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Geogram 2009

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Western Kentucky University

WKU Department of Geography and Geology

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Recommended Citation

Keeling, David J. Editor and WKU Department of Geography and Geology, "Geogram 2009" (2009). *Geography and Geology Publications*. Paper 8.
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GEOGRAM



Fall 2009



GEOGRAPHY, GEOLOGY, METEOROLOGY, GIS

A LEADING AMERICAN UNIVERSITY WITH INTERNATIONAL REACH

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

Dear Friends,

The Department of Geography and Geology enjoyed another extremely productive academic year in 2008-2009. Highlights of the year's accomplishments include the following events and activities:

- ▶ Senator McConnell officially opened the Kentucky Mesonet and recognized the \$2.9 million in funding obtained for the project.
- ▶ John All received a Fulbright Scholarship to study in Nepal in Fall 2009
- ▶ The SGA recognized Margaret Crowder as Ogden College Professor of the Year and Greg Goodrich as Advisor of the Year.
- ▶ Thirty-five students were actively engaged in applied research with faculty through the ARTP, Gatton Academy, and through externally funded research projects.
- ▶ Hoffman Institute faculty and staff conducted research in Jamaica and Haiti.
- ▶ Geology major Seth Cude won a \$40,000 "Go Green" Facebook competition.
- ▶ Faculty and students were featured over 100 times in media print, in online articles, on WKYUFM radio, and on local television programs.
- ▶ A GIS student received an ESRI scholarship for the eighth year in a row.
- ▶ Aaron Celestian was named to the Editorial Board of the *American Mineralogist*.
- ▶ Geoscience graduate student Ronnie Leeper was recognized as the Ogden College Outstanding



A Letter from the Department Chair

Graduate Student for 2008-2009.

- ▶ The BS in Meteorology degree continues to attract new students, with 42 majors currently active in the program. The first cohort graduates in S2010.
- ▶ The Department exemplifies WKU's International Reach, with faculty and students at multiple overseas locations for conferences, research, professional development, study-abroad programs, expedition study tours, and collaborative activities, including multiple visits to China and Europe, and visits to Peru, Chile, Samoa, Argentina, PNG, Cambodia, India, UAE, Tanzania, Morocco, Mongolia, and Russia, among other locations
- ▶ Meteorology students won several competitive & prestigious internships.
- ▶ William "Joey" Coe awarded prestigious Udall Scholarship for sustainability work.
- ▶ A new minor program in Sustainability Studies was approved by Board of Regents.
- ▶ Over 100 students participated in study-abroad programs, field camps, special field projects, and field trips during the year, including programs in Florida (2), the Mojave, the Bahamas, the Appalachians, and around the local region.
- ▶ Meteorology undergraduate/graduate students established the StormTopper Network.
- ▶ Thirty-three students presented research at local, regional, and national conferences, as well as in Japan and Slovenia.
- ▶ The Hoffman Institute purchased Cave Springs

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Cavern with KHLCF conservation funds.

► Chris Groves was appointed to the Board of the U.N. Karst Program established by UNESCO.

Faculty and students excelled again in scholarship, research, and professional development, convening and/or participating in myriad professional workshops and presenting about 40 papers at local, regional, national, and international conferences. Faculty also engaged significantly with the local community, continuing to serve 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.

Faculty served as editors or co-editors of professional academic journals or book series, six faculty reviewed manuscripts for academic journals or publishers, and geography and geology faculty research articles appeared in such diverse journals as *Material Culture*, *Progress in Human Geography*, *Groundwater*, *Journal of Climate*, and *Palaeontographica Americana*, among others. About twenty faculty research articles or book chapters are either currently in review, revision, or awaiting publication, several co-authored with undergraduate or graduate students, an exceptional level of productivity indeed.

In May 2009, the Department recorded 142 majors in geography, meteorology, and GIS; 79 in geology; and 80 total minors. The Department graduated 38 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 demonstrated excellence in achievements this 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, November 7, 2009

** Special Event: Geography and Geology Departmental Tour (Including our GIS lab, MESONET, and Applied Research Centers).

Time: 11:00 - 12:00pm

Location: Meet on 3rd Floor EST Building

** Special Event: Homecoming Tailgating

Time: 12 p.m. - 3 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 <http://www.wku.edu/geoweb/>

The Department website homepage underwent an overhaul this past spring, with a new, cleaner template, updated pictures, and more links. In addition, the geology program is developing its own website with information about the major options, faculty research, student opportunities, and other information. Dr Aaron Celestian is the webmaster and you can view the page at <http://www.wku.edu/geology/>.

Archived information about the Department's news announcements and other publicity can be found on the website at <http://www.wku.edu/geoweb/info/newsarchive.htm>, where news reports are listed by month. There is also a link to news reports archived by calendar year. Visitors to the website can also view details of faculty and student publications. Just go to <http://www.wku.edu/geoweb/info/facpubs.htm> and you will find recent publications listed alphabetically by faculty, with a link to another page that lists faculty publications by rank. There is also a link to the student theses and other publications page, where you can see the breadth and depth of student research activities.

We love to receive updates from our alumni! Please take the time to fill out the alumni update form attached to this GEOGRAM or go online and fill out the electronic form:

<http://www.wku.edu/~david.keeling/files/geomail.htm>

Outstanding Geography and Geology Students, 2008-09

The Department of Geography and Geology 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 2008-09 academic year, Chelsea Brunner received the Outstanding Geology Senior Award, presented by Dr Andrew Wulff. J. Kyle Thompson received the Ronald R. Dilamarter Outstanding Senior in Geography Award, presented by Dr Stuart Foster. Ronnie Leeper received the Outstanding Geoscience Graduate Student award, presented by Dr Rezaul Mahmood. Nathan Rinehart also was recognized as joint recipient of the Department's Outstanding Geoscience graduate student award



Dr Andrew Wulff presents Chelsea Brunner with the Outstanding Senior in Geology Award at the Annual Ogden College Awards Ceremony, April 2009



Dr Rezaul Mahmood presents Ronnie Leeper (left) with the Outstanding Geoscience Student Award at the Annual Ogden College Awards Ceremony, April 2009.

Ronnie also was recognized as the Outstanding Ogden College Graduate Student



Dr Stuart Foster presents J. Kyle Thompson (left) with the Ronald R. Dilamarter Outstanding Senior in Geography Award. at the Annual Ogden College Awards Ceremony, April 2009

Congratulations to ALL our Outstanding Students!



Introducing Our Newest Faculty Members:

Dr Margaret “Peggy” Gripshover

Dr Margaret (Peggy) Gripshover joins the faculty as an assistant professor of geography with specializations in cultural, economic, and historical geography. Some of her recent research topics include equine geographies, sports geographies (in particular, baseball), economic development, and the influence of print media on perception of culture and place. Her regional specialties include the U.S. South and Midwest. Peggy is looking forward to sharing her research interests with the undergraduate and graduate students at WKU. Prior to her arrival in Bowling Green, Peggy was a faculty member at the University of Tennessee, Knoxville, and Marshall University. She earned her B.S. and M.S. degrees in geography from Marshall and her Ph.D. in geography from Tennessee. So, in coming to WKU, this will be the first place at which Dr. Gripshover has taught that she has not earned a degree! She is also happy to make Kentucky her home as she has family roots in the state. Her father was born in Erlanger and her maternal grandfather was from Owingsville.

Peggy’s dissertation was on the development and diffusion of the Tennessee Walking Horse and she has continued her interests in equine geographies with research on the American Quarter Horses, Thoroughbreds, and mules. She has also conducted research on inhumane practices in the Walking Horse industry. Dr Gripshover’s interest in horses is not purely academic. For many years she was involved in showing Quarter Horse hunters, and horses are the frequent subjects of her paintings. In addition to her research on horses, Dr Gripshover has also studied various aspects of companion animal geographies, including the diffusion of dog agility sports and dog-fighting.

Dr Gripshover was born in Cincinnati, OH, and is genetically predisposed to be a diehard Reds baseball fan. Her grandmother took her to her first Reds game at Crosley Field, Cincinnati, in 1969, and Peggy was hooked. In recent years, however, she has metamorphosed into a Chicago Cubs fan, both out of geographic convenience and research curiosity. When she lived in Knoxville, it was difficult to find a station that carried Reds games but WGN-America aired lots of Cubs and White Sox games. Fundamentally opposed to root for any American League team--the designated hitter is blasphemy--she quickly became a part of the faithful (and forlorn) cadre of Cubs fans. In 2008, when Dr Gripshover was asked to contribute a chapter to a book on the social history of the Chicago Cubs, she was already immersed in Wrigley Field lore. Her chapter examined the cultural landscape of “Wrigleyville,” the neighborhood that surrounds the historic home of the Chicago Cubs. As an outgrowth of her Wrigleyville research, Peggy is currently working on a book-length manuscript about “Lucky Charlie Weeghman,” the man who built the baseball park that we now call Wrigley Field. Weeghman not only influenced baseball, but the city’s geography as well. His decision to build “Weeghman Park,” in the Lake



View neighborhood forever changed Chicago’s North Side. Her research in Chicago is not only limited to baseball. Dr Gripshover (along with her husband and fellow geographer Dr Thomas L. Bell) has also published research on the influence of the media on the perception of suicide rates in

Chicago before and after the “Great Chicago Fire.” She is currently working on a study of the media’s

role in shaping environmental perception in 19th century Chicago.

In her civilian life, Peggy is an avid tennis player, cook, and artist. Along with her Australian Shepherd, Sophie, she has been involved in animal-assisted therapy for Alzheimer’s patients and various humane society causes. She and her husband Tom love to travel, especially on blue highways. And even though her husband is a Red Sox fan, she plans to keep him around for the foreseeable future.

Dr Xingang Fan

Dr Xingang Fan joined the WKU faculty in Fall 2009 as an Assistant Professor of Meteorology and Climatology in the Department. Dr Fan earned his Ph.D. in atmospheric sciences in 1996 at Lanzhou University, China. For more than 13 years he has conducted research in the broad areas of meteorology and climatology. He worked as a postdoctoral research associate at the University of Alaska Fairbanks for eight years, and was a Research Assistant Professor at Mississippi State University (MSU) before coming to WKU.

Dr Fan has strong interests in interdisciplinary research. He has published research on mesoscale weather modeling, remote-sensed data applications (data assimilation) in numerical weather prediction, land-air interaction, nonlinear climate systems, climate predictability, and soil/geothermal heat flux and climate. His newly funded NASA grant, in collaboration with scientists at MSU, is to study the impact of regional climate change on forests and to provide decision-making support for forest managers. Climate data downscaling that utilizes regional weather/climate models and simulating of forests are two main components of this project. While at MSU, Dr Fan worked on two NASA observation system simulation experiments (OSSEs), studying the utilization of potential observations from two future satellites, Aquarius (for soil moisture) and ATMS/CrIS (for atmospheric sounding).

Dr Fan’s prior experience using soil temperature in seasonal climate prediction has fueled more recent interests in land-surface and climate interactions. His

recent paper in *Monthly Weather Review* presents some of his preliminary work, which he is planning to expand upon during his next few years at WKU in order to develop a research program in weather and climate modeling studies. Dr. Fan looks forward to engaging students with his research, especially in weather and climate modeling, and exposing them to advanced tools (the models) used in theoretical and applied research, as well as in operational weather and climate prediction.

Dr Fan’s Ph.D. dissertation was on nonlinear climate systems, supervised by Professor Jifan Chou, an academician of the Chinese Academy of Sciences. A simple nonlinear model was built and solved numerically to study the nonlinear characteristics of a climate system. His work considers the theoretical limits of climate predictability, prediction methods, and their applicability to the simple climate system. With his collaborators, he has published a monograph titled “*The nonlinear characteristics and prediction theory of climate system*”, and a series of peer-reviewed journal papers including two in the journal *Theoretical and Applied Climatology*.

Dr Fan and his wife, Lei, two daughters, Joy and Emily, are very excited about joining the WKU family and moving to Bowling Green.



Dr Jason Polk

Dr Jason Polk joins the Department from sunny Florida, where he received a B.S. in Environmental Science and Policy and earned his Ph.D. in Geography and Environmental Science and Policy at the University of South Florida in Tampa. For his dissertation research, Jason focused on using cave deposits (speleothems and cave sediments) for paleoclimate and paleoenvironmental reconstruction in Florida and Belize using geochemical analysis of stable and radiogenic isotopes. The results culminated in new and interesting developments for understanding the role of major atmospheric and oceanic teleconnection influences in the subtropics and tropics, including the environmental impacts of past climate change on the Maya in Belize. From his research, Jason has published several articles in *Quaternary Research*, *Geophysical Research Letters*, and the *Journal of Cave and Karst Studies*, and is currently working to publish the remaining results in the near future.

