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ODYSSEY



HORSE OF A DIFFERENT COLOR

Gene Mapping for Better Equine Health

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The University of Kentucky's publication
on research and graduate studies

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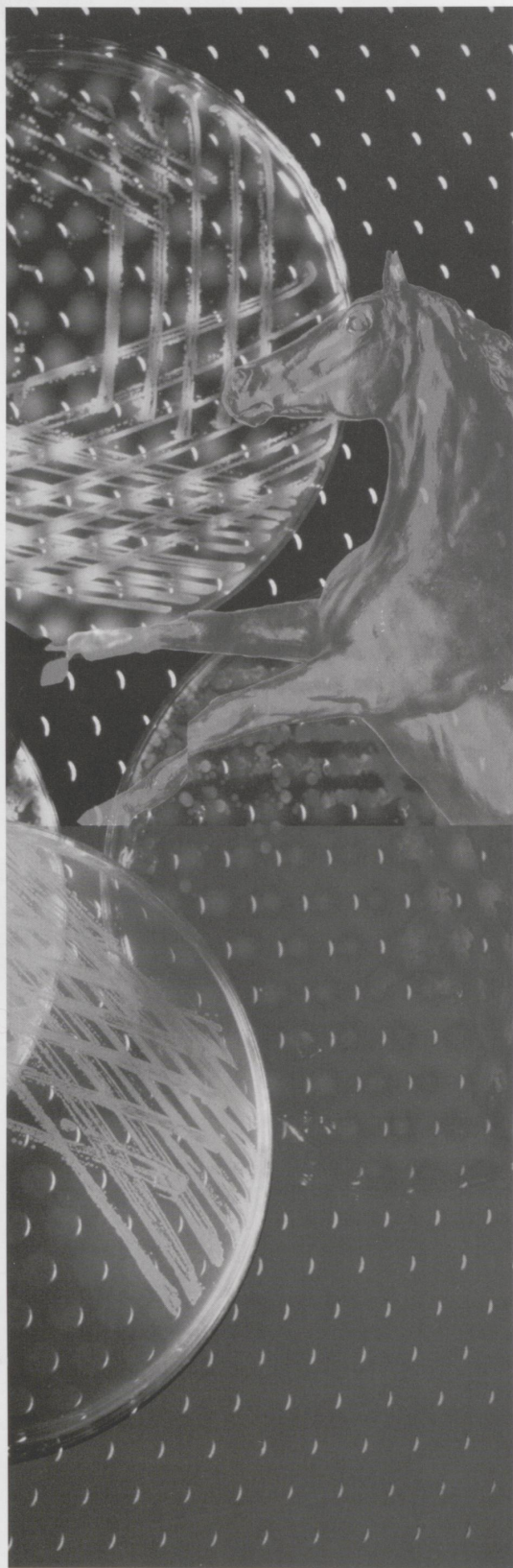
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A HORSE OF A DIFFERENT COLOR:

Gene Mapping for Better Equine Health

Genes are destiny. DNA holds the secret to life.

"These are phrases that leap to people's minds when you talk about genetics," says Ernest Bailey, an immunogenetics researcher and professor at the Maxwell H. Gluck Equine Research Center at the University of Kentucky. "By creating a gene map, we are not going to unravel every secret. But the reality is that gene mapping is to the next century what vaccines and antibiotics were to this century.

"Vaccines and antibiotics have dramatically improved the health of people and the health of livestock. Research in the next century is going to have an equivalent benefit because of the application of the genomic information we are discovering today," says Bailey, who is leading the horse gene mapping effort at UK.

Scientists' efforts to piece together maps of the total genetic code, or genome, for a number of species began in the late 1980s. The U.S. Human Genome Project began in 1990 with the goal of identifying each of the 100,000 genes in human DNA and assigning these genes to specific locations on chromosomes. The National Animal Genome Project, funded by the U.S. Department of Agriculture, began in 1993 to support collaborative efforts among American laboratories working on livestock. In April 1998 this project included, for the first time, support totaling \$225,000 over five years to coordinate construction of a horse gene map.

Scientists have made significant progress on gene maps for humans and for the animals we eat or keep as pets: cattle, sheep, pigs, chickens, cats and dogs. The livestock projects began with a business-minded focus on identifying genes that could be manipulated to make leaner meat or thicker wool. Bailey says that although horses do not produce food or fiber they are a significant part of our

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"agricultural landscape" and contribute heavily to our economy.

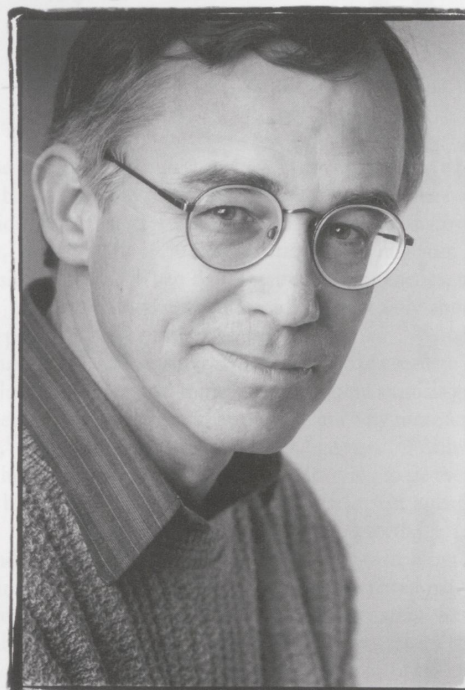
To support this contention, he points to a 1996 study commissioned by the American Horse Council Foundation. The study estimates that the horse industry has a \$112 billion impact on the nation's gross domestic product and generates 1.4 million full-time jobs. Goods and services produced by the horse industry are valued at \$25.3 billion, roughly the same amount as the apparel manufacturing or the motion picture industries.

"A gene map for the horse will allow us to investigate the complex hereditary basis of behavior, performance and disease. But this concept concerns horsemen," Bailey says.

"One of my colleagues made the unfortunate statement awhile ago that in the future horsemen are going to have to understand molecular genetics. That simply isn't true. You don't have to be a mechanic to drive a car," Bailey says. "With this map geneticists are going to be able to give people in the industry better quality information to explain why things happen the way they do and how to avoid problems in the future. We are not going to be developing secrets that are going to destroy the industry."

In fact, Bailey says that much of the concern over the gene map's possible performance applications is unfounded. In March 1998, scientists, horsemen and veterinarians met for a conference focused on "Horse Genomics and the Genetics of Factors Affecting Horse Performance" at the Cold Spring Harbor Laboratory in New York. "One of the revelations for the breeders and veterinarians was that although we are doing these genetic maps, we really don't see a lot of point in going after performance genes," Bailey says. "That is something breeders are doing and have been doing effectively for years, so why should we bother?"

"People spend a lot of money on horses. A lot of money is wasted and a lot of suffering is caused because of health problems. Our gene map will save money and create better health for horses." —Ernest Bailey

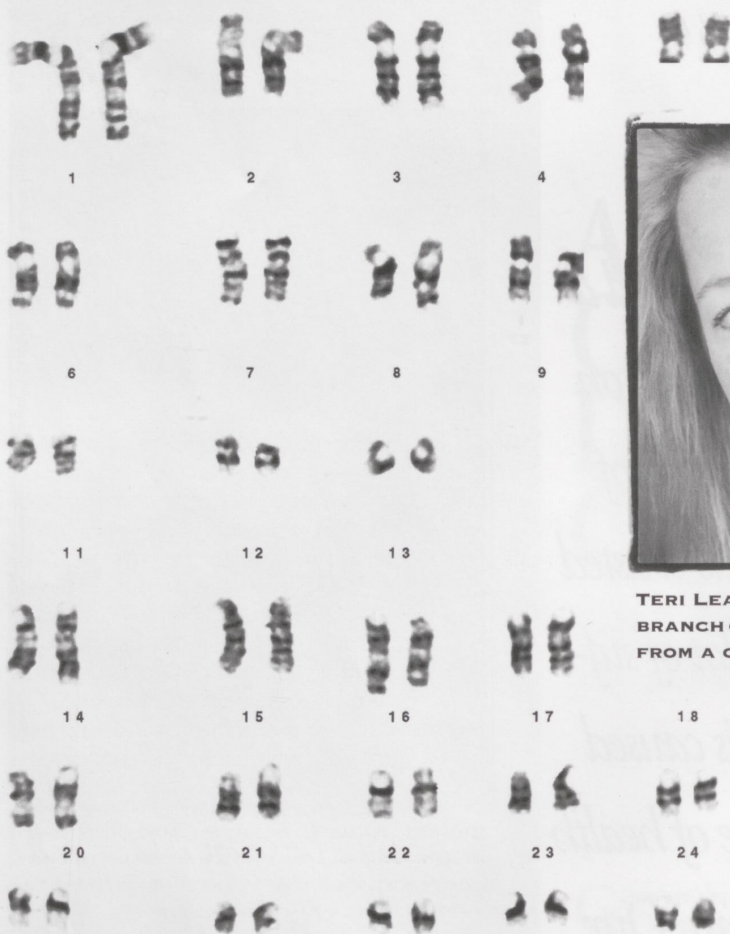


ERNEST BAILEY: "A GENE MAP FOR THE HORSE WILL ALLOW US TO INVESTIGATE THE COMPLEX HEREDITARY BASIS OF BEHAVIOR, PERFORMANCE AND DISEASE."

"What we are concerned with is that while breeders are selecting for performance traits, these people assume that the related developmental bone diseases will just go away," he says.

Developmental bone diseases affect 10 to 25 percent of horses across a wide range of breeds, decreasing their performance and breeding potential. And often, although breeders are adept at selecting for performance, inherited defects negate those efforts.

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THESE HORSE CHROMOSOMES WERE TAKEN FROM A KARYOTYPE—A FULL SET OF CHROMOSOMES ARRANGED ACCORDING TO NUMBER, SIZE AND SHAPE. THE DISTINCT BANDS, THE LIGHT AND DARK STRIPES, REVEALED BY THE KARYOTYPE SERVE AS TOOLS TO DIAGNOSE GENETIC DISEASES.



TERI LEAR IS A LEADER IN THE FIELD OF CYTOGENETICS, A BRANCH OF BIOLOGY DEALING WITH THE STUDY OF HEREDITY FROM A CELLULAR AND GENETIC PERSPECTIVE.

"People spend a lot of money on horses. A lot of money is wasted and a lot of suffering is caused because of health problems. Our gene map will save money and create better health for horses," says Bailey.

Mapping the horse around the world

The horse branch of the National Animal Genome Project is part of a larger collaboration which includes laboratories in the United States, the United Kingdom, Australia, New Zealand, Japan, France, Sweden, Norway, Denmark, Germany, the Czech Republic and the Netherlands. In 1994, Bailey and other equine geneticists began to discuss their mutual interest in creating a horse genome map, but funds were a problem. "It wasn't plausible to say we would lead the effort to make a gene map when we didn't have our first dollar," Bailey says.

That same year UK received the first financial boost—a grant from the Grayson Jockey Club Research Foundation. "That grant was really the impetus for us to say, 'Okay, we're in the gene mapping business. We're going to put up the flag in Lexington, let everybody come, and we'll organize a workshop.'"

A second pledge of support from the Dorothy Russell Havemeyer Foundation made the workshop a reality. The Havemeyer Foundation, a small group in New York City that funds workshops on horses, committed to five years of funding for travel and meeting expenses. This money supported the first meeting in Lexington, and subsequent meetings in California and Sweden. Seventy representatives from around the world came to Lexington for this first meeting of the International Equine Gene Mapping Workshop in January 1995.

"Everyone came into this project with different reasons for making the map, but we all agreed that in order to have a successful workshop we had the necessary elements: we have a project that is larger than one laboratory can do, and we will all benefit by not competing," Bailey says. "If we competed to see who could put the most genes on chromosomes, we wouldn't be easily sharing information."



The creed of cooperation established at the first workshop has prompted researchers to circulate abstracts and papers before publication, an activity which required a level of trust some groups were initially reluctant to allow. "Scientists have to be a little competitive, so it took us about two years to achieve the open communication between laboratories we have now. When we find that everyone has different interests for applying the map, we don't mind helping each other because it doesn't take away from our own work."

A plan of attack

The horse genome contains between 60,000 to 80,000 genes—pieces of DNA which code for proteins and enzymes. In order to shed some light on where genes are located, scientists look for markers. "A marker is any measurable inherited difference that shows variation between individuals," Bailey says. The genetic variation scientists use as a marker can be something as small as a change in a single base in the DNA to a whole deleted section. "Ninety-five percent of DNA does not code for proteins. If we find a mutation in that so-called 'junk' DNA, we make that our marker," he says.

Each gene is a segment of the DNA on a chromosome. When the scientists sat down at the Lexington workshop, they realized that before mapping could begin they needed to establish a standard—to identify and number the 64 domestic horse chromosomes.

Teri Lear, a cytogeneticist from UK who works closely with Bailey, was one of the specialists eager to solve this problem. Cytogenetics is a branch of biology dealing with the study of heredity from a cellular and genetic perspective. Lear, one of 10 leading experts in horse cytogenetics in the world, met with her colleagues at the University of California, Davis, in 1995 to address the chromosome problem. "We got together for three days and did nothing but

hash out which horse chromosome was which, according to their individual banding patterns, and wrote a description of each chromosome for everyone to use," says Lear, who is currently a research assistant professor at the Gluck Center.

With the chromosome standard in place, Bailey and Lear began the second phase of international mapping: getting samples out to 20 labs all over the world. "We became the coordinating laboratory for this," says Bailey. "DNA from 12 families of horses was sent here, and we distributed 460 blood samples to every laboratory."

A family includes one stallion and between 20 and 60 offspring. The families tested for the gene map were breeds from all over the world, including thoroughbreds,

difficult this kind of activity was. But with the advent of molecular biology and molecular genetics, technicians can discover 20 or 30 new genetic systems in a year."

