



The Basic Facts

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The Basic Facts, College of Basic and Applied Sciences, Middle Tennessee State University, Murfreesboro, TN

The Science of Success

MTSU Faculty Working on Device to Detect Small Amounts of Biological and Chemical Warfare

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The following article appeared recently in an issue of *The Daily News Journal* as reported by Jennifer Farish.

An MTSU research project could result in a device able to detect very small quantities of biological and chemical warfare.

The project, funded by a grant from the National Science Foundation, is centered on developing a device that is able to detect small quantities of a substance in a solution of gas, said Andrienne Friedli, Chemistry professor.



Donald Curry, Vice Provost of Research, said the NSF grant is for \$209,000 this year and can be renewed up to four years. The money will go to fund everything from supplies and equipment to staff.

"As MTSU is making the transition to a major comprehensive university, we are trying to make it known to the public that

we are actively doing research in a variety of areas," Curry said. "Some universities think of research as separate from teaching, but professors who are doing cutting edge research are translating that information back in the classroom, so that the students benefit as well."

The "Development and Applications of a Novel Biosensor" project will involve work from three principal investigators from different fields, with each investigator overseeing different parts of the research. Stephen Wright, biology professor; William Robertson, physics professor, and Friedli are the principal investigators on the project.



"It is a unique approach because it combines biology, chemistry, and physics. So it is kind of like a tripod — if you knock any of the legs out, it all falls over," Wright said.

The ultimate goal of the project is to develop a device that can pick out a single virus or chemical warfare agent, Friedli said, adding the application of the research could be used in a number of fields including medicine, environmental issues and terrorism.

"The application possibilities are really endless," Wright said of the device. "After basic laboratory testing, we will be testing genetic sequence for the presence of Lyme disease and a new virus I found in ticks in the Middle Tennessee area about a year and a half ago."

In addition a collaborator from Maryland has sent Wright more than 3,000 ticks from the northeast part of the country to be tested. Testing ticks would have taken years under the former process, but with the new biosensor device, all of the testing could be done in a matter of weeks, Wright said.

Although the sensor could also be used to test for chemical and biological warfare, MTSU will not be doing any research in that area, Wright said.

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CBAS Faculty Who Served on Summer Faculty Fellowship Programs

At least four CBAS faculty participated in summer faculty fellowship programs in 2002:

Dr. Ngee-Sing Chong (CHEM)

Dr. Chong worked in the Air Force Research Lab at Tyndall AFB in Florida for 10 weeks this summer. The Summer Faculty Fellowship Program there is sponsored jointly by the USAF and the National Research Council. He did research on the use of Fourier Transform infrared spectrometry and gas chromatography-mass spectrometry with thermal desorption for the detection of polar organic compounds.

Dr. John Bertrand (AERO)

Dr. Bertrand had a fellowship from NASA at Langley, VA, for 10 weeks. This was part of the NASA Faculty Fellowship Pro-

gram (NFFP). He worked in the Small Aviation Transportation System program, particularly in the Single Pilot Performance strand. His assignment was to research new ways of offering pilot training in light of near-future technological developments that will significantly alter how personal and corporate flying is done. He said, "it was a great opportunity for me and I am grateful for the encouragement and support I received from Tom Cheatham and Paul Craig."

Dr. Walter Boles (Chair, ETIS)

Dr. Boles spent the summer at Marshall Space Flight Center, Birmingham, AL, as a participant in NASA's Faculty Fellowship Program. His exploratory and experimental research investigated "The Potential of Microwave Radiation for Processing the Martian Soil." Dr. Boles used a Martian

soil analog derived from a volcanic ash deposit in Hawaii, carbon in the form of graphite, and a 700w domestic microwave oven to conduct the research. Dr. Boles will continue the work this year to develop additional material for a research proposal to be developed next year.

Dr. Dwight Patterson (CHEM)

Dr. Patterson worked in the Advanced Diagnostics and Measurement Division at the NASA Langley Research Center. The main thrust of his work was understanding lueco dyes as used in temperature insensitivity and pressure sensitive paints. He also studied the characterization of fluoro acrylate co-polymers. The purpose of the research is the development of cheaper and more efficient design of aircraft.

