



GEOGRAM



Fall 2006

The Annual Newsletter of the Department of Geography and Geology at Western Kentucky University

Dear Friends,

2005-2006 proved to be another very successful year for the Department of Geography and Geology. Highlights of the year's accomplishments include the following events and activities:

☺ Faculty and students were featured 30+ times in media print and online articles during the year.

☺ Faculty generated over \$4 million in grants and contracts funding during the year.

☺ Majors and minors in the Department have increased by 50 % since 2001.

☺ Over 100 students participated in study-abroad programs, field camps, special field projects, and field trips during the year. Study abroad field-camp programs visited Tanzania and Australia in 2006, and are in development for Western Europe in Winter 2007 (with Leadership Studies), the Bahamas in Spring 2007, and China for Summer 2007, with over 50 students scheduled to participate.

☺ The Department awarded 29 GIS Certificates this year; and 50 students have completed half of the requirements. Seven new Graduate GIS Certificates were awarded.

☺ Three students were selected for National Science Foundation and other (NASA) funded summer research programs.

☺ Two students received awards at the annual

Sigma Xi student conference; 3 students won awards at the annual Kentucky Academy of Science meeting.

☺ Faculty and students visited 20 overseas locations for research, professional development, conferences, study-abroad programs, expedition study tours, and collaborative activities, including three separate visits to Chile, two visits to China, and multiple visits to Europe and Africa.

☺ Nick Crawford developed a void-seeking robot with Engineering faculty and students.

☺ A geoscience graduate student discovered 27 new species at the Sequoia and Kings Canyon National Parks.

☺ Rezaul Mahmood received the 2006 WKU Award for Outstanding Research and Creativity – he also won the Ogden College Award.

☺ Geology faculty Rick Scott won the Outstanding Ogden Adjunct Faculty Award.

☺ Sara Dalton was recognized as the SGA's Ogden Outstanding Teacher of the Year.

☺ Graduate student Scott Schoefnacker was recognized as the Outstanding Ogden College Graduate student.

☺ Chris Groves received UNESCO funding through 2009 for the global karst aquifers and water resources project.



A Letter from the Department Chair

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Faculty and students continued to excel in scholarship, research, and professional development, convening and/or participating in myriad professional workshops and presenting over 50 papers at local, regional, national, and international conferences. Faculty also were significantly engaged with the local community, serving on committees and task forces, participating in WKU-sponsored community outreach events such as the *Far Away Places* series at Barnes and Noble, sharing geoscience expertise on WKYU-FM's Midday Edition program, and giving talks at schools, churches, community organizations, and for service groups.

Two faculty served as editor or co-editor of professional academic journals, seven faculty reviewed manuscripts for academic journals or publishers, one faculty authored a chapter in a textbook on Sinkholes, another authored a chapter in a book on cities in Latin America, and another co-authored a revised edition of a popular physical geography textbook. Faculty research articles appeared in such diverse outlets as the *International Journal of Climatology*, *Environmental Management*, *Hydrological Processes*, and *Essential Sources in Cave Science*, among others. Eighteen faculty articles or book chapters are either currently in review, revision, or awaiting publication.

In May 2006, the Department recorded **224** majors in geography (235 in 2005), **76** in geology (62 in 2005), and **93** total minors (82 in 2005). ***This is a 3.5% increase in declared majors and minors over the 2004-2005 academic year.*** The Department graduated 40 students from its major programs during the year and it has a target of 40 new majors each year to maintain and grow the programs.

The students and faculty of the Department of Geography and Geology again have performed exceedingly well over the past year. We have each and every one of you to thank for helping to build the Department into what it has become--the best in the state and one of the very best in the nation. We look forward to hearing from you this coming year.

Best Wishes,

David J. Keeling
Department Head

*** HOMECOMING ***

Saturday, October 28, 2006

** Special Event: Geography and Geology Departmental Tour (Including our GIS lab, MESONET, and Applied Research Centers).
Time: 1:00 - 2:00pm

Location: Meet on 3rd Floor EST Building

** Special Event: Homecoming Tailgating
Time: 2 p.m. - 4 p.m.

Location: DUC South Lawn - Join us at the
Geography and Geology Alumni Tent.

Enjoy good food and old friends. Meet the departmental faculty and current students.

VISIT THE DEPARTMENT'S WEBWORLD

The Department's homepage continues to undergo significant updating, with a completely revised home page and a redesigned information portal. In addition to the outstanding Kentucky Climate Center site, originally developed by Glen Conner, our State Climatologist Emeritus, and continued by current State Climatologist Stuart Foster, the homepage provides complete program and course information, with links to myriad geography and geology related pages. For instance, pointing your browser to **http://www.wku.edu/geoweb/** will take you to the index page. From here, you can link to all the different types of courses offered by the Department. Many of the course descriptions will have links to the syllabus or to the Professor's personal homepage, to a variety of study guides, and eventually to interactive activities. From the homepage, you can also explore all of the different program tracks offered by the Department and link back and forth to the individual course descriptions within each track. There is always more construction to do, but we hope you find the material available so far informative and useful. Email us with your comments!! We'd love to hear from you.

http://www.wku.edu/geoweb/

Outstanding Geography Students, 2005-06

The Department of Geography and Geography takes pride every year in the quality of its graduating seniors and, each year, the Department recognizes its outstanding seniors at a public presentation by presenting them with awards and certificates. The recipients of the Department's highest honors also receive recognition at the annual Ogden College Awards Ceremony.

For the 2005-06 academic year, Brandy Woodcock received the Outstanding Geology Senior Award, presented by Dr Andrew Wulff. Crystal Edge Bergman received the Ronald R. Dilamarter Outstanding Senior in Geography Award, presented by Dr Rezaul Mahmood. Scott Schoefnacker received the Outstanding Geoscience Graduate Student award, presented by Dr Mike May.



Margaret Crowder presents Brandy Woodcock with the Outstanding Senior in Geology Award at the Annual Ogden College Awards Ceremony, April 2006

**Congratulations to ALL
our Outstanding Students!**



Scott Dobler presents Crystal Edge Bergman with the Outstanding Senior in Geography Award at the Annual Ogden College Awards Ceremony, April 2006

Introducing Our Newest Faculty Member:



Dr. Yanmei Li

Dr Yanmei Li joins the WKU faculty after receiving her Ph.D. in City and Regional Planning from the Ohio State University in Columbus, Ohio. Dr Li is from Yunnan Province, China. Her hometown is famous for caves and karst topography, which partially contributed to her interests in Geography as an undergraduate student. Afterwards she pursued her Master's degree in regional economics.

Dr Li is an amateur figure skater at the intermediate level. She also likes outdoor activities, playing tennis, gardening, reading, watching movies, and travel-

ing. She is a dog lover and has a mixed Labrador retriever.

Dr Li's professional interests center on spatial statistics and econometrics, housing and community development, land use planning, economic development,



real estate economics and finance, and advanced quantitative methods in city and regional planning. She is especially interested in policies addressing urban issues in affordable housing, sustainable community development, housing programs for people with special needs, community redevelopment/revitalization, historical preservation, and housing rehabilitation. She is also interested in racial issues and their impact on the housing market. Her most recent research agenda focuses on mortgage foreclosures. Her dissertation is about the interaction between residential mortgage foreclosure, neighborhood characteristics, and neighborhood change. Besides producing significant academic outcomes from the dissertation, she hopes to extend her dissertation through a complete research agenda in mortgage foreclosures, and to introduce some previously neglected statistical issues and research methods to city and regional planning.

She is teaching two sections of Data Analysis and Interpretation and one section of Advanced Planning Theory and Application during the Fall 2006. She will help develop a new curriculum for the city and regional planning concentration, and she will introduce planning majors to the Association of Collegiate Schools of Planning (ACSP) and other professional

and academic planning organizations. She plans to develop new courses in city and regional planning, especially planning for housing, physical elements of urban development, land use planning, and urban economics. She is looking forward to working with students who are interested in pursuing careers in planning!



Study Abroad Students in Outback Western Australia

Kentucky Climate Center Receives Funding to Develop Mesonet

Published originally in the Newsletter of the the Applied Research and Technology Program (ARTP)

The Kentucky Climate Center and the people of Kentucky received good news when U.S. Senator Mitch McConnell announced a National Weather Service earmark of \$1.5 million for development of the Kentucky Mesonet. This appropriation covers the first year of a planned two-year project to develop a high-density, meso-scale, network of automated environmental monitoring stations across Kentucky. Instruments will measure precipitation, temperature, relative humidity, solar radiation, wind speed and direction, soil moisture, and soil temperature. Further, Kentucky Mesonet stations will be platforms to which other critical environmental monitoring sensors can be added as the need arises.

Nearly 100 automated stations will be deployed across the state. Each station will include a set of instruments located on or near a 10-meter-tall tower. Measurements will be packaged into observations every 5 minutes, and then transmitted to the Kentucky Climate Center every 15 minutes, 24 hours per day throughout the year. The data will undergo quality assurance checks and become available to customers and the public within minutes.

Data collected by the Kentucky Mesonet will provide wide-ranging benefits. Some of these are highlighted below:

As Kentucky's agricultural economy diversifies, the mesonet will provide data that can help producers assess the viability of entering new high value markets, while enhancing the efficiency of traditional crop and livestock operations. When severe weather threatens, the mesonet will provide data that can help forecasters target watch and warning areas and help emergency responders save lives and property.

As Kentucky faces the challenge of educating the next generation, the mesonet will provide data that can help teachers challenge their students in math and science through innovative and engaging



When drought grips the state, the mesonet will provide data that can help managers of scarce water supplies address the needs of urban and rural communities.

As cities address challenges of erosion, flooding, sedimentation, and pollution from storm water, the mesonet will provide data that can aid planners in developing best management practices tailored to their communities.

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Figure 1: Mesonet site at Lost River Cave & Valley in Bowling Green.



Figure 2: Dr. Stuart Foster, Director of the Kentucky Climate Center.



Figure 3: Probe for monitoring soil moisture levels.



Figure 4: Dr. Rezaul Mahmood, Associate Director of the KCC and the Kentucky Mesonet



Figure 5: Baker Natural Area, Russellville, KY. Site reflects a partnership between the Kentucky Climate Center and the North and South Logan Conservation Districts.

As a member of the National Climate Services Partnership, the Kentucky Climate Center is working closely with representatives of the National Weather Service (NWS) and the National Climatic Data Center. “Representatives of the five NWS Forecast Offices that serve portions of Kentucky have displayed great enthusiasm for the project,” said Dr. Stuart Foster, Director of the Kentucky Climate Center. “They will play a vital role in helping us to develop the best possible network to serve the needs of Kentuckians.”

The Kentucky Mesonet will require investments in three divisions. An instrumentation division will support technicians responsible for ongoing site maintenance of mesonet stations and an on-campus laboratory for testing and

calibrating instruments. An information technology division will handle ingest (which refers to the process by which the server receives and stores data from weather stations around the state) and quality assurance procedures in near real time for data acquired from the mesonet sites across the state. Data will then be archived at the Kentucky Climate Center and other remote sites. Finally, an applied research and service division will focus on development of web-based applications and outreach programs to add value to mesonet data for a variety of users.

“The Kentucky Mesonet will create some exciting opportunities for Western,” Foster said. “In addition to offering an array of services across Kentucky, the mesonet will provide rich

learning experiences for students. Many of these experiences will involve opportunities for students to work with faculty on applied research in areas ranging from meteorology and climatology to environmental planning. The mesonet promises to help attract quality students on a regional and even national scale.”

In the coming months, the Kentucky Climate Center will be building partnerships to support the development and ongoing operation of the mesonet. For more information regarding the mesonet and opportunities for partnering with Western, please contact Dr. Stuart A. Foster by email at stuart.foster@wku.edu or by phone at (270) 745-5983.

by
*Stuart Foster, Director
Kentucky Climate Center*

Area Development Districts Host Kentucky Mesonet Kickoff Meetings

The Kentucky Climate Center and the Kentucky Council of Area Development Districts are working in partnership to invite local stakeholders to become involved with building the Kentucky Mesonet. This summer, kickoff meetings have been held at the Lincoln Trail, Pennyrile, Green River, Kentucky River, and Cumberland Valley Area Development Districts. Representatives of the Kentucky Climate Center and National

Weather Service have provided information about the Kentucky Mesonet and the variety of applications and benefits that it will provide. Local stakeholders at these meetings have been invited to participate by recommending potential sites where mesonet stations can be installed. “In building the mesonet, we want to maximize the benefits to people throughout Kentucky, and the best way to do that is to involve them at the local level,” said Dr. Foster. “Our meetings thus far have provided some valuable information from people with expert knowledge about the opportunities and challenges associated with finding the best possible sites for environmental monitoring stations in their areas.”

As development of the Kentucky Mesonet continues over the next two years, the Kentucky Climate Center will schedule additional meetings around the state.

by
*Stuart Foster, Director
Kentucky Climate Center*

The Center for Cave and Karst Studies

By Nick Crawford

The Center for Cave and Karst Studies (CCKS) is pleased to announce that Annie Croft, our Research Hydrologist and Karst Field Studies Coordinator, has been promoted to Assistant Director. Our dedicated and extremely hard-working Laboratory Manager, Scott Roach, has gone back into full-time teaching. We will miss Scott greatly; however, the CCKS has hired Adam Coffman as our new Lab Manager. Adam, a chemistry major, is doing a great job managing our very busy Dye Tracer Laboratory.

This year the Center assisted in the establishment of the Mammoth Cave International Center for Science and Learning (MCICSL) located at Mammoth Cave and provided half of the new Director's salary. Dr Rickard Toomey has been hired as Director of the MCICSL and is part of this cooperative program between WKU and Mammoth Cave National Park. His primary office is at Mammoth Cave National Park (MCNP), but he also has an office within the CCKS in the Department. Our major area of cooperation at present is improvement and expansion of the Karst Field Studies Program.

During the 2005 summer, the CCKS and the MCICSL offered the following one-week courses/workshops: Karst Geology – Dr Art Palmer; Exploration – Dr Stan Sides; Cave Cartography – Pat Kambeis; Karst Stewardship – Dr Rick Toomey, Rick Olson, and Dr Pat Seiser; Karst Hydrology – Dr Will White and Dr Nick Crawford; Hydrogeology of the Edwards Aquifer (San Antonio, Texas) - Dr George Veni; Cave Geomicrobiology – Dr Hazel Barton; Cave Biology – Dr Horton Hobbs and Rick Olson.

Center personnel and students attended the 14th International Congress of Speleology in Athens, Greece, August 21-26, 2005. Those giving professional papers included Nick Crawford, Annie Croft, Rick Toomey, and students Gina Cesin, Brian Sakofsky, Jeremy Tallent, and Josh Brewer. At the meeting, it was decided that the 15th International Congress of Speleology in 2009 would be held in Texas. The scientist in charge is none other than one of our distinguished alumni, Dr George Veni.

Three years ago Nick Crawford received a

\$225,000 grant from the Kentucky Science & Technology Corporation to build a robot platform for measuring microgravity to facilitate the location of caves and clandestine tunnels. The CCKS and the Engineering Services Center have worked together on the project, with most of the robot construction being directed by Dr Stacy Wilson and performed by her engineering students. It has been a very successful cooperative program between the two centers over the past three years.



Geophysical research using the microgravity meter and the Void Detection Robot (VDR) along the California-Mexico Border. Left to right: Annie Croft, Nick Crawford, and students: Tom Rippy, Michael Howard, Matt Coffelt and Gina Cesin (not pictured, Nathan Rinehart).