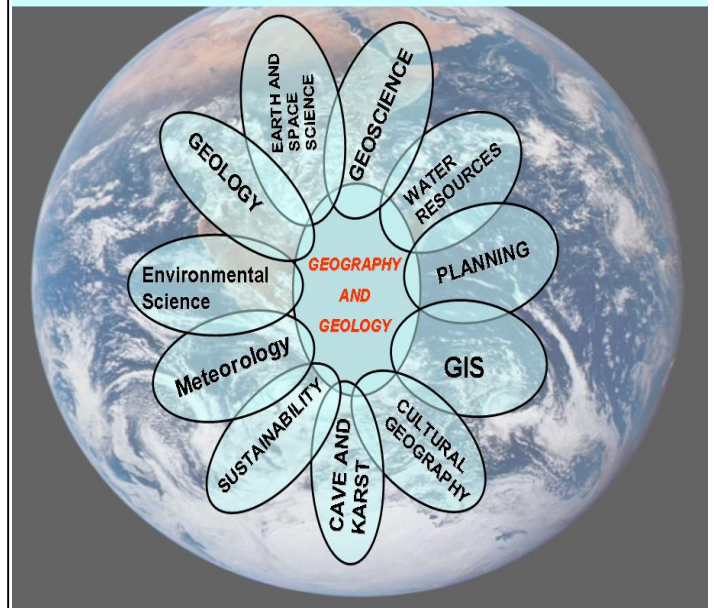
While at USF, Jason also served as President of the Karst Research Group and is currently Vice President of the Karst Conservancy. Thus, as an avid caver and karst explorer, Jason is particularly excited to be in the vast karst region of Kentucky and hopes to continue expanding WKU's cave and karst research in the area, as well as other places of interest. Over the next few years, he hopes future endeavors will include paleoclimate reconstructions using speleothems and sediments from KY, TN, and VA, geomorphologic studies in Mammoth Cave, and developing new techniques for the geochemical analysis of isotopes in calcite deposits. Jason was fortunate enough to start his career at WKU by collaborating with several other faculty to submit a grant for several million dollars worth of advanced instrumentation, including two mass spectrometers, which, if awarded, will provide exciting research and teaching potential in the Department! Dr Polk's goal is to engage students in meaningful learning experiences, especially research-oriented projects using field and laboratory experiments within the realm of physical geography and geology. He is eagerly looking for students who are interested in working on projects related to his research areas.

Jason has a busy first Fall semester lined up, which includes finishing a book chapter in "The Great Maya

Droughts in a Cultural Context," piloting a karst atlas and cave inventory project in west-central Florida, and developing an invigorating Geomorphology class to teach in the Spring semester. Outside of the classroom (and when not underground), Jason enjoys hiking, biking, basketball, photography, and music. Jason hopes to spend some time outdoors enjoying the great weather this Fall and also looks forward to getting married in November and having his future wife, Leslie, and their 5 dogs join him in Bowling Green after the Fall semester.



DEPARTMENT OF GEOGRAPHY AND GEOLOGY





GOODBYE TO A TEACHER, MENTOR, AND FRIEND

James Bingham, 1941-2009



Professor James Morris Bingham, 67, of Bowling Green died at 4:10 a.m. May 2, 2009, at Greenview Regional Hospital. The Saltillo, TN, native was born in 1941. He was an assistant professor of geography in the Department of Geography and Geology at Western Kentucky University. He earned his B.S. in geography, history and political science from Memphis State University in 1963, remaining at MSU to complete a Master's in Geography in 1965. His thesis, titled "Northwest Hardin County: A Study in Industrial Development," presaged Jim's lifelong interest in planning and economic development. He arrived at WKU in the summer of 1965 as a geography instructor and taught a number of general education and planning-related courses over the following five years.

In 1970, Jim received a teaching assistantship from Indiana State University to pursue a Ph.D. in economic geography. Although Jim only spent two years in the program at ISU, the experience and coursework

broadened his academic skills and he arrived back at WKU in 1972 to take up an appointment as assistant professor in geography, receiving tenure in 1977. Over the years, Jim teamed with former department head Wayne Hoffman on dozens of research projects related to city and regional planning, not only through the Center for Local Government, but through partnerships with local and regional government agencies. He published as an author or co-author several articles and planning reports, presented his research findings regularly at regional and national meetings and received funding support from numerous local, state and federal agencies, especially in the 1980s.

Jim contributed to his department, college and community in myriad ways over the past 40 years, serving on innumerable committees, advising WKU's Gamma Theta Epsilon chapter and working with area P-12 schools to promote geographic awareness and science education. Jim loved teaching and was widely appreciated as a tough but fair professor who always went out of his way to help a student if the student showed a willingness to improve. A few student comments illustrate his no-nonsense approach to teaching: "He's the kindest man ... he does expect the truth from students and is a 'straight shooter.' If you lie to him, you had better be prepared for the consequences. He's as smart as a tack and loves what he does." "Overall, he is a fun instructor with numerous stories and anecdotes, but his tests are the bane of human existence." "I just wanted to tell you that I really enjoyed your many classes I took at WKU. I still tell some of the stories you once told me. You are a credit to WKU as you make learning fun. That was a pretty tough time in my life and I really believe you helped keep me in college."

In recent years, Jim suffered several health challenges and he opted for transitional retirement in June 2007. Jim was an engaging teacher, a feisty character and a lifelong geographer. He believed in challenging students to rise above their own expectations and he pushed them to change the world. He will be sadly missed by friends and colleagues. Professor Bingham was a member of the Masonic Lodge and former president of the Iris Club in Bowling Green. He was a son of the late Earl and Erah Gott Bingham.

Op-Eds About Issues of Importance to Society

*By David J. Keeling
Department Head*

As a member of the American Geographical Society's Writers Circle, I continue to 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 regional political alliances (see below), about transportation investment in the U.S., to global climate change's impacts in the Arctic region. 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 ongoing 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 people to engage with these issues in their communities, thus helping to influence policies in a proactive way.

The following Op-Ed addresses the lack of awareness about Russian regional relationships by the U.S. and its NATO allies. The long-term implications of this failure to consider Russia's strategic needs could be disastrous for both the European Union and the trans-Atlantic community, and will have a negative impact on the U.S.'s ability to build effective alliances in the fight against terrorism and anti-Western ideologies. This Op-Ed appeared in a number of newspapers around the country, including Pravda in Moscow.

RETHINKING ALLIANCES IN A CHANGING WORLD

Alliances can make for strange bedfellows and even stranger conflicts. Whether they be military (NATO, for example), economic (NAFTA), or political (the European Union) alliances are really about control over territory and, more broadly, influence. As conditions change, alliances shift, giving way to new tensions and new opportunities. NATO's ongo-

ing geographic rearrangements since the fall of the Soviet Union have been a source of both. European and American tensions with Russia over the nature and reach of the NATO alliance continue to fester. They were further exacerbated recently by the Swedish Liberal Party's support for NATO membership.

The potential expansion of the NATO alliance to include Sweden is significant in part because of Baltic regional geography. Influence and control over territory continue to be a central pillar of the global geopolitical structure. Control over territory provides access to resources, and resources help countries and alliances to build economic and political power. In turn, such power provides motivation and opportunity to exert greater influence and control over more territory. This completes a geopolitical cycle and feeds the drive to gain influence and control over more resources. Such a process can be observed playing out across the globe in myriad ways, as airline alliances compete for control over profitable routes, as like-minded countries build economic alliances such as the Central American Free Trade Agreement to maximize economic opportunities, and as democratic societies build military alliances to tackle common threats like global terrorism.

As one of the two states that sit astride the Kattegat and Öresund straits leading into the Baltic Sea, Sweden holds sway over a strategic body of water. Should Finland also join NATO, the Baltic Sea would effectively fall under the influence of the Western Alliance, geographically marginalizing Russia even further and potentially setting in motion a new security challenge on its periphery. The Baltic provides an important connection for Russia to the North Atlantic economies, which is especially critical given Russia's lack of warm-water ports and its reliance on strategic waterways controlled by other states. In other words, geography matters!

Alliances that change geographic relationships between and among states have enormous political, economic, and social consequences. Russia fears a new containment strategy, where its vulnerable edges along the western, southern, and eastern borderlands are controlled by countries and alliances with whom it does not have good relationships. President Medvedev's recent announcement of a national security strategy that would last through 2020 is significant be-

cause it rejects implicitly NATO's expansion plans. It also rejects any attempt by the NATO alliance to take a global role in security matters that would marginalize Russia or force it into a subordinate role. Pressuring Russia along borders where it no longer has the benefit of buffer states, such as Eastern Europe during the Cold War, may force Medvedev and Putin to seek alliances with countries that are not necessarily friendly to NATO or the U.S.

Alliances can be productive and often create significant benefits for members, but they can also lead to heightened tensions and conflict. Therefore, rethinking both the role and geographic extent of the NATO alliance is more important today than at any time in the recent past. The U.S. would do well to remember that an unequal relationship with Russia likely will lead to no good outcomes.

WKU Geoscience Student and Faculty Attend International GIS Conference

Another Geoscience graduate student received a scholarship to participate in the 29th Annual Environmental Systems Research Institute (ESRI) International User Conference convened July 13-17 in San Diego, CA. Melissa Cary of Bowling Green was selected from a pool of applicants for the competitive scholarships, which supported 60 graduate and fourth-year undergraduate students from universities and colleges throughout the United States. The scholarships required students to work half-days at the conference while it covered their conference registration, workshops, meals and lodging. This is the eighth year in a row that the Department has had a student selected for the scholarship.

Also attending the conference was WKU's GIS Center director, Kevin Cary, who presented "Streams and Networks" about Warren County's Blueways project, with Dr. Steve Spencer of the Department of Physical Education and Recreation.

ESRI is the biggest organization and vendor of geographic information systems (GIS) software in the world. Each year, ESRI hosts an International/Educational conference for GIS users in San Diego to share ideas and gain knowledge about GIS technology. For this year's event, there were more than

14,000 attendees from at least 120 countries and 350 sponsors. "It is important to attend this international conference because it showcases so many applications in GIS as well as informing us where GIS is today and where it will be tomorrow," Cary said. "This opportunity allows us to enhance our program to better our students pursuing GIS as a tool or as a profession."

For information about GIS, WKU's GIS Programs, and GIS applications in business and industry, contact Kevin Cary in the Department of Geography and Geology at (270) 745-2981. For information about applying for an ESRI student assistantship, contact Melissa Cary at (270-745-4555).

Kentucky Mesonet Expands Coverage and Builds Visibility

By Stuart Foster and Rezaul Mahmood

U. S. Senator Mitch McConnell officially launched the Kentucky Mesonet during an event held at the Grayson County High School on May 26th, 2009. Federal funding to support the Mesonet has reached \$2.9 million. John Gordon, meteorologist-in-charge at the NWS forecast office in Louisville, emphasized, "The Mesonet will help protect lives and property and that's the goal of the National Weather Service." The widespread benefit that the Mesonet provides across the Commonwealth of Kentucky makes it an attractive project. Indeed, there is a growing presence and awareness of the Kentucky Mesonet throughout the Commonwealth.

Last year the Mesonet included 10 operational stations as the calendar turned to September. A year later, that number has reached 33. Mesonet staff have worked diligently across the state to identify and negotiate agreements for new sites and then to install station foundations and instrumentation. "Local officials and stakeholders become more interested in the project when they see Mesonet stations going up in surrounding areas," said Dr Foster. The number of operational sites is expected to approach 50 as the calendar year draws to a close.

Over the past year, Mesonet stations have provided critical data to the National Weather Service (NWS) offices that serve Kentucky. Mesonet data have docu-

mented heavy precipitation events and high wind events. A station in Barren County narrowly missed being hit by a tornado on June 11th. Not so fortunate was the Mesonet station in Breathitt County. This station, which provides critical valley data that complements mountaintop data from the nearby NWS station, was damaged by a flash flood on Quicksand Creek. Technicians have since restored the station to operational status.

While still in the build-out phase, the Kentucky Mesonet is already providing data to support basic and applied research. Meteorologists with the NWS and the Mesonet have begun analyzing the complexities of mountain-valley climates in eastern Kentucky. Under certain synoptic atmospheric conditions, local temperature differences between mountaintop and valley locations can exceed 20°F. Research employing Mesonet data promises to help the NWS to improve temperature forecasts in mountainous terrain. Dr Rezaul Mahmood further emphasized, “The Kentucky Mesonet provides a high degree of spatial and temporal resolution in observational data that can feed into meso-scale atmospheric models, enabling faculty and students to answer research questions concerning land-atmosphere interactions.”



Mesonet Station near Calhoun in McLean County

The presence of the Kentucky Mesonet provides unique opportunities for students and has contributed to the popularity of the department’s new meteorology degree program. In addition to using Mesonet data in the classroom and research projects, students employees work side-by-side with Mesonet professionals in conducting site surveys, assisting with the installation of Mesonet stations, quality assuring the incoming Mesonet data, and helping to develop information technology necessary to deliver Mesonet data to users.

Traffic Accident Study Published

Dr Jun Yan, an assistant professor of geography in the Department, recently completed research on traffic accidents in Bowling Green. Using sophisticated Geographic Information Systems (GIS) modeling with Kernel Density Estimation techniques, Dr Yan’s research aimed to produce a smooth density surface of spatial point events over a 2-D geographic space. His article on this research appeared in the September 2008 issue of *Computers, Environment and Urban Systems*.

Although quite theoretical in approach, the long-term goal of this type of research is to engage sophisticated GIS modeling in order to identify specific local effects as well as larger-scale accident hotspots. GIS is becoming an increasing valuable analytical tool in identifying, mapping, and interpreting data as diverse



From left to right: US Senator Mitch McConnell, WKU President Gary Ransdell, Professors Stuart Foster and Rezaul Mahmood, and John Gordon of the National Weather Service.

as climate change impacts, stream flows, migration, and crime. Both students and faculty in the Department of Geography and Geology are employing GIS techniques in research on Mammoth Cave, water resources, fossil fuels, and myriad other issues that affect our local and regional communities. The goal of this research is to provide policy makers with a more sophisticated set of data upon which to base important political and economic decisions.

Meteorology Student Recognized at Regional Conference

Astrid Suárez González, a junior Meteorology major in the Department was honored last April by the Kentucky-West Virginia Louis Stokes Alliance for Minority Participation. González, originally from Louisville, was recognized for her oral and poster presentations at the group's 2009 Student Research Symposium at Stonewall Jackson State Resort in Roanoke, WV.

The Louis Stokes Alliance for Minority Participation, funded by the National Science Foundation, is aimed at increasing the quality and quantity of students successfully completing science, technology, engineering and mathematics (STEM) programs. The Kentucky-West Virginia LSAMP includes WKU and nine other colleges and universities. Students from the schools presented their research reports during the annual conference April 24-25.