When Bailey started doing genetics, researchers could readily detect only about 30 genetic differences in horses. "We took these early markers and tried to use them to explain things like why some animals got sick and others didn't, and why some animals recovered better," he says. "We obviously didn't get very far trying to tie every trait of interest to 30 markers in a sea of 60,000 to 80,000 genes, but that's the point of the map: It allows us to tie genetics to the health traits we're interested in."

Today researchers worldwide have mapped 300 markers. He attributes this

The horse genome contains between 60,000 to 80,000 genes—pieces of DNA which code for proteins and enzymes.

Shetland ponies, quarter horses, and Anglo-Arabs.

"We required each of the laboratories to test at least five markers and to test all of the families for these five markers," Bailey says. Each group of scientists sends their test results to a laboratory outside Paris, France, for analysis and then the data is pooled to create the map.

The tools to do the job

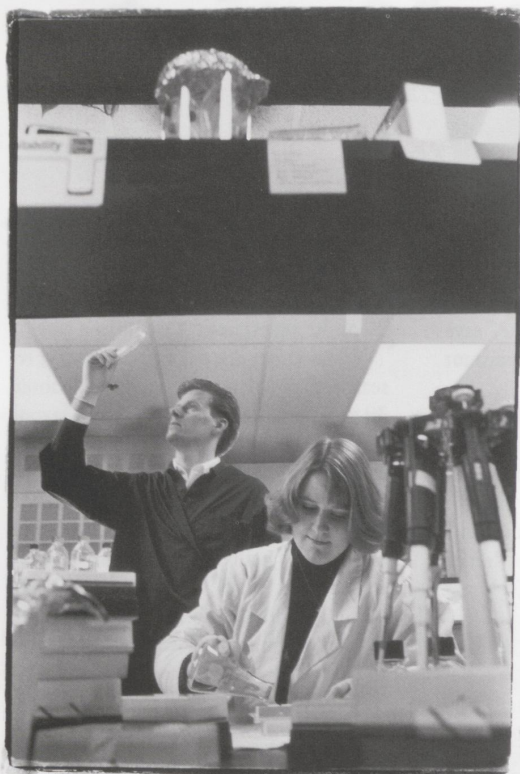
"When I was a student at the University of California, Davis, in the '70s, it was a big deal to discover genetic markers. In fact, my advising professor told me that if I managed to discover and describe three new genetic systems for the horse, I could earn my Ph.D.," Bailey says. "That's a simplification and kind of a joke, but it reflects how

advance in part to the workshop and in part to the new technology that has made it safe and easy to map genes.

From the 1970s to the late '80s, scientists relied on a technique called *in-situ* hybridization (ISH), which used radiation to label DNA. The process took six weeks to map one gene, and if something went wrong the researcher didn't know until six wasted weeks later. With today's fluorescent labeling, these tests can be done overnight. Fluorescent *in-situ* hybridization (FISH) was first used in 1989, but wasn't widely used until the last five years.

"In FISH, we isolate DNA from the gene we want to study and apply that DNA to a chromosome spread from a horse. We want

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AS PART OF THE HORSE GENOME PROJECT, GRADUATE STUDENTS PATRICK GALLAGHER AND MICHELLE MOUSEL ARE TACKLING TWO SIGNIFICANT EQUINE HEALTH ISSUES: "STRANGLES" AND SWAYBACK.

to know where that particular gene maps on the chromosome," says Lear. "The DNA we're applying is labeled with a fluorescent dye. Wherever the DNA finds homology—corresponding DNA—on the chromosomes, it will stick. We look at it under an ultraviolet light that's attached to the microscope, and we see the fluorescent signal where the gene is located on the chromosomes.

"Another form of this is ZOO-FISH, also known as chromosome painting," she says. "ZOO-FISH is when you place one species' DNA onto the chromosomes of another species. It's sort of a funny little term, but it helps you remember you're working with two different species. This permits us to identify large regions of the chromosomes which have been conserved, over time, between two species."

It's a small world after all

"One of the really great strengths of genomics research is that the genetic organization between species is very similar, so information developed in the human genome project, and information developed in the pig and cattle genomes can be applied to the horse," Bailey says. These genetic similarities allow researchers to predict fairly accurately what will happen before they test certain genes.

The similarities between the human genome and the horse genome were recently illustrated by a Swedish geneticist. By assigning each human chromosome a different pattern, he showed the distribution of human chromosome DNA over the 64 horse chromosomes.

"If you asked me 10 years ago what this would look like, I would have said it would be hash—little stripes all over the chromosomes," says Bailey. "In genetics you learn about evolution and chromosome rearrangements. You don't expect to see broad bands of similarity that have survived intact through evolutionary time."

In fact, though, large sections of DNA were the same in horse and human chromosomes. "All of the DNA from human chromosome eight is located on horse chromosome nine," Bailey says. "And because of that, we can draw information from the human genome and apply it very easily to our studies of the horse."

In the late '80s when the other livestock-mapping projects began, Bailey says the horse geneticists knew making a map would be expensive and assumed they'd have to do years of work just to start mapping the horse. At the time, they decided they couldn't afford to drop their other projects.

"Since then, testing for genes has become

much cheaper, so it came within our reach to make a map. We were impressed with the very early success other researchers had in mapping genes in cattle, pigs, sheep and chickens so we realized it really would be feasible for us to make a map to study health traits in horses," he says.

"We've basically done in three years what used to take scientists six or seven years to do. In part, we benefited by seeing what mistakes they'd made and by using the basic research they established."

The future of the horse map

The UK gene mapping project is supported by grants from the Grayson Jockey Club, the Morris Animal Foundation and Fares Farm Inc. Issam and Nijad Fares are prominent Lexington thoroughbred breeders known for generously supporting education.

Four full-time faculty and six graduate students are involved in the project. Bailey and Lear's lab includes graduate students Patrick Gallagher and Michelle Mousel. Faculty members Gus Cothran and Kathy Graves of the Equine Blood Typing and Research Laboratory lead a team of other graduate students.

"We've developed 80 markers for gene mapping and there are currently three maps—our workshop map, a map published by Swedish researchers, and a map that is coming out in England. Our markers are forming the background for all three of these," Bailey says. "That's a kudo of some sort because each map is using different sets of markers; but because we developed and shared ours very early in the mapping project, people used them quickly."

Bailey says the future of the horse map lies in collaboration, investigation and application. "We need to promote the map to the horse industry," says Bailey. "We've not done much of that in the last four years because we've not had a product. But now that we have a map, we need to spend some

time explaining to people what it is and how we can use it."

"We are dependent upon the cooperation and enthusiasm of horsemen and veterinarians," Lear says. "They provide us with the blood samples from horse families and affected individuals that are the basis of our work."

A second key is more research. "We have the bare minimum for markers. To be honest, a couple of million dollars worth of research across horse labs worldwide would help us flesh out the map," Bailey says. "At this point, they have 2,000 markers on the pig and cattle maps, and those scientists don't believe that's enough. Across the three maps, we have a total of 300 markers. We've got a way to go."

And the final vital step, Bailey says, is applying the map to health problems. "We are ready to demonstrate our worth by tackling and shedding light on some real problems," Mousel and Gallagher in Bailey's lab are tackling two significant equine health issues: "strangles" and swayback.

Mousel, who came to UK this past fall with a master's degree in quantitative genetics from the University of Nebraska, is studying strangles. *Streptococcus equi*, a bacterial infection that attacks the lymph nodes, causes this disease. Often, the lymph nodes around the horse's windpipe become swollen and restrict breathing. The rasping sound made by these horses has led to the common name of strangles for this infection.

"I'm studying the series of genes that deal with the immune system lymphocytes, to see how we can help horses fight this infection," Mousel says. "Infected horses start off with cold-like symptoms, then typically the lymph nodes swell and burst, and the horse either gets better or it doesn't."

Strangles is a widespread, contagious disease. "My horse has had it and when I worked with Dr. Kelly Anderson in Lincoln, Nebraska, strangles went through the

group and nearly killed one of the horses," Mousel says.

Gallagher, who has worked in Bailey's lab for more than a year, recently had a paper on his work on DNA markers accepted for publication by the journal *Mammalian Genome*.

"To some extent, the development of markers is based on the fact that each one is different," Gallagher says. "For this paper, I defined two families, based on areas of similarity in current markers, and I looked at what possible implications these similarities have on the use of markers." Gallagher says geneticists need to think about these similarities as they design experiments to test each genetic marker, to make sure they are using the unique portions, not the shared portions, of DNA.

Gallagher's particular interest in saddlebred horses led him to his current study of lordosis, or swayback, a problem for the American Saddlebred breed. "My dad has owned and shown saddle horses since before I was born," he says. "Swayback appears to be one of the major problems encountered by saddlebred breeders."

Lordosis seems to have a genetic basis, but before Gallagher works to isolate major genes responsible for this disease he is gathering information from horse breeders and trainers on other related factors. "American Saddlebreds are trained to hold their heads up high, which mechanically causes the back, over time, to drop," he says. "That's not genetic and could confound genetic studies."

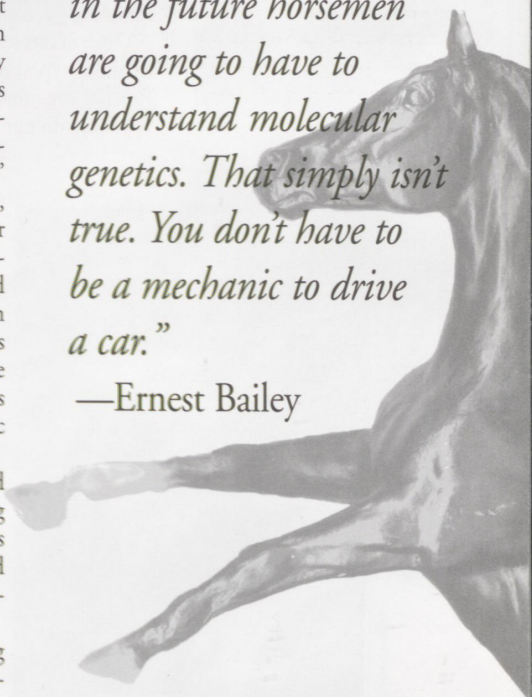
Research laboratories around the world involved in the horse genome mapping project are beginning studies in health areas ranging from developmental bone and muscle diseases to genetics and allergic conditions.

Today the gene map is a developing information source for equine health researchers, but in the next century, Bailey says, the gene map will be the primary

resource. "Scientists investigating the complex genetics of horse health are going to begin all their projects by asking, 'What is the gene for this? Where is it and how is it controlled?' And the map will tell them. We are laying the foundation for the advances of the next century." ■

"One of my colleagues made the unfortunate statement awhile ago that in the future horsemen are going to have to understand molecular genetics. That simply isn't true. You don't have to be a mechanic to drive a car."

—Ernest Bailey



WRITTEN BY
DEBBIE GIBSON

UK's Business and Economic Programs Banking on Change

In November 1998 the largest bank in the world was formed when Deutsche Bank, headquartered in Frankfurt, Germany, purchased the New York City-based Bankers Trust. It was the largest acquisition of a United States bank by a foreign investor in history and yet another harbinger of true global banking.

When the "Asian tigers" abruptly lost their economic bite last year, the fallout was felt almost as quickly in the United States. U.S. corporations laid off workers as orders slumped. The U.S. stock market gyrated wildly, and millions of individual investors began turning to the financial page before the sports section, in an attempt to understand how the price of goods in Japan was affecting their retirement account.

Once of interest only to business executives and financial types, Alan Greenspan and the Federal Reserve are now household names. While the paparazzi do not stalk him yet, Greenspan's every utterance is monitored and analyzed; and today, plumbers pay as much attention to how the financial world turns as politicians.

In short, the once stable and staid world of business and economics has become complex, confusing, and ever-changing, with threads from national economies woven together as tightly as a luxury necktie and a broad, informed perspective as essential as a good briefcase.

It is into this new age of commerce that graduates step from UK's Carol Martin Gatton College of Business and Economics.

A new program called the Research Challenge Initiative will help them enter with the depth of knowledge and understanding essential for success today.

Enhancing Research

That understanding is based on solid research. And in the Carol Martin Gatton College of Business and Economics, research is at the heart of Dean Richard Furst's vision for how the initiative will have a domino effect—enhancing everything from student preparedness to economic development in the Commonwealth.

The first domino will come in the form of new faculty members, each bringing strong research backgrounds and expertise which Furst and his colleagues have identified as crucial to both the college's and the students' future. By bringing nationally known faculty in these areas to the Gatton College, Furst says UK will be able to compete with schools such as Indiana University and Ohio State even though UK receives significantly less funding than those schools do. An infusion of new faculty will trigger the other dominos, bringing more research monies, more opportunities for graduate students, and more benefits to the state's economy.

Mirroring the Way of the World

Venture capital and private equity finance are good examples of essential areas that will be added at UK. Venture capital firms and private equity finance provide money for start-up and expanding companies, giving companies the financial wherewithal to buy equipment, hire employees, and do the research and development needed to compete in the global economy.

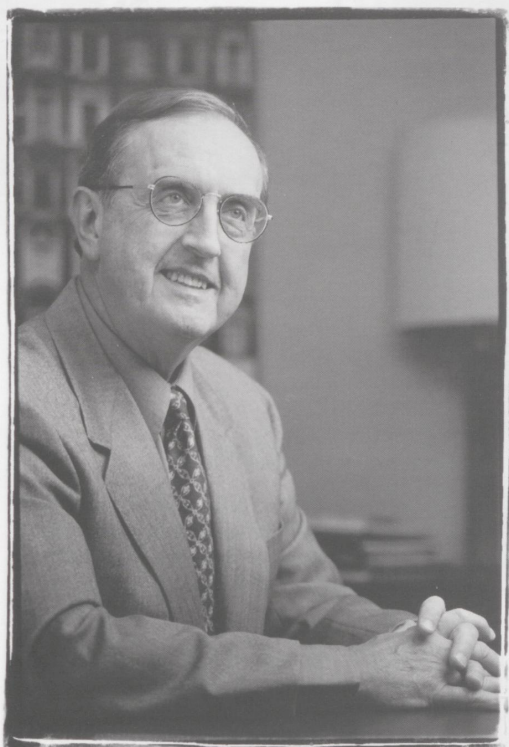
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photo by Lee Thomas

DON MULLINEAUX WAS WORKING WITH THE FEDERAL RESERVE BANK OF PHILADELPHIA AND TEACHING AT THE WHARTON SCHOOL OF BUSINESS AND AT TEMPLE UNIVERSITY BEFORE HE CAME TO UK.

photo by Lee Thomas



"OUR GRADUATES ARE LEADERS THROUGHOUT THE STATE. IF YOU CHOOSE ANY COUNTY, NINE OUT OF 10 TIMES YOU WILL FIND GRADUATES OF UK IN POSITIONS OF LEADERSHIP. THE QUALITY OF THESE LEADERS AND THE EDUCATION THESE PEOPLE RECEIVED AS STUDENTS IMPACT THE ECONOMY OF OUR COMMONWEALTH."

