

*The College of Sciences and Mathematics would like to recognize
those who have supported the campaign with a gift of \$25,000 or more:*

Drs. J. Lee and Brenda Baumann

Mr. John G. Blackwell

Dr. and Mrs. Fleming G. Brooks

Dr. Ashley C. Davis

Mr. and Mrs. Paul DePriest

Dr. and Mrs. Edmund C. Dyas IV

Dr. Anne and Mr. Leo Felteau

East Alabama Medical Center

Dr. J. David Hagan

Dr. and Mrs. Jeffrey M. Harris

Dr. and Mrs. William Ireland, Sr.

Dr. and Mrs. J. Ralph Jordan

Dr. Donald M. Keene

Dr. and Mrs. James E. Land

Mrs. Nancy Taylor Latimar

Mrs. Don Logan

Mr. and Mrs. Herbert G. Martin

Dr. and Mrs. James W. Mathews

Mr. Jesse D. May

Drs. Art and Carol Merkle

Mr. and Mrs. David C. Moore

Mrs. Nancy Mitchell Morris

Dr. Michael O'Brien

Dr. and Mrs. James W. Ott

Drs. David and Rita Patton

Dr. and Mrs. David Sarver

Dean and Mrs. Stewart W. Schneller

Dr. Jack D. Sherrer, Jr.

Dr. Raymond M. Sims (deceased)

Mr. John T. Simms

Mr. Paul J. Spina

Dr. Linda J. and Mr. Jeffrey Stone

Dr. and Mrs. E. Gaines Thomas

Dr. and Mrs. Edward L. Wampold

Mr. and Mrs. Gary L. West

Drs. Michael and Patricia Williams

Dr. Barry L. Wilson

Drs. Michael and Marie Wooten

Drs. Harold and Eugenia Zallen

Gifts made as of March 31, 2006

Thank You!

Thank you!

COSAM would like to thank the sponsors of our
11th Annual COSAM Dean's Scholarship Golf
Classic for their generous support:

Tee/Green Sponsors

Jim Ott
Steve Caldwell
Barry Wilson
Ray Taunton
David Hagan
Jep Dalton
Dee Thornberry
John Trawick
Auburn Geology Alumni -- Dr. Art Merkle and Herb Martin
Auburn University College of Human Sciences
Auburn University College of Agriculture
Auburn Cardiovascular -- Dr. Michael B. Williams
Morgan Keegan, a Regions Company -- Tip Tipton of Atlanta
Aameco Transmissions
Colonel (Ret.) James W. Danley USA
Dr. Gary Gross, Jerry Batts, Sir William Pepper and Scott Smith
Sherman Industries

Additional Sponsors

A Little Taste of Home Catering Inc.
Advantage Golf
Amsterdam Cafe
Anders Bookstore
The Atlanta Falcons
Auburn Awards
Auburn City Limits
The Hotel at Auburn University
and Dixon Conference Center
Barbecue House
Behind the Glass
Bruno's
Buckalew's
Callaway Gardens
Char-Broil
Christine's Gourmet Steak and Wine
Chuck's BBQ
Cock of the Walk
Colonial Bank
Create-A-Spa Naturale
The Flower Store
Heritage House Gifts and Gourmet
Image House
Jackie's Cards and Gifts
J&M Bookstore
The Lodge and Conference Center
at Grand National
Moore's Mill Golf Club
Olde Auburn Ale House
Panera Bread
Publix Super Markets, Inc.
Purse Pi-Cas-It-Y
Southern Crossing
Spa Auburn
Talbots
Terra Cotta Cafe
The Olde Iron Horse
Antiques and Collectibles
Tiger Rags
Ursula's Catering
The Villager
Ware's Jewelers
Yellowhammer Restaurant



Title Sponsor

East Alabama Medical Center

Lunch Sponsor

*Lee OB/GYN
Dr. Bill Golden
Dr. Kenny Harris
Dr. Joel Pittard*

Long Drive Sponsor

Dr. Lee Segrest

Closest-To-The-Pin Sponsors

*Dr. Steven P. Disch
Haggar -- Chuck Hurston*

Putting Contest Sponsor

Dyas Automotive

Beverage Sponsors

*Premium Beverage
Coca-Cola Bottling Company of
Opelika*

Additional Sponsors and Volunteers:

Auburn University Alumni Association
COSAM Dean Stewart Schneller
COSAM Leaders
COSAM Office of Development
Dr. Tim Day
Greg Hartwell
Tammy Beck Hartwell
Summer Hemmings
Sherri Rowton
Danny Royal
Ed Wampold
Larry and Nancy Wit

2006 Tournament

Date:
October 13

**For more information
send an email to:**
cosamgolf@auburn.edu

09.21.2005

Earning a Living Writing and Editing Shakespeare

When Barbara Mowat, a 1956 mathematics graduate, talks about becoming the Director of Academic Programs for the world renowned Folger Shakespeare Library in Washington, D.C., she describes it as "stumbling into a wonderful world" -- one in which she has become well-known for her knowledge of the world's greatest playwright.

After earning her bachelor's in mathematics, Barbara went to Austria on a Fulbright Scholarship, where she discovered a career-path in her love for reading.

"While in Austria, I discovered that what I truly loved doing was reading and that I could actually make a living doing just that," Barbara said. "I got my master's in English at the University of Virginia working with Fredson Bowers, a very eminent Shakespeare scholar. By focusing on the history of the language, how words were used and ideas of the period, Bowers really captured my imagination. It was then I realized that studying Shakespeare was where I belonged."

Barbara later returned to Auburn to pursue a doctorate in English and began teaching Shakespeare and editing *Southern Humanities Review*, but it was some years later, while serving as Dean of Washington College in Chestertown, MD, that she received an interesting phone call from the Folger.

"They needed somebody who had experience editing a journal, which I had done at Auburn. They needed somebody who had been trained as a Shakespearean, which I had been, and somebody with administrative experience, which I received as a dean. They hadn't found anybody with exactly those qualifications, and for me it was just perfect to be able to step into a job where all of my training was needed."

The Folger Shakespeare Library, located on Capitol Hill in Washington, D.C., is a world-class research center on Shakespeare and on the early modern period. It is home to the world's largest and finest collection of Shakespeare materials and to major collections of other rare Renaissance books, manuscripts and works of art.*

Barbara began working with the Folger in 1985 as editor of the prestigious *Shakespeare Quarterly* (she is now its executive editor), and as director of academic programs and chair of the Folger Institute. She also serves on the advisory board for the International Shakespeare Congress, which meets every other year in Stratford-upon-Avon, England.

