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WKU Scholar

WKU Office of Sponsored Programs

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SCHOLAR

THE SPIRIT OF RESEARCH AND CREATIVITY AT WESTERN KENTUCKY UNIVERSITY

All That Jazz

Green Research

Dialect Not Deficiency

A Star is Born





Gordon C. Baylis

There is something wonderful, almost magical, about research and creative activity. After all, this is one pursuit where a product — new knowledge — can be created where it previously simply didn't exist. This exciting freshness of research attracted me to a career in research when I was an undergraduate student. Learning about research was the most formative experience I had at college. As a university with teaching as its foremost mission, WKU has a rich tradition of excellence in teaching that includes involving students in research and education.

This magazine is a snapshot of the research carried out by the faculty, students, and staff of WKU. The overwhelming majority of this research involves work by both graduate and undergraduate students. As a result, our students have invaluable exposure to world-class, cutting edge research.

In today's world, we all have instant access to a surfeit of information, putting assessment of information and knowledge at a premium. To achieve this understanding, there is no substitute for an immersion in high quality, original research. Teaching universities must prepare our students for a world we can barely imagine, and for careers that do not yet exist. Understanding the production, assessment, and application of knowledge are the tools that will best equip them. The students who have participated in the excellent projects described in this issue will be given an advantage in careers in industry just as surely as for careers in finance, or teaching, or research.

At the same time, the increasingly interconnected world means that business needs increasing interaction with universities engaged in applied research. The WKU community is now embarking on a further evolution of the university, as we increase our portfolio of research and creative activity in order to augment our teaching, and to increase our contribution to the quality of life in the Commonwealth of Kentucky.

Most of my colleagues can, like myself, point to a special encounter with research or creative activity that inspired their career. I am proud that WKU will provide students with such formative experiences that will irrevocably change their lives for the better — regardless of the careers that they choose.

Gordon C. Baylis

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ALTHAT JAZZ

BY MICHAEL J. SOBIECH

PARENTS WHO WORRY ABOUT TELEVISION ROTTING THEIR CHILDREN'S BRAINS SHOULD PERHAPS TAKE HOPE IN WKU'S MARSHALL SCOTT, FOR IT WAS THROUGH THE LATE-NIGHT TRUMPET CALL OF JOHNNY CARSON'S "TONIGHT SHOW" THAT HE DISCOVERED HIS LIFE'S WORK AS A JAZZ MUSICIAN AND PROFESSOR.

Growing up in West Virginia, the youngest of four, Scott began playing trumpet when he was nine. When he hit junior high and heard his "lifetime trumpet hero" Doc Severinsen, he knew he would make the trumpet and music his career. "Even though the show ran until 1:00 in the morning, by the time I was in eighth grade, I'd stay up just to watch the band."

Scott's late-night viewing eventually led to long nights studying, with a BME at Ohio University (1981), followed by an MM in trumpet performance at Notre Dame (1983), culminating in his doctorate (DMA in trumpet) at the University of Wisconsin-Madison (1988). "Through three college degrees and 24 years of college-level teaching (with 20 of those years at WKU), I've rarely taken a day off the trumpet," states Scott. "Even on a 'day off,' I still do a warm-up routine because even a couple of days off the horn will take a toll on the chops."



Dr. Marshall Scott

This level of commitment and natural passion is essential for his work of cultivating young musicians and music teachers. “Music students take one-on-one lessons with their professors on their chosen instrument, which means that I have to be ready to sound good for them at a moment’s notice. I have to be ready to walk in the door in the morning and play anything from B-flat trumpet (the basic all-around horn), to C-trumpet (orchestral), to Piccolo trumpet (for music from the Baroque period), to jazz styles.”

Scott’s work on the hill has not gone unnoticed in the world of jazz. He has performed for the International Trumpet Guild Conference’s Festival of Trumpets, and in addition to performing, he has been a judge and chaired the culminating event of the conference — the collegiate jazz trumpet competition. “These conferences are great places to hear all the best living classical and jazz players, and, of course, they are great places to try new equipment — mouthpieces and trumpets. My wife,” he admits, “always worries how much I’ll spend.”

His love for new trumpets and mouthpieces has brought positive

dividends to WKU and his students. “Trumpet players tend to be fanatics about equipment — I have about 100 mouthpieces and around a dozen trumpets. And while that may sound like a large number, the supply of trumpets is actually on the low side. And so when I replace trumpets of my own, I tend to sell them at a good price to my students so that they can have a professional-level horn in their hands. Additionally, over the years I’ve represented three major trumpet manufacturers, which has led to some wonderful exposure for my work and the University, along with producing a collaborative relationship with the manufacturers concerning trumpet and mouthpiece innovations.”

“I feel blessed to be a trumpet professor at WKU. I’m able to keep my own performance level high, while enjoying the great reward of seeing my students grow. “

During his quarter of a century of teaching, Scott’s highest-profile teaching and performing opportunities were his 14 summers as a trumpet instructor at the world-famous Interlochen Arts Camp in Interlochen, Michigan. “My family and I would live there for two months every summer. And as a result, I was able to teach some of the best students in our country along with performing alongside some of the most famous musicians in the world.”

Scott’s summers at Interlochen, while fulfilling and enjoyable, were no vacation from work. “It was a full teaching day, six days a week, like my work week at WKU. But at Interlochen, the teaching day often did not end at 5:00 or 6:00; rather, there would be another rehearsal or live performance with other faculty or professional guests who came

through for the summer concert series. To name a few, I was able to perform with various traveling groups including Aretha Franklin, Bernadette Peters, the Temptations, the Four Tops, Natalie Cole, and the Canadian Brass. I was constantly surrounded by outstanding players and great music — every summer, I learned a year’s worth of knowledge.”

Everything that Scott does to maintain his standards for himself and his current students is also done with a view to his future students. “Music faculty actually recruit most of our enrollment. It is my job to find good trumpet players but not just for my studio; with the trumpet, you are finding players



for almost every ensemble in the department. Recruitment is a year-long process involving visits by high school students to WKU, visits by myself and my colleagues to high schools, constant correspondence, and auditions for grant money. Considering all the other state-wide college music programs, it is highly competitive.” To maintain WKU’s high standards, Scott looks for help in the highest places: “President Ransdell was great about providing a personal contact with one potential student. And, I am happy to say, this student is one of our incoming trumpet majors this semester.”

Scott has also received help from generous alumni. “A huge amount of credit for WKU’s jazz program’s existence and success goes to Frances Wilson and the late Lively Wilson, whose generosity gives



“I was able to teach some of the best students in our country along with performing alongside some of the most famous musicians in the world!”

the jazz band its operating budget. Without their support, we would not be able to bring in guest musicians for concerts, purchase equipment, buy music, or do much else. Their vision has helped us with our goal — helping our students become good musicians and some of the most successful public school music teachers in the state.”

In addition to Presidential and alumni assistance, Scott and fellow WKU music professor John Martin, have been using their own music to bring new musicians to the Hill. “In 2003, I did a jazz quintet CD with all-original tunes, and in 2009, my good friend and colleague John Martin

and I recorded a duo CD of original music, with John on guitar and me on trumpet. We use both of these CDs as part of our efforts to promote the music program here at WKU.”

“And I have to mention that the long-awaited arrival of the new Van Meter Auditorium, as well as the new Rehearsal Hall, which is under construction, are two major pluses to help us stay competitive. Van Meter is now one of the finest acoustical and most beautiful halls I have ever been in.”

For Scott, a passion that began with viewing late-night television continues in constant practice in his own studio and beyond, for it is as an

“active practitioner and performer” that Scott sees himself fulfilling his role as a researcher. “To me and most people in similar positions at other institutions, we feel that we are performing artists in residence; and as such, I feel blessed to be a trumpet professor at WKU. I’m able to keep my own performance level high, while enjoying the great reward of seeing my students grow. We’ve had students go on to receive doctorates, and we’ve had students go on to become some of the most highly regarded school band directors in the country. And in both cases, all are — first and foremost — fine musicians.” ■

Green RESEARCH

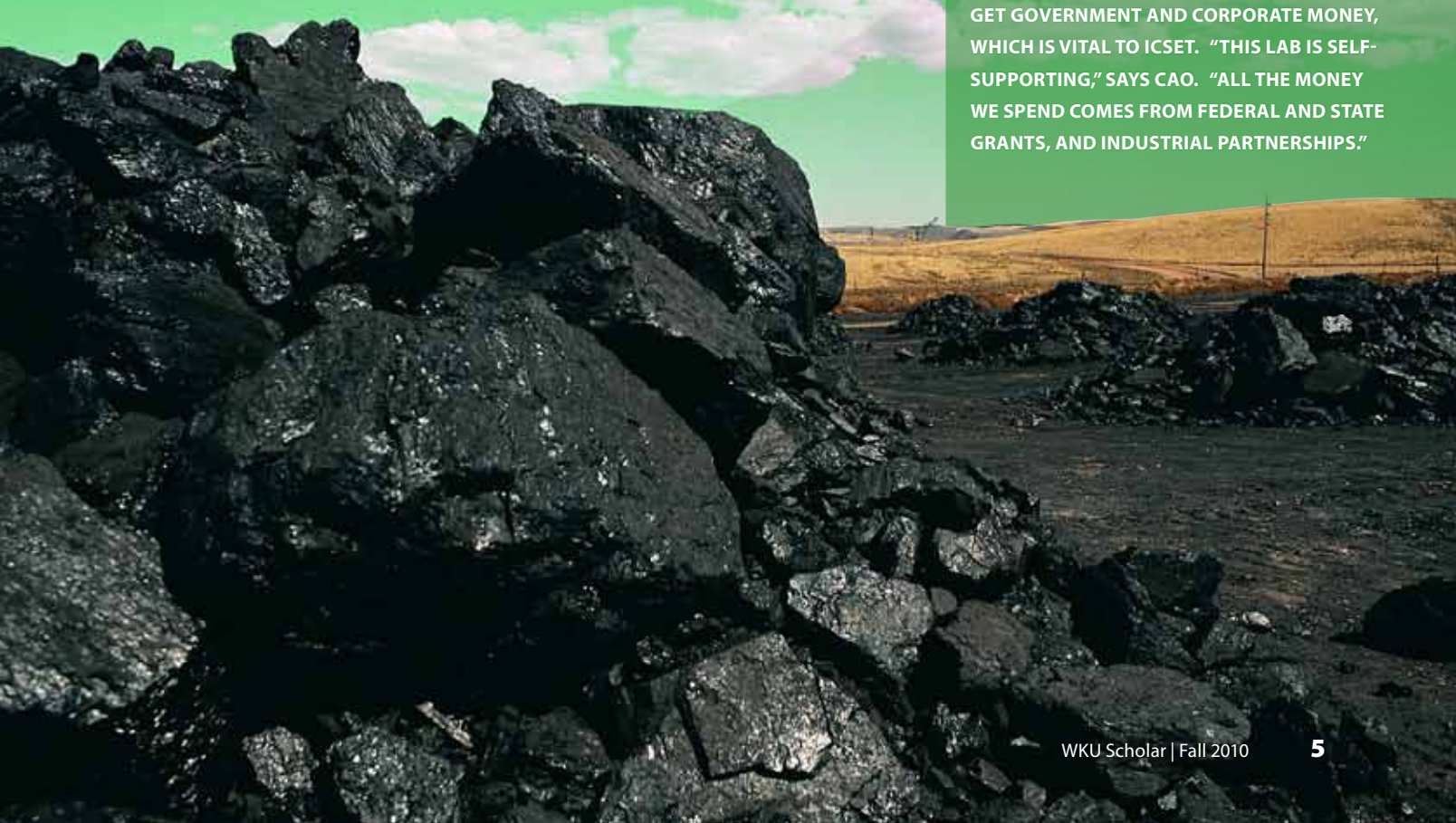
BY KATHERINE PENNAVARIA



Dr. Yan Cao

DR. YAN CAO HAS A PASSION FOR RESEARCH AND FOR THE WORK HE DOES AT WKU'S INSTITUTE FOR COMBUSTION SCIENCE AND ENVIRONMENTAL TECHNOLOGY (ICSET), A

