Western Kentucky University recently developed a Quality Enhancement Plan with “an emphasis on engaging students for success in a global society.” The broader goal states “students will engage with communities other than their own in purposeful learning activities that explicitly address their capacity and responsibility to contribute to community and society.” This edition of The Western Scholar highlights the work of eight WKU faculty members who are engaging their students in research and/or sharing the procedures and results of their own scholarship through classroom instruction. In each case, the faculty member demonstrates ways in which individual disciplines expand knowledge, respond to global issues, and seek solutions to universal problems.

Dr. Eric Conte, associate professor of chemistry, focuses on the search for environmentally friendly methods of preconcentration, detection, and measurement of pollutants produced by combustion processes. While traditional procedures of preconcentration require the use of toxic solvents, Dr. Conte is working to develop a more effective method and one that is safer for the environment.

The passion for caves, which initially attracted Dr. Chris Groves, geography and geology professor, to WKU, has now taken him to more than thirteen countries. Dr. Groves addresses the relationship between basic and applied research and describes how his pursuit of basic research questions inspired him to use his knowledge of caves to seek solutions to problems related to water supplies, health, and the environment.

According to assistant biology professor Jeffrey Marcus, the patterns, shapes, and colors of a butterfly’s wings provide more than beauty; they also reveal the organism’s genetic makeup and cell communication. These genetic pathways play a role in human health as well. With the funding he receives from the National Institutes of Health, Dr. Marcus studies the role of cell communication in regulating cell division in the human colon. His findings may someday help cancer researchers in providing better approaches to treatment for colon cancer.

Not all research takes place in the laboratory. When Dr. Tom Nicholson, professor of public health, found a lack of research literature and data on occasional illicit drug use by adults, he and his colleagues turned to the internet, using an online survey as a vehicle for gathering information on this “hidden population” and for identifying implications for American drug policy.

History professor Dr. Hugh Phillips was drawn to a study of Russian history following a study-abroad trip to the Soviet Union. After the fall of the Soviet Union, he gained access to archival data related to Tver, an ancient Russian city. As he studied the memoirs of the citizens, he gained insight into the social as well as political conditions affecting the population, and he began to focus on the impact of the Russian Revolution on the residents of Tver. He spent considerable time in Russia over a thirty-year period and has written extensively on topics related to the Revolution. His writings provide graphic descriptions of life in Russia during the period of the Revolution and the subsequent rise of Communism.

Assistant art professor Heather Pulliam also travels through time and distance to conduct her research. Her interests lie in the illuminated manuscripts created by monks and nuns during the Middle Ages, particularly the Book of Kells, housed at Trinity College in Dublin, Ireland. In 2004, Dr. Pulliam received a grant from the National Endowment for the Humanities, which supported her travel to Ireland to study the book more closely. Her work with the manuscript, which began as an honors thesis, evolved into a book, published in 2005.

Europe is also the source of the documents researched by Dr. Michael Seidler, professor of philosophy. An internationally known expert on modern German philosophy, he collaborated with European scholars on publication of the collected works of political theorist, Samuel Pufendorf. His major work is a large volume containing fifteen long essays written by Pufendorf over a sixteen-year period.

The research of physicist Dr. Phil Womble is unique because he actively seeks commercial application of his discoveries. Current projects include instruments used for homeland security and the application of wireless technology for medical purposes. A major component of Dr. Womble’s work is the involvement of students in the Applied Physics Institute (API). The API not only provides hands-on experience for WKU students to gain engineering and scientific skills, it also includes individualized teaching and the opportunity to work one-on-one with a professor on an exciting project.

The articles in this issue once again illustrate the wide range of expertise present among the WKU faculty. The level of scholarship they exhibit, the knowledge they transmit, and the degree to which individual faculty members encourage and engage their students in meaningful and exciting research contribute greatly to the WKU educational experience.

Sherry Reid, Interim Dean
The Bowling Green Community College of Western Kentucky University
The Secrets of Butterfly Wings
by Tommy Newton
Jeffrey Marcus is using his study of butterflies to assist cancer researchers.

An Expert on Russia
by Carol Cummings
A chance trip to the Soviet Union led to a career as an expert on Russia for Hugh Phillips.

An Underground Experience
by Tommy Newton
Chris Groves, an international cave explorer is still waiting for a once-in-a-lifetime experience.

Word and Image: Studying Ancient Illuminated Manuscripts
by Heather Pulliam as told to Scott Sisco
Heather Pulliam turns an interest in illuminated manuscripts into a book on the Book of Kells.

A Wireless War on Terrorism
by Bob Skipper
Phil Womble, director of the Applied Physics Institute, is using wireless and Internet infrastructure to develop a new generation of homeland security devices.

A Continental Philosopher
by Kimberly Parsley
Michael Seidler joins European editors in researching Pufendorf’s collected works.

Making Pollution Detection More Environmentally Friendly
by Scott Sisco
Eric Conte is searching for ways to make pollution monitoring more environmental friendly.

The Hidden Population
by Joy Baum
Tom Nicholson is researching adult users of illicit drugs who don’t end up in jail or rehabilitation.

Research Briefs
Conserving the Green River, Set Your Goals High, Preparing Child Educators, Studying Capitol Hill

About the Cover
The cecropia moth (Hyalophro cecropia) is the largest moth native to the eastern United States. Photograph by Jeffrey Marcus.
The genetic pathway involved in determining the size, shape, or location of butterfly wing patterns may provide information about how tumors grow in the human colon.

WHEN JEFFREY MARCUS LOOKS AT THE WINGS OF A BUTTERFLY, HE’S LOOKING AT MORE THAN JUST THE PATTERNS, SHAPES, OR COLORS. HE’S LOOKING AT ITS GENETIC MAKEUP AND CELL TO CELL COMMUNICATION.

And, as the Western Kentucky University biology faculty member has learned, the color patterns on butterfly wings are important to more than just the butterfly. The genetic pathway involved in determining the size, shape, or location of the wing patterns also plays a role in tumor growth in the human colon.

Dr. Marcus is receiving funding from the National Institutes of Health to continue his research. What he learns over the next few years may provide cancer researchers with additional information on how tumors form in the colon and may provide better options for treatments or medical care.

“What I do is I look at how genes are regulated, how they’re turned on and off so that the patterns of gene expression can define different aspects of the color patterns in the wings of a butterfly,” said Marcus, who has been at WKU since 2003.

Marcus has been conducting his genetic research for a number of years. He spent six years at Duke University (where he received his doctorate) and one year as a post-doctoral researcher at the State University of New York at Buffalo before coming to WKU.

“I got into this work because the patterns on butterfly wings very clearly play roles in the ecology of these organisms,” he said. “Some patterns clearly play a role...
in camouflage. Other patterns are used for warning colorations or for advertising that ‘I am a poisonous animal, don’t eat me.’ Other patterns have a clear role in thermal regulation so the insect doesn’t get too hot in the sun and die. A lot of white butterflies are white because they reflect solar radiation. Patterns also are involved in mate selection.

In the wings, a particular set of genes is involved in cell to cell communication, which can create certain color patterns. The cell communication wasn’t surprising, Marcus said. “What is a little bit surprising is that this genetic pathway that allows these cells to communicate is actually the same genetic pathway that regulates cell division in the human colon,” he said.