In May, 2006 faculty, staff, and graduate and undergraduate students from the Center for Cave and Karst Studies and the Engineering Services Center participated in a blind test to evaluate our ability to locate clandestine tunnels extending beneath the US-Mexico Border at Calexico, CA, using microgravity and electrical resistivity. The CCKS and the Engineering Services Center also demonstrated the Void Detection Robot (VDR). Dr Crawford, Annie Croft, and graduate students, Gina Cesin and Nathan Rinehart and undergraduate students, Matt Coffelt, Tom Rippy, and Michael Howard spent 3 days using microgravity and electrical resistivity along the border to locate clandestine tunnels. Several geophysicists from various government agencies were there to observe the test of the techniques and equipment. The demonstration has resulted in the U.S. Geospatial Intelligence Agency and the U.S. Geological Survey providing over \$130,000 in new instrumentation to assist with

the continuing research to develop ways to locate caves and clandestine tunnels. Also, graduate student Gina Cesin, who is doing her graduate thesis on locating clandestine tunnels along the US-Mexico Border, has received a grant of \$25,000 from Los Alamos National Laboratories to finish her MS Thesis. Building the VDR and research along the border was an excellent experience for the students and involved learning through applied research and national public service. If the microgravity and electrical resistivity techniques pioneered by WKU faculty and students to locate and map caves from the ground surface can also be applied to locate clandestine tunnels, it could be an important contribution to National Homeland Security. However, the existing techniques are slow and very labor intensive, which makes the VDR a critical component to the use of these geophysical techniques.

Other research consisted of a series of dye traces to delimit the source areas for springs and cave streams at Russell Cave National Monument, AL, Lookout Mountain National Military Park, TN, and Chickamauga National Military Park, GA, under a two-year grant from the National Park Service. Numerous dye tracer tests to determine groundwater flow routes were performed at each location. Some of these included injecting dye into streams that discharged from caves and then dropped over beautiful waterfalls into large sinkholes. Graduate student Brian Sakofsky is completing his MS Thesis on the karst hydrogeology at Lookout Mountain

Other research activities have included investigating a sinkhole collapse under a 3.5-million dollar building in Alabama. The Center performed a microgravity and electrical resistivity subsurface investigation and also drilled a 300-ft deep well and injected dye that traced the groundwater flow to a nearby rock quarry that had lowered the water table more than 330 feet by pumping. Our research concluded that the quarry was responsible for the collapse by de-watering the karst aquifer under the building site.

The Center also performed a geophysical investigation of a sinkhole collapse that destroyed a home in Portland, Tennessee in December, 2005. The Center also had grants to perform two studies of groundwater flow for the Missouri Department of Conservation that involved performing dye tracer tests of groundwater that flowed to some of the largest and most beautiful

springs in North America.

Other research activities by our faculty, staff and students included several karst subsurface geophysical investigations using microgravity and electrical resistivity. The Dye Tracer Laboratory has been involved in traces of groundwater flow at numerous locations including sites in Virginia, Tennessee, Kentucky, Georgia, Alabama, Texas, California, New York, Guam and Croatia. Annie Croft and our student associates have performed numerous karst subsurface investigations over the past year.



Students injected dye into the stream that drops 80 feet into a large sinkhole to determine the groundwater source area for Russell Cave National Monument.

The Center received approximately 50 research grants and contracts over the past year, and our faculty, staff and graduate and undergraduate students have written numerous technical reports and publications and presented papers at numerous professional meetings, including the 14th International Congress of Speleology, Athens, Greece; the 10th International Sinkhole Conference, San Antonio, TX; the National Geological Society of America Annual Meeting, Salt Lake City, UT; the 17th National Cave and Karst Management Symposium, Albany, NY; the Kentucky Academy of Science Annual Meeting, Richmond; the USEPA Region 3, Leaking Underground Storage Tank Conference, -Roanoke, VA; the Real-Time Detection of Clandestine Tunnels Conference, Oxford,

MS; the American Geophysical Union Annual Meeting, Joint Assembly, Baltimore, MD; the National Speleological Society Annual Meeting, Huntsville, AL; and several other meetings, workshops and field trips.

The CCKS continues to work with and assist the Friends of Lost River in the development of Lost River Cave and Valley as an educational tourist attraction. During 2005, Lost River had over 74,000 visitors! Lost River has grown from the original 23 acres to approximately 80 acres of land and includes almost all the area between Cave Mill Road and Dishman Lane. This year the CCKS worked with Dr Stuart Foster and the Kentucky Climate Center in the construction of a weather station at Lost River. We are also working on plans to establish a prairie similar to the original "Barrens" of Kentucky, which will surround and protect the weather station and serve as an educational exhibit. Numerous school groups now visit Lost River to learn about karst hydrogeology while viewing the cave by boat and walking the trails down the cave Valley. The Center is also assisting with the establishment of a wetland treatment system for storm-water runoff and other educational projects.

Kentucky Geographical Alliance

At Western Kentucky University, the Department and its faculty are taking a key role in a five-year campaign to improve geographic education. Scott Dobler, a geography instructor and coordinator of the Kentucky Geographic Alliance, is working to promote *My Wonderful World*, an educational campaign launched this week by the National Geographic Society.

A National Geographic-Roper survey shows that many young Americans can't locate nations like Japan, India or Iraq and can't locate the states of Louisiana and Mississippi, which were hit by hurricanes last year. "Our young people don't know enough about geography, so we can either complain about it or do something about it," Dobler said. "Fortunately the Kentucky Geographic Alliance is already engaging this topic. National Geographic has empowered people like me at the grassroots level."

The My Wonderful World campaign (www.mywonderfulworld.org) is addressing geo-

graphic education at the national, state and local level. The campaign fits the KGA's main purpose, which is to continue geographic education for all of our citizens. The KGA provides teacher training and family activities throughout the year. "I want people to understand that as our world globalizes, events around the world have a larger impact on each of us," Dobler said. "Geography provides people with essential information that they can integrate into better decisions for themselves. At that time you can explain issues instead of repeating what others say."

"Geography is more than maps. The My Wonderful World campaign helps teachers, parents and students understand that concept," Dobler said. For example, three recent issues in the news – the war in Iraq, concerns about rising oil prices and the immigration rallies across the United States – are all integrated into geographic themes. Geography also integrates directly to history, economics, political science, sociology, psychology and other disciplines, he said.

"Just understanding where something is located is the first step," Dobler said. "Understanding why it's there is next. "That's what I love about geography. It pulls everything into one idea. If you like geography, the world needs your help now." For more about geographic education, visit the KGA website at www.kga.org. Additional geography resources for teachers, students and parents are available at www.mywonderfulworld.org



Study Abroad Students in Australia



Op-Eds About Geography Can Encourage Critical Thinking

David J. Keeling
Department Head

As a member of the American Geographical Society's Writers Circle, I regularly write commentaries about relevant social issues viewed from a geographer's perspective for publication in the local, regional, national, and international media. These Op-Eds have ranged from arguments about transportation investment in the U.S. to left-wing politics in Latin America. Part of the mission of the American Geographical Society (www.amergeog.org) is to stimulate debate on issues of importance to society and to highlight a geographic perspective on such issues. Scientists too frequently are accused of failing to engage with public policy in a meaningful way (witness current debates over global climate change), so writing opinion pieces for local newspapers is one way to encourage a dialogue about important social and political issues. Our hope is to encourage the citizenry to engage with these issues at the local and regional level, thus helping to influence policies in a proactive way.

The following Op-Ed addresses the issue of illegal immigrants in the U.S. and suggests that the U.S. invest in infrastructure development in Latin America rather than in walls between our neighbors. It has been published in the *Georgia Calhoun Times*, as well as in other local and regional newspapers.

If We Build it, They Won't Come!

Recent attempts by President Bush and the Congress to address illegal immigration reveal a stunning level of indifference and ignorance about the geographies of regional socioeconomic development. All of the rhetoric about militarizing the border with Mexico, building better barriers, and legalizing (or not) the estimated 12 million illegals in the U.S. misses a fundamental question. Why have source countries in Latin

America failed so miserably to provide better economic opportunities for their citizens? And why has the U.S. failed so miserably to encourage a level of economic development in Latin America that would counter the migration flow northward?

Most Latin American illegals in the U.S. would rather be working in their home country if a sufficient level of economic opportunity were available. The fact that it is not is a sad indictment of a century of U.S. engagement in the region. In recent decades, the U.S. has supported brutal right-wing dictatorships in Latin America and turned a blind-eye to horrific human rights abuses. It has helped to overthrow democratically elected governments, and engaged in pointless rhetoric about leaders such as Allende, Castro, and Chavez, who at least have talked about improving quality of life for the masses even if that goal is not often achieved.

What the U.S. has not done is help to build the necessary infrastructure for a modern, integrated, functioning economy in countries that are the source of most illegals coming northward. Roads, railroads, airports, ports, energy and telecommunications networks, schools, hospitals, and potable water systems should be the focus of U.S. investment in Latin America. Yet we've left that task to the Enrons, who built dams in Brazil and elsewhere, and the Bechtels, whose privatizing of Bolivia's water system proved politically destabilizing. We should be supporting public infrastructure projects. If we build it, they won't come!

The U.S. is not without lofty ideals and ambitious goals when it comes to building up societies - think back to the Marshall Plan for war-devastated Europe. Indeed, several countries or groups of countries have realized the importance of building infrastructure in regions where there are strong trade and social interrelationships. In recent decades, for example, the European Union has invested billions of euros in infrastructure development in the poorer regions of Portugal, Italy, Spain, and Greece to stimulate economic growth. Similar strategies are currently in place to help develop the weaker economies of Central Europe that have recently joined the EU. Within the U.S., infrastructure investment has stimulated economic growth in regions as disparate as the Appalachians and Puerto Rico. Yet meaningful infrastructure investment in Latin America by the U.S. has been minimal

and ineffective.

How many millions of lives could have been improved positively in Mexico, the Caribbean, and Central America if the billions now flowing into Iraq, a country that has few trade or social inter-relationships with the U.S. beyond oil, had been invested in creating economic opportunities for the region's poor? The illegals who flock to the U.S. from Latin America do so not because of the promise of an enlightened democracy but for a good paycheck that can feed their families and help them achieve a better life. What illegals in the U.S., and those that would follow them, need right now is economic opportunity in their home country, freedom to build a better quality of life, and open borders befitting an economically and socially integrated trading region. What they don't need is fences, arcane amnesty rules, and platitudes from politicians about democracy, assimilation, and security.

In reality, countries like Mexico, Guatemala, or Honduras present a "clear and present danger" to the U.S. in far more serious ways than does a country like Iraq. Illegal immigration is more damaging to the socioeconomic wellbeing of both source and host countries than Iraq could ever be. Saddam Hussein had no capacity, or intent, to infiltrate the American heartland and wreak economic havoc on its citizens, thereby weakening social and economic structures at home. Some commentators have argued that illegal immigration has attacked the economic heartland of America, and is inflicting serious socioeconomic damage on host communities. Actually, the impact of illegal immigration extends to the entire U.S. and the source countries. Social and economic infrastructure in the region must be improved for the welfare and security of all citizens in the region. The U.S. must use what little influence and leverage it has left in Latin America to work together to provide economic opportunities, social mobility, and basic infrastructure. If we build it, they won't come.

More Changes in the Department!

This past summer, the Department renovated several rooms in the 3rd floor of EST, partly with Academic Quality funds received from the administration and partly with departmental and grant funds. Room 328 has been converted into a 26-seat conference and

seminar room, with half-circle tables and comfortable chairs. A state-of-the-art document projection system is provided in the room. EST 337 now has 48 seats with accompanying work tables and is the primary classroom for general education courses such as Introduction to Meteorology, World Regional Geography, and Introduction to the Physical World. The new Mesonet project (see story on page 5) has funded renovations in rooms 344 and 355. Room 344, which used to serve as the Cartography Laboratory before the GIS Center opened, becomes the administrative offices of the Kentucky Mesonet, and Room 355 has been converted into a Climate Research laboratory.

Graduate student accommodations have been consolidated into one room—EST 326—where a new computer system and printer, along with desks and chairs, make for a more comfortable environment within which the graduate students can interact. Former graduate offices in EST 358 and 352 have been converted to other uses; 352 is now an adjunct faculty office and 358 serves as a temporary climate research office until renovations are completed elsewhere. Room 353 is now the headquarters of the Kentucky Geographical Alliance, co-directed by Scott Dobler, the 2006 Kentucky State Geographer, and Dr Kay Gandy, who teaches geography education in the P-12 environment.



WKU Geoscience Students Win GIS Conference Scholarships

Two more Western Kentucky University geoscience graduate students received scholarships to participate in the 26th Annual Environmental Systems Research Institute (ESRI) International User Conference in San Diego during the week of Aug. 7–11, 2006. Shawn Marie Simpson of Bowling Green and Jon Hall of Louisville were selected from a pool of international applicants for the competitive scholarships, which supported 60 graduate and fourth-year undergraduate students from universities and colleges throughout the United States and around the world. The scholarships required students to work half-days at the conference in exchange for their conference registration, workshops, meals and lodging.

This is the fifth year in a row that WKU's Department of Geography and Geology has had a student selected for the scholarship, but this year is the second time that ESRI has selected two; last year was the first. Simpson presented "An ArcIMS Application with the Kentucky Climate Center at WKU" and Kevin Cary, WKU GIS director, presented "Network Analysis: A Classroom Project." Also in attendance were WKU alumni: Clint Franklin (Instructor of Geoscience at Indiana University Southeast), Allen Glennon (GIS Ph.D. candidate at the University of California in Santa Barbara), Rhonda Glennon (ArcGIS Product Specialist at ESRI in Redlands, Calif.), Shwu-Jing Jeng (Database Developer Analyst at ESRI in Redlands, Calif.), Guy Perry (GIS Analyst for the USDA), Dan Taylor (Master Planner/GIS Specialist for the Army Corps of Engineers), Jeremy Weber (GIS Developer/Analyst for the state of Tennessee), and Jason Wood (GIS Analyst for Texas Gas Transmission in Owensboro).

Geology Students Selected for Summer Research Programs

Three Western Kentucky University geology majors were selected this past year for summer research programs. Daniel Hawkins, a senior from Hanson, participated in a National Science Foundation-funded Research Experiences for Undergraduates program this past summer through the Keck Geology Consortium. Research involved fieldwork on the island of Vinalhaven off the coast of Maine, studying a bimodal suite of plutonic rocks associated with the mid-Paleozoic Coastal Maine

Magmatic Province. Fieldwork will be followed by analytical/laboratory work to identify the geochemical and mineralogical characteristics of the rocks and develop models of petrogenesis.

During the program, Daniel worked with Dr. Robert Wiebe and David Hawkins, whose research in this area has focused on the replenishment of granitic magma chambers and associated volcanic rocks. He will continue the research at WKU under the supervision of Dr. Andrew Wulff (assistant professor of Geography and Geology) and present results of this research at the national Geological Society of America conference in October 2006 in Philadelphia and at the annual Keck Symposium in April 2007.

Dianna Schaeffer, a senior geology major from Bowling Green, was selected to participate in a competitive, paid NASA summer internship through the Student Intern Program. She worked on data being sent back by the Mars Rover Operation. "I am very honored to have the opportunity to put my skills and knowledge to work for NASA," she said. "It is my goal during this summer's internship to work hard and not only shine for this University but also for others who have worked very hard to get where they want to be in life." Housing and other needs are provided for the duration of the internship in Washington, D.C., which ran from June 5 to August 14.

Geology major Ashley Williams from Leitchfield was selected to participate in a summer course in field volcanology offered jointly by the University of New Mexico and Los Alamos National Laboratory. The course is only offered every other year and participants come from all over the world and include many professional volcanologists who come to New Mexico to study the remarkably well-exposed volcanic deposits and features. Participants form teams and map volcanic deposits, study emplacement mechanisms and depositional structures, employ various gas sampling techniques, and write reports on their findings. The fieldwork will complement the analytical work Williams has been doing, using isotopes to characterize geologic environments.

"Great research and internship opportunities such as these add significant value to the geology program at WKU," said Dr. David Keeling, head of the Department of Geography and Geology. "The level of preparation these students receive in their preparatory and advanced geology classes makes them highly competitive when external opportunities become available, including graduate programs and research positions such as these."