WORLD-CLASS RESEARCH FACILITY ON EMISSION CONTROL AND GREEN ENERGY. PERSISTENCE AND HARD WORK PUT HIM IN THE LAB MANY EXTRA HOURS AS ITS ASSOCIATE DIRECTOR, MANAGING MULTIPLE RESEARCH PROJECTS, SUPERVISING STAFF AND STUDENT INTERNS, PUBLISHING RESULTS IN HIGH-IMPACT INTERNATIONAL JOURNALS, AND WRITING GRANT PROPOSALS. HIS LAB COMPETES WITH OTHER UNIVERSITY LABS TO GET GOVERNMENT AND CORPORATE MONEY, WHICH IS VITAL TO ICSET. "THIS LAB IS SELF-SUPPORTING," SAYS CAO. "ALL THE MONEY WE SPEND COMES FROM FEDERAL AND STATE GRANTS, AND INDUSTRIAL PARTNERSHIPS."



The lab has ten full-time staff members, plus visiting scholars and graduate student interns. Cao must spend approximately one-third of his time working on grant proposals. "I write about five grant proposals a year, and maybe only one or two will get funded." He works on grant proposals in conjunction with ICSET's director, Dr. Wei-Ping Pan, whom Cao thinks of as "a remarkable mentor." As a representative of one of only two labs in Kentucky working on energy technologies, Dr. Cao recently testified before a state government commission dealing with emission control and green energy.

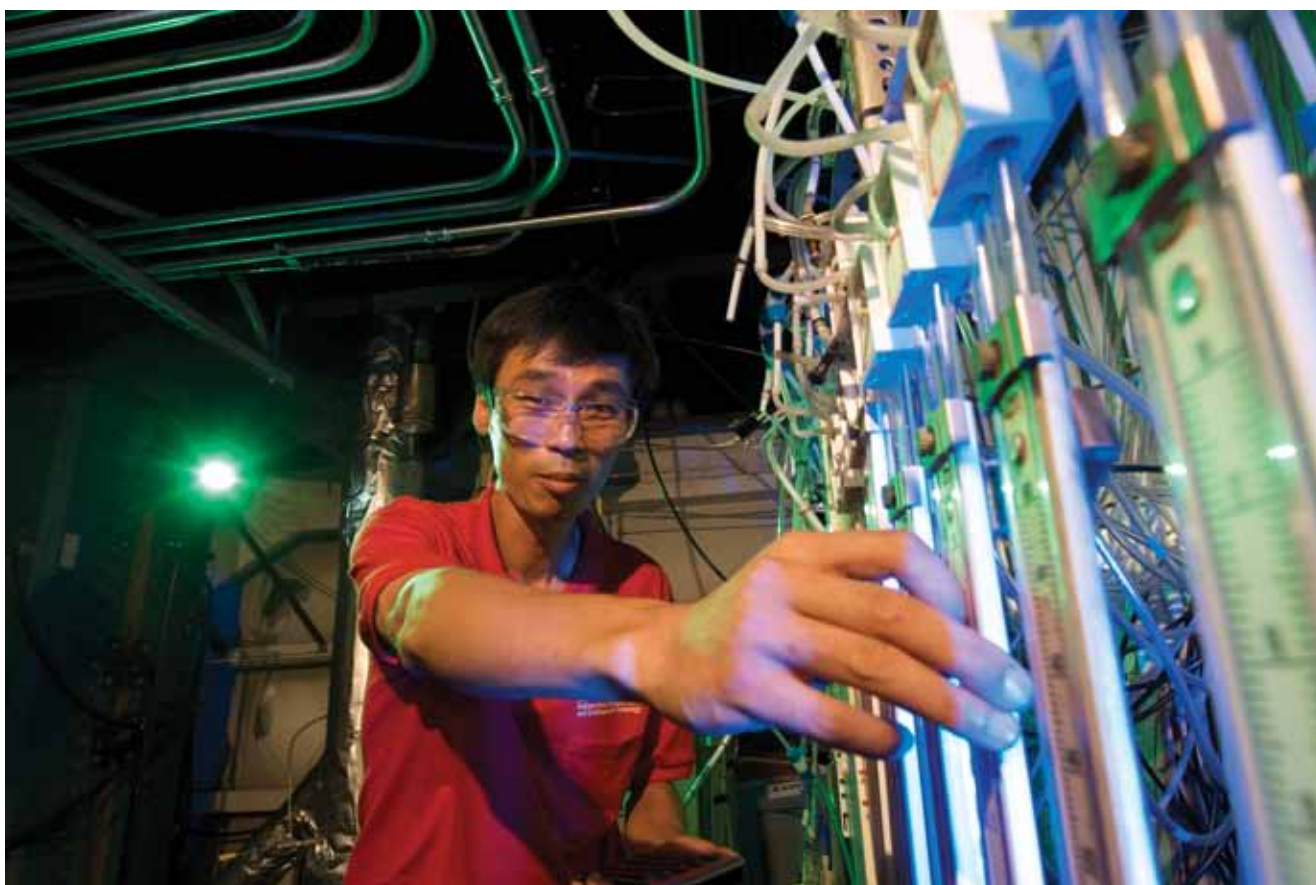
Dr. Cao, who has a Ph.D. in chemical engineering from the

Institute of Coal Chemistry (at the Chinese Academy of Science in Beijing), knows his talents could be put to use in the private sector. Large chemical and energy-producing companies regularly contact him about his research and consulting services. But for the last nine years, ICSET has provided him with a favorable environment and the freedom to pursue research and research-related education. "I love to explore new things," he says with a smile. "My mind cannot keep on one thing, and research is what I want to do." Because of his professional expertise and dedicated work, he has moved up from research assistant to research associate, lab manager,

assistant director for research and development, and finally to his current position of associate director.

His profession was established for him long ago by family circumstances, says Dr. Cao. "My parents and their colleagues were all engineers or professors in chemistry and chemical engineering. When I was a child, I would always watch and learn in their labs. I naturally followed them into the areas which had fascinated me for so long." He adds, "Some of my father's colleagues later became my Ph.D. advisors."

When he first arrived at ICSET, Cao immersed himself in the lab's research projects involving mercury emissions. In the years he has been



Cao believes carbon-capture technology has the capacity to extend itself into new areas such as hydrogen production and oxygen production, which are critical for the development of green energy.

with WKU, says Cao, energy scientists have learned to measure mercury emissions from coal-burning that had not been fully studied before. "Lots of things are getting into the air from burning coal, some we don't even know about yet. It's very tough to do measurements on trace metals such as mercury, but the technology is improving every year," he says.

Over the past ten years, Dr. Cao and his colleagues have serviced more than 150 of the 1000 United States coal-fired power plants. In fact, he says, "several top electricity-generating companies work with our lab, including AEP, Southern Company, Duke Energy, and TVA." After analyzing their systems, ICSET researchers provide these companies with ideas for reducing and controlling mercury emissions.

Since 2003, Cao has been leading research on the development of chemical-looping combustion technology, which is different from the conventional combustion process in that it uses oxygen from metal oxide oxygen carriers, not air, for fuel combustion. Thus, there is no energy penalty or reduction in power-plant efficiency.

This research has been funded by the federal and state governments, as well as industrial partners. The overall project will make a vital contribution to the scientific, technical, and institutional knowledge necessary to develop commercially feasible carbon-capture technologies, which can reduce overall electricity costs. Cao believes this technology has the capacity to extend itself into new areas such as hydrogen production and oxygen production, which are critical for the development of green energy.

Another exciting green technology being developed at ICSET is turning carbon dioxide into ammonium bicarbonate, an economical and environmentally

acceptable carbon fertilizer. After this compound is assimilated and metabolized in crops, a considerable amount of the carbon is absorbed by the plants, which leads to increased biomass production. Meanwhile, the majority of the unused carbon source percolates into the soil to form carbonate salts.

At ICSET, Dr. Cao also works with WKU undergraduates and graduate students to improve their research skills and capabilities. "Education



"If we share this knowledge [sustainable green energy], everybody benefits."

and training activities help develop future scientists and engineers, who will then possess the skills required for implementing and deploying carbon capture and sequestration technologies," he says. Dr. Pan and Dr. Cao have been selected by the United States Department of Energy (DOE) National Energy Technology Laboratory (NETL) to conduct fundamental research projects on the aforementioned chemical-looping combustion with students throughout the United States.

Another highly competitive program, Research Experience for Undergraduates (REU), allows students to work closely with WKU faculty members on research to determine levels of toxic PCBs (polychlorinated biphenyl

compounds) in the Green River where it runs through Bowling Green.

Over the years, Dr. Cao has worked with many visiting scholars and student interns from other countries, who then return to their homelands to spread the knowledge they have gained. Dr. Cao says, "It is exciting to work with those people and to exchange multidisciplinary experiences."

For Cao, carbon emissions are the energy problem of today. In the future, he says, he wants to look at the interface between coal-based energy and other renewable energy resources such as biomass (mostly plant material) and solar energy. "In the area of clean energy technology, I have many ideas," he says. "I want to research turning biomass into biodiesel fuel." As a co-principal investigator with Dr. Pan, he has already received a \$500,000 grant from the U.S. Department of Energy to begin studying this process. "Right now, the raw resource for biodiesel production is not 100% green [i.e. from biomass]. Half of it still comes from coal," he explains. With the funds, Cao wants to develop a new process to create biodiesel production that uses a 100% biomass supply.