If that genetic pathway goes haywire in a butterfly, it may change the size, shape or location of pattern, but if the pathway goes haywire in the human colon, you wind up with tumor growth, Marcus said. About eighty percent of inherited colon cancers seem to involve mutations in this one particular path, he added.

For his NIH-funded project, Marcus is looking to make new mutations in the butterfly to alter the set of color patterns. The project has several stages:

First: Marcus and the WKU students working with him will create a genetic map of the butterflies and look at variations in DNA. He’s primarily working on the common buckeye butterfly and hybridizing it with a species from Florida called the mangrove buckeye butterfly.

Second: Marcus is continuing his research to develop techniques to introduce new genes into butterflies. “Right before I came to Western, I was the first person ever to introduce new genes into a butterfly,” he said. “I took a gene that encodes a fluorescent green protein from a jellyfish and introduced it into butterflies. What we got were butterflies that had eyes that glowed under certain illumination. That experiment was sort of a proof of principle experiment. Now we’re modifying these techniques. We can go in and take our green fluorescent gene and interrupt butterfly genes with it.”

Third: Marcus and his students are looking at how genes already present in the butterfly work in developing the wing. “We’re interested in how these colors have changed over time and if there are groups of butterflies that share certain types of color characteristics. There may be some opportunities to use that information to learn more about the mechanism by which these patterns are produced.”

Fourth: The research isn’t limited to butterflies. Marcus also conducts genetic studies on moths and fruit flies. Some of the fruit fly research parallels the butterfly work, “but fruit flies have a charisma problem,” he said. In one project, he’s looking at gene expression in the wings of luna moths. “My research so far seems to indicate they’re using the same genes that butterflies use to make these color patterns, but they’re using them in some unusual ways,” he said. “As I put the pieces together, I can make some interesting comparisons of what’s going on with moths and with butterflies.”

Another project is a study of the signaling system in fruit fly wings. Marcus and Travis Evans, a senior undergraduate from Orlando, Florida, are looking at how the cells communicate with each other to organize themselves and build wing structures. Fruit fly wings don’t have color patterns so the research focuses on interactions of cell signaling pathways in a wing vein that is important in determining flexibility.

If that genetic pathway goes haywire in a butterfly, it may change the size, shape or location of pattern, but if the pathway goes haywire in the human colon, you wind up with tumor growth, Marcus said. About eighty percent of inherited colon cancers seem to involve mutations in this one particular path, he added.
“As we find new genes in that system, we can actually also look and see what’s going on in butterflies with the same genes. Once we identify what a gene is, we can look at it in all sorts of different organisms. These things interface at a number of different levels.”

Dr. Marcus also finds satisfaction in working with WKU students. In the fall of 2004, he had five students working with him and had seven in the spring of 2005. “Without students, it would be just me doing the work,” he said. “I’ve been fortunate in that I’ve had a number of terrific students.”

Student assistance isn’t limited to the laboratory in the new Complex for Engineering and Biological Sciences. Students travel to Florida to collect samples and they help out in butterfly and moth surveys at the Upper Green River Biological Preserve.

In 2004 at the 671-acre preserve, Marcus and his group identified sixty-two species of moths and forty-seven species of butterflies, including some rare species. The group, which also includes members of the Society of Kentucky Lepidopterists, expects to find even more species in 2005.

“Knowing what’s out there, knowing what it looks like, knowing where to find it is very important,” Marcus said.

Survey work is important as WKU scientists restore the preserve’s natural habitat. Marcus also has been asked to assist Mammoth Cave National Park with an insect survey.

The buckeye butterfly used for his research is among the species found at the Upper Green River Biological Preserve. “What’s really great about becoming familiar with the diversity of butterflies and moths that are out there is that the patterns found on the buckeye butterfly are different from patterns on the swallowtail and monarch,” he said. “If we become interested in a certain pattern, we can find it and look at gene expression in that species.”

For example, Marcus shows a photograph of a three-inch green caterpillar. Spots on the caterpillar make it look like eyes on a green snake. “We know a lot about how patterns like this are made on the wings of adult butterflies but we know nothing about how patterns like this are made on larval butterflies,” he said.

And, as his NIH-funded work continues over the next five years, Dr. Marcus might find more clues about how the wing patterns play a role in colon cancer. “I’ve been really excited about what we’ve been able to do so far,” he said.
HUGH PHILLIPS CAME TO BE AN EXPERT ON RUSSIA IN THE MOST UNLIKELY OF WAYS. A PHILOSOPHY UNDERGRADUATE AT THE UNIVERSITY OF ALABAMA, HE WAS POISED TO GRADUATE IN 1974. HE WANTED TO SPEND THE SUMMER BACKPACKING AROUND EUROPE WITH HIS FRIENDS, BUT HIS PARENTS REFUSED TO GIVE HIM THE MONEY FOR THE ADVENTURE. HE STUMBLED UPON A SUITABLE COMPROMISE, AS HE LEARNED ABOUT A GROUP TRIP TO THE SOVIET UNION. SINCE IT WAS ORGANIZED AND EDUCATIONAL, HIS PARENTS AGREED TO THAT.

PHILLIPS SPENT A MONTH IN THE SOVIET UNION WITH THE STUDENT GROUP, AND THEN HE WAS HOOKED.

Upon his return, Dr. Phillips began to study the Russian language and earned his master’s degree in European History at the University of Alabama. Then he transferred to Vanderbilt for his doctorate in Modern Russian History, where he completed his dissertation on Soviet Foreign Policy in 1985.

Dr. Phillips also had the opportunity for post-graduate study in 1982-83 at Moscow State University as a part of the Graduate Student / Young Faculty Exchange sponsored by the International Research and Exchanges Board (IREX). “IREX wanted people to go over and live in the Soviet system to see first-hand what their lives were like,” he said. “At that time, the archives in the Soviet Union were closed. I actually put in a research request in September 1982, and I was finally denied the opportunity the following April.” The private lives of the Soviets would be a closed book for outside research.

However, that closed book was opened less than a decade later. Dr. Phillips began his research efforts on Tver, one of the oldest cities in central Russia, in 1990. He chose Tver primarily because it had not been previously studied, and his timing was impeccable. “When the Soviet Union collapsed, the archives of Russian cities which had previous been sealed were opened,” Dr. Phillips said. He was able to gain unrestricted access.

As Dr. Phillips pored over the archives of this city, he began to study the effects of the Russian Revolution on this one province over a twenty- to twenty-five-year period. “Using Tver’s archives gave me an actual microcosm of the whole revolutionary experience,” he said.

Tver is located 250 miles northwest of Moscow and is a unique and leading textile center in Russia. During the first quarter of the twentieth century, the textile workers were mostly young females who were brutally exploited and received very low wages.

As Dr. Phillips reviewed the writings within the archives, he learned that men wrote most of the memoirs, as the majority of Russian women were illiterate at that time. “By and large, the women were very poorly paid,” he said. “Women made up most of the lower working class, while the men comprised the skilled workers and positions of power. Women definitely did the dirty work.”

However, Dr. Phillips soon found a unique exception to this rule. He stumbled across the memoir of one twenty-two-year-old female factory worker. “There were 15,000 employees in her textile factory. At first, this woman loved her country, and she loved the Tsar, but within a year and a half she had joined a terrorist organization,” he said.

Phillips attributed this marked change to the conditions endured by the workers. “They were horribly treated,” he said.