Adventures in Geoscience

Geography, Geology, and Archeology Erupt Together: The Ruins at Pompeii

By Michael Trapasso

Pliny the Younger (a Roman geoscientist) wrote in the summer of 79 C.E., "These recent tremors are not particularly alarming because they are frequent in Campania" (the Roman province around Pompeii). But in early August he reported that springs and wells had dried up, and the tremors, which began around the 20th, were becoming more frequent. On 24 August of that year, a catastrophic eruption of the volcano Vesuvius began and for the next two days the shower of tephra and ash, and lava flows buried the cities of Pompeii and Herculaneum under 6 meters of volcanic effusion. Ironically, this cataclysm coincided with the 'Vulcanalia', the festival of the Roman god of fire. There would be no revelry in Pompeii that year!

The same pyroclastic material that destroyed Pompeii, also acted to preserve the city. In essence, this vibrant resort city and vacation spot - pride of the Roman Empire - was frozen in time, only to come to life again over fifteen centuries later.

In 1599, an engineer by the name of Fontana discovered rooftops of some of the buildings of these two cities while digging a new course for the River Sarno. It took another 150 years before funding could be allocated and a serious effort to uncover these cities was put forth. In 1748, the archeological digging began in earnest, and Pompeii's remarkable architecture and wondrous artwork began to emerge.

If the Greeks were the master scientists and philosophers of the ancient world, then the Romans were the master architects and engineers. It was the Romans who perfected the semicircular arch, which allowed Roman architecture its strength and stability. They learned to construct arches atop other arches to build massive structures in both area and height. They learned to rotate the perfect arch to create perfect and stable dome structures as well.

Roman engineers were also the ones who perfected the mixture known as concrete. In addition

to the mixture of calcium carbonate (lime) and stones, the Romans further added a volcanic sand known as *pozzolana*. Pozzolana is an uncommon kind of sand, which reacts chemically with lime and water to become a rocklike mass. Its components of silicon and aluminum, when combined with calcium hydroxide, form a compound with remarkable cementation properties. In essence, Roman concrete could harden underwater! With this new amazing building material, the Romans became masters of seaside development (i.e., piers, and bridges) and hydraulic engineering (the famous aqueducts).



The Temple of Jupiter is found in the Forum of Pompeii, and Vesuvius looms in the background

It is no wonder that Roman structures are still used today. These remarkable construction techniques and other urban developments were certainly employed at Pompeii. This resort town, and playground for the rich and famous of the Roman Empire, possessed the amenities of the best Imperial cities.

In exploring the ruins of the city, one finds many elements that remind us of our modern cities. For municipal entertainment, there were 2 amphitheatres, the large one for gladiatorial games and the smaller one for recitation of plays and poetry. Gymnasiums were complete with a field for sporting events (*palaestra*), swimming pools, and dressing rooms, with individual lockers and walls adorned with beautiful fresco paintings. Homes

were built around atriums and private gardens containing statuary and fountains. Frescos grace the walls and mosaic tile decorate floors of even some of the simpler and more modest homes.

The elevated sidewalks and crosswalks protected the Roman gentry from flooded or dirty streets. The streets themselves were edged with a zigzag mosaic of white reflective stones so that after dark, people with lantern or torchlight could watch their footing. Street corners displayed carved signs depicting such scenes as livestock crossings, or areas for loading and unloading materials. Three short, wide pillars were placed at the end of various streets to stop chariots and horses from entering pedestrian malls and plazas. Water fountains were found on numerous streets for municipal use. There were even holes drilled through curbstones so people could tie their horses and chariots by the side of the street.

Like most Roman cities, Pompeii had a sewer system (another Roman invention), which allowed for overall public sanitation. Some homes possessed the luxury of running water by means of pipes embedded in their walls. Subterranean waterways supplied Pompeii's public bathhouses (a staple of every Roman city), where people could bathe in the hot pool (*caladarium*) located closest to the furnace or natural heat source, and the cold pool (*frigidarium*). Other chambers supplied moist heat like a steam room, and even dry heat like a sauna (*laconicum*). Constantly flushing open public toilets were also commonplace, (the Romans obviously had a high-level of hydraulic engineering but a low-level of modesty).

The marketplace was filled with all sorts of shops, some designed with sliding doors. Countertops were equipped with built-in compartments where various products could be displayed. Some streets were lined with bars and restaurants where Romans could take their meals and socialize. Pompeii also possessed an extensive "red light district." Each room in the brothels was decorated with paintings depicting the type of sexual activity that should take place in that particular room.

The population of Pompeii was estimated to be over 20,000, with about 8,000 people in Herculaneum. Since the volcanic eruption took the city by surprise, there is no telling how many may have escaped the devastation. Most of the populations of these two cities were killed by a pyroclastic flow (which was first

described by Pliny the Younger). These superheated gas and tephra clouds emerged from the vent and swept down the slopes of Vesuvius at an estimated 100 km/h (60 mph) and with an estimated temperature of about 600 degrees C (1000 degrees F).

In 1860, under the direction of archeologist Giuseppe Fiorelli, researchers began to inject plaster into any cavities and crevasses exposed by the archeological digging. When the volcanic material was removed, the hardened plaster displayed the casts of human beings, whose flesh and bones had long deteriorated but their exact shapes were left intact. Some of these human impressions were quite dramatic! People huddled in corners, people shielding their faces, mothers holding young children to protect them, people gasping for air ... in other words their last position before they died.

One final bit of irony ... pozzolana sand, the vital ingredient to Roman concrete, comes from the area known as Pozzuoli, which is located near Vesuvius. Thus, Vesuvius and volcanoes like it, supplied the material that helped to make the Roman Empire great, only to erupt and destroy one of the premier Roman cities.



Plaster cast of a man in his last position before he died

Across the Seven Seas

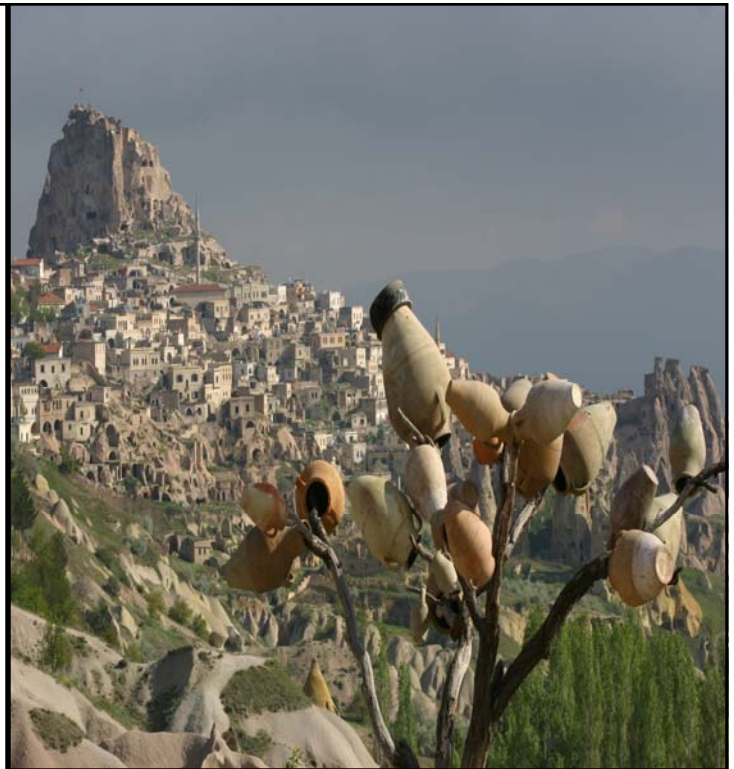
By David Keeling

Part of the joy of life as a geographer is embracing the opportunity to travel to, and explore, remote and distant places across the planet. In my capacity as a national councilor for the American Geographical Society, I frequently lecture on educational tours that focus on the geography of people and places. This past November, I traveled throughout the Mediterranean basin on a lecture tour that journeyed from Egypt to Malta, via Crete, Sicily, and Tunisia. In April and May, I lectured on an expedition that covered the Seven Seas: from the Adriatic, Black, Caspian, and Mediterranean, to the Arabian, Persian (Gulf), and Red. On these expeditions, my primary goal is to inculcate in passengers how a geographical perspective can shed light on society's most pressing issues.

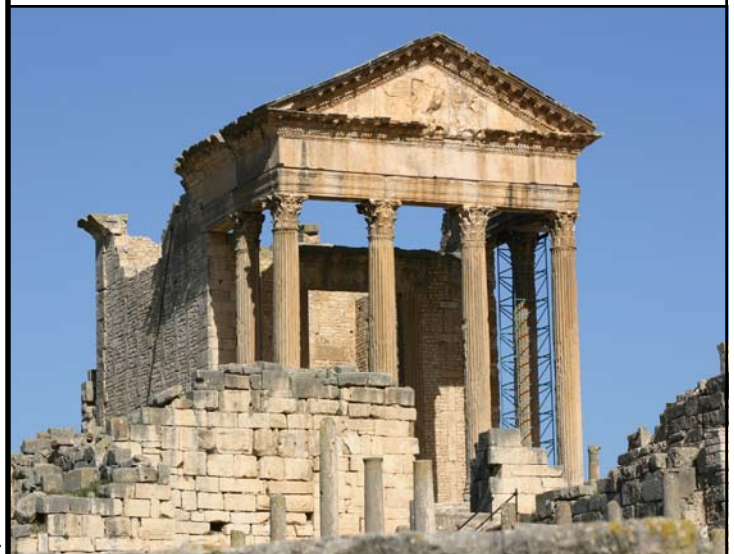
In Turkey, for example, we discussed some of the many challenges faced by the country in attempting to gain admission to the European Union. Turkey's Islamic culture, its recent repression of Kurdish nationalism, and its economic difficulties all play a significant role in determining whether or not the country will ever gain admission to the Union. In Dubai, we explored the consequences of oil dependency and what strategies countries like the United Arab Emirates are taking to build a sound economic future for a post-oil revenue world. Dubai, in particular, is a fascinating case study given its investment in infrastructure, freight logistics, tourism, and other non-oil centered economic activities.

The Maldivian archipelago provided a wonderful locale to discuss the implications of global climate change for low-lying islands. In the wake of the recent devastating Indian Ocean tsunami, governments are starting to become more aware of the implications of global events on local places, and our discussions of the mechanics of global climate change generated several spirited conversations about the responsibility of more wealthy societies to address big-scale issues.

In Tunisia, Sicily, and Egypt, we explored the myriad layers of past civilizations, most notably the Romans in Tunisia. North Africa contains the Mediterranean world's finest Roman ruins, including El Jem, Dougga, and Carthage, to name but a few sites.



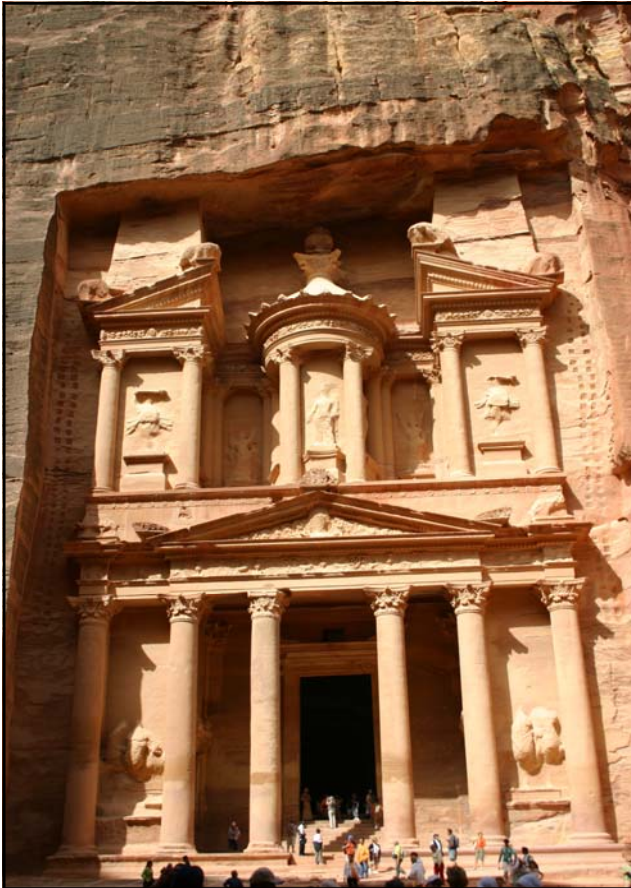
Cappadocia, Turkey



The Main Temple in Dougga, Tunisia

Traveling across the planet as frequently as I do, it often strikes me that the modern infrastructure we are so proud of may not be around in 100 or 200 years. Compared to the majestic Roman, Minoan, Egyptian, and Nabatean (Petra) infrastructure, our modern buildings seem almost frail and inadequate. Marveling at the incredible temples of Petra, especially the Treas-

ury building, it's hard to believe that these civilizations flourished so successfully over 2000 years ago. What will geographers be exploring 2000 years from now?



The Treasury at Petra

The "Geology of the Bahamas" offered again!

By Fred Siewers

One of the Department's new Winter Term offerings this past year was a 7-day study abroad experience on San Salvador Island, Bahamas, titled the "Geology of the Bahamas." The course utilized the facilities of the Gerace Research Center, a field station on San Salvador devoted to the geology, biology, archaeology, and marine science of the Caribbean. The course was led by Dr. Fred Siewers, as well as by faculty from the University of Akron and Minnesota State University at Moorhead. Twenty students par-

ticipated in the course; six of those students were from Western Kentucky University.

The purpose of the "Geology of the Bahamas" was to learn about the development of Quaternary (150,000 year old) tropical islands from the perspective of geology, biology, oceanography, and physical climatology. Students learned how limestones form (and are destroyed) in modern tropical environments and, in so doing, gained an appreciation for the development of more ancient limestones such as those found in south-central Kentucky. Students studied living reefs, fossil reefs, shell preservation, modern and ancient dunes, ancient soils, cave and karst features and the range of evidence scientists use to infer past changes in climate and sea level. Students also participated in a preliminary research project involving sediment coring of Bahamian lakes for the purposes of unraveling hurricane frequencies and past climate change.

Responses to the course were decidedly enthusiastic! All the students worked and played hard and, as indicated by submitted group and individual exercises, learned a tremendous amount. The research project was particularly important to many of the students as it helped them understand the process of science and what it takes to conduct scientific research in remote locations. After returning to Bowling Green, one of the Department's students submitted the following:

"Being on San Salvador provided me with many great opportunities. It gave me a chance to interact with students and faculty from all across the nation and to hear about their various areas of research. It also provided me with an insight into the area of carbonate or sedimentary geology. The field work, and especially the coring, provided me with much knowledge about what can be deduced from these cores and how to go through the whole process of an experiment from start to finish. As a future Graduate School student, I believe all of this is necessary and important for my continued success in geology. It has provided me with insights that will allow me to enter successfully a very competitive graduate student realm, and to move on to real-world jobs where I hope to do research that is relevant for years to come."

Future offerings of the "Geology of the Bahamas" will occur on an annual to bi-annual basis, either during the Winter Term or the May Term.



Field Work Can be Exhausting!

To Row or Not to Row, That is the Question!



STUDY ABROAD ADVENTURES IN TANZANIA & AUSTRALIA

By Debbie Kreitzer

This past year the geography program offered two study abroad opportunities for students -- Tanzania and Australia. With the addition of the new winter term, we were able to take a group of students to Tanzania. January is a good time to visit Tanzania because it is during the short dry season (which lasts from December to March) and travel in and around game areas, like the Serengeti, is easier when it is dry. So here is a short synopsis of where we went, what we saw and what we did in Tanzania.

