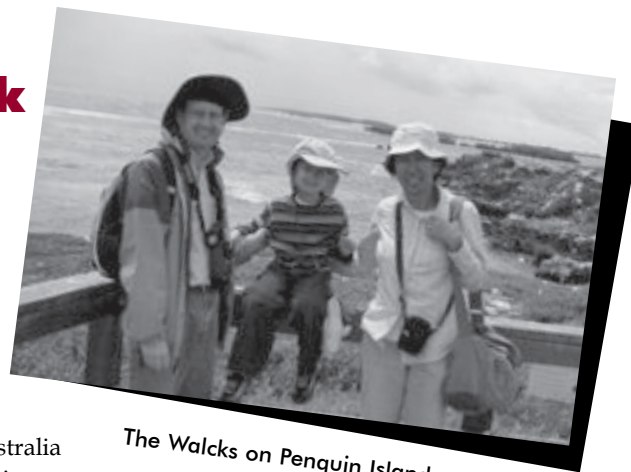
We were disappointed that our building was not included in the governor's budget proposal for 2008–09. As this newsletter goes to press, we are still hopeful that funding can be secured. Tennessee has had pressing needs for new science facilities at our institutions

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Jeffrey Walck in the Land Down Under

Dr. Jeffrey Walck is on a two-year sabbatical from the department (2007–2009). He is a research fellow in the School of Plant Biology at the University of Western Australia (UWA) in Perth. The position is a collaborative partnership between Kings Park and Botanic Garden (KPBG), the UWA School of Plant Biology and the Millennium Seedbank Project. The Millennium Seed Bank Project is an international collaborative plant conservation initiative aimed at safeguarding 24,000 plant species from around the globe against extinction. It is housed at the Royal Botanic Gardens (Kew, U.K.).

Researchers from around the world come to visit KPBG and study various aspects of plant biology, particularly western Australia's unique biodiversity. The new Biodiversity Conservation Centre houses scientists working in restoration ecology, seed biology, conservation genetics, propagation science, and orchid conservation. The landmark discovery of karrikinolide (from "karrik." Nyungar Aboriginal for smoke), a germination-stimulating



The Walcks on Penguin Island.

compound isolated from smoke, was made by KPBG and UWA scientists.

Southwestern Australia is one of the world's 25 biodiversity hotspots. It has a Mediterranean climate, is fire prone, and contains about 8,000 species of plants. Exploring naturally hard-to-germinate seeds from a variety of Australian species will be the primary aim of research for Jeff and his wife, Siti Hidayati, who is also a research fellow. Particular focus will be on understanding the mechanisms involved in dormancy break and germination in relation to fire ecology.

Aside from work, Jeff and his family are enjoying the sights of Australia. Perth has a lot of natural areas to explore. They have seen kangaroos, bobtails (a kind of skink), laughing kookaburras (and many other new birds), and dolphins and have enjoyed

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"From the Labs": A New Feature of *BioUpdate*

This year's issue of *BioUpdate* includes a new segment. "From the Labs" will highlight the research programs of Biology faculty members. Actually, "From the Labs" is a repackaging of information found in previous issues of the newsletter.

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Chair's Message

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of higher education for the past 20 years. Because of our rapid growth and lack of new construction, MTSU has far less space per student than any other TBR or UT-system university. Reviewers of our programs have been amazed at the level of faculty productivity and student performance under existing conditions. Each year, our needs for more modern labs increase as enrollments go up, current facilities age, and new technologies become available. In the late '90s, there was no funding for higher education capital projects due to a variety of economic difficulties and other funding priorities. Capital projects such as buildings are placed on a priority list and move up as projects at the top are funded. In the past several years, projects on the funding list have been completed and the MTSU science building moved up to be funded. As we neared the top a couple of years ago, construction costs escalated and the size of the building was cut from the recommended size by approximately 30 percent, even though our needs continued to increase. A project of over \$100 million is huge, but it has taken the past 40 years to get to this point. Current buildings should have been upgraded and expanded as needs became appar-

ent and were verified by campus planners and science consultants. Years of neglect have caught up with us and have brought a hefty price tag.

The message today is that the students and faculty of MTSU will continue to do outstanding work under trying conditions. But we truly believe that investments in science and technology education will contribute to and, in fact, drive the economy of the future.

On a brighter note, the department has enjoyed many successes. We had a large group of incoming freshmen and, overall, our number of majors continues to climb. One of our goals has been to increase student involvement in research projects including presentations and publications. Of 30 national peer-reviewed publications, 13 were coauthored with 5 undergraduate and 12 graduate students. Twenty-three undergraduate and 39 graduate students shared authorship of 57 of the 93 papers and posters presented this past year. All of these accomplishments are detailed in the new "From the Lab of" section of this year's **BioUpdate**. For the past couple of years, the faculty received record funding of grants and contracts, with new and continued funds totaling over \$4 million. Faculty

members continue to serve as journal editors, sit on editorial and advisory boards, and serve on executive committees of a number of societies. In 2007, faculty members reviewed over 70 manuscripts for journal publications, and many have also been busy with a number of outreach programs—over 200 service presentations, consultations, and training sessions were conducted last year. The tradition of leadership within the Tennessee Academy of Science continues, with Dr. Cindi Smith-Walters serving as president for 2008. Others, as well, have been involved in the academy, as you will discover elsewhere in this issue.

These are exciting times for the field of biology. We hope you can take pride in the accomplishments described in this edition of **BioUpdate** and share your successes in the future. As always, we encourage you to visit in person or on our newly updated Web page. [E](#)

George Murphy, chair

Departmental Logo Shirts and More

The department is selling shirts, coffee mugs, and water bottles that sport the departmental logo. The shirts come in five styles: a light tan short-sleeve or long-sleeve t-shirt with the logo on the front and an enlarged color logo on the back, a dark green short-sleeve or long-sleeve polo shirt with the logo on the front, and a long-sleeve denim shirt with the logo on the front. Several faculty members and students have been seen wearing the shirts. The coffee mugs are white with the logo in blue on both sides. The water bottles are 500 mL (16+ oz.) in blue plastic with a white logo.

T-shirts

Short-sleeve, \$10
Long-sleeve, \$12

Polo shirts

Short-sleeve, \$20
Long-sleeve, \$25

Denim shirts

(long-sleeve), \$28

Coffee mugs, \$3

Water bottles, \$4



Front logo on
Polo Shirt



Back Logo on T-shirt
(actual logo is in color)

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

Department Welcomes New Faculty and Staff

Sarah Bergemann



was born in Minnesota but grew up in Jefferson, Iowa. Following graduation from high school, she moved to Santa Cruz, California.

She received both her B.S. in botany and her M.A. in biology from Humboldt State University in Arcata, California. Her master's thesis was "The Ecology of the Pacific Golden Chanterelle, *Cantharellus formosus*." *C. formosus* is a mycorrhizal mushroom that partners with western hemlock and other conifers, usually in old-growth and second-growth forests.

Sarah received her Ph.D. in botany from the University of Wyoming–Laramie in 2002. Her dissertation was "Population Structure of *Russula brevipes* across Stands, Hosts, and Geographic Regions." *R. brevipes* is the most common of the *Russula* species in the western United States. After graduate school, Sarah returned to California, this time as a postdoctoral associate in the lab of Dr. Matteo Garbelotto at the University of California–Berkeley. The project was investigating interactions between *Phytophthora ramorum* and microbial

populations of oaks and tanoak. This five-year position was funded by the Betty and Gordon Moore Foundation.

Sarah came to MTSU in fall 2007 as assistant professor in population genetics. So far, she has taught the freshman course (BIOL 1110) and genetics. She is in the process of organizing a graduate-level course in analysis of genetic markers. Her research continues in the field of mycology, looking at the evolution and ecology of mycorrhizal fungi.

Outside the lab, Sarah likes hiking, camping, and travel. She has visited locales in Central and South America.

Ryan Otter



is a native of Monroe, Michigan (south of Detroit). He received his B.S. and M.S. in zoology from Michigan State University. His master's degree project was "Development

of a Macroinvertebrate Index of Biological Integrity for Lake Michigan Coastal Wetlands." Ryan earned his Ph.D. in environmental toxicology from Clemson University. His dissertation was "Spatial Characterization of Biomarkers in a Contaminated Watershed: Usefulness in Ecological

Risk Assessment." He completed an 18-month postdoctoral project in the Department of Zoology at Miami University in Oxford, Ohio. This research investigated mercury contamination in aquatic ecosystems.

His most recent research has been investigating the effects of urbanization on aquatic ecosystems, especially on aquatic vertebrates. Ryan assumed his assistant professor position at MTSU in fall 2007. He has taught the nonmajors biology course (BIOL 1030) and plans to offer a graduate course in environmental or aquatic toxicology.

This summer will be very busy for Ryan—he plans to get married in May to Liz Milroy, a physician's assistant in Murfreesboro, who is also from Michigan. They met while both were at Michigan State. Later this summer, Ryan will be participating in MTSU's International Education Program, for which he will be teaching the nonmajors biology course in Cherbourg, France, during Summer Session II.

He and his fiancée have purchased a home in Murfreesboro. Both enjoy the outdoors and bicycling. Ryan rides his bicycle to work every day that the weather permits. 🚲



New Building Update: An Interview with Stephen Wright

BioUpdate interviewed Dr. Stephen Wright, the departmental "shepherd" for the new science building, about plans and progress for the new facility. Although some details could not be divulged, Dr. Wright was very willing to discuss many aspects of the plans. We thank Steve for taking the time to answer our questions and help update everyone on the progress of the new science building. Throughout the past year, Steve has been very forthcoming in keeping everyone informed.

BU: Steve, you have been designated as the "building shepherd" for the planning, design, and construction of the new science building. What exactly is the "building shepherd"?

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An Interview with Stephen Wright

Continued . . .

SW: The shepherd's responsibilities are primarily facilitation and communication. I serve as liaison between the faculty, the architect designers, Campus Planning, MTSU administration, and the Tennessee Board of Regents. And, as the title implies, occasionally I need to encourage "strays" to join the rest of the flock.

BU: Where are we in the process right now?

SW: In the planning process, particularly one of this magnitude, there are milestones that must be reached before moving on. We have completed programming (distribution of square feet) and schematic design (rough layout of spaces) and have recently finished design development (space details). We are currently developing construction documents, which are very detailed drawings of each space. These documents will be completed by summer 2008, at which time the project will go out for bid if the state approves funding.

BU: There has been a lot of talk and wishful thinking during the past several years about a new building. When did we become aware that the new building would actually happen?

SW: I recall our first meeting, only a few months after I joined the department—November 1992. Over the years, there have been countless meetings, workshops, field trips, and reports. Persistence paid off when, in summer 2006, Governor Bredesen signed the state budget in a ceremony at MTSU. That budget included planning money for our science building as well as construction of a new chiller plant for the science building.

BU: How many members of the Biology Department have been involved in the planning of the new building? Are there any individuals that you wish to highlight?



An architectural image of the new science building is pictured looking at the northwest corner, the location of the main entrance and atrium.

SW: Most of the biology faculty has been involved in planning; faculty input is so critical in the design, and I'm thankful for my dedicated colleagues. Several faculty members have been closely involved with the process, serving as "champions" for particular spaces. These champions include Dr. Dennis Mullen (responsible for developing the education spaces, Dennis also serves on the building executive committee); Dr. Bruce Cahoon (responsible for cell and molecular/genetics and greenhouse spaces, Bruce is also a member of the executive committee); Dr. Vince Cobb (organismal); Dr. Gore Ervin (physiology); Dr. Mary Farone (microbiology); Dr. Amy Jetton (vivarium); and Dr. Jeff Leblond (molecular biosciences). The most crucial faculty member to the entire project—leading the effort over the past 15 years—is Dr. George Murphy, our chair. Dr. Murphy's commitment to our department is unsurpassed and, I believe, without his vision and leadership we would still be in the starting blocks rather than nearing the finish line!

BU: What architectural company is responsible for designing the new building? Have they designed any other buildings that we are familiar with here in middle Tennessee?

SW: The architects actually represent a joint venture team. This project has

benefited greatly from the services of Art Lidsky, president of the Boston firm Dober, Lidsky, and Craig (DLC), for programming. Einhorn, Yaffee, and Prescott (EYP), also out of Boston and led by Kip Ellis, were the consultants responsible for design. Both DLC and EYP are firms that specialize in the planning and design of science buildings. The Tennessee Joint Venture group includes the lead team of Thomas, Miller, and Partners; Hastings Architecture Associates; and engineering consultants I. C. Thomasson Associates. The construction manager for the project is Turner Universal. These local firms are not strangers to MTSU, having designed and constructed James E. Walker Library, the Campus Recreation Center, and the recent addition to the Cason-Kennedy Nursing Building.

BU: How large will the new building be? How much of the building will be allocated to the Biology Department? For comparison, what is our current space?

SW: The new building will be approximately 260,000 gross square feet (133,000 net square feet). Of the total net square feet, not including lecture rooms or shared spaces, Biology will have nearly 65,000. This is approximately 36,000 net square feet more than the existing 29,000.

NEW BUILDING UPDATE

BU: When were our current facilities, Wiser-Patton Science Hall and Davis Science Building built?

SW: Wiser Patton Science Hall was built in 1932 and Davis Science Building in 1967.

BU: What is the projected cost for the project? Does that include new furniture and equipment? Are we still within budget? Do you foresee any potential problems with respect to running over-budget?

SW: The cost of the new science building—planning, furniture, fixed equipment, materials, and construction—is approximately \$100 million. Being over budget is a problem that affects nearly every project and our science building is no exception. Construction costs are at an all time high (and grow up to 10 percent each year). This is why it is particularly important that the state provide funding for the science building as soon as possible.

BU: When the new building comes online, what will we have that we don't have now (besides more space)?

SW: There are a number of changes and opportunities that new facilities will provide:

- Something that has never happened in the history of the department is that all faculty, staff, and teaching assistants will be housed in the same building. Currently, Biology personnel are stationed in six different buildings across campus.
- A key feature of the building design is flexibility that will accommodate different teaching and learning styles as well as changes in research directions. In fact, having dedicated research

space for both faculty and students will be something new for us.

- Teaching and research technology will exist throughout the building. In addition to wireless Internet access everywhere, interactive learning technologies are planned for all classrooms and teaching laboratories. It's interesting that final decisions as to which technologies will be included won't be made until the very end of the project. This is to ensure that the most recent technological advances will be part of the project.
- Some things we won't have (and won't miss) are some of the distinct odors often associated with biology at MTSU—formalin-fixed specimens and the "delightful" aroma of autoclaved microbiology waste. The building will have state-of-the-art air handling systems that will not only get rid of noxious smells but will also provide fume hoods and plenty of safety stations for students and faculty.



Two Boston firms specializing in science buildings were consulted in the designing of MTSU's planned science facility. Bruce Calhoon (left) and Matthew Elrod-Erickson examine the model.

- While the new building will provide so many exciting opportunities for the department, it seems to me that it will be the students who will benefit the most. A number of spaces have been created for students—spaces that really don't exist anywhere else on

campus. In addition to a small food court in the atrium, there are a lot of spaces designated as "informal learning," "commons," and "write-up" areas. These are unique, technology-rich spaces where students can study, work in groups, or simply relax. I suspect that many of our current students have sore bottoms from sitting on the hallway floors waiting for their next class! In the new building, plenty of comfortable seating will be the norm.

BU: How "green" will the new building be? What environmentally-friendly characteristics will the new building have?

SW: The design team has striven to make the new science building as sustainable as possible. A great deal of attention has been given to energy-saving design and the inclusion of as much daylight as possible. While not seeking LEED (Leadership in Energy and Environmental Design) certification, the team's real goal has been a design that incorporates maximum sustainability.

BU: The Biology Department has been growing rapidly over the past several years. How many Biology faculty members will the new building accommodate? Will the new building limit our future growth as a department?

SW: The new building is planned to house 48 biology faculty members (we currently have 43 tenured/tenure track and temporary). In addition, the department will have four secretarial staff members, a lab director, a stockroom coordinator/media-maker, and an animal care technician. (This will be a new position since we don't have a vivarium now.)

BU: Where will the new building be located?

SW: The new science building will be located west of Walker Library. This

New Building

Continued . . .

site is currently occupied by Felder, Wood, Gore, and Clement dormitories. If funding were provided for 2008–2009, these student housing units would be demolished in summer 2008, representing the official start of construction. Construction is anticipated to be completed by spring 2011, and the first classes will be taught in fall 2011. The move into the new facilities will be done during the summer. Coincidentally, 2011 will also be the year of MTSU's centennial celebration.

BU: Which departments will move into the new building?

SW: The Departments of Biology and Chemistry will be housed in the new science building, leaving Davis Science Building (DSB) and Wiser Patten Science Hall (WPS) available for others. MTSU's master plan calls for DSB and WPS to be occupied by the Department of Physics and Astronomy and the Department of Geosciences. In addition, the classrooms will be available to the University community.