In 1989, Barbara began a new project editing Shakespeare plays, which are published for the Folger for use in the classroom and for general readers of the plays and poems. Out of the 36 plays published in Shakespeare's First Folio,



Barbara Mowat '56, Director of Academic Programs at the Folger Shakespeare Library in Washington, D.C., says *Hamlet* is her favorite Shakespeare play. Photo courtesy of Barbara Mowat.

Barbara and her co-editor recently completed the 31st play.

"We start editing each play with the text saved as a computer file. Then we go through the file bringing the spelling and the punctuation up-to-date, making sure the speech-prefixes are where they belong, checking the entrances and exits, all of the things that make a dramatic text," she said. "Then we write commentary notes on all unfamiliar words, along with a brief introduction and a language introduction, and we ask a scholar to write an essay on the play that is printed in the back of the edition."

The whole process takes a couple of years to complete for each play, with two or three plays being worked on at any time, but Barbara, a Shakespeare enthusiast, she never gets tired of studying the plays.

"My free time is spent working on the Shakespeare editions. That's what I do for fun," she said.

To learn more about the Folger Shakespeare Library, log on to: www.folger.edu.

* Source: Folger Shakespeare Library Website at www.folger.edu

By Martha Barker

Atlanta's Good Samaritan

After 13 years as a pediatrician on Atlanta's affluent north-side, Bill Warren, a 1975 chemistry graduate, left his job stating that he had "a desire and sensed a call to engage in the fulltime healthcare of Atlanta's neediest residents."

"When I told my pediatric partners that I was going to be leaving to open the Good Samaritan Health Center, of course they thought I was crazy," Bill said.

It was while on a mission trip to the Dominican Republic as a medical school student that he began to realize what he was meant to do, but it wasn't until some 20 years later that he was able to make his dream come true.

"In 1998, my brother and I went to the bank and asked for a million-dollar line of credit to start a healthcare center that would provide dependable and reliable services to Atlanta's working poor," he said. "We asked for a line of credit with a personal guarantee so that if the project didn't fly, we would be in debt, not the Center."

But, the Center not only flew, it took off as Bill hit the road preaching his cause to local churches, industry and healthcare related professionals. Within three months, he managed to raise \$2.5 million, repay the bank, purchase a building, and hire a staff.

In January of 1999, after months of praying, fundraising and planning, The Good Samaritan Health Center became a reality in downtown Atlanta.

"We opened our doors with a staff of seven," he said. "And, that whole first week we only had 12 patient visits."

But today, the Center, which experienced 552 visits a month during its first year, has grown to receive more than 1,600 patient visits each month and has since opened two sister facilities in Cobb and Gwinnett counties.

The Center is a privately funded, non-profit, tax exempt 501(c) (3) Christian mission entity that provides a wide array of healthcare and social services to greater metropolitan Atlanta's homeless and destitute (who make up 20 percent of the patients), working poor who have no health insurance and recent immigrants (70 percent of patients), and those who are Medicaid/Medicare eligible (10 percent of patients).

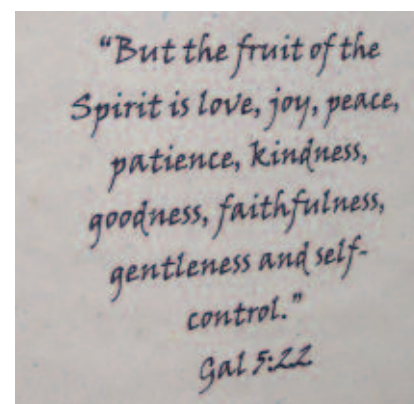
The Center has five broad areas of service, including medical, dental, social, health education and psychological counseling.

"One of our objectives here is to provide healthcare services to people who are not used to receiving medical care. We do that by providing many services under one roof such as dentistry, medicine, health education and social services," Bill



Above: Bill Warren inside one of the pediatric rooms at The Good Samaritan Health Center.

Right: Bill said he was compelled by Biblical teaching to open the Center and thus, Bible verses can be found throughout the Center.



said. "We have a core staff of about 22, which includes a family practitioner, myself and the nurse practitioners. We also depend a good bit on medical professionals who volunteer their time. I meet a lot of people who say, 'Oh, you are the one with the free clinic.' No, we don't have a free clinic, but if you are destitute we will see you at no charge. If the patient is working, they pay on a sliding fee scale that's compatible with their income level. We are here for people who just don't have the resources or they have nowhere else to go."

Bill told the story of a homeless mother of three who was living around the corner at the Salvation Army shelter.

"This young mother brought her one-month-old baby in about three times, she later brought her son who had an eye infection and then she returned with her daughter for a school check-up," he said. "That is the type of people we are trying to serve. She doesn't have transportation and she has to walk to get here, but we are located close to the Salvation Army so it is convenient for her. People like this mother really need our care and I am glad to help them."

For more information on the Center, visit its website at: www.goodsamhc.org

By Martha Barker



Left: Jonathan Renfroe works with a patient during a mission trip to Cayambe, Ecuador.

Right: A view of the Cayambe countryside.

*Jonathan Renfroe
Photography by:
Jeff Etheridge*

Love Is a Universal Language

During the summer of 2005, Jonathan Renfroe '89, took a week off from his Albertville, Ala. dental practice to participate in a mission trip he refers to as a “mountaintop experience.”

Jonathan traveled with 22 other missionaries to Cayambe, Ecuador, an agricultural town on the western coast of South America, as a part of the Servants in Faith and Technology (SIFAT) mission organization out of Lineville, Ala.

“I refer to the trip as a mountaintop experience because I can now step back and reflect on the time spent in Cayambe and the people I met,” he said. “I realize that everything I thought was important, before I took the trip, really isn’t. We are so blessed in this country.”

In Cayambe, many mothers work in the fields during the day and there is very little organized daycare in the town so children are either locked inside their homes or left to roam the streets. One of the goals of SIFAT was to help teach and prepare mothers in the community, who didn’t work in the fields, to start daycares.

One of two dentists to make the trip, Jonathan spent a better part of his days providing free dental care to local residents including many of the town’s children.