—RICHARD FURST

Editor's Note: The University of Kentucky has targeted management and economics as one of 11 programs to receive enhanced funding through the Research Challenge Initiative. These programs have already achieved a level of national and international distinction in areas crucial to the development of the Commonwealth of Kentucky. Enhanced funding in the form of additional faculty and staff will elevate these programs in their respective fields and advance UK toward its goal of becoming one of the country's top 20 public research universities by 2020. Endowed professorships are also part of the Research Challenge Initiative.

The Chellgren Endowed Professorship in Corporate Strategy

As the CEO of a major, international company, Paul Chellgren is immersed daily in corporate strategy. And now, thanks to a generous gift from Chellgren, students at UK's Gatton College of Business and Economics will have the opportunity to learn more about this key business tool.

Chellgren, CEO of Ashland Inc., recently pledged \$250,000 to the Carol Martin Gatton College of Business and Economics. The pledge will be used to create the Chellgren Endowed Professorship in Corporate Strategy and to hire a senior-level professor in strategy who will teach in the college's MBA program and work with doctoral students.

"Corporate strategy tends to be more of an integrative area of study involving such important functions as accounting, finance, and production," Chellgren says. "I think it's a very important part of students' educational perspective to be exposed to leading-edge thinking. It helps students put things in context and helps them get more out of their specialized fields of study."

The pledge will also be used to increase the interaction between students and CEOs, according to Richard Furst, dean of the college.

"Paul and I have often talked about the need to bring corporate CEOs into the classroom, particularly at the MBA level," Furst says. "Part of the responsibilities of this professor will be to administer a visiting CEO series. It is important that students meet corporate CEOs and hear what they have to say. This brings to life what is in the textbooks."

Chellgren is, in fact, an example of how academics and business experience come together to create success. A graduate of UK, Chellgren has remained involved with UK throughout his business career. He currently serves on UK's Board of Trustees and will continue in that role for another four years. He also has strong ties to UK through his family and his professional relationships.

photo by Lee Thomas



CHRISTOPHER WALLER IS ONE OF UK'S FIRST ENDOWED CHAIRS APPOINTED THROUGH THE RESEARCH CHALLENGE INITIATIVE.

However, there is only sparse research on many aspects of these vital business components. In addition, venture capital funding is vitally important in the emerging market economies, and the area is highly multidisciplinary—drawing on finance, economics, management, law, and global business.

It is no coincidence that one of the new faculty members will have strong credentials in these specialties. Steven Skinner, director of the School of Management and the Warren W. Rosenthal Professor of Marketing, heads this search committee.

According to Skinner, adding this expertise will allow students in the college to take a more multidisciplinary approach in their studies, an approach which mirrors what is going on in the world.

"The issues students face now are more global and cut across different disciplines," Skinner says. "For example, the financial and monetary problems facing countries such as Russia also cut across political and cultural lines. They are systems problems. They are more complex and require a broader perspective. This new position will really help us give our students that perspective and help us offer some graduate

programs which might lead to Ph.D. dissertations that consider problems from a multidisciplinary approach."

The process has already had another positive effect, Skinner says.

"This whole initiative has caused us to evaluate where we want to be and has refocused our thinking on research," Skinner says. "It is almost a renewal since it has us talking about how all our departments fit together and what impact that has for students. That can only be good, only boost an already good program. It is a real opportunity."

Don Mullineaux, the Dupont chairholder in banking and financial services, heads another committee, this one looking for a specialist in the area of international economics, finance, and/or banking. The new faculty member will work with Ph.D. students in both economics and finance, and will be responsible for strengthening the college's grant activities in Central and Eastern Europe and Asia.

"The whole field of banking is changing dramatically," Mullineaux says. "The same is true for the money and capital markets. Both are much more global. We

increasingly see U.S. firms borrowing money abroad and foreign firms borrowing funds here by issuing bonds. However, currently there is no one teaching or doing research in the field of international banking at UK. By hiring someone with expertise in this area, we may be able to offer courses we couldn't previously."

"This is not a Larry Bird or Michael Jordan effect," Skinner says. "We're not out there trying to get some top superstar, because we have a fine faculty already; but the fact is, you don't normally get to bring in senior-level faculty members. This is a chance we rarely get. The new faculty can make our programs even better."

Dean Richard Furst concurs. "I wouldn't trade Don Mullineaux, our endowed chair in banking, for any banking professor in the United States," Furst says.

Mullineaux was working with the Federal Reserve Bank of Philadelphia and teaching on the adjunct faculty at the Wharton School of Business and at Temple University when he came to UK. His current research interest is loan contracts, especially syndicated loans—a trillion dollar market that no one has researched deeply.

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In fact, the college will ultimately be able to add some endowed chairs in addition to the three appointments for the fall of 1999.

The college already boasts one of the first endowed chairs through the Research Challenge Initiative—Christopher J. Waller—and it was the offer of an endowed chair which helped to lure Waller from Indiana University in August of 1998.

Waller's primary area of interest for the past 10 to 12 years has been the design of central banks. He delves into issues such as how the Federal Reserve or other central banks should be structured to deal with policy from a global perspective while still dealing with competing political issues. The new European Central Bank has been a particular focus, one that most economists have not looked at.

Waller also researches the question of whether local banks are important in bolstering the economy in their

region and vice versa, going on the theory that the more financial integration there is in the United States and world, the less important such banks should be for the local economy since local banks can get deposits from anywhere in world and make loans to institutions anywhere in world.

Improving the Economy of the Commonwealth

Back in Kentucky, local banks are still a key to local economies, a fact supported by Waller's research, and improving that economy is still a forte of the college.

"In this college we believe that education is a key to economic development, education at all levels, including higher education," Furst says. "Our graduates are leaders throughout the state. If you choose any county, nine out of 10 times you will find graduates of UK in positions of leadership. The quality of these leaders and the education these people received as students impact the economy of our Commonwealth." ■

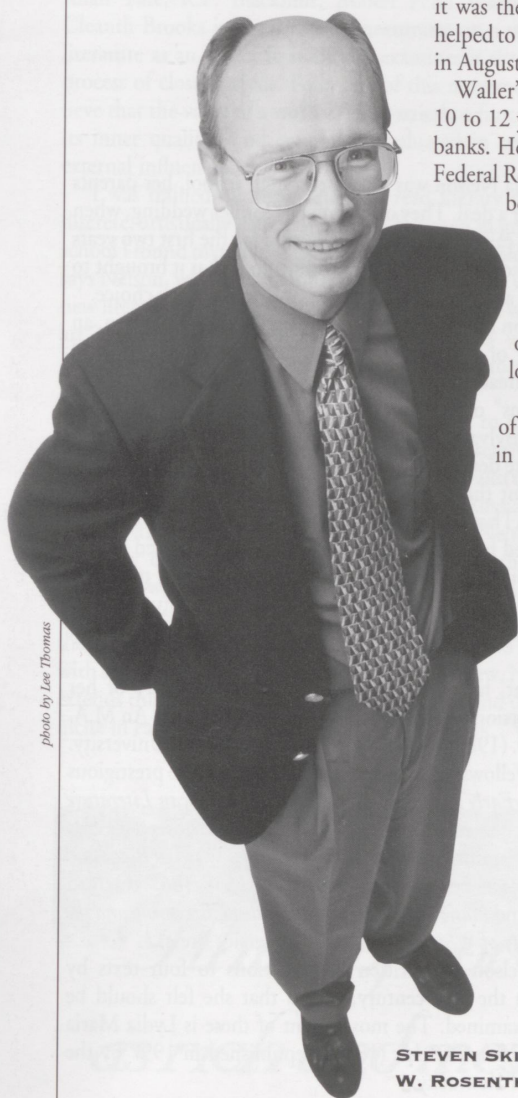


Photo by Lee Thomas

"The issues students face now are more global and cut across different disciplines. The financial and monetary problems facing countries such as Russia cut across political and cultural lines. They are systems problems. They are more complex and require a broader perspective."

—Steven Skinner

STEVEN SKINNER IS THE CURRENT WARREN W. ROSENTHAL PROFESSOR OF MARKETING.

RESEARCHING LITERATURE THROUGH MULTIPLE LENSES:



photos by Lee Thomas

A Theory of National Manhood

When Dana Nelson was a senior in high school, her parents made her a deal. They offered to pay for her wedding, when the time came, or pay half her tuition for the first two years of college. For Nelson, who had loved reading and what it brought to her life for as long as she could remember, this was an easy choice.

"I took the tuition for the first two years of college," says Nelson, an associate professor of English at the University of Kentucky. And though she had already developed a love of literature through the "dozens and dozens" of novels she'd read, Nelson went to Indiana University of Pennsylvania as a pre-law political science major.

"My parents were determined that college not be a waste of money. They were adamant that I major in something practical," she says. "The problem was, I hated the only political science class I was taking."

But Nelson loved her one writing class, which was focused on the theme of alienation in society, and her professor—a "very mentorly figure"—suggested she should consider becoming a literature major. She did just that, and four years later graduated with a B.A. in English from IU.

From that point, her vita outlines the further trajectory of her interest and immersion in literary scholarship and research. An M.A. (1987) and a Ph.D. (1989) in English from Michigan State University. Mellon Research Fellowship. On the editorial board of two prestigious literary journals—*Early American Literature* and *American Literature* (where she currently is serving as a guest co-editor). Eighteen articles published in literary journals. And two books—*The Word in Black and White: Reading 'Race' in American Literature, 1638-1867* (Oxford University Press) and *National Manhood: Capitalist Citizenship and the Imagined Fraternity of White Men* (Duke University Press).

In addition, Nelson has written introductions to four texts by women writers in the 19th century, novels that she felt should be reprinted and reexamined. The most recent of these is Lydia Maria Child's *Romance of the Republic* (1867), republished in 1997 by the University Press of Kentucky.

Approaches to Literary Criticism

As in any academic discipline, the researcher or scholar brings a framework or system of thought to the body of work at hand in order to more fully understand and explain it. In the early years of Nelson's serious study of literature, the "New Critical" approach was a dominant methodology used by many literary scholars. New Criticism, a term that is applied to the criticism written by John Crowe Ransom, Allan Tate, R.P. Blackmur, Robert Penn Warren and Cleanth Brooks in the 1930s, concentrates on a work of literature as an object in itself and examines it through a process of close analysis. Followers of this movement believe that the value of a work of art is strictly a function of its inner qualities and cannot be evaluated in terms of external influences.

"I was trained by New Critics to read literary texts as discrete, artistically coherent entities, but then in graduate school I found myself in the midst of the theory explosion," says Nelson, who became intrigued by the fact that various new literary theories extended analysis beyond the work of art itself. "What really excited me about theory was the possibility that you could use literary criticism to understand cultural, social and political issues."

That initial spark of possibility led Nelson to a wide-ranging study of various approaches to the literary text: post-colonial theory, gender theory, post-structuralist theory, and Russian formalism. The writings of one Russian formalist, Mikhail Bakhtin, particularly attracted Nelson.

"I rely on Bakhtin's linguistic model about the way language works, that words are never used in a strict dictionary sense, that no two people use a word in precisely the same way. Instead, I think of words as rich and messy with social usage." In her study of literary texts now, Nelson extends this theory of "the word"—its slippery and unique niche in each context—to an entire literary work. "Words

are like magnets that attract all sorts of metal shavings to them," she says.

Developing a Wider Literary Context

Nelson has written extensively about early American literature, and this period continues to fascinate her. And to better understand the literature of this era, she has spent "just an enormous amount of time" reading non-literary works from colonial times to the mid-19th century.

"We're all shaped by what happens to us in society, what happens to us politically. What writers do is shape stories around these various experiences, so in order to better understand these stories I'm interested in extensively researching this period," says Nelson.

One book that became useful to Nelson in her literary analysis and interpretation is *Travels in the Interior Districts of Africa*, published around 1800 by an explorer named Mungo Park. This book became the key that allowed Nelson to unlock a previously elusive passage in Herman Melville's short novel *Benito Cereno*.

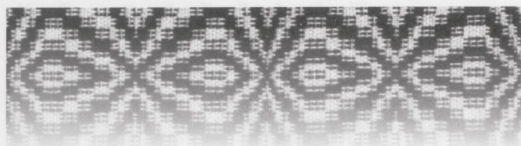
The novel is about a Massachusetts ship captain named Amasa Delano who boards a Spanish slave ship, the *San Dominick*, because the vessel isn't showing its colors. The ship's captain, Cereno, indicates that there is some kind of trouble but refuses to specify what that trouble is. And he continues to behave oddly with Delano rather than welcoming his company, which leads Delano to think the Spanish captain might be planning to take over his ship. In fact, the slaves aboard the ship have taken control, a situation that Delano doesn't discover. Unable to puzzle out the nervous and unfriendly "fellow captain," Delano remains uncomfortable for the duration of his stay on board. Tremendously ill at ease, Delano looks over to see a naked African woman playing with her baby and comments on the tenderness and love of "naked nature."