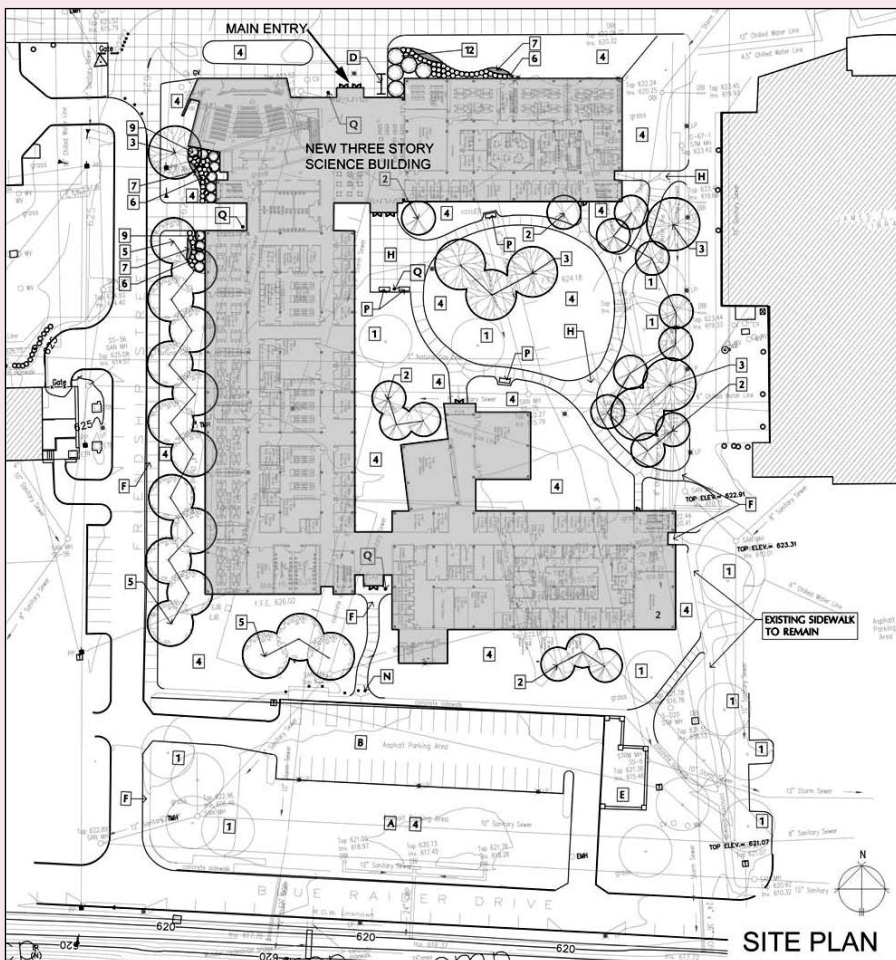
BU: How much equipment will be moved from DSB and WPS?

SW: All equipment (that works!) in the department will be moved into the new facility. The construction budget does not provide for new equipment other than fixed, specialty items (fume hoods, cold rooms, autoclave, etc.).

BU: Will the University be hiring a professional moving company to move equipment and faculty to the new building?

SW: Yes, a moving company will be responsible for relocating equipment related to teaching and research as well as faculty items. The construction company will provide utilities to all specialty equipment (water, drains, gas, etc.).

BU: Most buildings on campus have been named for an individual. Will that be the case for the new science building?



The approved site plan showing the "footprint" of the new building and adjacent landscaping is shown with other structures.

ing? Has a name or list of potential names been considered?

SW: To my knowledge, there has not been any consideration of individuals for whom the building might be named.

BU: Is there anything else about the building that you would like to add?

SW: There are a few additional things to note regarding the science building.

- The most pressing issue facing the science building is state approval of funding. Tennessee may be facing economic shortfalls in the next year and funds may not be available for construction. Legislative approval of the final state budget is not expected until late spring. We will continue to fine-tune our plans so that whenever funds are allocated construction can begin.

- In addition to the hard work done by so many faculty members to achieve

this building, the dream could not have been realized without unending support from Patti Miller (assistant vice president, Campus Planning), Jerry Preston (executive director, Office of Facilities Development, Tennessee Board of Regents), and our senior administration.

- While the new science building will house the Departments of Biology and Chemistry, it will also include a good deal of "shared space." These areas are designed to support future Ph.D. programs in computational science, math-science education, and molecular biosciences.
- This building is certain to be a jewel in the crown of MTSU and promises to be a facility that the state will take great pride in! 🏡

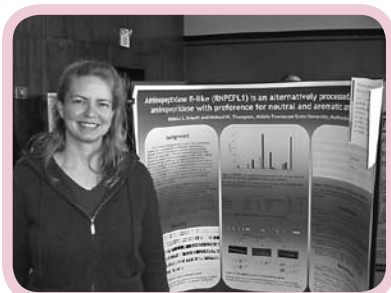
Biology Well Represented at Annual Scholars Week

MTSU Scholars Week was held April 2–6, 2007. The annual event originated as Scholars Day but has evolved into a week of activities including a variety of lectures, performances, hands-on learning showcases, exhibits, posters, and presentations. The overall goal of Scholars Week is to showcase the quantity, quality, and diversity of research and scholarly and creative activities across the University. It is a chance for the University community to see the activities and productivity of the various colleges and departments. The event involves a tremendous amount of planning and coordination; however, it was well worth the efforts of the planning committee because it was very well attended.

The Department of Biology displayed its diverse research programs: 21 biology faculty members along with 14 graduate students and 25 undergraduate students contributed in the presentation of 33 papers and posters on Friday at the University-wide exposition.

Faculty Presentations

Anthony Newsome, Rebecca Seipelt, and Michael Thompson presented “Apolactoferrin Inhibits Matrix Metalloproteinase-2 (MMP-2) by Zinc Chelation Mechanism.”



Rebecca Seipelt (above) and **Michael Thompson** presented “Arginyl Aminopeptidase-Like 1 (RNPEPL1) Is an Alternatively Processed Metalloproteinase with a Preference.”

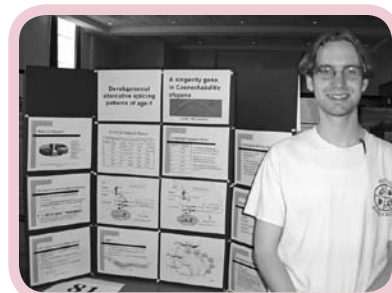
Jeffrey Leblond presented “Relationships between Sterol Composition and Evolutionary History in Dinoflagellates.”



Graduate Student Presentations

Jennifer Freimund and **Amy Jetton** (faculty) presented “Aldosterone Signal Transduction Pathways Regulating Serum and Glucocorticoid-Induced Kinase 1 (SGK1).”

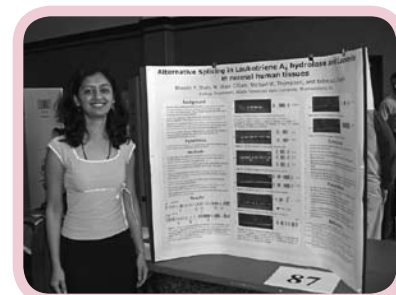
Daniel Roberts and **Amy Jetton** (faculty) presented “The Effects of Reduced Oxygen Breathing Induced Hypoxia on Error Rate in Civilian Aviation Simulators.”



Alexander Winfrey (above), **Chera Pierce** (undergraduate), and **Rebecca Seipelt** (faculty) presented “Developmental Alternative Splicing Patterns of AGE-1, a Longevity Gene, in *Caenorhabditis elegans*.”

Richard Sharpe and **Bruce Cahoon** (faculty) presented “Q(RT)2PCR for Relative Expression of Selected Genes along the Length of a *Zea mays* leaf.”

Richard Sharpe and **Bruce Cahoon** (faculty) presented “Preparatory Steps for *Daucus carota* Transformation with an O-Antigen Gene from *Shigella sonnei* for Plant Vaccines.”

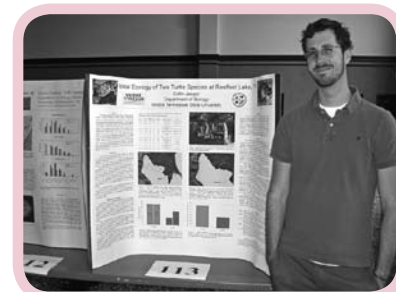


Bhoomi Shah (above), **Shain Gilliam**, **Michael Thompson** (faculty), and **Rebecca Seipelt** (faculty) presented “Alternative Splicing of Leukotriene A4 Hydrolase and Laeverin.”

M. Shea Cofer, **Jeffrey Walck** (faculty), and **Siti Hidayati** (staff) presented “Determinants of Species Richness and Exotic Species Invasion on Cedar Glades in Middle Tennessee.”

Stanton Belford presented “Baseline Coral Density Data: A Simple Way to Know What’s Out There.”

Carrie Casteel, **Collin Jaeger** and **Vince Cobb** (faculty) presented “Reproduction of Three Freshwater Turtle Species at Reelfoot Lake, Tennessee.”



Collin Jaeger (above), **Carrie Casteel**, and **Vince Cobb** (faculty) presented “Spatial Ecology of Two Turtle Species on Reelfoot Lake, Tennessee.”

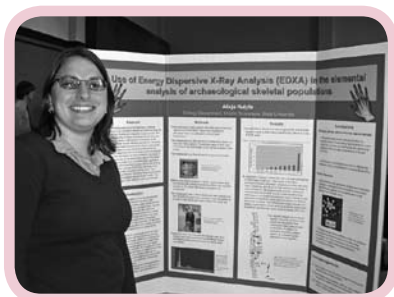
Graduate Student Presentations

Matthew Carver, Anthony Farone (faculty), and Mary Farone (faculty) presented "Sequencing and Phylogenetic Comparisons of the RPOB Gene of a Novel Bacterium."



Brock Arivett (above), Mary Farone (faculty), and Anthony Farone (faculty) presented "Mutagenesis and Expression of the Inosine-Uridine Hydrolase Gene from *Escherichia coli*."

David Olsen, along with undergraduates John Lewis, Megan Musick, Erin Archer, Christopher Davis, and Allison Cummings and faculty members Anthony Farone and Mary Farone, presented "Identification and Characterization of a Novel Amoeba-Associated Bacterium from a Sprinkler System."



Alicja Kutyla (above) and Marion Wells (faculty) presented "Use of Energy Dispersive X-ray Analysis (EDXA) in the Elemental Analysis of Archaeological Skeletal Populations."

Undergraduate Student Presentations

Jessica Garland and Mary Farone (faculty) presented "Occurrence and Genetic Diversity of Uncultured *Legionella* spp. in Hot Tub Water Samples."

Joy Young, **Eric Salmon**, and George Benz (faculty) presented "Colonization of Juvenile Lemon Sharks by Monogeneans."

Jason Hailey and Judith Shardo (faculty) presented "Differences in Muscle Alignment Affect Mobility in Quadrupedal and Bipedal Mammals."

Erin Archer, along with faculty members Frank Bailey, Rebecca Seipelt, and Michael Thompson, presented "Tryptophan356 and Asparagine362 Contribute to Proteolysis by Leukotriene A4 Hydrolase."



W. Shain Gilliam, Michael Thompson (faculty above), and Rebecca Seipelt (faculty) presented "Human Laeverin Is a Ubiquitously Expressed Metalloprotease that Is Alternatively Spliced."

Kristy Stanislav and Anthony Newsome presented "Overloading of the Ce(IV)/SiO₂ Solid-Supported Reagent."

Lisa Percy and William Stewart presented "Histological Analysis of Genetically Treated Non-adipocyte Precursor Fibroblast Cell Line."



Capri Pace (above), **Anthony McRaven** (above), and Jerry Reagan (faculty) presented "Cholesterol-Mediated Regulation of Acid Sphingomyelinase."

Scott Harris and Bruce Cahoon (faculty) presented "Chloroplast Nucleoid Visualization and Architecture."



Sweeti Bhakta (above) and Nicole Welch (faculty) presented "The Trials and Tribulations of Finding Polymorphic Loci in *Pinus pungens*."


Vivak Master and Stephen Wright (faculty) presented "Development of a Flow-Cell Biosensor Based on Surface Optical Waves."

Nate Brady and Stephen Wright (faculty) presented "DNA Interaction Analysis Using Multispot Array Biosensor Based on Surface Optical Wave Resonance."

Erin Archer, **Joshua Hughes**, Anthony Farone (faculty), and Mary Farone (faculty) presented "The Characterization of Amoeba-Associated Bacteria from Natural and Human-Constructed Water Sources."

Bahareh Tahriri and John Zamora (faculty) presented "A Comparison of the Antifungal Activity of Commercial Disinfectants."

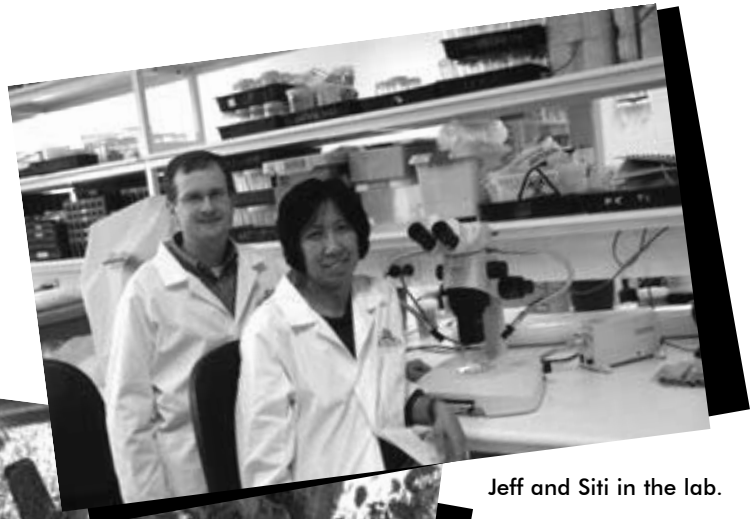
Justin Head and Amy Jetton (faculty) presented "Beating Heart Cells in Culture: Development of a New Lab for Physiology."

Heather Moss, **Matthew Neil**, **Krystal Weber**, **Elena Sanchez**, and Matthew Elrod-Erickson (faculty) presented "Making GFP-Fusion Constructs for Four Novel Yeast Genes Implicated in ER Protein Retention." 

Jeffrey Walck in the Land Down Under

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going on camel rides. Among many new and interesting plants, they have been fascinated with the diversity of carnivorous plants (about 15 taxa of sundew and the endemic byblis in a small nature preserve close to Perth), orchids (about 50 species in Kings Park), a parasitic tree (yes, a tree), the many different kinds of banksia and eucalyptus, and the large number of plant families endemic to Australia. So far, the Walcks are having a wonderful time exploring. You can keep up with them by visiting their blog at <http://walcks.blogspot.com/>.



Jeff and Siti in the lab.



Edwin petting a koala.

In Memoriam: Horace B. Reed Jr.

It is with great sadness that we report the death of Dr. Horace B. Reed Jr. Dr. Reed, age 84, died of multiple myeloma November 29, 2007, at his home in Murfreesboro. He was a native of Knoxville and is survived by his wife of 43 years, Helen Weaks Reed of Murfreesboro.

Dr. Reed was a light machine gunner in the 84th Infantry Division in Europe during World War II. He was twice awarded the Purple Heart and Bronze Star medals as well as five other decorations. He received his A.B., M.S., and Ph.D. degrees from the University of Tennessee and an M.A. from the University of Michigan. He won letters in track and cross-country as a student at the University of Tennessee and was captain of the cross-country team in 1947. For decades, he participated in long-distance races including marathons and ultramarathons.

He taught biology and zoology at the University of Maine and later at Shorter College in Rome, Georgia, where he was chair of the Division of Natural Sciences. In 1964, Dr. Reed came to Middle Tennessee State College, where he taught Introductory Biology, Human Anatomy and Physiology, Microbiology, Entomology, Advanced Invertebrate Zoology, Population Biology, Introduction to Graduate Study, and Biological Literature. His research was with brown recluse spiders. Other accomplishments were described in last year's (Spring 2007) *BioUpdate*.

At his request, his body was donated for medical science. This act shows his devotion to students and teaching. He will continue to help students learn biology and medicine, even after his death.



Featured Faculty Member: J. Padgett Kelly

J. Padgett Kelly has devoted his entire career to environmental education for both teachers and students at all levels, and he has consistently “given back” to the institutions that helped him on his academic journey.

Although Padgett was born in San Diego, California, he grew up in Tennessee. His father, James, was a chief petty officer in the U.S. Navy who was stationed in San Diego when Padgett was born but who moved his family to Dickson, Tennessee, shortly after. Padgett’s mother, Mary Elizabeth, worked for the Navy as a civilian administrator. Padgett attended Dickson High School and graduated without ever taking a biology course. However, during his first semester at MTSU, he took his first biology course under Dr. Wymer Wiser. That was all it took to get him hooked on biology. Padgett credits Dr. Wiser and Dr. John Patton, along with Professor George Allen, for turning him on to biology. After receiving his baccalaureate degree in 1967, Padgett stayed in the department as a master’s student under the mentorship of Dr. Marion Wells. (He was Dr. Wells’ first graduate student.) At the same time, he was teaching high school biology at his alma mater, Dickson High School. He completed his master’s in 1969 and headed to Mississippi State University in search of his Ph.D., which he received in 1975. His dissertation topic was “The Effects of Stream Channelization on Fish Species Diversity in the Luxapalila River in Mississippi and Alabama.”

He began his collegiate teaching career at Bethel College in McKenzie, Tennessee. There, he was a one-person biology department for four years. Padgett left the ranks of academia to become the state director of conservation education in Tennessee, in which



capacity he founded Project C.E.N.T.S. (Conservation Education Now for Tennessee Students). He presented workshops and developed curricular materials on conservation education for use throughout the state. He returned to collegiate teaching in 1991 with his appointment as professor in the Biology Department at MTSU. Since then, he has taught the nonmajors Biology course, the old Zoology course, Biology for Elementary Teachers. He has also taught Biome Analysis during summers in the Florida Keys and spring breaks in Maui. Padgett has conducted over 40 trips to Maui to look at coral reef fishes and the rainforests. He calls himself a “shameless Maui lover!” The most enjoyable part of his job is working with pre-service teachers in the Biology for Elementary Teachers course and the Biome Analysis course in the Florida Keys. His students credit him with turning them on to biology just like his mentors did for him. Global warming and other environmental pressures make it imperative that teachers be well-informed and excited to teach environmental biology, and Padgett has devoted his career to that mission.

