As Western Kentucky University enters its centennial year of 2006, research and scholarly activities in the sciences and humanities depict a robust effort to discover new knowledge through collaborations among Western faculty members, between Western and other universities, and between WKU faculty and their colleagues at foreign universities.

Collaborations abound in the sciences as evidenced by stories you can read in this issue. Several professors in the Department of Agriculture — Becky Gifflin, Todd Willian, and Byron Sleugh — are working together on a multi-year U.S. Department of Agriculture research grant to alleviate the affects of poultry waste on the environment and turn litter into an environmentally friendly fertilizer.

Next time you drive along Natchez Parkway notice the reddish or brown rocks like shale and sandstone. These formations are the research focal point of Mike May of the Department of Geography and Geology. True to our collaborative research bent, Dr. May is working with a colleague at Indiana University to discover where our red dirt came from and what it contains that can help the environment. They are also going offshore to study similar concentrations of red clay for comparative purposes.

Botanist Larry Alice of the Department of Biology concentrates on what grows from the soil, primarily blackberries and raspberries. Professor Alice has studied these plants all over the world in an attempt to classify the various species of blackberries and raspberries. His conclusions will be of assistance to fruit crop producers and for environmentalists.

Our biological clocks are ticking, and Dr. Sigrid Jacobshagen of the Department of Biology is pursuing an extensive research project to study the mechanics of circadian (biological) rhythms. Dr. Jacobshagen and her students are learning more about how the biological clock regulates our lives and gene expression, which has proved critical in cancer research.

It takes healthy students to participate in research projects, and Dr. Marilyn Gardner of the Department of Public Health is studying how to improve student health. Her goal is to insure student health and academic performance through timely, well evaluated interventions. Her evaluation skills have led to collaborations with numerous area health providers and health educators.

Two Western Alums, Dr. Beverly Davenport Sypher and Dr. Howard E. Sypher, have fulfilled our goals of scholarly excellence and globalism by holding key academic positions in communication at Purdue University. Their work continues to contribute to collaborations among the academic disciplines, a trait that Western values in its faculty members and students.

Please read about the research and scholarly activities of Western’s faculty, students, and collaborators elsewhere in this issue of The Western Scholar. I believe that you will enjoy the diversity in the projects and their applications to improve the public good. You’ll be able to understand even more about the hundreds of projects in motion by reading the Research Briefs section at the end of the magazine. As spring comes to Kentucky and the end of another academic year draws near, you’ll come away from this issue with the realization that the quest for new knowledge continues as Western begins its second hundred years.

Collaborations and global partnerships are alive in the humanities as seen through the research of Dr. Andrew McMichael, Assistant Professor of History, into slave records in the Caribbean and South America. He is working with colleagues at Vanderbilt and the Universidade Federal Fluminense in Rio de Janeiro, Brazil. Their work will not only preserve primary records but also provide longitudinal data that will better define the history of the Atlantic slave trade and Africans in the Americas. Several student researchers have participated in collecting information for a database of the records.

Phillip E. Myers, Ph.D.
Director
Office of Sponsored Programs
Executive Director
Western Kentucky University Research Foundation, Inc.
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Western Kentucky University, 1906 College Heights Blvd., Bowling Green, KY 42101-1026

CO-EDITORS
Dr. Gay Helen Perkins  
University Libraries  
<gay.perkins@wku.edu>

Dr. Phillip E. Myers  
Office of Sponsored Programs  
<philip.myers@wku.edu>

ASSISTANT EDITOR
Ms. Pamela Napier  
Office of Sponsored Programs  
<pamela.napier@wku.edu>

FACULTY SCHOLARSHIP COUNCIL MEMBERS
Dr. Elmer Gray  
Co-Chair, Dean of Graduate Studies and Research

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Co-Chair

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CONTRIBUTING EDITOR
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ART DIRECTOR
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CONTRIBUTING WRITERS
Ms. Carol Cummings
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Mr. Bob Skipper

CONTRIBUTING PHOTOGRAPHERS
Mrs. LaDonna Harmon

CONTRIBUTING DESIGNERS
Mr. Marcus Dukes, Senior Designer
Mr. C. Scott French, Graphic Designer
Mr. Stephen Ayres
Mr. Ben Davis
Mr. Greg DeJaynes
Ms. Christina Valdez
Ms. April Yates

Western Kentucky University, 1906 College Heights Blvd., Bowling Green, KY 42101-1026

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A page from a badly damaged book of ecclesiastical records may hold life records of enslaved Africans in the Americas. Photograph by Andrew McMichael.
Shedding Light On The
CIRCADIAN

BY KIMBERLY SHAIN PARSLEY
IF YOU HAVE EVER TAKEN A PLANE ACROSS SEVERAL TIME ZONES, THEN YOU PROBABLY KNOW ABOUT THE CIRCADIAN CLOCK, ALTHOUGH YOU LIKELY DIDN’T CALL IT THAT. WHAT YOU MIGHT NOT KNOW IS THAT THE CIRCADIAN CLOCK, WHICH IS RESPONSIBLE FOR THE FEELING KNOWN AS JET LAG, IS PRESENT IN ALMOST EVERY LIVING ORGANISM.

Dr. Sigrid Jacobshagen, associate professor of biology at Western Kentucky University and current director of the Biotechnology Center, is interested in learning more about the circadian (or biological) clock. The word circadian comes from the Latin circa meaning “about,” and dian meaning “day,” she explained, adding “It means a rhythm that is about a day long.”

Dr. Jacobshagen said that medical researchers are finding links between the circadian clock and some forms of depression, mental disorders, sleep disorders, and weight gain. “It even goes further,” she said. “Scientists have discovered that in cancer research the circadian clock is important.” She said studies have shown that an individual’s ability to fight off cancer has a circadian component. Some drugs appear to be more effective in combating certain cancers based on the time of day they are administered. She said that “crono-therapy,” the study of how time affects medication, is becoming increasingly popular.

“There is currently a lot of interest in the biological clock,” continued Jacobshagen. “This is basic research, but also applied, in terms of medicine and agriculture. The agricultural implications of circadian research could have positive benefits on livestock breeding seasons, growing seasons, and crop optimization.”

Dr. Jacobshagen’s research of the circadian clock deals with the organism Chlamydomonas reinhardtii, a kind of green alga. “I’m working on a green alga that is also used to study other phenomena,” she said. “The advantage is quite a lot of research groups work on this organism, so I can also rely on their results for certain methods and knowledge.”

Algae too have a circadian clock. Dr. Jacobshagen said that a circadian clock has even been discovered in a certain group of bacteria. She will be able to compare her results to those from plants, which are evolutionarily closely related to Chlamydomonas.

“I’m interested in basically two aspects,” she said. “One is how the...
biological clock regulates certain things, and specifically how it regulates the expression of genes. The second is how the biological clock is trained or adjusted to the outside cycle — for example, light or dark, and temperature — that you have over a day."

Dr. Jacobshagen said the regulation of genes by the circadian clock in the green alga of her study is very common, even more common than she first suspected. She said that to make that determination, she and her students measure how much RNA [ribonucleic acid] is synthesized from these genes over the course of a day. To understand what is regulating the genes, they isolate mutant algae that are defective in circadian regulation. By doing this, they can conclude that the mutant gene was responsible for the regulation. "We also look at the gene," she said, "particularly, what part of the gene is the regulatory component."

Phototaxis is one circadian rhythm expressed by the green algae. Phototaxis, Dr. Jacobshagen explained, is essentially an organism’s ability to "swim toward the light." She has a phototaxis machine that measures this phenomenon. "When they think it’s day, even when you have them in constant conditions, they swim toward the light. When they think it is night, they don’t do it."