Cao welcomes emails and calls from other universities, government agencies and corporate representatives, because each contact might lead to another research project being implemented. "I will soon finish with a project funded by the biggest gas company in Canada," says Cao. "They emailed me after reading the published results from ICSET projects." The technology developed here at WKU might someday help the governments of the world develop sustainable green energy and offset the warming effects of coal combustion, he says. "If we share this knowledge, everybody benefits." ■

Dialect

IS NOT DEFICIENCY

Valuing the Variety in Language

BY JEANNE SOKOLOWSKI





ASSISTANT PROFESSOR ELIZABETH WINKLER DIDN'T SET OUT TO BE A LINGUIST, BUT SEVERAL UNEXPECTED EXPERIENCES, OCCURRING AT CRITICAL MOMENTS IN HER LIFE, COMPELLED HER TO CONSIDER A CAREER STUDYING LANGUAGE: ITS DEVELOPMENT, INTRICACIES, USES, AND ROLE IN BOTH

Dr. Elizabeth Winkler

SHAPING AND REFLECTING SOCIAL REALITY.

SHE CALLS THESE MOMENTS "WEIRD LITTLE ACCIDENTS OF LIFE." THE FIRST WAS WHEN SHE TRAVELED — UNDER PROTEST, SHE SAYS — TO MEXICO AS AN UNDERGRADUATE TO FULFILL A LANGUAGE REQUIREMENT FOR OHIO UNIVERSITY IN ATHENS. WINKLER HAD TAKEN A YEAR OF FRENCH AND A YEAR OF SPANISH, ONLY TO FIND OUT FROM HER ADVISOR THAT THE UNIVERSITY REQUIRED TWO YEARS OF THE SAME LANGUAGE. AT THE TIME, SHE SAYS, "I DIDN'T SEE ANY REASON WHY I NEEDED A FOREIGN LANGUAGE." ONCE IN MEXICO, HOWEVER, SHE IMMERSSED HERSELF IN THE LOCAL CULTURE AND LIVED WITH A HOST FAMILY FOR FOUR MONTHS. FOR THE FIRST TIME, WINKLER SAYS, "IT BECAME VERY CLEAR TO ME THAT I WASN'T JUST A PART OF THE HUMAN COMMUNITY. I WAS AN AMERICAN, AND THAT MEANT CERTAIN THINGS."

Having originally planned to go to law school, Winkler returned to the United States and completed her BA in Political Science — a degree that contributed to her awareness of how the world functions, how social groups interact, and what governs them. But she had already been bitten by the travel bug. The second happy accident concerned the placement for her service with the Peace Corps after college: on the border of Haiti and the Dominican Republic. She thought her background in French would help her communicate with Haitians, and was surprised when people couldn't understand her. At first, she attributed this to her "terrible French," but Winkler later learned that her French skills weren't the problem. Rather, it was that people were speaking a creole — a mixture of French and many African languages that was virtually unintelligible to her when she first arrived, but which was so fascinating to her that she became hooked.

Now Winkler is an expert on creole languages, some of which are spoken in certain areas of the United States. In Louisiana, for example, a French-based creole is spoken, and Gullah is the creole language used by African American populations on islands off the South Carolina, Georgia, and north Florida coastal regions. Creole, Winkler explains, is more a reflection of the origin of the language than a scientific definition. "Creoles have all the same properties that other languages do," she says. "The only difference is in how they were born." Creole arises when the

altogether. The Afro-Caribbeans, mostly Jamaican and speaking Jamaican Creole (English-based, but influenced by West African languages like Akan), immigrated to work on the construction of a railroad from the coast to the capital of San Jose, and then stayed to work for the United Fruit Company. The Spanish spoken by native Costa Ricans in the surrounding communities continues to be an active influence. The result is Limonese Creole, a stabilized but not static language which draws from English, Spanish, and West African dialects.

With fascinating examples like these, it is no surprise that students pay attention in Winkler's classes. Though housed in the English department (Western Kentucky University doesn't have a separate Linguistics department), Winkler's classes serve a specific population of students, including both Education majors and students in the English and Allied Arts track, some of whom are preparing to teach English as a Second Language (ESL). Though most linguists are not trained to teach ESL (or teach others to teach ESL), Winkler received Teaching English as a Foreign Language (TEFL) certification as part of her Masters degree in Applied Linguistics from Ohio University, Athens, and she has significant experience in that area.

But Winkler's favorite class to teach is Introduction to Linguistics, which attracts students from a variety of disciplines. She explains its appeal as stemming from the fact that "language is what we do every day. Everyone on the planet can contribute to this course." She adds that it is a particularly dynamic course, one in which she never has to "pull teeth" to get students to talk because "the students come in with lots to say." Their enthusiastic participation, their contributions about real life experiences and their observations about how they and their communities use language ensure that Winkler learns something from every class, and that students learn to appreciate their own regional diversity. "A lot of Americans don't think we're unique at all," Winkler says. "We are too used to what television tells us about ourselves. We think we have no culture, no anything, but we do. We have very distinct culture, and it's interesting."

If there is one thing she hopes students learn in her classes, it is that "dialect is not deficiency" and that

"So many kids get turned off to education so early on because their teachers come down on them for being local."

native speakers of several different languages live in close proximity and need to communicate with each other. In most cases, the dominant language (usually that of the group in power) supplies the vast majority of the vocabulary, but the languages of the subordinate group influence the structure and grammar of the creole as well.

Naturally, the development of any specific creole language is dependent on the particular context. In a colonial location like Haiti, for example, which the French left in the early 1800s, Haitian Creole has become more and more distinct because of the absence of contact with generalized French. In Barbados and the Bahamas, on the contrary, the creole is more intelligible to English speakers because the British retained their presence and set up schools, and the languages grew closer and closer together.

And the creole spoken in the Limon province of Costa Rica, where Winkler did research for her dissertation, had a different trajectory

This dynamic interaction between different languages results in some unusual grammatical and syntactical developments. For example, sometimes Spanish words appear in Limonese Creole, but are made to conform by speakers to the rules of creole grammar. The example Winkler gives of this is the word "pasearin'," which comes from the Spanish word "pasear," or "to hang out," to which has been added the *-ing* verb ending found in English, creating a hybrid that means "hanging out." Other times, the meaning of a word in Spanish affects the usage by Creole speakers, as in the sentence "Di taym chieng op man" ("the time change up man"). In this utterance, "taym" (time), though it seems to be English, actually draws on the meanings of the Spanish word *tiempo*, which can refer either to time in the sense of "date" or to "weather." The speaker of Limonese Creole who says "Di taym chieng op man" is actually communicating that the *weather* is changing a lot.

speaking in a certain way does not make someone sound “ignorant.” Winkler’s classroom conversations with teachers and future teachers help them see that the standard language is not necessarily more beautiful or logical than local language, but that we all need to learn when and how to use each. This is especially important, she says, for future educators, sometimes overly influenced by mainstream media, who think their job is to enforce an idealized, standard English usage exclusively. As she tells her students, “Language is a dialect with an army and a navy.” In other words, the “standard” language is the version that was used by the group with the most power, whether that is economic, political, or military power. “So many kids,” Winkler laments, “get turned off to education so early on because their teachers come down on them for being local.” As a teacher of future teachers, Winkler’s influence extends to the students of her students in ever-widening circles.

One of Winkler’s ongoing research projects also has far-reaching implications. She is at work helping scholars, educators, and politicians in Liberia develop an orthography (standardized system of spelling or representation) for the Kpelle language. Winkler first encountered this unwritten language in a field methods course she took as a Ph.D. student. Though she was told by professors that publishing a Kpelle dictionary would be of “linguistic interest,” Winkler actually became interested in Kpelle mostly because of her relationship with a Kpelle-speaking refugee family that she worked with in Indiana.

It was about ten years ago that she met someone from the Liberian government (who, incidentally, knew her parents) and who later ended up becoming the Minister of Education. The Liberian government was



Dr. Winkler and friends at the International Festival in Bowling Green

interested in developing Kpelle as the co-national language of Liberia. Like many African countries with a history of colonialism, Liberia, whose official language is English, sees the institutionalization of Kpelle as a means to promote cultural pride and active identity among Liberians. “It will connect people back up to their culture,” Winkler says, adding that it will also raise literacy. “Raising literacy and producing materials in that language,” she elaborates, “will provide local people with more access to education and knowledge from elsewhere.” Winkler does acknowledge, though, that language preservation is a contentious issue among linguists. Preservation of languages, like Limonese Creole or Liberian Kpelle, is important, but, as Winkler says, “The preservation of the community is first.” She indicates that this is a big debate in linguistic circles, but added that it’s sometimes a matter of where to spend limited resources: on printing textbooks and creating dictionaries or on the more pressing material needs of the people of the community, like food or a clean water supply.

It depends a lot on the country, Winkler states, describing significant efforts in Jamaica and Hawai’i, for example, on growing and publicizing Creole through television shows, textbooks, dictionaries, poetry, literary journals and presses. Celebrating the diversity and variety in language is clearly at the heart of Winkler’s academic and teaching interests. Winkler grows even more animated when she reflects on the joys of teaching at Western Kentucky University, where she is able to help students — aware of the stigma of rural, “country” talk — develop a pride in their roots through inquiry into the way in which they use language. “I’ve had a ball working here,” she says, “because I’ve had such open students in my classes. They have been open to talking about where they come from and get excited about discussing themselves.” It’s not hard to imagine students walking out of one of Dr. Elizabeth Winkler’s classes with a deeper intellectual understanding of language, but also with a deeper appreciation of what makes them special. ■

A STAR IS BORN



Sean Kinder

ASSOCIATE PROFESSOR SEAN KINDER IS WRITING A BOOK ON A KENTUCKY ACTRESS NAMED UNA MERKEL, WHO STARRED IN HOLLYWOOD

MOVIES, ON TELEVISION AND RADIO, AND ON BROADWAY FROM THE 1920s TO THE 1960s. UNA'S ONCE-PROMINENT NAME HAS TOO OFTEN BEEN RELEGATED TO FOOTNOTES AND OCCASIONAL PHOTO CAPTIONS ALONGSIDE FAMOUS STARS. KINDER HOPES THAT HIS UPCOMING BOOK ON UNA WILL HELP BRING HER BACK INTO THE LIMELIGHT, WHERE THIS KENTUCKY NATIVE BELONGS.