Since 1991, Padgett has been codirector of the MTSU Center for Environmental Education (CEE). In this capacity, he has presented numerous workshops for both teachers and students, most

notably with the assistance of a 68-foot-long, inflatable humpback whale. He estimates he has given over 250 whale presentations to more than 200,000 high school students. During his time at Project C.E.N.T.S. and the CEE, he has presented workshops to more than 30,000 teachers. His most recent exotic workshops were for teachers in St. Lucia and Curacao in summer 2007.



Dr. Kelly’s teacher training workshops have taken him to several exotic locales. Here he’s in St. Lucia with St. Lucian teachers and Peace Corps workers (summer 2007).

Padgett’s work with environmental education has garnered him several local and national awards. In 2001, he received the Outstanding Teacher Award from the National Marine Educators Association (NMEA), the largest organization of marine educators in North America. In 2006, the NMEA elected him to its board of directors, making him the board’s only director from an inland state. His term on the board will extend until 2009. He is also cochair of the NMEA Conference Committee. Some of Padgett’s other awards include the 2005 Career Achievement Award from the Tennessee Environmental Education Association and the 2006 Outstanding Aquatic Educator Award from the Tennessee Educators of Aquatic and Marine Science. Padgett was notified in January 2008 that he was named Most Valuable Trainer by the Population Connection, a population education organization in Washington, D.C. Padgett has trained more teachers in this program in the past two years than anyone else in the

Alumni Are Making Their Marks!

Elvis Brandon (B.S. '86) was named dean of allied health at Volunteer State Community College in March 2007. He received the 2006–2007 Excellence Award from the National Institute for Staff and Organizational Development and was selected for the Regents Academic Leadership Institute for 2007–2008.

Sandra Brasfield (B.S. '99) was granted her doctoral degree from the University of New Brunswick in October 2007. Sandra's doctoral dissertation was "Investigating and interpreting reduced reproductive performance in fish inhabiting streams adjacent to agricultural operations." Dr. Brasfield is been employed by the U.S. Army Engineer Research and Development Center's Environmental Laboratory in Vicksburg, Mississippi.

Jeremy Dahmen (B.S. '03; M.S. '05) is a third-year graduate student in the molecular plant sciences program at Washington State University. He is working under Dr. John Browse in the Institute of Biological Chemistry, and his project consists of characterizing a group of genes believed to be involved in lipid and hormone metabolism in *Arabidopsis*. He interned at DuPont-Pioneer in Wilmington, Delaware, in summer 2007 as part of his fellowship, working

on seed oil modification in soybeans. Jeremy still follows Cleveland Indians baseball and attends many football and basketball games at WSU.

Sarah Castellanos Helbig (B.S. '87; M.S. '93) has been a medical technologist for 18 years in the hematology lab at Vanderbilt University Hospital.

Shannon Huff (B.S. '02) completed the accelerated nursing program at Union University in December 2006. She is working as an R.N. in the medical intensive care unit at Jackson-Madison County General Hospital in Jackson.

Jon Paul Johnson (B.S. '04) was accepted at Ohio College of Podiatric Medicine (class of 2011).

Daniel Lawrence (M.S. '05) has been admitted to the Ph.D. program in mycology at the University of Arizona.

Jaquicola Lott-Smith (M.S.T. '79) is a dentist working with Southwest Dental Group in Tucson. She has received the Women of Color Award in the field of medicine, the Provider of the Year Award, and the Warren Mohammad Award for Excellence in Dentistry.

Prima Patel (M.S. '07) is a clinical data associate in Nashville for Covance, a global drug development services company.

Erin Lewis Rohman (B.S. '99) received her M.D. in 2004 from East Tennessee State University, completed her internal medicine residency in 2007 at the University of Tennessee–Memphis, and began a two-year allergy/immunology fellowship at UT–Memphis in July 2007. Erin's father, Dr. Steve Lewis, continues to serve on the faculty of the Jones College of Business at MTSU.

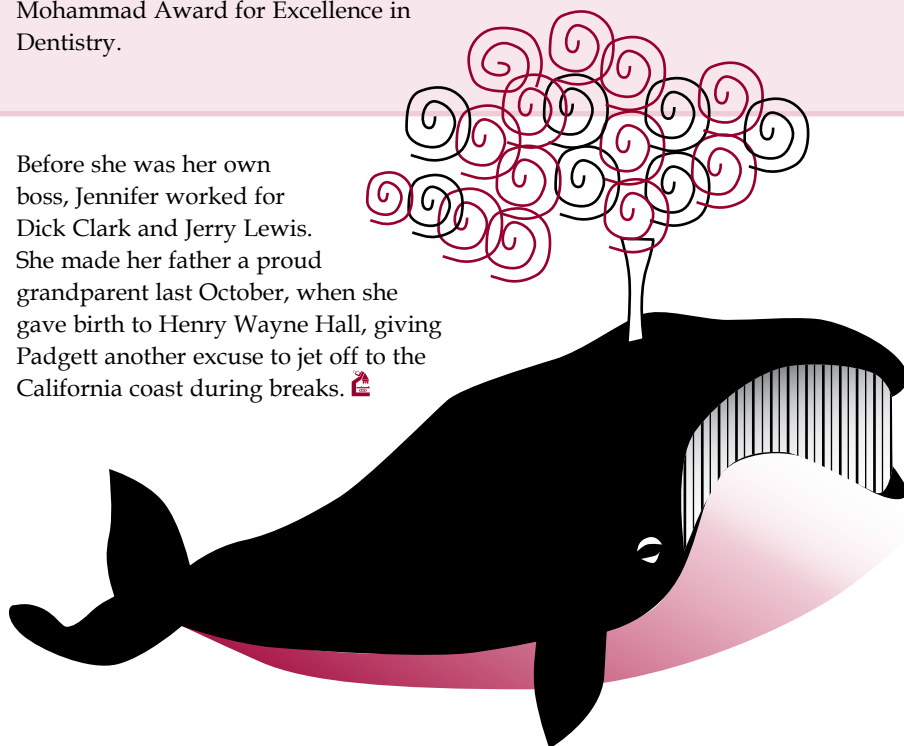
Cynthia Rohrbach (M.S. '97) is manager of the statewide Green Schools program at the Tennessee Department of Environment and Conservation, Office of Environmental Assistance. She began the position in 1999. A major aspect of the program is the EPA-funded School Chemical Cleanout Campaign, which is removing old, outdated, and often dangerous lab chemicals from Tennessee public and private schools. In June 2007, Cynthia received a National Notable Achievement Award from the EPA for the success of the campaign.

United States. He will be featured on the front page of the group's newsletter in an article about his work as a trainer.

When not teaching or giving workshops, Padgett enjoys fishing (in Maui, the Florida Keys, and at his place on Kentucky Lake). He says his favorite fish is anything that will bite! He also enjoys kayaking and golf. For the latter, he reports that he gets his money's worth—he pays the least amount in fees "per stroke" than most golfers!

His daughter, Jennifer, lives in Los Angeles and owns Kelly Films Limited, a movie production company that currently has three movies in the works.

Before she was her own boss, Jennifer worked for Dick Clark and Jerry Lewis. She made her father a proud grandparent last October, when she gave birth to Henry Wayne Hall, giving Padgett another excuse to jet off to the California coast during breaks. 🐳



"From the Labs":

A New Feature of BioUpdate

continued from the cover

This new segment brings together the research activities of the faculty, graduate students, and undergraduate students and notes collaborative projects in which they may be involved. Each faculty member who submitted information provided a statement about current research, lists of recent publications and presentations, recently completed student theses, and news from current and former students. We hope you like the new format and, as with any part of BioUpdate, we welcome your comments.



from the lab of

**Frank
Bailey**

The Bailey research group has been involved for several years in developing methods to determine the sources of fecal bacteria contamination in streams. Several graduate and undergraduate students (**Justin Anderson, James Farmer, Greg Larsen, Tory Woodyard**) as well as collaborators at Tennessee State University (Drs. Terrance Johnson and Anthony Ejiofor) have been involved with various aspects of this ongoing project. Graduate student **Tory Woodyard** is working on field validation of terminal restriction fragment length polymorphism (RFLP) as an effective fecal bacterial source tracking method. In addition, Dr. Bailey is working on a project in fecal bacterial source tracking in the Eagleville, Tennessee, area, funded by a contract from the Harpeth River Water Association.

Graduate student **Morgan Cook** is working on her thesis project investigating lead accumulation and ALAD activity in ground beetles (Coleoptera: Carabidae) found on or near dove fields at Arnold Air Force Base in Tennessee. Graduate student **Elizabeth Reed** is investigating the effects of aquatic plants on metal bioavailability to benthic organisms for her thesis topic. Graduate student **Amy Tolley** is finishing her thesis research on the effects of polychlorinated biphenyls on gonadal differentiation in the gray tree frog (*Hyla chrysoscelis*).

For the last two years Dr. Bailey, Dr. Vincent Cobb, and graduate student **Timothy Worrall** have been collaborating with Dr. Thomas Rainwater from Texas Tech University on a project to determine the extent of mercury and organochlorine accumulation in cottonmouths (*Agkistrodon piscivorus*) at sites along the Big Cypress Bayou near Caddo Lake, Texas (see accompanying photo). This is part of a larger project involving several universities examining mercury accumulation in the food chain at Caddo Lake and is partially funded by a grant from the Caddo Lake Institute. In a related project, Bailey, Cobb, and Matt Klukowski are examining the impact of human

disturbance on stress hormone levels in cottonmouths from this same area.

In the summer of 2006, Dr. Bailey received a StepMT Summer Research Team Award for a project titled "Evaluation of water quality improvement in Middle Tennessee streams due to use of riparian vegetated buffer strips and best management practices." This project involved undergraduate students **Deidra Lyons** and **Leonela Carriedo**, high school students Michael Bolton and Afrah Mohammed, and high school teacher **Chris Garner**. Garner is working on his master's thesis, "The influence of riparian zone width on water quality and stream macroinvertebrate communities," in Dr. Bailey's lab (see accompanying photo).

Even with all of the activities mentioned above, Dr. Bailey found time in fall 2006 to coach two Science Olympiad teams, "Science Crime Busters" and "Ecology," for St. Rose Catholic School. The teams placed first and third, respectively, in the regional competition.

Recent Presentations

Woodyard VA, Farmer JJ, Farone M, Johnson TL, Bailey FC. 2006. Field validation of terminal restriction fragment length polymorphism as an effective fecal bacterial source tracking method. Society of Environmental Toxicology and Chemistry North America 26th annual meeting in Montreal.

Reed EG, Bailey FC. 2006. Effects of aquatic plants on metal bioavailability to benthic macroinvertebrates. Society of Environmental Toxicology and Chemistry North America 26th annual meeting in Montreal.

Bailey FC. 2007. Use of fecal coliform bacteria and common sense to determine the sources of fecal pollution in streams around Eagleville, Tennessee. Eagleville, Tennessee, community meeting.

Bailey continued . . .



From left to right: Thomas Rainwater (Texas Tech University), Vincent Cobb, Frank Bailey, and Timothy Worrall (graduate student) after a day of sampling at Caddo Lake, Texas.



StepMT summer research team, 2006. From left: Michael Bolton, Deidra Lyons, Dr. Bailey, Chris Garner, Afrah Mohammed, and Leonela Carriedo.

Worrall TE, Cobb VA, Bailey FC. 2007. Variation in mercury and organochlorine contamination in cottonmouths (*Agkistrodon piscivorus*) along the Big Cypress Bayou of east Texas. Society of Environmental Toxicology and Chemistry North America 27th annual meeting in Milwaukee.

Recently Completed Theses

Street, Roger. 2006. Effects of the selective herbicide atrazine on egg viability, sex ratios, growth and development, mortality, and anatomical deformities in gray tree frogs (*Hyla chrysoscelis*). 74p.

Former Students

Justin Anderson (M.S. '05) is now in medical school at the University of Cincinnati.

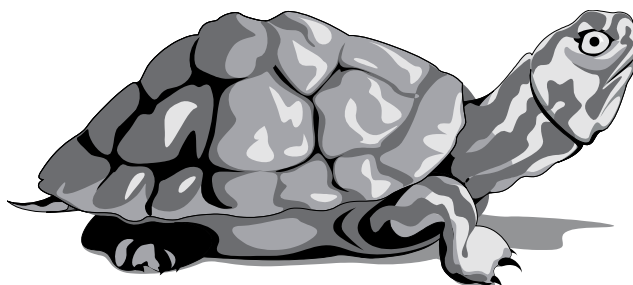
James J. Farmer (M.S. '97) completed his Ph.D. in biology at TSU in 2006. Dr. Farmer is an employee of the U.S. Geological Survey, Water Resources Division in Nashville.

Felicia Hix (M.S. '98) is now working for the state of Tennessee at the Fleming Training Center in Murfreesboro, where she teaches training classes for wastewater treatment plant operators.

Patrick Ihrle (M.S. '04) is working for the Tennessee Bureau of Investigation in the serology/DNA unit as a special agent/forensic scientist. He spends much of his time in the lab testing evidence submitted by law enforcement agencies. He is also on a violent-crime response team that goes to crime scenes to find, document, and collect evidence.

Dana Lingle (M.S. '99) works for Tetra Tech EMI in Nashville. The company specializes in environmental consulting and engineering services for government agencies and private clients in the U.S. and internationally.

Roger Street (M.S. '06) is an environmental scientist for the Center for Toxicology and Environmental Health (CTEH). Roger is working in environmental compliance, ground water, waste water, and surface water compliance. He is also a member of CTEH's Toxicology Emergency Response Program (TERP), which responds to emergency environmental situations and aids in regulation and cleanup.





from the lab of
**George
Benz**

Research in the Benz lab continues along two major avenues: (1) the morphology, systematics, and ecology of parasitic copepods collected from fishes around the world, and (2) the biology of sleeper sharks. Current research, including several student projects, involves collaboration with scientists outside MTSU. These include Dr. Stephen Bullard (Gulf Coast Research Laboratory), Dr. Gregory Deets (City of Los Angeles), and Dr. Gregory Skomal (Massachusetts Division of Marine Fisheries). George Benz once again participated as invited faculty at the Shark Reef Fish Medicine Seminar in February 2007 in Las Vegas, where he presented four hours of lecture on parasites of sharks.

Graduate student **Randy Stewart** continues his thesis research on the age and growth of the commercially fished blue catfish (*Ictalurus furcatus* LeSueur 1840) in heavily and lightly exploited Tennessee waters. Graduate student **Ken Ulicny** is researching the life-history variation and gene flow among populations of banded scuplin, *Cottus carolinae*, in surface and cave streams in middle Tennessee.

Graduate student **Andrew McElwain** participated in the fall 2007 National Marine Fisheries Service ichthyofauna survey of the eastern Gulf of Mexico aboard the NOAA ship *Gordon Gunter*. During the cruise, Andrew collected parasitic copepods and fish samples for Dr. Benz and also participated in general deck activities.

Members of the Benz lab once again participated in the Expanding Your Horizons in Science and Mathematics Conference at MTSU. Their workshop

for the fall event was called "Hands on Jaws." Those participating included undergraduate students **Amelia Crofts**, **Arezoo Doosthaghghi**, and **Clea Klagstad** and graduate students **Randy Stewart**, **Ken Ulicny**, and **Andrew McElwain**.

Recent Publications

Benz GW, Smith BE, Bullard SA, Braswell JS. 2007. New genus and species of eudactylinid (Siphonostomatoida, Copepoda) from gill lamellae of ornate eagle rays, *Aetomylaeus vespertilio* (Myliobatidae), collected in the Beagle Gulf off northern Australia. *Journal of Parasitology* 93: 32-38.

Benz GW, Hoffmayer ER, Driggers WB, Allen D, Bishop LE, Brown DA. 2007. First record of a sleeper shark in the western Gulf of Mexico and comments on taxonomic uncertainty within *Somniosus* (Somniosus). *Bulletin of Marine Science* 80: 343-351.

Recent Presentations

Eric Salmon, along with J. Young, G. Benz, S. Gruber, and S. Frasca presented a poster titled "Colonization of juvenile lemon sharks by monogeneans" at the 2007 MTSU Scholars Week in April.

Andrew McElwain won the Byrd-Dunn Student Paper Award for his presentation "In the nose of jaws: patterns of infection of the copepod *Kroeyerina elongata* on blue sharks," presented at the April 2007 annual meeting of the Southeastern Society of Parasitologists in Georgetown, South Carolina. Andrew presented a modified version of the presentation at the 2007 annual meeting of the American Elasmobranch Society in St. Louis.



Biology undergraduate student **Amelia Crofts** demonstrated several sets of shark's jaws to students during the "Hands on Jaws" workshop presented at the Expanding Your Horizons Conference.



Randy Stewart sampled flathead catfish as part of his thesis research.

Benz continued . .

Ken Ulicny, along with D. Stewart, A. McElwain, E. Salmon, S. Bullard, J. Cook, G. Skomal, H. Pratt, and G. Benz, presented "Proper sealing of Whirl-Pak®, Twirl'em®, and similar sample bags" at the April 2007 annual meeting of the Southeastern Society of Parasitologists in Georgetown, South Carolina.

Recently Completed Theses

Andrew McElwain recently defended his master's thesis, "Infection patterns of *Kroyerina elongata* Wilson 1932, Kroyeriidae, Copepoda, on the blue shark, *Prionace glauca* L. 1758.

Former Students

Joy Young (B.S. '06) is living in Philadelphia, where she is working as an environmental specialist for the city.