When the Soviet Union collapsed, the archives of Russian cities which had previous been sealed were opened. He was able to gain unrestricted access.
“The government immediately stifled anything that smacked of power for the individual. This period in Russian history was extremely politicized. It began the establishment of the Communist government in Russia.”

A drastic change occurred in 1917, when a sudden and largely unexpected revolution ended the Romanov dynasty and the rule of the Tsar in Russia. History tells us that it was not planned, nor did any organized political group direct it. And the sleepy backwater town of Tver played a role in this historical uprising. In February 1917 Tsar Nicholas II was overthrown, and all of Russia was in celebration. All, that is, except Tver.

“At that time, the governor in the province was a German,” Dr. Phillips said. “The people took over his residence and broke into his wine cellar. Then a mob, led by men but made up mostly of women, got violently drunk and lynched the governor during a two-day drunken rampage. It got so bad that revolutionary police were given the power to shoot people on the spot.”

The second phase of the upheavals of 1917 was the October Revolution, in which the Soviets, increasingly controlled by Vladimir Lenin’s Bolshevik Party, seized power from the provisional government. The revolution affected both the urban areas and the countryside, including textile communities such as Tver.

Following the October Revolution, the Communist party emerged as the most powerful group in Russia, and thus the Soviet Union was born. It was the world’s first Communist state, with the political organization of the country defined by the only permitted political party, the Communist Party of the Soviet Union. According to Dr. Phillips, they accomplished this through the use of violence and terror that eventually led to a civil war.

Over the last thirty years Dr. Phillips’ studies have allowed him to spend a total of almost three years over eleven visits in Russia. His archival research in Tver has allowed him to publish three in-depth articles on topics related to the revolutionary movement within the province. His writings give the reader a candid snapshot into what life was really like for ordinary citizens during this pivotal moment in history. As Dr. Phillips said, “You can’t know what really happened in Russia without knowing what happened in these towns.”

Phillips’ scholarly interests include the Russian revolution and the Civil War, 1917-1921; Soviet foreign policy, 1917-1945, and contemporary Russian politics and international diplomacy, 1815-1945. Among his major publications are Between the Revolution and the West: A Political Biography of Maxim M. Litvinov (Westview Press, 1992), and articles in The Soviet and Post-Soviet Review, Slavic Review, Diplomatic History, Problems of Communism, Revolutionary Russia, the Encyclopedia of U.S. Foreign Relations and, most recently, several articles in The Encyclopedia of Russian History. He also has publications in the Occasional Papers series of the Kennan Institute for Advanced Russian Studies, an article on U.S.-Soviet relations, 1917-1946 and a “mini-monograph” on the Russian presidential election of 1996.

Dr. Phillips has received internal research grants from WKU as well as external grants from the International Research and Exchanges Board, the Kennan Institute for Advanced Russian Studies, and the American Council of Teachers of Russian. Besides a two-semester survey of Russian history, he teaches courses on European historiography and “Terrorism in the Modern World” at WKU. One of the things he most enjoys is leading group tours (similar to the one he took in 1974). WKU students, alumni, faculty, or anyone else interested in visiting Russia as part of a group tour may contact Dr. Phillips via e-mail at <hugh.phillips@wku.edu>.
By Tommy Newton

Waterfall Number 3 in Cave Spring Caverns

Even though he has traveled deep inside the Mammoth Cave System and visited caves in China, New Zealand, France, and thirteen other countries, Chris Groves is still waiting for a once in a lifetime experience. But he isn’t expecting one any time soon. “I just don’t know what’s going to happen tomorrow or the next day,” he said.

As director of WKU’s Hoffman Environmental Research Institute and professor of geography, Groves has built an international reputation in the cave and karst research field. He was elected president of the Cave Research Foundation in late 2004; he has worked with karst scientists in China for nearly a decade; and in February he traveled to Paris, France, where the research project Global Study of Karst Aquifers and Water Resources was approved by the United Nations’ scientific arm, UNESCO. In collaboration with three co-leaders from China, Spain, and England, Groves will lead the five-year project that includes about 150 scientists from more than thirty countries.

In the past five years, Groves’ research trips have taken him and his wife Deana, a faculty member in WKU’s library system who has been actively involved in the collaborative research effort, throughout much of the world. For many people, any of those visits could be the trip of a lifetime. But not for Groves. “It’s impossible to know of what the possibilities might be, which is part of what’s so exciting about it,” he said. “I can’t really say where all this should end up. The possibilities are so awesome that I can’t dream what they would be.”

Groves has been dreaming those dreams since he was a child growing up in Maryland. “Pretty much my pathway was set at the age of four,” he said. “When I was little my dad was taking a geology class while going to night school at Johns Hopkins University. During those days he would come home from his classes and talk to me and my brother about the things he was studying, and the stories from his geology class captivated me. When over that Christmas break he took me out with him to collect minerals where his class had taken a field trip, I realized even at that early age I couldn’t imagine a better job.”

Then when Groves was six, his grandmother gave him a National Geographic magazine with a story on caves. “I was looking through that article and there was a picture of some guys in a cave standing in an underground river,” he said. “The first thing I thought was that’s the creepiest thing I could imagine. Not much later though, it occurred to me that walking deep in a cave somewhere, especially waist deep in an underground river, was about as far out as you could be and still be here on earth. That thought was very appealing to me.” He was hooked.

In 1981, Groves made his way to Western Kentucky University to work on his undergraduate and master’s degrees. He was drawn to WKU because geography professor Nick Crawford had founded the Center for Cave and Karst Studies in 1979, and because Mammoth Cave National Park, with the world’s longest known cave, was nearby.

“One of the great cave laboratories of the world is right here,” Groves said of Mammoth Cave. “What drew me to Western was this combination of being able to learn about caves and science but also on weekends and evenings to actually go out and explore new caves.” Groves has been involved in exploring, surveying and studying Mammoth Cave and other southeastern Kentucky caves ever since.

More than twenty years later that same attraction continues to draw students from around the country to WKU. “It’s part of an almost magical lure for students interested in caves that come to WKU,” Groves said. “And a key reason why we continue to draw an extremely high level of both undergraduate and graduate students drawn to the karst program.

“Even more than that, since there are a lot of places in the world where there are caves and universities, what sets it apart here is the fact that Mammoth Cave is the biggest cave in the world and that separates it from other karst areas.”

In 2005, Groves is focusing on two related international studies that involve karst water resources: a global study of karst water resources through UNESCO and planning for a collaborative project through USAID between the U.S. Geological Survey and WKU to develop a center for environmental health and research in China.

“The overall theme of the environmental project is to seek solutions for environmental problems associated...
with the natural conditions in China, including problems with drinking water supplies in the karst areas. In addition, some coal deposits in the region naturally contain high levels of arsenic. The Chinese people dig up the coal from hillsides and burn it in their homes. “The people are so poor that many don’t have chimneys because that would let the heat out, so people are breathing arsenic, and eating it along with dried chili peppers that they dry over the coal fires,” Groves said.

For Groves, his work comes down to basic research (how caves are formed) vs. applied research (how can problems be solved). “In China in particular I’ve gone over there to look at basic research questions like how do caves form and what’s happening to CO₂ in the atmosphere. Then I realized at the same time we’re going to these caves I look around and see a village with people whose average salary is $60 a year,” he said. “More and more it occurred to me that we’re spending a considerable amount of resources — both financially and intellectually — to look at relatively esoteric questions when we could be taking the same energy and applying it to getting better water supplies for people.”