González' poster was titled "Soil Moisture Analysis for the 2007 Drought in the Southeastern Region of the United States." The poster also won first place this spring in the undergraduate poster competition for the Physical Sciences at the 39th annual WKU Student Research Conference. Her oral presentation was titled "Applications of Regional Atmospheric Modeling System (RAMS) to Assess Sensitivity of Planetary Boundary Layer to Varying Volumetric Soil Moisture." Her faculty advisor is Dr. Rezaul Mahmood, associate professor of Geography and associate director of the Kentucky Mesonet and Kentucky Climate Center.

Earlier this year, González was awarded a summer 2009 research internship at the National Weather Center (NWC) in Norman, OK. She was one of ten stu-

dents chosen from a pool of nearly 80 for the National Science Foundation (NSF) funded summer research experience for undergraduates (REU). "The high levels of achievement demonstrated by meteorology students such as Astrid, not only in research, publications and conference participation but also in their overall academic work, is a testament to the teaching and mentoring skills of the meteorology faculty," noted Geography and Geology Department Head David Keeling. "With the first cohort of students scheduled for Spring 2010 graduation, WKU's two-year-old professional meteorology program is setting the standard in the region for excellence in student engagement."

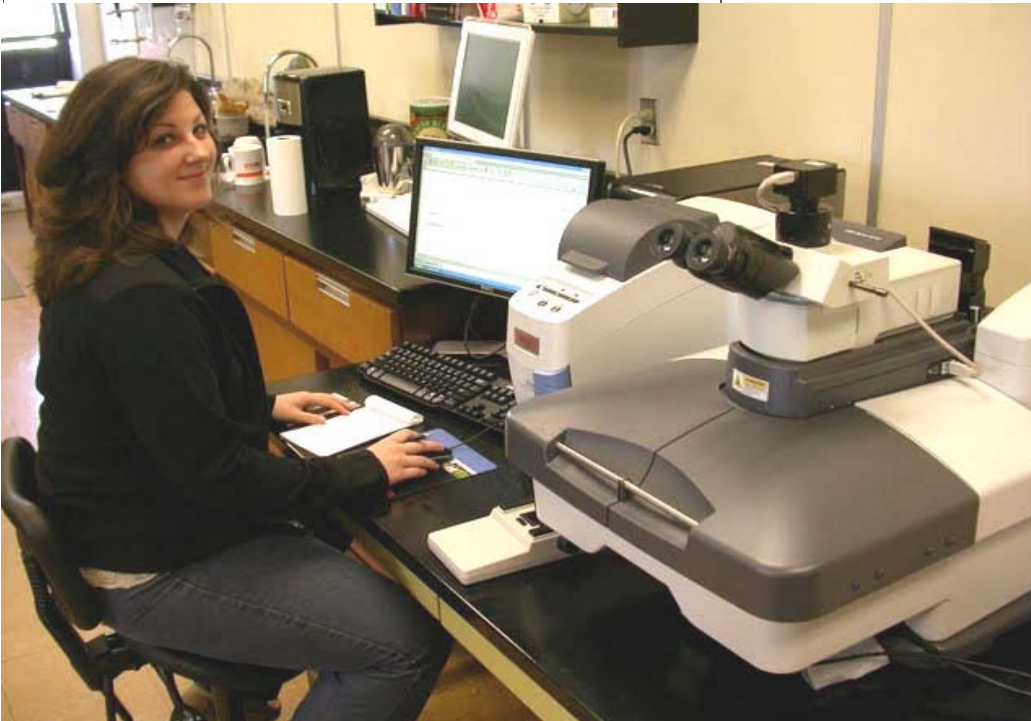
Geologists, graduate student attend international petroleum conference

Two WKU faculty members and a graduate student attended the annual convention and exhibition of the American Association of Petroleum Geologists this past June in Denver, CO. Geology faculty members Drs Michael May and Ken Kuehn presented a poster titled "Renewed Interest in Heavy Oils and Rock Asphalt in South Central Kentucky" and geoscience graduate student Chrissie Hollon of Bowling Green presented a poster titled "Identifying and Reconstructing the Pre-Pennsylvanian Surface in the Mammoth Cave National Park Region in South-Central Kentucky."

An editor of *World Oil* recognized the poster by May and Kuehn as being of interest to the magazine's international readership, so they put together a related article on assessment and recovery of heavy oil resources that was published in the August issue of *World Oil*. Hollon was recognized by the Society for Sedimentary Geology (SEPM), a sister AAPG organization, for her initial research efforts and was awarded a monetary prize to defray her cost of attending the conference and conducting research.

The conference was the largest energy based geology gathering in 15 years, with more than 7,000 professional geologists and students attending from more than 30 countries. The AAPG has cultivated a truly international atmosphere in its meetings, as notably evident by the placement of the international pavilion at the Denver Convention Center for 2009. The inter-

national pavilion provided a venue for petroleum geologists to discuss various applications of technologies and myriad prospective areas around the world. Nearly all continents were represented at the pavilion, as well as a wide range of countries such as Aruba, Canada, Greenland, Iceland, Ireland, Kenya, Korea, Namibia, Peru, Senegal and Uruguay.



Geoscience graduate student
Samantha Kramer with the
Raman Scope

Gatton student Ryne Weiss
fusing a sample for X-Ray
analysis at the
Michigan State University
laboratory



ADVENTURES IN GEOSCIENCE

Road Traffic in the Subcontinent or When driving in India and Nepal, Hold on to your Butt!

By Dr Michael Trapasso

After several years of trying and failing, due to inadequate scheduling or astronomical costs, I found a tour company with which I could design a trip to India and Nepal, during an extended spring break. There were some locations in the Subcontinent (as I like to call that region) I just had to see and photograph. The Taj Mahal in Agra was 'a must photograph', but so were the Fortress at Jaipur and its massive walls (in length, second only to the Great Wall of China). I wanted to explore the Red Fort at Agra, and boat along the Ganges River near Varanasi. In Nepal, the Kathmandu Valley held many centuries of historical cities, where I could do some "Indiana Jonesing." As a physical geographer, it was imperative that I see the Himalayas up close -- right up to Sagarmatha, also known as Mt. Everest. My time had finally come, and it proved to be an adventure of a lifetime. Each of my target sites can constitute a story in itself. Someday they will be written. But, for the present, let me tell you this one.

No doubt many of you have visited a chaotic America city or some foreign country where the folks drive kind of crazy, and you have your own stories to tell. I, too, thought I had seen it all; after Rome, Italy, I had plenty of stories to tell. I was almost hit by a taxi in Mexico City. And the Brazilians drive like they play soccer! But for sheer numbers of cars, utter chaos, traffic congestion, variety of motor vehicles, and traffic obstructions, nothing beats driving in the congested cities of the India, and Nepal. I wholeheartedly challenge any computer gamer to match wits, visual acuity, and reflexes with a Nepalese cabbie.

Because both India and Nepal were strongly affected by many years of British influence, everyone drives on the left side of the road. I have driven on the left side as well, throughout the British Isles,

Australia, and New Zealand. It's not too difficult either. If all oncoming traffic is in the right-hand lane, believe me, you'll keep your vehicle in the left-hand lane. The real difficulty for me was sitting as a passenger on the left side of the car, normally the driver's side. You keep reaching for a steering wheel that isn't there!

Riding on the opposite side of the car, coupled with the frightening traffic on those mangled streets, actually caused me physical pain. I suppose it would be considered a "sympathetic" injury to my right leg. I noticed on several evenings a muscle pain in my leg, especially in the shin and front of the thigh. Then it dawned on me ... I was sitting in the usual driving position, but not in control of the car. Countless times a day I would mash my foot down as if to hit the brake pedal, which of course wasn't there. So my foot was actually pushing down rather hard on the floor board each time I thought we were going to hit something ... again countless times a day. Therefore, each evening my leg was quite sore. Through time, I learned to relax my right leg even when I was convinced an accident was imminent.

Rules of the Road: Through the days of anxiety, punctuated with bits of terror, I finally figured out the functioning rules of the road in these two countries. With rules like these, I wonder how many of these drivers actually had a license of some type. Not many, I suspect.



Rule #1: Don't hit anything, especially cows. These sacred animals are held with great honor and esteem in these Hindu-dominated countries. Cows

(and their bovine cousins the oxen and the water buffalo) always have the right of way. Some cows are sensible about their supreme right and stand in the median between lanes or on a street corner, or in the middle of a parking lot. These are nice cows. I include among these 'Elsie', a light brown cow I named as I saw it standing in the parking lot of the Palace City Museum in Jaipur, India. She watched me go into the museum and after my tour she was still standing in the exact same spot, watching me coming out again. Heck, 'Elsie' doesn't have to go anywhere, and she knows it. Then there are the not-so-nice cows that walk or stand in strategic driving lanes. Roundabouts are popular hang-outs for these who abuse their privilege. The bottom line ... if one needed to decide which deserves right of way, a woman holding her baby or a cow, put your money on the cow.

Rule #2: Right of way goes to whoever gets there first. The streets are filled with vehicles of all kinds: bicycles, motorcycles, 3-wheeled cars, 4-wheeled cars, vans, trucks, and buses; all trying to maneuver around each other. Not to mention vehicles pulled by horses, donkeys, oxen, water buffalo, camels, and the occasional elephant. Beast-powered vehicles will confuse any traffic situation. And then there were thousands of pedestrians popping in and out of these streets anytime, anyplace. Foot traffic has no conception of the term jaywalking. Altogether it is an incredible mixture of moving objects, and all of them are 'playing chicken.' Somehow, someone always gives in, and this is often decided at the very last second when vehicles stop within inches of each other.

Rule #3: Blow your horn often with zeal and conviction. The sound of blowing horns is ubiquitous at all times on these streets. This is the way of signaling to other drivers to: "Move over!" or "Speed up!" or most importantly, "I'm coming through!" Rule #3 helps to determine Rule #2.

Rule #4: The lanes painted on the roads are only suggestions. You don't have to stay in the lanes -- nobody does. It's fine to drive with your vehicle in two lanes until someone else blows the horn. It is perfectly acceptable to drive in the oncoming lane to pass multiple vehicles-- just blow that horn and be quick about it.

Rule #5: Stop lights, few and far between, are heeded at the driver's discretion. When you en-

counter a red light, you might consider stopping if the cross-traffic is heavy. But if the intersection is at least partly clear, red means go!

Rule #6: Driving on sidewalks is allowed for short periods of time. It's not just for movies anymore.

Rule #7: DON'T HIT ANYTHING!

In each city it seemed the traffic only got worse! Delhi driving seemed bad at the time but its insanity faded with each successive city. Jaipur had me all tense. Agra had me seriously worried. Varanasi was just plain crazy. Then came Kathmandu: that place was darn near suicidal. I recall my final ride from my hotel in Kathmandu to the airport to begin my journey home. I kept praying, "Please Lord, let me have just one more ride without incident." I had been so lucky up until then. During that last drive I actually witnessed a slight collision. In the game of "playing chicken," someone has got to give way. A motorcycle tire slightly bumped up against the rubber bumper of the car in front of it. It was so minor, neither driver stopped to check the results. As always, traffic just kept moving.

To sum it all up, driving conditions in the Subcontinent are absolutely insane but it appears to be relatively safe in the hands of lunatic drivers, who seem to know the game.



Sagarmatha (a.k.a. Mt. Everest) is the world's tallest mountain at 8848 meters or 29,029 feet above sea level.

Summer Field Geology Course

By Dr Andrew Wulff

Senior undergraduate geology majors again participated in a geology field course this past summer, along with students and faculty from Illinois State University, Northern Illinois University, Clemson University, George Mason University, SUNY-Stony Brook, Bloomberg University (PA), Eastern Michigan University, and Western Illinois University. Students Heath Dame, Kristin Leftwich, Brian Lewis, Heather Monohan, Cody Munday, and Amber Yates studied the geology of South Dakota, Montana, and Wyoming for six weeks from May 18 through June 28. This year, two of the top three finishers were WKU students, including Cody Munday who earned the top honors, and Heath Dame who earned the top spot for the first half of the course, and was third overall. The top finishers are nominated for USGS/NAGT internships, working with top researchers in a variety of geology fields.

Dr Andrew Wulff once again taught the final three weeks, as the geology emphasized igneous and metamorphic terrains. The course, which is a capstone for geology B.S. majors at WKU, emphasizes field mapping techniques to develop geologic maps, construct geologic cross sections, and address some of the practical applications of these maps. Students also compose detailed rock descriptions, measure and construct stratigraphic sections, and write reports and abstracts of their work. Projects include mapping exercises in the Bighorn Mountains, Badlands, Black Hills, White-wood Peak, and the Absaroka volcanics, which immerse students in a wide range of geologic structures, depositional environments, and rock types. Additional trips to Yellowstone Park, Devils Tower, various mining operations, and other areas of geologic interest were led by national experts, extended the geological experiences, and built context for the projects. The weather this year was great compared to the past few years. Students experienced a couple of feet of snow in June, but that only meant – SNOWBALL FIGHTS!! The course was challenging, but all agreed that it was an exceptional, fun, and intense experience. And then, there was the “Zombie Flu.” A new crop of field geologists are ready for their careers, armed with amazing but true field camp stories!

The department has sent twenty-seven geology students to various field-based geology opportunities over the past six years. These summer field courses, and an array of shorter field-based courses and experiences during the semester, are absolutely necessary for setting the field context for both coursework and for professional success. We surely appreciate the financial support of alumni that allows for such important experiences. Thank you!!



WKU geology folks at the Whitewood Peak field area (from left back: Brian Lewis, Cody Munday, Dr. Andrew Wulff, Heath Dame; front: Kristin Leftwich, Amber Yates, Heather Monohan).

Spring Break Field Geology Course

By Dr Andrew Wulff

Dr Wulff was pleased to lead fourteen undergraduates out to Death Valley and the Mojave Desert during the 2009 Spring Break. The rationale for this experience is that geology is a field-based discipline, yet the opportunities for a broad range of field experiences are limited in the region surrounding WKU – and, of course, there’s always fun and getting away from Kentucky! The field course included several geologic mapping exercises in the Mojave Desert, in addition to field exercises examining igneous and metamorphic rocks, young volcanic centers, and “classic” field locales in Death Valley and the surrounding area. These experiences are necessary to set a context for

core geology courses in Structural Geology, Sedimentology and Stratigraphy, Geomorphology, Igneous and Metamorphic Petrology, and Mineralogy, and they provide a geological context that students at WKU literally cannot experience anywhere else.