Andrew McElwain was part of an ichthyofauna survey in the Gulf of Mexico in 2007. He's shown with a scalloped hammerhead shark aboard the NOAA ship Gordon Gunter.



from the lab of
**Andy
Brower**

Dr. Brower received funding from the National Science Foundation to conduct phylogenetic and biogeographical studies on pronophiline butterflies (Lepidoptera: Nymphalidae: Satyrinae), which are native to South America. As part of that project, **Joshua Ogawa** (Ph.D. 2007, Oregon State University) has joined the Brower lab as a postdoctoral associate. Graduate student **Jess Matz** is working on a monograph of south temperate pronophiline butterflies. This past summer, undergraduate **Rebecca Guet** worked in the Brower lab on the molecular systematics of pronophiline butterflies. A fair amount of her time was spent helping Dr. Brower set up the lab and troubleshooting DNA extractions and PCR reactions. In collaboration with Dr. Brian Miller, Dr. Brower is beginning one project on the phylogeography of the streamside salamander in the Stones River watershed and another on the molecular systematics of troglodytic carabid beetles.

Dr. Brower received a College of Basic and Applied Sciences award for excellence in publication for 2006–2007. In addition, he moved his office to the Haynes House (Main Street) and, along with his wife, moved their horse farm (Oldenburg horses) to a log cabin on 14 acres in Christiana, Tennessee. Andy and Darlene were the proud pseudo-parents of a new foal in 2007 named Disco Volante.

Recent Publications

Beltrán M, Jiggins CD, Brower AVZ, Birmingham E, Mallet J. 2007. Do pollen feeding, pupal-mating and larval gregariousness have a single origin in *Heliconius* butterflies? Inferences from multilocus

DNA sequence data. *Biol J Linn Soc.* 92:221–239.

Brower LP, Oberhauser K, Boppré M, Brower AVZ, Vane-Wright RI. 2007. Monarch sex: ancient rites or recent wrongs? *Antenna* 31:12–18.

Elias M, Hill RI, Willmott KR, Dasmahaptra KK, Brower AVZ, Mallet J, Jiggins CD. 2007. Limited performance of DNA barcoding in a diverse community of tropical butterflies. *Proc R Soc London B.* 274:2881–2889.

Simonsen TJ, Wahlberg N, Brower AVZ, de Jong R. 2006. Molecules, morphology and fritillaries: a combined approach towards the phylogeny of *Argynnini* (Lepidoptera: Nymphalidae). *Insect Systematics and Evolution* 37:405–418.

Tree of Life Web pages: Brower AVZ. 2006–2007. Nymphalidae, Pieridae, Hesperidae, Lycaenidae, Riodinidae (and many included taxa: 1,400+ pages) Sept. 2006–Sept. 2007, in the Tree of Life Web Project, <http://tolweb.org/>.

Recent Presentations

Dr. Brower presented a paper at the Naturalis symposium in Leiden, Netherlands, in April 2007 and coauthored two papers presented at the Fifth International Butterfly Ecology and Evolution Symposium in Rome in July 2007.

Dr. Brower was an invited speaker at a meeting of the Kentucky Lepidopterists in December 2006.



from the lab of
**Bruce
Cahoon**

The Cahoon research team is working on several projects related to plant genetics and biotechnology. Graduate students **Rick Sharpe** and **Gregory Gu**, along with McNair Scholar **Sade Dunn**, have been working on dissecting the details of chloroplast gene expression and their relation to C4 photosynthesis in the bundle sheath and mesophyll cells of corn. (Gu graduated in December 2007.) Graduate student **Sheri Mersch** has developed a molecular genetic test to screen for fescue toxicity in grazing pastures. She has also demonstrated a direct link between fescue endophyte compounds and drought tolerance. Other undergraduate students conducting independent research studies are making constant progress toward completely sequencing fescue and switchgrass chloroplast genomes.

Recent Publications

Cahoon AB, Takacs EM, Sharpe RM, Stern DB. 2008. Nuclear, chloroplast, and mitochondrial transcript abundance along a maize leaf developmental gradient. *Plant Molecular Biology* 66:33-46.

Cahoon AB, Komine Y, Stern DB. 2006. Plastid transcription: competition, regulation and promotion by plastid- and nuclear-encoded polymerases. In Wise RR, Hoobe JD (eds.). *The structure and function of plastids. Adv. Photosynth. Respiration*. Volume 23: pp. 167-181.

Recently Completed Thesis

Gu, Gregory. 2007. Analysis of two RNA polymerases in maize chloroplasts. 53p.



from the lab of
Vince Cobb

The Cobb research team has been investigating reptile ecology in Tennessee and east Texas. The group has focused on two areas: (1) the thermal biology of snakes, and (2) the ecology of freshwater turtles. The snake projects have involved radio-tracking timber rattlesnakes and black racers in Rutherford County for examining thermoregulation, habitat selection, movement patterns, and home ranges. Additionally, feeding and digestion experiments are being conducted with speckled kingsnakes in the laboratory. The turtle projects have investigated the demography, growth, reproduction, home ranges/seasonal movements, basking activity, and hatchling biology at Reelfoot Lake in northwest Tennessee. To date, Cobb and colleagues have collected data on approximately 4,000 turtles at the lake.

Dr. Cobb has maintained collaborative efforts regarding rattlesnake ecology with Chuck Peterson's lab at Idaho State University. An additional collaboration has begun with **Dr. Frank Bailey**, graduate student **Timothy Worrall**, and Thomas Rainwater of Texas Tech University on mercury contamination and stress responses of cottonmouths in east Texas.

Graduate student research in the Cobb laboratory includes **Carrie Casteel** working on her project investigating the temporal influences of nest emergence on the locomotor performance of hatchling stinkpots and painted turtles; **Lacy Danikas** studying the thermal ecology of hibernation in the timber rattlesnake in Tennessee; **Collin Jaeger** looking at the spatial ecology of two freshwater turtles at Reelfoot Lake; **Diane Massey** investigating the effect of temperature

on feeding behavior and prey digestion in king-snakes; and Dr. Bailey's student, **Timothy Worrall**, studying the mercury and organochlorine contamination of cottonmouths in east Texas. Undergraduate student **Meggan Haase** (URSCP assistant) is conducting studies on the marking and recapture of turtles at Reelfoot Lake.

Last year, Dr. Cobb served as president of the southeastern division of the American Society of Ichthyologists and Herpetologists and continues as publications secretary for the Tennessee Herpetological Society. He received a College of Basic and Applied Sciences award for excellence in teaching for 2006-2007. He recently has taken over the role of advisor for the undergraduate biology honor society, Beta Beta Beta, following the departure of Dr. Nicole Welch.

Recent Publications

Hanna CJ, Cobb VA. 2007. Critical thermal maximum of the Green Lynx Spider, *Peucitia viridans* (Araneae, Oxyopidae). *J Arachnology* 35:193-196.

Neimiller ML, Glorioso BM, Young EL, Cobb VA. 2007. *Farancia abacura reinwardtii* (Western Mud Snake): Reproduction. *Herpetol Rev.* 38:207.

Cobb VA, Peterson CR. In press. Thermal ecology of hibernation in a population of Great Basin rattlesnakes, *Crotalus oreganus lutosus*. In Hayes WK, Beaman KR, Cardwell MD, Bush SP (eds.) *The Biology of Rattlesnakes*. Loma Linda (CA): Loma Linda University Press.

Cobb continued . .

Recent Presentations

Cobb V. 2006. Tennessee Snakes. Annual Meeting of Friends of Steele Creek Park, Bristol, TN.

Cobb V. 2006. Freshwater Turtles Populations at Reelfoot Lake. Annual Meeting of Tennessee Herpetological Society, Martin, TN.

Cobb V. 2007. Status of Turtles at Reelfoot Lake. Annual Nongame Meeting of Tennessee Wildlife Resources Agency, Chickasaw State Park, TN.

Casteel C, Jaeger C, Cobb V. 2007. Reproduction in Three Turtle Species at Reelfoot Lake, Tennessee. Annual Meeting of Southeast Partners in Amphibian and Reptile Conservation, Chattanooga, TN.

Casteel C, Jaeger C, Cobb V. 2007. Reproduction in Three Turtle Species at Reelfoot Lake, Tennessee. Annual Meeting of Association of Southeastern Biologists, Columbia, SC.

Casteel C, Cobb V. 2007. Reproduction in Three Turtle Species at Reelfoot Lake, Tennessee. Joint Meeting of Ichthyologists and Herpetologists, St. Louis.

Jaeger C, Cobb V. 2006. Preliminary Analysis of Movements and Home Ranges of Two Freshwater Turtles at Reelfoot Lake. Annual Meeting of Tennessee Herpetological Society, Martin, TN.

Jaeger C, Casteel C, Cobb V. 2007. Road Mortality Observations of Turtles and Snakes at Reelfoot Lake, Tennessee. Annual Meeting of Southeast Partners in Amphibian and Reptile Conservation, Chattanooga, TN.

Jaeger C, Casteel C, Cobb V. 2007. Spatial Ecology of Two Turtle Species at Reelfoot Lake. Annual Meeting of Association of Southeastern Biologists, Columbia, SC.

Jaeger C, Cobb V. 2007. Spatial Ecology of Two Freshwater Turtles at Reelfoot Lake. Joint Meeting of Ichthyologists and Herpetologists, St. Louis.

Worrall T., Cobb V, Bailey F, Rainwater T, Anderson T. 2007. Variation of Mercury and Organochlorine Contamination in Cottonmouths along the Big Cypress Bayou of East Texas. Joint Meeting of Ichthyologists and Herpetologists, St. Louis.

Former Students

Jeffrey Green (M.S. '05) is a member of the biology faculty at Nashville State Community College.

Chad Hanna (M.S. '05) is a Ph.D. student at the University of Louisville.

Brad Glorioso (M.S. '06) is a research technician for the Missouri Department of Natural Resources.

Jake Pruett (B.S. '06) is an M.S. student at University of Texas at Tyler.



from the lab of

**John
DuBois**

Dr. DuBois' research of late is more of consulting with others on various research projects. Since taking over teaching the Biometry course from Dr. Philip Mathis almost four years ago, Dr. DuBois has been consulted for statistical analysis of research data.

Collaboration with Dr. Anthony Newsome has involved investigating the effects of using chlorine dioxide as a sterilizing agent on high school and college football players' equipment. The initial findings of this study are being written up as a manuscript for publication in a sports medicine journal. Another project has involved helping undergraduate student **Leonela Carriedo** in the statistical analysis of her research data on kudzu. The project is looking at the effects of varying light intensity on the growth rate and leaf area of kudzu vines. Dr. DuBois has also been working with graduate student, **Alicja Kutyla** on her analysis of data for her investigation of age-related changes in the auricular surface of the sacrum in the human sacroiliac joint.

During the past year, Dr. DuBois has continued his efforts in the MentorNet program, mentoring fifth-year doctoral student Samantha Desmarais in the Molecular and Cellular Biology program at Dartmouth College. Her project in protein crystallography is trying to solve the structures of a couple of different motor proteins: a kinesin-like protein and a myosin VII homologue from *Dictyostelium discoideum*. This is Dubois' fifth year in the MentorNet program.

In November 2007, Dr. DuBois represented the MTSU chapter of Sigma Xi, the Scientific Research Society, at its annual assembly of delegates in Orlando. While there, he met with several chapter delegates from across the U.S. in a discussion of ways to increase awareness and membership in Sigma Xi. Also, he was a judge for student posters presented at the conference.



from the lab of
**Tony and
Mary
Farone**

The Farone research team is searching for novel bacteria in aquatic systems. This research is funded by the Environmental Protection Agency. The bacteria are unique in that they live within amoebae hosts. The team is collaborating with Dr. Sharon Berk at Tennessee Technological University in Cookeville. They are looking at organisms in a drinking water distribution system.



The Farone laboratory is very busy with several graduate and undergraduate student projects. Graduate student projects include that of **David Olsen**, who is studying the characterization of the novel bacterium HT99 in eukaryotic cells. **Brock Arivett** is investigating the mutagenesis of the IUNH gene of *Escherichia coli*. **Heather Hensley** is looking at the intracellular trafficking of the novel bacterial pathogen CC99.

Undergraduate student projects include that of **Allison Cummings**, who is investigating the infection of a human epithelial cell line with an intracellular pathogen isolated from a cooling tower as her Honors thesis. **Satree Khuanusuwan** is identifying bacterial pathogens of amoebae from environmental water sources. **Tu Vu** is studying the detection of mimivirus in a water distribution system. **Paul Jacob Bauer** is looking at the use of real-time PCR for the detection of nonculturable bacteria. **Tim Jacobs** is investigating intracellular growth of *Aeromonas hydrophila* in naturally occurring aquatic amoebae. **Sarah Schwartz** is studying the growth of *Aeromonas hydrophila* from the Stones River in the amoeba host *Acanthamoeba polyphaga*.

Mary Farone received a College of Basic and Applied Sciences award for excellence in presentations for

2006–2007. Tony received a College of Basic and Applied Sciences award for excellence in teaching for 2006–2007.

Recent Publications

Berk SG, Gunderson JH, Newsome AL, Farone AL, Hayes BJ, Redding KS, Uddin N, Williams EL, Johnson RA, Farisian M, Reid A, Skimmyhorn J, Farone MB. 2006. Occurrence of infected amoebae in cooling towers compared with natural aquatic environments: implications for emerging diseases. *Environ Sci Technol.* 40(23):7440–7444.

Farone AL, O'Donnell SM, Brooks CS, Young KM, Pierce JM, Wetzel JD, Dermody TS, Farone MB. 2006. Reovirus serotype-dependent inflammatory cytokine responses and replication patterns in a human monocyte cell line. *Viral Immunol.* 19(3):546–57.

Recent Presentations

Arivett BA, Farone MB, Kline P, Khaliq A, Sinakala Z, Quinn T, Farone AL. 2007. Mutagenesis and expression of the inosine-uridine hydrolase gene from *Escherichia coli*. 106th Meeting of the American Society for Microbiology, Toronto.

Hensley HM, Roden CM, Farone AL, Farone MB. 2007. The intracellular trafficking of a novel bacterium infecting the nuclei of eukaryotic cells. 106th Meeting of the American Society for Microbiology, Toronto.

Jackson JC, Farone MB, Farone AL. 2007. The detection of diarrheagenic enteropathogens in a population in rural Haiti. 106th Meeting of the American Society for Microbiology, Toronto.



from the lab of
Amy Jetton

Research in the Jetton lab continues in the field of endocrinology. Graduate student **Jennifer Freimund** completed her thesis research spring 2007 on aldosterone signal transduction pathways regulating serum and glucocorticoid-induced kinase-1 (*sgk1*) expression in murine kidney cells. In a different field, **Dan Roberts** completed his research on the effects of reduced oxygen breathing induced by hypoxia on error rate in civilian aviation simulators. (Roberts is a major in the U.S. Air Force.)

Undergraduate student **Justin Head** has been studying beating heart cells in culture. His research led to a presentation during the 2007 MTSU Scholars Week and the development of a new lab exercise to be used in Jetton's General Physiology course.

Recent Presentations

Freimund JA, Jetton AE. 2007. Aldosterone signal transduction pathways regulating serum and glucocorticoid-induced kinase-1 (*sgk1*) expression in murine kidney cells. The Endocrine Society's 89th Annual Meeting, June 2–5, Toronto, and during 2007 MTSU Scholars Week.

Roberts DA, Craig PA, Nauer FL, Jetton AE. 2007. The effect of reduced oxygen breathing induced hypoxia on error rate in civilian aviation simulators. 78th Annual Scientific Meeting of the Aerospace Medical Association, May 13–17, New Orleans, and during 2007 MTSU Scholars Week.

Head J, Jetton AE. 2007. Beating heart cells in culture: development of a new lab for physiology. 2007

Jetton continued . . .

Scholars Week (won second place for undergraduate research award).

Recently Completed Theses

Jennifer Freimund. 2007. Aldosterone Signal Transduction Pathways Regulating Serum and Glucocorticoid-Induced Kinase-1 (sgk1) mRNA in a Mouse Inner Medullary Collecting Duct Cell.

Daniel Roberts. 2007. The Effect of Reduced Oxygen Breathing Induced Hypoxia on Pilot Error Rate in Civilian Aviation Simulators.

Former Students

Jennifer Freimund (M.S. '07) is living in Carlsbad, California, and has started work for Zimmer Dental as a study monitor. She is involved in protocol devel-

opment, which involves research in either the clinical affairs department or the R&D unit.

Dan Roberts (M.S. '07) was promoted to major shortly after completion of his degree. He is stationed at the Pentagon as chief of Human Factors and Operational Safety for the U.S. Air Force.

Amy Mauritsen (B.S., '07) recently returned to Murfreesboro to "CLEP" her last American history course. Amy is doing well at UT-Memphis Medical School.

Jacob Acton (B.S. '06) and Sarah Hayes Jenks (B.S. '06) are both doing very well at UT-Memphis Medical School.



from the lab of
Matt Klukowski

The Klukowski research team has been focusing its efforts on the study of adrenal gland steroid hormones in squamate reptiles. Recent projects have involved the influence of season and adrenocorticotrophic hormone (ACTH) injections on the stress response in female fence lizards (*Sceloporus undulatus*) and the potential effects of acute temperature stress and sex on corticosterone levels in water snakes (*Nerodia sipedon*).

Students in Klukowski's lab include graduate student **Kyle Sykes**, who is completing a field study of the potential effects of acute temperature stress and sex on corticosterone levels in water snakes (*Nerodia sipedon*); and **Andrea Huff**, who is studying the behavior of captive giant anteaters (*Myrmecophaga tridactyla*) in response to enrichment at the Nashville Zoo at Grassmere.