Kinder says he started researching early Hollywood stars because, "I have a huge interest in silent films and 'The Golden Age' of Hollywood." Although not all are in agreement with what "The Golden Age" means, to Kinder it indicates films made in the 1930s and 1940s. Film scholars and enthusiasts often consider these decades to be the pinnacle of Hollywood filmmaking. The era produced what are arguably the most glamorous stars of all time: Joan Crawford, Errol Flynn, Cary Grant, Katharine Hepburn, Laurence Olivier, and Ingrid Bergman. But Kinder wanted to bring back to the public's attention stars who were famous, talented, and brilliant, but not quite as well known today.

BY AMY J. W. SLOWIK

Kinder did not settle on Una Merkel easily. "I was initially drawn to write about another actress named Ann Harding." But Kinder discovered mid-way into his research that two other biographers were already working on biographies of Ann Harding. Soon after, however, Una came to Kinder's attention. An avid early film viewer, Kinder had already noticed Una and soon realized that she was a native Kentuckian. Just as important, not much had been written about her. Kinder started collecting material about Una with a colleague, Associate Professor



UNA MERKEL

Terri Baker, coordinator for the Visual and Performing Arts Library at WKU. Although Baker eventually had to leave the project due to time constraints, she contributed significantly in the early stages of the research process, including gathering and organizing boxes of materials that can now be found under Kinder's desk.

Born in Covington, Kentucky, in 1903, Una Merkel always wanted to be an actress. She took acting lessons from the mother of famous actor Tyrone Power. Una left for New York City as a teenager and found work as a hand model. Building upon her Kentucky roots, she often appeared in photos in *True Story* magazine as "the country

girl" or "the young girl who comes to the city." Her golden curls and innocent face went perfectly with her (somewhat embellished) southern accent and graceful charms. She eventually made it to Broadway. Soon, she was invited to Hollywood by the great director D.W. Griffith, who wanted Una to appear in his film *Abraham Lincoln* with Walter Huston. Kinder says, "She was originally going to play Lincoln's wife, but [Griffith] decided to recast her as Ann Rutledge, Lincoln's ill-fated first love. It was a dramatic role and helped establish Una as a Hollywood actress, but she wouldn't hit her stride until later, when filmmakers discovered her natural flair for comedy."

Una moved to Hollywood with her mother and father, with whom she lived until the end of their lives. In Hollywood, Una established herself at Fox Studios, but when her contract went up for renewal, she signed a seven-year contract with the most illustrious motion picture studio of the day: MGM. It was an incredible coup for the young actress. At MGM, Una played in some of the era's most enduring films: *Private Lives*, *Red-Headed Woman*, *The Merry Widow*, and *On Borrowed Time*. She was also frequently loaned out to other studios, where she appeared in the original *Maltese Falcon*, *42nd Street*, and *Destry Rides Again*. She played alongside and became close friends with actors and actresses still known today: Jean Harlow, Ginger Rogers,



At MGM, Una played in some of the era's most enduring films: *Private Lives*, *Red-Headed Woman*, *The Merry Widow*, and *On Borrowed Time*.

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Robert Taylor, Jimmy Stewart, Norma Shearer, Eleanor Powell, and Clark Gable — to name but a few. She even caught Helen Hayes' wedding bouquet. Although she played serious parts and was nominated for a Best Supporting Actress Oscar, Una became known for roles as, "the wise-cracking best friend of leading ladies," says Kinder. One of Hollywood's most prolific actresses, Una made thirteen films in 1933 alone.

Unlike many other actresses, Una never let fame and fortune go to her head. Says Kinder, "She was a very sweet, down-to-earth person who had absolutely no ego whatsoever. She was not your typical Hollywood diva by any stretch of the imagination. She never looked at herself as a big star. Family always came first to her. She never really bought into the whole glamorous, condescending attitude that some people did." Una married only once (to an aviation engineer) and the couple lived with her parents. After they divorced, Una never remarried. She never left her parents and never had any children. She worked hard, long hours at MGM. Kinder says, "They worked her to death, but she loved it."

During World War II, Una traveled to Australia and New Guinea to entertain U.S. troops with comedy sketches alongside Gary Cooper and actress Phyllis Brooks. "Una and Phyllis were the first white women that some of the indigent New Guineans had ever seen. Gary got over there and was awestruck by the whole experience. Una was a seasoned pro, so she was in her element. She was very good at ad-libbing, and she really helped Gary hold things together. He was used to having a script and working in front of a camera, but working live on a stage was very different," Kinder reports. After the war, Una returned to the United States to resume her film career and take up Broadway again in New York City.

Soon after returning from abroad, a life-changing tragedy struck Una. For the sensational details, the reader will have to wait for Kinder's book. For now, Kinder is only willing to say that, "I look at her as a Hollywood survival story. She

went through so much, but when people think about her, they don't realize how rich and eventful her life was. She wasn't one to go out and party. She liked to stay home with her family and friends. She was extremely humble, yet she was a star. Nevertheless, there are elements of her life that played out like a Greek tragedy in the headlines."

After several years of recovery, Una returned to Broadway. In 1956, she received a Tony Award for her performance in *The Ponder Heart*. In between, she appeared in dozens of television and radio shows such as *I Spy*, *Burke's Law*, and *The Red Skelton Hour*. Finally, she returned to Hollywood, playing matronly roles like the housekeeper in *The Parent Trap* with Hayley Mills. In 1962, she won a nomination for Best Supporting Actress in *Summer and Smoke*. She worked until 1968, when she retired to a quiet life.

Kinder has spent years tracking down and interviewing surviving friends, family, and colleagues of Una Merkel, and he is in constant correspondence with people who may hold key information about Una's life. He says, "I've communicated with fans and friends who had some connection with Una, and I continue to write to her former Hollywood colleagues in the hopes that they will share with me their experiences with her." He also traveled to Una's birthplace in Covington, Kentucky, where she and her parents rest side-by-side. The Kenton County Public Library in Covington also holds materials on Una's life that Kinder used.

Like all Hollywood biographers and film scholars, Kinder had to travel to California to visit the official archives of the Academy of Motion Picture Arts and Sciences, housed in the Margaret Herrick Library in Beverly Hills. "When I went to the Margaret Herrick Library, I was armed with a lengthy list of citations, mostly movie magazine articles about Una. The library had most of them, but some of the more obscure ones remain elusive, especially those from British publications. However, while at the library, I was able to use a fantastic

database that is only available in-house. It seems the librarians there have gone through many of their movie magazines and created an index of the articles in them. This tool was an absolute treasure trove of information, and I have to thank Lea Whittington, a librarian there, who fulfilled request after request for me, always graciously and with a smile!" While in the area, Kinder also went to the Cinematic Arts Library at the University of Southern California. He did so with a grant from the Kentucky Library Association.

Kinder has left no stone unturned, "I first searched for every bibliography and index I could find pertaining to Hollywood, Broadway, motion pictures, cinema, theater, and radio that might have references to Una. My next step was getting these items — usually with help from WKU's Interlibrary loan staff — which included microfilm, articles, books, and audio-visual materials. In addition, I have spent hours skimming through newspaper archives, databases, websites, messages boards, blogs, genealogical records websites — all to find other nuggets of information about her." In going through all these materials, Kinder says his wife, Valérie Kinder, has been invaluable. In libraries where materials are too fragile to be photocopied, Valérie painstakingly hand-copied or typed entire articles for the project.

Kinder continues searching, scouring, and discovering items and information about Una Merkel. Traveling across the country from rural Kentucky to Los Angeles, Kinder has compiled a wealth of information on Una Merkel that will be available to the world for the first time. He now owns a veritable archive of Una Merkel resources, including vintage photos, lobby cards, letters, and rare magazines in which she appears. This labor of love is scheduled to be published by the University Press of Kentucky, allowing the world the opportunity to finally learn about and appreciate Una Merkel's rich life and career. Thanks to Sean Kinder, Una Merkel will be immortalized. ■



Can Dung Beetles Save the World?

BY MICHAEL J. SOBIECH



Dr. Keith Philips

“KEITH, WHY DON’T YOU START AN INSECT COLLECTION?” WITH THAT FATHERLY QUESTION, A SEVEN-YEAR-OLD KEITH PHILIPS, WHO WAS HOLDING A GRASSHOPPER, WAS SET ON COURSE TO BECOME A LIFETIME STUDENT, AND EVENTUAL GLOBAL RESEARCHER, OF A GROUP OF INSECTS THAT DOESN’T ALWAYS GET THE RESPECT IT DESERVES: THE SCARABAEINAE OR DUNG BEETLES. BUT THROUGH THE EFFORTS OF WKU’S DR. PHILIPS AND OTHERS, A LITTLE BEETLE MIGHT PROVIDE A BIG HELP IN THE ONGOING CAMPAIGN TO SAVE PLANET DIVERSITY.

Philips’ interest in the natural world was a family affair. “I spent my summers at a cabin in the woodlands of Ontario. And my father and grandfather, while a radiologist and a banker, were ‘closet’ naturalists. In our home or at the cabin there were field guides on nature. I still have some of my childhood books on snakes and reptiles. And I was fortunate that my mother didn’t complain too much when she found some of my first ‘research samples’ — snakes, rodents for my pet boa constrictors, and, one time, a bat — staring at her in the kitchen fridge.”

But while his first love might have been for reptiles, eventually Philips decided to pursue insects. “It was while I was getting my biology degree at Carleton University (CU) in Ottawa that I decided to study entomology. I worked for a professor who studied insect diversity, and about twice a year he would go to some exotic locale and return with samples of insects. It was then that I decided that a life of traveling, teaching, researching, and being surrounded by professors and students would be a great job.”





In the mountains of Bolivia

For his Master's in Science, Philips went to Montana State University, where he took his first entomology course: "I never took the two courses in entomology at CU, thinking that I already knew something about insect biology — how wrong I was!" From Montana, Philips then went on to Ohio State University, a school with a long and distinguished record in entomological research. It was here that Philips began his research on spider beetles (so named because of a resemblance to spiders). But it was while on a post-doc fellowship in South Africa that Philips decided to focus also on nature's fertilizer—the dung beetle.

"Dung beetles are most common in tropical or subtropical regions, but they can be found everywhere except for cold temperate regions and Antarctica," states Philips. Kentucky has about twenty species. Dung beetles are typically divided into two categories — "rollers" and "tunnelers" — with rollers making balls of dung and then rolling them away from a dung pile, while tunnelers burrow down underneath or next to the manure. "These beetles are absolutely critical in some

ecosystems for 'dung recycling' (or spreading the manure). In the process of burying their food, dung beetles bury seeds that then germinate." Dung beetles may not be as cute as squirrels burying acorns, but they provide as important a service.