“The children were the reason we were there,” he said. “We would do mostly fillings, and there were a few people with bad teeth, but overall it was about teaching children the importance of dental hygiene.”

Jonathan said he was impressed with the children’s bravery; after all, many of them had never even seen a dentist.

“You could see the fright at first, but we quickly learned how to say, ‘No pain, no drilling,’” he smiled. “It was fulfilling when we would later see the children out in town. All they had was a concrete basin and water spigot, but they would all be out there brushing their teeth. It was a very touching experience.”

A member of the Sand Mountain Cycling Club, Jonathan said he almost didn’t make the mission trip because of an annual bike ride from Albertville to Destin, Fla., that was to take place the same week as Cayambe.

“I prayed to God that he would help me make the right decision,” he said. “And, I realized that there are not enough miles that you can run to condition your heart spiritually until you do something like this mission trip and to share God’s love with these people was an awesome experience. The people are so appreciative. They say love is a universal language and now I believe that is true.”

By Martha Barker

Alum Refuels His Childhood Dream

When he was just a child, Paul Flowers' father would take him to Sebring International Raceway in central Florida to watch legends such as Bobby Rahal and Hurley Haywood participate in the 12-Hours of Sebring Endurance Race.

As a starry-eyed fan, Paul would watch his idols race while dreaming of someday climbing behind the wheel himself. But it never happened, at least not right away.

Paul would go on to college and earn a bachelor's in engineering and a master's in mathematics from Auburn University and then to work with the family business - Flowers Hospital in Dothan, Ala.

It wasn't until years later, when the family decided to sell the hospital, that Paul refueled his dream, and now, at the tender age of 62, is a 10-year veteran of the SportsCar Vintage Racing Association series.

"I have been interested in cars and racing since I was old enough to know what cars were," he said. "And, if you don't count some drag racing in high school, then I didn't officially start racing until 10 years ago. Racing takes two things - time and money, and I didn't have either of those until retiring and selling the family business."

After attending a three-day school at the Mazda Raceway Laguna Seca in Monterey, Calif., Paul discovered just how many opportunities there were to race, climbed behind the wheel and hasn't looked back.

During his racing career, Paul has participated in more than 100 race weekends. He usually arrives at the track on Wednesday, participates in a test day on



Above: Paul in his 1980 Toleman TG 280 Formula 2 race car.

Right: Paul in his Dothan, Ala., office beside a poster of himself in his 1963 Elva Mark 7s.



Photos courtesy of Paul Flowers

Friday and runs a qualifying race on Saturday that sets the field for the official race on Sunday.

He owns five race cars, but two of his favorites are the 1963 Elva Mark 7s and a 1980 Toleman TG 280 Formula 2. The cars are housed and maintained in Connecticut then loaded on a tractor-trailer transport truck and delivered to the track for each event.

"I chose to race the vintage cars because those are the cars that I remember growing up and seeing raced professionally at places like Sebring. I never dreamed that I would actually be able to do that someday...so racing, to me, is like reliving my childhood fantasies."

One of Paul's most memorable racing moments took place during the premier historic racing event in the United States -- the Rolex Monterey Historic Races at Laguna Seca.

"The Monterey Historic Races is a whole week worth of racing and cars. People from all over the world apply, but only about one-third of the cars are chosen to participate. It was during that week that I passed Bobby Rahal during a race. I didn't really think about it much at the time, I just saw another car and thought, 'I have a chance and I am going to pass him,' and then I realized it was Bobby Rahal," Paul smiles as he admits that he was only able to make the pass because Bobby was having some sort of trouble with his car.

Paul says that after 10 years of racing, he is finally beginning to think about retiring from his hobby, but that doesn't mean he'll be slowing down...the self-confessed computer nerd likes to rebuild computers for his friends, go skiing with his family and pilot his own airplane.

By Martha Barker

Alumni Editorial Honors Dr. Bill Lazenby



Large miracles are easy to explain; it is the little ones that are mysterious. One little miracle of special interest to us is the growth of a sophisticated medical community in the Auburn-Opelika area. Where once a few general practitioners served the local community mending bones, delivering babies, and pretending to cure colds, a large multi-specialist group of physicians now draws patients by referral from the entire East Alabama/West Georgia region.

Dr. Ed Fann '55 Until 1964, the local physicians were all family practitioners, hardworking and dedicated, well-known and well-loved by their patients; but none sufficiently trained in a medical specialty to be eligible for national certification as a specialist. That has all changed over the last 40 years, and there is now medical care capability in East Alabama that was once available only in large metropolitan communities.

Auburn's part in this miracle is enormous: the specialist physicians who were the first to arrive and become the prime movers of the larger influx are Auburn graduates. They continue to serve in many capacities on the hospital governing board, recruiting other specialists and developing ancillary services; they selected this area, principally for its proximity to their alma mater. Perhaps the earliest arrival was Dr. Bill Lazenby '53, a general surgeon, in 1964. The following year, Dr. Steve Russell '55, an Ob/Gyn, set up practice there. Since attracting specialists away from urban centers is not easy, they decided to first concentrate on other Auburn graduates using the allure of Auburn to assist them. Russell, who had been urged to return by Lazenby, joined him in recruiting the late Dr. Doyle Haynes '56, a cardiovascular surgeon and Dr. Clint Hurd '55 Ob/Gyn. As the group enlarged it became easier to attract even non-Auburn graduates to the area on the merits of the competence, variety and synergistic interactions available within the growing medical community. The list has now grown to more than 100 physicians practicing in the Auburn-Opelika area, with the majority being Board Certified specialists.

Bill Lazenby, who I would consider the pioneer of this group, said that the opportunity to raise his family in a small community, academically and culturally enriched by the university he knew and loved, was probably the dominant reason for his decision to locate in the area. He said he felt sure he could find others like in mind and feelings about Auburn and the area, and willing to build the medical community. Though many, especially Steve Russell, are unabashed and energetic athletic fans, their interactions have not been limited to sporting events. They have served on school committees, lectured and at least one, the late Doyle Haynes, has conducted joint research with university faculty and published the results of their work in referred national medical journals. Such activity not only benefits the university and its academic community, but broadens the contributions and career satisfaction for the physicians involved and serves as at least one indicant of how mutual benefit of this "return to Alma Mater" has been to the institution and the individuals.