Recent Publications

Phillips JB, Klukowski M. 2008. Influence of season and adrenocorticotrophic hormone on corticosterone in free-living female eastern fence lizards (*Sceloporus undulatus*). *Copeia*. In press.

Recent Presentations

Phillips J, Klukowski M. 2007. Influence of season and adrenocorticotrophic hormone on corticosterone in free-living female eastern fence lizards (*Sceloporus undulatus*). National Meeting of Ichthyologists and Herpetologists, St. Louis.

Sykes K, Klukowski M. 2007. Effects of acute confinement and temperature change on corticosterone levels in water snakes (*Nerodia sipedon*). National Meeting of Ichthyologists and Herpetologists, St. Louis.

Former Students

Julie Phillips (M.S. '06) has entered the Ph.D. program in quantitative and systems biology at the School of Natural Sciences at the University of California-Merced. She is working on northern elephant seals under the direction of Rudy M. Ortiz. The goal of her project is to elucidate the physiological machinery that northern elephant seals (*Mirounga angustirostris*) have evolved and adapted to inhibit or minimize the effects of oxidative stress as a result of sleep-apnea-induced hypoxia.





from the lab of
**Jeffrey
Leblond**

Research in the Leblond lab continues on lipids in dinoflagellates. Members of the lab are taking advantage of a recently purchased liquid chromatograph/mass spectrometer. Graduate student **Cynthia Gray** is finishing her thesis on chloroplast glycolipid diversity in dinoflagellates, and has presented her work at a recent meeting at Woods Hole. Undergraduate student **Shannon Roche** is in the process of finishing a study of non-phosphorus-containing membrane lipids in Chlorarachniophyte algae and will soon be writing up her work for publication.

Jeff and his wife, Leah, now have a second son, Elijah, born June 16, 2007 (8 pounds, 12 ounces).

Recent Presentations

Gray CG, Lasiter AD, Leblond JD. Glycolipid families of peridinin-containing dinoflagellates. Fourth

Symposium on Harmful Algae in the U.S., Woods Hole, MA, October 2007.

Former Students

Jeremy Dahmen is a third-year graduate student in the molecular plant sciences program at Washington State University. He is working with Dr. John Browse in the Institute of Biological Chemistry. His project consists of characterizing a group of genes believed to be involved in lipid and hormone metabolism in *Arabidopsis*. In summer 2007, Jeremy interned at DuPont-Pioneer in Wilmington, Delaware, working on seed oil modification in soybean. Jeremy continues following Cleveland Indians baseball (Go Tribe!) and attends many football and basketball games at WSU.



from the lab of
**Brian
Miller**

Dr. Miller's passion has been for understanding the life histories of amphibians, reptiles, and cave-dwelling organisms. He uses a variety of research tools (light microscopy, scanning electron microscopy, molecular genetics, etc.) to answer questions about species of interest. He is more interested in understanding the ecology and evolutionary biology of the organism than in the tool used to answer a question. Although he spends an inordinate amount of time studying salamanders, his most recent treks underground have reawakened an interest in cave life in general.

His students, as well, share his enthusiasm for research. Graduate student **Brooke Villeneuve** is studying the ontogeny of the dentition in the southern two-line salamander, *Eurycea cirrigera*. Graduate student **Daniel Estabrooke** is beginning a project on the natural history of the streamside salamander, *Ambystoma barbouri*, in middle Tennessee.

Recent Publications

Niemiller ML, Glorioso BM, Nicholas C, Phillips J, Rader J, Reed E, Sykes KL, Todd J, Wyckoff GR, Young EL, Miller BT. 2006. Status and distribution of the streamside salamander, *Ambystoma barbouri*, in middle Tennessee. *Am. Midl. Naturalist*. 156:394-399.

Niemiller ML, Glorioso BM, Miller BT. 2006. An eastern and subterranean maximum size record of the banded sculpin, *Cottus carolinae*, from Tennessee. *J. Tennessee Acad. Sci.* 81:41-43.

Niemiller ML, Miller BT. 2007. Subterranean reproduction of the southern two-lined salamander

(*Eurycea cirrigera*) from Short Mountain, Tennessee. *Herpet. Conserv. Biol.* 2:105-111.

McAllister CT, Bursey CR, Niemiller ML, Miller BT. 2007. A noteworthy infection of *Clinostomum complanatum* (Digenea: Clinostomidae) in a cave salamander, *Eurycea lucifuga* (Caudata: Plethodontidae), from north central Tennessee. *Texas J. Sci.* (in press).

Glorioso BM, Nicholas C, Phillips J, Rader J, Reed E, Sykes KL, Todd J, Wyckoff GR, Young EL, Miller BT. 2008. Notes on the reproduction of the streamside salamander, *Ambystoma barbouri*, from Rutherford County, Tennessee. *Southeastern Naturalist* (in press).

Miller BT, Niemiller ML. 2005. The Tennessee Cave Salamander Complex. In Schenck J, Brown S, Simon S (eds.) *NSS Convention Guidebook*. Huntsville (AL): National Speleological Society. pp. 91-94.

Niemiller ML, Miller BT. 2005. Common salamanders of Tennessee caves. *Tennessee Caver* 2:12-18.

Miller BT. 2008. The Salamander Pond. In Mitchell J, Reese J (eds.) *Courting the Wild: Love Affairs with Amphibians and Reptiles*. Ecos Systems Institute (in press).

Miller BT, Niemiller ML. 2008. Distributions and Relative Abundance of Tennessee Cave Salamanders (*Gyrinophilus palleucus* and *Gyrinophilus gulolineatus*) with an Emphasis on Tennessee Populations. *Herpetological Conservation and Biology* 3(1): (in press). (Selected to be the cover article.)

Miller continued . . .

Niemiller ML, Fitzpatrick BM, Miller BT. 2008. Recent Divergence-with-Gene-Flow in Tennessee Cave Salamanders (Plethodontidae: *Gyrinophilus*) Inferred from Gene Genealogies. *Molecular Ecology* (in press). (Selected to be highlighted in the News and Note Section of *ME*.)

Recent Presentations

Mccallum ML, Bury RB, Doody S, Germano DJ, Miller B, Saumure RA, Smith B, Trauth SE, Vogt RC, Wheeler BA. 2006. *Herpetological Conservation and Biology*: a journal dedicated to the conservation, ecology, and natural history of amphibians and reptiles. Joint Meeting of the Association of Ichthyologists and Herpetologists and the Society for the Study of Amphibians and Reptiles, New Orleans.

Doody S, Mccallum ML, Bury RB, Germano DJ, Miller B, Saumure RA, Smith B, Trauth SE, Vogt RC, Wheeler BA. 2006. *Herpetological Conservation and Biology*: a new journal devoted to the conservation of amphibians and reptiles. Australian Society of Herpetologists Conference, Healsville, Victoria, Australia.

Niemiller ML, Miller BT. 2006. Phylogenetics of the Tennessee cave salamander (*Gyrinophilus pallescens*) complex. Association of Southeastern Biologists, Gatlinburg.

Niemiller ML, Glorioso BM, Miller BT. 2006. Status and distribution of the streamside salamander (*Ambystoma barbouri*) in middle Tennessee. Association of Southeastern Biologists, Gatlinburg.

Niemiller ML, Miller BT. 2005. Molecular systematics of the Tennessee cave salamander complex, *Gyrinophilus pallescens*, based on the mitochondrial 12S rDNA gene. Eleventh Annual Tennessee Herpetological Conference, Lebanon.

Niemiller ML, Glorioso BM, Nicholas C, Phillips J, Rader J, Reed E, Sykes KL, Todd J, Wyckoff GR, Young EL, Miller BT. 2005. Notes on the reproduction of the streamside salamander, *Ambystoma barbouri*, from Rutherford County, Tennessee. Annual Meeting of the Tennessee Academy of Science.

Miller BT, Niemiller ML. 2007. The Streamside Salamander (*Ambystoma barbouri*) in Middle Tennessee: Geographically Isolated, Genetically Distinct, and Destined for Extirpation. Annual Meeting, SE Partners in Amphibian and Reptile Conservation, Chattanooga.

Miller BT. 2007. The Tennessee Cave Salamander: Distribution, Abundance, and Systematics. Tennessee Central Basin Grotto Meeting, Murfreesboro.

Former Students

Matt Jarrett is a scientist with Northside Foods in Atlanta.

Matt Niemiller is a Ph.D. candidate at the University of Tennessee.

Richie Wyckoff is a wildlife ecologist with ATA Conservation at Arnold Air Force Base.

Jeremy Speiss has been employed as a wildlife biologist on various projects since graduating.

Tamara Berthel is teaching at University School of Nashville since returning from fieldwork in South Africa.

John Lamb is an ecologist with ATA Conservation at Arnold Air Force Base.

Gary Gerald is a Ph.D. candidate at Miami University of Ohio.

Kurt Regester completed his Ph.D. at Southern Illinois University. Kurt was teaching in the Biology Department until recently, when he accepted a full-time, tenure-track position at Clarion University in Pennsylvania.



from the lab of

**Dennis
Mullen**

The Mullen research group is focusing primarily on understanding the impact that reservoir construction has on the small-stream ecosystems that flow into the reservoir. In addition to affecting the community structures of those streams, reservoirs have the potential to halt gene flow between stream populations that were once connected through the free-flowing river system. This creates a potential for genetic drift and extinction of these small populations. Additionally, along with his Aquatic Ecology class, Dennis is continuing to study the interactions between banded sculpin and crayfish in a small-stream ecosystem.

Graduate student research in the Mullen lab includes **Jessica Radar** investigating the effects of impoundment on fish communities of low-order streams in the Upper Elk River watershed in Tennessee. **Crystal Bishop** is studying an assessment of the potential for reservoir shorelines to serve as dispersal corridors between small-stream ecosystems draining into the reservoir. **Stanton Belford** recently defended his thesis, "Analysis of coral distribution and coral symbionts in a patch reef and fringing reef in the southern Caribbean."

continued on page 22

Mullen continued . . .

Recent Publications

Koczaja C, McCall L, Fitch E, Glorioso B, Hanna C, Kyzar J, Niemiller M, Spiess J, Tolley A, Wyckoff R, Mullen D. 2005. Size-specific habitat segregation and intraspecific interactions in banded sculpin (*Cottus caroliniae*). *Southeastern Naturalist*. 4(2):207-218.

Bishop C, Begley B, Nicholas C, Rader J, Reed E, Sykes K, Williams T, Young E, Mullen D. 2008. Shelter-use and interactions between banded sculpin (*Cottus caroliniae*) and bigclaw crayfish (*Orconectes placidus*) in stream pool habitats. *Southeastern Naturalist* (in press).

Recent Presentations

Bishop C, Begley B, Nicholas C, Rader J, Reed E, Sykes K, Williams T, Young E, Mullen D. 2006. Shelter-use and interactions between banded sculpin (*Cottus caroliniae*) and bigclaw crayfish (*Orconectes placidus*) in stream pool habitats. Annual Meeting of the Tennessee and Kentucky Chapters of the American Fisheries Society.

Recently Completed Thesis

Belford, Stanton. 2007. Analysis of coral distribution and coral symbionts in a patch reef and fringing reef in the southern Caribbean. 60p.



from the lab of
**Anthony
Newsome**

Dr. Newsome spent most of the past year investigating the bactericidal properties of chlorine dioxide. Chlorine dioxide has a long history of use as a disinfectant. It is used worldwide to treat drinking water and preserve food (especially fresh fruit and vegetables) and is used in the paper and pulp industry. Chlorine dioxide gas was also used to decontaminate several federal buildings contaminated with anthrax spores in 2001. Chlorine dioxide is approved by the EPA for use as an anthrax decontamination agent. Thus, there is increasing interest in the gas for potential use in a bioterrorism event. Unfortunately, the gas is too unstable to ship and must be made at the application site. Historically, this has also required the use of dedicated equipment and the training of personnel, limiting more widespread use of the gas. Several years ago, Anthony met several individuals from a small company named ICA TriNova. They had recently obtained the rights to a novel system of generating chlorine dioxide that does not require equipment or personnel training. One simply mixes a two-powder system together and chlorine dioxide is generated. Newsome was asked to help evaluate the bactericidal properties of this gas-generating system and explore novel applications that might become apparent due to its portability and ease of use. Support was received from ICA TriNova to evaluate the system's potential for use by the military. In addition, studies are underway to examine its potential for elimination of bacteria from a variety of sports equipment that could serve to transfer bacteria to humans. Results of some of these studies were recently on local TV. **Dr. John DuBois** has performed statistical analysis for the study, which should be published soon.

Most recently, Anthony has worked in conjunction with **Drs. Michael Thompson** and **Rebecca Seipelt**

to publish a paper in *Biochemistry and Cell Biology*: "Apolactoferrin inhibits the catalytic domain of matrix metalloprotease-2 by zinc chelation." They describe a previously unknown possible function for the protein lactoferrin. This protein is found in human secretions and in neutrophils. Graduate student **Trevor Wilson** has been studying the prevalence of the nematode parasite *Baylisascaris procyonis* in raccoons (*Procyon lotor*) of southern and middle Tennessee. Graduate student **Jason Palmer** has been investigating amoeba products promoting *Listeria* multiplication.

Recent Publications

Berk SG, Gunderson JH, Newsome AL, Farone AL, Hayes BJ, Reeding KS, Uddin N, Williams EL, Johnson RA, Farsian M, Reid A, Farone M. 2006. Occurrence of Infected Amoebae in Cooling Towers Compared with Natural Aquatic Environments: Implications for Emerging Pathogens. *Environ. Sci. Tech.* 40:7440-7444.

Newsome AL, McGhee CR. 2006. *Trypanosome cruzi* in Triatomines from an Urban and a Domestic Setting in Middle Tennessee. *J. Tenn. Acad. Sci.* 81:62-65.

Recent Presentations

Palmer J, Newsome A. 2006. Amoeba products promote *Listeria* multiplication. Am. Soc. Microbiol. Annual Meeting. Orlando.

Newsome AL. 2006. New Generation Technology for Chlorine Dioxide: A Role in Bioterrorism and Natural Disasters. Tennessee Homeland Security Consortium Meeting, Nov. 2006, Nashville.



from the lab of

**Jerry
Reagan**

Research in the Reagan lab has focused on sphingomyelin, a phospholipid that contains a choline headgroup, a sphingosine backbone, and long-chain, saturated fatty acids. While it is similar to phosphatidylcholine in some respects, its unique characteristics convey unique structural and functional properties, including a high affinity for cholesterol. Consequently, sphingomyelin and cholesterol have similar subcellular distributions and contribute to the formation of lipid rafts, membrane domains that house a number of signaling proteins. Cells also possess enzymes that hydrolyze sphingomyelin to yield ceramide and phosphorocholine. One of these enzymes, acid sphingomyelinase (aSMase), has a pH optimum of 4.5–5.0 and functions almost exclusively within lysosomes. The egress of LDL-derived cholesterol from the lysosomal compartment requires aSMase-mediated hydrolysis of sphingomyelin. Members of the Reagan lab are interested in learning how cholesterol regulates the activity of this important enzyme.

To study the cholesterol-mediated regulation of aSMase, Reagan and colleagues use Chinese hamster ovary (CHO) cells. These commonly used, functionally hemizygous cells are ideal because they are easy to grow and maintain; they are easy to transfect with cDNA's encoding proteins of interest; and it is possible to create mutant CHO cell lines that possess functional defects in genes of interest. Using normal CHO cells and CHO cells that express aSMase containing GFP or FLAG epitopes (tags placed on proteins that make the proteins much easier to see within cells), researchers follow the intracellular trafficking and activation of aSMase under various treatment conditions that alter cellular cholesterol content.

Collaboration with **Dr. Bill Stewart** involves ceramide, one of the products of sphingomyelin hydrolysis. It is a potent lipid second messenger involved in the regulation of cell growth and apoptosis. Utilizing a murine neuroblastoma cell line that

overexpresses aSMase, researchers are investigating the effects of altering aSMase activity on the induction of apoptosis.

Graduate student **Haley Rush** is finishing her research of aSMase trafficking. This year, she will complete her studies and write her thesis. Undergraduate student **Logan Key** is working on aSMase trafficking using the aSMase-GFP cDNA construct. Undergraduate student **Rod Teasley** is working on the neuroblastoma project with an emphasis on the apoptotic response to various stimuli. Undergraduate student **Adam Pflum** joined the lab this spring semester. Adam is working with Logan Key and Haley Rush on the aSMase trafficking project. New graduate student, **Kimberly Hammers**, also joined the group this spring and is working on the neuroblastoma project. The Reagan colleagues are in the initial stages of an exciting collaboration with **Dr. Bruce Cahoon** using a combination of cell biology and molecular biology techniques to unravel some of the mystery surrounding lysosomal biogenesis.

Recent Presentations

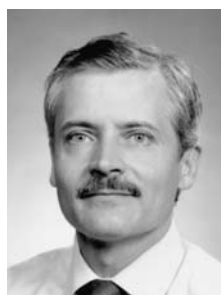
Reagan J. 2007. Analysis of Cyclodextrin-induced Cholesterol Efflux on Acid Sphingomyelinase Activity. 17th Annual Southeastern Lipid Research Conference in Callaway Gardens, GA, October.

Rush H. 2007. Analysis of Cyclodextrin-induced Cholesterol Efflux on Acid Sphingomyelinase Activity. 47th Annual Meetings of the American Society for Cell Biology in Washington, D.C., December.

Former Students

Shane McRaven (B.S., '07) is in medical school at LMU-DeBusk College of Osteopathic Medicine.