In the spring of 2004, for example, Groves traveled to China to organize an expedition to western Hunan Province where WKU graduate students and other experienced cavers from around the United States explored and mapped a cave system to aid Chinese geologists and engineers with the construction of an underground dam/reservoir system that, if ultimately successful, will make water more readily available to tens of thousands of very poor residents of villages on a high plateau above the cave system.

In the village on the plateau where the WKU caving expedition stayed, for example, during the region’s winter dry season residents can spend up to several hours per day walking to small springs to obtain drinking water. The cave surveys required descending deep pits by rope, as well as the first American cave scuba diving ever carried out in China.

In another recent project, in February 2005 a WKU team organized by Groves and his Chinese colleagues traveled to Wanhuayan (Ten Thousand Flowers Cave) near Chenzhou in eastern Hunan to map unexplored regions of the cave system and assist with development of new tours in the cave. Like other parts of southwestern China’s karst region, limited means of economic resources mean that tourism plays a key role in sustainable development and the quality of life for the region’s residents.

Overall, in southwest China, eighty million people live in a largely rural cave and karst area, and about ten percent of them earn an average salary of less than $100 a year — far below the U.S. poverty level.

Western’s growing reputation for cave and karst research has allowed Groves and his students to work with scientists studying water issues around the globe in places like Eastern Europe, Asia and South America. In August 2005 Groves, along with Nick Crawford and about a dozen of their students, will attend an international cave and karst science conference in Greece, which will allow the group to interact with karst researchers from throughout the world. “This is a way we can build relationships and communication with people all over the world interested in karst. A fringe benefit for Western and myself and students is that from these activities we’ve got colleagues throughout many of the great karst areas of the world. So if we want to work on a project in Thailand or Europe there are partnerships we can develop.”

While Groves continues to develop those global relationships and projects, he maintains numerous relationships and projects, including cave formation, cave chemistry, and water quality, at nearby Mammoth Cave National Park.

“The relationship between Mammoth Cave National Park and Western Kentucky University is very important for several academic areas in Ogden College and throughout WKU,” he said.

One project Groves and park hydrologist Joe Meiman have been working on in recent years involves the removal of carbon dioxide gas from the atmosphere as water dissolves limestone in the cave. The issue, though small compared to impacts on the global carbon cycle by other processes such as fossil fuel burning, represents a relatively poorly understood piece in the overall carbon cycle and the associated potential for global climate change. Groves said “Carbon is involved in so many complex processes and we need to better understand how CO₂ levels are impacted,” Groves said. “My colleagues and I at Mammoth Cave have been working on figuring out how to better measure that more accurately.”

The work has now been expanded to other sites such as China, Sequoia National Park in the mountains of central California, and a new site in southeastern Alaska currently under development. Groves explained, “Understanding the details of processes that affect the carbon cycle helps us better understand the potential for global climate change. But there are a lot of complexities.”

“...A fringe benefit for Western and myself and students is that from these activities we’ve got colleagues throughout many of the great karst areas of the world. So if we want to work on a project in Thailand or Europe there are partnerships we can develop.”
HeatHer Pulliam Has been interested
in illuminated manuscripts since
when she was an undergraduate at the
University of St. Andrews in Scotland.

From the sixth to the sixteenth
centuries, manuscripts were the
primary art form in Europe. These
books were handwritten copies of
works ranging from early versions of
the gospels of Christ, to the writings
of Augustine, to Latin translations of
Greek works from the classical period.
The vast majority contained little
or no decoration; however, a small
percentage of manuscripts included
“sumptuous decoration” — large, deco-
rated initials and images which served
as bookmarks in the unnumbered
pages, helping the reader to locate
specific chapters and passages. Until
the thirteenth century, monks and nuns
were the primary creators and patrons
of illuminated manuscripts. For the
monks who created the Book of Kells,
the act of writing and illuminating
manuscripts served to glorify God.

Dr. Pulliam, an assistant professor
of art history at Western Kentucky
University, began a paper on the Book
of Kells, and used it as an honor’s
thesis. That paper has now become a
book, Word and Image in the Book of
Kells. The Book of Kells is important
for several reasons. It is a national
treasure of Ireland — believed to have
been created sometime between 750
and 850 A.D. Additionally, it is one of
the greatest European works of art
from the medieval period, and because
of Viking raids and the chaos of the time,
Dr. Pulliam said. In addition to the
artwork in the Book of Kells, visitors
are drawn to the high crosses, carved
with images from the Bible and saints
lives. Because they have been standing
in churchyards or fields and exposed to
wind and rain for so long, the images on
the crosses are much harder to study.

In preparation for writing her book,
Dr. Pulliam traveled to Ireland to study
the Book of Kells and the high crosses
more closely. The manuscript contains
about twenty full-page images.

Dr. Pulliam said she thinks
researchers have focused on its full page
images for two reasons. First, art history
as a discipline traditionally focused upon
paintings and sculptures, and when
viewing objects of art that did not fall
into these two categories, there was a
tendency to view them as if they did.
Second, the manuscript contains 680
pages and those that were reproduced
and available to scholars tended to be
those with full-page images.
Most of the images that have been investigated and reproduced are described as “miniatures” — illuminations that occurred within a frame and looked like a painting. The problem with studying only miniatures is that it takes the image out of its context. Just as it is important to understand Michelangelo’s Creation of Adam within the context of the entire iconographic program of the Sistine Chapel ceiling and its position within the Vatican, imagery within manuscripts — especially sumptuously illuminated manuscripts — has an intimate and essential relationship with the entire cycle of images within the manuscript but also with the text of the manuscript.

“Viewing the images without considering this relationship is a bit like having a film studies course where you study stills from the film and read the screenplay but never actually watch the film itself,” Dr. Pulliam said.

Dr. Pulliam is more interested in the smaller graphics, which she says share many of the same concerns as twentieth and twenty-first century graphic design. There are approximately 2,000 decorated initials that Dr. Pulliam has studied, looking for correlations to the text.

“I did find considerable correlation between the text and the minor decoration or ‘drolleries’” Dr. Pulliam said. “For example, heads, which I believe portray Christ, appear in those passages of the gospel that describe the visual apprehension of Christ when he returns from the dead. For example, a human head appears within the initial that begins Mark 14:61-62, where the high priests ask Christ, ‘Art thou the Christ, the Son of the blessed God?’ and Christ replies, ‘I am. And you shall see the Son of man sitting on the right hand of the power of God, and coming with the clouds of heaven.’”

Dr. Pulliam said these manuscripts have more in common with graphic design than with painting. Much of the “art” of making illuminated manuscripts is a consideration of the overall layout of a page — the placing of words, the choice of “font” style (or in the case of manuscripts “script”), the size of the text, and other design elements. Moreover, like graphic design, there is often a sense of play between the meaning of the words, their shape and the relationship between word and image.

The gospels are written in Latin, but the texts of Matthew, Mark, Luke, and John are basically the same in content as most modern English versions of the Bible, which makes translating the text a little easier, according to Pulliam.

Until 1990, there was no color version of the Book of Kells available. Even now, a full-color copy costs around $18,000 and Dr. Pulliam frequently travels to Louisville to see the copy located closest to Bowling Green. Because the manuscript is so old and the way it was made with paints, handling it does contain the risk of a certain level of damage. “It’s virtually impossible to see the manuscript itself,” Dr. Pulliam said.