By Dr. Ed Fann

Dr. Bill Lazenby received the 2005 Paul W. Burleson Award from the Medical Association of the State of Alabama for "faithful and meritorious service to the profession of medicine."



Dr. Bill Lazenby '53

Office of Development

One of the roles of the Office of Development is to serve as a means for the College of Sciences and Mathematics (COSAM) alumni to reconnect with their alma mater, former classmates, and professors.

The College of Sciences and Mathematics (COSAM) Office of Development recently welcomed two new staff members: Peyton Bean '02 and Summer Hemmings '04.

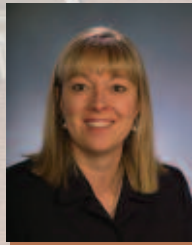
Peyton, a native of Montgomery, Ala., was named COSAM's Special Events Coordinator. She graduated from Auburn with a degree in public relations. She comes to COSAM after serving as an admission department events coordinator for The Savannah College of Art and Design in Savannah, Ga.

Summer, a native of Wetumpka, Ala., was named COSAM's new Development Coordinator – a position formerly held by Jan Chamblin. She graduated from Auburn with a degree in marketing. Prior to COSAM, Summer worked as an Auburn Fund representative.

Please contact the Office of Development at 334.844.2931 with any questions about how you can become part of the COSAM family. We ask that you join us in building on the qualities that made Auburn University and the College of Sciences and Mathematics a special place for you.



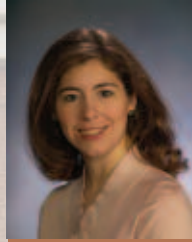
Tammy Beck Hartwell
Development Officer
becktam@auburn.edu



Sherri Rowton
Development Officer
rowtosj@auburn.edu



Summer Hemmings
Development Coordinator
hemmisu@auburn.edu



Peyton Bean
External Affairs
Program Coordinator
beanpey@auburn.edu

Office of Communications

The COSAM Office of Communications increased its staff and communications features in 2005.

Tim Meeks, a native of Indianapolis, Ind., was named COSAM's Associate Editor. He graduated from Auburn with a bachelor's degree in marketing. Tim has more than 10 years of marketing experience with the university.

Carol Nelson, a native of Montgomery, Ala., was named COSAM's Assistant Editor. She earned a bachelor's in communication from Huntingdon College in Montgomery, Ala. Carol comes to COSAM after serving as a public relations assistant at Catholic Social Services in Montgomery.

In addition to the staff, the Office of Communications also added video production services and has to-date, produced a number of videos to promote the college's outreach and diversity programs and also a COSAM Campaign video which takes a look back at the history of the college.

Just one click on www.auburn.edu/cosam and you'll see the Office of Communications has totally revamped its website with improved navigation and toolbars, and increased multi-media functions.



Martha Barker
Editor
barkeng@auburn.edu



Tim Meeks
Associate Editor
meeksta@auburn.edu



Carol Nelson
Assistant Editor
nelsoc4@auburn.edu

AUBURN UNIVERSITY SPECTRUM

2006



A Spectrum of Research
in the Departments of:

- Biological Sciences
- Chemistry and Biochemistry
- Geology and Geography
- Mathematics and Statistics
- Physics



COSAM Student Research
Opportunities Span the Globe

ASSOCIATE DEAN FOR RESEARCH

Marie Wooten

Highlighted in this issue of *Spectrum*, we focus on the contributions of our faculty and students. The college has maintained a commitment to providing state-of-the-art research facilities, equipment infrastructure and rewards for research. Our annual research funding base has grown to approximately \$10 million, due in no small part to COSAM's world-class researchers who continue to make discoveries at the forefront of their fields. Critical to our sustained success is the ability to attract new faculty that will drive the future of our research and teaching enterprise.

As federal research budgets have become constrained, we continue to explore opportunities for collaborative projects between groups of faculty in the college and with faculties in other colleges. By pooling our research talents and encouraging interdisciplinary team approaches, we are often better able to compete for research funding. This past year, faculty members working within the Cellular and Molecular Biosciences Peak of Excellence were awarded a National Science Foundation EPSCoR grant. These funds are competed for on the state level and then at the national level. Funding from this grant will support acquisition of new equipment and student support for talent expansion.

Daily interactions with our outstanding undergraduate and graduate student population continue to confirm that the process of discovery begins with an inquiry based K-12 curriculum. Along those lines, the college is committed to the development and submission of research proposals that enable faculty to take laboratory findings into the state's classrooms. Utilizing proposal preparation as a platform to



address inquiry based learning, we have worked with local and regional science and mathematics educators to define the type of academic infrastructure needed to support continued growth of scientific and mathematical training. Such efforts will enable us to implement strategies that are likely to return substantial educational rewards as we train future generations.

As you examine this issue of *Spectrum*, we trust that you will discover the excitement and commitment for research shared by faculty and students in the College of Sciences and Mathematics.

on the COVER

Auburn biologists on the remains of an old whaling boat in Deception Island, Antarctica. The group was studying the evolutionary genetics of marine invertebrate animals. From left: Heather Eccleston, research assistant II; Adriene Burnette, master's student; Ken Halanych, biology faculty; Rebecca Belcher, Ph.D. student; and Jon Craft, COSAM undergraduate student. Photo courtesy of Ken Halanych.

COSAM Opens NMR Facility

The newly formed Bio-NMR laboratory is located on the first floor of the Chemistry building. It houses the recently purchased Bruker Avance-II 600 MHz magnet for high-resolution Nuclear Magnetic Resonance (NMR) studies on biomolecules. This state-of-the-art instrument is part of Auburn University's effort to initiate a program in structural biology. Our new faculty, Dr. Smita Mohanty with expertise in protein NMR, will be instrumental in setting up this program. She is also in charge of this high field magnet. NMR is an extremely versatile and robust spectroscopic method for studies of biomolecules in solution. Indeed this is the only spectroscopic technique that provides detailed structural and dynamic information of a biomolecule in its native environment. Three-dimensional structure of a protein defines specificity of its function; so much so that even a small change can often disrupt or modify the function causing, in many instances, abnormalities or diseases. This state-of-the-art NMR instrument will be crucial in our investigations to elucidate the atomic structures of proteins and protein-substrate complexes to reveal the mechanisms of their function at molecular level.