The group consisted of seven students, David Keeling and his wife, myself, and a colleague from Hofstra University. We left Nashville on December 28, 2005, and flew first to Amsterdam, then to Tanzania. It was a long, tiring flight and it was late at night when we arrived at the lovely Kilimanjaro airport. We were met by some very friendly Tanzanians and could see and smell the many flowering trees surrounding the airport. Just being in Africa was invigorating. We spent a day exploring the city of Arusha and then began an exciting nine-day safari trip that took us to many of the wilderness areas of northern Tanzania, including Lake Manyara National Park, Lake Natron, Serengeti National Park, Ngorongoro Crater, Oldavai Gorge, Tarangire National Park, and Arusha National Park. It is difficult to summarize the amazing landscapes and animals we saw during this time period. Tanzania has some of the most spectacular natural landscapes in the world. We also saw almost every animal shown on any nature show about Africa -- and we were seeing them in their natural environment. What a thrill it is to have a wild elephant walk right past the window of your vehicle, or to watch a lion eating its latest kill just a few yards away! This was definitely a trip of a lifetime. Students learned about serious environmental issues threatening the natural environment of Tanzania, as well as the importance of ecotourism to the regional economy.

We also had the opportunity to interact with many different cultures. There are over one hundred different ethnic groups in Tanzania and, amazingly, they all

get along fairly well. Students were able to meet and interact with many different people. We visited both a Maasia village and a Tengeru village and learned a lot about their cultures, including agricultural techniques, living arrangements, arts and crafts, and food.



After our safari we flew from Arusha to the beautiful and exotic island of Zanzibar. The people of Zanzibar are predominantly Muslim and have many different cultural traditions compared to the people we came in contact with in northern Tanzania. Here we spent time exploring the maze-like city of Stone Town (which is a UN-designated World Heritage Site), visiting the many markets and enjoying the beautiful beaches. We ended our trip in Tanzania's largest city, Dar es Salaam. Here the students studied the effects of colonialism, poverty, and cultural diversity on Tanzania as a whole. Although in most cases this was a wonderful and satisfying experience for all of us, it was also very sobering. Tanzania (as well as most of Africa) has severe economic difficulties that translate onto the landscape in the form of poverty, disease, and corruption. It was difficult to appreciate the enormous challenges presented by this environment and the experience left us feeling a little helpless. However, because of this experience and the awareness they gained, our students will be better global citizens.

In June we took six students "Down Under" on the Department's second trip to Australia. In 2002 we took twenty students to the east coast of Australia and to the Northern Territory. This time we spent three



Grinding Coffee in Tengeru

weeks in Western Australia and a week in Sydney. We began our study-abroad experience in the Western Australian city of Perth. Getting to Perth was an adventure in itself, as it is about as far away from Bowling Green as one can get on the planet. We spent the first few days visiting the city of Perth and its vicinity. Many of the Australians we talked to consider Perth the most beautiful city in Australia. It is a very clean city with a distinctive skyline and many beautiful parks. We also traveled to nearby Fremantle for a day. Fremantle is known for the large historic prison, but we were more enchanted by its beautiful harbor and colonial-style buildings. We also visited one of the famous wine districts in Western Australia, the Swan Valley. But, according the students, the best place we visited was a wildlife park where students could get close to, and even pet, some of Australia's famous animals.

From Perth we followed the Great Northern Highway into the interior of Australia. Traveling in the Outback is a bit like going back in time. Many of the little communities reminded us of towns in the Wild West days of the western United States. Mining is still the most important industry in many of the little

towns we visited. Gold, silver, and iron ore are the most important minerals mined in this region. But we also visited other towns, like Wittenoom, whose economy was founded on the mining of blue asbestos. When we visited Wittenoom, its population was down to only 30, relying almost solely on tourism for income. Today the population of Wittenoom may be much less because the government cut off the main power supply to the town on July 1, 2006. Some Wittenoom residents are still fighting to keep their town alive despite the government's actions and the chance of contracting an asbestos-related disease.

We followed the Great Northern Highway to the coast and stayed in Port Hedland for a few days, then drove to Carnarvon, a small coastal town. It is known today for its agricultural products and the site of Australia's first earth station for satellite tracking and communications (instrumental in both the Apollo and Gemini space missions). Several of the students will argue that the best fish 'n chips shop in the world is located in downtown Carnarvon. After leaving Carnarvon we drove to the Monkey Mia Dolphin resort. Monkey Mia is located in the World Heritage Site of Shark Bay. It is one of the few places where dolphins will regularly come to the beach and interact with visitors. Our group was lucky enough to get to Monkey Mia just as the dolphins swam up to the beach. It was a once-in-a-lifetime experience.

We ended our Western Australian experience back in Perth, from where we flew to Sydney. We spent a week in Sydney studying economic, environmental, and population issues while seeing the famous sites of this great city. Some of the students went to a play in the famous Sydney Opera House, while others climbed the Sydney Harbor Bridge. All of us were able to take unlimited bus, subway, and ferry rides throughout the Sydney area. We also spent a day traveling through the beautiful Blue Mountains to the Three Sisters rock formation, Katoomba, and Echo Point. After a very successful visit, the group flew back to Nashville, having experienced what few other people will in their lifetime. Study Abroad really can be a life-changing experience!

FACULTY ACTIVITIES

KATIE ALGEO taught a mix of human geography, GIS, and research methods courses during the 2005-2006 academic year. During Fall semester she taught for the first time Geog 500, the Geoscience Research course that launches graduate students on their thesis projects. Although a challenging course to teach (as well as for students to take!), a good crop of incoming students and dedication all around made for a successful class. She also taught the undergraduate research methods class, Geog 300, and was very pleased that one student, Brian Biache, was able to expand upon his semester project on spatial patterns of hurricane landfall along the Gulf coast, and enter a poster in the Sigma Xi undergraduate research symposium. Yeah, Brian!

An exciting development in the GIS Analysis and Modeling class, Geog 417, during Spring 2006, was the inclusion of a service learning project involving the Baker Arboretum. Students in this class learned to use GIS technology, such as global positioning systems, terrain analysis, and 3-D landscape modeling, while contributing to the creation of a permanent digital database of plant information for the arboretum. As a culmination of the project, students created posters integrating data on plant species, elevation, roads, buildings, and the



Students at the Baker Arboretum using GPS to record location information for specimen plants

arboretum boundaries, and highlighting potential applications of the arboretum GIS, such as landscape planning and a virtual web-based arboretum tour.

On the grants front, Katie had a successful year. Working with co-principal investigators Dr. Rick Toomey (the new director of the Mammoth Cave International Center for Science and Learning) and Dr. Darlene Applegate (Folk Studies and Anthropology), Katie wrote and was awarded a \$113,000 grant from the National Endowment for the Humanities to fund two week-long workshops for community college teachers. The workshops highlight place-based teaching methodologies and were centered on, as the workshop title suggests, *11,000 Years of Culture History at Mammoth Cave*. Each day of the workshop featured a different theme (archeology, folk life, African-American experience, tourism, and creation of the national park), as well as highlighting a specific teaching methodology (field

mapping, oral history, genealogy, literary analysis, and map and photo interpretation). The workshops ran the last two weeks of July 2006 and drew almost 40 community college educators from around the country. Workshop reviews were highly favorable, and the trio of Algeo, Applegate, and Toomey hope to repeat them next

summer under their new title, *Mammoth Cave: People, Place and History*.

Katie had a book chapter published in *Rural Change and Sustainability: Agriculture, the*

Environment and Communities, edited by Stephen J. Essex *et al.* Her chapter is entitled "Mammoth Cave National Park and Rural Economic Development." Katie also developed a brochure for a historical walking tour of downtown Scottsville, Kentucky, and led two tours of the route during Scottsville's spring heritage celebration, *Jacksonian Days*. Katie's newest research project investigates the causes and conditions surrounding the recent rise (since 1990) of a wine industry in Kentucky. In addition to crunching a lot of census data and researching the impacts of changes in the state legal code on wine making and grape production, Katie has started systematically interviewing the people behind this phenomenon – the grape growers, wine makers, and winery owners – as well as evaluating a little of their product. Ah, field research!

JOHN ALL has had a busy year as his research took him to Chile and Tierra del Fuego for a month over Christmas and he taught a new class – Environmental Law - and a revised class – Remote Sensing - while serving as vice-chair of the University Senate. John also taught his normal load of Environmental Planning, Natural Resource Management, independent research and, of course, World Regional Geography.

John submitted new grants for over a million dollars and worked on the grants from WKU and the National Science Foundation that supported his research in Chile. This work examined the impacts of Global Climate Change and Climate Variability in Chile and Southern Argentina. While he was there, Patagonia experienced a heat wave: the high temperature is normally 60 degrees that far towards the South Pole but, while John was there, the mercury moved past 90 degrees and local people were extremely upset about the very evident climate changes. This heat combined with the ozone hole to give John one of the worst sunburns of his life.

Dr. All's had research on climate and species habitat published in *Environmental Management*. He made several conference presentations, including in Athens, Greece, at the International Congress of Speleology; in Chicago, Illinois, at the

Association of American Geographer's (AAG) annual meeting; and in St. Louis, Missouri, at the American Association for the Advancement of Science (AAAS) annual meeting. Dr All is currently serving on the AAAS Geology and Geography National Committee. His symposium for the 2007 AAAS meeting on the impact of climate variability and change on the world's mountain regions was recently accepted after passing through peer review.

In December, John went to Chile with two graduate students. This was funded in part by WKU and NSF grants to study the effects of climate changes on vegetation over the past few decades using satellite imagery. The students were examining the effects of globalization on sustainability in Chile. John was able to collect enough data for several interesting research projects in the area. John spent Christmas in Torres del Paine National Park (with a cold can of beans for Christmas dinner!) and New Year's Eve in Tierra del Fuego, where it was still light at midnight! Most of his work involved hiking up and down the Andean range with a GPS, collecting ground control points and interviewing resource managers.

Locally, John served as Vice-Chairman of the University Senate and instituted several new programs, including a Senate Newsletter for the campus community. Dr All was successful in this endeavor and was re-elected as Vice-Chair for the coming academic year.

Finally, John's son Nathaniel Oakes is just about to turn three. Not much has changed other than he grows bigger - he still runs everywhere, climbs like a monkey, and it is impossible to keep out of trouble. He also still carries on conversations with anyone who will listen. Unfortunately, they are still in a language that often times only Nathaniel understands. This has been a great year and John looks forward to a busier but even more rewarding one next year.

WILL BLACKBURN continued work this year on promoting the Geography major at the Glasgow campus. Although recruiting remains a

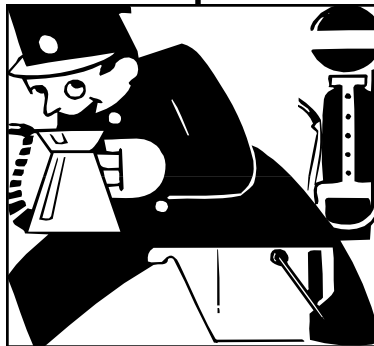


challenge, the program is new and it is too early to gauge results. The students Will has recruited choose to go to the Bowling Green campus for most of their classes.

Also this past year, Will has organized a new field experience for the Geography of Kentucky students. A tract of farmland fronting Barren River Reservoir has been donated to Western Kentucky University and provides students an opportunity to study in the natural environment. Will has utilized the land as an example of the tremendous cultural and physical changes that have occurred in the region since the Barren River was dammed in the mid 1960s. Another project that Will is working on for the students of Kentucky Geography is the "study a state" program, similar to a study abroad program but at a regional level. Next summer he will lead a tour of Kentucky utilizing the state park system for accommodations. The course will involve a journey that circles the state. This will allow students to experience, first hand, the diverse cultural and physiographic regions found throughout the Commonwealth. As a bonus, it should also be great fun!

Will continues to enjoy teaching the introductory classes for which that he has responsibility, and has added GEOG 121, Meteorology, to his repertoire. At home, after 10 years of debate (Will was in opposition), the brick on the family home is getting painted, and painted, and painted..... He does admit that the final results will be an improvement. Spouse Stephanie continues her work as an RN with the Medical Center, and daughter Abby is in the fourth grade and doing great.

KEVIN CARY just had a wonderful fourth year and is looking forward to another exciting year at Western Kentucky University. Along with his other duties as an instructor and GIS Director for the Center for GIS, Kevin has been spearheading the GIS committee to strengthen and improve the Department's GIS program. We now have seven GIS-based courses to offer our students along with the following programs in GIS: Certificate in GIS, Graduate Certificate in GIS, Minor in GIS, B.Sc. in



Geography (GIS track), and M.Sc. in Geoscience (GIS track). Currently, the Department is developing a stand-alone degree in GIS, a B.Sc. in GIScience. So stay tuned for the announcement! Check us out at <http://www.wku.edu/gis>.

Kevin participated in several conferences throughout the year. In August 2005, he presented *Mapping WKU's Information and Communication Infrastructure for GIS* at the 2005 Kentucky GIS Conference in Bowling Green with geoscience graduate student Shwu-Jing Jeng, who is now an ESRI Database Developer Analyst in Redlands, CA. In March, he was an attendee at the 2006 Annual Tennessee Geographic Information Consortium (TNGIC) in Franklin, TN. At this year's 2006 Kentucky GIS Conference in July, he participated as a panelist (a request from the governor's office on geographic information) on GIS in Kentucky schools. In August 2006, he presented *Network Analysis: A Classroom Project* at ESRI's 2006 Education User Conference in San Diego, CA. On the way back home from ESRI's 2006 Education and International User Conference, he got to experience a very challenging day in U.S. aviation history, 8/10! That was the first day neither liquids nor gels could be brought onboard any

U.S. domestic and international flight. He got home at 4am Friday morning after leaving San Diego on Thursday morning.

In June 2006, Kevin had the opportunity to be a co-instructor with Debbie Kreitzer for a study abroad trip to Western Australia and Sydney. Some of the interesting sites they visited in Western Australia included the Fremantle Prison; Scarborough Beach (world-famous surfing site) and Kings Park & Botanic Garden in Perth; gold mines in Mount Magnet; the Tropic of Capricorn in Newman; the gorges and waterfalls in Karijini National Park; a ghost town in Wittenoom; iron ore and salt industry in Port Hedland; the Indian Ocean at Eighty Mile Beach; the Satellite Earth Station (NASA's "Sheep Station" during the '60s and '70s) and banana plantations in Carnarvon; petting wild dolphins in Monkey Mia; and in Geraldton, the lobster industry and a meteorological office. For the

last leg of the trip, the group spent a week on the opposite coast in Sydney, visiting the famous sites such as seeing a play in the Sydney Opera House and climbing the Sydney Harbor Bridge!

GLEN CONNER continues to enjoy an active retirement. Although he did not teach during the year, his other professional activities did not diminish.

Two papers were submitted to and accepted by the publisher of *The Kentucky Almanac* that was published in December. The articles, each over 1,000 words, were on Weather Folklore and Climate Folklore. *The Almanac* was the first published in Kentucky in over 180 years.

Glen has been conducting research as part of NOAA's Climate Database Modernization Program on the history of weather stations, whose records extend deep into the nineteenth century. During the past year, he wrote Histories of Weather Observations in Bowling Green (July), Indianapolis (August), Memphis (September), Salt Lake City (November), Los Angeles (January), and San Diego (February), Wickenburg (May), and Sonoma (June). Collectively, these histories totaled 477 pages and are available to researchers through the National Climatic Data Center. Research for those histories required extended stays in the libraries and archives of the cities represented as well as to the National Archives and Records Administration in College Park, Maryland, the National Library of Medicine of Bethesda, and to the Smithsonian Institution in Washington.

He was invited to the Climate Services Vision and Discussion meeting at the Indiana State Climate Office at Purdue University in Lafayette, Indiana in October and presented "History of Climate Observations" in the "Connecting Past and Future" session. Glen also presented "Hurricanes and Yellow Fever: Some Commonality of Impacts" at the Association of American Geographers in Chicago in March, 2006, and chaired a session on "Human Vulnerability to Hazards" at that meeting.