"How Well Do You Know Your Chair/Director?" Quiz

1. Which Chair/Director published 52 articles in 2001-02?
2. Which two Chairs/Directors received \$300,000 plus in external grants in 2001-02?
3. Which Chair/Director was a NASA Summer Faculty Fellow in Summer 2002?
4. Which Chair/Director moved his/her residence from Murfreesboro to Franklin this summer?
5. Which Chair/Director served as President of his/her national professional organization in 2001-02?
6. Which Chair/Director recently co-authored a publication related to the treatment of renal cell carcinoma?
7. Which Chair/Director has a brother who holds the same position (Chair of the same department) at another university?
8. Which Chair's/Director's wife is President of the MTSU Dames Club?
9. Which two Chairs/Directors have spouses who are MTSU faculty members?
10. Which two Chairs/Directors had 25 tons of hazardous wastes removed in 2001-02?
11. Which Chair/Director was named both F'01 and S'02 as "one who makes a difference?"
12. Which Chair/Director is a "jogger?"
13. Which Chair/Director has season tickets to Tennessee Philharmonic series?

Answers on following page.



The Basic B.E.S.T. (Boastful Educators Showing Talents)

All departments are invited to submit items for this column

Biology

Jeffrey Walck recently presented a research paper entitled "The Influence of Light During Dormancy Release on Germination of Schoenolirion Croceum (Hyacinthaceae) Seeds" at the annual meeting of the Botanical Society of America in Madison, Wisconsin.

Chemistry

Judith Iriarte-Gross and **Dara Grissom** (senior nursing student) attended a NSF Chautauqua course titled "Award Winning Programs for Women, Minorities and Disabled Students in Sciences." After this workshop, both attended the 17th Biennial Conference of Chemical Education where they presented a paper titled "Chemistry Beyond Chemistry: Introducing Technology-Based Labs for the Non-Science Major." **Iriarte-Gross** also attended a workshop titled "An Introduction to the Nuts and Bolts of Chemical Education Research" and "Teaching Strategies to Enhance Gender and Cultural Equity in Chemistry Classes." **Grissom** also attended the "Teaching Strategies" workshop and "Vernier Hands-On Data Collection" and "Coloring Your Chemistry Course — the Chemistry of Tie-Dye."

Engineering Technology/Industrial Studies

David Gore attended the Society of Manufacturing Engineering's (SME) annual meeting in Dallas in May. He attended conferences entitled "The Collaborative Manufacturing Summit," and "The Lean Manufacturing Challenge." He also attended educational seminars entitled "Lean Manufacturing Overview," and "Value Stream Mapping for Collaborative Manufacturing."

Heather Brown and **Dwight Patterson** (CHEM) were awarded a grant from a private company for fiber reinforced concrete research.

Saleh Shenaty presented four papers at the ASEE Annual Conference and Exposition in June in Montreal, Quebec, Canada. The papers were entitled "Assessments and Transfer of Knowledge in Case-Based Instruction — Promising Results," "Curriculum Development and Delivery Using Industry-Based Case-Study Models," "Active Collaborative Learning in Engineering and Technology Using Industry-Based Case Studies," "Teaching Problem-Solving Using Industry-Based Case Studies."

Mathematical Sciences

Rajesh Barnwal has published the following abstract "Testing for Departure from Exponentiality Among Distributions Possessing Increasing Hazard Rates" in the *American Mathematical Society*.

Ginger Rowell was invited to review grant proposals for the National Science Foundation Division of Undergraduate Education Course, Curriculum, and Laboratory Improvement Program in July. The panel review was held in Arlington, VA. Participation in this NSF panel review team was valuable for gaining insight into qualities that are considered meritorious for Proof of Concept and Full Development proposals of curriculum development projects.

Military Science

Byron Deel, a new faculty member, arrived to the University over the summer after completing a tour in Bosnia. He recently graduated from the United States Army Airborne School located at Ft. Benning, Georgia. The distinction he holds is having been the Oldest Member to complete Airborne training in the Company which he was assigned. He was awarded a plaque commemorating the accomplishment. He will be the MS II Instructor as well as an Assistant Professor of Military Science.

Nursing

Suzanne Prevost attended the International Nursing Research Conference in Brisbane, Australia where she gave the keynote presentation on "International Trends in Evidenced-Based Practice" and she also attended a workshop on "Outcomes Measurement for Nursing Practice."

(Continued from previous month)

Summer Research

Thomas Hemmerly (BIOL) has begun work on his fourth book, *Southeastern Wildflowers*. He has taken photographing trips to Florida, Alabama, and Georgia and will be taking additional ones before the start of the fall semester.