She said her study focuses largely on the protein that allows the cell to see the light and then adjust to the light. "The biological clock is, in a way, different from some other phenomena. For example, how a cell divides is very much the same in all animals and plants. But with the biological clock, there are more differences, so it’s also a question of what is the protein that adjusts the clock in a particular organism."

She finds this protein to be a very interesting subject of study. The protein that adjusts the circadian clock in insects, for example, is present in humans, but it performs a different function. Rather than adjusting the circadian clock, it is part of the clock that creates the cycling. "It is still not really understood how it came about or what makes these variations in different organisms," Dr. Jacobshagen said.

Students are very important to her research, and Jacobshagen believes the research experience is extremely valuable for the students as well. "Understanding the research part of the sciences is very important for students because that’s how knowledge is gained. It’s learning experimental thinking and progressing that gives students such an edge in addition to lecture and formal labs," she said.

Dr. Jacobshagen, who has been at Western for more than ten years, said the combination of teaching and research is the aspect of Western that she most enjoys. Western’s emphasis on molecular biology was also a draw for her. "Western was very attractive for my kind of research because of its strength in molecular biology and its Biotechnology Center." She added, "The Biotechnology Center makes Western special as a comprehensive university."
Imagine being snatched away from your home, stolen out of your country, taken to a new land, and sold into slavery, leaving your heritage behind you. You might think your legacy would be forever lost, but one Western Kentucky University faculty member is working hard to ensure that these names will be preserved forever. Dr. Andrew McMichael, an assistant professor of history, is working with other noted scholars to preserve slave records in the Caribbean by digitizing deteriorating archives in Cuba and Brazil.

“We are looking mainly at ecclesiastical records,” he said. “These are church records of baptisms, deaths, and wills at Catholic Churches. Often times, at the request of their new owners, the slaves were baptized very soon after they stepped off the ship from Africa. These church records have allowed us to construct a database of all the people and, in many cases, we can actually track them from their arrival from Africa through their deaths.” The documents they are reviewing consist of records from the 1500s through the late 1800s.

In cooperation with professors Jane Landers of Vanderbilt University in Nashville, Tennessee; Mariza de Carvalho Soares of the Universidade Federal Fluminense in Rio de Janeiro, Brazil; and Paul E. Lovejoy, of York University in Toronto, Canada; McMichael wrote an article for the spring 2006 issue of the Hispanic American Historical Review titled “Slavery in Ecclesiastical Archives: Preserving the Records.”

“Ecclesiastical records provide an important source for their research, and church archives in Brazil, Cuba, and the Spanish circum-Caribbean provide the longest serial data available for the history of Africans in the Americas, beginning in the sixteenth century and continuing through almost the end of the nineteenth century,” the article states. These records also offer insights into African history and critical demographic information on African populations in South America, as the Catholic parishes recorded African baptisms, marriages, and burials.

“Entries also record, when known, parents’ names and occasionally allude to birthplaces in Africa,” they write. “These ethnic and geographic markers will enable scholars to track the history of specific groups over time in targeted areas and allow for comparisons across Spanish and Portuguese colonies.”

Dr. McMichael says he has learned many unique things about the demographics of Brazil during this time period. “During the early 1800s, thirty to forty percent of the population of Rio Di Janeiro was born in West Africa instead of in Angola as scholars had originally thought,” he said. “These African slaves tended to form tighter knit communities and help perpetuate African rituals specific to that region of Africa. This explains the persistence of specific African cultural practices in Brazil.”
One of the most exciting finds was in the life of Francisco Menendéz, a runaway slave in Florida. “He was baptized there, ends up in Havana, marries, is recaptured, escapes once again, and becomes a ship captain,” he said with excitement. “Menendéz ends up in the Philippines, where he was a captain of a Spanish ship and later made his way back to the Caribbean.”

Much information can be found in these historical records, but many of these documents are in danger of being lost forever. “Churches store most of these records in religious archives or local churches, at risk from climate, bug infestation, and other damage,” he writes. “Too often, local lay persons or parish priests guard the records, and some of these well-meaning individuals are unaware of the historic significance or the fragility of the documents they manage.”

In May of 2004 Dr. McMichael traveled with Landers and graduate student David Wheat to begin digitizing records at the churches in Havana and Matanzas using techniques he calls
“guerrilla preservation.” On occasion the team worked without water or electricity, or without sufficient electrical outlets or work areas in which to film. “While some of the volumes at some churches remain in excellent condition, other record books have almost disintegrated, the paper consumed by worms and humidity,” he writes. These collections are being combined into comprehensive databases using so-called “new media,” which will allow for a greatly expanded understanding of African slavery in the Americas.

In February of 2005 Dr. McMichael made a second trip with Landers; Wheat; Vanderbilt’s Latin American bibliographer, Paula Covington; graduate students Oscar Grandío Moráquez and Henry Lovejoy of York University; and the archivist from Nova Iguaçu, Antonio Meneses. The group worked together to preserve more than 40,000 images from churches in Havana, Regla, and Matanzas.

To expand his work, McMichael has begun to assemble a much larger database of slave records from Matanzas, East and West Florida, and Louisiana. This database will contain an actual digital image of the ecclesiastical record, transcriptions in Spanish and English, and fields for age, name, place of origin, and other relevant information from the record.

The total work of the team will not only provide a framework for preserving and disseminating religious documents regarding the history of the Atlantic slave trade and slavery in the Americas, it will also publicize the importance of ecclesiastical archives. “The preservation and dissemination of ecclesiastical records from these areas will help scholars refine demographical estimates of the Atlantic slave trade and answer questions about the ethnicity of Africans in the Americas with more precision.... Scholars can also employ the ecclesiastical records in longitudinal and comparative studies of population, fertility, and mortality,” Dr. McMichael writes.

WKU also benefits from Dr. McMichael’s work, as he is able to bring these materials to students so they can see them firsthand and work on them. In many cases, the students are working with documents that no other scholars have seen.

“My teaching follows my research interests, to a large degree,” he explained. “At the same time, I want my personal interests to influence my teaching as well, which I believe helps keep my classes fresh for students. I believe that students should be challenged to think about history in new ways, that they should think about how history is packaged in the public space, and the ways that knowledge of history can help them better understand their own time. If my classes don’t challenge students’ identity, their assumptions about the world in which they live, and their social and cultural viewpoints, then I’m not doing my job.”

Dr. McMichael received both his bachelor’s and master’s degrees from George Mason University and his Ph.D. from Vanderbilt University. Prior to coming to WKU he served as assistant editor for papers of Thomas Jefferson at Princeton University. At WKU he has taught a variety of courses including new courses on Jefferson’s America and the Cultural History of Alcohol in America.
Terra rossa, the red, iron- and clay-rich soil common in karst areas, is found above limestone bedrock,” May said. “What parents in the Bowling Green area haven’t encountered their children’s sports, school, or play attire stained with terra rossa? It literally touches all of our lives. Get some on your soccer clothes, or gardening clothes, and it will not wash out easily. That’s the iron in the terra rossa, the element that gives our soil its red color. Exactly how this unusual soil forms has been a mystery.”

Geologists have proposed that by better understanding the origin of this red material there may be a more solid basis for finding and extracting enriched ores of iron, aluminum, and similar economically important elements, he said. For years, researchers have tried to determine the origin of terra rossa soil. One theory was that the red soil resulted from the dissolution of limestone and is simply an insoluble residue or leftover from that process. Another theory was that glaciers had “bulldozed” the red soil as far south as southern Indiana and other terminal areas.