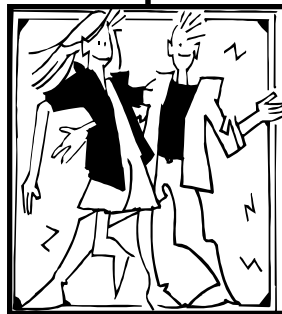
He attended the American Meteorological Society's Second Midwest Extreme and Hazardous Weather Conference in October in Champaign, IL,

the Association of American Geographers in Chicago in March, and Association of American State Climatologists in Rapid City SD in June. In his spare time, Glen volunteered as a coach for the Science Olympiad Teams representing the High School and Middle School from his county.

NICHOLAS CRAWFORD was recognized by the Geological Society of America Hall of Fame for receiving the 2005 Outstanding Contributions to Karst Science Award at the GSA Annual Meeting in Salt Lake City, Utah, on October 16-19, 2005. Nick received the award at a banquet in his honor at Mammoth Cave National Park hosted by the Karst Waters Institute on March 5, 2005. WKU also recognized Nick in 2005 as a member of the "Million Dollar Club" for receiving over \$1,000,000 in grants over the past 5 years.

Dr Crawford, with his staff and student associates, authored numerous technical reports based upon funded research performed by the Center for Cave and Karst Studies. Ten articles, most of them co-authored with students, were published in Proceedings of several international and national meetings. Two refereed articles titled "Hydro-geologic Investigation of Leakage through Sinkholes in the Bed of Lake Seminole to Springs Located Downstream from Jim Woodruff Dam" and "Ground-Water Basin Catchment Delineation by Dye Tracing, Water Table Mapping, Cave Mapping, and Geophysical Techniques: Bowling Green, Kentucky" were published in *Sinkholes and the Engineering and Environmental Impacts of Karst*, published by the American Society of Civil Engineers.

Crawford attended and presented papers (most of them co-authored with students) at the following scientific meetings: the 14th International Congress of Speleology in Athens, Greece; the 10th International Sinkhole Conference in San Antonio, TX; the Kentucky Academy of Science Annual Meeting in Richmond, KY; the Geological Society of America Annual Meeting in Salt Lake City, UT; and the National Speleological Society Annual Meeting in Huntsville, AL. Nick also presented "Invited Papers" at the Real-Time Detection of



Clandestine Shallow Tunnels Conference in Oxford, MS, the USEPA Region 3 Leaking Underground Storage Tank Conference in Roanoke, VA, and the American Geophysical Union Joint Assembly Annual Meeting in Baltimore, MD.

Crawford served as Vice-Chairman of the Board of Directors of the National Cave and Karst Research Institute (NCKRI) and attended two meetings in New Mexico for the NCKRI Board. Other travels included a trip with Annie Croft and five students to perform a blind test to evaluate our ability to locate clandestine tunnels extending beneath the US-Mexico Border at Calexico, CA, using microgravity and electrical resistivity. The Void Detection Robot (VDR), built by the cooperative efforts of the CCKS and the Engineering Services Center under a grant obtained from the Kentucky Science and Technology Corporation, was also demonstrated at that time to various government agencies.

Much of the spring semester was spent traveling to Missouri and Virginia to perform field research for dye tracer studies and to Alabama to perform microgravity and electrical resistivity research on sinkhole collapses. Nick continues to teach a full load and direct the CCKS and the Karst Field Studies Program at Mammoth Cave. He continues his position on the "Friends of Lost River Board of Directors," this year as Vice-Chairman. He would like to express his appreciation to all the previous students who have worked over many years to save and protect this site on the National Register of Historic Places by making it accessible to the public as an educational tourist attraction.

Nick may not "have a life," but he enjoys his work teaching and performing research with his students! He is grateful for his wife's patience, support and considerable assistance...the old man needs all the help he can get!

MARGARET CROWDER continues to have a great time being a part of the Geography and Geology community! This past year saw her active in a variety of events both on and off the Hill. Margaret continues to teach several sections of Introductory Geology courses (including lab

sections), a course in Oceanography and the relatively new offerings of Backyard Geology and Geology and Cinema. In addition to her teaching responsibilities, Margaret is the current Chair of the WKU Science Alliance (website is under development at: <http://sciencealliance.wku.edu/>) and the Secretary to the Science Education division of the Kentucky Academy of Science (<http://www.kyacademyofscience.org/>).



Simulated Volcanic Eruptions!

Margaret has been involved in a number of educational outreach activities this past year, including presenting another Super Saturdays course to some wonderful 4th and 5th grade students, and creating simulated volcanic eruptions for middle school students in Girls in Science Day at WKU. For the 'volcanic' eruptions, she used a trash can filled with water, some fruit loops, and a small bottle of liquid nitrogen. You can see from the picture that this was a pretty explosive event! Please don't try this one at home....!

As for a few of Margaret's college classes? Here's some of what they were up to since last fall:

GEOL 102 and 311 students participated in problem based learning activities involving environmental decisions going on both in the local community and world community. Students researched their individual problems, interviewed local citizens, business owners, and faculty at WKU, and presented results and potential solutions to their peers.

The GEOL 107 class toured various locations throughout the area to learn about the geology of South Central Kentucky. Students in the course were introduced to rock sample collecting and local fossil types as well as observational techniques to help them record data in field notebooks.

GEOL 106 students wrote, directed, filmed, produced, and even created their own special effects in 'bad geology' movies. Students learned how popular movies are often scientifically inaccurate and involved themselves in the movie-making process for some hands on learning and laughs.

Along with her 'regular' work, Margaret is also extensively involved in volunteer work within the community. As a part of this, she is a member of the Outreach Committee at her church, she serves on the Board of Directors for Friends of the Shelter, a not-for-profit animal rescue organization in Franklin, KY, and she is currently the only certified SAFER (Safety Assessment for Evaluating Re-homing) dog evaluator for the Simpson County Animal Shelter.

SCOTT DOBLER has completed his sixth year at Western Kentucky University. This past year he presented a paper at the Kentucky Academy of Science that addressed alternative ways to engage primary and secondary students with geoscience. He also presented at the Kentucky Council for Social Studies Teachers and Kentucky Science Teachers Association. Scott's continuing research interests will address how Kentucky college and university geoscience programs are preparing P-12 students for their future.

In order to concentrate on this endeavor, he has teamed up with a geography special-interest group. He is now a co-coordinator of the Kentucky Geographic Alliance (KGA). This group of

geographers will concentrate on the efforts of the Kentucky Geographic Alliance, which is already established with the National Geographic Education Foundation. The website: <http://www.kga.org> offers myriad options for educators, and public-private interests. If you are interested in geographic literacy or geographic education, Scott would be interested in talking to you.

This past year Scott was identified by National Geographic to represent Kentucky as a liaison for the <http://www.mywonderfulworld.org> campaign. The campaign is dedicated to solving some basic issues in regards to geographic education. It has activities for parents and schoolteachers to help engage the next generation in global awareness.

This summer Governor Ernie Fletcher recognized Scott as the State Geographer for the Commonwealth of Kentucky. This is a wonderful opportunity to address geographic education in the state. The duties of state geographer include advising state officials and agencies on geographic matters; serving as a resource for teachers of geography and for publishers of geography textbooks and atlases; assisting state and local officials with boundary studies; advising state and local agencies on mapping and cartographic programs; assisting state and local officials with planning, zoning and land-use studies; and cooperating with other states in exchanging geographic information.

Other activities that Scott is involved with include being an advisor for the Taiwanese Student Association, and he has accepted an invitation to be on the Board of Directors for the Wesley Foundation. He is a non-commissioned officer in the Kentucky National Guard and was recently appointed to Pack leader for Boy Scouts of America.

STUART FOSTER writes that the year was highlighted by the announcement in November of funding for development of the Kentucky Mesonet through a legislative earmark secured by U.S. Senator Mitch McConnell. (You can read more about the Kentucky Mesonet elsewhere in the GEOGRAM.) Preparations for the Mesonet got underway with an initial set of meetings in January, when the Kentucky



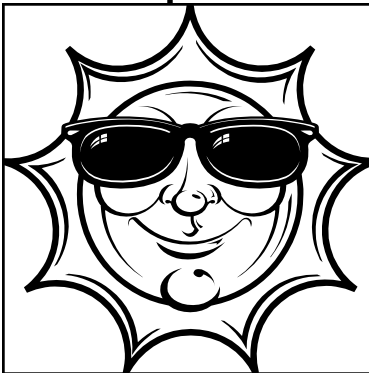
Climate Center hosted representatives from National Weather Service (NWS) Headquarters in Washington, DC, and the National Climatic Data Center in Asheville, NC. These meetings helped to lay the foundation for an evolving partnership. Drs Foster and Mahmood have since coordinated training sessions with NWS representatives as part of the Mesonet site selection process. In addition, they held a number of Mesonet kickoff meetings around the State, including stops in Elizabethtown, Hopkinsville, Owensboro, Hazard, and London, to introduce the project and invite local stakeholders to become involved. On a larger scale, Dr Foster gave presentations on the Kentucky Mesonet at the Annual Meeting of the American Association of State Climatologists in Rapid City, SD, in June and at the NWS Central Region Sub-Regional Climate Services Meeting at Purdue University in West Lafayette, IN, in July.

In addition to activities associated with the Kentucky Mesonet, Dr Foster has been busy as a guest speaker and attending professional meetings. He spoke at the ribbon-cutting ceremony for the Baker Natural Area in Russellville, KY, last April. Dr Foster was then invited to speak to high school students participating in the state-level competition of the Kentucky Envirothon at Jabez, KY, in May. He gave presentations on historical cold waves in Kentucky at the Midwest Extreme and Hazardous Weather Conference in Champaign, IL, last October and at the Annual Meeting of the Kentucky Academy of Science in November. More recently, he gave a presentation on the Mammoth Cave Biosphere Reserve Program at the Freedom 21 Conference in Fort Mitchell, KY, in July.

GREG GOODRICH had a solid first year in the Department. He taught introductory courses in Physical Geography and Meteorology at both the main campus and at Glasgow. He looks forward to teaching his new course GEOG 432/532, Synoptic Meteorology, for the first time this Fall. Greg is also involved in the curriculum design for the new B.S. degree in Meteorology and recently traveled to Louisville to discuss the new curriculum with the

National Weather Service. The new curriculum, which is expected to begin in Fall 2007, will meet all requirements of both the National Weather Service and the American Meteorological Society. He also expects to be heavily involved in the development of the many advanced meteorology courses that will be coming on line in the next few years.

Greg's research objective for the past year was to publish a number of journal articles based on his dissertation research on climate teleconnections and their impact on drought and precipitation patterns. Thus far, four of his six dissertation chapters have been published (or are in press) in peer-reviewed climate and geography journals and another is currently in review. New lines of research include the



impact of climate teleconnections on wine-grape production and wine quality in the western United States, regional precipitation variability in the Pacific Northwest, and statistical models for predicting winter precipitation in Arizona and summer ozone in Kentucky. Greg presented his research on climate and wine quality at the AAG national meeting in Chicago and gave local presentations at the KAS meeting in

Richmond and the East Tennessee Ozone Symposium in Oak Ridge. He is presently developing with a colleague at Arizona State University an NSF research proposal to study the spatial and temporal variability of extreme seasonal precipitation reversals in the United States. He was also invited to submit a review article on "Multi-decadal variability and drought" to the new *Geography Compass* journal this summer. Finally, Greg is working with graduate student John Walker on an article that examines the impacts of climate teleconnections on precipitation in the eastern United States. This work was funded by a Summer Faculty Scholarship from Western.

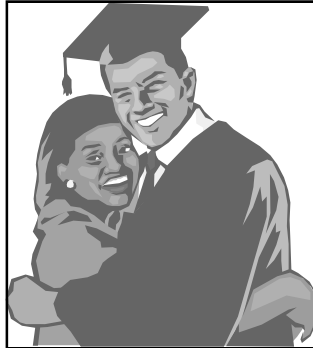
On the home front, Greg's wife Demara is beginning her second year in the graduate program in the Nursing department at Western and plans on graduating in May 2007. Greg and Demara have spent much of their free time over the past year taming their gardens and fixing up their house.

CHRIS GROVES, along with his students and colleagues, continued to make progress on the Hoffman Institute's various research programs, both in the US and internationally.

Most prominent (or at least most time-consuming) was the ongoing research program in water resources in southwest China that, after several years of effort, is scheduled to expand wildly this October with the establishment of the *WKU Hoffman Institute China Environmental Health Project*, made possible with a large, multi-year grant from the US Agency for International Development. Chris made two trips to China during the year to negotiate final details of the program with his colleagues at Southwest University of China (SWUC) near Chongqing. During the first trip early in the year, over three days he and his friends there took time out to examine some of the fantastic karst areas of the upper Yangze River near the famous Three Gorges Dam. Deana joined him on the second trip in August, as she is working with the SWUC library system on the USAID grant to improve access there to current English-language scientific information. On that trip, Chongqing earned its reputation as one China's four so-called "Furnace Cities," reaching a temperature of 110° during one day of their trip.

In another developing collaboration, Chris was invited in April to speak on the China work at an afternoon symposium at Harvard University's Fairbank Center for East Asian Studies. This, in turn, led to an invitation later in the year to expand the talk as a workshop at the annual conference of the Harvard University Project for Asian and International Relations, held this August in Singapore. Deana joined Chris on the August trip, merging it with the side jaunt to China above.

In the other direction, Chris traveled to the United Nations' UNESCO Headquarters in Paris, France, in February to attend the meeting of the International Geoscience Program, where the project *Global Study of Karst Aquifers and Water Resources*, on which he serves as Project Leader, was approved for funding through 2009. On the trip he also visited friends (and with them, several caves) in the Muese River region of Belgium and near Maastricht, Netherlands, a country certainly not known for caves. In April,



Groves sent two students, Pat Kambesis and Beth Medley, to represent him at conference of the UNESCO project in Malaga, Spain, and, as part of a separate cooperative effort, the Hoffman Institute welcomed Dr. Angel Fernández Cortes *from* Spain during the year. Over several visits, he is working at the Institute as a post-doctoral research scientist.

Nearer to home, a number of projects with students have progressed, including USDA-funded work in collaboration with Dr. Carl Bolster and a number of students at Cave Spring Caverns near Smiths Grove and Monin Cave in Green County, to understand impact of agriculture on karst groundwater quality, and ongoing collaboration with The Nature Conservancy (TNC) to map and study caves in an effort to help TNC develop protection strategies. Work also moved forward on collaborations with scientists in Tongass National Forest in southeast Alaska, with two Hoffman Institute students, Johanna Kovarik and Melissa Hendrickson, spending the summer in Alaska working on thesis research.

DAVID J. KEELING reports that his thirteenth year in the Department, and fifth as Department Head, once again generated challenges, excitement, some great international trips, several informative workshops, and hard-working students to keep him extremely busy.

As always, travel remains at the center of Dr Keeling's professional and personal life, and over the course of the past year he enjoyed some marvelous research and lecture trips to the four corners of the planet. In May 2005, Dr Keeling joined colleagues from Hofstra University for a visit to Greece, where they visited Meteora and Santorini, before attending a conference in Athens. Santorini is famous for the massive volcanic explosion that occurred in 1650 BCE. In July and August, he accompanied Debbie Kreitzer and Will Blackburn on the annual summer departmental study-abroad program to Chile and Argentina. The program commenced in Santiago, Chile's vibrant and cosmopolitan capital, and proceeded along the western foothills of the Andes mountains to the Atacama desert in northern Chile. After several days in the Atacama desert, the group crossed the rugged Andes on a newly paved highway

(at least on the Chilean side) and spent several nights in colonial Salta. From there the group drove down the eastern foothills of the Andes to Mendoza, enjoying a ski excursion to the slopes of Aconcagua, the Western Hemisphere's highest mountain. After two more nights in Santiago, students and faculty returned home after a wonderful learning experience.