This field course followed the series of Fall and Spring Break field courses offered in past years to parts out west. Students flew into Las Vegas for a night of exploration and took off for Death Valley early (HA!) the next morning. After almost three days of exploration of maar eruptions, folded and faulted rocks of all kinds, alluvial fans, and slot canyons, we left the park to the south and saw obsidian/ashfall deposits and Lake Tecopa sediments (with cave-dwelling carved out – not in prehistoric times - but during the Great Depression). That night was spent camping out and enjoying Tecopa Hot Springs. The next two days involved mapping exercises at Rainbow Basin, a wonderfully exposed syncline north of Barstow, where students learned how to take strikes and dips while sliding down the sloping beds. The following days took the group to young volcanic fields, a large granitic dome, the site of an enormous explosive volcanic eruption, Joshua trees, yuccas and sage, huge sand dunes, magnetite deposits, and a lot. The group camped in parks or in the open, and traveled by rented vans to field sites for work. Funding came from the Department, Ogden College, wildly successful Bake Sales, and Chris Groves and the Hoffman Environmental Institute. Many, many thanks for the support!!

The field course was a great opportunity to introduce students to field evidence for large-scale tectonic forces, recent and ancient volcanism, and features and styles of erosion/modification of the Earth's surface. Death Valley is a "classic" field site for studying the effects of large-scale extension of the Earth's crust and for processes of geomorphological change in an extreme arid environment. The remarkable exposures reveal the three-dimensionality of geological forces in detail, and the desert environment is in great contrast to climatic conditions in Kentucky. Students came away from the trip excited about applying their new geological context to their coursework, and returning to the southwest for more later! What a great time!!

Gatton Academy Engagement and Equipment Acquisitions

By Michael May

During the latter part of the 2009 spring semester a number of faculty wrote grant proposals to the Carol Martin Gatton Academy for Science and Mathematics (Gatton Academy—see <http://www.wku.edu/academy/>) in an effort to obtain field and laboratory equipment that would enhance research project opportunities for talented Gatton students engaged primarily with the geology program. The Gatton Academy was established two years ago at WKU and its principal purpose is to provide an incentive for increasing science and math scholars in Kentucky and keeping these bright minds in the state. The Academy houses about 120 high school juniors and seniors who finish high school and also earn college credits while residing on the WKU campus. The Gatton Academy was named in Newsweek's 2009 list of "Public Elite" high schools, a first for any Kentucky High School. The Academy brings in the best and brightest youth from all across Kentucky, providing a challenging living-learning atmosphere for these chosen students. WKU faculty are quite excited to engage with them, most especially in research projects. Ten Gatton students, including Holly Mitchell, Kristine Song, Anna Walter, Cody Feldhaus, Forrest Simmons, Elaine Flynn, Ryne Weiss, Matthew Kirk, Elizabeth Nethaway, and Shelby Rader, worked over the summer on projects with Drs Celestian, Wulff, May, Florea, and Groves.

Dr Celestian worked with students on zeolite synthesis and characterization of novel silicates that may be used for isolating high-level radioactive waste for geologic disposal. In order for new zeolites to be applied to real environmental issues, they must first be tested exhaustively in order to predict how radioactive elements might behave in their zeolite 'coffins.' X-ray diffraction and Raman spectroscopy are ideal tools to study the uptake rate and crystallographic positions of sequestered elements. This summer's Gatton students used both techniques to gain a better understand of how zeolites form and their applications to real world problems. Dr Wulff worked with students studying lavas from the Descabezado Grande—Cerro Azul volcanic complex in the Chilean Andes. The group exam-

ined mineralogy, petrography, textures, and geochemistry, all within the context of the field relations, in order to model the petrogenetic history of the Casitas Shield portion of the complex. The experience was capped by a trip to Michigan State University to prepare and run samples at the MSU X-Ray Facility. The work utilized new platinum crucibles and molds in fusing samples into glass disks for analysis.

Dr May worked with Gatton students, several other interested geology majors, and a graduate student on measuring and correlation of stratigraphic sections of the Mississippian and Pennsylvanian rocks near Highway 185 at the Green River and Shanty Hollow in northeastern Warren County, Kentucky. This field work entailed use of the newly acquired gamma-ray scintillometer funded by the Gatton Academy. The scintillometer made it possible to make one-foot incremental gamma-ray measurements up cliff faces and road cuts. Students then were able to take standard field descriptions and match these up with a constructed gamma-ray profile. These profiles in turn will serve as a basis for outcrop-to-subsurface correlation for additional research on the Mississippian-Pennsylvanian Unconformity and hydrocarbon resources in similar aged rocks.

Dr Florea worked with Gatton students and one other undergraduate student to learn how to use equipment that detects the high-frequency echolocation calls from bats to develop an estimate of bat numbers and distribution in the south-central Kentucky region. The significance of this research is that it will contribute to the database needed to ascertain the effect of a new illness affecting bats, White Nose Syndrome. This work is part of statewide program coordinated by the Kentucky Department for Fish and Wildlife Service. Dr Groves worked with a Gatton Academy student who began her second year of work with the Crawford Hydrology Laboratory. This lab work entailed discerning chemical interactions of fluorescent dyes used for groundwater tracing. It was determined that common fluorescent tracer dyes are degraded by hydrogen peroxide (a compound used in groundwater chemical remediation) and chlorine. Determining concentration thresholds where degradation begins is also a part of the research strategy. Additionally, work in the hydrology lab determined that common fluorescent tracer dyes are unaffected by Trichloroethylene, a groundwater contaminant.

New equipment acquired through the support of the Gatton Academy totaled over \$105,000, including the following:

- 1) Groundwater Monitoring System (Chris Groves) for \$13,598;
- 2) Crucibles for the X-ray Fluorescence Unit (Andrew Wulff) for \$6,833;
- 3) Bat Detector (Lee Florea) for \$2,933.59;
- 4) Hand Held Gamma-Ray Scintillometer (Michael May) for \$5,175, and;
- 5) Powder X-ray Diffraction Unit (Aaron Celestian) for \$76,744.

Additional acquired equipment during 2009 included the Raman Scope (EPSCOR grant award and Ogden College to Aaron Celestian for \$91,027.49). Indeed 2009 was an impressive year for equipment acquisition for the geology program and faculty are excited about being better positioned to provide Gatton and all other students with many new high-technology tools to conduct research both within the context of their courses (e.g., analytical methods and field methods) and beyond the classroom.



Geology student Ryan Hart taking a field measurement with the hand-held Gamma-Ray Scintillometer.



Faculty members Margaret Crowder (bottom right) and Lee Florea (bottom left) with the Oceanography class



Margaret Crowder (left) with SCATS students, June 2009

FACULTY ACTIVITIES

KATIE ALGEO enjoyed a sabbatical during the 2008-2009 school year, concentrating on a major research project, a book on the cultural history of Mammoth Cave. When Dr Algeo conceived of this project a few years ago, she thought she was picking up a local project. Little did she know that it would eventually take her to research libraries from coast to coast! Collections she has mined this year for information on Mammoth Cave or the people connected with it include the Library of Congress, the Historical Society of Washington DC, the Smithsonian Institution Library, the Hagley Library (the DuPont Company archives), the University of Pittsburgh Library, the Carnegie Library of Pittsburgh, the Historical Society of Western Pennsylvania, the Filson Historical Society, WKU's own Kentucky Library, Special Collections at the University of Kentucky, the New York Public Library, the Tennessee State Archives, Special Collections at UC-Berkeley, and the Huntington Library of San Marino, California. Why does the web of Mammoth Cave history spread so far and wide? You'll just have to wait and read the book!

Although on sabbatical, Dr. Algeo continued working with graduate students who made major strides on related research projects. Matt Brunt has been instrumental in constructing a historical GIS from the 1920 manuscript census of Edmonson, Barren and Hart Counties for the park area. This decennial census is a critical document, for it was the last census taken before land began to be purchased for the park and its residents moved out. Thus, it is the most complete record of what the pre-park communities were like. Matt is in the final stages of writing his thesis on this project. Ann Epperson has developed a prototype of a web GIS interface for the historical GIS and will integrate historic photographs taken by the CCC of many of the houses that were removed as the park was created. Ann and Dr Algeo demonstrated the historic GIS at the annual Homecoming at Mammoth Cave National Park on July 4, garnering much public interest. Dr Algeo has a chapter titled "Remembering Rural Community:

Historical GIS for Mammoth Cave National Park" slated to appear in *Sustainable Rural Community Change: Geographical Perspectives from North America, the British Isles, and Australia*, with an anticipated publication date of 2010. Related to tourism in the Mammoth Cave area is another publication, "Indian for a Night: Sleeping with the Other at Wigwam Village," which will be the cover story of the Fall issue of *Material Culture*.

Though Dr Algeo spends much of her time thinking about Mammoth Cave these days, she continues to serve as the treasurer of SEDAAG (the Southeastern Division of the Association of American Geographers) and on the board of Friends of Dumont Hill, a Civil War site located in Scottsville, Kentucky, that is in the midst of preservation planning. She is looking forward to her return to teaching this Fall.

JOHN ALL writes from Nepal that he is suffering from jet lag. After a fruitful year of teaching and research on climate change and sustainability, John joined his wife Narcisa in Africa for the summer while she worked on her dissertation. Together they camped for two months in several national parks in Botswana and Namibia while collecting vegetation data. This proved to be the wettest year in the area for the past 100+ years of record and literally hundreds of square miles were underwater. Most of their time was spent in fear as elephants tried to charge them, hyenas, lions, and leopards tried to eat them, snakes tried to bite them, and hippos tried to join them in the tent. They even drove their 4x4 into flooded rivers up over the hood (and to the windshield twice) in crocodile-rich waters. Somehow they survived and gathered a huge amount of data.

After less than a week in the US, they turned around and flew the other direction – to Nepal. Dr All was awarded a Senior Fulbright Fellowship to study Climate Change and Resource Management in the Himalayas. He will be teaching at the national university – Tribhuvan University – and spending a lot of time in the mountains collecting data. Dr All will also be developing a Remote Sensing/GIS lab for the Institute of Science and Technology within the University. Working with local researchers, he has already submitted two grants to support the new lab and more are on the way. Narcisa will use the semester to finish her dissertation using the data

gathered in Africa and will help teach GIS at Tribhuvan. While they won't climb Mount Everest, they will certainly see it everyday...

KEVIN CARY conducted a series of GIS workshops on WKU's main campus in the Center for GIS before the 08/09 academic year began. Working with GIS graduate student Brandon Fowler, he helped to train personnel associated with GEOSCIRE out of Bogota, Colombia. Kevin has been working with Dr Keeling to evaluate the existing GIS capabilities of GEOSCIRE and CERAC as part of a grant associated with the AGS Bowman Expedition project (<http://www.amergeog.org/bowman-expeditions.htm>).

This past fall, Kevin traveled back to Colombia, South America, to further access the GIS capabilities of CERAC and GEOSCIRE. It was a quick but enjoyable visit to Bogota. He came back with GIS data to use in a website that is viewable in Google Earth or ArcGIS Explorer. You can visit www.wku.edu/geoscire to see the site and its links.

The newest edition to WKU's GIS program is an Enterprise GIS. This past academic year the GIS Center purchased two blade servers to begin utilizing an enterprise GIS for the program. An enterprise GIS is a way of centralizing data and disseminating data to users throughout a network. This infrastructure will greatly enhance the *Internet GIS* and *GIS Databases* courses and help to train highly qualified students coming out of the GIS program. The configuration has ArcGIS Server running on one server with ArcSDE and SQL Enterprise running on the other. It is also worth noting that WKU's GIS Certificate is now available online. All the courses for the certificate will be available online for the first time this fall semester.

Kevin was also appointed as a GISP reviewer for the GIS Certification Institute (<http://gisci.org/>) during the 2008 summer. The total number of certified GIS professionals worldwide is 4,536. The GISP credential recognizes those individuals who have met the standards set forth by the GISCI in ethical conduct and professional practice. Each

candidate must earn a minimum amount of points in (1) educational achievement, (2) professional experience, and (3) contributions to the profession, as well as accepting the code of ethics of GIS. Kevin recently applied for recertification this past summer since the certification is only valid for five years. He has been a GISP since February 2005. GISCI was established in 2004.

The blueways site for Warren County, Ky. (<http://www.wku.edu/blueways>), which he developed with Dr Spencer in the Dept. of Kinesiology, Recreation, and Sport, is gaining a lot of attention these days. It was recently featured in the winter 2008/09 edition of the journal *Kentucky Recreation & Park Society* and Kevin, along with Dr Spencer, continues to present this site at conferences and meetings.



D. GLEN CONNER writes that an Emeritus faculty can still be active in his profession. Glen's activities differ little from those before retirement, except that there was no teaching assignment in the Department. He filled that urge by becoming one of the coaches of the Allen County-Scottsville High School

Science Olympiad team that finished fifth in the Kentucky state tournament in April 09.