"Then Delano goes off into this anthropological rumination about African women being fierce as leopardesses and tender as doves, and thinks these may be just the type of women that Mungo Park saw on his travels," adds Nelson. "I used to get very hung up at this seemingly minor moment

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*"I think of words
as rich and messy with social usage."* —Dana Nelson



*His attention had been drawn back to
a slumbering negress, partly disclosed
through the lacework of some rigging,
lying, with youthful limbs carelessly
disposed, under the lee of the bulwarks,
like a doe in the shade of a woodland
rock. Sprawling at her lapped breasts,
was her wide-awake fawn, stark naked,
its black little body half lifted from
the deck, crosswise with its dam's; its
hands, like two paws, clambering upon
her; its mouth and nose ineffectually
rooting to get at the mark; and meantime
giving a vexatious half-grunt, blending
with the composed snore of the negress.*

*The uncommon vigour of the child at
length roused the mother. She started
up, at a distance facing Captain
Delano. But as if not at all concerned*

in the story—What did it mean? Why did Melville include this?

The narrator then observes, “these natural sights somehow insensibly deepened [Delano’s] confidence and ease.”

“Having recently read about Mungo Park, a kind of icon of British hyper-imperial masculinity in the 19th century, helped me make a useful new connection,” Nelson says, “one that coalesced with a number of other similar observations I’ve made since then in early American literature.”

Delano enjoys looking at the African woman and her child, Nelson explains, because by contrast it fills out and confirms his whiteness and his manhood. Delano then finds a “sociable” moment, an imagined connection, with Mungo Park because he is desperately seeking one with Cereno and not getting it. “Among other things, this story delineates a crisis in the fraternity of white manhood,” Nelson says.

Making this connection was, for her, what scientists who make a breakthrough in the lab sometimes call an “Ah ha!” experience. “This story just opened up for me in a new way,” Nelson says. “I was so happy, I glowed for weeks.”

Nelson underscores the importance of Delano’s connection to Mungo Park as an imaginary alliance. In her reading of various novels and short stories from this period of American literature, she has found that white fraternity works only with dead or absent men. “Economic structures encourage competition to the point that fraternal satisfaction only comes in imagined moments, not real ones,” Nelson says. “How close can you feel to someone who is struggling against you for economic gain? So this turns out to be an identity that promises a lot but very seldom delivers.” Nelson hopes that her book *National Manhood*, among other things, will help to raise “compassionately formulated questions” for white men.

The Imagined Fraternity of White Men

Using as literary touchstones Melville’s *Benito Cereno*, Child’s novel *A Romance of the Republic*, and Edgar Allan Poe’s short story “Some Words with a Mummy,” Nelson spent seven years writing *National Manhood: Capitalist Citizenship and the Imagined Fraternity of White Men*. A glance at the bibliography of *National Manhood* underscores the wide-ranging multidisciplinary connections Nelson uncovered as she delineated what she terms “national manhood.” The 25-page bibliography in this book includes works that focus on biology, economics, anthropology, race, culture, gender, politics, religion, psychology, geology, evolution, medicine, feminism, the presidency, adolescence, colonialization, sex, and diet.

“This book describes the formulation of something I’m

calling national manhood, an ideology that has worked powerfully since Constitutional times to link fraternal white manhood to civic identity," she says. Nelson goes on to explain that she was specifically trying to understand, through her extensive research, how white men's affiliations with local identities shifted in order to guarantee national unity.

"In the early United States, people didn't talk about themselves as white men," she says. "They talked about themselves as German bankers or Lutheran farmers or British merchants—identifying themselves in very local, concrete ways. But with the quickly evolving 'universalization' of white manhood suffrage—the right to vote—the concept of 'white' men cut across class divides and became a new national force."

Nelson explains that in "unpacking the concept" of the nationalization of white men, she isn't talking about anybody in particular. "Anybody who thinks he or she is white should hold their hand up against a white wall and see if it matches. What I'm talking about is whiteness as a metaphor. It's a way of organizing groups of people into a single sensation of identity," she says. "I'm not concerned with vilifying particular white men, but I am exploring how and under what conditions 'white' manhood came to stand for nation, how it came to be idealized as a representative identity in the United States."

Nelson adds that although she isn't castigating anyone in particular, the institution of white men and its correspondence with citizenship in the early history of our country are to blame for some elitist and deplorable actions. "White men, for example, collaborated for decades to take the vote away from free black men," Nelson says, citing evidence from a book titled *Market Revolution* by Charles Sellers. "Free blacks could vote even in many Southern states until the mid 1830s, when their disenfranchisement finally became complete." Nelson also mentions the denial of citizenship to women in the early United States. "Actually, there were a couple of states in the colonial period where women could vote or were identified as citizens. In Virginia women were citizens. In New Jersey women could vote. When the Constitution went into effect, women lost these rights."

"Few studies combine the historical breadth and theoretical sophistication of *National Manhood*," says Priscilla Ward, a history professor at the University of Washington, "and none puts together the topics of gender and nation, whiteness and masculinity with the efficacy of this work."

Nelson hopes readers of her book will take away "a lot of questions for themselves" about what it means to be a citizen of



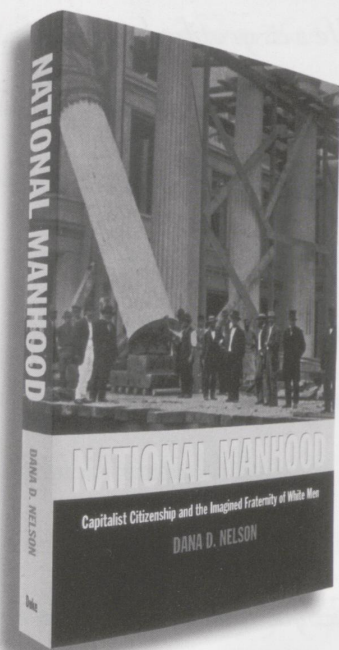
at the attitude in which she had been caught, delightedly she caught the child up, with maternal transports; covering it with kisses.

There's naked nature, now; pure tenderness and love, thought Captain Delano, well pleased.

This incident prompted him to remark the other negresses more particularly than before. He was gratified with their manners: like most uncivilized women, they seemed at once tender of heart and tough of constitution; equally ready to die for their infants or fight for them. Unsophisticated as leopardesses; loving as doves. Ah! thought Captain Delano, these, perhaps, are some of the very women whom Ledyard saw in Africa, and gave such a noble account of...

continued on page 16

"In the early United States, people didn't talk about themselves as white men. They talked about themselves as German bankers or Lutheran farmers or British merchants—identifying themselves in very local, concrete ways. But with the quickly evolving 'universalization' of white manhood suffrage—the right to vote—the concept of 'white' men cut across class divides and became a new national force." —Dana Nelson



Dana Nelson hopes that her book *National Manhood* will help raise "compassionately formulated questions" for white men.

the United States and about the ways in which civic identity has continued to be associated with whiteness.

The Story's the Thing

With her intense interest in history, politics, societal mores and gender issues, why does Nelson "need" literature in order to try to answer the questions that intrigue her?

"I am totally driven by story. I'm fascinated with the way people learn to internalize concepts in ways that allow them to make meaning in their lives, and literature is one of the best ways to get at those kinds of structures for me, both in terms of character development and of the various dialogues that emanate from a work of literature," she says. By "dialogues," Nelson means not only the literary dialogues between narrator and reader and author and reader, but also implied dialogues between the author and various political and social institutions of the time.

"We live our lives through stories and use storytelling to construct our sense of self," she says. "Stories help us solidify our human ties to one another. Why do you have these time-honored stories when your family gets together? You retell these stories to magically recreate the family bond. It's a ritual." And beyond the personal or familial, stories seem to generate, almost magnetically, an interest in other people's lives.

"It's just fun to listen to other people's stories—that's why there are all these bar sneaks who sit at their table with their ears extended," she says. "We're interested in how other people's lives brush up against our lives, and literature is a place to navigate all those desires."

One of the best reasons to read novels, to read widely, she adds, is to get ideas about living our own lives. "Literature isn't only entertainment. I think it's absolutely fundamental in enriching our lives."

The Humanist and the Scientist

Both the literary critic and the scientist are involved in research that, if all goes well, leads to new discoveries. The scientific process involves experimentation, replication of results, analysis of cause and effect, and documentation. How is this similar to, and different from, what the literary scholar does?

"I'm obviously concerned with factual correctness in my work," Nelson says, "and I share with the scientist a concern for rigor and replicability," adding that both the humanist and the scientist share a willingness to do a lot of "plain hard work" and to risk that this time spent becomes a worthwhile investment. But the scientist, she points out, is trying to pin down material facts and to document phenomena. Humanists are trying to get at something which is slipperier in trying to understand the history and culture of a certain time.

"More often what we do is what I'd call carefully reasoned and substantiated opinion," she says. "But I did a heck of a lot of research in order to come to the conclusions I did when I was writing *National Manhood*, to nail down facts. I worked to bring to this project a scientific rigor in the sense that I tried very hard to test my own assumptions against the literature and history and political writings of the time."

Though the historian can locate dates for the beginning and end of an event, and it's true that some facts are indisputable, Nelson says that her interest always returns to the "story" half of the word "history."

"There's no way we know our history apart from the narrative form in which it must be presented. Although there are indisputable historical facts, how you make sense of those facts is another question entirely and—like the scientist—

you're making inferences, analyzing cause and effect, and drawing conclusions."

Nelson says that the scientist may come to feel reassured that his findings are more stable than those of the humanist, but the fact that "paradigms get replaced" needs to always be acknowledged. "Scientists once thought that the Earth was the center of the universe, that man was the center of everything," she says.

Linus Pauling, winner of the 1954 Nobel Prize in chemistry, called the modern scientific method the "search for truth." Nelson believes this also applies to the literary scholar. "But what I like focusing on is the word 'search' rather than the word 'truth.' The process is what I think is important. Through the process of searching you test your ethics and your abilities and your knowledge."

A Jury of Her Peers

The process of putting her thoughts down on paper is another exciting, if daunting, challenge of scholarship and research, Nelson says. In this endeavor, it's been essential for her to be involved in writing groups—colleagues who understand what she's trying to accomplish and help her state her ideas in the clearest way possible.

"I was involved in a writing group when I was at LSU, and it was simply a life-changing experience," Nelson says. "We were together long enough to get to know each other's writing tics and insecurities and patterns, and there was something really magical about everybody sitting down together with the writer and delving into a chapter or article."

Nelson has also been involved in a writing group at UK, a core of faculty interested in social theory. "I came to love the work of research and writing most when it became a community effort rather than solitary enterprise," she says. "For me, writing groups take all the loneliness out of research because there's a whole group of people who not only care about my writing but help me make my ideas clearer and sharper."

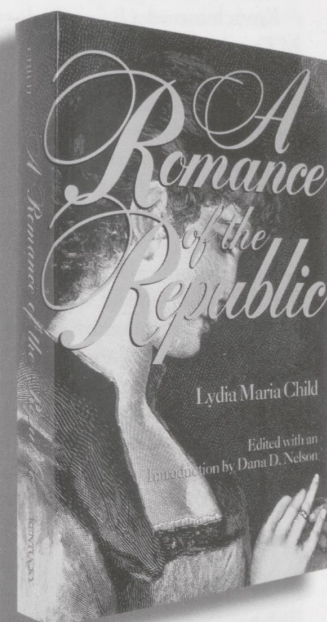
"Dana is a superb colleague, a gifted reader, and a theorist who has productively integrated powerful traditions of literary criticism, social and cultural theory. It has been a joy witnessing the development of her book and other projects in shared teaching and research venues," says Wolfgang Natter, a member of the UK writing group who team-taught, with Nelson and three other colleagues, a multidisciplinary social theory seminar on whiteness. Natter is director of the UK Committee on Social Theory.

The input from her writing groups has also helped Nelson become a much better teacher, she believes. "When my graduate students here are trying to work out difficult arguments in their writing, I am much more useful in helping them as a result of my experience in the writing groups," she says. "It's also made me much more aware of how 'layered' writing is. No one should expect to write a wonderfully clear first draft. My students sometimes become angry with themselves or blocked when their first draft needs a lot of work. I tell them the truth: 'My first drafts are always, *always* a mess.'"

"Dana's first book on the impact of ideas of race on early American literature has already established her as an important scholar of this period," says John Cawelti, a professor in UK's English department. "Her new book is a dazzling blend of materials and methods, and it will undoubtedly have a major impact on the way in which other scholars understand the political and cultural development of early American literature and history." ■

*"We live our lives through stories
and use storytelling to construct our
sense of self. Stories help us solidify
our human ties to one another."*

—Dana Nelson



"*Romance of the Republic* is a remarkable novel, far ahead of its time. When Dana brought this book to our attention, we agreed that it needed to be widely available to students and general readers."

—Nancy Grayson, University Press of Kentucky

Jim Kovach: B.S., M.D., J.D. and All-SEC Linebacker

by Jeff Worley

When faced with the decision to either play professional football or work toward a medical degree, Jim Kovach made the choice that surprised nobody who knew him: he chose both.

Kovach earned a B.S. in biology (cum laude) in 1978 and an M.D. with distinction from UK in 1984 before getting a law degree at Stanford University four years later ("I just thought getting a law degree would be an interesting thing to do"). The former UK defensive linebacker could serve as a one-man wrecking crew for the perdurable stereotype of the student athlete as a dumb jock hanging out in the back row of Basker Weaving 101.

"I loved the academic life, and I loved playing football," says Kovach, who for the past few years has been vice president of NetGenics, a software company in Cleveland that works with research labs and pharmaceutical companies to manage discovery research data. "So I put a lot of effort into both."

Even before his university days, Kovach acknowledged the two loves of his life, which coalesced in what he calls a "quite unusual first trip to Lexington" when he was being recruited from high school in Valley Forge, Ohio, a suburb of Cleveland.

"When I was in my senior year of high school, Coach [Fran] Curci came on a recruiting trip and brought along Dr. Nicholas Piscano to meet me. Dr. Piscano is the founder of the American Academy of Family Physicians and was a huge backer of Curci's. This blew me away." When Kovach came to Lexington the weekend of the UK-Tennessee football game in 1973, instead of touring the campus as the other recruits were doing, he spent that Saturday morning watching an operation at the medical center.