In the past several years, May has been collaborating with Dr. Enrique Merino and other researchers at Indiana University on another theory. “We’re throwing out the idea that it’s just a simple insoluble residue,” May said. “It doesn’t make sense geochemically to be able to take a rock that is about ninety-nine percent calcium, carbon, and oxygen, and magically get all that iron by simple dissolution.”

“Then the second discounted idea was that glacial ice could just push in such soil. We found the soil in central,
south central, and western Kentucky, and the glaciers never touched those parts of Kentucky. So the question still remains: What kind of evidence should we be looking for to help us understand where all this red dirt originated?"

Their idea is fairly simple and based on the “conservation of mass principle.” The principle is applied to fixed volumes, known as control volumes (or surfaces), as in a known volume of limestone. For a given control volume, the principle states that mass entering per unit time equals the mass leaving per unit time plus the increase of mass in the control volume per unit time. Assuming a steady state flow of mass, mass in equals mass out, and there is no volumetric change in the limestone — only a replacement of the rock’s original minerals by minerals.

“Using that as a kind of thesis, what we came up with was that we could collect evidence in the field that would be suggestive of a mineralogical or chemical replacement process within the limestone,” May said. “The problem always has been that people making the observations weren’t trained in microscopic analysis of rocks. They didn’t look for it so they didn’t see it.”

In recent years, May and others have been collecting samples.
The best samples come from construction sites, such as the huge limestone rock resting near the Environmental Science and Technology Building. That rock was removed from the site of WKU’s new Complex for Engineering and Biological Sciences. “That rock shows the interface where chemical and physical processes are changing our white limestone into something red,” May said.

May began working on the replacement theory during his Ph.D. work at Indiana University. “It’s an ongoing interest of mine to look at sedimentary rocks such as the limestones around Bowling Green with an eye toward the changes they undergo over time,” May said. “And when I say time I mean geologic time — several hundred thousand to a few million years.”

The samples, such as those from the rock removed at the WKU site or from a grocery store construction site in Bloomington, Indiana, revealed that the calcite (limestone’s main mineral) is being replaced by iron-rich minerals.

“We’re looking for bona fide textures that were characteristic of a certain limestone. For instance if it had seashells in it, we might find ghost outlines of the seashells in the terra rossa right at the limestone-terra rossa interface,” May said.

Photographs from the microscopic analysis of the limestone show burrows of organisms that once lived on the sea floor. May said that texture also shows up in the nearby terra rossa soil. “If you have the same shapes of fossil grains in the terra rossa that you have in the immediately adjacent limestone, you should be able to see that it is not simply an insoluble residue. It’s actually an active phenomenon where the limestone goes from calcite to an iron-rich series of minerals that are totally different, but it retains its original depositional texture,” he said.

Samples taken farther away from the limestone-terra rossa interface and closer to Earth’s surface show more impact from weathering and other natural phenomena such as earthworms and microbes. “The question that is really out there is where did all this iron come from,” May said. “Perhaps the best idea, but it can’t be proven at this point, is that it’s literally dust in the wind. We have a lot of iron-rich, airborne particulates that get moved all across the earth,” he said.

WKU students have traveled to the Bahamas in recent years and have documented some red layers in otherwise white limestone there. “Where did all this red sediment come from?” May said. The red, yellow, and brown dust has blown from Africa across the Atlantic Ocean and is affecting areas in the Caribbean causing demise of some coral reefs.

And if you travel up the Natcher Parkway, you’ll see reddish or brown sedimentary rocks such as shale and sandstone. “Guess what they have?” May said. “Lots of iron in them. So as those were stripped off and eroded over hundreds of thousands or millions of years, they contributed to the raw materials of iron or iron oxide that could have easily been washed or blown into the karst plain area. And simply put, nothing is lost or gained. It is just recycled. Again just because you can’t prove how the iron got there, doesn’t mean it didn’t get there. But I think it’s a pretty good explanation.”

The replacement phenomenon is ongoing. “Nature has been tricking people about terra rossa for a number of years just by what we call simple weathering or soil forming processes. Once this is converted mineralogically...”
or chemically, it also gets churned some more by natural soil forming processes — it freezes and thaws,” he said.

“The phenomena of weathering and replacement are little understood by a lot of people who do landscape analysis including geomorphologists because they don’t get microscopic views,” May said.

“All the rocks in the area appear to be eventually turning into this red soil.” The replacement theory also has economic value because companies that deal in enriched ores, such as bauxite for aluminum and laterite for iron, want to know the concentrations of elements in the ore. They also want to know the processes responsible for variations in concentrations. Some globally important metallic ores owe their genesis to mineralogical replacement processes, May said.

May’s work is a rare combination that bridges soil science, petrography, sedimentary geology, and geochemistry. “This research is interesting because it is getting involved with the complexities of geology,” he said.

“We’re not looking way out there at big mountains or other large features. It’s the opposite. It’s a matter of focusing on the microscopic and putting it in the context of the selection of samples in the field. People simply haven’t had the opportunities to look at it in this way.”

For WKU students, the research has given them opportunities to visit places like the Bahamas, to conduct hands-on applied research, and to present their findings at local, regional, and national conferences.

“At this point, my work is to engage the students,” May said. “Through study abroad programs, we want to continue to provide students the opportunity to examine these rocks and ancient soils. We want to let students look at these things in the field and also under the microscope when we get back.”

May hopes the students will continue to share in his enthusiasm for the terra rossa research. “We know so little about the soil we walk on. I enjoy taking some dirt and finding out how old it is and what it’s made of.”
Even her background is diverse. Dr. Gardner holds a bachelor’s degree in journalism and advertising from Southern Illinois University, a master’s degree in wellness from the University of Mississippi, and a doctorate in health behavior from the University of Alabama at Birmingham. But she contends her varied background is what is most helpful in her current position as assistant professor of Public Health.

“With advertising, you’re selling a product or service. To be successful, you have to know your audience, how reach them, and how to motivate them. It’s the same with public health. We try to get people to buy into changing their behaviors. We sell health,” she said.

But measuring success in public health is much harder than it is with products or services sold via advertising campaigns. This is where Gardner’s expertise in evaluation comes into play. “Often times, the true impact of a public health program doesn’t occur for years, sometimes decades. In the meantime, you need to determine if what you’re doing is working.” Gardner added, “One of the challenges faced in health program evaluation is finding appropriate proxy measures for a desired health outcome or a behavior and a rigorous way to assess them.”

According to Gardner, it is not uncommon for people to cringe when they hear the “E” word. “Many people view evaluation as being officious and as something that takes too much time and other valuable resources away from running their programs. Many people also mistakenly believe that evaluation is something that you add on at the end of the program instead of viewing it as an integrative and continuous process. And sadly, many people and agencies simply do not see the value of evaluation.”

One agency that does see the value is the Barren River District Health Department (BRDHD), an agency with which Gardner frequently partners in her evaluation research. “Evaluation is the often-forgotten but critical component for any program that uses public funds to address community need. For far too long, public health and other publicly-funded services, have just ‘gone forth to do good’ without ever learning how to measure if our efforts actually accomplished anything,” said District Director Dennis Chaney. “But no publicly funded service can be responsibly run without evaluation as a key activity. A well-designed and well-executed evaluation is the cornerstone of planning.”

“Far too long, public health and other publicly-funded services, have just ‘gone forth to do good’ without ever learning how to measure if our efforts actually accomplished anything.”