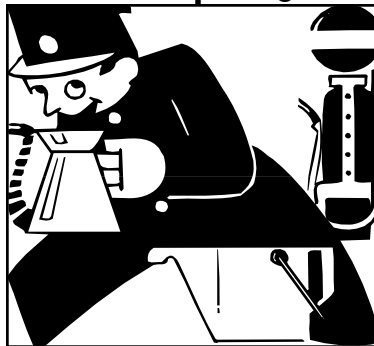
He attended the American Association of State Climatologists' annual meeting in July 2008 in Burlington, Vermont. He conducted a workshop on researching and writing nineteenth century weather stations, and also presented "Station History: More Fun than Metadata." In August, Glen presented "Searching for the Daily Mean," coauthored by Dr Stuart Foster, at the Applied Climatology Conference of the American Meteorological Society in Whistler, British Columbia. His paper, "Weather isn't what it used to be," was accepted for presentation in October at the National Weather Association's annual meeting in Louisville. He traveled to Santa Cruz, California, in November and presented two research proposals to the National Climatic Data Center. One of those, "Daily Mean Temperature Formulas and the True Daily Mean" was accepted and will be funded during the coming year by the Climate Database Modernization

Program. He attended the January annual meeting of the American Meteorological Society in Phoenix, chaired the session “Improving Depiction of Climate Phenomena” at the March meeting of the American Association of Geographers, and presented “The Army Surgeon General’s Climate Network” there.

Glen still had time for Mardi Gras in New Orleans, the May jazz festival in Sacramento, and fossil digging in Utah in June.

MARGARET CROWDER is proud this year not just to be a faculty member within the Department of Geography and Geology, but also to be a student joining the Doctoral Program in Educational Leadership at WKU. She hopes to complete her Ed.D. in 2012 and, by so doing, become an even more dedicated leader in promoting the advancement of science and math education in the region. In the meantime, Margaret continues to work in the areas of STEM education through involvement with SKyTeach, an education program at WKU designed to develop and support more and better science and math teachers for our middle- and high-schools. Margaret has also been an active instructor in outreach programs designed for elementary and middle school students – programs such as Super Saturdays, Girls in Science Day, and SCATS. In addition, Margaret was honored this past year to be the recipient of the Student Government Association Professor of the Year Award for Ogden College of Science and Engineering, as recognition for work in her college classrooms.

Not all of Margaret’s work was done in the classroom this past year. Margaret’s Honors Colloquium class on Global Climate Change helped host an event on campus along with WKU Campus Sustainability, entitled ‘Climate Change is Beyond an Environmental Problem’, and students presented research findings at the event, which was held in December. In addition, Margaret, along with fellow faculty member Dr Lee Florea, involved Oceanography students in a field-trip experience to



St. Petersburg, Florida, that included work with researchers from the University of South Florida. Oceanography students presented some of their work at the Campus Community Partnerships conference in late April.

Margaret also traveled to San Francisco in early December for the annual fall meeting of the American Geophysical Union, where she presented a poster, “Using Hollywood Movies to Teach Basic Geological Concepts: A Comparison of Student Outcomes,” highlighting research on learning outcomes in students from Introductory Geology classes and in Geology and Cinema. She had presented preliminary findings from this research at the Kentucky Academy of Science Annual Meeting in Lexington in October.

As always, Margaret is also involved in community service activities. She was a county delegate to the Kentucky Democratic Party 2008 State Convention and is a Session member, Elder, and member of the Worship Committee at Franklin Presbyterian Church, where, this past spring, she conducted a three-part series on Christian Stewardship of the Environment.

Life is surely good (and getting busier and better all the time!) in Margaret’s world.

SCOTT DOBLER has completed his ninth year at Western Kentucky University. He has continued as the co-coordinator of the Kentucky Geographic Alliance (<http://www.kga.org>). The KGA has been funded by an ongoing grant from National Geographic to support the development of geography awareness in and outside of the classroom. This year, the competitive funding from National Geographic has been reduced (We know this is a surprise to many of you!) This has changed our approach to sustaining our position in the state. We have continued to find support money, albeit much smaller amounts, and we will be using it to restructure how we do business in outreach to K-12 teachers.

The KGA has developed or is continuing to develop a number of products. An online atlas/classroom atlas is being developed that will contain

content that teachers will be able to use in the classroom. Over the next year, the KGA will be bringing in teachers to develop the material. The last step in this product is to find a number of sponsors in order to provide a copy to each school in Kentucky. This is one of the things that the KGA will be working on over the next year.

Another product that has been partially developed links the Commonwealth Accountability Testing System (CATS) scores to a spatial database in order to visualize the results of KERA in Kentucky. This product lists content-level scores at the regional, district, and school level. It has been presented to the Kentucky Department of Education but, due to budget cuts and the elimination of the CATS test, the project has been put on hold.

Scott has teamed up with the Kentucky Mesonet (<http://www.kymesonet.org/>) to help K-12 teachers use local meteorological data in their classrooms.

This past year, the KGA and Mesonet worked together to develop lesson plans in the content areas of social studies, science, and math. The lessons have been digitized and rendered for use in conjunction with the Kentucky Mesonet website. Teachers will be able to use real-time data in their school from the Kentucky Mesonet, while following teacher-developed lesson plans. These plans will be introduced to teachers at a number of state-level meetings. A grant from the WKU Science Alliance was used to purchase a number of classroom materials for elementary and high school teachers. These teachers will be using the material in their classroom, and developing additional lesson plans for other Kentucky teachers that can use the Kentucky Mesonet data.

This past year Scott presented or attended a number of state meetings, including the Kentucky Academy of Environmental Educators, Kentucky Council for Social Studies, Kentucky Science Teachers Association, and Kentucky Council for Teachers of Math. Over the coming year, Scott will be working with state and local educators to help implement Geographic Information Science (GIS) in schools. He will also be searching for additional funds to create an endowment for the Kentucky Geographic Alliance. If you have any ideas or

suggestions (or money), please contact Scott (scott.dobler@wku.edu).

JOSH DURKEE had a productive inaugural year in the department. Josh taught sections of GEOG 100, 121, and 424. His students in GEOG 424 competed in a multi-university forecasting competition, where several students placed in the top ten in various forecasting categories, including first place in precipitation. Josh has also taken over some of Michael Trapasso's previous commitments by serving as the Meteorology Laboratory Administrator and Chair of the Meteorology Technology Program. Additionally, Josh was actively involved in various activities including the Meteorology Club, WKU Storm Spotter Network, First Lego League Robotics Tournament, and the Science Olympiad.

Josh was also quite active in his research program. He published two articles (in top ranking atmospheric science journals –*International Journal of Climatology* and *Journal of Climate*) on particularly large, long-lived thunderstorms (called mesoscale convective complexes), and using remote sensing techniques to quantify precipitation over subtropical South America. In addition to



contributing two chapters on global precipitation and extratropical cyclones for the upcoming book, *The Encyclopedia of Geography*, Josh also published an article on precipitation trends in the eastern U.S. as they relate to the North Atlantic Oscillation in *Theoretical and Applied Climatology*. Further, Josh contributed to proceedings from the annual Conference on Severe Local Storms, on non-convective high-wind events in the Great Lakes region. Josh worked closely with undergraduate student T.J. Malone on high-wind events over Lake Erie, where T.J. took the opportunity to present their research findings at the annual conference of the Association of American Geographers in Las Vegas. Lastly, Josh submitted two educational pieces on the integration of active severe weather exercises and educational global climate models in introductory weather and climate curriculum, which are currently in review.

Josh has quite a year planned for the upcoming academic semesters. He has already submitted another article on South American thunderstorms to a leading journal (*Monthly Weather Review*) and plans to submit three more articles relating to global precipitation methodologies and non-convective wind events. For one of these projects, Josh was recently awarded a WKU New Faculty Scholarship. He will begin advising graduate students this year and looks forward to engaging undergraduates in other research endeavors.

In addition to teaching Honors sections of GEOG 100 and 121, Josh will introduce new courses in Physical and Mesoscale meteorology. Josh is particularly excited about teaching these upper-level atmospheric science courses in the newly renovated Meteorology Lab on EST's 4th floor. In addition to these new courses, Josh's plans to take students storm chasing in the Great Plains this coming spring, as well as develop a new real-time weather observation system for WKU, are starting to take shape. Lastly, Josh looks forward to outreaching to public elementary schools in Bowling Green, KY, about severe weather awareness.

LEE FLOREA spent this past year settling into his position at WKU and establishing lines of research in local, national, and international venues. He is excited to be back in Kentucky and back in the classroom after a six-year absence while conducting research for his Ph.D. and his Postdoc. When not around campus, Dr. Florea is likely off caving, running, biking, hiking, kayaking, or helping his mother on the family farm in the Daniel Boone National Forest. This summer, Dr Florea was wed to his beautiful fiancé and long-time companion, Amber Yuellig.

This past year, Dr Florea has advised one graduate student, *Scot Russell*. Scot's MS thesis topic addresses a geophysical technique called electrical resistivity to map features of the subsurface, such as the sand-bedrock boundary and the interface between freshwater and saltwater, at an abandoned well field on the north end of San

Salvador, a small island in the eastern portion of the Bahamian Archipelago. His research is permitted by the Bahamian Government and supported by a combination of resources and funds from the Gerace Research Center (College of the Bahamas), Hoffman Environmental Research Institute, the Cave Research Foundation, and the Department of Geography and Geology. Geography and Geology senior *Chasity Stinson* also participated in the fieldwork and, in October, she and Scot will present findings of this work at the annual meeting of the Geological Society of America in Portland, Oregon.

This summer, Dr Florea is advising one BIS senior, *Joe Jenkins*, and two Gatton Academy students, *Matthew Kirk* and *Elizabeth Nethaway*.



Their research focus is to use equipment that detects the high-frequency echolocation calls from bats to develop an estimate of bat numbers and distribution in the south-central Kentucky region. The driving force behind this research is a new illness affecting bat species. The disease, called White Nose Syndrome, just this year has spread

like wildfire into PA, NJ, WV, and VA. The prognosis of this disease is dire; it has a 90-100% mortality rate. Kentucky, the next suspected target, hosts several threatened and endangered bat species. The data that Joe, Matt, and Beth will collect are part of a much larger, state-wide program coordinated by the Kentucky Department of Fish and Wildlife Resources.

Over the next year, Dr Florea will continue developing course materials for a range of upper-level and graduate-level courses in the geosciences. This fall, he will be teaching *hydrogeology* and *geoscience field methods*. In the spring, he will teach *geophysics* as a cross-listed course between Geography and Geology and Physics and Astronomy, and is tentatively planning to offer a field-based course similar in scope to the *Cenozoic geology* course he offered in the spring 2009 semester.

Dr Florea's publications this past year have included an article in the highly respected journal *Ground Water* based upon his postdoc research, and

four chapters in the book, *Caves and Karst of America*, published by the National Speleological Society. He is presently working on five additional manuscripts based upon work conducted in Florida, and this winter term he hopes to focus on writing. In particular, he hopes to work on his contract to write *Roadside Geology of Kentucky*.

Most recently, Dr Florea was elected to the office of Executive Vice President within the National Speleological Society. The primary responsibilities of the office are to oversee NSS publications, grants, exploration committees, and liaisons to scientific organizations. The two flagship components of the department under the office are the ISI-ranked *Journal of Cave and Karst Studies* and the Ralph Stone Award that supports graduate studies in cave and karst science.

STUART FOSTER completed his 21st year in the department. Notes Dr Foster, “while much has changed over the years, this department continues to be a great place to call home. I value and respect my colleagues on the faculty, appreciate our outstanding professional staff, and enjoy witnessing the successes of our students.” Over the past year, Dr Foster has contributed in the classroom, served Kentucky through his role as the state climatologist, and helped to direct the ongoing development of the Kentucky Mesonet.

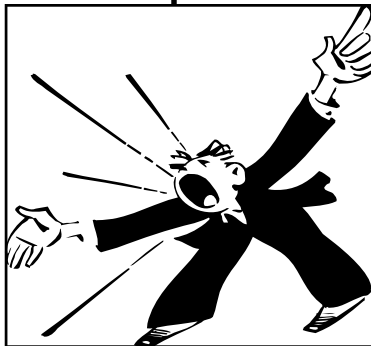
Building the Kentucky Mesonet requires a commitment to developing local, state, and federal partnerships. At the local level, Dr Foster has conducted numerous meetings with local officials and stakeholders throughout Kentucky in an effort to identify high-quality monitoring sites. Since the project began in 2006, he has led meetings at each of Kentucky’s 15 area development districts, and he has met with groups including local elected officials, emergency managers, cooperative extension agents, conservation groups, and others. Drs Foster and Mahmood continue to build relationships with state and federal agencies that have a keen interest in the ongoing development and operation of the Kentucky Mesonet.

In addition to these efforts, Drs Foster and Mahmood completed a manuscript titled “Spatial

Metadata for Weather Stations and the Interpretation of Climate Data,” that will be published in a forthcoming book, *Historical Climate Variability and Impacts in North America*. Stuart also participated in the 2008 Annual Meeting of the Kentucky Academy of Science and the 2009 Annual Meeting of the American Association of State Climatologists.

In his role as state climatologist, Dr Foster published a statistical and graphical analysis of climate change in Kentucky on the Kentucky Climate Center website (<http://kyclim.wku.edu/>). While the analysis does indicate evidence of a warming trend in mean annual temperature, the monthly and seasonal patterns are quite interesting and, in some cases, perplexing. These patterns will be a focus of ongoing research in the center.

It should also be noted that Dr Foster is quickly becoming a senior member of the department. This fall, Stuart and Jo Ann will be faced with the proverbial empty nest, as both of their children, Caley and Greg, will be Hilltoppers.



GREG GOODRICH writes that developing professional relationships with the meteorology community for students in the new B.S. Meteorology degree program was his primary focus in 2008-09. Now that the WKU Meteorology program, which fulfills all requirements of both the National Weather Service and the American Meteorological Society, has been established with nearly 50 majors, the focus turns to helping students obtain internships and present their research at local and national conferences. Greg took ten undergraduate meteorology majors to the national meeting of the National Weather Association in Louisville in October 2008. Those ten students presented five research posters on historical weather events in the Mid-South as part of a student poster competition. Greg is also happy to report that 17 of his advisees completed a summer internship in 2009. Five of those internships were for academic credit and five others were paid, including two SCEP internships that guarantee the students (Danny Gant and Jane Marie Wix) a job with the National Weather Service upon graduation.