"Dr. Piscano set this up with Dr. Ward Griffin, who took me to the med center library, then took me to watch him perform an abdominal operation," Kovach recalls. "For me, this was the perfect way to spend a few hours before the Tennessee game."

As an undergraduate at UK, Kovach says he remembers "running between classes a lot." One of these classes he ran to was a biology class taught by Piscano. "This was a class on human biology. It was a fantastic introduction to the complexity and wonder of human life." Kovach says that at least one other class stands out in his memory, another biology course taught by Dr. Pritam Sabharwal ("a very wise and good man").

Kovach says that his first year as a Wildcat linebacker was full of fine memories. "I got to play a lot as a freshman and we ended up with a winning record (6-5). The most memorable game for me was with Florida. They came to play us and were ranked in

the top 10, and we knocked them off—we just crushed them in Commonwealth Stadium. And for me to be a part of that as a freshman was unbelievably exciting."

He adds that a major disappointment that year was the Tennessee game. Both teams were 6-4, and the winner of the game would head to the Liberty Bowl. "They ended up beating us with some weird, overbalanced line formation," Kovach recalls. "We never could adjust to it."

The team really came together, he says, in his junior and senior years. "We became a dominant team, and it was fun to go out every time expecting to win against teams like Florida and Georgia and LSU, teams you'd seen as a kid play on TV, and then just go out and matter-of-factly beat them up. That was a lot of fun."

To be successful as a student and as an athlete was always a challenging balancing act of time management, Kovach admits. The only way to do it, he says, was to realize that "something had to go," and for him that something was socializing on weekday evenings. "What I gave up was hanging around with guys on weeknights. I still had good friendships but was viewed as kind of an oddball because I was always studying."

"I remember one of Jim's professors saying that Jim was the most time-managed person he'd ever met," says Bob Bradley, director of UK's Center for Academic Tutorial (CAT) Services. "He'd be talking to other students or a professor after class for a few minutes, then say, 'I'd like to talk with you some more, but I'm scheduled in the library right now.'"

Though Bradley wouldn't go so far as to agree with Kovach's characterization of himself as an "oddball," Bradley does recall his former mentee as "not your big prototype football player. Jim would walk across campus wearing wire-rim glasses, his books tucked way up under an arm. He looked very astute, not much at all like a football player." Bradley characterizes Kovach's appearance as his "Clark Kent disguise," pointing out that Kovach was probably the hardest-hitting linebacker UK had had in years. He was voted an All-SEC linebacker in 1978.

Kovach credits Bradley for the strong academic support he received. Through the center (the first academic center for student-athletes in the nation) athletes were provided with books and tutors. "I probably used tutors more than anyone else on the team," Kovach says.

Being drafted by the New Orleans Saints after he

graduated from UK was another dream come true for Kovach. "It had been a goal of mine since I was a kid," he says, "and I'll never forget that first play as a pro. We were playing the Falcons in the Superdome in front of 82,000 people. Absolute chaos, total pandemonium. And from the first step the kicker took until the end of the play a few seconds later, everything was locked in slow motion. I know this sounds like a cliché, but that's how I experienced it."

Although he never made it to the Superbowl, Kovach did have one great season, he says. In 1983 the Saints' defense was ranked number one in the NFL in fewest yards given up, and Kovach was voted by his teammates as Most Valuable Player of that defense.

During his first six years with the Saints, Kovach also attended medical school at UK. He would typically enroll for the spring semester and work through June; then he'd report to the Saints training camp in mid to late July. "The Saints never made the playoffs in those years, unfortunately, so I was always able to head right back to UK after Christmas," Kovach says.

As his studies progressed, he says he particularly appreciated Emory Wilson in obstetrics/gynecology and Ward Griffith in surgery. "They seemed to sense the fine line I was treading between success and failure, and routinely took extra time to encourage me," says Kovach. He received his medical degree in 1984.

Adding a law degree from Stanford four years later, Kovach became a corporate and intellectual property attorney for the law firms Baker & Hostetler and Cooley Godward in Palo Alto, California. Then he moved on to the Edison BioTechnology Center, where he directed a program in which he evaluated medical technologies developed at Case Western Reserve University and the Cleveland Clinic. In 1996, a year before joining NetGenics, Kovach became director of the Office of Technology Management at Case Western.

Asked if he plans any further career moves in the areas of genetics and technology transfer, Kovach replies, "Well, yes. I've decided to start my own company." Called Swivel Scientific Services, the company will provide software and services designed to help physicians and patients cope with the explosion

of genetic data caused by the human genome project and the discovery of disease-associated genes.

"I've been thinking about this for a long time, and I'm really excited about it," Kovach says. "I've always wanted to get to this point. A tidal wave of genetic sequence information is making its way through the research labs now and starting to trickle out into the clinic in the form of new products and therapies, but it's nothing compared to what it's going to be in just a few years. The practice of medicine is set to change in dramatic and exciting ways because of our ability to discover new genes and associate them with diseases."

His confidence in the success of the new company is an offshoot, he says, from his days as a student here. "I remember the confidence I felt when I graduated that the training I received at the University of Kentucky was as good as any in the country, and I continue to feel that way. Having had the chance to work at Case Western allowed me to interface with clinicians from all over the world, and I've always been able to go toe-to-toe with any of them on subjects and issues of mutual interest."

And the name of Kovach's new company also has a UK connection. "I remember Coach Charlie Bailey saying to us in practice, 'You've got to keep your head on a swivel,'" Kovach says. "And since this company's focus will rotate from medicine to law to technology and back, this seemed like an appropriate name."



JIM KOVACH, ON A RECENT VISIT TO UK, WITH FITZGERALD BRAMWELL, VICE PRESIDENT OF RESEARCH AND GRADUATE STUDIES

JIM KOVACH WAS VOTED AN ALL-SEC LINEBACKER IN 1978.

Medicaid in Kentucky: How Well Is It Working?

by Heidi Bright Parales

One Kentuckian put it this way: "I am altogether satisfied with Medicaid. Not only that, but I am very grateful to have it for another six months. Most average working single mothers cannot afford medical insurance." Another Medicaid recipient made an even stronger statement: "I think Medicaid is wonderful. If it had not been for Medicaid, I could never have made it, because I can't afford any kind of insurance. Medicaid is the only thing that made it possible to pay my bills; without Medicaid, I would be dead."

These were two of the 5,000 responses from Medicaid recipients in Kentucky who returned a survey on their level of satisfaction with this program. The survey was developed by the University of Kentucky's Martin School of Public Policy and Administration and sent to 10,000 randomly selected Medicaid recipients in 1997. The Martin School was asked by officials at the Kentucky Department for Medicaid Services to develop and administer the survey, and to evaluate the results. The Martin School's history of policy analysis made it an

obvious choice for conducting the Medicaid research, says Greg Hager, assistant professor of political science and co-principal investigator in this project.

The typical reaction to the survey, according to co-principal investigator Jeff Talbert, was satisfaction. "The results of the baseline survey revealed an overall satisfaction with Medicaid across the state, which for purposes of the study was divided into eight regions, each sent 1,250 surveys," says Talbert, an assistant professor in the Martin School. "In fact, more than 60 percent of Medicaid recipients reported being very satisfied with Medicaid."

This baseline survey was important, the researchers say, to get an accurate idea of how people liked the "old" system of Medicaid in order to compare these findings with those from future surveys on Medicaid satisfaction. The new system is already in place in some areas of Ken-

tucky. What makes the system new isn't so much its philosophy of care, but is the result of one of the oldest conflicts in the nation: federal versus state responsibility and control.

"It's not a dramatically different program, but what's different in Kentucky and a lot of other states is that the states have demanded more control of how medical care is to be supplied for those who qualify for Medicaid," Hager explains. Previously in Kentucky, Medicaid operated as a federal-state partnership, each supplying money to keep the system going. But it's been an unequal partnership: the federal government laid down all the ground rules for the system, dictating, for example, eligibility requirements for Medicaid.

"So the federal government could expand the pool of people eligible, the states had to, in effect, just cough up the additional money," Hager says. As the price tag for Medicaid rose like an unchecked fever in most state budgets—Medicaid is now the largest item in Kentucky's state budget, with an annual price tag of about \$2.5 billion—governors began to insist that they have more say in how these considerable state funds were being spent. So



photo by Lee Thomas

GREG HAGER (LEFT) AND JEFF TALBERT SAY THAT THIS IMPORTANT BASELINE STUDY REVEALED AN OVERALL SATISFACTION WITH MEDICAID IN KENTUCKY.

SPOTLIGHT ON GRADUATE EDUCATION

the governors challenged the state legislators to work toward this end. The result has been that many states have applied for and received waivers from many of the federal guidelines, resulting in a lot more local control.

"The impetus for these changes was that both the federal government and the states wanted to save money, and the states wanted to show that they could run the Medicaid system in their state and that they could provide health care better and cheaper than the federal government could," Hager says.

One significant change in parts of Kentucky is the move away from a standard "fee-for-service" system. Under the old rules, any hospital in the state that accepted Medicaid patients charged the same fee for a particular service.

"What we're seeing now is more of an HMO-like situation," Hager says, "where companies bid, agreeing to provide a long list of doctors and types of medical care for Medicaid patients. The HMO gets paid so much per month per patient to do that. If the HMO can provide care for less than in the fee-for-service system, the HMO makes a profit."

But what about patient care? How would Medicaid patients in Kentucky benefit from an HMO-like system?

"The HMOs have an incentive to emphasize more preventive care since it's obviously cheaper for them to work on preventive health care with someone than pay thousands of dollars for a heart-bypass surgery later on," Hager says. "Clearly, an HMO is interested in doing what they can to encourage people to come in for regular checkups, which would result in a healthier population of Medicaid users."

Other results of the survey also indicate that more than 60 percent of adult Medicaid recipients rate themselves in poor or fair health, and 53 percent said they had

been on Medicaid five years or more. Among adults, 28 percent reported seeing a medical provider at least 10 times during the past year. And perhaps not unrelated to that statistic is the report that 35 percent of adults on Medicaid are regular smokers, and 42 percent live with at least one smoker.

Among Kentucky children covered by Medicaid, 46 percent were reported to have seen a physician at least five times during the past year, and 65 percent live in a household with at least one smoker. As part of the evaluation process to be completed this year, researchers will also be analyzing actual Medicaid utilization records and surveying health-care providers in the state.

By comparing survey data and information available from Medicaid claims, the project offers a rare opportunity to study Medicaid using two distinct and complementary data sources. According to Talbert, "We are among a handful of researchers in the country to have access to such high-quality data on utilization of services and public opinion about those services." Survey and claims data work best together, Hager says, making the research much more effective. For example, the survey can show how far recipients travel to get to a Medicaid provider, information not available from claims records.

This research project is funded by a \$166,000 grant provided this year by the Kentucky Department for Medicaid Services, an office of the Kentucky Health Services Cabinet.

The James W. Martin School of Public Policy and Administration offers applied research and training services to public and not-for-profit organizations. The Martin School is administratively located in UK's Graduate School.

First James Still Fellow—Christina Parker

by Jeff Worley

Christina Parker, a 1997 graduate of Carson-Newman College in Jefferson City, Tennessee, received the \$15,000 James Still Fellowship for this academic year. The fellowship, awarded through the UK Graduate School, is given each year to an alumnus of a private Appalachian college who is pursuing graduate work at the University of Kentucky. The fellowship is renewable for a second year for master's students and a third year for doctoral students.

"I'm thankful every day for this fellowship," says Parker, a doctoral student from Cookeville, Tennessee. "I didn't have any support like this as an undergraduate; I had to work my way through." Last year she worked full time for a small newspaper in Newport, Tennessee.

Parker is studying English and is especially interested in creative writing. In the fall semester she took Gurney Norman's fiction writing class, and she's currently enrolled in a creative writing class taught by James Baker Hall. Both Norman and Hall are in UK's English department. Parker has already had some of her poetry published.

She first read Still's well-known novel *River of Earth* in an Appalachian studies course at Carson-Newman College, and the book left an indelible impression. "It's simply one of the most intense novels I've ever read," Parker says. "The imagery has really stayed with me, and the universal themes move it beyond being thought of as only a regional novel. His style in this novel is very poetic."

Parker met Still for the first time at a book signing and reading in Lexington



CHRISTINA PARKER WITH JAMES STILL, AT A BOOK SIGNING IN LEXINGTON

SPOTLIGHT ON GRADUATE EDUCATION

last November. "I loved hearing Mr. Still read. He read several poems that are my absolute favorites." She adds that when she talked with him after the reading, he was encouraging and gracious. "It was all very inspiring," she says, adding that meeting such a prolific writer in his '90s (Still is 92) reminded her that she has "a lot of years yet to write."

Still was in Lexington to promote a new book of verse titled *An Appalachian Mother Goose*, published by the University Press of Kentucky. "I'm astonished how well this book is doing," says the Knott County native. "In the first place, I never expected the University Press to publish it. I did that book just for fun. I was just playin'." He explains that novelist Lee Smith first read these poems when she was visiting Still in 1997 when he had pneumonia. "During her visit, she asked me if she could see them," Still says. "Her reaction was: These have to be placed. It's great to have friends like that."

Still says that in his many readings and

classroom visits throughout the Appalachian region, the most common question asked of him is, Should I become a writer?

"I get this especially from high-school students," Still says. "I rather facetiously say, 'Don't become a writer—you don't know what you're getting into.' I do try to clarify that writing is a lifelong commitment, not something you do in your spare time." Still advises would-be writers to get a good liberal arts education. "All the writers I've known are great readers. They don't just write poetry, they know who else is writing it and in which magazines and journals the writer's poems appear."

Parker, encouraged rather than dissuaded by Still's words, says she plans to continue to take creative writing courses at UK and, beyond that, to perhaps get a Master of Fine Arts degree in creative writing somewhere.

"I definitely plan to go back to eastern Tennessee or eastern Kentucky and teach writing after finishing my formal education," she says.