Dr. Marilyn Gardner
Beth Siddens, Health Planner at BRDHD, added, “If you compare publicly-funded services to a moving vehicle, then assessment and evaluation together are the steering and the brakes. You can go forward without brakes or evaluation, but before long you either crash or get stuck in a ditch.”

Tricia Callahan, Assistant Director for Proposal Development in Western’s Office of Sponsored Programs, stated, “More funding agencies are requiring rigorous evaluation designs, something that hasn’t been emphasized as much in the past. Some agencies want to see as much as ten percent of the project budget devoted to evaluation.”

Because of this, Gardner collaborates with other faculty members outside of public health on their projects. “That’s one of the best parts of being an evaluator. I get to work on really interesting research projects with people who are content experts in some very fascinating fields.” Laughing, she added, “I’m not so sure they feel the same about my field.”

Gardner also assists state and local agencies and organizations with their funding and evaluation efforts. “In this sense, evaluation is both applied research and public service. It also provides wonderful service-learning and civic engagement opportunities for our students.”

Much of what she and her students do for these agencies are needs assessments. “Needs assessments allow programs to identify targets for change based on good data rather than someone just thinking it’s a good idea. They also establish good baseline data for future impact evaluations.”

Findings from these assessments often generate lengthy reports that, once submitted to the agency, are generally used to direct policy and implement programs, something she finds gratifying both professionally and personally. “In the five years I’ve been at Western, I’ve had the opportunity to see my evaluation efforts make a difference both in the community and on campus.”

Gardner is hoping her recent evaluation efforts will make a difference in the lives of WKU students. Initially, Gardner was asked by WKU Health Services to devise a strategy for obtaining a random sample of students for the 2004-2005 administration of the National College Health Risk Behavior Survey (NCHRBS) — which assesses several priority health risk behaviors of college students including behaviors contributing to unintentional and intentional injury; tobacco use; alcohol and other drug use; sexual behaviors that contribute to unintended pregnancy and sexually transmitted infections; unhealthy dietary behaviors; and physical inactivity.

Later, Gardner obtained funding through the Office of Sponsored Programs to conduct an in-depth analysis of the data. “The data are being used for planning purposes on campus — to identify where we need to put our time and effort in intervening to reduce risk and to ensure student health, safety, and academic performance.”

A detailed report of the findings was disseminated to key stakeholders on campus and within the community. Gardner hopes they will use the findings collaboratively to establish priorities for programmatic issues. “I’m hoping that once priority areas are identified, groups will work together to design and implement health programs aimed at reducing risk among WKU students.”

But educating students, Gardner stated, isn’t enough. “There are things we can do as an institution to reduce that risk, and to provide an environment that promotes and rewards healthful behaviors.” Gardner is hopeful her findings will be used for policy decisions and institutional change on campus.

Gardner is confident that the institution will administer the survey every few years so that she and others will be able to track trends on campus to see if these efforts are making a difference. “Fortunately, there has been great support from administrators for this project. They understand that evaluation is a process, and not a one-time activity; that it is a continuous feedback loop that allows programs to capitalize on strengths and improve weaknesses, so that, ultimately, we can improve our campus’s health.” She added, “They see the value in evaluation.”

“Some agencies want to see as much as ten percent of the project budget devoted to evaluation.”
After five years of research, WKU Agriculture scientists Becky Gilfillen, Todd Willian, and Byron Sleugh have learned not to spread it on too thick — poultry litter, that is.

Spreading the litter too thick creates environmental problems and may not provide increased crop yields.

“What we have found is good news or bad news depending on who you are talking to,” Dr. Sleugh said. “It’s good news to those who are interested in environmental protection and environmental quality, but it is not such good news for a farmer who has a lot of chicken litter to get rid of. What we found is that you don’t really need to apply a huge amount of poultry litter to get adequate yields and quality.”

How to handle the litter has become an issue in recent years as the poultry industry has grown across Kentucky. The management practices being developed at WKU will benefit farmers and the general public. “Overall we’re trying to find environmentally responsible ways to use litter as a fertilizer source,” Dr. Willian said.

The three faculty members have begun a second five-year research cycle with the U.S. Department of Agriculture. The first five years of research were conducted in conjunction with the USDA-Agricultural Research Service (ARS) unit at Mississippi State University. Now, the WKU researchers are working with the USDA-ARS unit at Bowling Green. The research and the USDA-ARS unit have been funded in recent years thanks to the efforts of U.S. Senator Mitch McConnell.

In their research, the WKU faculty members have applied varying levels of poultry litter to orchardgrass,
alfalfa, sorghum-sudangrass, tall fescue, and corn. One of the things learned in the first five years is that “when we apply litter at rates to meet the nitrogen needs of the plant, we see a phosphorus buildup,” Dr. Gilfillen said. “And it happened a lot faster than we were anticipating. You get soil test levels that are considered very high after two to three years of application when we had thought it would take ten years.”

In the new five-year cycle, the researchers have begun applying poultry litter at a lower rate and supplementing it with inorganic fertilizers to reduce the phosphorus buildup and have begun looking at planting cover crops to remove phosphorus from the soil, she said.

Dr. Sleugh also conducted a litter rate application study on tall fescue, Kentucky’s most important forage crop. In the test plots, he applied no litter, one ton per acre, two tons per acre, three tons per acre, four tons per acre, and so on. “Looking at the data, you could get equivalent yield and quality by applying no more than about two tons of litter per acre, compared to what inorganic fertilizers would provide,” he said. “There’s no return on your investment if you go with four tons per acre, other than getting rid of the litter. If you’re going to be buying litter by the ton, it’s not worth it to pay for and transport two extra tons of litter per acre, if you’re not going to see a benefit in the yield or quality of the crop you’re growing.”

Dr. Willian also had similar findings with corn. “There was no agronomic advantage to applying more than four tons per acre of litter to corn,” he said. “Almost universally across the different crops and species that we work with it’s the same. Just dumping it on doesn’t make sense. It doesn’t make economic sense and it doesn’t make environmental sense.”

“Almost universally across the different crops and species that we work with it’s the same. Just dumping it on doesn’t make sense. It doesn’t make economic sense and it doesn’t make environmental sense.”

Photo by LaDonna Harmon
The faculty members and students who work with them have presented their findings at numerous local, regional, and national conferences, as well as field days at the WKU Farm. The management practices are becoming more important as states look for ways to reduce environmental problems of animal waste. “The growth in the poultry industry has been phenomenal,” Dr. Sleugh said. “More birds mean more litter. More litter brings associated problems of managing, handling, and disposing of it.”

According to the Kentucky Agricultural Statistics Service, broiler production was just 1.5 million birds in 1990 but that number dramatically increased to 22.2 million in 1991 and has risen each year. Production was at 64.5 million in 1995, topped 110 million in 1997, and was 230 million in 2000. In 2003, production was at 275.9 million birds with a value of production at $506.6 million. That ranked poultry at third in Kentucky’s top five farm commodities in 2003, behind horses and cattle and ahead of tobacco and soybeans.

With proper management, the waste material becomes a valuable recyclable resource, Dr. Willian said. “We feel we’re trying to take a proactive approach toward management practices that may be mandated in the future,” he said.

The issue has economic impacts not only for farmers who pay to transport or dispose of the waste, but for consumers who see those costs passed along, Dr. Gilfillen said.