In the classroom, Greg had new preparations with GEOG 175 (University Experience) and GEOG (now GEOS) 500 (Geoscience Research and Literacy). In GEOG 175, Greg taught incoming freshman, most of whom are meteorology majors, how to navigate life as a freshman student and how to develop critical thinking skills. In GEOS 500, the incoming graduate students read articles on topics ranging from Marxist geography to postmodernism as they developed the important reading and writing skills necessary to create a thesis proposal. Greg also taught honor's sections of GEOG 100 and GEOG 121, as well as one of his favorite courses, Meteorological Instruments (GEOG 325). The course was set up so that students learned the theory behind each of the instruments used in the Kentucky Mesonet. The course was very hands-on as students were also responsible for setting up the tripod, data logger, and instruments and were required to write a group lab report for each lab exercise. Greg received his first advising award last year when he was named the WKU Student Government Association Ogden College Advisor of the year.

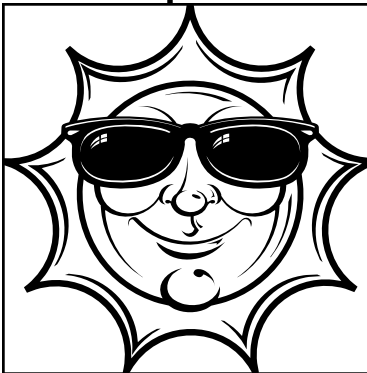
Greg continued to advance successfully his research program of investigating the relationship between low-frequency variability of the ocean/atmosphere (also known as teleconnections) to drought and precipitation patterns. He published two peer-reviewed articles in climate journals (*Monthly Weather Review and International Journal of Climatology*). The IJOC article investigated a new way to study the spatial variability of drought in the Colorado River Basin. He now has thirteen peer-reviewed journal articles since arriving at WKU in 2005 and sixteen overall. Greg made presentations of his research at five national and regional conferences, three of which were invited. Most notably Greg presented two papers via videoconference on the relationship between climate teleconnections and forest fires; his presentations to the National Interagency Fire Center occurred on the morning of the historic ice storm in late January.

Finally, Greg continues to write about Kentucky weather in the "WKU Meteorology Blog" which can be found at <http://meteorology.blog.wku.edu/>. The blog contains information about the new B.S.

Meteorology degree program as well as dozens of links to weather and climate websites.

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.

The Institute's China Environmental Health Project continued to work to improve environmental conditions in China through the development of partnerships with university and government scientists and students. In southwest China's extensive karst area, the CEHP continued training activities in collaboration with Southwest University (SWU) in Chongqing municipality and the Anhui



University of Science and Technology in Huainan. In a successful evolution of the project from a model where CEHP participants are directly training SWU students and scientists, in 2009 we jointly held a workshop in Kunming on karst resource management with these partners for government scientists in the karst-rich provinces of southwest China. In January the Hoffman team was pleased to

welcome Dr Jiang Yongjun from China's Southwest University and Dr Zhang Cheng from the Institute of Karst Geology in Guilin, both of whom are working as post-doctoral researchers through this fall at WKU. They have been working on dye tracing in Mammoth Cave National Park.

In another successful and especially satisfying accomplishment, CEHP partnered with the organization "A Child's Right" to combine resources on a project that has installed water treatment systems in 102 Chinese government-run orphanages in six provinces, providing safe drinking water to some 14,000 children. In many cases, without such systems these children are drinking water polluted with bacteria, especially where there are not resources to either boil drinking water or to buy bottled water.

In December, after more than two years of surveys, appraisals, and other lawyerly activities the Hoffman Institute and WKU became the owners of Crump's Cave in northern Warren County, where we

have been conducting USDA-funded research in groundwater quality for several years. The cave and property are a great location for both education and research. Since closing on the cave we have held two public workshops for local farmers and teachers, and are working to evaluate biological and archeological resources in the cave.

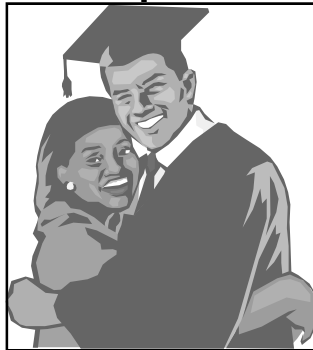
In a new and evolving project, a team of six from the Hoffman Institute visited Jamaica at the invitation of the Jamaican Water Resources Authority. The team traveled through the country's karst areas in order to assist the JWRA with long-term planning designed to develop a water protection strategy for these areas.

At home, Chris and Deana (more or less) finished construction of a new home in the middle of 50 acres of woods to the west of town, continued to have fun with their two daughters. Lillian had a wonderful time in kindergarten this year, and Leah continues to develop her talking skills; it's fun to finally find out what's on her mind!

PAT KAMBESIS was fortunate to have the opportunity to participate in geologic, hydrologic, and resource inventory field work both nationally and internationally and to attend several professional conferences and workshops this past year.

On the home front, she organized and led a team that conducted resource inventory and re-survey at Slaughter Canyon Cave, in Carlsbad Caverns National Park and at McKittrick Cave on Bureau of Land Management lands outside Carlsbad, New Mexico in October, 2008. Both fieldwork projects were completed and work on maps, GIS, and resource inventory databases is currently in progress. In November, Kambesis returned to Carlsbad Caverns National Park to continue her survey project of delineating the boundaries of the three-dimensional Chandelier Maze in Lechuguilla Cave.

In December 2008, the Haitian Ministry of Tourism sponsored Kambesis and graduate students Dan Nolfi and Ben Miller to continue reconnaissance and assessment of a significant karst area on the south coast of Haiti. The team mapped almost two kilometers of new cave passages in Grotte Marie Jeanne, which identified it as the longest cave in Haiti.



Eight additional caves were also documented and biologic inventory was initiated in all known area caves. Based on this fieldwork, a management plan and development recommendations for the Port-a-Piment area were submitted to the Ministry of Tourism. Plans are underway to continue this work in October 2009.

Fieldwork in Puerto Rico in January and May 2009 included coastal inventories of caves and karst features, with a total of 65 coastal caves documented including littoral, talus, and flank margin caves. Kambesis organized a team sponsored by the Puerto Rico Department of Natural Resources (PDNR) to visit Isla de Mona, an island located 50 km west of Puerto Rico. PDNR provided transportation, food, and accommodations on the island for 9 days in June. Forty-three additional caves were discovered and mapped and over two km. of passages surveyed in known caves. In addition to an ever-growing karst feature inventory, the team also documented significant archeological and historical artifacts and other evidence of human use. Results of the team's work will be featured at the new visitor center on Isla de Mona, scheduled for completion in October 2009.

In February 2009, Kambesis orchestrated a dye trace in a remote karst area in Honduras to help delineate the watershed of a significant cave system in order to address water access/quality issues faced by local villages. The trace was successful but the current politics in the region have put future hydrologic work on hold.

In March 2009, Pat traveled to Jamaica as part of a team from the Hoffman Institute and WKU's School of Journalism and Broadcasting by invitation from the Water Resources Authority of Jamaica to familiarize the WKU team with the hydrologic environment in north-central Jamaica's Dry Harbor Mountains. The objective of the trip was to develop a strategy for future hydrologic study by the WRA. Kambesis and undergraduate student Dalene Smith spent an additional three days doing reconnaissance of coastal karst in the Discovery Bay area and on the west coast of Jamaica. This is a new area of karst study, as most past research efforts have focused on the fluvial karst of the interior of the island.

In June 2009, Kambesis, along with Lee Bledsoe, Rick Fowler, and Elizabeth Winkler, participated in the 2009 Karst School and Conference hosted by the Karst Institute of Slovenia. Kambesis presented a poster on the effects of autogenic recharge on cave climate. The group also participated in field trips to Slovenia's classic karst (the area where karst was first described). After the conference, Kambesis, Bledsoe, and Winkler travelled to Croatia where, among other things, they conducted preliminary fieldwork on the north coast near Riejka and on the islands of Krs and Cres, documenting what may be a series of small flank margin caves in tertiary breccias. They also made a side trip to Plitvice Lakes World Heritage Site, where Kambesis couldn't resist mapping two small tufa caves..

In July 2009, the International Union of Speleology and National Speleological Society co-sponsored the International Congress of Speleology in Kerrville, Texas. Kambesis accompanied a group of Hoffman Institute graduate and undergraduate students to the congress, where she presented a poster on the documentation of the largest cave in Laos and gave oral presentations on survey project management and karst development at Caguanes National Park in Cuba. In addition she co-chaired a session on Survey and Cartography methods and participated in a panel discussion on writing UIS cartographic metadata standards. She also served as a judge for the ICS International Cartographic Salon and was elected secretary to the recently reactivated Commission on Long and Deep Caves of the World.

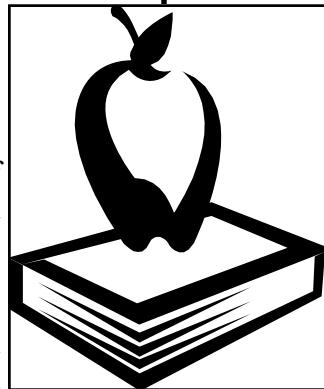
After the congress, Kambesis returned to Kentucky where she and co-leader Jim Borden ran an ICS post congress field camp in the Mammoth Cave area. A total of 30 international speleologists and karst scientists participated in the week-long field camp. Activities included daily interpretive tours of various parts of the Mammoth Cave System, several surface field trips, and evening presentations by Mammoth Cave National Park personnel, members of the Cave Research Foundation, and from the participants themselves.

In August 2009, Kambesis traveled with Chris Groves, Priscilla Baker, Lee Anne Bledsoe, and

graduate student Chrissy Hollon to the city of Kunming in Yunnan Province, where they all participated as speakers in a 3-day workshop on Karst Hydrology that was organized and sponsored by the Hoffman Institute, USAID, National Park Service, and Southwest University, Chongqing, China. After the workshop, the Hoffman-NPS team traveled to Stone Forest, where NPS and Stone Forest Management signed a sister-park agreement. Afterwards, the Hoffman team traveled to the East Plateau in Mengzi near the Vietnam border to visit a field demonstration site.

In between national and international travels and field work, Kambesis also taught sections of Fundamentals of GIS during Fall 2008 and Spring 2009, and administered the Center for Cave and Karst Studies Summer Karst Field Studies Program in June 2009.

She hopes to spend the Fall 2009 semester taking a break from the crazy amount of international travel that she's been doing for the past year.....or not!



DAVID J. KEELING writes that his sixteenth year in the Department, and eighth as Department Head, continued to generate challenges, excitement, some great international trips, several informative conferences and workshops, and hard-working students to keep him extremely busy.

As in past years, travel continued to dominate Dr Keeling's professional and personal life, and over the course of the academic year he enjoyed several marvelous research and lecture trips to the four corners of the planet. In May 2008, Dr Keeling co-led the Department's annual study abroad program, this time to Turkey, Greece, Italy, and Slovenia. In July, he spent time in Bogotá and Medellín, Colombia, conducting research as part of the Bowman Expeditions project, along with a historian colleague and a graduate student from the University of Southern Mississippi. Sandwiched between regional trips to New York and Lawrence, KS, for meetings related to ongoing research for the Bowman Expedition Colombia project, he again joined an AGS educational expedition, this time on the Trans-Siberian railroad from Vladivostok to Moscow,

Russia, via Mongolia. Dr Keeling gave lectures on climate change, geopolitics, and socio-economic challenges for Russia and its wider region.

In November, Dr Keeling traveled to Scarsdale, New York, to give a seminar on the “Seven Revolutions” for the Scarsdale Teachers Institute. He also traveled to Los Angeles, Milan (Italy), and London (England) for further research on emerging transportation system changes and long-term plans for high-speed rail systems. The new year started off with a trip to Granada, Nicaragua, to attend the annual conference of Latin Americanist Geographers (CLAG), where he presented ongoing research on community change in Medellín, Colombia.

In February, Dr Keeling joined an around-the-world expedition representing the American Geographical Society and gave lectures on a variety of topics, including climate change, geopolitics, globalization, and resource management. The itinerary included Machu Picchu, Easter Island, Samoa, the Great Barrier Reef, Papua New Guinea, Angkor Wat (Cambodia), the Taj Mahal (Agra), Dubai, the Serengeti (Tanzania), Marrakesh, and London. In March, he journeyed to Las Vegas to attend the annual conference of the Association of American Geographers and to serve on a number of panels. The academic year ended with a quick trip to London, England, for more research on Britain’s proposed second high-speed rail line from London northwest to Birmingham and Manchester.

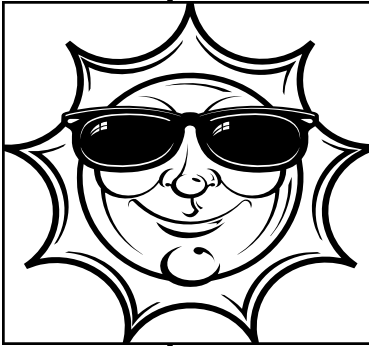
Within the community and on campus, Dr Keeling gave several talks on issues ranging from Russia’s economic and political challenges, to Cambodia and Arctic environmental issues. He appeared several times on WKYU-FM’s Midday Edition—his 32nd appearance on this forum featured a discussion about recent Russian military action in South Ossetia and the ongoing conflict with Georgia. Dr Keeling also gave a presentation on Cambodia 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 still attended

way too many meetings during the year, but managed to contribute to the ongoing Leadership Studies program (www.wku.edu/leadership) and to international education on campus. Despite the administrative load, Dr. Keeling still found time to write and publish research—this past year his third review article on transportation research was completed and will appear in the August issue of the international journal *Progress in Human Geography*. He also completed an article titled “Latin America’s Transport Conundrum” that appeared in the *Journal of Latin American Geography* this past Fall 2008, and had a photo essay on the Sahara and Sahel region published in the Spring issue of *FOCUS on Geography*. Several OpEd commentaries in development were scheduled for publication during the 2009 summer,

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 c y b e r s p a c e a t : 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>.