"The James Still Fellowship is one of the University of Kentucky's most prestigious awards and is open to graduate students entering one of the university's humanities or social science programs," says Mike Nietzel, dean of the Graduate School. "UK is pleased to offer this award plus full tuition under the name of one of the state's most venerable and respected writers."

For information about how to apply for the James Still Fellowship—eligibility requirements, nomination process and due date for nomination—contact the UK Graduate Fellowship Office, 365 Patterson Office Tower, Lexington, KY 40506-0027; e-mail wheeler@pop.uky.edu or call 606/257-3261.

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KIOSK



RESTORING BAT HABITATS

About 150 new shelters for homeless tree-roosting bats have been created in the Daniel Boone National Forest in a concerted attempt to restore their habitat.

The endangered Indiana bat and the northern bat prefer above-ground habitats in older-growth forests with snags (standing dead trees), rather than cave dwellings, during the summer months. Because a significant number of the bats' forest homes have been destroyed, University of Kentucky researchers are assisting with a bat box program to provide substitute homes for these species.

As an endangered species, the Indiana bat faces an immediate threat of extinction because not enough bats are born to replace those that die. For several years, the entire population of Indiana bats has continued to rapidly decline, says Mike Lacki, associate professor of wildlife ecology in the UK College of Agriculture.

Lacki and forestry graduate student Jeff Schwierjohann have been studying the above-ground habitat requirements of

these bats. Lacki says, "We try to identify what habitats are more suitable for bats, and try to determine where they feed and what they feed on. Results from completed projects on the Virginia big-eared bat and Rafinesque's big-eared bat have contributed to the management protocol for the bats in the Daniel Boone National Forest."

Lacki says he has worked extensively with several resource agencies in Kentucky and shares his research findings with the U.S. Fish and Wildlife Service, the U.S. Forest Service, the Kentucky Department of Fish and Wildlife Resources, the Nature Conservancy, and the Kentucky State Nature Preserves Commission.

Lacki's goal this summer is to analyze the placement locations for the 150 bat boxes in the Daniel Boone National Forest—which ones were occupied, and whether single male bats or maternity colonies occupied the homes. Currently, Lacki and Schwierjohann are analyzing data from natural roosts for patterns.

These bats are important to the ecology of the area, according to Lacki. "Bats are the primary night-flying predators of insects. In the temperate zone, most bats feed exclusively on insects. They decrease the overall impact of agricultural pests such as beetles and moths. Several bat species eat these pests in the adult stage, thereby reducing the numbers in the larval, or pest stage. This way, bats provide important ecological controls."

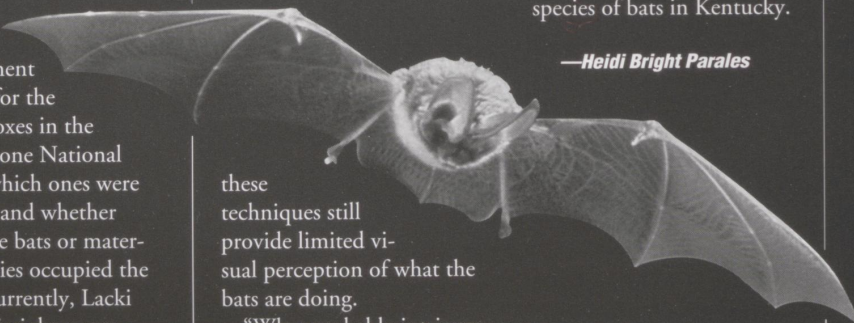
As important as bats are to the state's ecology, they are difficult to study. "They are hard to observe because they are active at night and we can't see them directly when they are foraging," Lacki says. Researchers can tag the bats with transmitters or luminescent tags, but

little we really know about them," he says.

Lacki's master's thesis at Ohio State University involved a survey of bats in Wayne National Forest in southeastern Ohio. He says he enjoyed the project, but went on to study other animal species to broaden his background.

Following his doctorate in zoology at North Carolina State University, Lacki held positions at various universities until he was offered the position at UK in 1989. Upon arrival, he immediately accepted a contract from the U.S. Forest Service to evaluate the habitat of the endangered Virginia big-eared bat. "The fit was perfect and I never looked back," Lacki says. To date, he has studied the habitats of five of the 14 species of bats in Kentucky.

—Heidi Bright Perales



these techniques still provide limited visual perception of what the bats are doing.

"What probably intrigues me most about bats is how

photos courtesy of John MacGregor, USFS, Daniel Boone National Forest

GRANT WRITING IN CYBERSPACE

Backed by a nearly \$1 million grant, the University of Kentucky is providing Internet grant writing training for faculty of minority institutions who have not successfully competed for basic research grants. The National Institute of General Medical Sciences, an agency of the National Institutes of Health, awarded UK the five-year grant to establish interactive learning modules on the Internet.

"This project is a natural extension of our mentoring efforts with minority institutions," says Ada Sue Selwitz, director of UK Sponsored Program Development (SPD). "We thought applying for the grant was an ideal opportunity to continue minority outreach initiatives. Also, it provided us with the chance to develop a Web-based training course. SPD was ideally suited because we're a service unit of UK Research and Graduate Studies actively involved in training people to write competitive grant proposals."

Selwitz asked Don Frazier, professor of physiology at the UK College of Medicine, to head up this project because of his outreach experi-

ence. Frazier had previously worked with SPD in presenting grant writing workshops for various organizations in Kentucky. Together, Frazier and SPD developed a unique training model in 1992 that provided the basis for the project.

"I knew it was something we should pursue," says Frazier, who also serves as director of the medical center's Outreach Center for Science and Health Career Opportunities. "All we needed to do was incorporate the necessary media design personnel to help us translate our workshops into electronic format. I knew we'd be competitive because we have a unique training method that has proven to be successful."

Staff at the UK Faculty Academic Computer and Technology Support Center were enlisted to convert learning modules to a Web-based, CD-ROM format. The modules will be tested and evaluated at two pilot sites, the University of Puerto Rico in San Juan and Virginia State University in Petersburg, Virginia.

The first group of faculty members from 80 institu-

tions will attend an introductory conference at UK, where they will take classes on grant writing and the peer review process, learn computer hardware and software, and receive an overview of the 10-week Internet course modules. As they work through the grant review process, they will have support from UK personnel and research mentors across the country.

The collaborative effort opens the door to communication with faculty at various universities and colleges that train predominantly under-represented students. The modules eventually will become available to UK faculty, Selwitz says.

—**Kim Cumbie, UK Chandler Medical Center Public Relations**

FINK NAMED AMERICAN PHARMACEUTICAL ASSOCIATION FELLOW

Joe Fink, a professor in the UK College of Pharmacy, joined an elite group in early March. He was selected as one of 10 new fellows by the American Pharmaceutical Association's Academy of Pharmacy Practice and Management Awards Committee. Fink was recognized at the association's 146th annual meeting in San Antonio, Texas.



"I was surprised and honored by this, particularly because it comes from my colleagues and peers," says Fink. "And as the son of a pharmacist who started working in the family pharmacy at age 11, this recognition by the national organization in pharmacy is particularly pleasing." Fink also serves as assistant vice president for Research and Graduate Studies at UK and director of the Advanced Science and Technology Commercialization Center.

continued on page 26

SELWITZ HONORED BY NATIONAL ETHICS GROUP

Coming to UK in 1981 from the Philadelphia College of Pharmacy, he served as assistant dean of the UK College of Pharmacy from 1981 to 1988. Fink was the associate vice chancellor for academic affairs at UK from 1988 to 1996.

"I have always considered myself to be a pharmacist first and foremost," Fink says. His scholarly works include nearly 250 publications in the fields of law pertaining to pharmacy and pharmaceuticals, food and drug law, and health-care law. He is an editor of *Pharmacy Law Digest*, the most widely used pharmacy law text and reference in the United States.

"This recognition is for those who have made sustained outstanding contributions to the field," says Thomas Foster, also a professor in UK's College of Pharmacy.

"It is particularly gratifying that, as I understand it, the recognition is primarily based on the research I've done over my career," Fink adds.

The Applied Research Ethics National Association (ARENA) honored Ada Sue Selwitz with the group's distinguished service award at the annual meeting last November. One award is given each year to an individual who exemplifies outstanding professional dedication to the ethical use of human subjects and animals in research, and in ensuring compliance with federal regulations.

More than 800 colleagues attended the meeting in San Diego, which was held in conjunction with the Public Responsibility in Medicine and Research national meeting. ARENA's membership includes professionals from academic health science centers, community-based hospitals, industry, the federal government and universities in the United States.

"I was totally shocked to get this award," says Selwitz, who directs the Office of Sponsored Program Development as well as the Research Subjects Office (RSO) at the University of Kentucky. She was also surprised at how she found out about the award. Selwitz was sitting with about 800 other ARENA members at the opening plenary session when her name was announced as the recipient.

"I'm just very touched to be recognized publicly like this, not only by my peers in administration but also by ARENA's members in the faculty ranks at various universities in the country," she says.

Selwitz, a native of Murray, Kentucky, who taught at Berea College in Kentucky in the '70s, has been involved since 1979 with promoting ethical conduct in research on both a local and a national level.

For example, she chairs the public policy committee for ARENA, which has important input on development of federal

regulations on protecting human subjects in research. "I've worked hard as UK's representative to impact public policy," Selwitz says, adding that she worked especially hard in the area of including women and minorities in clinical trials.

Selwitz is also proud of the work she spearheaded with her colleagues in the Research Subjects Office. Last year the RSO gave 34 presentations at the university to promote ethical conduct in research. And Selwitz takes this message to the national arena as well, giving 10 to 15 workshops or presentations a year on ethical conduct of research and research administration.

"I've met some of the top policymakers in the country at these national meetings and, truthfully, I've often learned more in presenting than I may have given to my audience," Selwitz says.

"Ada Sue is unquestionably deserving of this award with her extraordinary talents and commitment to human and animal protection issues, not only through her leadership on this campus, but also through her long and dedicated service to ARENA," says Thomas Foster, a professor in UK's College of Pharmacy who has worked with Selwitz for more than 15 years.

Ada Sue Selwitz



photo by Lee Thomas

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UK FUNDING SETS ANOTHER RECORD

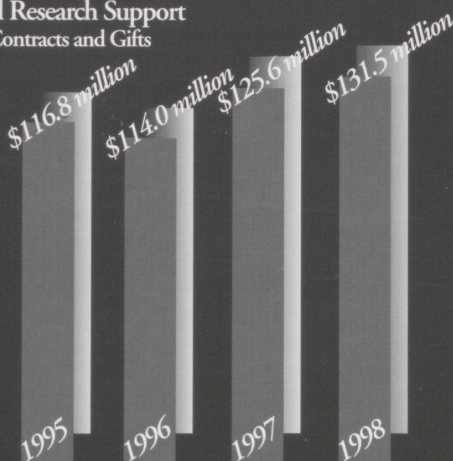
Whether they're developing improved therapies for stroke and Alzheimer's disease or finding alternative uses for tobacco, researchers at the University of Kentucky are seeking answers that could improve the quality and length of our lives.

Unlocking those mysteries takes money, a large portion of which comes from sources outside the university. UK researchers tapping these extramural sources led UK to a banner year in fiscal 1997-98. During that time, faculty and staff attracted a record \$131.5 million in contracts, grants and gifts. The amount represents a 4.7 percent increase over the previous year and exceeds the previous record of \$125.6 million established in fiscal 1996-97.

This is the fifth consecutive year that the university has exceeded \$100 million in research funding, says Fitzgerald Bramwell, vice president for Research and Graduate Studies. "One measure of our success as a top research institution is the magnitude of grant and contract money coming from federal sources," Bramwell says. "UK received nearly \$73 million from federal sources last fiscal year.

"The composition of research awards reflects UK's dual mission as a land-grant university and a research university," Bramwell adds. Sixty-seven percent of the total amount was for basic and applied research, and the balance was for public service, instruction, and training projects.

External Research Support
Grants, Contracts and Gifts



UK CHEMISTRY PROFESSOR WINS PRESTIGIOUS NSF AWARD

Robert Grossman, a UK chemistry professor, has won a \$348,000 National Science Foundation Faculty Early Career Development Award for work on his new method of making synthetic organic compounds. The grant will fund Grossman's research and will support two graduate students and two undergraduates to assist him in his work.

Grossman recently discovered a rapid and efficient method of assembling a particular class of organic compounds called "decalins." Decalins are organic compounds made up of 10 carbon atoms joined together in two six-membered rings that share one edge, Grossman says. "They look somewhat like two adjacent honeycomb cells, with each corner being one carbon atom."

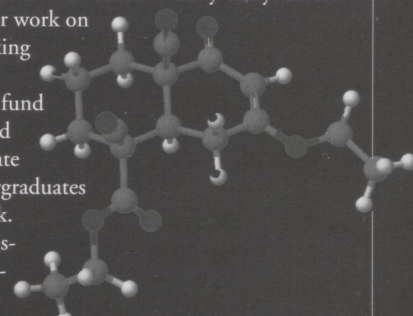
He explains that when a carbon atom is bound to other atoms such as oxygen or nitrogen, it is "functionalized." "Our method for preparing decalins provides decalins in which many of the carbon atoms are functionalized, so it is easy to do further chemistry on them." His new method gives decalins "handles" that allow them to be further manipulated.

It's important to be able to manipulate these substances because, depending on the arrangement of the 10 carbon atoms of the decalin, various useful compounds can be made. "Maybe the compound can fight cancer, kill bacteria, repel insects from crops, or has some other useful property," Grossman says.

Several important classes of naturally occurring insect repellants have a decalin subunit in them, he adds. "There is a great need for new agrochemicals that have these properties. Our work might eventually lead to new environmentally benign pest repellants."

Grossman says he is pleased by this award because, now, his graduate students can focus full-time on their research, his research program can be much more productive, and UK's profile in the national research community will be enhanced.

Grossman earned his doctorate at the Massachusetts Institute of Technology and worked as a postdoctoral fellow at the University of Cambridge in England before coming to UK.