Smita Mohanty,
*Associate Professor of
Chemistry and Biochemistry*



"The GK-12 Program will give teachers a rare opportunity to provide individualized attention to each student and the ability for students in general to receive high-quality, one-on-one instruction."

*Overtoun Jenda
Professor of Mathematics and Statistics*

The Auburn University College of Sciences and Mathematics recently received a Graduate Fellows in Science and Mathematics (GK-12) Grant from the National Science Foundation, which will place AU and Tuskegee science and math graduate students in the classroom and allow teachers more individualized time with their students.

"Many times teachers have heavy teaching loads and cannot provide as much individualized attention to each student as they would like during a problem-solving session," said Overtoun Jenda, lead investigator of the GK-12 Grant and an AU Professor of Mathematics and Statistics. "Moreover, teachers will now have much needed help in utilizing more challenging science and mathematics instructional strategies."

The GK-12 Program will place sciences and mathematics graduate fellows from Auburn and Tuskegee Universities in 9-12th grade science and mathematics classrooms beginning this fall to serve as resource persons and assist teachers with instruction. To achieve its goals, Jenda said, the program will spread 13 GK-12 Fellows among three schools in Lee County (Beauregard, Beulah and Loachapoka) and two high schools in Macon County (Booker T. Washington and Notasulga) to assist teachers in physical science, biology, chemistry, mathematics and physics classes.

Another key activity will be involvement of Alabama Science-in-Motion chemistry and physics specialists and vans in conjunction with GK-12 Fellows to enhance instruction and demonstrations in the classroom.

"This visionary GK-12 funded program represents a model example where the sciences and mathematics skills of the Auburn and Tuskegee faculty and graduate students will be taken into the classrooms of three Lee County and two Macon County schools," said COSAM Dean Stewart Schneller. "The symbiotic arrangement between these school systems and the two collaborating universities to improve the science and mathematics educational experience for the affected students is truly exceptional."

The graduate fellows will be chosen in May and will attend a two-week instructional workshop conducted by the AU Department of Education's Science Education Department this summer.

The National Science Foundation (NSF) has a leading role in fostering and supporting programs that contribute toward the improvement of sciences, technology, engineering and mathematics (STEM) education. NSF recognizes that graduate students in STEM disciplines can contribute to the national effort to address the challenging issues in K-12 education.

"I like statistics because you find many different problems in many different areas, and you have to come up with the methodology to determine the answer."



Looking to Statistics for the Answers

By: Martha Barker

Even though her office is tucked away inside a suite in the far corner of Parker Hall, folks from all academic disciplines come to her for answers. A psychic she is not, but rather a professor who is able to speak a language that is the very principle of everyday life - the language of numbers.

Nedret Billor, who joined the Department of Mathematics and Statistics in 2003, said what she likes most about her job as a statistics professor and researcher is that you can use statistics to find the answer to just about any question.

One might be surprised at the types of answers Dr. Billor is able to provide using statistics. In her research, she uses outlier detection methods to determine if a result given is inconsistent with the bulk of data.

"I can give you one very interesting application which made a great impact in the world," Dr. Billor said. "A group of British scientists found a problem with the ozone concentrations in the world using ground measurements, while satellite measurements didn't. When scientists went back to analyze the satellite levels, they found that some of the lower concentrations were being deleted automatically because that is what it was designed to do and it was amazing to see the results. After they stopped leaving the lower concentrations out, they started seeing great danger in the ozone levels, which is very important information and is a prime example of how outlier observations are some of the most important observations that we make."

Another area of Dr. Billor's research includes classification, where she researches the use of statistical methods to classify cancer tumors.

"If you can pinpoint which one type of cancer a tumor belongs to, this will help doctors to provide a more efficient treatment," she said.

Since math and statistics are used in many areas such as determining everything from the size of holes in the ozone layer and classifying tumors, to tracking terrorists and even classifying trees which are about to become extinct in Alabama, Dr. Billor's work will not be slowing down anytime soon; in fact, there is a great demand for graduate-level statistics classes at Auburn University.

"Auburn University is a research based institution and statistics is a very important part of this university. We see the evidence in the number of graduate students enrolled in statistics," she said.

Class sizes average about 30 students, which Dr. Billor says is a large class. Last summer she taught two sessions of a graduate-level statistics class and had 27 students enrolled each time.

"We were recently hosts to a very successful three-day international statistics conference on campus and 350 people attended," Dr. Billor said. "It really sent a message about the future of statistics and that it is in great demand. The number of graduate students in statistics will only continue to increase."

*“I have been asked many times,
‘Why in the world would you worry about a mouse?’”*

In the past year, terror by the names of Ivan, Katrina and Dennis have rained down on Alabama’s Gulf Coast leaving behind a trail of mangled steel buildings, disintegrated roadways and residents wondering if the return is worth the risk.

One resident who returned and has been weathering, what steel mega-structures could not, is the 11-gram beach mouse – a nocturnal creature that is the focus of Biological Sciences Professor and Geneticist Michael Wooten’s research.

Dr. Wooten is concerned the recent frequency of hurricanes and the Gulf Coast’s rapid development may be detrimental to a creature that he calls a “beacon of health” for Alabama’s waterfront.

“I have been asked many times, ‘Why in the world would you worry about a mouse?’ The simplest answer is that they are an important part of the coastal ecosystem. They are more like the lighthouse for the beach. They are a signal – a beacon of health for the beach.”

Dr. Wooten and his group have spent many twilight hours combing the Gulf Coast’s beaches all the way from Fort Morgan to St. Joe collecting data. The group’s main goal has been to figure out why these furry critters are able to weather such fierce storms and how the stress of continual development along the Gulf Coast will affect the endangered species.

“The mice are out there by themselves for the most part. They are monogamous, which is rare in small mammals. They do not really have social groups like larger animals. They are just out there as pairs and families, but they do form these little genetic neighborhoods with individuals related

to each other much like tribes. We have recently discovered that these neighborhoods are one way that the mice have adapted to living in fluctuating environments. Living in kin groups appears to allow beach mice to protect their genetic variability while maintaining their population. This discovery has important implications for how this and many other endangered species can be managed,” Dr. Wooten said.