"While I was still a graduate student at Ohio State, I went on a research trip to the Dominican Republic," Philips states. "I had helped document two new species of dung beetles, but at the beginning of my post-doc I was still quite naïve about their evolution." But Philips' naivety was to his — and the scientific world's — advantage. Prior to his work in South Africa, the accepted view among entomologists was that rollers and tunnelers had each evolved from a separate ancestor; the rollers had a common ancestor and the tunnelers had a common ancestor, but never the two did meet: "My study showed that their evolution had not taken place separately — at several different points in time, their developmental paths had crossed: rollers evolved many times from tunnelers. This was a dramatic modification of the accepted view."

In the days since his ground-breaking work in South Africa, Philips has continued to expand the boundaries of knowledge about the dung beetle, and, just as importantly, he has used these beetles to diagnose the current health of the planet. "Dung beetles are perhaps one of the best groups to examine in monitoring the health of various ecosystems: they are easy, quick, and cheap to sample; using them in surveys does not negatively affect the viability of their population; and their diversity and abundance, or lack thereof, correlates well with the diversity of other species and overall ecosystem health. I can go into a forest in West Africa and after two days have a pretty good idea how stable and well functioning the forest ecosystem is, based on the number and types of dung beetles."

But while Philips has an eye to the earth, he has not forgotten the students in — or outside — his classroom. Several of Philips' graduate and undergraduate students have gone on to become medical doctors or high school teachers. And as he benefited from fieldwork with his professors, so now he helps train a new generation of biologists and entomologists. "I have been fortunate to work with several excellent students here, including students from Columbia, Australia, and Ghana. In fact, one of our Ghanaian students recently finished his doctorate at Auburn, working with fruit tree insect pests. He's actually in a post-doc at Auburn right now. And when he's



finished, he'll return to Ghana to begin a research position at one of their agricultural stations. In light of the 'brain drain' that some countries experience, where their students learn abroad but do not return, his going back is a really good thing."

Philips has more than one tie to Ghana. In addition to his work with Ghanaian graduate students, Philips continues hard at work on the Ghana Insect Project. For WKU, this project is noteworthy for several reasons including both its being funded by the National Science Foundation (NSF) and the sizeable amount of the grant — more than \$400,000. "The Ghana Insect Project had several goals including student training, and studies on both dung beetles and spider beetles. Additionally, we are helping create in Ghana the National Insect Collection at the University of Ghana in Accra, which will be a collection not just of the insects in Ghana but of all the insects in the Guinean forests." This past summer Philips worked in the highest mountain range in West Africa: "The Nimba region in Guinea has a largely unstudied and poorly known insect fauna, and most of the specimens we gathered on this trip will be placed in the collection." As he ponders the future of the work in Ghana and his own future, Philips sees a continued relationship with the efforts in Ghana: "I see myself working with this project for the rest of my career."



Philips believes that he and his colleagues are close to securing another grant from the NSF. "In January 2010, a large group of us applied to the NSF for three-million dollars for five years of support. While we were not at that time successful, all the reviews ranged from very good to excellent — which is just indicative of how difficult it is to acquire NSF funding. But I am optimistic that we will be successful with our resubmission. If funded, we will be able to establish a Planetary Biodiversity Inventory accessible via the Web. The creation of various on-line resources will greatly

"I decided that a life of traveling, teaching, researching, and being surrounded by professors and students would be a great job."

facilitate the study of the diversity of the dung beetles, as well as helping with a relatively massive evolution study using a vast amount of evidence from specimens that will be supplied from collaborators located in nearly every corner of the planet!"

While Philips and his colleagues wait to hear from the NSF, they continue their work of preserving ecological diversity — a diversity that he hopes to secure with the help of another old friend, the spider beetle. "While I always had an interest in dung beetles, I never switched to 'dungers' completely; while they were a side line during my post-doc in South Africa, spider beetles receive an equal emphasis in my lab." Today, using both spider and dung beetles, Philips collaborates with other scholars to determine new sites to be preserved. "South Africa is arguably one of the world's leaders in conservation efforts; nevertheless, their reserve system has been created in somewhat of an *ad hoc* manner. It is well known that there is still a tremendous amount

of diversity that is not protected in any manner, and the threats from continuing population growth and human development, along with invasive, non-native species, are some of the greatest threats. The work we are doing now, documenting spider beetle diversity, will in the long term prove to be extremely helpful in identifying and protecting biodiversity hotspots — areas with species found nowhere else on the planet, and often with a very small and restricted distribution, putting them at greater risk of extinction than more numerous species with larger ranges," Philips explains.

"Everyone should have an interest in documenting and preserving biodiversity because everyone is affected, ultimately, by the health of the earth," Philips continues, "I think this is an ethical issue for humans: we have no right to entirely eliminate from existence another species. If one is religious, he or she can think of this as destroying the creations of God. Once a species is gone, it's gone and can never be replaced. And perhaps we will have lost something that may ultimately have been shown to be of great importance to humans — maybe a new gene to improve crop yields or a new drug against cancer. All species have a right to exist, and we should do our utmost to protect them."

Can 'dungers' save the world? Maybe that's asking too much of one little beetle. But as they roll and tunnel, the humble Scarabaeinae are proving to be invaluable colleagues for Keith Philips and others in global efforts to conserve the abundance — and beauty — of life in the world's biodiversity hotspots. ■

MICROSCOPIC RESEARCH FOCUS

EXPANSIVE RESEARCH VISION

BY JEANNE SOKOLOWSKI

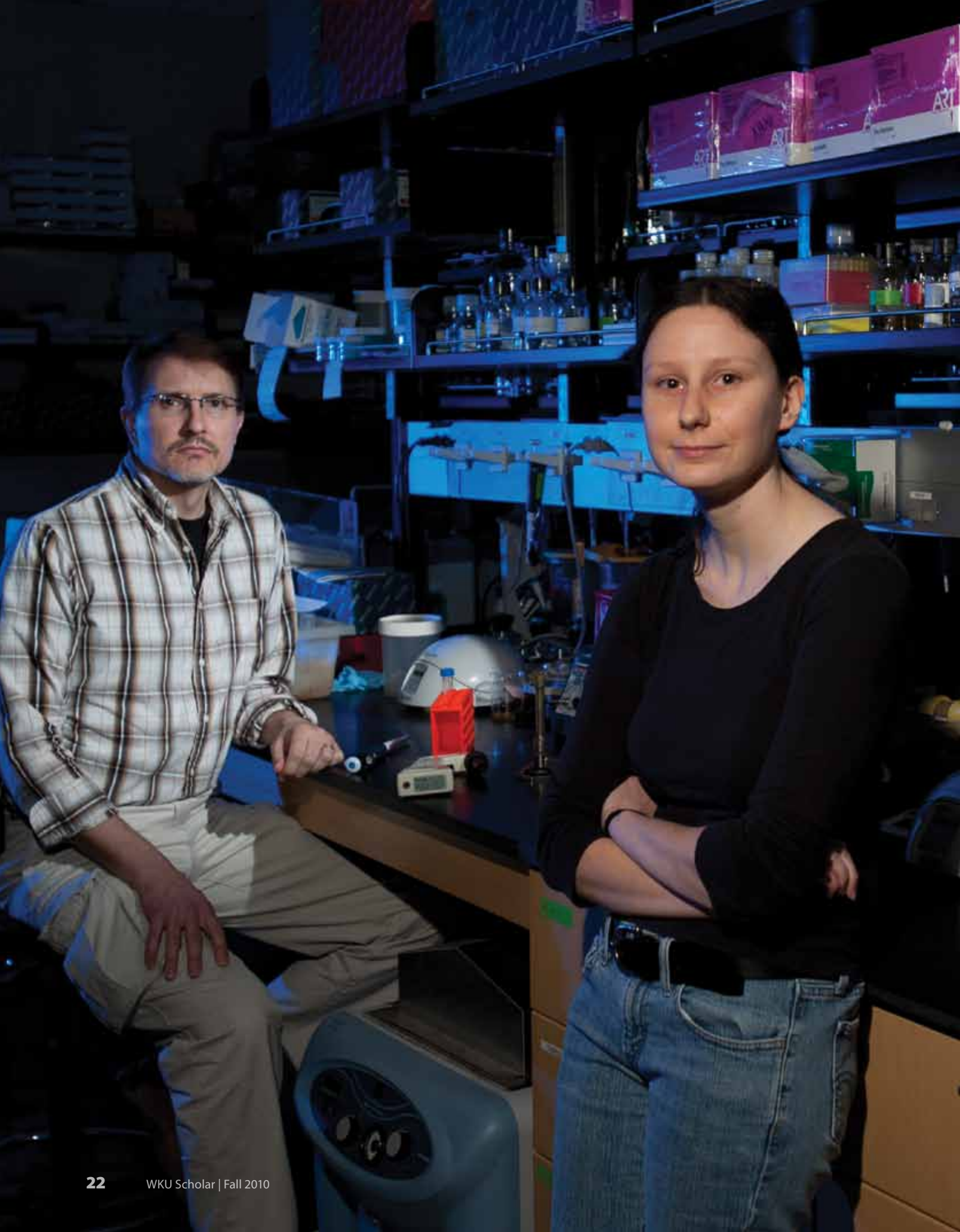


Dr. Rodney King

AS YOU TALK TO DR. RODNEY KING, IT BECOMES INCREASINGLY DIFFICULT TO BELIEVE THAT IT WAS ONLY EIGHT YEARS AGO THAT HE MADE THE TRANSITION FROM FULL-TIME RESEARCHER WITH THE NATIONAL INSTITUTES OF HEALTH (NIH) TO TEACHING IN THE BIOLOGY DEPARTMENT HERE AT WESTERN KENTUCKY UNIVERSITY. IN THAT SHORT PERIOD OF TIME, NOT ONLY HAS HE SUSTAINED A PRODUCTIVE INDIVIDUAL RESEARCH AGENDA, BUT HE HAS ALSO BEEN TIRELESS IN MENTORING AND ENCOURAGING NUMEROUS UNDERGRADUATE AND GRADUATE STUDENTS ON CAMPUS. LIKE THE UNIVERSITY, DR. KING CLEARLY PLACES A PREMIUM ON TEACHING AND STUDENT LEARNING, ASPECTS OF HIS JOB AS A FACULTY MEMBER THAT OCCUR WITHIN AND ARE COMPLEMENTED BY HIS OWN RESEARCH EXPERTISE AND INTERESTS.