“For centuries farmers have used animal waste as a source of nutrients,” Dr. Sleugh said. “In the last few years with the increase in the cost of inorganic fertilizers, primarily nitrogen, a lot of farmers have looked at going back to using some of these organic fertilizers. The cost of nitrogen is going up and chicken production in Kentucky is skyrocketing, so lots of litter has become available. It was good timing for the farmers.”
A CONVERSATION ON
In a recent article on civil discourse, Dr. Sypher argued that competent communication also must have an ethical dimension. “Competence is not simply achieving our goals in any encounter,” she explained. “It also should entail a sense of respect and restraint that forms the basis of civility. In arguing that we need to reclaim civil discourse at work, I warn of the detrimental effects of spiraling incivility which includes subtle intentions to subvert the interests of others for our own self interests to more overt aggression, verbal harassment, bullying, and ‘desk rage.’”

In her award-winning article, Dr. Sypher reviewed a number of reasons why incivility at work seems on the rise including longer working hours; increased stress from an over-stimulated, fast-paced, rapidly changing work and home life; increased anger and depression among employees; more mobility; fewer long term relationships; and less commitment to organizations.

Dr. Sypher’s secondary research interests focus on e-health and telemedicine applications. “E-health or telemedicine refers to the use of communication technologies to facilitate the delivery of health care,” she said. “It has emerged as one potential solution to address both access and costs concerned with the delivery of health care.”

Dr. Sypher has been involved in the design and evaluation of various telemedicine projects which have examined how telemedical consults are organized and understood by the participants. “For example, my coworkers and I have examined issues of access, satisfaction, and understanding in projects that link rural health care providers with specialists at medical centers via computers, videoconferencing, and e-mail,” she explained.

Her work has included telehospice projects that used small cameras connected to televisions and...
telephone lines to link patients and caregivers with health care providers at remote sites. “Telemedicine is a crucial topic that demands innovative and interdisciplinary approaches to address efficiency, productivity, and quality of health delivery processes,” she said. “Recent projects have included everything from telepsychiatry, teleradiology, and telenursing to telehomecare and telehospice.”

Beverly Davenport Sypher received her Bachelor’s and Master’s degrees from WKU in 1976 and 1977. In 1981 she received her Ph.D. from the University of Michigan, where she completed her dissertation on a multi-method investigation of employee communication abilities, communication satisfaction, and job satisfaction.

Prior to her appointment at Purdue in 2002, she was a Senior Fellow in the Office of the Provost at Virginia Tech University, divisional dean for the social sciences at the University of Kansas, chair of the Department of Communication at the University of Kentucky, and a Distinguished Visiting Fellow in Melbourne, Australia. She also has been the principal investigator for some $6 million in U.S. Department of Education grants to promote learning, retention, and graduation among underrepresented students from middle school through graduate school, and she directed the University of Kansas Dean’s Scholars Program that was designed to mentor talented underrepresented students in the liberal arts and sciences into graduate school and the professoriate.

Dr. Sypher has served on the boards of various professional journals and associations, and she is the 2005-06 chairperson of the Organizational Communication division of the National Communication Association. She received the university’s highest teaching awards at both the University of Kansas and the University of Kentucky and from the National Communication Association.

Dr. Howard E. Sypher joins his wife in a distinguished career. Currently department head at one of the larger communication programs in the country, his department at Purdue includes a range of instructional areas. “My colleagues are humanists, former Associated Press reporters, Emmy Award winners, lawyers, social scientists, and even a former host of “Nick at Nite,” he said. The department has approximately one thousand undergraduate majors and more than one hundred graduate students from sixteen different countries. Faculty include thirty-two tenure-track members, ten continuing lecturers, several part-time lecturers, and more than eighty graduate teaching assistants.

Dr. Sypher is firmly committed to international partnerships. “Since I arrived at Purdue, we have initiated new international research partnerships with Tsinghua University in China and the Katholieke Universiteit Leuven in Belgium,” he said. In the same period Purdue has assumed leadership of a study abroad program in Northern Italy as well as summer internship programs in London and Sydney. “We send more students abroad than any other unit in the College of Liberal Arts and more students than most of the colleges at Purdue,” he said. “Since I became department head we have also moved to internationalize our faculty by developing new semester-long international immersion experiences. In the last three years, five of my colleagues have spent three to six months teaching overseas on three continents."

Most of Dr. Sypher’s academic career has been spent in traditional Research I Universities. However, in every case he has been involved in
working with corporate partners and/or developing programs in metropolitan areas. “At the University of Kentucky I worked with colleagues at IBM, Corning Glass, and other organizations on research-based initiatives to improve work life or ease the stress of change brought on by technological innovation,” he explained.

“At the University of Kansas I proposed, developed, and initiated an applied MA program in Kansas City at the Edwards Campus and later directed an MBA program at the same facility.” Sypher spends a great deal of time in Indianapolis meeting with business leaders and healthcare managers, working with Purdue’s Engagement Office, and working at a campus shared by Indiana University and Purdue.

While Dr. Sypher has been involved in administration for almost fifteen years he has worked to maintain a research agenda. “My current research with colleagues in computer science is funded by the National Science Foundation,” he said.

“This year I have also been supported by the Regenstrief Center for Healthcare Engineering (RCHE) at Purdue as a faculty fellow and have funded graduate students through several smaller grants from healthcare organizations and from internal grant funds. This work is on the disciplinary boundaries, and I expect it to continue.”

In Dr. Sypher’s current position he connects academic colleagues (in communication, liberal arts, the sciences, engineering, and other disciplines) with each other and with various business and government leaders. “This has involved working on projects with Eli Lilly Inc. to increase the quantity, quality, and diversity of the pipeline for medical communicators, to working with a community mental health system to utilize faculty expertise in a branding project,” he explained.

As a Regenstrief Fellow and member of RCHE’s management team, Dr. Sypher spends about a day a week in Indianapolis, at the IU Medical Center, with Presidents and CMOs of major hospitals, with various startup companies, and with healthcare providers in an effort to solve real world problems. “My job in part is to align Purdue’s resources with healthcare challenges at the state and national level,” he explained.

“That may involve pulling together an interdisciplinary team to build or evaluate a new telemedicine system, organizing a conference to discuss strategies to pay for healthcare for underserved populations, or working with a technical advisory panel on how to rollout a new Emergency Medical Response system. It’s really about solving problems and locating and organizing the human resources to solve these problems.”

Dr. Howard E. Sypher received his Bachelor’s degree at the University of South Florida in 1974, his Master’s at Western Kentucky University in 1976, and his doctorate at the University of Michigan in 1979. Before his tenure at Purdue, he was previously department chair at Virginia Tech and the University of Kansas where he was also Associate Dean of the School of Business. He regularly teaches and conducts research in the area of communication and new technology. His latest research focuses on “digital identity” and is funded by the National Science Foundation and he is a fellow in the Regenstrief Center for Healthcare Engineering.

Dr. Sypher has lectured or taught in universities in Australia, Italy, Belgium, Finland, England, Japan, and China. In March 2001 he gave the keynote address at the Finland Virtual University Seminar at the University of Jyväskylä in Jyväskylä, Finland. In March 2003 he lectured at Nanjing University and was a guest (with Purdue colleague, Jian Wang) on “Dialogue” – a CCTV9 interview program recorded in Beijing and distributed to over four million viewers. In October 2005 he returned to the University of Jyväskylä where he was one of three international scholars invited to lecture at a meeting on human technology and issues on the human dimension of technology.

Both Howard and Beverly maintain ties with professors with whom they studied during their time at Western. They cherish the connections made on The Hill.
In Kentucky, an estimated 70,000 grandchildren are being raised by their grandparents and other family caregivers who are not their parents. What effect does that relationship have on the grandparents? The grandchildren? What support is there for these nontraditional families?

Those are some of the issues that Melissa Hakman, an assistant professor of psychology at Western Kentucky University, is trying to address with her research. A clinical psychologist by training, Dr. Hakman is taking research which started with “traditional families” and combining it with research she began at the University of Richmond in order to work with the Barren River Area Development District (BRADD) to help caregiving grandparents.