“Our genetics research has told us two things: one, beach mice are a lot older and more unique than we first thought they were, which is an important factor to ongoing questions about the Endangered Species Act; and two, just from a pure theory standpoint, they are providing us with a truly unique view of the organization of the genetics of species out in nature. It is nothing we have ever seen before. We are excited about what our studies have found and our success in re-establishing the mice along the beaches.”

Dr. Wooten says he is also excited about the possibilities of future genetics’ research which could provide his group with more vital information and enhance their efforts at protecting the mouse, thanks to the continued growth of the university’s DNA sequencing facility.

“The university was kind enough to help us set up a sequencing facility by providing some initial money for personnel and now the facility has grown into a critical component for research in the college. Our work requires that we examine hundreds of thousands of genetic reactions, and in the past we had to do it by hand. Now we are able to process the more than 4,000 samples we have collected, a task that simply wasn’t possible only a few years ago.”



Beach Mice: A Beacon of Health for Alabama’s Waterfront

By: Martha Barker



Dr. Michael Wooten

“I couldn’t afford to buy a house in my hometown now. My parents bought a home in 1971 for \$14,000 and now it would probably sell for \$400,000...”

Nineteenth century America was a bustle of activity as the United States entered into the Industrial Revolution and the nation’s status began to change from an agricultural country to a major commercial and industrial power.

As a result of the Revolution, America also experienced rapid urbanization as families packed their bags and moved to cities to work in and live near the factories. But now, in the 21st century, a new phenomenon called “counter urbanization” is taking place as America makes a U-turn and heads out of town.

Counter urbanization – urban populations moving into rural areas – and the effects this migration has on rural communities are the focus of Assistant Geography Professor Toni Alexander’s research.

Dr. Alexander, who grew up in the middle of an agricultural area about 70 miles east of San Francisco, has a vested interest in the effects of counter urbanization.

“I couldn’t afford to buy a house in my hometown now. My parents bought a home in 1971 for \$14,000 and now it would probably sell for \$400,000 and it is a two bedroom bungalow,” Dr. Alexander said. “Today, people from the San Francisco Bay area are willing to drive two hours to work everyday if they can get the house because \$400,000 at 70 miles inland is still cheaper than \$750,000 in the Bay area.”

Dr. Alexander says the increased cost of living is just one of the many conflicts caused by the movement; others include planning issues and most of all the perception that there is an enormous loss of prime

farmland.

“The question brought up is who has the right to the farmland?” she said. “One belief is that the rapid development has begun to swallow much of the region’s prime farmland.”

Dr. Alexander plans to use state-of-the-art GIS technology to study a set of maps collected from the area over a period of time.

“Luke Marzen (Assistant Geography Professor) has offered to help us with remote sensing,” Dr. Alexander said. “I actually think the perception is that much more agricultural land is being lost than is actually happening. GIS will allow us to take previous land use patterns and overlay them with current patterns to look for differences which will help us in terms of pinpointing if the prime farmland is actually being lost or just reclassified.”

“Unfortunately, public perception can be what steers government policy so if they perceive there to be an enormous loss of prime farmland, they may just reclassify grazing land to prime farmland, while in the meantime, the actual prime farmland is being lost to residential housing developments.”

While Dr. Alexander is currently focusing her research on the central valley of California, she hopes her findings can be used in other areas of the country, and even on the Plains, to help better prepare communities and farmland for impending growth.

“Lee is one of the fastest growing counties in the state of Alabama and housing prices are beginning to go up here,” she said. “I am especially interested to see how the new Korean and German auto manufacturing industries will draw in and enlarge the population.”



America Heads Out of Town

By: Martha Barker

The World Health Organization reports that obesity has reached epidemic proportions globally with more than 1 billion overweight adults of which at least 300 million are obese.

This has left doctors and politicians scratching their heads and wondering what to do about a disease that threatens lives and costs the United States billions of dollars in health care each year.

Now that it looks like diet and exercise alone may not be enough to combat the problem, scientists like Susanne Striegler, an organic chemist in the department of chemistry and biochemistry, are stepping with the goal of developing functional enzyme mimics which could be used to synthesize new pharmaceuticals that trick the body and do not allow to digest complex sugars.

"The development of functional enzyme mimics is of great interest and some remarkable achievements have been made recently, but the mimicking of sugar-transforming enzymes by chemical models is a difficult task and achievements in this area are still pending," she said.

Dr. Striegler's research efforts are focused on the design of advanced materials based on molecular recognition between immobilized metal complexes and biomolecules, concentrating on the development of polymer-based materials for sensing purposes and catalytic transformations of underivatized carbohydrates and glycosides.

"I am most interested in catalysts that allow reactions on biomolecules that nature cannot do," she said.

"Functional enzyme models are roughly defined as structures that mimic the two properties of enzymes: high activity and high selectivity. Both functions need to be mimicked and combined," Dr. Striegler said.

"The combination is the challenge," she said. "To overcome low activity for catalysts in water and make them highly selective, we use metal complexes as a core of an enzyme mimic because metal complexes are known to transform. On the other hand, most of these metal complexes are not very selective. To achieve that, we want to create a templated surrounding around the complex.

Templating is like putting a key inside chewing gum so that it leaves an imprint of the key after removal of the template."

Dr. Striegler hopes to create highly selective catalysts that target one sugar type only.

"That's when we start to make an enzyme mimic by taking principles out of nature and creating reactions that nature cannot do. A mimic that can be used for creating new food additives and food fillers as a substitute for table sugar by unnatural sugars would be very valuable. Easy access to unnatural sugars that cannot be digested in the body would open a new way to battling obesity," she said.



Enzyme Mimics Target Obesity

By: Martha Barker

“We are grateful for the support we receive from the college and its alumni. The computer cluster which we received through the PRISM Award has been great.”



State of the Solid

By: Martha Barker

The diamond has been called the “ultimate gemstone,” ranking a perfect 10 on the hardness scale, not to mention in the heart of every woman. But, on the other end of the rainbow is graphite – a dark and very soft solid. While the two solids couldn’t possibly seem more different, the truth is – they couldn’t be more alike. In fact, scientists have known for years that if you apply enough pressure to graphite that it will become a diamond.

Such dramatic transformation is not limited only to the carbon-based solids (diamond and graphite); and that is where Associate Physics Professor Jianjun Dong’s research comes into the picture. With funding from the Department of Energy and the National Science Foundation, Dong and his collaborators are developing new quantum theory-based computational algorithms to investigate the mechanisms of complex structural transformations in solids, and apply their newly developed methods to predict novel ceramic nitrides.