DEBBIE KREITZER writes that the 2008-2009 academic year was another exciting and productive one. Debbie spent a very industrious year teaching, researching, traveling, and planning new geographical experiences. She is involved in teaching the *Fundamentals of GIS*, *Geography of North America*, *World Regional Geography*, and the *Professional Preparation* class for graduating seniors. She is also continuing to teach *Cultural Geography* and two online courses for Independent Learning; *World Regional Geography*, and *Natural Resource Management*.

Along with the other faculty in the Department of Geography and Geology, Debbie is also dedicated to continue learning by attending research conferences and meeting with experts and colleagues in the field of geography. In March she attended the annual meeting of the Association of American Geographers (AAG) in Las Vegas, NV. Debbie attended the

meeting and presented a paper with her colleague Will Blackburn that examined how study abroad affects students' professional and personal life after the experience. Of course, geographers who attend out-of-town conferences are "required" to go on field-trips. Las Vegas is a fun city to explore, and slot machines and entertainment are found everywhere. But geographers see a growing city with a lack of water and a very arid landscape. However, the big casinos and hotels do not seem to be aware of the water shortage, as they have some very extravagant water displays.

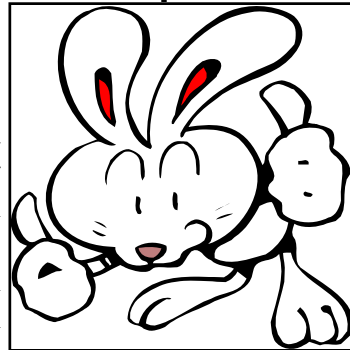
Debbie spent some of the summer in Utah visiting family and investigating the landscape. The Salt Lake Valley has an exploding population and the pollution that goes along with it. However, the city recently built a light-rail system and there are plans to expand it throughout the valley.

Debbie and her family also visited Maine and New Hampshire this summer and Debbie is working on research concerning the *Main Street Maine* and the *Maine Downtown Network*. This research concentrates on how small businesses in small towns contribute to economic revitalization by applying for and using state and federal grants and registry status. For more information about her research or about study abroad, please contact Debbie at this email address: debbie.kreitzer@wku.edu.

KEN KUEHN's silver anniversary year at WKU was another busy one! Last Fall, he was co-developer and leader, along with Dr Mike May and colleagues from the Kentucky Geological Survey, of the annual field conference for the Kentucky Society of Professional Geologists (KSPG). He also co-authored the guidebook for the conference: *A Rough Excursion - An Investigation of Upper Chesterian and Lower Pennsylvanian rocks in Grayson County, Kentucky*. More than 20 WKU geology majors participated in the field conference, together with students representing three other Kentucky universities. The students all enjoyed working side-by-side with the 40 or so professional geologists from across the Commonwealth who attended as well.

Ken continued his research with the National Park

Service and co-authored a presentation with Geoscience graduate student Nathan Rinehart and NPS personnel titled, *Natural Resource Condition Assessment at Little River Canyon National Preserve (LIRI), Alabama*. That assessment project is now complete and the report ready for submission to the NPS for final review and publication. Another project, a natural resource condition assessment for the Abraham Lincoln Birthplace National Historical Park, is still in progress. Ken was on sabbatical leave in the Spring 2009 semester to continue that research plus initiate a new grant-funded NPS project, *Preparing an Evaluation Report for a potential National Natural Landmark known as The Walls of Jericho, Alabama*. He currently has two geography undergraduates working with him on the "Walls."



Ken served on the Association of State Boards of Geology (ASBOG) Council of Examiners for the professional examinations and attended its meeting in Seattle. He also received the honor of being elected as a national Member-at-Large of that body, meaning that he can participate in all such future meetings independently, not solely as a representative of the Kentucky Board of Registration. The ASBOG examinations are required as part of the professional registration process in Kentucky and 30 other states. His article about these experiences, *A Professional Tune Up*, was published in *Kentucky Geologists*, the semi-annual newsletter of the Kentucky Board of Registration, and will be available on their website shortly (<http://bpg.ky.gov/>).

In addition to his Seattle trip, Ken was able to participate in professional travel to California, Florida, Colorado, Mexico and Belize this past year. He is always glad to hear from you and get caught up on your latest career and family news. Stay in touch! (kenneth.kuehn@wku.edu, 270-745-3082)

REZAUL MAHMOOD writes that it was another busy and productive year. He has continued to focus on various aspects of teaching, research, and service. He taught Physical Climatology and engaged a number of graduate and undergraduate students in research. His research focus remained on the impacts

of land-use change on long-term climate, soil moisture modeling (as it relates climate), land surface-atmosphere interactions, modeling of transport of aerosols, and the hydrometeorology of flash flooding in the Appalachian region.

Rezaul mentored students to present papers and posters at the 105th Annual Meeting of the Association of American Geographers (AAG) in Las Vegas, NV, the Kentucky-West Virginia NSF-LSAMP 2009 Student Research Symposium, Roanoke, WV, and at the Sigma Xi conference here in Bowling Green, KY. Rezaul also gave an invited talk at the Corn and Climate Conference at Iowa State University. He has also presented papers at the USDA-PIs meeting at Auburn University and at the annual meeting of the American Association of State Climatologists.

Rezaul published his research in the *Journal of Geophysical Research-Atmospheres*, *Atmospheric Environment*, *Physical Geography*, and the *Transactions of the ASABE*. He also published chapters in books titled "Land Use Policy" and "The Corn and Climate Report: A Practical Guide to Help Midwestern Farmers Understand and Respond to a Changing Climate."

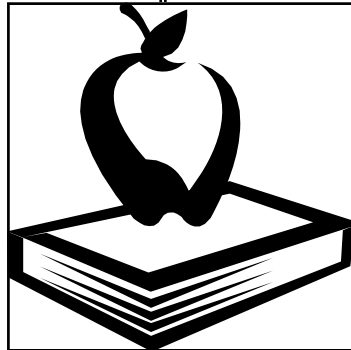
A number of his papers currently are in press with the *Bulletin of the American Meteorological Society*, *Journal of Hydrologic Engineering*, and *Applied Engineering in Agriculture*. He has papers in review with *Monthly Weather Review* and the *Journal of Geophysical Research-Atmospheres*. In addition, Rezaul has continued to review proposals for the National Science Foundation (NSF) and continued to serve on the editorial board of *Physical Geography* and *Geography Compass*.

Dr Stuart Foster and Rezaul have been working diligently on establishing additional weather and climate observing stations for the Kentucky Mesonet (please see accompanying piece on the Mesonet in this *GEOGRAM* issue). They also successfully organized the first *Kentucky Mesonet Workshop*. The workshop was attended by representatives from public and private sectors and from local, state, and federal level entities.

Dr. Claire Rinehart (of Biology) and Rezaul were awarded \$2.379 million to establish a High

Performance Computing Center. Rezaul has continued his research on micro- and meso-scale land surface atmosphere interactions and aerosols transport funded by the United States Department of Agriculture (USDA). He has also submitted several large competitive grants to the NSF, USDA, and NOAA. For more information about his research or about graduate and undergraduate research opportunities, get in touch with Rezaul at rezaul.mahmood@wku.edu

MICHAEL MAY has most recently been focusing on petroleum-related projects, but he has also continued to have geologic input into an environmental project he has worked on for the past five years. Dr. May developed a new course this past year titled "Energy and Society." Students in this course investigated myriad types of energy, including alternative energy sources such as solar, composting, methane from landfills, geothermal, etc, as well as traditional resources such as oil and gas, coal, and uranium. Unconventional energy resources were also studied, such as those that are



more difficult to extract from the Earth, such as tar sands and heavy (high viscosity) oil. This upper-level course had a solid enrollment of 16 students. The students were also tasked with perusing and identifying all energy related articles and advertisements from the weekday editions of the *New York Times* throughout the spring semester. Needless to say, it was a great learning experience for all once they considered that energy was at the heart of many global issues, including conflicts, scientific innovation, planet stewardship, environmental responsibility, sustainability and, of course, the economy, to name a few. Keeping up with the *Times* and the text was a challenge but students had high praise for the timely course offering, which emphasized an understanding of energy from a physical science viewpoint dealing with fundamentals such as thermodynamics and the continuity equation.

Dr. May was the lead author on two peer-reviewed articles recently. The first paper, titled "Carboniferous conodont biostratigraphy along the southeastern periphery of the Eastern Interior Basin, Kentucky,

U.S.A., appeared in *Palaeontographica Americana*, Conodont Studies Commemorating the 150th Anniversary of the First Conodont Paper (Pander, 1856) and the 40th Anniversary of the Pander Society. The second article, published with co-author Dr Kuehn, titled "Renewed interest in heavy oils and rock asphalt in South Central Kentucky," appeared in the August issue of *World Oil*, a Houston-based Gulf Publishing periodical with over 35,000 subscribers (archived articles on WO available at <http://www.worldoil.com/mag-archive.aspx>). The Conodont paper contributed to better defining age relationships for the Mississippian (Chester Series) and Pennsylvanian rocks between Bowling Green and Morgantown, Kentucky, along the Natcher Parkway. This work is also being further developed by one of Dr May's graduate students, Chrissie Hollon, in the context of utilizing the Kentucky Geological Survey's online petroleum geology interactive maps and oil and gas geophysical logs and well records, especially those focusing on the Mississippian-Pennsylvanian unconformity in five south central Kentucky counties. The *World Oil* article has brought a global focus to a local, unconventional energy resource centered in Edmonson County, Kentucky.

The Edmonson County area was also the focus of a poster presentation on heavy oil and tar sands by Drs May and Kuehn at the International American Association of Petroleum Geologists convention held in June in Denver, Colorado. Mike also had a second trip to Denver over the summer for collecting additional geologic materials for courses and visiting with family, as well as a trip to Ontario to meet with colleagues on an ongoing environmental project. He was happy to meet up with many successful WKU geology alumni in Colorado at the AAPG meeting and he eagerly awaits discussion for more student opportunities in the form of internships and permanent employment opportunities. Please contact him at Michael.may@wku.edu or 270 745-6891.

FRED SIEWERS had another full and exciting year in the Department. He taught courses in Earth History, Paleontology, and Sedimentary geology. Like offerings of those courses in previous years, Dr Siewers created opportunities for students to study geology in the field. Highlights included his paleontology trip to West Tennessee and his

sedimentary geology trip to Pound Gap, near Jenkins, Kentucky. New this year was his first offering of the senior capstone course "Professional Preparation," a course normally taught by Dr Kuehn. Students in Professional Prep developed résumés, gave scientific presentations, evaluated the presentations of their class colleagues, and learned about the practice of geology from a number of visiting professionals. Based on student evaluations, the course was very successful.

Dr Siewers continued his work with Dr Lisa Park (University of Akron) on the limnogeology and biotas of saline lakes on San Salvador Island, Bahamas. Notable achievements of this work included a co-authored presentation at the national GSA meeting in Houston, TX (led by undergraduate geology major Andrew Reeder) and the publication of a paper with Dr Park in the journal *Quaternary International* devoted to geological records of climate change. In addition to those contributions, Dr Siewers worked actively as a co-editor of the proceedings volume of the 14th Symposium on the Geology of the Bahamas and other Carbonate Regions, a symposium he co-chaired with Dr Jon Martin of the University of Florida. Additional scholarly contributions included a co-authored presentation at the Fall AGU meeting on his work in Earth System Science Education and another co-authored presentation at a statewide conference on sustainability hosted by WKU. The sustainability conference presentation highlighted his efforts to work with faith communities to advance sustainable living and Earth stewardship.

Dr Siewers was active on several department and university committees and he continued to serve as the Secretary and Treasurer of the Kentucky Society of Professional Geologists. He continued his involvement with the university's Cultural Enhancement Series, playing an integral role in the campus visits of the Carolina Chocolate Drops, a traditional old-time string band, and of Dr Kenneth Miller, a highly regarded evolutionary biologist from Brown University. Dr Siewers is currently laying the groundwork for a new curricular initiative in sustainability. He serves on the fund-raising task force of the campus sustainability committee and is developing two new courses pertaining to global environmental change: one focused on Cenozoic Earth History and another focused on contemporary

environmental change issues in the US and China. Dr Siewers has enjoyed hearing from alumni over the past year and looks forward to talking with anyone interested in the Department's programs. Feel free to contact him anytime at fred.siewers@wku.edu

ANDREW WULFF continued to develop undergraduate research opportunities, be involved at a high level in field-based geology research and learning, and augmenting the analytical side of “hard rock” geology at WKU. Andrew and his students were active at professional meetings, as they combined for six research presentations at regional to international scientific conferences. Dr Wulff also was awarded three grants to develop exercises and purchase materials for a series of hands-on activities in geology for 4th-8th grade classrooms, and he is a Researcher/Investigator on two NSF proposals (totaling \$4.6 million) submitted in the early summer.

Andrew is currently supervising undergraduates working on projects ranging from igneous petrology/geochemistry of lavas, radiogenic isotope characterization of dikes in the Mojave, soil quality/clay mineralogy, and a variety of geoscience education projects. Four geology majors have been examining lavas from Chile, developing petrogenetic models and an eruptive history for a large frontal arc volcanic complex in the Chilean Southern Volcanic Zone. The “Chile Dream Team” comprised Chelsea Brunner, Matt Downen, Kelly Kramer, and Austin Moyers. All presented aspects of their research at the WKU Student Research Conference and got a good dose of what analytical research in the geosciences is all about, contributing new data to the understanding of SVZ volcanism. Matt will be presenting further research at the national GSA conference in October. Students presented aspects of their research at the Kentucky Academy of Science, Sigma Xi, Posters at the Capital, and a regional GSA meeting. Andrew is also the academic advisor for fifteen students, one graduate student, and is on four graduate committees.