Dr. Hakman said her interest in parent-child interactions extended to custodial grandparents because there was little information available. “Most of the literature which is available has documented effects on the custodial grandparents, including increased stress, lack of resources, financial strain, decreased marital satisfaction, decreased parenting satisfaction, and difficulty managing the grandchildren’s behavior. Research has also examined the reasons why grandchildren are placed in grandparent care. Some of those reasons include parental drug abuse, child maltreatment, and child neglect,” she explained.

When she came to Western in 2003, Dr. Hakman began working with Kim Halter, coordinator of the Barren River Family Caregiver Support Program at BRADD, by conducting a psychoeducational group treatment program for grandparents and another program for the grandchildren. The programs were conducted using two treatment manuals which Dr. Hakman created with student assistance based on her findings from a previous study of needs identified by the grandparents.

“Dr. Hakman, through her research, has identified that not only are grandparents in need of support groups and educational training, but that...”
The grandchildren also need support groups and educational trainings,” Halter said.

“The grandparent group involved an educational component focusing on ‘normal’ child development. The group also covered parenting issues, coping with the new parenting role, managing stress, and building a positive relationship with the grandchild,” Dr. Hakman said.

The children’s group targeted children aged four to twelve who were raised by their grandparents. “One of the first goals of the grandchildren’s group is to help grandchildren cope with feelings associated with their placement and normalize some of the feelings they have about being different,” she said. “Letting them know ‘hey there are other kids like me living with their grandparents,’ helps them understand that they are not alone. The group also helps the children cope with some of the feelings of rejection because they often don’t know why they have been placed with their grandparents.”

Other areas addressed were increasing feeling identification, increasing coping skills, building the relationship with the grandparent, and taking responsibility for their behavior. The group also helps children deal with issues which sometimes arise when parents reenter the picture. Grandchild ask, “Who am I supposed to obey and how am I supposed to deal with that?” Hackman added.

At the end of the program, Dr. Hakman said the grandparents verbally reported improved behavior by the grandchildren and that they were feeling less stressed. “But I don’t have the empirical research data to support that,” she added. “I hope to do that within the next couple of years.”

Halter concurred with Dr. Hakman’s report, stating the grandparents she worked with reported they benefited greatly from the training, and that children showed a decrease in behavior problems at school as well as an increased willingness to work harder at school. “They also reported that they felt like barriers between their grandchildren and themselves had been lifted,” she said.

Halter and Dr. Hakman are hoping to expand the program to the other counties in the BRADD, and one of Dr. Hakman’s graduate students just finished her master’s thesis which examined custodial grandparents’ level of reported stress and role satisfaction.

“Dr. Hakman has also conducted many one day workshops with grandparents raising grandchildren throughout the ten-county BRADD, and we receive very positive feedback from the grandparents regarding her presentations on issues with which they are struggling while raising their grandchildren,” Halter said.

In another study, funded by a junior faculty research grant titled A comparison of parent-child interactions between traditional caregivers and nontraditional caregiving grandparents to their children’s behavior, Dr. Hakman is conducting a naturalistic observation examining parent-child interactions in traditional families and in nontraditional, caregiving grandparent families. “Some of the research documents the high levels of stress in these nontraditional families, and we do not know if the stress experienced by these caregivers is any greater than stress experienced by traditional caregivers,” she said. “Even though grandparents will say...
child behavioral management issues, we do not know if this is actually the case. We need research that investigates how grandparents and grandchildren interact and how that influences what parenting strategies they use. In addition, we need information about how these interactions influence the grandchild’s behavior, especially in the long term.”

Although her primary focus is on parent-child interactions in “traditional” families, Hakman said she expanded her research to custodial grandparents because she found herself treating more and more of these nontraditional families clinically. “I hope to examine grandparent-grandchild interactions in order to devise interventions to help this population in need — both the grandparents and the grandchildren. Some grandparents report to me that the grandchildren are different than what their children were, and often face difficulty dealing with issues facing today’s children.”

Dr. Hakman’s interest in parent-child interaction began when she was an undergraduate student at Oklahoma State University. “My early studies were laboratory manipulations focused on “normal kiddos” (those without significant psychological problems) and their mothers where I assessed the efficacy of various parenting strategies, particularly verbosity and nurturance in a variety of tasks.”

Hakman expanded her research to examine parenting issues in parent-child interactions in clinical populations. She obtained a research grant from the U.S. Department of Health and Human Services Administration for Children and Families which funded a project examining an empirically validated treatment used with children to try to correct behavioral problems (Parent Child Interaction Therapy, or PCIT) with physically abusive parents. “So the work that I did was with children who had been physically abused by a caregiver who was referred for treatment,” she said. “We provided PCIT to see what changes occurred as a function of treatment and where the majority of change occurs within the program.”

Whether Dr. Hakman is doing research with nontraditional or traditional families, she engages both graduate and undergraduate students in her projects. “I think it’s a unique opportunity for them, especially since my area is clinical psychology. You don’t necessarily see a whole lot of clinical psychologists using observational research methodology due to its tedious nature,” Dr. Hakman said. “I always tell students that even if they aren’t going on into clinical psychology, the research experiences in my research lab give them a good foundation of research methodology, and they get to experience the nuts and bolts of doing research with children and families.”

One of the unique opportunities for students is exposure to behavioral coding. Many of her undergraduate students begin as she did, coding the recorded interactions between parents and children in experimentally manipulated lab studies. This involves dividing each taped observation into ten-second increments and coding discrete and continuous behaviors as well as coding for content and duration. “There are a lot of different behaviors that are coded in the various studies for both children and the parent,” she said. Students typically train from six to fifteen hours a week and have to attain a ninety percent reliability with a master code before they can actually code the interactions independently. As part of observational research, students also are exposed to issues related to interrater reliability, the difficulties operationally defining behaviors, and the importance of accuracy.

“It is a very tedious research process,” Dr. Hakman said. “It is time intensive but very rewarding. It is also a research method that lends itself very well to student engagement.”
SOME PEOPLE LOOK AT A BLACKBERRY BUSH AND SEE A TASTY FRUIT CROP. OTHERS SEE A NASTY INVASIVE WEED. DR. LAWRENCE ALICE SEES A LIFETIME OF RESEARCH OPPORTUNITIES.

Larry Alice, an associate professor in Western’s Department of Biology, has been researching the systematics of the plant genus *Rubus*, which includes blackberries and raspberries, since beginning his doctoral work at the University of Maine in 1992.

“A lot of people ask me, ‘How did you end up picking this group?’ It’s prickly. It’s not a particularly nice plant. It’s a weed. You don’t necessarily get to go to scenic habitats to find them. You can look on the roadside or your backyard or a fence row,” Dr. Alice said.

But for a botanist, the species are economically important, generally familiar, and biologically challenging. “It was something that I knew had so many problems that it effectively could be a lifetime worth of work,” Alice said. “I didn’t want a project that would get me a Ph.D. but then leave me wondering what I was going to work on after that.”

In the past thirteen years, the work of Dr. Alice and his students has itself spread like a blackberry bush. The project has taken him from New England to southcentral Kentucky to various locations around the world and has opened the door for other research projects. On the Tree of Life, Rubus indotibetanus, a large-fruited raspberry from the Mo Chu river valley in Bhutan.
where animals represent a branch and plants represent a branch, “somewhere on the little, tiny twig that I’m working on is where Rubus is and it’s on a larger branch that comprises the rose family,” he said.