The manuscript, which is very dear to the Irish people, is kept at Trinity College Dublin, Ireland, under a modern security system. Very few people have been able to examine the manuscript outside of its display case. Bernard Meehan, the keeper of manuscripts at Trinity College Dublin, decides who may have access to the manuscripts.
“From conversations I had with the security guards, it seems the pages are turned every four to six months. These commitments plus the status of the manuscript — both in terms of a national treasure and as an artwork — make it exceedingly difficult to see the manuscript. I attended a conference a few months before seeing the manuscript, where one scholar claimed to be one of six or seven ‘people alive’ to have had access to the Book of Kells, so it’s a pretty rare privilege.”

In 2004 with the help of a National Endowment for the Humanities Grant, Dr. Pulliam was granted permission to spend about seven hours studying one of the four books. She was allowed to look at, but not touch the manuscript.

“They turn the pages for you,” she said. “Getting to the manuscript room itself was interesting. You have to walk past a long line of people standing to see the two gospel books that are on display and then go up with a security guard through the ‘long room,’ the Old Library of Trinity College Dublin, which itself is an amazing sight. George Lucas is said to have designed the ‘Jedi Library’ in the Star Wars prequel from it.”

The manuscript was set up in a room for Dr. Pulliam. It travels in its own specially designed carrying case. “When working with the manuscript, you quickly forget the surroundings and take advantage of what is probably a once-in-a-lifetime chance to analyze it,” she said. The clarity of the manuscript surprised Dr. Pulliam. “It also looked as if the decoration was interrupted at some point and the artist who continued it was not as skilled or was unfamiliar with the techniques. For example, in places, someone has covered over the fine under-drawings with blue paint.”

Two of the four gospels are kept on display at all times. A third has been taken out of rotation. That leaves just one book for scholars to study at a time, Dr. Pulliam said. She was allowed about fifteen minutes to look at the two display books after the area was closed to the public.

Pulliam has studied other manuscripts of about the same age as the Book of Kells in other locations. Each setting is different. In France, she studied one manuscript in a small library in the country with children doing their homework at a table next to hers.

She also studied the Trier Gospels, a manuscript related to the Book of Kells, in Trier, Germany. Trier, which was one of the Northern most cities of the Roman Empire, still has an incredible range of Roman ruins and artifacts. Although created on the European continent, the Trier Gospels show the influence of an Irish scribe. They are less sumptuous and certainly lack the sophistication of the Book of Kells, but they are one of the few related manuscripts that share a similar number of decorated initials, Dr. Pulliam explained.

In Trier, the gospels are owned by Trier Cathedral and kept in the cathedral treasury. Professor Franz Ronig, a Catholic priest, who has charge over the cathedral and its treasures, dictates who may or may not see the manuscript and for how long. Sometimes, as is the case with both the Trier Gospels and the Book of Kells, the keeper of the manuscript will limit the number of pages one is allowed to examine. In some places, scholars are left alone with the manuscript and in others (as was the case in both Trier and Dublin) someone else will turn the pages for the researcher. In the case of larger manuscript collections, there are reading rooms for manuscripts, where no pens are allowed and there is a staff that monitors researchers constantly. Typically in these rooms, readers examining a manuscript that is older (eleventh century or earlier) or that contains a certain amount of illumination (which is vulnerable to flaking) are seated nearer to the library staff.

Trier Cathedral

As an iconographer, Dr. Pulliam strives to “decode” the symbolism of images, using sources such as Bible commentaries written centuries ago, as well as other artworks of the same era. She tries to interpret how the scriptures were perceived in the past. She explains, “The events of 9/11 brought to the surface a renewed awareness of the complexity of religious belief and the need for understanding other religions. My research attempts to add to that understanding.”

Dr. Pulliam’s book, Word and Image in the Book of Kells, which was published by Four Courts Press, Ireland’s premier academic press, is scheduled for release in December 2005.
A WIRELESS WAR ON TERRORISM

BY BOB SKIPPER

DR. PHIL WOMBLE, DIRECTOR OF THE APPLIED PHYSICS INSTITUTE (API) AT WESTERN KENTUCKY UNIVERSITY, IS USING WIRELESS AND INTERNET INFRASTRUCTURE TO DEVELOP A NEW GENERATION OF DEVICES FOR USE IN HOMELAND SECURITY. SOME OF THE GADGETS, WHICH ARE USED TO DETECT RADIOLOGICAL, CHEMICAL, AND BIOLOGICAL HAZARDS, ARE REMINISCENT OF A JAMES BOND MOVIE.

Photos of various instruments line the walls throughout the API’s offices in the Center for Research and Development. The devices include the results of the Institute’s earlier work with neutrons as well as the current research in wireless scanners and tracking devices.

In the back, antenna in series are used to track electronic sensors that could be carried by emergency personnel. Upstairs, co-researcher Alexander Barzilov shows off a cell phone that has been modified to become a scanner that can transmit readings to a central location for analysis. And across the room, the parts of a battery-powered toy truck are scattered about as researchers modify it to carry a camera and sensors with wireless operation.

And now the staff is working to secure a $1 million, 2.5 million volt particle accelerator from the U.S. Army to begin a new generation of research. “If you took a look at us four or five years ago, we were doing neutron this and neutron that,” Womble said. “Today we’re thinking a lot about wireless, but with things like the accelerator, we’re trying to keep our options open.”

The path to a particular project is often not linear, but more like the branches of a tree, Dr. Womble explained. In 2003, someone asked him to make a wireless device to do a certain task, which was the first stage of an electric meter that can be read wirelessly from a distance. “I said ‘sure that’s easy’ and we did it. Then I said, ‘gosh, this wireless stuff is kind of cool; what else can it do?’” Womble continued.

The next branch is growing toward medical applications. “If you had told me a year and a half ago that I would be developing medical sensors, I would have laughed at you,” Dr. Womble said.
“Now I have an interest in it because I’ve done all these other projects and I’m thinking ‘wow this should be easy based on what we’ve learned.’ That’s typical for the Institute.”

Dr. Womble and his API team are eager to find the right application for the commercial market. “That’s the hardest part. You come up with an idea and try to sell it,” he said. “At this institute we do more applied research. We ask a question that you typically don’t get asked in university life — is what we’re doing commercially viable? Can it be marketed?”

That commercialization puts the API at odds with some who say that’s not true research. “But the problem is, once you say there’s a viable market, we find out there’s a whole load of basic research problems that must be solved before you get to the applied part,” Womble said. “Usually a person involved in basic research solves one problem in a particular discipline and then goes on to the next problem. I may have to simultaneously solve three or four problems in various disciplines.”

Dr. Womble uses the cell phone scanner as an example. The team used an ordinary cell phone; designed new circuitry to fit inside; wrote programs to work with the cell phone’s Bluetooth technology; and came up with a small scanner that can be used to search for radiological, chemical, or biological hazards. The phone can send the information to what Dr. Barzilov calls a “center of excellence” for interpretation, and can still be used as a phone or a camera.

“So there will be all these problems and they won’t all be in one area of physics,” Dr. Womble said. “It will be across a whole bunch of disciplines that you’ll have to know.” These experiences have led to “a large knowledge base,” he said.