In November and December, Keeling led an AGS expedition to the Mediterranean, visiting Egypt, Crete, Sicily, Tunisia, and Malta. On the expedition, he lectured about the regional economy, about Libya's new role in the North African world, about resources and the environment, and on issues of sustainable development. A highlight of the trip was a visit to Dougga, in Tunisia, one of the best-preserved Roman cities in the region.

In later December, Dr Keeling headed across the Atlantic once again, this time to Tanzania with a small group of students for a winter-term field camp in the Serengeti. The group spent three weeks in Tanzania, completing a 12-day safari in the Serengeti, and then spent four nights in exotic Zanzibar before spending the final two nights in the noisy and chaotic capital of Dar es Salaam. Although the 24-hour journey from Tanzania back to Bowling Green is hard on the body, the experience of visiting Africa is well worth it! In March, Keeling headed back across the Atlantic for the third time for a short research trip to rural Wales. He spent the week examining ongoing development and change in Bala, a small, rural, Welsh-speaking community on the fringes of Snowdonia National Park. The academic year concluded with another AGS expedition, this time to the Seven Seas of antiquity. In mid-April, the tour commenced in London and proceeded first to Dubrovnik in Croatia, before visiting Kotor (Montenegro), Odessa (Ukraine), Baku (Azerbaijan), Dubai (UAE), the Maldives, Petra (Jordan), Dougga and Tunis (Tunisia), and Cappadocia and Istanbul (Turkey). During the expedition, he lectured on the breakup of Yugoslavia, global climate change, the relationship between oil and Islam, and the potential accession of Turkey to the European Union.

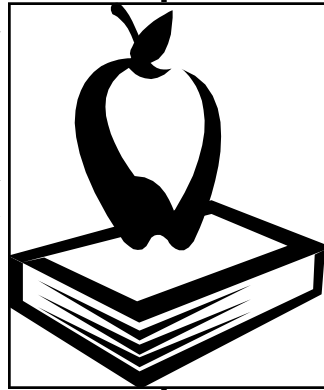
David participated in several conferences and workshops during the year. Over the 2005 summer, he participated in Western's inaugural Engaging the

Spirit workshop, talking about how to plan a study abroad program, and in the FaCET mini-conference on global studies. He also participated in a leadership and team-development workshop organized by the university. Finally, in March, he attended the annual Conference of the Association of American Geographers in Chicago.

Within the community and on campus, Dr. Keeling gave several talks on issues ranging from Hispanics in Bowling Green, France's EU referendum vote, and globalization in Russia and China. He appeared several times on WKYU-FM's Midday Edition, gave a talk at the Midday Rotary Club on business ethics in Latin America, gave a presentation on Tanzania at Barnes and Noble, and contributed lectures to a number of departmental courses. Dr Keeling continues to serve as a National Councilor for the American Geographical Society, and as the webmaster for the Society (visit www.amergeog.org).

As Department Head, Dr. Keeling attended way too many meetings, as usual, but during the year he contributed to the ongoing development of the Leadership Studies program (www.wku.edu/leadership) and to International Education on campus (www.wku.edu/iec). Department Head duties have severely restricted his ability to write and publish research, but during the past year Dr. Keeling's chapter titled *Waterfront Redevelopment and the Puerto Madero Project in Buenos Aires, Argentina* finally appeared in *Cities and Urban Geography in Latin America*, published by the Universitat Jaume I in Valencia, Spain. He also made sporadic progress on his book *Geography Rocks!*, a geographical analysis of the development and change of popular music in American society, and reviewed several books and manuscripts for publishers and academic journals.

As always, Dr Keeling encourages past, present, and potential students to come by and share travel stories, information, and geographic tidbits. He can be reached easily in cyberspace at: david.keeling@wku.edu or by phone at (270) 745-4555. Also, visit Dr Keeling's homepage on the World Wide Web— just enter: <http://www.wku.edu/~david.keeling/index.htm>.



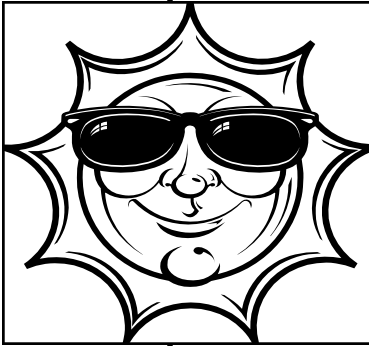
STEVE KENWORTHY had an interesting and challenging year in the Department. Steve continued his sediment-related field research on the Upper Green River, setting up instrument sites on Pitman Creek with the help of several students. Graduate students Narcisa Pricope and Sarah Rehkopf, both working on Green River-related MS theses, went on to pursue new challenges in graduate studies and environmental consulting. Meanwhile, Steve continued his semi-transformation to a cave-and-karst researcher by making regular forays underground to collect data on water and sediment fluxes at Logsdon River, in Mammoth Cave National Park. Steve will be presenting the first of his Logsdon River work at the Geological Society of America meeting in Philadelphia this October. Also at the GSA meeting will be graduate student Juan Herrerra, presenting storm-scale geochemical analysis of Logsdon River flows, and Charles Trodick, a summer NSF-REU (Research Experience for Undergraduates) student, who will present an analysis of sediment fluxes from Pitman Creek. Steve was fortunate to get involved with several of the students in the WKU-Green River REU program over the summer.

Steve and his spouse, Renae Speck, continue to enjoy their Bowling Green home so close to campus, and the work of fixing up the interior. Renae's job in the WKU Office of Sponsored Programs remains challenging and rewarding, particularly since they moved into new offices (with windows!!) in Potter Hall. Steve and Renae enjoyed a trip to Hawaii in March, including scuba diving, whale watching, and hula lessons! Back in Kentucky, they also purchased a 15' sailboat (1974 Chrysler Mutineer) after taking a sailing class in Bowling Green, and thus created a new recreational interest (sailing weekends on Barren River Lake) as well as new boat fix-it projects to attend to in Steve's spare time.

DEBRA KREITZER spent another very productive year teaching, researching, traveling, and planning new geographical experiences. She is still the advisor of the Geography Club, which grew by

several members and was more active than the previous year. The club seems to be picking up more majors as freshmen, which means club members participate longer and become invested in the club. This growing club includes students in departmental activities, builds camaraderie between faculty members and students, provides public service opportunities, and provides geographical experiences through field trips.

Expanding the departmental Study Abroad Program is an important goal of Debbie's. Because of the new Winter Term at WKU, the Department was able to offer more study abroad opportunities for students. Debbie participated in two of the department's programs. The first was a trip to



Tanzania in January. The most anticipated and most exciting part of the trip was the safari in the northern portion of Tanzania. The word "safari" originates from a Swahili term meaning "to journey," and it was quite a journey! The group journeyed to Lake Manyara National Park, Lake Natron, Serengeti National Park, Ngorongoro Crater, Oldavai Gorge, Tarangire National Park, and Arusha

National Park in two Land Rovers that held seven passengers each. Most of the travel time was spent on very bumpy and dusty dirt roads. However, the scenery more than made up for all of the discomfort. It included landscapes ranging from mountains and volcanic craters to savannahs and every animal one could hope to see, including lions, hippopotami, giraffes and zebras.

The last part of the trip was spent on the island of Zanzibar and in and around the city of Dar es Salaam. Zanzibar is an exotic tropical island that was an important trading center in the Indian Ocean region during the 19th century. The group took a couple of tours around the island to see some of the famous beaches and spice plantations. The people of Zanzibar are predominately Muslim, which is reflected in the Arabesque Mosques, bazaars, and especially in the elaborate doors. Stone Town, a World Heritage Site, was especially fun with its maze-like streets and alleyways shadowed by three-to-four-story houses, shops, schools, and mosques. All in all, the trip to Tanzania was extraordinary!

The second study abroad trip Debbie led (along with Kevin Cary) was to Western Australia and Sydney. Students who participated experienced landscapes that even most Australians never get to see. The expedition began in the Western Australian capital of Perth and then turned north. In order to experience the outback, the group spent several days in the interior. In this region, roads stretch forever, sometimes with only a single roadhouse providing gas and food for travelers coming from hundreds of miles in any direction. Like the western United States, gold and other minerals led to the settlement of several small towns in the region. However, unlike the western U.S. most of the settlements have not grown much. In fact, many of them have either lost population or become ghost towns even though the mining of valuable minerals continues in the region.

After reaching the coast again, the group headed south. The Western Australian coastline is similar to the southwestern coast of the United States in some ways. For example, the ocean current that skirts the coast of Western Australia is cold and the surrounding climate is arid to semi-arid -- just like the coastal areas in southern California. The group enjoyed many memorable moments, including watching the "staircase to the moon" in Port Hedland, the blowholes near Carnarvon, and the dolphins at Monkey Mia.

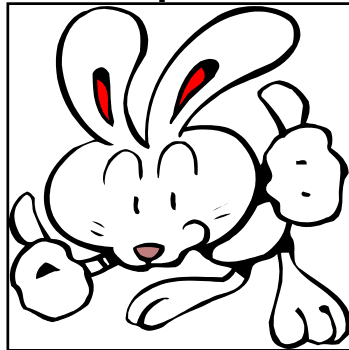
Sydney was the last stop on the trip. Although the students enjoyed Western Australia, Sydney was their favorite part of the trip -- probably because there are so many things to see and do including touring the Sydney Opera House, riding the ferries in the harbor, visiting the Sydney Aquarium, climbing the harbor bridge, or just walking around the city and enjoying the cosmopolitan atmosphere.

Debbie also attended the Association of American Geographers (AAG) Annual Meeting in Chicago, IL, and presented a paper with graduate student Ashley Littell. Will Blackburn and Debbie drove to Chicago with two students. While in Chicago they were able to visit some of the city's more famous sites like the Sears Tower, the Magnificent Mile, and Millennium Park. This year Debbie hopes to encourage a record

number of students to attend the AAG in San Francisco.

If any or you are interested in participating in one of our study abroad programs or in supporting a student on a study abroad trip, please send me and email <debbie.kreitzer@wku.edu>.

KEN KUEHN writes that, thinking back, it seems that last year was an especially busy and productive one. He collaborated on five articles, six published abstracts, and eight professional presentations, plus he attended nine professional meetings. Many of those efforts involved topics in the realm of academic professional development. Since Spring 2004, Dr Kuehn has been associated with WKU's Faculty Center for Excellence in Teaching, but that temporary assignment has ended and he is back in the department full-time this year. It was a wonderful experience, both in the role of teacher and learner. He worked with professors and graduate students from across campus to help improve the process of teaching and to help meet the University's goal of



"preparing students for success in a global society." Ken attended the annual conference of the Professional and Organizational Development (POD) Network in Higher Education in Milwaukee last October and co-presented two workshops there: *Part-time at the Center: Staffing Models and Personnel Issues* and *Reaching Out: Collaborating to Leverage Resources and Improve Impact*. Some of his other topics throughout the year included *Significant Results: Ten Items for the Bottom Line*, *Maximum TLC: Making the Most of Your Campus Teaching and Learning Center*, and *Exploring the New York Times in Education Program*.

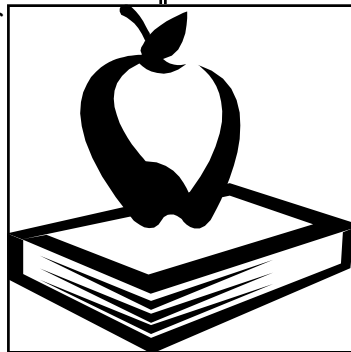
In the world of Geology, Dr Kuehn's biggest event was the 42nd Annual Meeting of the American Institute of Professional Geologists (AIPG) which was held in Lexington. Drs May and Kuehn prepared a guidebook - *Karst Geomorphology and Environmental Concerns of the Mammoth Cave Region, Kentucky* - and led a day-long field trip around the region for more than 40 geologists from all parts of the country. He also co-presented two papers there: *Planning for Interstate 66 in South-central Kentucky*:

Increasing Public Awareness through Geologic Maps (with a colleague from the Kentucky Geological Survey) and *Who needs NEPA? A Case Study of the Kentucky Transpark* (with Dr May). By the way, the guidebook is available through AIPG and the black-and-white hardcopy comes with a CD that also has stored on it several other guidebooks from the meeting, all in their original color format.

To update you on the Department's Geology programs, the new curriculum is now in its second full year of implementation and is doing quite well! Geology is the only program at WKU to offer both the BS and BA degree and Ken is pleased to report that a number of majors are pursuing the new BA path. Right now the Department has more than 60 declared majors, which is the highest total in recent years. He suspects that this is the result of increasing demand in the marketplace, especially in the fossil fuels sector, as well as the flexibility provided by the new curriculum. This past spring Dr Kuehn rolled out the first-time offering of a new required course, *Professional Preparation in Geology*, wherein students surveyed employment and graduate school opportunities, prepared résumés, participated in a program at the new Student Success Center in DUC, and discussed many other topics that were designed to smooth the transition between college and career.

As for the coming year, Ken will be building momentum for a campus-wide effort on educating for a sustainable future. Dr Kuehn is currently forming a committee he calls "Ogden CSI", or the *Ogden College Sustainability Initiative*. As every geologist knows, the depletion of Earth's non-renewable natural resources and our continued reliance on conventional technologies is causing problems that have global implications. It is time to find some better ways to help ensure that future generations will have the same opportunities that we do. He is also getting involved with a natural resource assessment study for the National Park Service that will continue for approximately two years.

"Well, that's it for now. Please keep in touch; you know I am always happy to hear from you! (kenneth.kuehn@wku.edu, 270-745-3082)."



REZAUL MAHMOOD writes that it was another busy and productive year. He taught Meteorology, Weather Analysis and Forecasting, and Physical Climatology. Rezaul continued to conduct research in soil-moisture modeling (as it relates climate), impacts of land-use change on long-term climatic records, land surface-atmosphere interactions, hydrometeorology of flash flooding in the Eastern Kentucky and Appalachian regions, and ground ozone concentration. Six graduate and four undergraduate students participated in these research activities and gained hands-on learning experiences. Rezaul mentored two students to present papers at the 21st Meeting of the Weather Analysis and Forecasting, Washington, DC; one student at the 102nd Annual Meeting of the Association of American Geographers (AAG) in Chicago, IL; one student at the 60th Annual Meeting of the AAG Southeastern Division (SEDAAG) in Biloxi, MS; two students at the 91st Annual Meeting of the Kentucky Academy of Sciences, in Murray, KY; and five of his students presented posters at the Sigma Xi conference here at Bowling Green, KY.

A new Climate Research Laboratory has opened in the Department. This lab is the result of collaboration between Rezaul, Drs Michael Trapasso, Greg Goodrich, and Stuart Foster, and Scott Dobler. All of the equipment in the lab has been obtained through extramural funding.

Rezaul is pleased to note that he received this year's *University Award for Research and Creativity*. He is the recipient of a similar award from the Ogden College of Science and Engineering. During the past academic year, Rezaul published his research in the peer-reviewed *International Journal of Climatology*. A number of his papers are either in press or currently in review with *Global and Planetary Change*, *Hydrological Processes*, *Monthly Weather Review*, and *Journal of Applied Meteorology and Climatology*. He is currently organizing a special issue to be published by the *Journal of Applied Meteorology and Climatology*. This issue focuses on the impacts of land-use change on climate. A special issue on this topic, to be published by *Global and Planetary Change*, is currently in press, with Rezaul serving as

the lead editor. In addition, Rezaul has continued to review proposals for the National Science Foundation (NSF), which required a significant time commitment.

Rezaul was also invited to serve on the editorial board of *Geography Compass*, a journal published by Blackwell, and he reviewed papers for prestigious academic journals such as *Geophysical Research Letters*, *International Journal of Climatology*, *Climate Research*, *Journal of Applied Meteorology and Climatology*, *Agricultural and Forest Meteorology*, *Hydrological Sciences Journal*, *Journal of the American Water Resources Association*, and *Agricultural Water Management*.