Kim Sadler (BIOL) is compiling data from the spring semester on pre- and post-biological knowledge and perceived confidence in biological applications to other settings in a subset of students that took Biology 1030 and Biology for Elementary majors.

Matt Klukowski (BIOL) worked at the

Cedars of Lebanon State Forest examining how fence lizards respond physiologically to stressful situations. Specifically, how rapidly do corticosterone levels (the main stress hormone in lizards) rise in captured males, does the stress response vary seasonally, and is stress associated with reduced testosterone levels? He also studied seasonal changes in trombiculid mite (chiggers) abundance both in the environment and as parasites on the fence lizards. This information is needed in order to interpret his previous finding that males with elevated testosterone levels are more heavily parasitized by chiggers than low testosterone males.

Rebecca Seipelt (BIOL) did research concerning genotype-phenotype correlations in human disease genes with BioVentures, Inc.

Sarah Barlow (BIOL) received an Instructional Technology Development Grant for the summer to develop an instructional CD that implements new teaching strategies for Biology 1030 Honors. A research component of the project involves collecting data regarding student performance and attitude toward teaching strategies used.

Jeffrey Walck (BIOL) worked on the following projects: 1) invasion ecology and restoration of the cedar glade/woodland community complex. 2) seed ecology of two rare bladderpods, and management implications. 3) seed dispersal of big-fruited evening primrose. 4) seed dormancy and germination characteristics of three western North American plants.

Anthony Newsome (BIOL) served as mentor for **Eddie Lambert** (McNair Scholar). His research was about the ecology of *Bordetella bronchiseptica* a bacterial pathogen of dogs and cats and possibly humans. The work is in conjunction with the Centers of Diseases Control and Prevention in Atlanta, GA. He served as advisor for **Jason Goforth's** summer research project about distribution of the protozoan *Acanthamoeba* which has the potential to cause eye infections in humans, **Goforth** worked to determine the absence or presence of the parasite in the contact lens cases of students. This is thought to be the source of infection in humans. He also worked on the ecology and distribution of *Legionella* bacteria in various natural aquatic environments in TN.

Steve Howard (BIOL) was involved in two research projects, both of which were funded by grants from the College of Graduate Studies. The first is an empirical study of predator induced phenotypic plasticity in tadpoles. One of Biology's MST graduate students, **Heather Corban**, worked with **Howard** on the project. The

second investigation was a theoretical study of mate choice on the evolutionary stability of sexual reproduction. This work has been completed and the resulting article submitted for publication.

Anthony Farone (BIOL) received a MTSU Summer Research Grant to investigate the interaction of reovirus with transformed cells (tumor cells) compared to non-transformed ("normal") cells.

Norma Dunlap (BIOL) worked on three projects for the summer: 1) the synthesis of peptidomimetics of d-alanyl-d-alanine as potential antibacterials. Three students were involved in this project — **Wosenu Mergo**, **Brian Smith** and **Terry Parsons**. 2) **Leah Wong** worked on the synthesis of butadiene dioxide adducts of nucleosides in order to gain more information on the toxic adducts of butadiene dioxide which is an environmental toxic. 3) **Mohammed Shadid** worked on the synthesis of analogs of the antitumor agent podophyllotoxin which he then assayed for enzyme and DNA binding under the direction of **Dr. Andy Burden**.

Wayne Rosing (BIOL) continued to be engaged in a continued screening for Myxomycetes of the Smoky Mountains National Park via moist-chambering of vegetative debris, bark, etc. Also he will participate in Discover Life in America's Myxo Blitz the last weekend of July.

Answers to Quiz

1. Dr. Paul Craig (AERO)
2. Dr. Robert Carlton (PHYS)/Dr. Richard Detmer (CSCI)
3. Dr. Walter Boles (ETIS)
4. Dr. Pam Holder (NURS)
5. Dr. Harley Foutch (ABAS)
6. Dr. Curtis Church (MATH)
7. LTC Todd Overby (MS)
8. Dr. Earl Pearson (CHEM)
9. Dr. Richard Detmer (CSCI)/Dr. Paul Craig (AERO)
10. Dr. Earl Pearson (CHEM)/Dr. George Murphy (BIOL)
11. Dr. Harley Foutch (ABAS)
12. LTC Todd Overby (MS)
13. Dr. Curtis Church (MATH)

Summer Research Information
to be continued in September