Capri Pace (B.S., '06) is in the Biology graduate program at MTSU.



from the lab of

**Wayne
Rosing**

Dr. Rosing continues his consulting and research in the identification of slime molds from the United States and locations across the globe. Recently, he has been investigating specimens collected in New Zealand and Australia that he received from a colleague at the University of Arkansas. He will soon receive tree and vine bark from Singapore collected by another colleague (at UC-Berkeley). Those specimens will constitute his next endeavor: researching the myxomycetes of the island state of Singapore.

Recent Publications

Rosing WC, Mitchell DW, Stephenson SL. 2007. Corticolous Myxomycetes from Victoria. *Australasian Mycologist*. 26(1):9–15.

Moreno G, Rosing WC, Mitchell DW, Stephenson SL. 2007. *Comatricha pseudonigra*, a new corticolous Myxomycete from Australia. *Boletín de la Sociedad Micológica de Madrid*. 31:171–175.



from the lab of
**Michael
Rutledge**

Dr. Rutledge continues his research into the acceptance and teaching of evolution by school teachers and university faculty. His past research has resulted in several publications that bring to light the weak presentation of evolution in schools. Mike also organizes and helps coordinate the freshman biology labs. In this capacity, he researches various methods for presenting biological concepts in the freshman biology laboratory.

Recent Publications

Rutledge ML, Sadler KC. 2007. Reliability of the 'Measure of Acceptance of the Theory of Evolution'

(MATE) Instrument with University Students. *The American Biology Teacher*, 69(6), 328–331.

Rutledge ML. 2007. Effectiveness of Elements of a Diversified Instructional Approach in an Introductory Biology Course. *Bioscene – The Journal of College Biology Teaching* (in press).

Recent Presentations

Rutledge ML. 2007. Experimental Design and the Nature of Science. AP Biology Teachers, as part of a Math-Science Partnership Teacher Excellence Grant.



from the lab of
**Becky
Seipelt**

The Seipelt research group has been studying the gene expression, function, biochemistry, and evolution of wild-type zinc metalloproteases and their inhibitors under normal and disease-state conditions in a variety of eukaryotic species.

Graduate student **Bhoomi Shah** has been investigating laeverin and leukotriene-A4-hydrolase and alternatively spliced human M1 metalloproteases. The Seipelt lab has been teeming with abundant undergraduate student research in recent years. **Shain Gilliam** worked on characterizing alternative splicing of the laeverin gene in 20 human tissues. Shain presented this work during MTSU Scholars Week in 2006. **Matt Schmidt** worked to construct recombinant baculovirus with the human ptgs2 gene, to infect insect cells, and produce recombinant protein for kinetic assays. This work will form the basis for Matt's Honors thesis and also received Undergraduate Research Scholarship and Creative Activity (URSCA) funding for summer/fall 2007.

Students **Tamara Augustine** and **Nick Saïtes**, along with Blackman High School student Brandon Ladd; former graduate student and now Smyrna High School teacher **Chris Garner**; SUNO undergraduate student Kevin Akor; and graduate student **Emily Vest**, worked in a StepMT research team to investigate aminopeptidase localization in normal joint; abnormal thyroid; and normal, abnormal, and metastatic breast tissue.

In classroom-related research, 20 students in Dr. Seipelt's spring 2007 Human Genetics class examined alternative mRNA splicing in genes selected by them using resources at the National Center for Biotechnology Information. They performed reverse transcriptase-polymerase chain reaction to identify whether alternative regions were used in human tissue mRNAs. Ten students in the spring 2007

Bioinformatics class contributed to several projects, including identification of three types of chloroplast gene promoters; investigation of genes relating to Alzheimer disease progression; examination of genes relating to the vagal nerve's role in diabetes; investigation of the effect of stress conditions on expression of yeast intron containing genes; and several phylogenetic analyses including oxytocin (orthologous), protein kinase C α (paralogous), prions (orthologous), and ERG1 and ERG9 (orthologous). Twenty-four students in the summer 2007 Genetics class performed northern blot analysis for regions of possible alternative mRNA splicing in human aminopeptidase genes.

Recent Publications

Thompson MW, Archer ED, Romer CE, Seipelt RL. 2006. A conserved tyrosine residue is essential for transition state stabilization in *Saccharomyces cerevisiae* leukotriene A4 hydrolase. *Peptides* 27:1701–1709.

Newsome AL, Johnson JP, Seipelt RL, Thompson MW. 2007. Apolactoferrin inhibits the catalytic domain of matrix metalloproteinase-2 by zinc chelation. *Biochemistry and Cell Biology* 85(5):563–572.

Recent Presentations

Thompson MW, Seipelt RL. 2007. RNPEPL1 is a ubiquitously expressed, alternatively spliced human M1 aminopeptidase with a preference for neutral and aromatic amino acids. Middle Tennessee State University Scholars Week.

Recently Completed Theses

Winfrey, Alexander. 2007. Developmental alternative splicing of the longevity gene *age-1*. 64p.

Former Students

Alexander Winfrey (M.S. '07) is working on alternative splicing in the comparative biomedical sciences Ph.D. program at Cornell University.



from the lab of

**Judith
Shardo**

Dr. Shardo is continuing her research on the comparative embryology of teleost fishes using scanning electron microscopy (SEM) to produce detailed descriptions of morphological development in embryos and larvae. Since morphological ontogenies of extant fishes are the result of adaptive and evolutionary changes modifying their ancestral development, comparisons of developmental patterns among descendant species of a common ancestor can be used to reconstruct their history of changes and adaptations. Channel catfish is the species used in this research, which is supported by an MTSU Faculty Research and Creative Activities Committee grant.

Alicja Kutyla, a graduate student in Dr. Shardo's lab, has completed much of her thesis research on identi-

fying age-related changes in the auricular surface of the sacrum in the human sacroiliac joint. Alicja spent part of the past summer measuring specimens of the Terry Collection at the Smithsonian Natural History Museum. She was awarded a Smithsonian Graduate Student Fellowship to support her research. Alicja will be presenting her work at the 2008 annual meeting of the American Association of Physical Anthropologists.

Sara Serati, an undergraduate student mentored by Dr. Shardo, spent the summer of 2007 using scanning electron microscopy to compare the porosity and microstructure of insoluble collagen pads used for surgical implantation. This project was supported by BioMimetics Therapeutics of Franklin, Tennessee, and an NSF STEP grant to MTSU.



from the lab of

**Michael
Thompson**

The Thompson research team has been interested in the molecular mechanism of proteolysis in the regulation of inflammation. The focus of the group is the molecular mechanism of leukotriene A4 hydrolase (LTA4H), a bifunctional aminopeptidase that produces leukotriene A4, a chemotactic compound for neutrophils. In collaboration with **Drs. Rebecca Seipelt** and **Anthony Newsome**, researchers are studying interactions between matrix metalloproteinase-2 (MMP-2) and lactoferrin, and have uncovered a previously undescribed inhibitory interaction between the two molecules. In additional collaboration with Dr. Seipelt, Mike and undergraduate student **Stacy McMurray** are characterizing arginyl aminopeptidase-like 1 (RNPEPL1), a novel aminopeptidase similar to LTA4H. Stacey is analyzing potential dimerization reactions of RNPEPL1. Undergraduate student **Courtney Thompson** is studying the structural characteristics and halide ion kinetics of leukotriene A4 hydrolase mutant N362E.

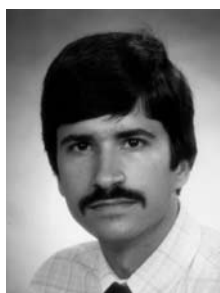
Mike is also involved in writing textbooks. Soon, he will be a coauthor of *Biology* (10th edition) and *Essentials of Biology* (2nd edition), both with Sylvia Mader.

Recent Publications

Newsome AL, Johnson JP, Seipelt RL, Thompson MW. 2007. Apolactoferrin inhibits the catalytic domain of matrix metalloproteinase-2 by zinc chelation. *Biochemistry and Cell Biology* 85(5):563-572.

Recent Presentations

Thompson MW, Seipelt RL. 2006. Arginyl aminopeptidase-like 1 (RNPEPL1) is a ubiquitously expressed, alternatively processed metalloproteinase with preference for neutral and aromatic amino acids. American Society for Cell Biology, San Diego.



from the lab of

**John
Zamora**

The Zamora research group has been busy investigating the isolation and identification of various bacteria that utilize or degrade many different environmental compounds. Graduate student researchers have included **Bryan King**, who has finished his thesis, "Isolation and Identification of 2,4-Dichlorophenoxyacetic Acid-Degrading Bacteria." Bryan is now at the University of Tennessee-Memphis Medical School. **Adam Wright** is working with permethrin-degrading microbes. Permethrin is a man-made insecticide, structurally similar to a naturally occurring chemical called pyrethrum. The first part of this study was to determine if permethrin is toxic to microorganisms. After determining toxicity,

the aim was to determine which organisms actually were able to degrade permethrin and use it as an energy source. The final part of the study will be to determine which microorganisms can degrade permethrin most efficiently.

Michelle Drury is looking at toluene-degrading microorganisms. Michelle presented her research at the Tennessee Academy of Science and won third place. Toluene is a volatile, water-insoluble, aromatic hydrocarbon commonly used as an industrial solvent for paints, inks, and lacquers; it is subject to slow biological degradation. A recent toluene spill in Franklin, Tennessee, allowed for this unique study of

Zamora continued . . .

microbial toluene-degraders. Resulting natural and laboratory strain isolates may be useful for bio-remediation of toluene.

Efua Adetona is studying the antimicrobial and allelopathic properties of *Matricaria Recutita* L., or German chamomile, a member of the aster family. It appears that there are allelopathic chemicals in chamomile. The extracts did not lower the number of plaque-forming units per ml, thus indicating no antiviral activity. **Matt Goff** is investigating the antimicrobial and allelopathic properties of oregano (*Origanum vulgare*). **Nazra Haniff** is looking at the antimicrobial and allelopathic properties of *Camellia Sinensis*, the plant from which black tea, white tea, and green tea is made. (The difference between green tea, black tea, and white tea is in how the plant is processed.)

Laura Segars is studying the bacteriological water quality of areas on the Tennessee River and Wheeler Lake. She is testing several areas for the presence of coliform bacterial including *E. coli*. **Cayce Owens** is working with turmeric (*Curcuma longa*). In Ayurvedic medicine, turmeric is thought to have many medicinal properties. In India it is used as an antiseptic for cuts and burns. The purpose of this study is to see if extracts of this plant have antimicrobial, antiviral or allelopathic activity.

Clay Kennedy is working with formaldehyde in aqueous solutions, used as a disinfectant. The first part of this study is to determine how toxic formaldehyde is to microorganisms. The second part will be to determine if any microbes can degrade formaldehyde. The final part will be to measure levels of formaldehyde in river runoff. **Gina Sizemore** works for a food company. In food processing, there are particular stages that affect the quality of the final product. Gina is monitoring the levels of different bacteria at a food-processing plant in order to improve final quality. **Sana Shaikh** is trying to compare isolation methods of *Salmonella* from chicken, using the standard method as well as an alternative method that may be easier to perform. **Josh Newby** is testing pot pies to determine if microwaving actually kills *Salmonella* as effectively as conventional heating.

Recent Presentations

Patel P, Zamora JM. 2007. Pigment-production and hydrocarbon-degradation analysis of bacteria in the presence of motor oil. American Society for Microbiology International Meeting, Ontario.

Handerson A, Tahriri B, Zamora JM. 2007. Detection and elimination of *Escherichia Coli* from spinach. Tennessee Academy of Science Meeting, Volunteer State Community College, Gallatin.

Tahriri B, Zamora JM. 2007. Testing disinfectants for antifungal activity. Tennessee Academy of Science Meeting, Volunteer State Community College, Gallatin.

Drury M, Zamora JM. 2007. Isolation and identification of toluene-degrading microorganisms. Tennessee Academy of Science Meeting, Volunteer State Community College, Gallatin.

Haniff N, Zamora JM. 2007. Antimicrobial and allelopathic properties of *Camellia Sinensis*. Tennessee Academy of Science Meeting, Volunteer State Community College, Gallatin.

Goff M, Zamora JM. 2007. Antimicrobial and allelopathic properties of *Origanum Vulgare*. Tennessee Academy of Science Meeting, Volunteer State Community College, Gallatin.

Tahriri B, Zamora J. 2007. A comparison of the antifungal activity of commercial disinfectants. Scholars Week, Middle Tennessee State University.

Burrell E, Zamora JM. 2007. Toxicity and degradation of Sevin-10 insecticide. McNair Scholars Poster presentation, Middle Tennessee State University (second place).

Recently Completed Theses

Jefferson, Stacie N. 2006. Allelopathic and antimicrobial properties of *Tabebuia impetiginosa*. 110p.

Overcast, Andrea, 2007. Allelopathic and antimicrobial properties of *Yucca schidigera*. 122p.

Paschall, Randi. 2007. Testing for antiviral and antimicrobial properties of antiviral Kleenex. 62p.

Patel, Prima. 2007. Prodigiosin production and lipid degradation analysis of *Serratia marcescens* in the presence of motor oil. 145p.

Zeger, Nicholas S. 2007. Allelopathic, antimicrobial, and antibacterial properties of *Vitis rotundifolia*. 150p.

Center for Environmental Education

by Cynthia Allen and Cindi Smith-Walters

From conducting workshops abroad to publishing book chapters to getting wet feet in local streams, the faculty and staff at the Center for Environmental Education (CEE) has done it all. A highlight of 2007 was that WaterWorks!, the public awareness program promoting water quality coordinated by the CEE, received the **2007 Governor's Environmental Stewardship Award** in the Green Schools-Higher Education category. The award recognized the excellent outreach of the program to the public, specifically for TV, radio, and print ads. As an outgrowth of this success, the Tennessee Department of Environment and Conservation (TDEC) has become a sponsor of WaterWorks! and is funding the used oil and oil-recycling segment.

The Tennessee Department of Agriculture is working with the CEE to develop a **new, 32-page educational booklet for youth**, *Discover the Waters of Tennessee*, which will stress the importance of water, water quality, and water use across the three grand divisions of our state. Additional partners include National Project WET (Water Education for Teachers), a number of municipal separate storm sewer systems, and watershed groups across the state.

Although **Karen Hargrove**, former natural resources coordinator and WaterWorks! director, is no longer with MTSU or the CEE, she had an exceptional 2006-07 year. As an invited speaker, she represented the CEE at a number of state, regional, and international conferences. She received a special invitation to represent MTSU/CEE at the spring 2007 Governor's Land and Water Conservation Forum and the TDEC Social Marketing Conference and at a quarterly BOB (Building Outside the Box) meeting at the Capitol.

Amanda Sherlin and **Cynthia Allen**, CEE staff members, were active in a number of activities outside the office. These included representing the CEE at the state-sponsored Social Marketing Conference and distributing water quality information at Car Care Night at Nashville's Greer Stadium. The latter

event, hosted by WaterWorks! partner TDEC, served to raise awareness of environmental issues connected with vehicle maintenance, particularly the use of oil and other automotive fluids. Two surprising facts are (1) Tennesseans who change their own oil produce over 1 million gallons of used oil a year, and (2) it takes **42 gallons of crude oil** but only **1 gallon of used oil** to produce 2 ½ quarts of new, high-quality lubricating oil. That is environmental education!

Cynthia also coordinated her third NatureLink event in March. NatureLink is a weekend family camping event funded by the Tennessee Wildlife Federation and the Tennessee Wildlife Resources Agency (TWRA). This year, 17 inner-city families participated. The event encourages family bonding through interaction in various outdoor activities. Attendees learn about ecology, conservation, and water quality to help them become more involved in protecting Tennessee's natural resources.

Padgett Kelly, CEE codirector, was busy this past year as well. In addition to having a busy schedule conducting numerous whale programs and teacher trainings in the midstate, he traveled to the Caribbean at the invitation of the Caribbean Student Environmental Alliance and Project Learning Tree. At St. Lucia on the island of Curacao, he worked with 75 teachers as a part of Reef Fest, an event organized to benefit and promote coral reef conservation. St. Lucia was also a destination for teachers and Peace Corps volunteers who attended Kelly's sessions on watershed ecology and the effects on coral reefs. Dr. Kelly is highlighted in this year's *BioUpdate* as the featured faculty member on page 10.

The Tennessee Amphibian Monitoring Program (TAMP) is continuing to grow and produce results. In the past year, **Bob English**, state coordinator and an excellent emissary for the program, trained over 100 new volunteer "frog-loggers." The CEE was able to purchase several GPS units and handheld recorders for use by the volunteers on their



Cynthia Allen spread the WaterWorks! message at a booth on Car Care Night at a Nashville Sounds game.



Cynthia Allen and Sonia Harvat from Metro Water Services

assigned routes. Three new county records (all documented using the new recorders) have been approved and assigned catalog numbers and will be in the *Atlas of Amphibians in Tennessee*. Using funding from the MTSU Public Service Committee, the cassette "Vocalizations of Tennessee Frogs and Toads," was completely remastered using all-digital recordings and produced as a compact disc. Species nomenclature and narration was updated, and a new hypothetical species, southern toad, was added. All new practice choruses were added and a "Similar Sounding Species" section was included. Two thousand CDs were produced for distribution to TAMP volunteers and environmental educators.