After several years of groundwork, Dr Stuart Foster and Rezaul have received \$1.5 million from the NOAA to begin work on the first phase of the Kentucky Mesonet. They anticipate a second year funding award of equal amount. Their goal is to build a state-of-the-art real-time weather observing network. The Kentucky Climate Center will take the lead in building this network, which will record data on temperature, precipitation, wind speed and direction, relative humidity, solar radiation, and soil moisture and temperature (at five depths up to 1 meter). The data will be transmitted every 15 minutes (year round) and high quality will be assured through near-real time in-house processing. These data will be available to schools, universities, first responders, and various other stakeholders in the private and public sectors through the world wide web. The Kentucky legislature has passed a bill signed by the Governor recognizing the Mesonet as the official source of climate and meteorological data for the Commonwealth. Dr Foster and Rezaul expect tremendous opportunities in research, education, outreach, and service in the future using the Mesonet.

Rezaul has continued his research on micro- and meso-scale land-surface atmosphere interactions funded by the United States Department of Agriculture (USDA). This funding allowed him to recruit one graduate student and he is currently in the process of hiring a post-doctoral research associate. Three years ago Dr Cathleen Webb (Dept. of Chemistry) and Rezaul received \$254,000 in competitive grant funding from the National Science



Foundation's (NSF) Research Experience for Undergraduate (REU) program. This funding was for three years and they have successfully completed the third year of the project. This past year they recruited nine extraordinary undergraduates from all over the nation to come to Western for ten weeks to conduct research. As in the past, participating students focused their research on hydroclimatology, hydrology, water quality, and water chemistry issues around Mammoth Cave National Park and the Upper Green River watershed. These activities allowed students to gain hands-on research experience within a close one-on-one mentoring environment. Rezaul also submitted two competitive grants to the NSF (\$600,000) to study soil moisture and bias in precipitation measurement. Moreover, NOAA funded Rezaul to build a flash flood climatology of the Appalachian region.

Rezaul was invited to serve on the editorial board of the climate section of *Geography Compass*, a new journal published by Blackwell. He served on the Dean's advisory committee for Ogden College of Science and Engineering. He went to Chicago, IL (AAG annual meeting), to organize three special sessions focusing on the topics of impacts of land use change on climate and hydroclimatology. Rezaul also presented papers in this meeting and co-authored papers at annual meetings of the SEDAAG and the KAS.

MICHAEL MAY finds it hard to believe that he has spent a full decade in Bowling Green and he is looking forward to his next decade at WKU. He is excited about the new curriculum developed for the undergraduate degrees in geology and this fall is teaching the field methods course for the first time. In addition to teaching classes and engaging students, various side projects have kept him busy, including a continued interest in *terra rossa* soils as chronicled in the *Western Scholar* magazine this past spring (see Spring 2006 issue at <http://www.wku.edu/Dept/Support/AcadAffairs/Magazine/>), being active as President of the Kentucky Society of Professional Geologists (KSPG), aiding Ogden College in developing an MS degree in environmental science, consulting on sedimentary geology issues at various

sites from coast to coast, finishing up a paper on biostratigraphy of conodonts in Pennsylvanian rocks northwest of Bowling Green with Indiana and Michigan colleagues, organizing a field trip for the national meeting of the AIPG along with Dr. Kuehn, chairing an MS thesis, and working as a member of the content advisory team for Prentice Hall and American Geological Institute (AGI) in developing a new textbook.

The Prentice Hall book in development is entitled *Living with Earth*, a non-major environmental geology text. Dr May was selected by Prentice Hall and the AGI Headquarters in Alexandria, VA, to play a special role as a member of the advisory team because he teaches environmental geology and introductory geology, two areas that the book will target.

Dr May, along with Dr Ken Kuehn and Joe Meiman, Mammoth Cave National Park Hydrologist, led a group of AIPG members on a field trip in the Mammoth Cave area as part of the 42nd Annual Meeting of the American Institute of Professional Geologists – “Geologic Information: Racing into the Digital Age.” The three, along with Dr Chris Groves, published a 39-page field guide entitled *Karst Geomorphology and Environmental Concerns of the Mammoth Cave Region, Kentucky*, as part of the October 8-13, 2005, national meeting headquartered in Lexington, KY. At the same meeting, Dr. May and Dr. Kuehn presented a poster session entitled *Who needs NEPA? A Case Study of the Kentucky Transpark*.

Mike's first MS student, Scott Schoefnacker, finished, in early 2006, his thesis entitled *Spatial Characteristics of Paleochannels in Association with the Mississippian/Pennsylvanian Systemic Boundary in Western and South-Central Kentucky*. Other members of the MS committee were Drs Siewers, Kuehn, and Kenworthy. Scott's research focusing on extensive correlation of subsurface geophysical well logs and use of digital data helped him to be recognized as the outstanding Graduate Student in Ogden College during the first-ever separate Graduate Student Commencement Ceremony in May 2006. He was awarded a medal as the college winner at

Commencement. The Department is proud of Scott's achievement and we wish him well in his work as a geologist at ENSAFE in Memphis.

The 2006 calendar year has also been especially busy for Mike as he has had the responsibility of anchoring the organization center of the KSPG in the Department after its move from Lexington at the KGS. Along with Fred Siewers as Secretary-Treasurer, he has seen to it that the Society newsletter and web communication go out smoothly to approximately 150 active members of the Society in the Commonwealth of Kentucky. Plans are for a Quaternary geology trip October 5-7, 2006, in the Evansville-Henderson-Owensboro areas (for more details of the trip see <http://www.kspg.org/pages/events.html>). This provides a great opportunity for students. There will also be a soils description workshop at the Henderson office of the KGS, a banquet keynote speaker and, of course, great surficial geology in the Lower Ohio Valley. This year's trip is a joint effort between KSPG and AIPG-KY section.



Mike has continued his work with the Boyd-Lubker Visiting Scholar Committee at WKU and is now a co-chair of the committee. This academic year's chosen speaker, Dr Neal Cutler, from Widener University in Pennsylvania, will be coming to the WKU campus to speak on money and getting older, as Dr Cutler specializes in financial gerontology. Dr Cutler will guest lecture and participate in various classes while on campus, tentatively slated for February 7-9, 2007. His evening presentation should be of great interest to aging baby boomers and the general public. There will be an announcement of his visit on the WKU website in early 2007.

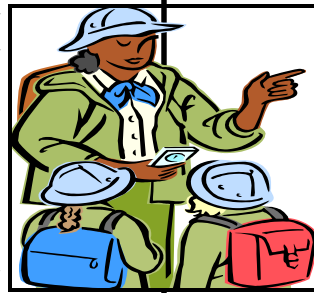
Dr May believes the geology program is vibrant and with a new curriculum and a variety of degree offerings such as BA and BS degrees there should be more students eager to come to the WKU program. In addition, there is a great need for filling many vacant spots in the energy industry. He is happy to have been part of the exciting growth in the geology program over the last five years with the number of majors doubling and he sees a bright future for WKU

graduates in geology.

In addition to many trips for meetings and research over the past year, Dr May and his family have enjoyed trips to Atlanta, Indianapolis, St. Louis, and all around Kentucky and Tennessee for competitive soccer games for sons Peter (13) and Kevin (11). Mike's wife, Beth, continues to work on a few projects with ENSAFE as a geologist out of the Bowling Green office and has enjoyed teaching environmental science and personal health classes as a part-time instructor in the WKU Dept. of Public Health. Life has been busy for the Mays!

FRED SIEWERS enjoyed another full and productive year during 2005-2006. On the teaching front, he taught courses in Earth History, Paleontology, Introductory Field Techniques, and a Winter Term field course focused on the Geology of the Bahamas (see p. 13). His Earth History classes experienced record enrollments (30+) in large part due to recent changes to the Geology undergraduate curriculum. His Field Techniques course was a brand new offering for the Geology program that, judging from student evaluations and submitted work, proved highly successful. Students learned the basics of sedimentary rock description, stratigraphic section measurement and correlation, Brunton compass and surveying techniques, and the integration of GPS technologies with topographic and geologic quadrangles. The course took the place of the laboratory components of the Department's old Stratigraphy and Sedimentology courses and is intended to expose students to geology in the field at an early stage of their geological development. So far it seems to be working!

Much of Dr Siewers' research and creative effort was in the area of Geoscience education, particularly in the use of Problem-Based Learning in undergraduate geology courses and in the delivery of professional development courses for pre- and in-service teachers. He was the lead author on presentations focusing on those topics at the annual GSA annual meeting in Salt Lake City and at the Kentucky Academy of Science meeting in Richmond, KY. Dr Siewers also became heavily involved in a new research initiative in paleolimnology and



Holocene environmental change. In January 2006 and again in June 2006, Dr Siewers collected sediment cores from saline lakes on San Salvador Island Bahamas for the purposes of documenting past hurricane activity and the sedimentary and biotic record of environmental change. This work was done in collaboration with Dr Lisa Park of the University of Akron and involved students from WKU, the University of Akron, and Minnesota State University at Moorhead. Preliminary results of their work were presented at the 13th Symposium on the Geology of the Bahamas on San Salvador. Look for much more research activity from Dr Siewers in this important area of climate change research.

Dr Siewers continued to be quite involved in a variety of the departmental, College, and University committees and in his service to the geological profession. Along with Andrew Wulff and other faculty in the Department, he worked to complete an enhancement plan for the undergraduate geology program that makes data-supported recommendations for new faculty lines and new research infrastructure. At the community level, Dr Siewers co-lead a five-part series on the science behind organic evolution and interpretations of Earth history. The series took place at Christ Episcopal Church in Bowling Green and was in response to questions and concerns from parishioners about intelligent design and creation science. Despite the sometimes controversial nature of the topics covered, the series was well-attended and was very well received.

Finally, in early 2006, Dr Siewers joined the executive committee of the Kentucky Society of Professional Geologists as its secretary and treasurer. Along with Drs May and Wulff, he worked to bring the central office of the KSPG to WKU and to define several new professional initiatives for the Society. Dr Siewers continues to enjoy a full and very active family life with his wife Helen and his daughters Anna (age 9) and Maria (age 6). He finds himself these days immersed in the sounds of old-time fiddle and string-band music, both as a listener and as a clawhammer banjo player. On weekends, he can often be found playing old-time music with other folk music enthusiasts at a local restaurant. Feel free to contact Dr Siewers anytime (fred.siewers@wku.edu).

He loves to hear from former students, alumni and anybody interested in the geological sciences.

L. MICHAEL TRAPASSO has had another busy year in the Department. He continues to teach a number of courses. At the introductory level, by teaching courses like GEOG 100 (Introduction to the Physical Environment) and GEOG 121 (Meteorology) he helps to recruit new majors and minors into our programs. At the intermediate level, he teaches the revised GEOG 222 (Observational and Analytical Meteorology) to help prepare students for the 400-level courses in weather and climate. Lastly, his many years of experience as an applied climatologist allow him to use his professional expertise to teach GEOG 426 (Applied Meteorology and Climatology). Trapasso, and his 5 undergraduate assistants, still maintain the historic College Heights Weather Station, and continue to operate the GEOG 121 Meteorology Computer Laboratory. This year he will head a departmental committee to propose a new Bachelor's degree in meteorology (to be housed in the Department). Of course, its success depends upon the University's willingness to fund new faculty positions. But Trapasso and his committee will make sure that a well-planned proposal is submitted and will stand by in the hope that WKU's administration will support this new program.

On the professional level, the newest edition of his textbook, *Essentials of Physical Geography*, by Gabler, Petersen, and Trapasso (Thomson, Brooks-Cole Publishing) was released in early February. The joy and relief over the book's release ended quickly when the authors were back at it ... this time, writing the ancillaries (i.e., instructor's manual, test banks, and student guides, etc.). The entire project was completed in late April. According to Trapasso, "The actual writing and revising the chapters is a lot of fun, the ancillaries on the other hand, are just a lot of work."

He continues to distinguish himself as a researcher and writer of local Civil War History as well. Last December's release of the new book *Kentucky's Civil War: 1861-1865* (Back Home In Kentucky Pub-

lishing) featured a chapter about Bowling Green during the Civil War written by Trapasso. He is often asked to join other contributing authors for book-signing sessions across the State. The last one was at the Southern Kentucky Book Fair held in Bowling Green in early April. This summer he submitted another article for publication in a Civil War journal entitled, *Now We'll See How Professors Fight: Two Scholar/Warriors in Bowling Green, Kentucky*.

This past year Dr Trapasso designed, researched, and wrote 'historical interpretive panels' for two locations in Bowling Green. The first was installed at Fort Webb, near the Bowling Green Country Club. The City of Bowling Green provided funding for this panel and requested that Trapasso create it. The second was installed at Fort Lytle, atop Western's Campus Hilltop. The WKU Centennial Celebration Committee paid for this interpretive panel, and again Trapasso was there to compose it. In recent years, there have been six 'interpretive panels' installed along Bowling Green's Civil War Heritage Trail. Four of these were designed and written by Michael Trapasso.

His travels still take him to various areas of the country and the exotic corners of the world. Last summer found him in Southeast Asia. He went to Thailand to view first-hand, some of the devastation wreaked by the 26 December 2004 tsunami disaster. He also explored some ancient temples (both Buddhist and Hindu) found in the rainforests of Cambodia. This type of travel is what Trapasso calls, "Indiana Jonsing-around." It was quite an adventure and yielded many photos and other types of information for the classroom and public speaking engagements.

January found Trapasso "Indiana-Jonesing around" the land of his ancestry ... Italy. Having explored so many ancient civilizations around the world, he yearned to return to his own roots imbedded in the Roman Empire. This trip allowed him to rediscover some of the ancient ruins in Rome, Florence, Naples and Pompeii. He greatly enjoyed visiting sites and museums highlighting the amazing developments of the Italian Renaissance as well. In Trapasso's opinion, "This trip was both personally rewarding and great fun!"



On the domestic scene, Spring Break allowed Trapasso and a friend to fly out to California, to visit national parks at Yosemite, King's Canyon and Sequoia. They then drove across the Sierra Nevada Mountain Range up to Lake Tahoe, and down into some historic gold-mining towns of Nevada. Geography, geology, and some 'wild west' history were all rolled-up together in that trip.

His plans for the remainder of the year include an extensive exploration of Chile, South America (from the Atacama desert up north to Tierra del Fuego down south), including a trip out to the mysterious Easter Island. A domestic trip through New York State is in the offing as well. He has firm plans for a short trip through the Colorado Rockies in early July, where he'll reenact for a couple of days as the Captain of the 10th U.S. Cavalry (the Buffalo Soldiers).

Speaking of reenacting, Trapasso still manages to get out to Civil War reenactments a few times a year with his regular unit, the 7th Tennessee Cavalry. Though he doesn't reenact as often as he would like to, he still loves to get into uniform, mount up, draw his Colt revolver, and charge into battle. He says it helps him to relax, clear his mind, and renew his soul. We'll have to take his word for that ... and wish him well.

ANDREW WULFF continued to develop undergraduate research opportunities, be involved at a high level in field-based geology research and learning, and augmented the analytical side of "hard rock" geology at WKU. Three grants helped to fund radiogenic isotope analyses, lab equipment, and undergraduate research projects. Andrew and his students combined for nine presentations at scientific conferences, and he was a co-author on three additional presentations with professional colleagues. He is a co-author on three submitted articles and hopes to submit two more this coming year.