Dr. Womble sees the particle accelerator as the future of the API. It will be used for a variety of studies from understanding the composition of surfaces to materials characterization down to parts per billion. It could lead to “some exciting stuff by building new materials or new integrated electronic components,” he said.

“I hope this will be the future of the API from the standpoint that we have a new strength to build on,” said Womble. “It will build research for the University, but it will also be a commercial tool for the local high-tech industry where they will be able to come in and use something like this.”

No matter where the research leads, one thing will remain constant — the involvement of students in the API. In the spring of 2005, eight undergraduate students were working at the institute, assisting with the research and gaining valuable practical experience as well as classroom knowledge.

“From a teaching standpoint, this is the best sort of teaching because it’s one-on-one with the students,” Dr. Womble said. “It gives them extra experience outside of the classroom that reinforces what’s taught in the classroom. What this center provides the University is a place for the students to learn more about how to become scientists and engineers.”

The university has to have that experience for its students, Womble said. “It used to be a good thing for a university to say ‘here’s a diploma, see you later.’ Now a university has to do much more than that. It has to respond to the community and offer training so that folks can go out and get careers and be successful.”

Dr. Phil Womble is using wireless and Internet infrastructure to develop a new generation of devices for use in homeland security.
Before Seidler could begin the work of editing the essays, he first had to locate them, traveling to rare book libraries in Germany, Sweden, Finland, and England. Then he compared the various editions and printings, sometimes up to nine per essay, in order to establish an official text with variants in the footnotes.

Also, Dr. Seidler has had to research nearly 200 authors from different historical periods, countries, and linguistic communities who are referenced in Pufendorf’s essays. “They articulate the historical, cultural, philosophical, and political associations needed to understand the individual essays, not only in the context of Pufendorf’s own career and development, but also the broader intellectual and social milieu of the seventeenth century,” he said.

Dr. Seidler described his work as “a kind of philological and intellectual detective work.” This is because it requires patience, ingenuity, attentiveness, persistence, and the ability to see connections—not to mention some luck. Many of the materials he reads or consults are in Latin, Greek, German, French, Italian, Swedish, or other foreign languages.

“I think that the more sophisticated you are as a philosopher, the more sophisticated you will be as interpreter of historical texts of a similar nature.”

“Dr. Seidler is the only American scholar involved in the project. The other editors—are most of the people working in this research area—are from Europe.”

One of the neat things about the work I do is that it fits so well with a lot of the philosophical interests I have in contemporary ethical and political theory,” he said. Among these, Seidler cited the origin of moral obligation, the nature of political authority, the separation of church and state, social responses to religious and cultural diversity, and the meaning and duties of patriotism. A week before Sept. 11, 2001, he attended a conference in Germany on early modern conceptions of patriotism, and presented a paper about Pufendorf’s influential essay on that topic (De patria).

“I had already worked much of that out by following Pufendorf’s analyses, which use the main ancient and medieval discussions of the topic,” he said. “Besides, I had read a lot of contemporary discussions of patriotism to give me conceptual flexibility in...”
approaching the historical texts. I always prepare like that when I do a paper, taking a comprehensive approach, because I think that the more sophisticated you are as a philosopher, the more sophisticated you will be as interpreter of historical texts of a similar nature.”

Dr. Seidler said he feels equally at home in both periods, the early modern and the present, and that understanding one era helps him understand the other. “Some of what we’re saying today is new and different — of course, much water has passed under the bridge — but in many respects, for better or worse, the intellectual problematic of the seventeenth century is still intensely relevant.”

According to Seidler, people have always struggled to maintain traditions and customs while integrating new ideas and discoveries. He says he is drawn to that challenge of valuing what has been acquired but also testing it with new perspectives. “I find that a very fruitful tension,” he said.

In further contribution to the scholarship on Pufendorf and the early modern period, Dr. Seidler is also working on two reprint editions of early English translations of Pufendorf’s notorious On the State of the German Empire, written in 1667. The other is John Crull’s 1695 version of Pufendorf’s Introduction to the History of European States (1682), a text used extensively in the eighteenth century, and frequently “continued” there by others who brought it up to date. These volumes will appear in a new Natural Law and Enlightenment Classics series, edited by Knud Haakonssen (Sussex University, U.K.) and published by the Liberty Fund, Inc. The first, which was recently completed and submitted, is slated for publication in 2006.

WKU students certainly benefit from Dr. Seidler’s expertise and world renown, but scholars around the world have also been influenced by his work. He has evaluated Ph.D. dissertations in Finland, Canada, and Australia; reviewed book manuscripts submitted to Cambridge University Press; and his research has been the basis of academic projects in yet other countries. For instance, Seidler said that he knows of students at Cambridge, Princeton, and other schools whose dissertations have relied on his writings. And three years ago, in the reading room of the Herzog August Bibliothek, in Wolfenbüttel, Germany, Seidler met a Hungarian scholar whose research project there had been influenced by one of his essays. “For weeks thereafter, I sat in the library looking at the back of someone who was there partly because of me. That was different,” he said.

“I love my work,” Seidler explained. “When people ask me what I do for fun or recreation, I never know how to respond. My scholarly activities have put me in touch with many smart and wonderful people around the world, including the dead ones. I am particularly pleased that my research not only generates further opportunities for myself, but that it also contributes to the kind of national and international recognition that is now so central to Western’s mission.”
INSTRUMENTS DESIGNED TO MONITOR POLLUTANTS NEED TO “SEE” HIGHER CONCENTRATIONS OF THE POLLUTANTS THAN USUALLY OCCUR IN NATURE. MOST PROCEDURES USED TO ATTAIN THESE HIGHER CONCENTRATIONS USE PRECONCENTRATION PROCEDURES TO CATCH THE POLLUTANTS. THESE PROCEDURES AREN’T USUALLY ENVIRONMENTALLY FRIENDLY. SOME SOLID PHASE EXTRACTION PROCESSES REQUIRE TOXIC SOLVENTS SUCH AS METHYLENE CHLORIDE AND BENZENE.

For the past eight years, Western Kentucky University’s Eric Conte, an associate professor in the Department of Chemistry, has been looking for preconcentration procedures that are more environmentally friendly, yet will still yield the same results as other procedures in detecting pollution. “If you go out to get a sample from nature, the instruments are not going to be able to see pollutants,” Dr. Conte said. “The levels are too low.”

Dr. Conte’s procedure works well for the more hydrophobic, or water hating, chemicals, since hydrophobic substances are easier to extract than less hydrophobic substances. The more a substance is “water hating” the more likely it will stick to other things in contact with water, like the substances Dr. Conte uses in his process.

He is still working on ways to improve trapping of less hydrophobic species by experimenting with different types of surfactants. Surfactants attached on a silica surface will make silica more hydrophobic depending upon their chemical composition.

Dr. Conte uses surfactants, a material that is a major component in soap, to remove the pollutants. He puts these surfactants on silica, and then passes environmental samples through them. The pollutants are attracted to the surfactants.

Silica is refined sand and it is a support used to hold the surfactant. Surfactants are molecules used to trap the target substances, and are molecules that have hydrophobic and hydrophilic portions. The hydrophilic portion sticks to the silica and the hydrophobic portion is exposed to the water sample and used to extract very low concentrations of hydrophobic substances.