Dr. Alice is seeking answers to what seems like a simple and fundamental question: What is a species in Rubus and how is it defined? But the genus Rubus is anything but simple. Depending on which classification you follow, historic or modern, the species of Rubus number anywhere from 429 to 750 or up to 1,000 worldwide. “That’s a fundamental question,” Dr. Alice said. “Do we have 429? Do we have 750? How many actual species do we have? It’s difficult to say.”

For instance, in eastern North America’s array of blackberry species, “we currently recognize a confusing group of approximately twelve indigenous species, yet over 400 have been formally recognized,” he said. Determining how many species exist, where they are and where they came from is an important issue for fruit crop growers and breeders trying to increase their yields and product quality and for those areas or agencies trying to eradicate noxious weeds.

Dr. Alice and his students use a variety of DNA techniques to address the evolutionary biology questions of the genus Rubus: “What we’re looking at is this modern day pattern of biological diversity in terms of how many species there are, where do they occur worldwide, how have they gotten from one place to another over geologic time, and how did they come to be in North America? Did they originate here or did they originate in China?” he said. “We’re also looking at the historical processes that gave rise to the modern day patterns. So there’s that aspect of the processes that have generated the patterns that we observe today, and since they are historical they’re not something that you can necessarily go out and observe today.”

That means that Alice and his group have to make inferences or “educated guesses” about those historical processes because “nobody was there to observe what happened two million years ago.” The researchers studying such questions can use information from DNA, chromosome structure, cell structure, and biochemical data, and can examine the various morphological characteristics such as the size or shape of leaves, the color of flowers, the type of fruit, and the number of seeds.

The genus Rubus is taxonomically challenging because of three phenomena that don’t occur in most plants.

**Rubus: The botanical name for raspberry, blackberry, and other bramble fruits**

1. **Hybridization.** About seventy percent of all plant species may have incorporated some degree of hybridization in their history. The various species of Rubus, such as the blackberry and raspberry, are able to hybridize easily.
2. **Apomixis.** Rubus species can use asexual production of seeds to generate new plants. A hybrid derived from two species might not be able to produce seeds normally, but apomixis gives the plant the ability to reproduce.
3. **Polyploidy or multiple sets of chromosomes.** Rubus species can have the basic number of two sets of chromosomes or as many as thirteen.
sets. Four, six, and eight sets are most common.

All of those factors have combined to create what Larry Alice calls a “hybrid swarm or a continuum of the species.”

As the Rubus species have hybridized over time, it has become more difficult to determine the original parental species. Two commonly cultivated crops in the United States, the Loganberry and the Boysenberry, are both derived from crosses between the Pacific blackberry and the European red raspberry.

Rubus growing on a roadside mountain in Bhutan.

Photo by Dr. Lawrence Alice

Hybridization has caused some of the problems with highly invasive weedy species in the Pacific Northwest and in South Africa. In the late 1800s, an American blackberry was introduced as a fruit crop in South Africa but the species subsequently hybridized and has become a noxious weed that is impacting commercial forestry. In the Pacific Northwest, the U.S. Department of Agriculture is looking for ways to eradicate two European blackberry species or control their spread.

In February 2003, Dr. Alice and his students started work on a three-year, $211,592 grant from the National Science Foundation. The group is hoping to sample and analyze twenty percent of the approximately 750 Rubus species worldwide. “The sample that we’re looking at of twenty percent of the total species of Rubus worldwide will be sufficient to answer this initial phase of questions,” he said.

They’ve acquired samples from the United States, China, and Bhutan, and will be collecting in Ecuador and Mexico next summer. “We’re trying to understand the evolutionary relationships and provide a road map of what’s related to what,” Dr. Alice said.

The trip to Bhutan in May 2004 was noteworthy because the Buddhist nation in the Himalayan region is biologically pristine, is largely unexplored, and allows just a few thousand foreign visitors each year. During a seventeen-day visit, Dr. Alice and Brittany Sutherland, a May 2005 graduate from Lawrenceburg, traveled across the mountains and valleys of Bhutan and collected specimens of twenty-five different Rubus species.

Sutherland is one of several students who have assisted Dr. Alice during his six years thus far at Western. Sutherland will be working on her doctorate at Washington University in St. Louis while another recent graduate, Kate Hertweck, is attending the University of Missouri for doctoral work. One of Dr. Alice’s first WKU students, Amber Hogart, is completing her doctoral research at the University of California-Davis.
By visiting other countries and presenting research papers at major conferences, the students exemplify Western’s “theme of engaging students and giving them opportunities to experience real science,” Dr. Alice said. On trips to Bhutan or Alaska or other locations, Dr. Alice schedules activities to provide the students with opportunities to learn about the biological diversity, geology, culture, and history of the places they visit. After a conference in 2004, Dr. Alice and three undergraduate students visited nine national parks in the southwest, including the Grand Canyon and Mesa Verde.

In 2006, Dr. Alice also began a project on the classification of the genus Rubus for the Flora of North America, which hasn’t been done since 1913. The work will include the number of species, their correct scientific names, morphological descriptions, and accurate distribution maps for all species of Rubus in North America including Greenland. During the summer, he spent three weeks at eight institutions in California to study the Rubus specimens there and tracking the spread of two invasive European blackberry species.

As curator of the WKU herbarium, Dr. Alice gets requests for information about the spread of invasive plants, such as kudzu, that may have been introduced as groundcover or as flowers in a yard. “A lot of times it becomes too late before we see it as a problem,” he said. “The more knowledgeable I can become on a global basis on these species of Rubus the more types of projects I can get involved in.” He is hoping his research on the genus Rubus as well as the mint and rose families along with his other projects will help him create a legacy at Western.

“If you’re only going to do the Flora of North America once every one hundred years, it’s a great opportunity for me,” he said. “I think it’s a good opportunity for Western and the Department of Biology to have that credit as an author. To a large degree, comprehensive universities like ours aren’t necessarily the ones involved in these types of projects. They tend to be the bigger institutions like Cal-Berkeley or Cornell.”

Dr. Alice, who received his bachelor’s and master’s degrees in botany from Southern Illinois University at Carbondale, also has benefited from the trips by making national and international research contacts. The trip to Bhutan, for example, provided him with additional contacts at the Royal Botanic Garden in Edinburgh, Scotland, and at the Missouri Botanical Garden.

Alice opted for a position at WKU because “by spending my entire professional career at Western, all my specimens end up being deposited in our herbarium, and all the publications we do carry Western’s name.” Dr. Alice also is developing an international reputation in the field. He doesn’t like to apply the term “expert” to himself, but he admits that he is considered by his peers to be the most knowledgeable person about Rubus on a global basis.

“**The more knowledgeable I can become on a global basis on these species of Rubus the more types of projects I can get involved in.**”

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*Rubus ellipticus,* another raspberry found throughout Bhutan and Asia; introduced in other countries for fruit production.
Selling Ethics

Dr. Craig Martin of the Department of Marketing in the Gordon Ford College of Business will spend the summer studying whether or not leadership and empowerment affect sales ethics. This topic is critical because as Dr. Martin writes, “the pressure to perform at the highest possible level is ever-present” in today’s competitive markets. Competition not only drives new marketing techniques but it can lead to unethical behaviors. As a result of his research, sales managers will ideally be able to “improve the ethical attitudes and behaviors of salespeople.”

Environmental variables play a key role in the ethical development of salespeople. Environmental variables that individuals encounter on a consistent basis include cultural, industry, and organizational environments. Of these three environmental forces, organizational variables appear to have the greatest ability to influence the ethical decision-making of salespeople. As business-to-business salespeople are often outside of the office, traveling to or preparing for sales presentations, their reference point for ethical dilemmas within the organization is often their immediate sales manager. The sales manager, therefore, plays a very important role in the ethical development and ethical performance of sales representatives.