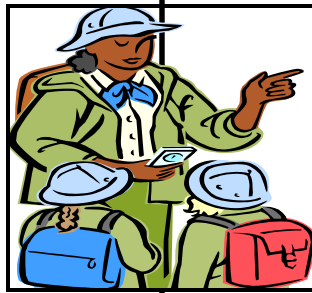
Andrew is currently supervising undergraduates working on ten different projects ranging from radiogenic isotope characterization of lava flows from Chile and dikes in the Mojave, to mineral phases in geodes from Kentucky, geothermobarometry of Appalachian schists, accessory minerals in carbonatites from Arkansas, intrusive relationships in

Maine, and the use of digital geological quadrangle maps using GIS. He is also the academic advisor for thirteen students. Two of his undergraduate students (Ashley Williams and Daniel Hawkins) presented aspects of their research at the Kentucky Academy of Science, where they received Best Paper and Second Best Paper awards respectively. They also presented at the Posters-at-the-Capitol conference, where Ashley represented WKU as the only student researcher in the one oral session before legislators. Way to go Daniel and Ashley!

Dr Wulff conducted research on a WKU Junior Faculty Research Grant for a proposal entitled: "Geochemical and Isotopic Composition of Dikes from the Cowhole Mountains, CA." Dikes associated with the Independence Dike Swarm are exposed throughout the Mojave Desert, and are evidence of large-scale extension associated with rapid changes in tectonic plate motions along the Western Cordillera in the Late Jurassic.

This research will examine the whole-rock, mineralogical and isotopic compositions of dikes in the Cowhole Mountains, which represent the eastern-most extent of the extension. Dr Wulff spent Spring Break with an undergraduate geology major, Derek Bell, mapping and collecting samples for detailed analysis. It was quite an experience for Derek, who had never been on a plane, much less into the mountains and Mojave Desert! Dr. Wulff also received a WKU Summer Faculty Research Grant for "Isotopic Analysis of Lavas from Volcan Cerro Azul, Chilean Andes." The grant provided funding for Andrew to take two undergraduates with him for ten days of training in sample preparation techniques and all the processes associated with the analysis of the radiogenic isotopic compositions in these lavas.

Andrew oversaw the renovation of EST 315 into a Polarized Light Microscopy Facility, which is now much better equipped through the purchase (via a Provost's Incentive Grant) of five new polarized light microscopes. The microscopes were immediately used in almost all of the upper-level Geology courses, and the new facility has quickly turned into a hub of activity (particularly after a new stereo and coffee pot were added!). He also oversaw the completion of EST 116 as the new Earth Materials Preparation facility,



housing rock saws, thin section equipment, lapwheels, a shatterbox, and other equipment. He developed a new course (GEOL 270) Analytical Techniques in Geology. The course was quite successful, leading to a number of undergraduate research topics, and this semester enrollment is actually over capacity. Andrew was asked to present information concerning this course at the national meeting of the Geological Society of America in October in a special session on "Teaching Instrumentation to Geoscience Students: Course Design, Objectives, and Presentations."

Dr Wulff is the President-Elect of the Kentucky Society of Professional Geologists and was recently appointed to the six-member board of the Alliance for Geoscience Field Education, charged with developing a National Center for Field Geology. This national center for field geology will provide field-based education and research opportunities for middle- and high-school teachers, under-represented and disadvantaged youth, Elderhostel groups, and even the local and national media. It will establish a set of national protocols for field-based geology education, as well as a series of industry-based (petroleum, coal, mining, environmental) field experiences. It will also focus on research into the cognitive aspects of field-based learning, determining why it is so effective.

Dr Wulff is committed to bringing more earth science to the K-12 classrooms in the area and logged more than 1300 contact hours with students (primarily 4th, 5th, and 10th graders). He has become known as "Dr Rock" and is tickled by the minor celebrity that accompanies his visits to area schools. The second year of a pilot study (The Consortium for Evidence Based Research in Rural Educational Settings - CEBRRES) examining the academic and social environment of a rural elementary school science classroom was completed in June. Now – the task is to start analyzing the data. Piles and piles of data! The design was to develop new integrated science activities with the science and mathematics teachers, with the goal of enhancing science education in rural settings. Andrew led twenty-two lab presentations on minerals, rocks, earth resources, energy, geological hazards, and volcanoes to 4th and 5th grade students at Austin Tracy Elementary School. Andrew and Margaret Crowder have simulated volcanic eruptions using liquid nitrogen, dry ice, balloons of all sorts, and many variations on the Mentos and Diet Coke

experiment that has become well-known on the Internet and Discovery Channel. He was also highlighted during Science Day activities at two area schools – blowing up things again!

Andrew continued to train Geology majors to help present aspects of geology to students at area elementary and high schools and become more involved in the community. Topics included the wonders of rocks and minerals, aspects of structural geology, geological hazards, and various earth resources. Some of the Geology majors have even gone back to their old schools as the "experts!" He continued to pursue affiliation of WKU with the NASA GLOBE program, and successfully ran a soil moisture sampling program in local schools in collaboration with the international GLOBE SMC program.

Andrew enjoys the challenges of identifying rocks and minerals brought to the Department by folks from all over the area, which this year included proposed meteorites (five different ones!), sedimentary iron deposits, carbonates of all sorts, artifacts, and fused sands from the Middle East. If you have samples or questions – bring them in! He continues to be involved in the community by helping to organize neighborhood events (e.g. a National Night Out potluck event), playing bass and singing around town in a rock band, and was a story-teller at a local church Sunday school.

JUN YAN joined WKU in August, 2004, after earning his Ph.D. in GIScience at Buffalo. Since then, he has offered a number of upper-level GIS and spatial method courses, including GIS, GIS Analysis & Modeling, GIS Application Development, Transportation Planning, Special Topics in GIS, and Geoscience Data Modeling. In all these courses, Dr Yan brought to the Department his expertise and experience in GIS and spatial quantitative methods. As a result, students were exposed to a variety of topics that have greatly enhanced the departmental curriculum. To give a couple examples, in the Transportation Planning class, TransCAD, the leading GIS software for Transportation (GIS-T) and transportation planning, was introduced to and used by WKU students for the first time. In the GIS Application Development course, students had the

opportunity to learn the concepts and principles of object-orientation, in both system design and system implementation. To be specific, students learned how to draw and read UML diagrams, how to customize ArcGIS interface, and how to expand the capability of ArcGIS by writing computer programs in Visual Basic For Applications (VBA) language with COM-based ArcObjects. All of these have notably strengthened the GIS and planning programs at WKU. With the collective efforts of all GIS faculty, the GIS program is now fully operational. In addition to the undergraduate GIS certificate offered by the Department, we now offer a GIS minor and a graduate certificate in GIScience. We will offer a GIS major soon and so students who are interested in pursuing GIS as profession can be well positioned to compete in the job market.

Dr Yan also had a very productive year in research activities. His main research area includes Geovisualization (GVis), geographic data mining (GDM), and spatial quantitative methods. He has continued to work around his dissertation research, where he adopted an integrated computational and visual approach for extracting useful geographic information from large geospatial databases. In his dissertation, Dr Yan applied this methodology to U.S. domestic airline travel databases and it proved to be very effective in providing important insights related to the structure and dynamics of the U.S. domestic airline market. After joining Western, he also moved his research focus into the field of data mining and visualization in climatology. He had a book chapter published and has another book chapter in press. Another two papers have been submitted and are under review for journal publication. He attended the AAG annual conference in Chicago, where he presented aspects of his research on the visual data mining of historical drought data in Kentucky. This research reflects the collective effort by Dr Yan and Dr Stuart Foster in studying spatio-temporal dynamics in drought evolution process.

In order to get students engaged with real-world applications, Dr Yan also focused his effort on developing projects that can best serve local communities so that students can have the opportunity to apply what they learn in class to solve real community problems. Currently he and his student researchers are working on a number of projects

related to community safety issues in the Bowling Green area, specifically aiming to support Bowling Green Police Department (BGPD). The first project is about the detection of traffic accident “hotspots” in a network setting. The findings of this study are expected to be used for improving decision making in the Bowling Green and State Police departments and to assist these law-enforcement agencies to develop more effective accident-reduction programs. The second project is related to crime pattern analysis. Findings from this project will help the BGPD understand spatial-temporal patterns of crime in the region, thus enabling them to allocate their resources more efficiently and effectively. In addition to these two projects, Dr Yan also worked actively with the Bowling Green Warren County Metropolitan Planning Organization (MPO) in a number of areas related to transportation planning and polices. This Fall, students in Transportation Planning course will have the chance to work on several real-world projects, including connectivity study of street network, accessibility study of commercial sites, and route selection of a new bikeway.



Victoria Alapo taught Geography of Africa



Tanzania Study Abroad, Winter 2006!



Geoscience Graduate Student Narçisa Pricope conducting fieldwork!

ALUMNI CONTRIBUTIONS

Contributions to the Department of Geography and Geology Development Fund in 2005-2006 increased over the past year. The number of individual contributions to our Fund topped the 100 mark! Thanks to everyone for helping us achieve our goals this year; we were able to support several students attending conferences and participating in study abroad programs. Your generous contributions go a long way to ensuring that we have sufficient supplies and equipment for student use. When you receive a call from students, or whenever the spirit moves you, make a contribution to the Department and to the University. You can also gift funds to the Hoffman Memorial Fund, in memory of Wayne L. Hoffman, who led the Department for over 20 years. Be sure to specify that the money be designated for use by the Department of Geography and Geology. Our profound thanks to our contributing alumni. We gratefully acknowledge gifts from:

Charles R. Allen
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 Mr & Mrs Michael Zimny
 Gregory Zoeller

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 for ongoing support of
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 especially Kent Gilder-
 sleeve.*

*Special thanks to the
 Leigh Roy Bell Estate*

ALUMNI NEWS

Anthony, Darlene (MS Geoscience 1998) teaches geoscience at Roane State Community College in the Cumberland County Higher Education Center.

Barnett, Lindsey (Geography 2003) is an Assistant Property Manager for University Housing Property Management in Bowling Green, KY.

Benson, Aaron (Geography 2000) is an environmental scientist at AMEC Earth & Environmental Inc. in Louisville, and is a Certified Hazards Material Manager (CHMM).

Burke, Wayne (Geography/History 1971) works in the insurance industry for Ultra Inc. and lives in La-Grange, KY. He remembers fondly Mr Bingham's earth science and economic geography classes.

Burton, Cara Moreland (Geography 2005) is now employed with an surveying and engineering firm, Bob Isgrigg and Associates, and she is busy with research and environmental impact statement preparation.

Calkins, Craig (Geology, 2002) has a full-time position as geologist with Nexen Petroleum USA in Dallas, Texas. Craig graduated WKU *magna cum laude* with a geology major and chemistry minor and worked for an oil and gas company in eastern Kentucky before matriculating at University of Texas-Austin where he earned his Master's degree.

Capps, Stephen (MS Geoscience 2001) works for Geotek Engineering in Nashville, TN. He does geotechnical engineering work (construction-related engineering that primarily pertains to the geology of sites), which involves the physical sciences related to soil, rock, groundwater, slopes, karst, etc...

Cassidy, Brian (Geology and Geography 1990) is a Principal with the Environmental Liability Management Corporation, providing Brownfield redevelopment opportunities in Michigan.



Fill out the Alumni Information sheet on the next page and mail it to the Department today. We want to know how your career and life are progressing. You can also attach a small passport-sized picture of yourself, if you like, that we can publish alongside your news.

“I predict a fantastic 2007 if you send in your Alumni Information sheet right away.....”

Copas, Shannon (Geography 1996) is the Principal Planner for the State of Tennessee, Chattanooga regional office. Shannon and spouse Amy have a new baby boy, Stone, born in November 2005.

Crowe, Shawn (Geography 2001) is a geoprocessing specialist with the Kentucky Transportation Cabinet and lives in Lawrenceburg. He married Tricia Rogers (WKU 1992) in October 2004.

Doublin, Jennifer Kaye (Sheppard) (Geography 1999) works at Moraine Valley College (IL) as an Earth and Environmental Science instructor. She and husband Joseph welcomed their first child (a future geoscientist) into the world in June 2005. She plans to publish a portion of her MS thesis on southeastern drought in the near future.

Durkee, Josh (Geography 2000) is a 3rd year geography Ph.D. student at the University of Georgia. He is teaching Introduction to Weather and Climate and loves the experience.

Feeney, Thomas (MS Geoscience 1985) is an Associate professor at Shippensburg University. He earned his Ph.D. in Geography from University of Georgia.

Feeney, Thomas (MS Geography 1985) is an Associate Prof at Shippensburg University. He earned his Ph.D. in Geography from University of Georgia

Ford, James (Tim) (Geology 1982) is a geoscientist with Houston Energy and, after 22 years in the oil business, is now focusing on deep-water exploration in the Gulf of Mexico.

Franklin, Clint (Geography 2001) has been appointed an Instructor of Geoscience in the School of Natural Sciences at Indiana University Southeast.

Fulkerson, Bruce (Geography 1983) is an Image Scientist with the Army Corps of Engineers in Virginia.

Glennon, Rhonda Pfaff (MS Geoscience 2003) recently married **Alan Glennon (MS Geoscience**

2001) and honeymooned in Australia and New Zealand. Rhonda works for ESRI in California as a GIS development specialist.

Graham, Mark (MS Geoscience 2004) is finishing up his Ph.D. in geography at the University of Kentucky.

Hambley, John (Geography 2000) is a planner with Glatting Jackson Kercher Anglin Lopez Rinehart, Inc., in Orlando, Florida.

Hawkins, Aaron (Geography 2005) is a GIS Specialist with the Lincoln Trail Area Development District.

Hays, John (Geography 2002) practices environmental management and GIS for the Georgia Environmental Protection Division.

Hosey, Kieran (Geography 2001) works as a geologist for Groundwater & Environmental Services, Inc., in Syracuse, NY.

Hughes, Tassall (Geology 2004) is working in Brentwood, TN, for UNIMIN Corp., a major mining corporation that is located worldwide. She analyzes kaolins, ball clays, dolomites, feldspars, and some sands using the XRF and is responsible for detecting defects in ceramics using the SEM and the light microscope.

Iovanna, AJ (MS Geoscience 2004) works for the National Geospatial Intelligence Agency.

Johnson, Greg (Geology, 2006) received a graduate assistantship and is enrolled in the Master's program at the Center for Earthquake Research and Information (CERI) at the University of Memphis.

Jordan, Jason (Geology, 2001) passed away in September 2005. Jason earned a dual degree in Geology and Chemistry and worked for an environmental services company in Tennessee.

Martin, Ty (Geography 2004) is studying Atmospheric Science in the MS program at the University of Alabama-Huntsville.

Milam, Keith (Geology, 1997) is completing his PhD at UT-Knoxville and has taken a tenure-track faculty position in planetary geology with the Department of Geological Sciences at Ohio University (Athens, Ohio).

Nelson, Jenna (MS Geoscience 2004) is a GIS Analyst for Thomas & Hutton in South Carolina. She recently married and is enjoying working on her house in the country.

Rink, Tim ((Geography 2003) recently relocated from Atlanta to Owensboro to take a position as GIS Analyst II with Texas Gas Transmission. Tim also writes that he recently married Rebecca Bean and hopes to see lots of friendly faces at the 2006 Homecoming.

Thomas, Joel (MS Geoscience 2004) works for the Division of Forestry in Mayfield, KY. Joel recently did some freelance consulting for the Pike County Library District, helping them to identify the needs of certain community groups. He also helped them to develop a Folk Music and Storytelling Festival, somewhat in the mode for which Jonesboro, TN is famous.

Troutman, George W. (Geology 1974) is a senior geologist with Forest Oil Corporation in Colorado. He is working in the Mid-Continent Basins, the Permian Basin, and other areas within the Rocky Mountains. George would love to hear from fellow WKU grads in the Denver area.

Van Duzer, Josh (Geography 2002) received his MA in City Planning and GIS from the University of Akron in December, 2005.

Vaughan, Shari Clayton (Geography 1993) is a professional geologist (TN, WA, TX) with the DoD, Contractor-Teledyne Solutions, Inc., and Busy working on new weapon system evaluations and resulting installation impacts for the Army Environmental Center on a contract with the US Army Space and Missile Defense Command.

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GEOGRAM is designed, edited, and produced for the Department by Dr David J. Keeling.

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