“Quantum theory has provided us an excellent understanding about the inter-atomic interactions in many solids. However, we do not yet know the details of how atoms will evolve from one structure (for example, graphite) to a different structure (for example, diamond). If we know how the transformation processes of solids work, we could possibly use the information to make a material that does not previously exist in nature. We can find a smarter way to design even better materials; for example, materials harder than diamond, or materials more efficient as electrical conductors – that is the goal of our research,” said Dr. Dong.

One of the more fascinating aspects of Dr. Dong’s research is the state-of-the-art modern computational techniques he uses to understand realistic material changes at the atomic scale. From a desktop computer in his office, he can log in to a supercomputer housed in COSAM’s Physics Department and conduct mega-calculations in no time.

“We are grateful for the support we receive from the College and its alumni,” he said. “The computer cluster which we received through the PRISM Award has been great. Before that, we would have to go to a national computer super center, which is really expensive and you have to work with other people and follow their rules. It was really not convenient for us to use. But now, thanks to the PRISM Award, a calculation that might take many days, can be completed in a half hour right here in the physics department.”

Dr. Dong said he and his research group will continue to use the information collected through their calculations to model the transformation process solids undergo when placed under high pressure. It is a step-by-step procedure that will require a complete understanding of the transformation process before a new material can be constructed.

“The interesting thing about our research is that we try to predict possibility. If we suggest certain novel forms of solids might have interesting properties, our experimental colleagues will try to synthesize that solid using their sophisticated high-pressure apparatus. But it is kind of like the lottery – if you hit one then that is a huge application.”

Professors to Establish Research Center

By: Carol Nelson

Imagine a place where any scientist in Alabama can find the technical resources needed to support his or her research in the field of cellular and molecular biosciences; a place where a community of researchers, all with their own projects, are united by a common theme and where innovative interdisciplinary research and education are fostered through these resources.

This is precisely the goal of the Center for Environmental and Cellular Signal Transduction (CECST). AU professors, Frank Bartol of the Cellular and Molecular Biosciences Peak of Excellence Program and Raymond Henry of the Biological Sciences Department have been awarded a \$1.5 million grant for three years through the National Science Foundation Experimental Program to Stimulate Competitive Research (NSF-EPSCoR) to establish this center.

"The CECST is intended to be a resource for any scientist statewide who is interested in studying how organisms respond and adapt to environmental stress," Henry said.

As stated in the program overview, the goal of the program is to integrate biology, biochemistry, mathematics, biostatistics and engineering elements in order to develop a more complete picture of how biomolecular networks contribute to organismal resilience in the face of natural or manmade extremes. Ultimately, interactions among these disciplines will provide new opportunities for discovery-oriented research and overall research competitiveness. The center will serve as a catalyst for technology development and will enhance the potential for the development of public-private partnerships in the biotechnology arena.

The CECST is multi-institutional, consisting of lead institution, Auburn University; Alabama A&M University; Tuskegee University and the University of Alabama at Birmingham. "Researchers will work primarily from their home institutions, but will have access to resources, both human and technical at AU as necessary," Bartol said.

The core laboratory facility will be housed at AU with satellite laboratories at A&M and Tuskegee, along with access to research facilities and expertise at other cooperating institutions, including the Extended Alabama Structural Biology Consortium.



From left: Frank Bartol and Raymond Henry

"The grant is called an Infrastructure Improvement Award, and funds will go to improve technological capabilities at all of the participating institutions through the acquisition of new, state-of-the-art scientific instrumentation," Henry said. "There is also a strong human resource development component to the grant, which will provide financial support for undergraduate and graduate students and summer support for high school science teachers and students."

According to the Alabama EPSCoR website, the program supports projects which address the special needs of Alabama and contribute to the statewide development of scientific and engineering capabilities. The state of Alabama received one of six national three-year Research Infrastructure Improvement awards worth \$6 million in National Science Foundation funds and \$3 million in non-federal matching funds, which includes the grant received by Bartol and Henry.

Dean's Research Award Recipients

The mission of Auburn University places the departments that compose the College of Sciences and Mathematics at the focal point of the university's long-term success and its future ambitions. The departments in COSAM pride themselves in the high quality of research conducted by faculty and graduate students. To recognize these accomplishments, the Dean's Research Award is presented annually to one faculty member, two graduate students, and one undergraduate student. The recipients are determined from nominations in each of the following areas: biological sciences, mathematics, discrete and statistical sciences, and physical sciences. We commend this year's recipients and offer thanks to our alumni and friends whose annual fund gifts have provided the resources for the awards.



Joe Perez
Faculty Recipient and Head of the
Department of Physics



Stephanie Doucet
Graduate Recipient in the
Department of Biological Sciences



Hyun (Henry) Joo
Graduate Recipient in the
Department of Chemistry and
Biochemistry



Michael Paine
Undergraduate Recipient in the
Department of Chemistry and
Biochemistry

Dean's Undergraduate Research Fellowship Recipients



Temitope Awofeso
Pre-Pharmacy
Mentor: Dr. Peter Livant



Adam Hajari
Physics and Applied Mathematics
Mentor: Dr. Stephen Knowlton



Daniel Boyett
Molecular Biology/Biomedical Sciences
with a concentration in Pre-Med
Mentor: Dr. Marie Wooten



Luke Powell
Biochemistry
Mentor: Dr. Doug Goodwin



Lisa Nicole Cox
Marine Biology
Mentor: Dr. Ken Halanych



Allan Seibert
Chemistry/English
Mentor: Dr. Michael Squillacote

COSAM New Faculty



Toni Alexander
Department: Geology and
Geography
Research: Examines perceptions
and impacts of urban to rural
migration



Mark Liles
Department: Biological Sciences
Research: Research in environ-
mental microbiology, with an
emphasis on microbial community
genomics and antibiotic discovery



Peng Zeng
Department: Mathematics
and Statistics
Research: Interests include
dimension reduction, non-
parametric regression, design
of experiments and
bioinformatics.