"HOLY PLUTONIUM, BATMAN—IT'S CHEMISTRY!"

What sort of reaction do you get when you mix comic books with chemistry?

Usually some chuckles and some curiosity, but also a new Web site.

The Comic Book Periodic Table site is the brainchild of two University of Kentucky professors of chemistry. John Selegue and James Holler discovered a mutual interest in the comic books of their youth, the 1950s and '60s, and the effect those comic books had on their early, and continued, interest in chemistry.

The Web site shows a Periodic Table of the Elements (a systematic arrangement of all the known chemical elements according to their atomic structure) and comic books that featured those elements, both in their characters and plots.

Click on oxygen (O), for example, and you'll get three thumbnails, including one of a Ricky Nelson panel. Click on the thumbnail image of Ricky Nelson, and you'll get the whole page. It features Nelson donning a geeky pair of glasses and trying to impress a young woman with his so-called knowledge of the atomic world, including oxygen.

If you click on "Web Elements," you are transported to a site that explains the element oxygen in more scientific terms. The Web Elements site was created by professor Mark

Winter of the University of Sheffield, England.

If you click on iodine (I), you'll get a thumbnail of a panel of Walt Disney's Donald Duck. Click on the thumbnail image and you'll get the whole page, which features Donald and his nephews harvesting kelp for its iodine content in an attempt to get rich quick.

In the process of getting this Web site up and running Holler says he gained skills he now uses when teaching his chemistry classes. "Most of my research now involves developing education materials and developing Web materials for educational purposes," he says.

Many of the comic book images on this site date from 1956 to 1970, says Selegue, "a time when many comic-book writers used science as a basis for character ideas and plot developments." Writers were aware that most people felt a bit intimidated by chemistry, so the writers played on this trepidation to awe their audiences. They created characters who gained special abilities through some chemical event.

Writers moved from chemistry to cosmic radiation, then to using genetic mutations as bases for their characters and plots. This

http://www.uky.edu/~holler/periodic/periodic.html Chemical Comics Tuesday, February 9, 1999

Click here or on the image above to see some articles about The Comic Book Periodic Table.

John P. Selegue
Email: selegue@pop.uky.edu

James Holler
Email: holler@pop.uky.edu

Department of Chemistry, University of Kentucky

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www.uky.edu/~holler/periodic/periodic.html

change in the comic books gives one insight into how science was viewed by audiences during the period the comic books were produced.

The site has become a popular destination on the Web, getting about 500 to 1,000 "hits" on the home page each day. Since April 1, 1998, browsers from more than 70,000 separate hosts in 120 different countries have accessed the site. About 10 percent of those accessing the site are from U.S. educational institutions.

On May 4, 1998, the site was selected as the Yahoo Pick of the Week. The next day it was declared the WorldVillage Family Site of the Day.

Feedback on the site is almost universally positive. Holler says parents love it. "They get really excited about the site as a way to keep kids interested in things scientific," he says.

Selegue says that the site is most gratifying when it comes to reactions from grade-school children. Holler adds, "Our hope is that there will be kids out there who are going to look at the table, not knowing what the table is, and click to see where it leads them." Both professors treasure the thought that perhaps their site might spark the interest of some child somewhere to pursue a career in chemistry.

—Heidi Bright Perales

WOMEN ENGINEERS WIN BEST CHAPTER, BEST TEAM PROJECT

The University of Kentucky chapter of the Society of Women Engineers was named the best chapter in the nation at the society's national conference in Houston last June. Members of the UK chapter also won the Boeing Team Tech Competition, in which a team of students works with a company to solve a real-life problem.

"The society gives these women an opportunity to develop leadership skills and learn to work effectively as a team," says Suzanne Scheff, advisor to the UK chapter. The chapter hosted the regional Society of Women Engineers conference in November. Approximately 110 members from chapters in western Pennsylvania, Ohio, West Virginia, and Kentucky attended the conference.

The UK chapter, with 120 women engineers, placed second to Cornell University in the national competition last year. The chapter has won best regional chapter five times—in 1993, 1995, 1996, 1997 and 1998.

"One of the reasons I joined the society was to meet other girls in the program. It's hard when there are so few girls in some of the engineering classes," says Renee Lacy, a materials engineering major from Michigan. This is Lacy's second

year in the society and she was a member of the Boeing competition team. "The society offers many different kinds of activities. I chose the Boeing Team Tech Competition because I could count it as job experience."

The eight-member UK team worked with Rexroth Mecman Pneumatics of Lexington. Rexroth makes valves, filters, regulators and other products for railcars.

"The part we worked on was part of a larger pneumatic valve that allows the railcar to unload coal through an opening at the bottom of the car while it's still moving," says Lacy. "You can switch it manually or electronically. It's about three inches by six inches and a spring controls the switch."

"What they were doing on the assembly line was putting the spring in and attaching a screw and nut, tightening it up to a certain height to fit into the box. The problem was, they were having to repeatedly tighten it, take it out, measure it, and put it back because it was either too small or too big."

So the team designed a wrench that would allow workers to size the spring with one try rather than several.

"Basically, what we did was put a lip on the wrench to restrict its action to the

exact measurement they needed," Lacy says.

Angela Doherty, a chemical engineering major from Louisville who presented this project at the national conference, says, "This project let me see the power of a simple solution. This change saves a lot of time and won't cost the company much."

"The best thing about this experience for me was applying what I've learned in the classroom to a real problem. As a student you don't normally get to work with people in industry," Lacy says.

The Boeing competition was sponsored by the society, but participation wasn't restricted to women. The group included team leader Ann Thomas, Mary Stuart Burks, Melissa Clark, Bryan Conder, Angela Doherty, Kim Glenn, Renee Lacy, and Laura Thomas. Bill Young, a Center for Robotics and Manufacturing Systems engineer, was the team's technical advisor.

This is the fourth time University of Kentucky students have placed first in this competition.

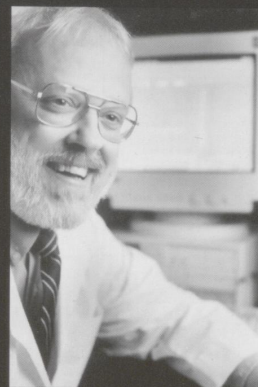
—Alicia P. Gregory

BUTTERFIELD RECEIVES PRESIDENTIAL AWARD

Allan Butterfield, a University of Kentucky chemistry professor, received White House recognition last September for his years of helping students. Butterfield received the Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring, particularly for his work with women and minorities. The award includes a \$10,000 National Science Foundation grant to further his mentoring work.

"I was extremely honored to learn that I would receive this award," Butterfield says. "There were 10 recipients in the United States, and to be in such a distinguished group was very humbling." Among his first reactions to being notified

continued on page 30



UK'S KENTUCKY INJURY PREVENTION AND RESEARCH CENTER

of this honor, he says, was the feeling that he was being recognized for something he does as a matter of course. "I have consciously tried to recruit females to my research group, and I have had many Appalachian undergraduate and graduate students over the years. So, in trying to help these students, I was pursuing my own passion."

Since Butterfield came to UK in 1975, he has advised 40 doctoral and master's degree candidates, has worked with more than 70 undergraduates in his laboratory and with about 100 students as director of the UK Center of Membrane Sciences. Many of those students have been involved in Butterfield's study of the effect of antioxidants such as vitamin E on Alzheimer's disease.

"It was truly inspirational being at the White House," Butterfield says. "I was privileged to meet President Clinton for about one-half hour in the Oval Office. This room has so much history and majesty to it, it was awesome in the true meaning of that word."

Butterfield adds that this meeting was followed by a presidential address to the award recipients and their guests in the Roosevelt Room of the White House, where Clinton spoke on the impor-

ance of mentoring and the desire to make the face of science and engineering reflect the face of America.

"Allan has been very active in training undergraduate and graduate students," says Boyd Haley, the UK chemistry chairman, who nominated Butterfield for the award. "Chemistry is extremely difficult and many times it scares students. And one thing you have to do is get them in the lab and doing experiments."

"My philosophy of mentoring can easily be summarized: require the highest possible standards and expectations, while providing the encouragement, support, and resources to help students achieve those standards and expectations," Butterfield says.

Injuries are the leading cause of death for Americans between the ages of one and 44, and Kentucky continues to follow this nationwide trend. Finding ways to prevent those injuries is the reason the Kentucky Department for Public Health formed a partnership with the University of Kentucky Chandler Medical Center to create the Kentucky Injury Prevention and Research Center (KIPRC) in December 1995. KIPRC's mission is to promote—through research, education and injury prevention programs—the health of Kentuckians by reducing injuries, disabilities, deaths and the associated medical costs.

"We have much more research money going into heart disease and cancer, but we lose more potential life years with injury than these two major killers," says Pam Kidd, KIPRC director. "People have risk factors for injuries just as they do for disease. Sometimes it's immaturity or lack of skill operating new machinery. Sometimes it's weather conditions. But injuries are not 'acts of God'; they can be prevented." Injury wasn't recognized as a major public health problem in the United States until the 1980s. Congress

created the National Center for Injury Prevention and Control, the youngest of the 11 Centers for Disease Control and Prevention, in 1989.

KIPRC is unique. One of 11 injury prevention centers in the United States, KIPRC is the only one which isn't federally funded. Instead, KIPRC is supported by contracts from the state health department, grants obtained by UK faculty, and the UK medical center. KIPRC also is the only center in the nation that has a partnership with public health and academia, Kidd says.

"We are involved in research and also in public health. The two are very complementary." Kidd adds that this double focus is necessary to combat the most serious problems in Kentucky—injuries and deaths resulting from motor-vehicle crashes, occupational causes (especially among the farming, construction, and logging industries), residential fires, and intimate partner violence.

KIPRC currently operates three programs—the Occupational Injury Prevention Program (OIPP), the Pediatric and Adolescent Injury Prevention Program and the State Injury

Prevention Program.

The Occupational Injury Prevention Program (OIPP) focuses on occupational fatalities and burns, reducing injuries in small construction companies, and agricultural injuries. Of Kentucky's 146 occupational fatalities in 1997, 34—or 23 percent—were related to agriculture. The number of farming deaths in Kentucky is nearly three times the national rate. Many of those deaths were caused by tractor overturns.

"We'd eventually like to get those numbers to zero," says Tim Struttman, program manager for KIPRC's Occupational Injury Prevention Program. "We know those deaths could be prevented with the use of ROPS (Rollover Protective Structures) and seat belts."

The Pediatric and Adolescent Injury Prevention Program (PAIPP) is composed of four projects focusing on general injury prevention, child fatalities, emergency medical services for children and occupational injury prevention among adolescents.

"Motor vehicle crashes cause the most injuries in Kentucky," says Robert McCool, program manager for KIPRC's Community Injury Prevention Program. "There are scientifically proven ways to prevent and reduce the severity of inju-

ries associated with motor vehicle crashes. It is our job to get this information to local communities and help them solve injury problems." KIPRC provided data and educational information to the Kentucky General Assembly when the Graduated Licensing Law was passed in 1996.

"In the same way that cancer and heart disease are major causes of death for our older population, intentional and unintentional injury mortality is just as serious a problem for our younger population," says SIPP director Carl Spurlock, who adds, "These kinds of injuries are called accidents. Accident is a good word in the dictionary, but we don't use it. We're trying to change the prevailing attitude that you

can't do anything about unintentional injuries because they are 'just accidents.' Essentially all accidents have a cause and could have been prevented. They are not just a matter of bad luck."

—**Betsy Hall, UK Chandler Medical Center Public Relations**

The Kentucky Injury Prevention and Research Center is located at 333 Waller Ave., Suite 202, about three blocks from the University of Kentucky campus.

For more information about the center, call (606) 257-4954 or check out the center's Web site at (www.kiprc.uky.edu).



Pam Kidd

photo by Lee Thomas

CENTER ON AGING ADDS 20 NEW RESEARCH LABS

A new four-story, 34,000-square-foot addition to the University of Kentucky Sanders-Brown Center on Aging provides greater opportunities for research into issues associated with aging.

The addition, which includes 20 new research labs and enlarged laboratory support facilities, attaches to the original building on all levels. The project, which cost \$9.4 million, was funded with a \$1.75 million grant from the National Center for Research Resources, part of the National Institutes of Health, and \$7.65 million in private and university funding.

The addition augments research programs that focus on healthy aging as well as Alzheimer's disease, stroke and other conditions primarily associated with aging. Under the leadership of director William Markesbery, the Center on Aging has become an internationally known aging center.

The additional labs ease the Center on Aging's overcrowding problem. Also, the relocation of researchers from elsewhere in the medical center to laboratories within the center has

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enhanced some multidisciplinary research programs.

The new facility means the consolidation of research teams such as the one led by Stephen Scheff, professor of anatomy and neurobiology. "My laboratory personnel were spread out over three floors in the older portion of Sanders-Brown. The new addition has provided enough contiguous space that everyone in my laboratory is now together," Scheff says. "This results in a much more productive laboratory environment."

The laboratories in the addition are modeled after those in the UK Health Sciences Research Building, which opened in 1995. Each lab can be entered through a work station area with windows that provide natural light. Next to the work station is a room for use as an office or as a station for lab procedures.

The organization of the new space is a major improvement, says James Geddes, associate professor in the department of anatomy and neurobiology. "It's divided into several bays and office/desk areas. As a result, we can place our tissue culture facilities in a secluded area, resulting in fewer cultures ruined by contamination. Our micro-

scope is now in a separate room. We need to turn the lights off to obtain photomicrographs of cells stained with fluorescent tags and can now do this without putting the entire lab in the dark."

Key features of the new addition include shared equipment rooms, shared environmental rooms for keeping specimens and liquids at constant temperatures, a central autoclave (sterilizing) facility, and large pieces of research equipment such as centrifuges, refrigerators and freezers. Such centralization frees up valuable laboratory space and allows more scientists to have access to the equipment.

Three Alzheimer's disease labs and mechanical space are on the first floor; six Alzheimer's disease and stroke labs are on the second floor; five immunology and Alzheimer's disease labs are on the third floor; and six labs housing atherosclerosis research are on the fourth floor.