After his undergraduate career at Virginia Tech, during which he took his first Microbiology class and got hooked on the field, King continued on for a Masters degree at the Medical College of Virginia/Virginia Commonwealth University. Originally, a Ph.D. wasn't in the works, but King fell in love with graduate school, and received, he says, great mentoring there and during his post-doctoral years with the NIH. "I've been very fortunate with my mentors," King said, describing them as individuals who gave him independence, but were always there to answer questions.

King's research involves the relationship between viruses and their hosts, specifically, how bacterial viruses, called bacteriophage, exploit the molecular machinery of their host to express their own genes. The organisms he looks at are small (an electron microscope is necessary for viewing), but their impact is profound. Bacteriophage are ubiquitous. It is estimated that there are 10^{31} bacteriophages in the biosphere — admittedly, King says, this number is hard to wrap your head around. "But if you appreciate that they're the most numerous biological entities on the planet," King adds, "then you can start to appreciate their impact."





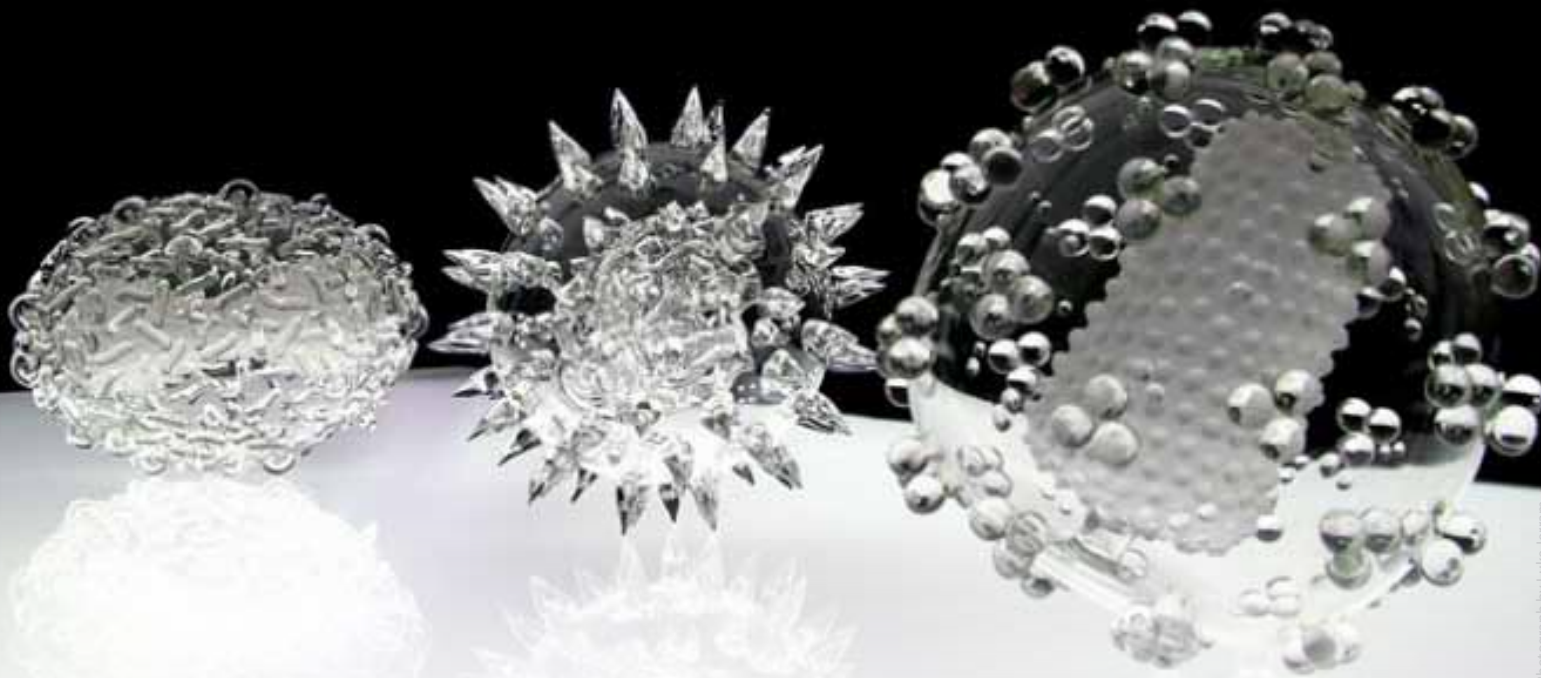
Bacteriophage do not infect humans, King points out. But in some cases, bacteria that carry certain bacteriophage do result in human or animal diseases, like diphtheria or cholera, for example. “Many of these familiar bacterial diseases,” King explains, “are due to toxins that these bacteria make. Well, it turns out that the genes for those toxins are actually carried on the viruses.” In other words, there is a kind of cyclical relationship among viruses, bacteria, and humans. King expounds on this: “Bacteriophage biology affects the biology of the host, that is the bacteria, which can contribute to its pathogenicity in us, the human population.”

King’s work is primarily on gene expression in bacteriophage — research at the molecular level. But the work that microbiologists like King do can have significant practical applications for humans, such as in the field of bacteriophage therapy, in which viruses are used to destroy their host bacteria — specifically, the bacteria which are potentially dangerous to human health. The virus becomes a weapon that humans can use to defend against the threat of harmful bacteria. Research in the former Soviet Union, for example, has resulted in the creation of “phage cocktails” that can be applied to an open wound. The viruses in the cocktail attack the targeted pathogen and thus help defend the human body against possible infection.

As much as he enjoyed the pure research he was doing at the NIH, King eventually decided that it was time to shift gears. “The transition into academics was always something I thought I would do,” King says, “I just didn’t know when it would happen.” To facilitate the move into teaching, King mentored summer students at the NIH, and also taught a laboratory course at Marymount University in Virginia. Additionally, he built his teaching experience by giving presentations of his research to other scientists at the NIH.

“It was a transition,” King admits of coming to WKU to begin his career as a college professor. “Going from total research to actually having my time split up and divided into other responsibilities was a challenge.” But King speaks with enthusiasm of the rewards of the job, particularly the opportunity to recruit and work with undergraduates and graduate students here at WKU. “I’ve had a tremendous group of undergraduate and graduate students come through,” King enthuses.

His mentoring success is apparent with Ali Wright, one of the first students with whom Dr. King worked. Wright has received recognition as being the first WKU student to complete the entire DNA sequence of an organism — the genome of a bacterial virus. She calls King a great mentor, but acknowledges that he has high standards. “He does demand that students know the material,” Wright says, “but he also makes sure the students know that he is available to help if there is a point they are struggling with.”



Photograph by Luke Jeram



Ali Wright

When asked about his role in developing Wright, and other students, as young scientists, King focuses on an approach that is supportive, but based on continually querying students about the research choices they make. At every step, King says, he is asking questions of the decisions that they make in conducting experiments. He also highlights interpretation of results as one of the key areas in which students need supervision and guidance. “I can show a student how to do a technique,” King says, “and they can do it right away. But then they need to start thinking more deeply about that, and that takes time. That’s where it takes closer mentoring to make that transition and get that deeper understanding.”

King’s teaching and mentoring efforts have extended beyond the WKU student body. He is currently assisting with a Research Experiences for Undergraduates (REU) program, underwritten by the National Science Foundation (NSF). With assistance from WKU’s

Office of Scholar Development, King and another member of the Biology Department, Dr. Shivendra Sahi, co-wrote the three-year grant to set up a program that will bring in students from across the United States to engage in intensive research, but also to help educate these students about graduate school, funding opportunities and

in students, give them an intensive research experience and get them excited about research,” King notes. The program is open to students who are early in their undergraduate careers because, according to King, “we want them to go back and build upon this experience and get involved in research at their own institutions.”

“The idea is to bring in students, give them an intensive research experience and get them excited about research.”

the process of taking their education further. He and the other REU mentors will work with the students for a total of ten weeks. There are several Gatton Academy students participating, as well as students from other schools across the state, including one from Kentucky’s Community and Technical College System (KCTCS). Students have also come from as far away as Texas and California to participate in what is an interdisciplinary experience: the REU program includes faculty from Biology, Mathematics, Chemistry, and Bioinformatics. “The idea is to bring

King’s approach to his work with the REU students — facilitating hands-on learning that gets them excited about science and about research — is the hallmark of other classes that he teaches, including the wildly popular “History and Science of Beer and Brewing,” which he has co-taught twice with Dr. Andrew McMichael of the History Department. For those inclined to dismiss the class as lightweight, geared toward attracting less serious students, King says drily, “Let them take a look at the syllabus, and take one of the tests.” (It’s also the case that

this course is only offered to Honors College or Honors-eligible students, another factor ensuring the rigor of the course.) Brewers themselves, King and McMichael walk students through the process of making their own beer, while educating the students on the biochemistry of the fermentation process and the rich history of beer in American culture. Though there is definitely a sense of fun in experimenting with recipes to get a desired taste or texture, King also emphasizes the science behind the process. "I'm using a living organism (yeast) to get a product. And I am using the biochemistry of that organism to give me something that has a great taste and has these different properties." Students emerge with a much greater appreciation of how and why a lager or a wheat beer tastes the way it does, and the science behind the production of the beverage.

It should come as no surprise that Dr. King is the current chair of the Student Research Council at WKU. A large part of his efforts focus on helping plan the annual Student Research Conference, a task complicated, he says, by efforts to be inclusive of a range of disciplines, and because of the various forms which research presentations can take, from posters to performance to video. In the past year, the Student Research Council has been particularly involved in an initiative to integrate college-wide efforts to encourage research. King mentions specifically the website which acts as a clearinghouse for listing various research and funding opportunities. And not just in the sciences, he is quick to point out; this initiative encompasses all the various departments on campus.

King's current teaching passion is the National Genomics Research Initiative. This project helped establish the WKU Genome

Discovery and Exploration Program, which he teaches with Dr. Claire Rineheart. WKU is one of thirty-six universities nation-wide chosen to participate in the program, which is sponsored by the Howard Hughes Medical Institute's Science Education Alliance. Genomics, King explains, is "the study of the genomes of the entire DNA sequence of an organism." Working with bacteriophage is especially suitable for the classroom, as its single piece of DNA makes it very manageable

"Here, we don't know what's going to happen, and we tell them that right off," King says. As a result, students get a sense of how research really occurs.

to isolate during the course of a semester. King's enthusiasm for the Genome Discovery and Exploration Program stems, he says, from the excitement it generates among students, particularly those with no prior research experience. "They can do authentic research in the classroom setting," King says. "This program allows them to experience the thrill of discovery because they're going to isolate the virus, they're going to go out and retrieve the soil sample. So it gives them also a sense of ownership." The process also, he notes, mimics the unexpected nature of research. "Here, we don't know what's going to happen, and we tell them that right off," King says. As a result, students get a sense of how research really occurs.