Ann Gorden
Department: Chemistry and
Biochemistry
Research: Organic Synthesis,
Ligand Design, Molecular
Recognition, Environmental
Chemistry, Actinide
Coordination Chemistry



Smita Mohanty
Department: Chemistry and
Biochemistry
Research: Structure-function studies
of proteins using high-resolution
solution NMR, circular dichroism
(CD) and fluorescence spectroscopy
techniques



Chemistry Professor's Technology Part of *TIME* Global Health Summit

Source: *AU Research News*, Oct. 2005

A water purification technology based on a research development by Dave Worley of AU's Department of Chemistry and commercialized by a Seattle-based firm was among the featured segments on "TIME Global Health Summit."

The six-part documentary, narrated by actor Brad Pitt, aired Nov. 1-3, 2005 and featured a multitude of celebrity speakers, including Microsoft founder Bill Gates, who also co-founded the Bill and Melinda Gates Foundation; broadcasting icon Ted Turner, chair of the U.N. Foundation; and former U.S. Secretary of State Madeleine Albright.

The Summit was designed to focus America's attention on global health, according to a press release issued by *TIME*. The magazine also announced publication of a special issue on Oct. 31, 2005 promoting the Summit.

"The developed nations of the world can no longer ignore the health crisis faced by millions of people every day," said Jim Kelly, managing editor of *TIME* in the release. "With the rapid spread of so many diseases that can be treated -- and in many cases prevented -- with simple interventions, *TIME* hopes the summit will inspire American leaders and the general public to commit the necessary resources to stop the needless deaths. This is not an insurmountable task. We have the drugs, the vaccines and the medical knowledge. All we have lacked is the will."

The *TIME* Global Health Summit focused on 10 major global health challenges.

Worley's technology was part of the session on clean water. Jeffrey F. Williams, senior vice president and chief technology officer for Vanson Halosource was a member the Summit panel.

Vanson Halosource of Seattle holds the commercial license to Worley's technology. Based on N-halamine chemistry, the technology can be used in a multitude of water purification and sanitation applications.

N-halamine chemistry creates surfaces that contain reversible binding sites for chlorine or bromine atoms enabling them to retain their natural antimicrobial power. Bacteria, mold or viruses contacting surfaces charged by the N-halamine solution are swiftly killed. Moreover, filtration materials treated with the technology maintain their purification properties indefinitely. Simply exposing the treated surfaces to chlorine bleach recharges the filtration properties.



Dr. Dave Worley works inside his lab to develop a water purification technology based on N-halamine chemistry.

Photo courtesy of Dave Worley



From collecting fish in the steamy Essequibo River in Central Guyana to braving the icy cold of the Antarctic Peninsula, COSAM students are provided with a multitude of research opportunities that take them around the world.

Photo courtesy of Jonathan Armbruster

Around the World



Photo courtesy of Troy Best

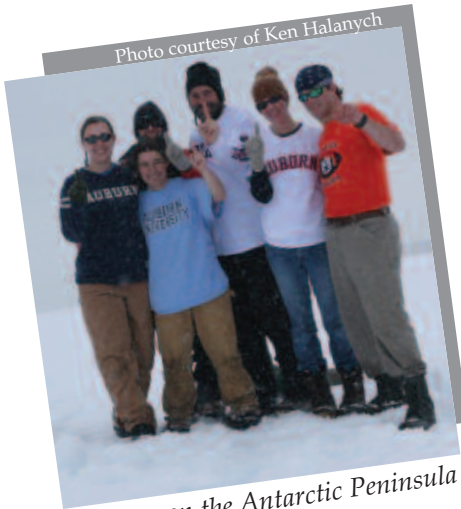


Photo courtesy of Ken Halanych

on the Antarctic Peninsula



Photo courtesy of Tony Moss

just east of the gulf stream

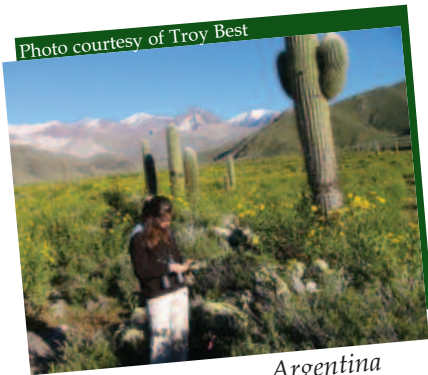


Photo courtesy of Troy Best

Argentina



Photo courtesy of Jonathan Armbruster

Essequibo River at Kurukupari, Guyana

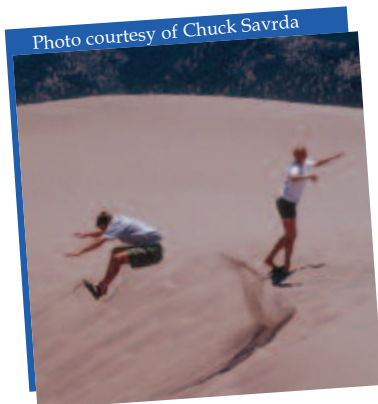


Photo courtesy of Chuck Savrda

Great Sand Dunes

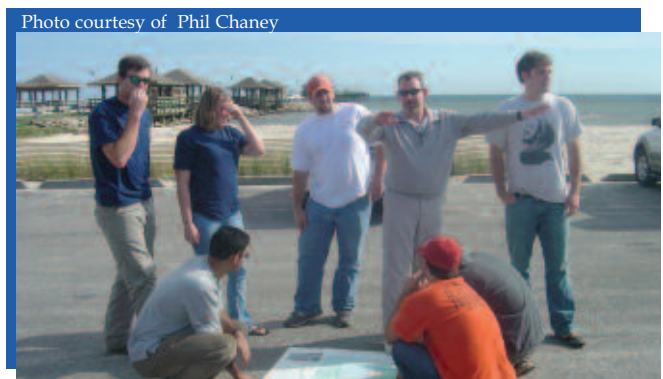


Photo courtesy of Phil Chaney

geography by the shore

Give us a click!

- ▶▶ *New and engaging visual theme*
- ▶▶ *Improved navigation and toolbars*
- ▶▶ *Revised and expanded links*
- ▶▶ *Increased multi-media functions*
- ▶▶ *Dynamic content and special features*



www.auburn.edu/cosam
www.auburn.edu/cosam
www.auburn.edu/cosam



College of Sciences and Mathematics/Development
317 South College Street
Auburn, AL 36849

Non-Profit Organization
U.S. Postage
PAID
PERMIT No. 150
Auburn, AL 36849

Address Service Requested