The Sanders-Brown Center on Aging is connected on the third floor to the Kentucky Clinic and to the rest of the medical center via a covered pedestrian skywalk



Stephen Scheff and lab technician Jennifer King

which crosses Rose Street. The research addition is the fifth major laboratory project developed at the medical center in the past 10 years in response to, and in support of, the medical center's growth in extramurally funded research programs.

"This added space also gives us more of an opportunity to recruit new high-quality faculty," says Markesbery.

**—Vikki Franklin, UK Chandler
Medical Center Public Relations**

UK COMMUNICATION HEAD TO LEAD NATIONAL GROUP

James Applegate, a UK professor of communication, has been elected president of the National Communication Association (NCA). With nearly 10,000 members, this is the world's largest association of communication teachers and researchers.

"I feel very honored by this appointment," says Applegate, who has been at UK since 1977. "Professionally, it means a lot of work in addition to my research and teaching. I do think it will be a boost for our communication program here at UK." Applegate also plans to stay on as department chair, he says, "assuming my faculty wants me to continue."

As president-elect, Applegate will plan the association's national convention in Seattle in the year 2000. He will assume the office in 2001.

Applegate is primarily interested in ways to strengthen "outreach for the discipline," he says. "First, given the success of our communication program here at UK as one of the most heavily funded research programs in the discipline—we have secured almost \$15 million in NIH support in recent years involving almost half of our faculty—I want to strengthen the discipline's ties with major sources of extramural research funding.

Communication issues dominate much of society's thinking about its problems and their solutions. We need to secure the research support needed to help address those problems," he says.

Applegate also plans to continue his involvement in a partnership between the National Communication Association and the American Association for Higher Education to foster service learning initiatives across the country. "Service learning is a collaborative learning format that engages students in community-based research and action. It enhances learning, improves communities, and encourages our students to recognize that an education comes with responsibilities to society as a whole," Applegate explains.

"I'm also interested in building on a partnership with the Pew Charitable Trust and other higher education groups to make communication a leader in discipline-based 'preparing future faculty' programs," he says. "UK has one of the large institutional grants in this area, so I am very familiar with the current program. This program is crucial to the development of the next generation of the professoriate."

One further goal of Applegate's is in the area of race and diversity. "I think

it's important to carry on work begun by our predecessors, engaging our best scholars and teachers to help this country address its challenges and opportunities in the area of race and diversity," he says. "The NCA has taken a leadership role in President Clinton's recent conversation on race. We are exploring partnerships with the Justice Department to provide resources to communities confronting the pain of hate crimes to resolve the conflicts those produce.

"Our discipline has the knowledge and research/teaching expertise to be a part of building a more civil, inclusive society for women, men, persons of color, whites, homosexuals and heterosexuals while maintaining our commitment to First Amendment freedoms."

THERAPEUTIC STORYTELLING

The Appalachian tradition of storytelling is being used as a tool to treat drug and alcohol addiction in several Eastern Kentucky communities. Carl Leukefeld, director of the University of Kentucky Center on Drug and Alcohol Research, came up with the idea to use storytelling as a form of treatment after discovering the traditional method of therapy used in many urban areas—role playing—wasn't working well in rural areas.

"With role playing, people put themselves in other people's shoes to help them understand how the behavior of others might be good or harmful. But acting out or being on stage in front of other people tends to make rural people feel uncomfortable," Leukefeld says.

Leukefeld and a team of researchers received a \$658,000 National Institute on Drug Abuse grant in 1995 to develop the rural therapy.

The pilot program began in April 1996 in three Kentucky towns—Campbells-ville, Jackson and Somerset—and ended in March of this year. About 90 subjects between the ages of 18 and 65 participated in the study.

The subjects included a control group who received

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the traditional approach to treatment—a mixture of individual and outpatient group therapy—and those who received the structured behavioral outpatient rural therapy (SBORT). In addition to its storytelling component, the rural treatment combines clinical approaches such as social skills training and “thought mapping” to help substance abusers change their behavior and, ultimately, become drug- and alcohol-free.

SBORT is a two-phase intensive outpatient program consisting of pretreatment and treatment. During pretreatment, patients meet with counselors individually for at least three sessions of 50 minutes each. The counselor works with them to understand the role drugs and alcohol play in their lives and to arrive at a joint commitment for change.

Treatment begins with training that focuses on social skills that are most helpful in establishing and maintaining recovery from chemical dependency. Storytelling and “thought mapping” are used to help clients develop those skills. Thought mapping involves analyzing important incidents before and after the onset problem behavior.

During treatment, sub-

jects meet in groups twice a week for six weeks. The sessions focus on solving problems and changing behavior by teaching different skills, including managing thoughts and fantasies about drug and alcohol use, coping with cravings and urges, relaxation techniques, and using self-help groups such as Alcoholics Anonymous and Narcotics Anonymous. Storytelling is used during the group sessions to help clients relate to the topic being discussed, gain insight into their behavior and learn new skills to change their behavior.

The way it works is simple. Using a technique called “priming the pump,” the therapist tells a scripted story in an engaging and artful manner that is designed to elicit stories about the clients’ personal experiences. The therapist might tell a story, for example, of a couple early in their marriage who are having trouble communicating because the wife expects her husband to know what’s bothering her rather than simply telling him.

The therapist then asks the clients to tell their own stories about mind reading while identifying the hurt feelings, confusion and conflict that can result when individuals in a relationship

Carl Leukefeld

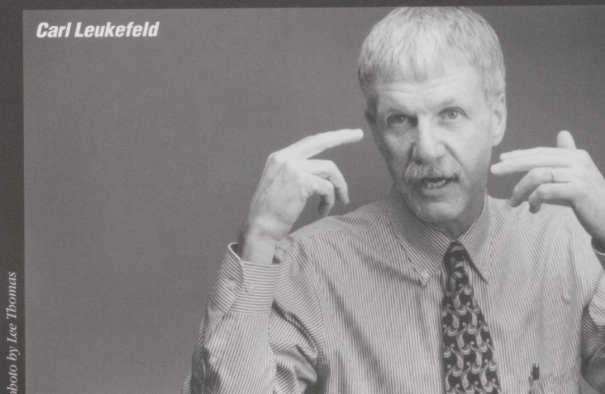


photo by Lee Thomas

don't make their needs known to one another. Discussion of the damaging role of drugs and alcohol is also an important part of such sessions.

Currently, Leukefeld and Cynthia Brown, research associate with the UK Center on Drug and Alcohol Research, are analyzing data from the study to see how well the pilot program worked. The study team is looking not only at the participants' level of addiction before and after the rural therapy, but also their opinions about the effectiveness of the treatment.

Anecdotally, however, Leukefeld and Brown think the treatment is working. Preliminary results indicate changes in drug and alcohol use among participants.

“The treatment is making a difference in their lives,” Brown says.

A manual will be published to train health-care providers across the commonwealth, including in urban areas, in the storytelling technique.

“This approach is creative and it's fun. Patients really get into it,” he says, adding that it's helping Kentuckians look closely at themselves and change their behaviors.

Leukefeld and his research team plan to apply for additional funding through the National Institute on Drug Abuse to conduct a clinical trial on the treatment. In addition to Leukefeld and Brown the research team includes Theodore Godlaski, associate professor of psychiatry; Jim Clark, College of Social Work; T.K. Logan, Center on Drug and Alcohol Research; and Lon R. Hays, associate professor of psychiatry.

—Betsy Hall

Fiber Optic Research Glowing with Promise for the Environment

When most people think about fiber optics, they think of telephone or cable service and visualize a bundle of glass or plastic threads that transmit data at close to the speed of light. One University of Kentucky researcher is taking fiber optics beyond communications to produce highly sensitive environmental monitoring tools.

Since 1995, Sylvia Daunert, an associate professor of chemistry, has been working on an NSF-funded project to produce fiber optic sensors that use bacteria genetically engineered to glow in the presence of very low—but still dangerous—levels of toxic substances. This bioluminescence is created by altering the same proteins that make fireflies and jellyfish glow.

Daunert, originally from Barcelona, Spain, has a joint appointment in the Department of Pharmaceutical Sciences in the College of Pharmacy, and is a faculty associate of the Center of Membrane Sciences. In this fiber optic project, she is studying the toxic substances arsenic and antimony, a chemical used in matches. Daunert's lab is also involved in ongoing studies of copper, PCBs and sugars.

"We've moved beyond luciferase, the protein that makes the firefly emit light, to a little bit more sophisticated system by using different proteins that can emit different colors," Daunert says. "This is very exciting because now we can detect many toxic substances at the same time just by looking at which color—red, green or blue—is emitted. We are tapping into the selectivity that nature offers us with these proteins."

The bacteria Daunert and her colleagues use is a non-toxic strain of *E. coli*, a very common bacteria widely used in biotechnology.

Daunert creates her bioluminescent bacteria by using natural bacterial genes that recognize small amounts of toxic substances. "What we do is kind of trick the bacteria by hooking up the gene that recognizes a toxic compound to what we call the reporter gene—the one that generates the bioluminescent signal," she says. "So as the toxic compound enters the cell, it is being recognized by the gene which triggers the production of the reporter."

Daunert attaches these bacteria to the optic fibers by trapping them in solution behind a membrane. "The membrane has pores that only allow small molecules to pass through, so the bacteria are trapped; but compounds like arsenic or sugars can pass through," she says.

The advantage of using these optic fibers for environmental monitoring lies in their ability to act as remote sensors. "You can



SYLVIA DAUNERT IS PRODUCING FIBER OPTIC SENSORS THAT GLOW IN THE DARK, LIKE FIREFLIES AND JELLYFISH.

place a fiber at a polluted site, say an industrial river that you want to monitor in a continuous manner. You can just leave the fiber there and monitor what is happening from miles away," says Daunert. Although she has not yet explored the logistics of how this will work, Daunert points to the ease with which signals pass through fiber optic wires across telephone poles or underground. It may soon be possible for a farmer to monitor his water supply by checking a graph of the sensor output sent directly to his computer.

Daunert says such a process will be highly effective and feasible. There is currently no method to detect the low levels of toxic substances Daunert's engineered bacteria are designed to detect. "Our method is a billion times more selective for arsenic and antimonite than current tests. It separates other compounds that are structurally related, so you have very little interference from anything else that is present in the sample," she says.

"We are also moving in the direction of freeze-dried bacteria, bacteria you can take to the field in a little pouch and reconstitute with solution on the spot to do your test," Daunert says. "Although we haven't done a market study, using our technology should be pretty cheap. Bacteria are very cheap and the instrumentation you need is not elaborate. A sensitive, hand-held luminometer that measures the light emitted by our sensors costs less than \$5,000."

"The most significant thing I think we have done in the past four years is to demonstrate that we can use this technology to detect many different substances, even several different substances at once," Daunert says.

In September 1998, her work on reporter genes and bioluminescence was featured as the cover-story of *Analytical Chemistry*, the most important journal in her field. Daunert's research at UK has been supported by federal institutions including the National Science Foundation (a CAREER Award), the Department of Energy, the National Aeronautics and Space Administration, the Department of Defense, and the National Institutes of Environmental Health. In 1996, she was selected as a Cottrell Scholar and was awarded \$50,000 by the Research Corporation, a foundation for science and technology advancement. In 1997 she won the \$10,000 Lilly Faculty Award in Analytical Chemistry. Eli Lilly renewed this award for a second year in 1998.

Sylvia Daunert's work was first featured in the Summer/Fall 1995 issue of ODYSSEY.

ODYSSEY

RESEARCH OUTREACH

The University of Kentucky's research goal is to conduct programs of basic and applied research which support graduate and professional education, provide for the advancement of knowledge, and seek solutions for the acute problems of society.

The university's research mission also acts as a magnet for attracting top graduate students who want to participate in nationally competitive research projects. *ODYSSEY*, through articles about various research projects and graduate research programs, reflects the breadth of the university's search for new knowledge and the myriad of research endeavors under way.

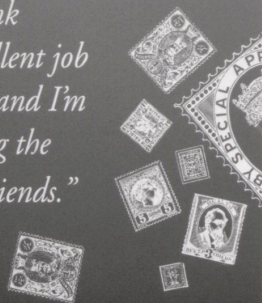
Research Impacts You

ODYSSEY is not just a magazine—it is a resource which serves as the basis for some very important outreach activities. The articles appearing in *ODYSSEY* are rewritten—in a briefer format—for a newspaper column titled "UK Science & You." This column is sent to every newspaper in Kentucky and is a regular feature of many of the weekly papers. Through these columns we reach a potential audience of 1.4 million readers—letting them know how UK research impacts their daily lives.

ODYSSEY is published twice a year and distributed free of charge to graduate alumni and friends of the University of Kentucky. *ODYSSEY* is not financed by the state general fund.

*"I'm a lifelong learner – I'm 85 –
and I have a master's degree and
a Ph.D. in history. I think
ODYSSEY does an excellent job
of reporting on research, and I'm
glad to be counted among the
magazine's donors and friends."*

—Nolan Fowler,
Cookeville, TN



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PARTING SHOTS

**“The difference
between fiction
and reality?
Fiction has to
make sense.”**

—Tom Clancy

*“A critic is someone
who knows the way
but can’t drive the car.”*

—Kenneth Tynan (1927-1980)

**“The man who does not read good books has no
advantage over the man who cannot read them.”**

—Mark Twain (1835-1910)

**“In literature, as in love, we are astonished at
what is chosen by others.”**

—Andre Maurois (1885-1967)

**“Science is
the refusal
to believe
on the basis
of hope.”**

—C.P. Snow (1905-1980)

**“The attempt to understand the
universe is one of the only things
that elevates the human condition
from farce to elegant tragedy.”**

—Steven Weinberg, Nobel Laureate 1979

**“Literature is news
that stays news.”**

—Ezra Pound (1885-1972)

*“The most exciting phrase to hear in science, the one that
heralds the most discoveries, is not ‘Eureka!’ (I found it!)
but ‘That’s funny...’”*

—Isaac Asimov (1920-1992)

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