A new section of MTSU's CEE Web site (<http://mtsu.edu/~mtsucee/TAMP2.html>) was created to promote TAMP. As always, data gathered by TAMP has been entered into both the North American Amphibian Monitoring Program database and a GIS-based TAMP database. Data from every stop on every route in the past year is view-

continued on page 28

Center for Environmental Education continued . . .

able on the TAMP database and can be queried and filtered. Close coordination with TWRA is a must for TAMP, and Bob does a great job. In fact, the program has produced such good results that **TWRA has renewed the contract for another three years.**

Cindi Smith-Walters, CEE codirector, is serving as president-elect of the Tennessee Academy of Science and was nominated for a Governor's Conservation Award in the higher education category. She is a member of a number of professional boards and committees and has been appointed by Governor Bredesen to a second term on the Keep Tennessee Beautiful Steering Committee. In fall 2006, **she was awarded the Tennessee Environmental Education Association's highest award, the TEEA Distinguished Service Award.** Last spring, through legislative appropriation, Dr. Smith-Walters worked with the Tennessee State University engineering faculty to coauthor a technical report, "Solid Waste Management in Tennessee: Diversion of Organic, Construction, and Demolition Material Wastes from Tennessee Class

I and Class IV Landfills." This report was delivered to the Tennessee General Assembly in February 2007.

In summer 2007, Dr. Smith-Walters served as a member of an advisory committee to the Tennessee State Department of Education and worked to revise the Tennessee State Science Standards in Ecology, Environmental Science, and Biology I and II. The new standards are to be approved and implemented within the next school year. Other activities keeping Cindi busy included reviewing manuscripts, writing and reviewing grants, and attending conference sessions for several international meetings.

The CEE just completed the year-long **Increasing and Enhancing Reading in the Content Area of Science** institute. Recognizing that students cannot learn science if they can't read the texts, Smith-Walters and **Kim Sadler** teamed up with MTSU College of Education and Behavioral Science professors Kyle Butler and Alyson Bass to target middle-grade science teachers. Over 30 participants from the midstate attended nearly

100 hours of professional development, where reading strategies were teamed with science content to provide a unique experience that can be duplicated by teachers in their own classrooms. Feedback has been phenomenal. A second grant application has been submitted and teachers continue to call and ask to be put on the waiting list. Nearly two dozen names have been compiled without any advertisement or promotion in midstate school districts. Word of mouth from very satisfied participants is the biggest reason for this success.

Smith-Walters and Sadler coauthored a book chapter along with Tracey Ring (MTSU College of Education and Behavioral Science) and Marrie Lassiter (Homer Pittard Campus School). Published earlier in the year, the chapter appeared in *Thinking Outside the Box: No Child Left Inside*, part of the National Science Teacher Association's Exemplary Science Programs series. Cindi attended the national meeting in St. Louis and participated in an authors session, where several of the chapter authors shared highlights of their particular programs. Sadler and Smith-Walters

Beta Beta Beta, Kappa Delta Chapter

Vincent Cobb, faculty advisor

Officers for 2007-2008

Megan Imboden, President
Dana Holbrook, Vice President
Rachel Lester, Secretary
Shannon Roche, Treasurer
Kelley Cartwright, Historian

The Kappa Delta Chapter of Beta Beta Beta spent the early portion of this year in a bit of turmoil. Former advisor Dr. Nicole Welch left the department last summer (2007) to continue her career in the Department of Sciences and Mathematics at the Mississippi University for Women in Columbus,

Mississippi. Dr. Vincent Cobb stepped forward to assume the advisor position, and the chapter is now back up and active this spring. Members continue to provide tutoring to General Biology and Anatomy and Physiology students.

Beta Beta Beta, Kappa Delta Chapter, Spring 2007 Seminars

Kenneth Catania, Vanderbilt University, "Sensory Biology of Star-Nosed Moles and Water Shrews," January 29, 2008.



Lee Dugatki, University of Louisville, "Mate Choice: The Interface between Genetic and Cultural Evolution," March 25, 2008.

Butch Brodie III, University of Virginia, "Time to Change the Channel: Coevolutionary Arms Races and Tetrodotoxin Resistance in Garter Snakes," April 15, 2008, 4:30 p.m., Davis Science Building, Room 100.

Matteo Garbelotto, University of California-Berkeley, "Decoding the Mysteries of Sudden Oak Death, the Worst Forest Epidemic of Our Times: Scientists at the Center of a Circus," April 22, 2008, 4:30 p.m., Davis Science Building, Room 100.

were also invited to present at the International Conference on Scientific Inquiry and Human Development in Beijing. Unfortunately, due to prior commitments they were unable to attend.

Kim Sadler has had an extremely productive and busy year. In addition to working on projects for the Center for Cedar Glade Studies (read about it elsewhere in this issue of *BioUpdate*), she has coauthored a chapter with Bonnie Ervin (wife of **Gore Ervin**) titled "Splash, Flash, Crank, Slide, Alive! Interactive Standards-Based Science Experiences for Pre-K through Second Grade at Discovery Center" published in *NSTA Monograph of Exemplary Informal Science Programs*. Another project completed in cooperation with Larry Sizemore, MTSU Grounds Services supervisor, and **Michael Rutledge** is an MTSU campus guide, *Tennessee Native Trees*, that uses GPS coordinates to identify the location of selected trees on campus. She continues her work with teachers and students of all ages and has several grant initiatives that keep her busy in the summer. Kim is working with TMSTEC on a three-year math/science

partnership grant to train middle school math and science teachers during a two-week summer institute and on several Saturdays throughout the year. Another exciting project is the three-year, NSF-funded Young Scientist Academy that has established after-school science clubs and a summer camp in five selected middle schools in Rutherford and Cannon counties. She continues to maintain the microscope and materials loan program through the Center for Environmental Education; over 120 microscopes have been "recycled" to area schools. Her outreach efforts have not gone unnoticed: Kim received the College of Basic and Applied Sciences Public Service Award for 2006–07.

Cindi Smith-Walters and Bob English received an MTSU Foundation Special Projects Award to develop the Four Season Virtual Tree Trail, based on the paved, handicapped-accessible tree trail at Barfield Park's Wilderness Station in Murfreesboro. During each season for the past year, Bob has been taking pictures and sound recordings. These visual and auditory cues will be integrated into a Web site where, from the comfort

of home, anyone can experience the sights and sounds of the trail. Viewers will virtually visit each of the 12 stations and, using a dichotomous key, be able to identify the trees. For viewers unfamiliar with scientific terms, a glossary feature will provide definitions with the click of a mouse. The site should be online by the middle of 2008.

Of course, you can always visit the actual tree trail at Barfield Park. Funding from the MTSU Public Service Committee Grant, International Paper Foundation, and the U.S. Environmental Protection Agency has paid for interpretive signage at each of the 12 stations along the paved trail. The signage is rotated seasonally so that visitors learn about different tree species throughout the year.

There simply isn't enough space in this edition of *BioUpdate* to detail all the efforts of CEE staff and faculty members. If you are interested in learning more, volunteering to be a "frog logger," or visiting the center, stop by the Fairview Building, Room 103, on Greenland Drive, or call (615)904-8575 or (615) 904-8133. 📍

Biology Club

Officers for 2007–2008

Daniel Tillman, President
Megan Hutchinson, Vice President
Shannon Barnes, Secretary
Adam Keasling, Treasurer
Nicki Luttrell, Activities Coordinator
John Zamora, Faculty Advisor

Former club members are continuing their studies or have entered career positions. **Bryan King** has started his first year of medical school at UT–Memphis; **Kimber Logan** has completed physician's assistant school; **Rebecca McWhirter** is a research assistant at Vanderbilt University; **Christina Nelson** is in her second year of medical school at UT–Memphis; **Prima Patel** and **Randi Paschall** are both working at Covance in Nashville; **Melanie Messina Wilk**

is clinical trials coordinator at Virginia Commonwealth University; and **Stacie Jefferson** is working as a biologist at WIL Research Laboratories in Ashland, Ohio.

Several student members presented their research at various local, regional, national, and international meetings.

Prima Patel presented "Pigment-Production and Hydrocarbon-Degradation Analysis of Bacteria in the Presence of Motor Oil" at the May 2007 meeting of the American Society for Microbiology in Ontario.

Andrew Handerson and **Bahareh Tahriri** presented their poster, "Detection and Elimination of Escherichia Coli from Spinach," at the November 2007 meeting of the Tennessee Academy of Science at Volunteer State Community College in Gallatin. At the same meeting, **Bahareh**

Tahriri presented her poster "Testing Disinfectants for Antifungal Activity."

Students presenting oral papers at the November, 2007 meeting of the Tennessee Academy of Science meeting included **Michelle Drury**, "Isolation and Identification of Toluene-Degrading Microorganisms"; **Nazra Haniff**, "Antimicrobial and Allelopathic Properties of Camellia Sinensis"; and **Matt Goff**, "Antimicrobial and Allelopathic Properties of Origanum Vulgare."

Additional presentations included **Bahareh Tahriri**, "A Comparison of the Antifungal Activity of Commercial Disinfectants," presented at MTSU Scholars Week; and **Eterial Burrell**, "Toxicity and Degradation of Sevin-10 Insecticide," presented at the McNair Scholars Poster Presentations. (Eterial won second place.)

Full-Time Temporaries and Adjuncts Ease Burdens of Growth

With increased enrollment come more courses. The need for instructors for these additional class sections is met primarily by full-time temporary and adjunct faculty. This academic year, the department again has hired eight full-time temporary faculty members and three adjunct faculty members. These numbers tie the departmental record set last academic year. Five of the eleven temporary/adjunct faculty members hold doctoral degrees, and the other six hold master's degrees. Dr. Wells, serving this year as an adjunct, was a long-time, tenured member of the department until his retirement in 2002.

These faculty members are teaching Human Anatomy and Physiology I and II, Exploring Life (nonmajors biology), Microbiology, Genetics, Life Science for Elementary Teachers, Radiation Biology, and Environmental Regulations and Compliance. Considering the expertise 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 fills in for research faculty who have received grants and/or contracts that include release time. The department is grateful for their help.

Full-Time Temporary Faculty

Steve Edwards, B.A. 1973, Ph.D. 1980, University of California-San Diego. Teaching Biology 2010, Human Anatomy and Physiology I.

Angela Malone, B.S. 1998, University of Tennessee-Martin; M.S. 2002, MTSU. Teaching Biology 2010 and 2020, Human Anatomy and Physiology I and II.

Amy Massengill, B.S. 1993, Stetson University; D.V.M. 1997, University of Florida. Teaching Biology 2010 and 2020, Human Anatomy and Physiology I and II.

Mary Penuel-Matthews, B.S. 1992, M.S. 2002, Middle Tennessee State University. Teaching Biology 2010 and 2020, Human Anatomy and Physiology I and II.

David Powell, B.S. 1999; M.S. 2002, Middle Tennessee State University. Teaching Biology 2230, Microbiology; Biology 3250, Genetics; and Biology 3000, Life Science for Elementary Teachers.

Kurt Regester, B.S. 1990, Clarion University of Pennsylvania; M.S. 2000, Middle Tennessee State University; Ph.D. 2007, Southern Illinois University. Teaching Biology 1120, General Biology;

Biology 2010, Human Anatomy and Physiology I; and Biology 3070, Biology Seminar on Environmental Problems.

Teresa Stegall-Faulk, B.S. 1997, M.S. 2000, Middle Tennessee State University. Teaching Biology 2010 and 2020, Human Anatomy and Physiology I and II.

Michael Thompson, B.S. 1993, University of Louisville; Ph.D. 2000, University of Kentucky. Teaching Biology 2010, Human Anatomy and Physiology I, and Biology 3250, Genetics.

Adjunct Faculty

Bipin Agarwal, B.Sc. 1975, Bareilly College (Agra, India); M.E. 1981, University of Virginia. Teaching Biology 4150, Radiation Biology.

Stephen Maloney, B.S. 1971, M.S. 1974, Middle Tennessee State University. Teaching Biology 3220, Environmental Regulation and Compliance.

Marion Wells, B.S. 1960, M.S. 1963, Memphis State University; Ph.D. 1971, Mississippi State University. Teaching Biology 4290, Scanning Electron Microscopy; Biology 6290, Advanced Scanning Electron Microscopy; Biology 4360, Energy Dispersive X-Ray Analysis; and Biology 6410, Advanced Transmitting Electron Microscopy.

Students Accepted to Professional Schools, Fall 2007

We're pleased to announce the acceptance of 13 biology majors into medical programs for fall 2007. These students are in programs leading to the M.D., O.D., D.O., D.D.S., Pharm.D., and D.C. degrees. Congratulations and best wishes to all!

John Cheesbrow, School of Medicine, St. Louis University

Wendy Craven, School of Medicine, University of Health Sciences Antigua

Adrienne DeWerff, College of Medicine, University of Tennessee

Jamie Falana, College of Pharmacy, University of Tennessee

Raymond Holmes, College of Dentistry, University of Tennessee

Bryan King, College of Medicine, University of Tennessee

Phillip Marlow, College of Chiropractic, Logan University

Vivak Master, College of Medicine, University of Tennessee

Shane McRaven, DeBusk College of Osteopathic Medicine, Lincoln Memorial University

Trey Pegram, College of Medicine, University of Tennessee

Kristen Slappey, DeBusk College of Osteopathic Medicine, Lincoln Memorial University

Elizabeth Thompson, School of Medicine, University of Alabama-Birmingham

Larry Waldrop, College of Medicine, East Tennessee State University

Graduate Teaching Assistants for 2007–2008

For the 2007–2008 academic year, the department is able to provide support to 26 outstanding graduate students who serve as graduate teaching assistants (GTAs). Eighteen of these students have received their undergraduate degrees from colleges and universities other than MTSU. Seven of this year's assistants hold baccalaureate degrees in subjects other than biology (behavioral sciences, chemistry, natural resources management, physics, psychology, environmental science and technology, and animal health). Two GTAs (Stanton Belford and Diane Massey) hold two baccalaureate degrees and one (Laura Wanamaker) double-majored. 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 nonmajors biology course (BIOL 1030) and the majors freshman courses (BIOL 1110/1120), along with some sophomore and junior level laboratories.

Stanton Belford, B.S. in behavioral sciences/biology, Martin Methodist College

Carrie A. Casteel, B.S. in natural resources management, University of Tennessee–Martin

Morgan B. Cook, B.S.A. in biological science, University of Georgia

Lacy Danikas, B.S. in biology, Francis Marion University

Abby Drumwright, B.S. in biology, MTSU

Michelle Drury, B.S. in biology, MTSU

Daniel Estabrooks, B.S. in biology, University of Tennessee–Knoxville

Cynthia G. Gray, B.S. in chemistry, University of the South

Kimberly Hammers, B.S. in biology, Lipscomb University

Kelly Harris, B.S. in biology, University of Tennessee–Martin

Andrea Huff, B.S. in biology, University of Tennessee–Knoxville

John C. Jackson, B.S. in physics, University of Tennessee–Knoxville

Collin P. Jaeger, B.S. in biology, Western Illinois University

Alicja K. Kutyla, B.S. in biology, Cumberland University

Jenny Maloney, B.S. in biology, MTSU

Diane Massey, B.S./B.A. in biology/psychology, Minnesota State University

Jessica Matz, B.S. in biology, MTSU

David W. Olsen, B.S. in biology, MTSU

Jessica Rader, B.S., MTSU (minor in Environmental science and Technology)

Haley Rush, B.S. in biology, Louisiana State University

Rick Sharpe, B.S. in biology, MTSU

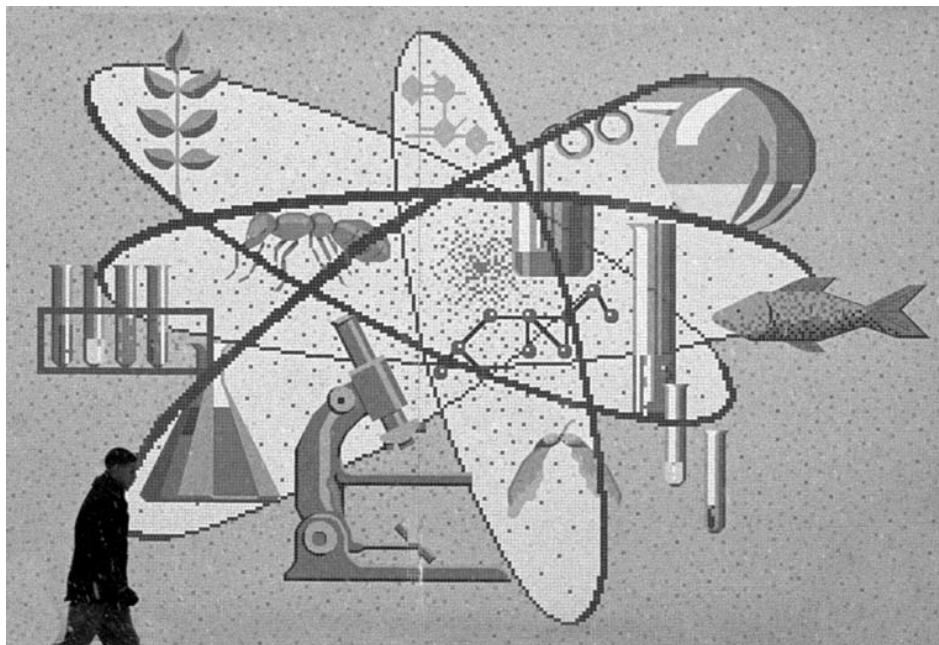
Randy Stewart, B.S. in biology, Martin Methodist College

Robert Trim, B.S. in biology, Lipscomb University

Kenneth Ulicny, B.S. in biology, Ashland University

Laura Wanamaker, B.S. in biology/chemistry, MTSU

Nicole Young, B.S. in animal health, Murray State University



BioUpdate

George G. Murphy, department chair

John D. DuBois, editor

Key contributors to this issue of *BioUpdate* were Cynthia Allen, Virginia McKnight, Kim Cleary Sadler, Becky Seipelt, Cindi Smith-Walters, Jeffrey Walck, Stephen Wright

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Biology Department Scholarship Winners, 2007

Each year the Biology faculty is honored to be able to work with outstanding students who excel in the classroom, present papers at scientific meetings, perform exceptionally well on national standardized tests, and conduct independent research. 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 Award