Dr Wulff took over Structural Geology in Spring 2009, as Ken Kuehn was on sabbatical. Enrollment

was above capacity in one of the largest classes in some time! It had been a few years since Andrew taught Structure, but he was able to draw on past lecture and lab notes, notes and suggestions from Steve Marshak (the text author), and Ken’s accumulated expertise. This was the first year in a while that there wasn’t a Structure/Petrology fieldtrip, but many of the students participated in a Spring Break Field Geology course in Death Valley and the Mojave Desert. More on this course can be found elsewhere in this edition.

This was the first year that the geology program had substantial involvement with students from the Gatton Academy of Mathematics and Science, and

Andrew worked to clear the way for ten students to do meaningful research in the program over the summer. He also wrote a proposal to the Gatton Academy to purchase additional platinum crucibles and moulds used in the fusion of rock powders for XRF analysis. Elaine Flynn and Ryne Weiss joined the “Chile Dream Team” (see above) in examining the geochemistry of lava flows from the Descabezado Grande-



Cerro Azul volcanic complex in the Chilean Andes. The experience was capped by a trip to Michigan State University to prep samples there and run them at the MSU X-Ray Facility. Everyone enjoyed the trip, learned a lot, and ate lots of good MSU ice cream! Both Elaine and Ryne plan on presenting their research results both on campus and at the 2009 Kentucky Academy of Science conference.

Andrew again taught three weeks of the summer field geology course with students from nine universities (see story and photo in this edition). Once again, students unraveled the geology of Montana, Wyoming, and South Dakota – and braved snow, sleet, wind, and the “Zombie Flu” this year. Ah, what stories will be told!

Dr Wulff continued in his term as a national Councilor for the Council on Undergraduate Research (CUR), and will be going to Washington in September to advocate for increased funding for the geosciences. Much time was spent with the WKU General Education Review Committee, charged with overhauling the entire General Education program at

WKU! He chaired a subcommittee charged with developing a survey of attitudes about the role of Gen. Ed. and curricular issues, which provided some very provocative results. He also served as one of three panel members for the closing session of the university-wide “Engaging the Spirit” conference. Andrew was asked to participate in an “Interdisciplinary Teaching Workshop” that explored ways of developing interdisciplinary courses, perhaps to provide a core for the Gen. Ed. revisions.

Dr Wulff is committed as ever to bringing more earth science to the K-12 classrooms in the area and he and his students logged approximately 1,200 contact hours with students (primarily 4th, 5th, and 10th graders) at eight schools in three counties and the Bowling Green area this past year. 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, maps, and various earth resources. Additional activities for this year include units on groundwater and limestone dissolution.

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, sedimentary iron deposits, carbonates of all sorts, artifacts, and various ores (from as far away as Honduras!). If you have samples or questions – bring them in! He continues to be involved in the community as a certified Community Emergency Response Team (CERT) member, giving interviews on radio and TV, and giving presentations on earthquake preparedness and radon analysis and mitigation. He continues to enjoy helping to organize neighborhood events (e.g. Neighborhood Strolls, National Night Out), playing bass, and singing around town in a rock band.

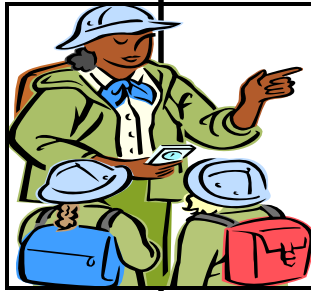
JUN YAN mainly taught several upper-level GIS and technique courses during the past academic year. In his courses, Dr Yan actively engages his students in a variety of real-world projects, including fire station performance assessment, WKU campus walking time analysis, Dale Hollow Lake State Resort

Park Assessment, and crime analysis, etc. Currently, Jun and his student researchers are working on a number of projects in local and regional communities. For instance, one of his projects is to analyze commuting patterns in a number of small-sized cities across the U.S., including Bowling Green. Another project is related to storm-water runoff monitoring in Karst regions. With Bowling Green as study area, this project aims to develop a general procedure in GIS to keep track of the transport of potential storm-water pollution on both surface and subsurface. Findings from this project could help the city government to understand groundwater movement and thus develop more informed storm-water monitoring and sampling strategies.

Dr Yan also had a very productive year research wise. He published three papers in prestigious international journals, one of which presents the findings from a study of traffic accidents in the Bowling Green region. The same project was also reported by the Bowling Green *Daily News* in January 2009. In addition, he attended several regional and national conferences, including the Middle Tennessee GIS Forum and AAG annual conference. At the AAG annual conference in Las Vegas, he gave a presentation on commuting analyses in small-size U.S. cities.

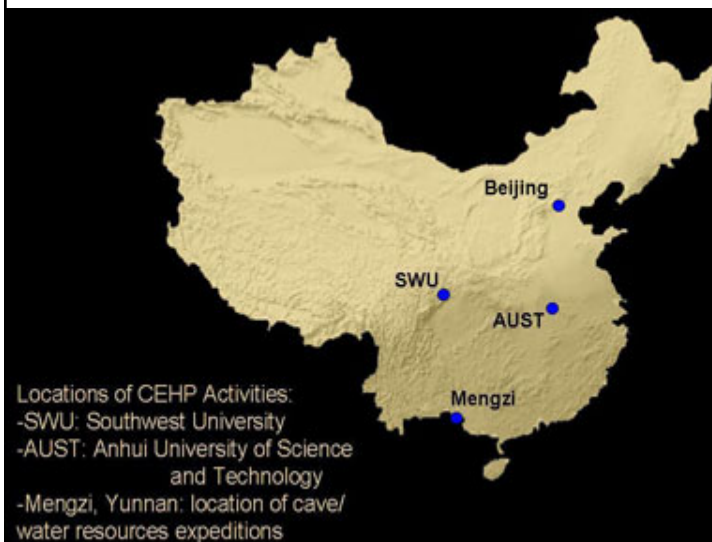
Last year, Dr Yan accepted the position as Chief GIS Lecturer by the International Research Center on Karst (IRCK). To fulfill this duty, in Summer 2008 he traveled to Guilin, China, and conducted a workshop at the China Karst Dynamics Laboratory. The workshop - *GIS and Spatial Analysis and its Applications in Geosciences* - was the first formal workshop sponsored by IRCK since its establishment in early 2008. In addition, as one of only four overseas GIS researchers, Dr Yan was invited to speak at the 2008 *CPGIS Young Scholar Summer Workshop* at China Eastern Normal University, sponsored by the International Association of Chinese Professionals in GIS (CPGIS).

Overall Dr Yan is really excited about the growth of the GIS program at WKU. He is proud that WKU has the most comprehensive GIS program in the region.





Dr Yan lecturing in China



ALUMNI CONTRIBUTIONS

Contributions to the Department of Geography and Geology Development Fund in 2008-2009 increased again this 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 in memory of James Bingham, who served the Department faithfully for over 40 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:

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Special thanks to the Gildersleeve Family for ongoing support of the Geology program, especially Kent Gildersleeve.

Special thanks to the Leigh Roy Bell Estate

Special thanks to Drs Jim and Nancy Davis

Special thanks to Bill and Amy Rich

Special thanks to Syed Ahsan and family

Special thanks to Stan and Kay Sides for support of the Hoffman Institute

ALUMNI NEWS

Abbey, Jeremy (Geology 2007) is a geologist for Freeport-McMoran Copper and Gold Mining Company in Arizona.

Alapo, Victoria (MS Geoscience 1996) is a geography instructor in the Division of Social Sciences at Metropolitan Community College in Omaha, NE. She recently completed a summer trip to Alaska.

Armstrong, Ambre (Geography 2006) is an office assistant and programmer for Combined Communications in Bowling Green.

Baines, Courtney (Geography 2007) recently completed an MA in Appalachian Studies with a concentration in Sustainable Development from Appalachian State University. She writes that she plans on applying for a GIS lab supervisor position at ASU - "I am in an advanced GIS class right now, and have realized what a great GIS education I received at WKU. Thank you. Even though I'm a bit rusty from the brief break I had from the GIS world, I feel very confident in my knowledge of GIS as compared to my classmates."

Baker, Ken (MS Planning 1988) is currently the Director of Planning and Development Services for the City of Southlake, TX (Dallas/Ft. Worth Area), and has spent over 20 years in local government planning.

Briggs, Michael (MS Geoscience 2004) is a planner for the Sumner County Planning and Zoning Commission in Gallatin, TN.

Crowe, Shawn (Geography 2001) writes that he and his wife Tricia (Rogers, WKU '92) have a son named Austin and they just celebrated his 2nd birthday in July! Shawn is still working in Frankfort for the Kentucky Transportation Cabinet as a geo-processing specialist, but says that meteorology is still in his blood and perhaps one day his path will lead him back to it.

Curry, William (MS Geoscience 2002) has been working as a hydrologist for the Army Corps of Engi-



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neers in Sacramento for six years and he is now taking courses in Meteorology through the USDA online program. Bill is pleasantly surprised to see that there is a major in Meteorology in the Department and has also noticed the growth of the department over the past few years.

Finley, Jason (MS Geoscience 1996) is a Medical Operations Officer and Captain in the Kentucky Army National Guard, part of the 41st WMD Civil Support Team (WMD-CST) in Louisville, KY.

Graham, Mark (MS Geoscience 2004) earned his Ph.D. from the University of Kentucky in geography and is a lecturer at Trinity College, Dublin, Ireland.

Hayden, Joe (Geology 1978) is a geophysical advisor for Devon Energy Corporation in Texas. He has worked in the "oil patch" since graduating from WKU, primarily in international oil and gas exploration, and completed an M.S. in Geophysics at the University of Oklahoma in 1983. Joe has made several key oil-field discoveries in West Africa and is currently exploring in prolific pre-salt trend in deepwater Brazil. He notes that the WKU days were the best days of his life and he especially enjoyed the geoscience professors, particularly Dr. Noland Fields. Joe was a recipient of the "Outstanding Senior in Geology" award.

Iovanna, Anthony (AJ) (MS Geoscience 2004) is an imagery analyst for the National Geospatial Intelligence Agency in St. Louis, MO.

Jarboe, Stacey M. (Geography 2006) is a GIS analyst and environmental scientist for Stantec Consulting in Louisville. She works with storm-water management, FEMA, and watershed management plans. Stacey writes that she is thankful for what she learned in the geography program and has put her WKU degree to good use so far!

Lahndorff, Kasi (Geography 2001) has worked as a legal secretary for 6 years, most recently in Paducah.

Malapote, Kenneth (Geography 2007) lives in Columbus, OH. He recently worked with Project Vote attorneys as the National Quality Control Supervisor, where he managed over 30 offices specifically in Kentucky, Ohio, Michigan, Indiana, Wisconsin, Pennsylvania, and Minnesota. Project Vote helped register 1.31 million student voters and low/moderate income voters. As a Quality Control Supervisor he has helped to prevent voter fraud, and some of his associates were interviewed by the FBI and national media such as the *Wall Street Journal* and the *New York Times*.

McGuffey, Robbie (Geography 1990) has been working for the Kentucky Department for Environmental Protection for the past 18 years.

Phillips, Rachel (Geography 1999) is AICP certified and is a Senior Planner in Strategic Planning for the Lexington-Fayette Urban County Government. She has been offered a position in Auckland, New Zealand, as a resource planner.

Polanski, Tom (MS Geoscience 1995) now lives in the Denver area and writes that, since WKU, he's worked on some very fun GIS-related projects at an electric utility (in southern Maryland), then GIS consulting for electric utilities (at Convergent Group in Denver... that company has since disbanded), then some very interesting work at an aerospace and medical device manufacturing consulting firm that was strictly computer science oriented and lower-level work (in terms of software/hardware). Tom is now at a company that is about as abstract as it gets doing data modeling for electric utilities.

Slaughter, Gina Renée (Geography 1985) is an environmental coordinator with the Kentucky Department of Highways.

Thomas, Joel (MS Geoscience 2004) has been living in Chicago the past 2.5 years, working for the Newberry Library as an assistant to the General Collections Librarian. During that time Joel studied for his MLIS at Dominican University in River Forest, IL - and graduated in May. In November, he began a new position at the Chicago Botanic Garden as Serials Cataloger, responsible for cataloging the old serial

publications contained in the Massachusetts Horticultural Society's Library, a collection which was obtained by CBG in 2002. His specialties are rare books, serials, descriptive bibliography, and Dutch language publications. Joel is engaged to Jenny Schultz of Fond du Lac, WI, who studies library science at University of WI, Milwaukee. She is also an MA student in German translation and the couple were tentatively scheduled to be married in September 2009.

Thornton, Melissa (Geology 2002) earned an MS in Geology from the University of South Carolina. She writes that "I'm currently working for URS (Washington Division) here in Oak Ridge. I actually don't currently do anything related to geology, but rather I do "Emergency Management," which is basically analyzing what happens if the manure hits the fan at the facilities in Oak Ridge, Los Alamos, Hanford, etc. I do dispersion modeling... so people know which way to run! I'm a Scientist II."

Van Duzer, Josh (Geography 2002) earned his MA in Planning from the University of Akron and is a GIS analyst for Techni Graphics, Inc., in Wooster, OH.

Whitaker, Amanda (Geography 2007) joined the United States Navy and is currently stationed in Virginia Beach, VA. She is an Aircrew Survival Equipment Personnel and is currently working toward Officer Candidate School in the navy. Amanda will be starting her Masters in Meteorology right after OCS.

Willis, Derek (Geography 1999) writes that he is still working as a pilot for Fruit of the Loom in Bowling Green.

Wood, Hillari (Geography 1991) is a Certified Weather Observer for Pacific Weather, Inc., in Omaha, NE.

Wyatt, David (Geography 2002) has been working for EnSafe, Inc., in Nashville for nearly five years, where he is a project manager, and he continues to do environmental consulting. David is in his first year of law at Nashville School of Law.

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