Sarah Schrader

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Sarah Schrader, a Gatton Academy and Chinese Flagship student who took King's Genome Discovery and Exploration course this past year, was able to experience the thrill of isolating her own unique

bacteriophage from a soil sample while in the class. Schrader was appreciative of King's teaching style, saying, "He not only explained the processes to us very clearly, but also told us why each step was necessary and what was happening during each part of our experiments." She goes on to describe King as a knowledgeable, patient and helpful teacher, but not, she observes, the type to hand-feed students. "He rarely gives a direct answer to a question," Schrader comments. "Instead, he helps guide

your thinking until you discover the answer yourself." From her experiences in the Genome Discovery class, Schrader became interested in working with Dr. King outside of class; she hopes to continue to work on the phage she isolated, and to identify all the genes in the genome of the virus. After graduating from the Gatton Academy in 2011, Schrader's intention is to remain at WKU to pursue an undergraduate degree before embarking on a PhD program, most likely in genetics or a related field.

Looking forward, King anticipates continuing to work with the many promising students at WKU, and broadening his own research to take advantage of the bacteriophage sequencing occurring here on campus. King expresses an interest in moving into the area of whole genome expression analysis, and in looking at how multiple genes work together with each other. His research may focus on life at some of the most microscopic levels, but Dr. Rodney King has no trouble seeing the big picture, and helping students move seamlessly between these two worlds. ■

CATTLE BUSINESS

BY KATHERINE PENNAVARIA



COWS HAVE NO IDEA HOW MUCH HUMANS THINK ABOUT THEM. EVERYTHING THAT AFFECTS THE HEALTH AND PRODUCTIVITY OF AMERICAN DAIRY AND BEEF COWS — THEIR LIVING SPACE, THEIR FEED, THEIR RANGE OF MOVEMENT, THEIR INTESTINAL TRACTS — HAS BEEN EXTENSIVELY STUDIED. ONE PLACE WHERE SUCH SERIOUS THOUGHT ABOUT BOVINES HAPPENS IS THE WKU UNIVERSITY FARM, WHICH IS OVERSEEN BY THE DEPARTMENT OF AGRICULTURE. FORMER AGRICULTURE DEPARTMENT HEAD, DR. JENKS BRITT, IS A LONG-TIME VETERINARY SCIENCE RESEARCHER. BRITT HAS BEEN THINKING ABOUT COWS FOR MOST OF HIS LIFE. AS A BOY GROWING UP ON A DAIRY FARM NEAR BOWLING GREEN, HE PARTICIPATED FULLY IN THE RAISING, TENDING, AND MILKING OF HIS FAMILY'S HERD.

On 400 acres supporting over 100 dairy cows, Britt got to see every stage in the life cycle of cows, both healthy and sick. "We had a mechanical milking operation," he says. "I also did 4-H projects involving dairy cows." He participated in Future Farmers of America as well, but ended his involvement with both groups when he finished high school.

One aspect of cow management that particularly struck him during his youth, says Britt, was the role of the veterinarian. "I got to watch him treat sick animals, deliver calves, give vaccinations," he says. "I decided at age ten or eleven what I wanted to do." When it was time for him to enter college, he stuck to his plan and double-majored in agriculture and biology. After graduating from WKU in 1966, he headed to Auburn University in Alabama for a graduate

degree in veterinary medicine, which he completed in four years.

For the next twenty-three years, Britt practiced veterinary medicine in Russellville, Kentucky, specializing in animal health management and reproductive technologies such as embryo transfer.

But in 1993, he decided to quit private practice and move into academia. At the University of Wisconsin - Madison, he took the position of clinical assistant professor in the College of Veterinary Medicine, and five years later joined the WKU Department of Agriculture. "I started doing research as part of the tenure process," he says, "and I've been doing it ever since."

At the university farm, Britt oversees three distinct types of projects involving bovines: applied research, applied field trials, and

in-depth disease research. Only the smaller projects can be done using the university's herd of 150 beef cows and 40 dairy cows. "If it takes 30 or fewer animals to do a trial, we can do it at Western," he says. "If we need 400 animals, then we do the project using private, family-owned herds." Some of the funding for new research comes from feed and pharmaceutical companies, who contact the researchers to set up trials.

The university farm sits on 783 acres just south of the Natcher Parkway, and is run by the Department of Agriculture. The farm currently has four staff members and about thirty students who work there raising crops (corn, wheat, alfalfa, pasture, and soybeans) and tending the livestock (in addition to bovines, there are horses, pigs, and goats). All of these animals are potential subjects of research studies and trials, but are also used for teaching within the department. WKU graduate students usually participate in the disease studies.

One focus of Britt's research has been on bovine nutrition. "I've done quite a bit of research looking at specific additives such as yeast culture in bovine feed," he says, "to see what effect it would have on health and milk production."



"I'd like to think our work with bovines has led to real improvement in the health and profitability of herds."

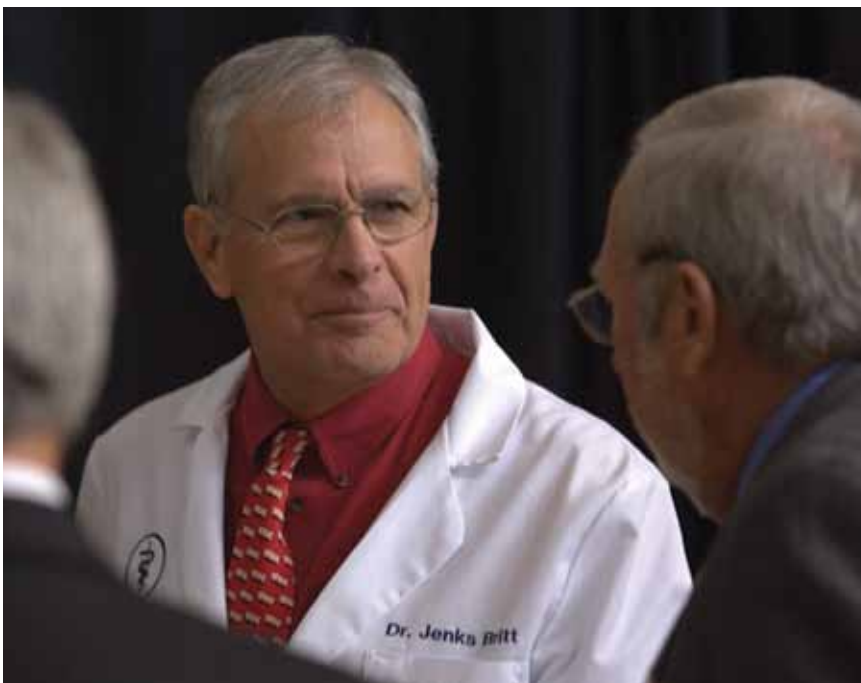
His research on bovine diseases, says Britt, focuses on two in particular: Johne's disease and bovine viral diarrhea (BVD), both gastrointestinal illnesses. The former malady, which was identified in cows more than one hundred years ago, resembles Crohn's disease in humans. The organism that causes Johne's disease is in the same family as tuberculosis and leprosy. Like those two sicknesses, Johne's is slow to develop. "A calf could have exposure and infection at two months old, but not show any sign of illness until seven or eight years of age," Britt notes. The disease, which is spread

through fecal contamination, is not curable yet. "A lot more research needs to be done," Britt says.

In addition to overseeing an extensive array of research projects and trials, Britt also teaches courses in the science of agriculture, livestock management, and animal pathology, among others. And when he is not supervising trials and teaching, he is writing (he has authored or co-authored 227 articles), giving presentations (he has given 222 in the U.S. and abroad), and participating in professional organizations (the American Dairy Science Association and the American Association of Bovine Practitioners, among many others). He is also on the editorial board of the *Journal of the American Veterinary Medical Association*.

Some of the numerous awards Britt has earned in his long career include Veterinarian of the Year (1993, Kentucky Medical Association), Practitioner of the Year (1992, American Association of Bovine Practitioners) and Alumni of the Year (1992, WKU). Starting in January 2011, he will shift from full-time teaching to part-time, and continue to oversee research projects at the farm. "I'd like to think our work with bovines has led to real improvement in the health and profitability of herds," he says.

So even in partial retirement, Britt will go on thinking about cows, just as he has done all his life. ■





Protecting our Waters and Human Health

BY AMY J. W. SLOWIK

DR. VIJAY GOLLA HAS SPENT NEARLY A DECADE RESEARCHING THE HERBICIDE ATRAZINE AND ITS PRESENCE IN MIDWESTERN WATER SYSTEMS.

Dr. Golla is an assistant professor in Western Kentucky University's Department of Public Health, which is seated in the College of Health and Human Services. Atrazine is an herbicide commonly used on corn and sugarcane. Though widely used in the United States, atrazine was banned in 2004 by the European Union because of concerns over groundwater contamination. Controversy over the use of atrazine in the United States persists as scientists such as Dr. Golla study its effects on human health.

Dr. Golla's work directly affects environmental standards as he makes it possible to measure atrazine in communities and to calculate the effects on the health of Americans. His work can be applied worldwide to communities that still use atrazine and for researchers who want to perform studies with similar methodologies.

Atrazine is a chemical compound that both prevents and kills annual and broad-leaf weeds. Cheap and effective, atrazine is one of the most widely used herbicides in the world, commonly sprayed on corn, sorghum, sugarcane, and wheat. The United States produces more corn than any other crop, which means that both supply and demand are so high that farmers spend a considerable amount of their earnings on pesticides. Farmers believe that they cannot afford more expensive — yet perhaps safer — herbicides and still stay in business. In 2003, the EPA stated that “the total or national economic impact resulting from the loss of atrazine to control grass and broadleaf weeds in corn, sorghum and sugar cane would be in excess of two billion dollars per year if atrazine were unavailable to growers.”

However, the cost to the health of Americans may outweigh even two billion dollars. A 2003 Department of Health and Human Services informational release states, “The general population is probably not exposed to atrazine. However,

exposure to atrazine may occur at farms where it has been sprayed. The human health effects of atrazine are still being investigated and documented. Atrazine may affect pregnant women by causing their babies to grow more slowly than normal. Birth defects and liver, kidney, and heart damage have been seen in animals exposed to high levels of atrazine.”

On the other hand, in 2007, the United States Environmental Protection Agency (EPA) studied the effects of atrazine on amphibians and decided that no further testing would be necessary, despite results that showed damage to the amphibians tested. Scientists like Dr. Golla have yet to agree with the EPA. To the contrary, Dr. Golla's studies suggest that further testing is definitely necessary before concluding that atrazine is safe to use on crops grown near human habitations.