BY SCOTT SISCO
Samples, such as river water, are placed in a two-liter container connected to a tube with a material inside it designed to catch any pollutants in the sample. The water drains through the material, called a sorbent, one drop at a time. “For one sample, it could take an hour or so to go through,” Dr. Conte explained.

The final preconcentrate is then placed in a smaller container to make the pollutants detectable. The preconcentrate containing the concentrated pollutants is then placed in milliliter containers and placed in a machine called an autosampler. The autosampler then introduces the sample to the detection instrument that identifies the pollutants. “From there, you can tell how much of each pollutant was in that original sample,” Dr. Conte said.

The instrument, a high performance liquid chromatograph, presents data in a graphical form. The pollutants show up on the graph as peaks. Each pollutant is represented by its own peak on the graph. “The bigger the peak the more the pollutant,” he stated.

Dr. Conte is comparing his procedure to traditional procedures to see if his will work better as well as be safer for the environment. After the surfactants are used, they are placed in a waste container; however, the extract is less toxic than extracts produced by conventional approaches, he said.

The main pollutants he’s looking at are polycyclic aromatic hydrocarbons, produced from combustion processes like automobile exhausts and power plants. “Some of these are suspected cancer causing agents,” Dr. Conte said.

Polycyclic aromatic hydrocarbons are organic substances formed during combustion processes such as from automobile engines or coal combustion. They are also found in cigarette smoke. Some are known carcinogens. “One of these substances known to form in cigarette smoke is called benzo(a)pyrene and it is particularly carcinogenic,” said Conte.

Western is Dr. Conte’s first teaching job after receiving his doctoral degree — he worked for the National Center for Toxicological Research before coming to WKU. The amount of time faculty members here spend with undergraduate and master’s seeking students was a major attraction to joining the Western faculty for Dr. Conte. “I’ve never been in a place where the faculty spent so much time, research-wise, with their undergraduate students,” he said. He’s currently working with two graduate students and two undergraduate students on his project.

Qing Zhao, one of Conte’s students, is looking at altering the hydrophobicity of the sorbents by attaching different surfactants. She is measuring the relative hydrophobicity of each sorbent she investigates. Dr. Conte and his students will choose the sorbent system she finds that has the greatest hydrophobicity, and then apply that sorbent to less hydrophobic substances.

Another student, Kyle Autry, is using an electroactive polymer that can be manipulated electrically from a neutral to a positive state. Ideally, negatively charged surfactants will adhere to this polymer in its positive state. This material is then used to collect target substances. Then, the polymer is switched to a neutral state and the hope is that the surfactant and target substances easily fall off.

“I enjoy watching students mature as scientists,” Dr. Conte said. “When one comes up with an experiment worth investigating, that tells me the student has applied his or her chemical knowledge. It also tells me that the student has a strong interest in making his or her project successful.”
Western Kentucky University, wants answers. Seven years ago, he and his colleagues, Dr. John White, from Western, and Dr. David Duncan, from Brown University, began researching adults who occasionally use illicit drugs. The measurement tool they have used is an Internet survey called DRUGNET, which is currently off-line.

After doing research in this field for about twenty years, Nicholson became increasingly frustrated about the lack of literature and data about adult users who didn’t end up in jail or rehabilitation—in other words, people who were users, but not abusers.

“We know a lot about substance abusers and people in rehabilitation programs, but we don’t know as much about adults who use occasionally, because they are a hidden population. Many of the drugs they use are illegal, and people can get into trouble with their jobs and their families, or go to prison,” he said.

DRUGNET was devised as a multiple item format survey posted on-line. After answering basic demographic and mental well-being questions, respondents were questioned about their use of alcohol, cocaine, depressants, hallucinogens, marijuana, opiate, and amphetamines.

The research group used on-line, targeted advertising, such as e-mail, to solicit people to take the survey. Dr. Nicholson and his colleagues were also interviewed by Wired magazine. After Wired ran the story in 1997, the number of people taking the survey began to increase. “These people basically hide themselves, so we take advantage of the Internet. People can take our survey, on-line, anonymously in their homes, and there is no way for us to find out who they are when their survey comes back to us. All forms of identification are stripped off, and we are left with a random number assigned by the computer. It’s a way for people to be honest and provide information,” he said.

The respondents also took the General Well Being Schedule developed by the National Center for Health Statistics. The test is a measure of overall mental well-being. “This is what the National Center for Health Statistics has used as a measure of normal, functioning adults. The DRUGNET respondents scored similarly to the national sample. The survey also screened for problematic behavior using similar questions that the Diagnostic and Statistical Manual of Mental Disorders uses,” Nicholson explained.

“The group itself is what we wanted. Well over ninety percent of the people who took our survey reported that they have a college degree. The majority of them reported that they have jobs or are in college. We’re not targeting people in prisons or treatment centers. The typical respondent reported that he or she was well-educated, employed full-time, and a participant in recreational and community activities,” Nicholson said.

Nicholson and his colleagues have gathered the largest data set of this type to date. The U.S. Department of Justice website has data on Youth, General Population, and Workforce employed users from the National Households Survey on Drug Use and Health, but no broad, detailed, self-defined data on casual illicit drug users.

The initial survey concluded in the fall of 2002 after a little more than 2,000 responses, but a new survey is being revised to include more essay questions, allowing people to give more detailed responses. It should go back on-line in 2006. Nicholson and his colleagues are hoping for even more responses to add to the already collected data.

“Our goal is descriptive data for this population’s behavior. The responses we got showed that their drug-taking behavior appeared to be well controlled, at mild to moderate levels in both frequency of use and the degree of intoxication. This could have implications for drug policy in this country. Right now we have a drug policy based on the assumption that drugs have to be eliminated altogether. This has not been effective. We are finding out information that helps improve harm reduction strategies. We have over two million people in this country in prisons or jails, and many are there for possession of small amounts of illicit substances. Some states are changing now, and sending more people to treatment as opposed to prison. We also need to rethink the way we do drug education,” Nicholson said.

Dr. Nicholson and his colleagues published their findings in several scholarly journals. The initial analyses were published in the Journal of Psychoactive Drugs in 1999. Other articles were published in the Journal of Substance Use in 2002, the American Journal of Health Behavior in 2003 and Psychological Reports in 2003. Many of Dr. Nicholson’s graduate students have done their theses using this data set. All have been presented nationally, and one was published in a scholarly journal. One of the students, a physician from India, got his master’s degree in public health, his doctorate in epidemiology, and is now doing a medical residency program. His presentation and a publication using this data set helped get him into a Ph.D. program.

“This is a wonderful tool for teaching students how to do data analysis. It also bridges the gap between students and teachers when teachers are doing what they are teaching,” Dr. Nicholson said.

Another one of his graduate students, Dr. Nivedita Seerpi, used the study for her master’s thesis. Her study was presented at the annual meeting of the American Public Health Association. Seerpi now works as an epidemiologist, and says that the research really helped her. “Dr. Nicholson’s personal interest and level of commitment to the research was the biggest asset,” Seerpi said. “He is very knowledgeable and was always available for questions, and always kept me focused.”

Nicholson has always been interested in improving community health. “I have personal and professional motives for this type of research,” he said. “A lot of my aunts and uncles died because of tobacco or alcohol abuse. I was born in a poor part of New York City. I saw what tobacco and alcohol abuse did to my family.”