Martin’s study seeks to identify specific sales manager leadership qualities that will directly or indirectly influence a salesperson’s ethical intentions and behaviors. Conceptually defined, transactional leadership revolves around managers clearly informing subordinates as to what their salient job activities are, how to perform these activities, and how successful completion of these activities will eventually lead to acquisition of organizational rewards. Conversely, transformational leaders raise their subordinates’ awareness of the worth of specified work outcomes, get employees to rise above their own self-interests for the benefit of the organization, and improve the subordinates’ desire for achievement.

Dr. Martin will gather his data through the National Association of Sales Executives who represent numerous industries. The executives consist of field representatives and sales managers. By analyzing the data from three hundred responses, he will try to uncover the ethics behind good sales relationships and explore the ethics between different genders and races of salespeople. The ethical intentions and behaviors of salespeople may be improved. Dr. Martin’s position at Western situates him to publish valuable research in this field as Western is the only university in Kentucky offering a marketing degree with an emphasis on professional selling. For more information on the sales concentration at Western Kentucky University, contact Dr. Martin via e-mail at craig.martin@wku.edu.

Support for Adolescents with Diabetes

Dr. Ron Ramsing of the Department of Physical Education and Recreation in the College of Health and Human Services was awarded a Summer Faculty Scholarship to study how adolescents with diabetes can be supported through summer camps. This study is critical for building the esteem of adolescents with diabetes who struggle with “one of the most psychologically and behaviorally demanding chronic illnesses facing adolescents.” Research shows that adolescents who do not have effective diabetes management skills have a higher risk of acute and long-term complications than their diabetic peers who possess these skills. Effective diabetes control has been shown to slow the onset and progression of complications such as eye, kidney, and nerve diseases. In other words, adolescent diabetics with proper motivational and management training can control blood glucose to reduce the progression of the disease.
Secondary Victims in the Workplace

Dr. Kathi Miner-Rubino of the Department of Psychology in the College of Education and Behavioral Sciences was awarded a Summer Faculty Scholarship to study the consequences of the mistreatment of women in the workplace. However, she is not studying the consequences for actual victims, but rather for those who simply observe or perceive their female colleagues being mistreated at work. Thus far studies have focused on the primary victims of abuse in the workplace; little is known about how observers of mistreatment are affected. Dr. Miner-Rubino intends to focus on these “secondary victims” of workplace mistreatment, who likely can’t help but be negatively affected by witnessing the mistreatment of their peers. Her research shows that these “vicarious mistreatment experiences” can lead to serious outcomes similar to the outcomes for those who are directly mistreated.

Dr. Miner-Rubino will analyze data from her study which includes over one thousand law school faculty members as participants. Faculty members were asked about their vicarious experiences of mistreatment toward women at work, emotional reactions, and important job outcomes. More specifically, Miner-Rubino assessed the degree to which they observed incivility toward female colleagues and perceived sex discrimination in their law school. Incivility was defined as rude and condescending behavior, and sex discrimination was defined as inequity between male and female law school faculty, such as in preferential treatment in recruitment and promotion. She also assessed faculty members’ feelings of fear and empathy, and their degree of job satisfaction, commitment to their law school, feelings of job burnout, and thoughts about quitting their job.

Professor Miner-Rubino’s conclusions will not only tell us more about gender dynamics at work, but also about how and why people who are vicariously exposed to the mistreatment of others also become victims.

Summer camps are a valuable experience for adolescents with diabetes to learn control measures for reducing the advance of the disease. Adolescents with diabetes can learn how to become more autonomous in managing the disease. Dr. Ramsing “will explore specific mechanisms” that enable this control at a summer camp in north central Kentucky that caters to male and female adolescents. He will interact with ninety-two subjects, examining several variables thought to influence perceptions of autonomy support inherent in the camp program. He will focus on diabetics in small and large group activities, noncompetitive and competitive activities and instructional programs. Data will be gathered as a result of these interactions to better understand the relationship between individual characteristics and delivery mechanisms. Dr. Ramsing expects to find the best mechanisms at the camp that lead to greater feelings of autonomy among his subjects. From there these mechanisms can be extended to more everyday experiences to better the lives of adolescent diabetics.

Nanotechnology Research

Dr. Tingying Zeng of the Department of Chemistry in the Ogden College of Science and Engineering was awarded a grant of $75,000 under the Kentucky Commercialization Fund through the Kentucky Science and Technology Corporation. She will study how to better clean up pollutants emitted from coal-fired power plants. Currently, the disposal of large amounts of activated carbon used to collect the mercury emitted from these plants is a critical issue because too much carbon in the waste renders it unsuitable for other uses. Dr. Zeng will try to surmount this problem by developing non-carbon sorbents for mercury removal in coal combustion.

Dr. Zeng’s work will focus on nanotechnology for the production of silica porous nanopowders. Nanotechnology involves research and technology development at the atomic, molecular, or macromolecular levels in the dimension range of approximately one to one hundred nanometers (one nanometer is one billionth of a meter). Her work not only provides fundamental understanding of phenomena and nanomaterials, but also creates and uses structures, devices, and systems at the nanoscale level.
The project will run for three years. In the first year of the three-year project Dr. Zeng will design and synthesize cost-effective nanopowder materials for evaluation. She will provide products for testing at a local power plant. Using the data collected in this experiment, she will spend the second and third years planning research and development to make the new generation of nanopowders capable of being manufactured to replace the currently used carbon sorbents.

The long-term goals of this research are equally significant. It will contribute to the goals of the Environmental Protection Agency and the Department of Energy to limit mercury emission to protect our environment. The technology that Dr. Zeng will perfect will lead to a cost effective method of synthesizing a broad range of inorganic oxide materials for use in advanced applications. Moreover, commercialization of the nanopowder is an important byproduct of Dr. Zeng’s research. In all of these ways, the outcomes of the project will have important impacts on protecting Kentucky’s environment, growing its economy through advanced technology, and perfecting high tech products.

### Crime Victims and Offenders

Dr. Jerry Daday, assistant professor of sociology, is working with a federally funded research team based in Albuquerque, New Mexico, tasked with studying violent crime in the community. They are comparing the demographic profile of the “typical victim” of violent crime to that of the “typical offender.” Researchers have found that just as prior deviance and offending increase one’s chances of future offending, they also increase one’s chances of future victimization. Victims and offenders also tend to engage in a host of risky lifestyles and behaviors, such as drug and alcohol abuse. It is believed that these risky lifestyles bring potential victims in contact with willing offenders in the absence of capable guardians, thus generating criminal opportunities. These same researchers have also found that living or engaging in activities in socially disadvantaged or in high crime neighborhoods increases one’s risk of offending and victimization.

While most earlier research compared all victims to all offenders involved in violent crimes, Daday and his colleagues from the University of New Mexico have spent the last few years examining the similarities and differences between victims and offenders involved in the same homicide and aggravated battery incidents in Albuquerque. Their research found that victims and offenders had a similar demographic profile and lived in equally disadvantaged neighborhoods. Both groups also had similar offending and medical utilization histories.

When developing violence reduction initiatives and intervention programs in communities and neighborhoods, practitioners often consider separate strategies for victims and offenders. Daday’s research suggests that separate interventions for victims and offenders may not be necessary, but that intervention programs that target both victims and offenders could potentially provide the most effective strategy for reducing interpersonal violence.