Dr. Golla, originally from India, earned the degree Bachelor of Medicine, Bachelor of Surgery (MBBS) from Andhra Medical College. He combined his medical knowledge

with a master's in public health from Western Kentucky University, and later a doctorate in Occupational and Environmental Health from the University of Iowa.

From 2001 to 2003, Dr. Golla examined atrazine levels in water before and after treatment. The study took place in the small community of Lewisburg, Kentucky, where drinking water supplies came from Spa Lake. One of Spa Lake's sources included run-off from agricultural fields that had high atrazine usage. Thus, the atrazine would flow from the plants and soil into traveling water (such as rain water or ground water) and down to Spa Lake. From Spa Lake, the atrazine would be collected in drinking water for treatment in the city's facilities.

Dr. Golla's question was whether the community's water treatment systems were able to adequately monitor and control the levels of atrazine in the water — water which was used in people's homes and public access places. Dr. Golla found that, despite water treatment, the presence of high concentrations of atrazine in finished water was of concern and posed a health risk to the people consuming water from Spa Lake in Lewisburg.

A later study produced by Dr. Golla between the years of 2004 and 2007 looked at atrazine's presence outside of drinking water. This research was conducted during his time as a doctoral student at the University of Iowa and in collaboration with the CDC/NIOSH (Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health). It measured the contamination of homes in farming households in three counties in Iowa that used atrazine.

Atrazine can travel through the air via dust and be absorbed into the human body through inhalation, ingestion, and skin absorption. It

cannot be completely cleaned out of a house, and it will remain in carpets, even after vacuuming, for at least six months after the planting season. In his research project, Dr. Golla wanted

drank either community water or non-community water. The goal was to determine whether atrazine was found equally in both water sources, or whether private water supplies

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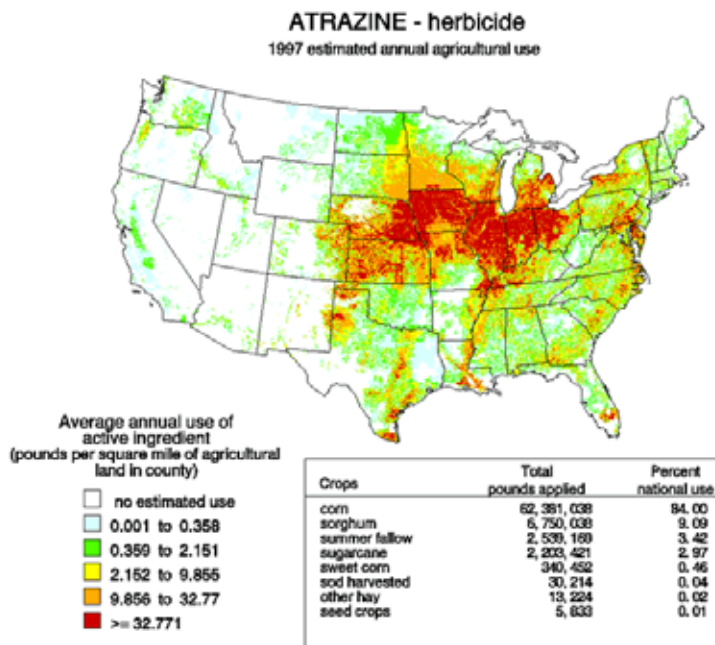
to know whether atrazine levels dropped to safe levels in the farmers' homes and in their urine during the non-planting season. They did not.

Dr. Golla found that atrazine made it inside the homes of even those who did not directly apply atrazine, and that neither time nor season made much difference in the levels of atrazine detected in dust and urine samples from farming households. This indicated the persistence of the pesticide over time.

Building upon his growing expertise in atrazine, Dr. Golla returned to Kentucky to teach at Western Kentucky University. From 2007 to 2008, he conducted another study on drinking water, this time examining farm families who

could be safer from atrazine than public ones. The study looked at farming households from four rural Kentucky counties. Almost seventy percent drank water from public sources, twenty-five percent drank water from private wells, and seven percent drank only spring water.

Dr. Golla tested the water in the homes of his participants to compare atrazine levels in water from these differing sources. He concluded that the atrazine levels were much higher in water from community sources than in water from private sources. Furthermore, his study did not make use of specialized laboratories, which paves the way for more such studies to be done without enormous costs.





In 2007, the EPA studied the effects of atrazine on amphibians and decided that no further testing would be necessary, despite results that showed damage to the amphibians tested. Scientists like Dr. Golla have yet to agree with the EPA.

Most recently — from 2008 to 2010 — Dr. Golla, along with researchers at the University of Kentucky College of Public Health, studied correlations between atrazine in public drinking water and lengths of pregnancies in Kentucky. Because of Kentucky's large crops of corn, atrazine usage in the state is quite high. Kentucky also ranks as one of the states with the highest rates of preterm births in the country. Preterm births refer to human births occurring before the full, normal gestational period. In his study, Dr. Golla examined levels of atrazine in all rural Kentucky counties' public drinking water with exception of counties in Appalachia. He also studied birth certificate data

from these counties to determine pregnancy lengths, taking account of other factors like maternal age, education, smoking, and prenatal care. The study ultimately found that a relationship indeed exists between even relatively low levels of atrazine in drinking water and preterm births.

In the future, Dr. Golla intends to further study atrazine's effects on long-term human health. Specifically, he will examine environmental and occupational exposure to atrazine through drinking water, dust, air, and biological samples. In this way he will build upon and combine his prior research studies.

So far, most studies involving atrazine have focused on amphibians, not humans. At present, Dr. Golla is

collaborating with the University of Kentucky's CDC/NIOSH agricultural health center to lead a larger research study to examine low-level pesticide exposures over time among inhabitants of farming areas.

In 2003, the Kentucky Public Health Association presented Dr. Golla with their Academic Excellence award, and in 2004 he won the Iowa Governor's Occupational Health and Safety Council's award. Given his continuing contributions to the science of health and safety, the awards will surely continue, as will Dr. Golla's research. ■



WKU STUDENTS WIN NUMEROUS AWARDS AT
KENTUCKY ACADEMY OF SCIENCE
MEETING

WKU hosted the 2010 Kentucky Academy of Science (KAS) Annual Meeting Nov. 12-13, 2010.

The group's 96th annual meeting broke a record with 775 registered attendees. This year's meeting focused on Careers in Science — what students need to know to be prepared and how faculty can help with the preparation.

Dr. Cheryl Davis, a WKU biology professor, was elected vice president of the Kentucky Academy of Science. After her year as vice president, Cheryl Davis will be president elect, then president and finally past president as part of a four year cycle.

The following WKU undergraduate and graduate students received awards for their paper and poster presentations:

2010 Undergraduate Paper Presentation Competition

AGRICULTURAL SCIENCES

Clarice Esch of Somerset, 3rd

ANTHROPOLOGY AND SOCIOLOGY

Colleen Wynn of Louisville, 3rd

CHEMISTRY

Dino Varajic of Bowling Green, 3rd

ECOLOGY AND ENVIRONMENTAL SCIENCE

Victoria Gilkison of Lawrenceburg, 2nd

Brenna Tinsley of Glasgow, 3rd

GEOGRAPHY

David Evans of London, England, 1st

Lee Campbell of Paducah, 2nd

GEOLOGY

Melanie Newton of Bardstown, 1st

Christopher Toney of Powellton, W.Va., 2nd

Austin Moyers of Bowling Green, 3rd

HEALTH SCIENCES

Justin E. Pile of Coxs Creek, 1st

MATHEMATICS

Anthony Bombik of Louisville, 2nd

Justine Missik of Danville, 3rd

MICROBIOLOGY

Kati Ayers of Westmoreland, Tenn., 1st

Aric Johnson of Bowling Green, 2nd

PHYSICS AND ASTRONOMY

John M. Wilson of Hickman, 3rd

PHYSIOLOGY AND BIOCHEMISTRY

Ruth Sudbeck of Omaha, Neb., 2nd

ZOOLOGY

Brenna Tinsley of Glasgow, 1st

2010 Undergraduate Poster Presentation Competition

AGRICULTURAL SCIENCES

Anna Marie Weldon of Schochoh, 2nd

BOTANY

Sydney Combs of London, 1st

CELLULAR AND MOLECULAR BIOLOGY

Zach Laux of Elizabethtown, 3rd

CHEMISTRY

Amar Patel of Russellville, 1st

Chad Willis of Bowling Green, 3rd

ECOLOGY AND ENVIRONMENTAL SCIENCE

Anna Mantooth of Shepherdsville, 2nd

GEOGRAPHY

Kyle Berry of Mount Washington, 1st

Sarah McCann of Danville, 2nd

Kyle Mattingly of Owensboro, 3rd

GEOLOGY

Matt Downen of Columbia, 2nd

Stuart M. Kenderes of Independence, 3rd

MICROBIOLOGY

Colin Moss of Bowling Green, 2nd

Kathryn Brady of Independence, 3rd

2010 Graduate Research Competition Awards

AGRICULTURAL SCIENCES

Nathan Howell of Bowling Green, 1st

Gary T. Cundiff of Louisville, 2nd

PHYSIOLOGY AND BIOCHEMISTRY

Yajie Wang of Pingdingshan, Henan, China, 1st

Amanda Webb of Rockfield, 2nd

ZOOLOGY

Jacob Eldridge of Bidwell, Ohio, 1st

Matthew Wood of Brownsville, 3rd

BOTANY

Yinu Wang of Shenyang, Liaoning, China, 1st

CELLULAR AND MOLECULAR BIOLOGY

Jahnvi Kancharla of Bowling Green, 2nd

CHEMISTRY

Eric Vanover of Owensboro, 1st

Vivek Badwaik of Gondia, India, 3rd

GEOGRAPHY

Josh Gilliland of Hartford, Ohio, 1st

Elizabeth Schmitz of Portland, Oregon, 2nd

Mitchell Gaines of Versailles, 3rd



The Kentucky Academy of Science encourages scientific research and promotes the dissemination of the scientific interests of the Commonwealth of Kentucky. According to the KAS web site, the Academy's aims are

- To stimulate effective communication among all scientists within the Commonwealth.
- To provide a forum for the presentation and publication of scientific information of significance to the Commonwealth.
- To foster the interaction of science with other sectors in seeking solutions to major social and environmental problems.
- To interest the youth of the Commonwealth in science and encourage them to consider science as a profession.
- To provide advisory assistance to the Commonwealth, as well as to local governments, in areas of science and technology.