With the determination to be different from previous generations of his family, he graduated magna cum laude with a bachelor of science in community health from SUNY at Brockport, and continued his education with a master’s of public health from the University of Texas, and a doctorate in Community Health from Southern Illinois University. In 2002, he was awarded the WKU College of Health and Human Services Faculty Award for Research and Creativity.

In addition to teaching, Nicholson’s involvement with the community health field extends nationally. He is a member of the Board of Directors for the National Association for Public Health Policy and has served on various committees for the American Public Health Association. His years of service dedicated to improving community health include a long list of national presentations and involvement with many health related groups, although drug education has always stayed near to his heart.

“I think there has got to be a way to prevent substance abuse,” he said. “There has to be a way for people to live with the inevitable availability of psychoactive drugs.”
Conser ving the Green River

Dr. Scott Grubbs, Associate Professor in the Department of Biology, is leading a partnership consisting of Dr. Albert Meier (Biology), Dr. Ouida Meier (Biodiversity Studies), Dr. Stephen Kenworthy (Geography and Geology), and collaborating agencies that is funded for up to $400,000 by the U.S. Department of Agriculture Natural Resource Conservation Service. This partnership will reduce nonpoint source pollution loading such as sediment, pesticides, and fertilizer into the mainstream of the Upper Green River and principal tributaries in our region. Dr. Grubbs and his partners will assess the impact of the Green River Conservative Reserve Enhancement Program (CREP), which recruits landowners into incentive-based ten to fifteen year cooperative agreements of best management practices that eliminate waste from running into the rivers as a result of agricultural and livestock practices.

Dr. Ouida Meier will map and analyze land use in the Upper Green River Basin in order to determine current conditions and to use as a baseline for detecting waste running into the streams. The maps will generate watershed-specific statistics to present a clear picture of the problem. Her team will also assess historic water quality and biological data and water quality data collected during the project to comprehend relationships between land use and water quality. The data will constitute a base-line from which future water quality changes may be analyzed. The data and analyses will be obtained from and shared with many agency partners in the best interests of this regional project.

Dr. Kenworthy will assess soil erosion related to agriculture and construction as threats to water quality. Managers of drainage lands need information about the “sediment budget” of the Green River Basin to understand how much sediment is transported by the Green River relative to how much is delivered from agricultural fields, and how much is stored in the river channel and floodplain. He wants to determine how much of the stored sediment gets into the streams. Obtaining this data will enable a comprehensive assessment for soil conservation efforts. One of the activities to accomplish this project involves quantifying water and sediment fluxes and quality from an underground stream. Here Dr. Kenworthy will draw upon the expertise of still more partners, specifically Western’s Director of the Hoffman Institute for Cave and Karst Studies, Dr. Chris Groves, Joe Meiman, Hydrologist at Mammoth Cave National Park, and partners at the U.S. Geological Survey.

Dr. Albert Meier, an expert in biodiversity, will contribute another layer of knowledge to the project by studying streamside vegetation along the Upper Green River. His findings will be provided to the Geographic Information System part of the monitoring to assess the effectiveness of the program at restoring riparian corridors and reconnecting landscapes along the river. This improvement should lead to substantial habitat growth.

Set Your Goals High

Dr. Bob Hatfield, Associate Professor of Management and Information Systems, is investigating the relationship between learning goals and learning in organizational training. His project results from collecting data on four hundred trainees. He is trying to determine if learning goals in training actually result in more trainee learning and how precise the goals need to be to maximize learning.

The project promises to have quite an impact, because fifty million workers in the United States (which is 42% of the workforce) need new or expanded skills to do their jobs. This transition requires training about new technolo-gies, management, customer-service, and basic skills. At the bottom of all of this is the unprecedented importance of training to products that consumers want and employers demand.

Dr. Hatfield has co-authored four textbooks on human resource management and has found little scientific evidence on the effectiveness of goals in training. One reason, Dr. Hatfield surmises, is that “we have a love-hate relationship with training goals.” Although much of the training literature advocates the use of learning goals, such goals are rarely used and there is opposition to their use. For instance, some adult learning advocates suggest that such goals are too manipulative. Thus, Dr. Hatfield will try to identify the interrelated reasons why training goals may or may not correlate to learning in training.

He will also consider how many goals are necessary for the successful conduct of training — if goals are found to be effective. He presumes that goals will help trainees learn, however, why goals help is yet to be determined. There are two competing theories. There is the “point to point” theory which military trainers use when they identify a different goal for each small training task. The alternate theory is that the mere presence of any goal may “signal importance” and thereby stimulate learning. Dr. Hatfield calls this “light-switch theory.”

Trainees will participate in Dr. Hatfield’s experiment by viewing a sixteen-minute videotape to try to detect a learning goal, by taking several surveys, and by writing essays. The outcomes of these tasks will help to explain if participants recognized a goal and if the different level of goals became an aid to learning.

Preparing Child Educators

Dr. Vicki Stayton, Professor of Early Childhood Education in Western’s College of Education and Behavioral Sciences, is collaborating with the University of Connecticut to establish a research center for Personnel Preparation in Early Childhood Special Education and Early Intervention. Dr. Stayton is a subrecipient of the U.S. Department of Education grant to the University of Connecticut, which she played an important role in writing. The grant has enabled the partners to establish a Center that collects, synthesizes, and analyzes information about (1) certification and licensure requirements for professionals working with infants, toddlers, and preschoolers who have special needs, and their families, (2) the quality of training programs for these professionals; and (3) the supply and demand of professionals representing all disciplines who provide early childhood special education and early intervention. The outcomes of this research will be policy recommendations that assure the proper education, certifications, and licensures, and an adequate number of capable professionals to serve children and families.

Dr. Stayton works with one other principal investigator and an advisory council to focus on the issues specified above. The advisory council is composed of experts in the fields of early intervention and early childhood special education. Expert consultants also provide guidance to the principal investigators and the advisory council members. This interlocking leadership structure insures objectivity in the research and will contribute to the success of the Center.

Research studies will determine the relationships between certification, training programs, and supply and demand of qualified professionals. These studies will enable streamlining of training programs and student satisfaction with what they learn. The research studies will focus on state systems, higher education issues, and direct provider performance with children and families. The final outcome will be the development of policy recommendations to the field.
Dr. Scott Lasley is working on a project entitled “Progressive Ambition in the U.S. House of Representatives.” He is analyzing how congressmen decide to run for governor or for the senate for more reasons than strategy and opportunity. Dr. Lasley, an assistant professor in the Department of Political Science, is testing a basic hypothesis that focuses on a House member’s background, experience, and preferences as central to whether a congressman will decide to run for the governorship or for the Senate.

The timeline he uses to test the hypothesis is a comparison of members of the U.S. House that ran for U.S. Senator or for governor between 1974 and 2004. The year 1974 coincides with the increase in prestige and stature of the governorship in many states. He will collect data on the personal, electoral, and political experiences of the incumbent House members who ran for U.S. Senator or governor in this time period.

Dr. Lasley believes that a key to solving this problem stems from personal characteristics and political experiences of the Senate versus the gubernatorial candidates. Another key will result from data collected that compares committee assignments and congressional behavior for the House members who pursued either the Senate or a governorship. A third key may result from Professor Lasley’s exploration of his subjects’ legislative activity and the support they receive for seeking higher office from their political parties. To supplement the quantitative analysis, he will provide anecdotes and observation from former congressmen who decided to run for higher office.