Merranda Holmes
Shannon Murphy

Ralph E. Sharp Outstanding Sophomore Award

Megan Hodorowicz

Philip M. Mathis Outstanding Junior Award

Allison Cummings
Katherine Schlicher

Peter I. Karl Outstanding Senior Award

Elizabeth Thompson

Kevin Driver Memorial Scholarship

Jena Paine-Medina

Elliott Dawson/BioVentures Biotechnology Scholarship

Erin Archer
Andrea Larsen

Maria de los Reyes Microbiology Scholarship

Sataree Khuansuwan

C. W. Wiser Medical/Allied Health Award

Erika Hall
Jenny Taylor

Sarah H. Swain Undergraduate Research Scholarship

Leonela Carriedo
Megan Imboden

George G. Murphy Research Scholarship

Alicja Kutyla
Kelly Harris

Stephen M. Wright Research Scholarship

Richard Sharpe

Kurt E. Blum Botany Research Scholarship

Richard Sharpe

John D. DuBois Scholarship

Kyle Sykes

Sarah F. Barlow Scholarship

Collin Jaeger

William H. Butler Jr. Graduate Research Scholarship

Stanton Belford
Alicja Kutyla
Andrew McElwain

Thomas E. Hemmerly Graduate Research Scholarship

Stanton Belford
Tim Worrall

John M. Zamora Graduate Research Scholarship

Jon Paul Johnson

Mary C. Dunn Graduate Scholarship

Alicja Kutyla
Laura Wanamaker

J. L. Fletcher Graduate Scholarship

Laura Wanamaker

Charles Holland Biology Club Scholarship

Andrew McElwain

J. Gerald Parchment Biological Field Station Scholarship

Stanton Belford

John A. Patten Scholarship

Heather Hensley
Collin Jaeger
Katelyn Thurow

Marion R. Wells Graduate Research Scholarship

Tim Worrall

Dennis Mullen Vertebrate Biology/Aquatic Biology Research Scholarship

Kenneth Ulicny

Brian Miller Graduate Research Scholarship

Tim Worrall

Padgett Kelly Research Scholarship

Kenneth Ulicny

Mary C. Dunn Freshman Scholarships

Danielle Millay
Chelsey Crowell

Patrick J. Doyle Freshman Scholarship

Channing Cantrell

Ellis Rucker Freshman Scholarship

Jessica Keck

TAS holds 117th Annual Meeting

The 117th annual meeting of the Tennessee Academy of Science was held November 15–16, 2007, at Volunteer State Community College in Gallatin. The Biology Department contributed an unusually low number of student and faculty papers (8) and posters (5) as compared to previous years. However, the department continues its strong support of the academy with a number of faculty members serving as officers, committee chairs, and committee members.

Faculty members serving as officers include Cindi Smith-Walters, president-elect, and Gore Ervin, managing editor of the academy's journal. Committee

chairs during the past year included Kim Sadler, Education Committee, and Charles McGhee, Fellows Committee. Former graduate students Karen Kendall-Fite and Mandy Carter-Lowe chaired the Membership Committee and Publicity and Research Committee, respectively. Additional service on committees was rendered by George Murphy (Necrology Committee), Cindi Smith-Walters (Education and Nominating Committees), and Kim Sadler (Publicity and Research Committee).

Cindi Smith-Walters, 2007 president-elect, welcomed members to the meeting. Dr. Linda Slakey from the National Science Foundation presented the opening symposium, "Directions in Undergraduate STEM Education." The 2007 plenary address was given by Kent Syler (B.S. '83), chief of staff for U.S. Representative Bart Gordon. Syler's address was "Rising Above the Gathering Storm."

Papers and posters presented are listed below with student authors or coauthors designated by asterisks and student presentation awards given in parentheses.

Papers

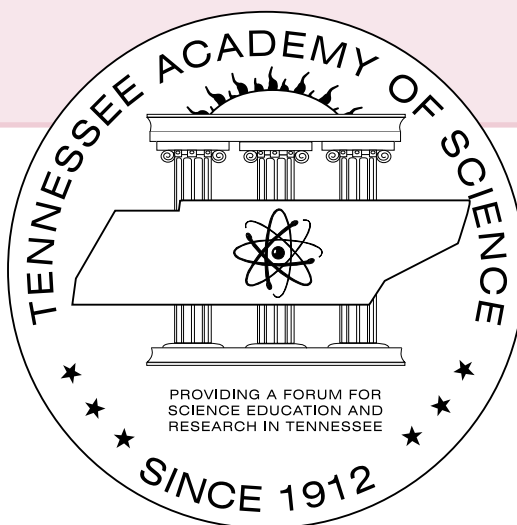
Thomas Hemmerly – "The Botany Section of the Tennessee Academy of Science, 1934–2007."

Anthony Newsome, J. P. Johnson, Rebecca Seipelt, and Michael Thompson – "Apolactoferrin Inhibits a Low Molecular Weight Isoform of MMP-2 By a Zinc Chelation Mechanism."

Kim Sadler – "Science Education and Business: BC3 Camp – A Model Partnership."

Kyle Sykes* and Matthew Klukowski – "Effects of Confinement and Temperature on Plasma Levels of Corticosterone in the Northern Watersnake, *Nerodia sipedon* (Colubridae: Natricinae)."

Charles McGhee – "Review of Nomenclature and Comments on the Genus *Leiobunum* (Arachnida: Phalangida: Sclerosomatidae) of North America."



Michelle Drury* and John Zamora – "Isolation and Identification of Toluene-Degrading Microorganisms." (Third Place, Microbiology Oral Presentation)

Matt Goff* and John Zamora – "Antimicrobial and Allelopathic Properties of *Origanum vulgare*."

Nazra Haniff* and John Zamora – "Antimicrobial and Allelopathic Properties of *Camellia sinensis*."

Posters

Michael Thompson – "Differential Localization of MMP-2 Isoforms in Autoimmune Thyroid Tissue."

Kristy Stanislav*, Anthony Newsome, and Marion Wells – "Alternative DNA Staining Strategies in Agarose Gel Electrophoresis in Forensic Analysis."

Katherine Barber* and Stephen Wright – "Detection and Differentiation of *Borrelia Species* Using a Novel Non-Fluorescence Based Biosensor." (First Place, Microbiology Poster Presentation)

Bahareh Tariri* and John Zamora – "Testing Disinfectants for Antifungal Activity."

Andrew Handerson*, Bahareh Tahriri*, and John Zamora – "Detection and Elimination of *Escherichia Coli* from Spinach." (Third Place, Microbiology Poster Presentation)

The 118th Annual Meeting of the Tennessee Academy of Science will be November 21–22, 2008, in conjunction with the Tennessee Science Teachers Association at the Sheraton Music City Hotel in Nashville.

Students Receive Valuable Training during Internships

Internships are a great way for students to get on-the-job training while they are still in school. Interns work in government labs or in private industry doing many of the things expected of full-time employees. At the same time, they earn college credit (BIOL 3200, two to four hours). Each student gains valuable experience to aid in making decisions regarding careers and/or further academic training. Internships are available during each semester and the summer. Several

new industry internship collaborations have been recently established. Due to the efforts of the Biotechnology Resource Group, internships are now available at Warner Laboratories, Biomimetic Therapeutics, Environmental Science Corporation, Human Genetics Computational Genomics Core Facility, and GenHunter. Interested students should contact Dr. Murphy or Dr. Seipelt. This past year's student interns, all under the direction of Dr. Seipelt, are listed below.

Spring 2007

Jeff Bellamy,

Orchid Cellmark, Nashville

Andrew Gould,

Esoterix Center for Innovation,
Brentwood

Jeri Shull,

Vi-Jon, Smyrna

Summer 2007

Lora Lowery,

MTSU Technology Transfer,
Murfreesboro

Chatoria Kent,

Vanderbilt University Genetic
Counseling Center, Nashville

Olivia Dees,

GenHunter Corporation, Nashville

Bhoomi Shah,

Orchid Cellmark, Nashville

Fall 2007

Katie Powell,

GenHunter Corporation, Nashville

Matthew Neal,

GenHunter Corporation, Nashville

Brittany Gibbons,

Orchid Cellmark, Nashville

Hanna Hanna,

Orchid Cellmark, Nashville

Theses Completed (2006-2007)

The Biology Department was pleased to have 12 graduates in the Master of Science in Biology program from December 2006 to December 2007. Nationwide, Middle Tennessee State University is a leader in producing master's level graduates. Thesis topics have included research on bacteriophages, bacteria, angiosperms, corals, amphibians, reptiles, fishes, and mammals. Students investigated pollution, morphology, floral and faunal diversity, physiology, molecular genetics, enzymology, and antimicrobial activity. Students, their graduation year, thesis titles, and faculty advisors are recognized below. A complete list of all 283 theses completed to date in the Biology Department can be found at www.mtsu.edu/~jddubois/3230/theses.html.

Belford, Stanton. 2007. Analysis of coral distribution and coral symbionts in a patch reef and fringing reef in the southern Caribbean. (Dennis Mullen, advisor)

Cofer, M. Shea. 2007. Determination of species richness and exotic species invasion on cedar glades in middle Tennessee. (Jeffrey Walck, advisor)

Freimund, Jennifer A. 2007. Aldosterone signal transduction pathways regulating serum and glucocorticoid-induced kinase-1 (sgk1) mRNA in a mouse inner medullary collecting duct cell. (Amy Jetton, advisor)

Gu, Gregory. 2007. Analysis of two RNA polymerases in maize chloroplasts. (Bruce Cahoon, advisor)

McElwain, Andrew. 2007. Infection patterns of *Kroyerina elongata* Wilson 1932, Kroyeriidae, Copepoda, on the blue shark, *Prionace glauca* L. 1758. (George Benz, advisor)

Overcast, Andrea. 2007. Allelopathic and antimicrobial properties of *Yucca schidigera*. (John Zamora, advisor)

Paschall, Randi. 2007. Testing for antiviral and antimicrobial properties of antiviral Kleenex. (John Zamora, advisor)

Patel, Prima. 2007. Prodigiosin production and lipid degradation analysis of *Serratia marcescens* in the presence of motor oil. (John Zamora, advisor)

Roberts, Daniel A. 2007. The effect of reduced oxygen breathing induced hypoxia on pilot error rate in civilian aviation simulators. (Amy Jetton, advisor)

Street, Roger R. 2006. Effects of the selective herbicide atrazine on egg viability, sex ratios, growth and development, mortality, and anatomical deformities in gray tree frogs (*Hyla chrysoscelis*). (Frank Bailey, advisor)

Winfrey, Alexander A. 2007. Developmental alternative splicing of the longevity gene age-1. (Becky Seipelt, advisor)

Zeger, Nicholas S. 2007. Allelopathic, antimicrobial, and antibacterial properties of *Vitis rotundifolia*. (John Zamora, advisor)

Center for Cedar Glade Studies

By Kim Cleary Sadler


The last report to *BioUpdate* from the Center for Cedar Glade Studies (CCGS) was submitted in 2005, when we were pleased to finally announce disbursement of funds from the Environmental Protection Agency after a two-year wait. (U.S. Representative Bart Gordon, D-Murfreesboro, announced in August 2003 that the U.S. House approved a \$200,000 appropriation to help establish the CCGS.) Biology faculty members **Thomas Hemmerly**, **Kim Cleary Sadler**, **Cindi Smith-Walters**, and **Jeff Walck** were responsible for the initial organization and development of the proposal.

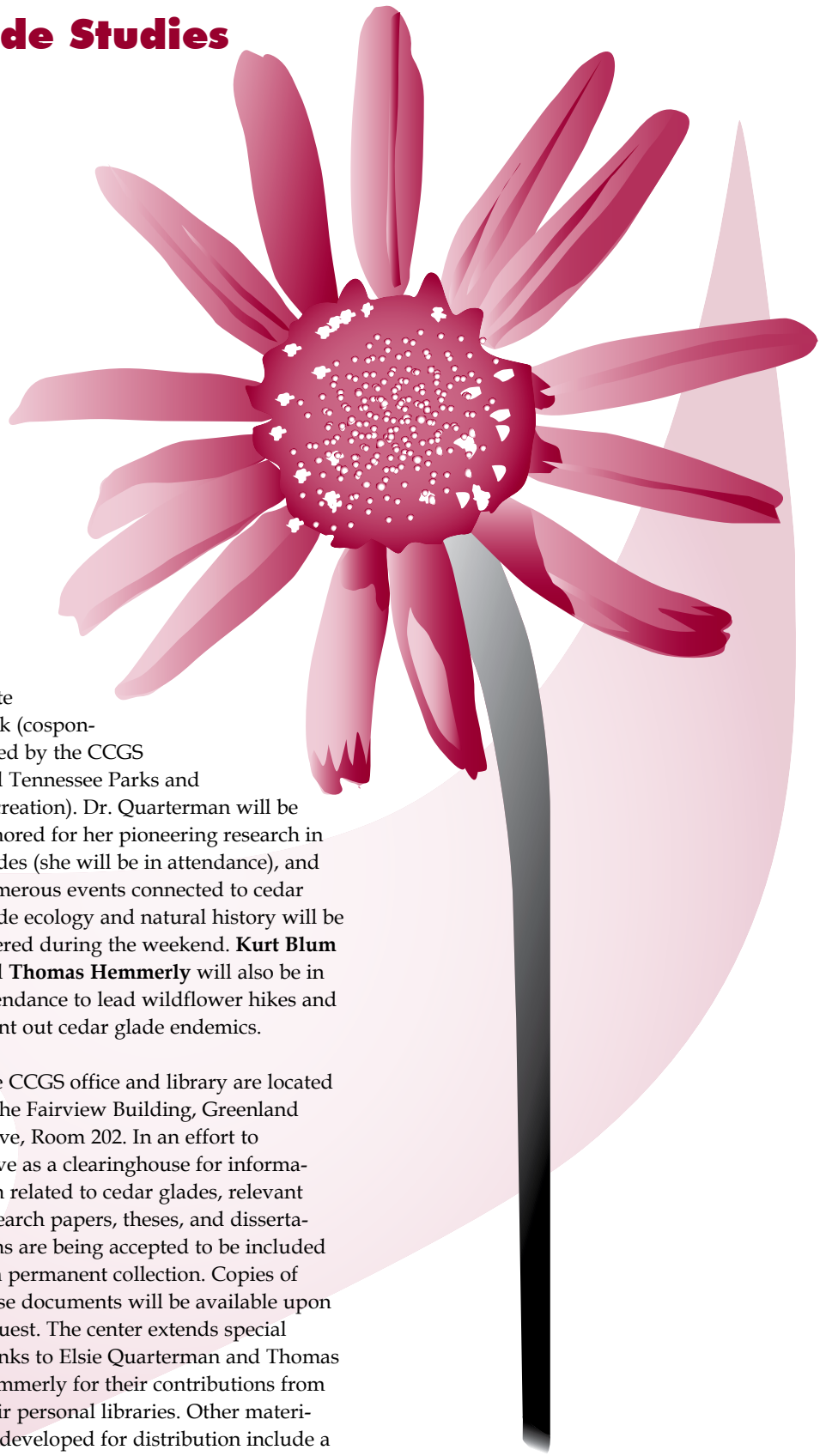
Drs. Sadler and Walck have served as codirectors for the center. Elizabeth Fitch (M.S. '04) served as assistant until she recently accepted a position with Motlow State Community College. Other people directly involved with center activities are graduate students **Karen Metius-House** and **Shea Cofer** (M.S. '07); undergraduate student **Marta Rolig**; and public school teachers Marrie Lasater, **Melissa Turrentine** (B.S. '86), and **Kim Hinton** (B.S. '84). The goals and initiatives of the center are biannually reviewed by a scientific advisory committee. Kevin Fitch, Tennessee Department of Environment and Conservation (TDEC), Division of Natural Areas, serves as chair of the advisory board, and other members are **Terri Hogan** (B.S. '95), Stones River National Battlefield; Sally Rollins Palmer, Nature Conservancy; Bill Wolfe, U.S. Geological Survey; Nancy Stetten, Tennessee Department of Education; and John Froeshauer, TDEC Division of Parks and Recreation. Launching projects and initiatives has been possible with support from a broad number of people and organizations, as evidenced by the first Research Roundtable held in May 2007: there were 24 attendees representing 15 different organizations concerned about cedar glade conservation and ecology.

Everyone should plan to attend the Dr. Elsie Quarterman Cedar Glade weekend April 11-13, 2008, at Cedars of Lebanon

State Park (cosponsored by the CCGS and Tennessee Parks and Recreation). Dr. Quarterman will be honored for her pioneering research in glades (she will be in attendance), and numerous events connected to cedar glade ecology and natural history will be offered during the weekend. **Kurt Blum** and **Thomas Hemmerly** will also be in attendance to lead wildflower hikes and point out cedar glade endemics.

The CCGS office and library are located in the Fairview Building, Greenland Drive, Room 202. In an effort to serve as a clearinghouse for information related to cedar glades, relevant research papers, theses, and dissertations are being accepted to be included in a permanent collection. Copies of these documents will be available upon request. The center extends special thanks to Elsie Quarterman and Thomas Hemmerly for their contributions from their personal libraries. Other materials developed for distribution include a wildflower guide to plants at Flatrock Glade, K-12 activity lessons related to glades, and a poster of cedar glade endemics. **Jeff Walck**, though on sabbatical leave conducting ecological research in Australia, is still directly involved

in the center via regular emails. Please direct questions to Jeff Walck at jwalck@mtsu.edu or Kim Sadler at ksadler@mtsu.edu. Visit the center's Web site for more information: www.mtsu.edu/~mtsucee/Cedar_Glades.htm. 





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