

FOCUS

On Research and Creative Productions at Morehead State University



It is with pleasure that I invite you to view the latest edition of Focus Magazine. Coordinated through the Office of Research and Sponsored Programs at Morehead State University, this publication highlights only a few of the many projects that were completed by faculty and professional staff during the last year.

As at any fine university, Morehead State supports the research efforts of its constituents. The professional resources and services offered serve to enhance one's abilities to provide quality instruction, conduct research, deliver public services and promote professional growth through internal and external funds.

Through the devotion of their time and efforts, these researchers have contributed to the vast pool that allows our students to be more knowledgeable, better educated, and more aware of the world in which we live. Future students will continue to reap the rewards of their labors. We commend them for their dedication.

We hope to continue to offer an annual summary of the research and creative projects that have been undertaken by the University's faculty and staff. You can help by providing input and participating in similar endeavors.

As Morehead State University continues to march steadily toward our vision of becoming the best public regional university in the South, we must form together to support the scholarship of our faculty and students.



Dr. Karla Hughes
Provost



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Comments or questions to:
focus@moreheadstate.edu

About The Focus Edition

FOCUS—a point to which something converges or from which something diverges—illustrates the ideals of Morehead State University for bringing the best research together and encouraging new efforts in distinctly different areas. The goal of FOCUS is to recognize faculty and professional staff involvement in sponsored research and creative projects and to illustrate diversity in the University's mission of teaching, research, and service to the people of East Kentucky. Through the combination of teaching with research, scholarship, and creative activities, an environment in which knowledge may be discovered, integrated, and disseminated to educate students is created. FOCUS is intended to illustrate the breadth of research within the University and thus describes only a few of the on-going projects under way in a variety of areas.

Morehead State University is firmly committed to a policy of Equal Employment Opportunity and will administer its personnel policies and conduct its employment practices in a manner which treats each employee and applicant for employment on the basis of merit, experience and other work-related criteria without regard to race, religion, sex, national origin, ancestry, age, disability, or any other protected class under relevant state and federal laws. Hiring goals have been established that outline our good faith efforts in practicing equal employment opportunity and affirmative action. These goals ensure that commitment is manifested in all aspects of employment including advertisement, recruiting, hiring, promotion, demotion, transfer, tenure, compensation and training. Morehead State University is committed to making a good faith effort to meet our hiring goals through an annual review of progress. In addition, all students are guaranteed access to educational opportunities, financial assistance, and social and recreational programs. The University Affirmative Action Officer has the responsibility to develop and monitor affirmative action and other equal employment opportunity programs. However, management personnel at every level including vice presidents, deans, directors, chairs, coordinators and supervisors must share in the responsibility for promoting affirmative action and equal employment opportunity to ensure that compliance is achieved. Anyone desiring information regarding the University's Affirmative Action Program may contact the Affirmative Action Officer at 314 Allie Young Hall, 783-2085. A copy of the Affirmative Action Plan will be made available to any employee or student upon request.

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FOCUS

Volume 15

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RESEARCH EARNED HER A DISTINGUISHED AWARD



One of the earliest sociological thinkers, Max Weber, maintained that a researcher's choice of topics for study should have "value relevance," or more specifically, should be about issues or concerns to their culture during the researcher's lifetime.

Dr. Suzanne Tallichet gets ideas for her research from real world issues. "My general guide has been to simply follow my interests which really means following my heart. To me, research without that kind of passion is sterile and mundane. It is of no use to anyone," she said.

That philosophy, and subsequent research, led to her being named the 2007 Distinguished Researcher at Morehead State University, one of the University's most prestigious awards given to a faculty member.

Her research is joined by a common thread. It is based on her personal experiences and interest in animal cruelty and gender and work-related issues in rural areas, particularly in the Appalachian region.

Her first formal investigation began while she was a graduate student at Penn State. The tragic death of the first female miner occurred at a location not far from where she was living. Her interest in the 1979 fatal mining accident brought the world of coal mining and the issue of women working underground to the spotlight. She proceeded to study women's experiences and their struggles for legitimacy and advancement in the masculine-identified culture.

"While analyzing my data from interviews with women miners, I heartily admired their courage and strength despite their flaws and foibles. Their perseverance

and endurance in the face of adversity has been inspirational," she said.

Dr. Tallichet's work on women in mining was qualitative, which requires the researcher to engage themselves in the field and be an active participant in the research process. It also requires the researcher to do some soul-searching and self-examination as part of that process.

"In that respect, your research becomes a profound part of you. Not a day goes by that I don't recall something one of the women told me as they reflected upon their hardships or triumphs. My experiences in the coal fields interviewing women and the men with whom they worked was as enriching as it was enlightening," she said.

"My general guide has been to simply follow my interests which really means following my heart. To me, research without that kind of passion is sterile and mundane. It is of no use to anyone."

A case study focusing on job-level sex segregation among women working at a large underground mine in southern West Virginia became part of her dissertation for the Ph.D. degree. In the fall of 1990, she interviewed 10 female and several male miners, union and company officials and the mine superintendent. After joining the faculty in MSU's Department of Sociology, Social Work and Criminology in 1993, she returned to the site during the summers of 1995 and 1996 to conduct some repeat interviews as well as add new informants.

"To date, there are relatively few journal articles or books about women coal miners," Dr. Tallichet said. "My work is the only study that focused entirely on a single cohort of women working at the same mine for a prolonged period of time," she continued, noting that her work filled a void in the literature on women working in nontraditional blue-collar occupations, particularly in rural areas of regions such as Appalachia.

Another issue that was borne from personal experience that became a research topic was the various facets of animal cruelty. Having grown up around dogs and served as a volunteer at the local animal shelter, she encountered several severe episodes of animal abuse.

Every new experience left her asking why do people do this? So she set out to find some answers. That yearning was the basis for research she completed with criminologist Christopher Hensley. The results became data for 10 publications and started to help fill a void in the animal cruelty literature, particularly regarding motivations, methods and the target animals involved.

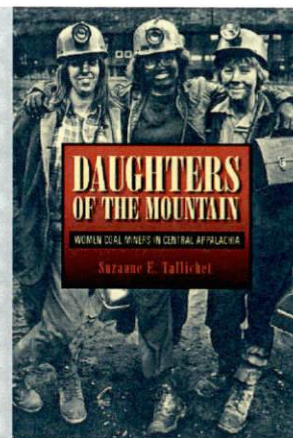
Occasionally, she has been asked why she's interested in such a grisly and sometimes grotesque topic, she said. "The answer is simple. You cannot stop something from happening if you don't understand it. We simply do not know enough about the topic; but the more we discover, the more we know how animal cruelty is learned, subsequently manifested and linked to human violence.

"More often than not, the early and repeated abuse of a sentient animal has led to further adult violence among certain individuals. But, we still need to know more about how to qualify that link."

Dr. Tallichet's research is getting attention from others across the country. A Virginia legislator was interested in the article on bestiality because he wanted to use it to support his bill about sexual assault. The publications have become links on various animal welfare Web sites and included in the growing literature on the topic.

"All this indicates that we made a contribution in this area of inquiry and that is perhaps the highest honor of all," she said.

She and her colleagues are in the process of replicating this research in another state. Eventually, they hope their work will result in another book on the subject.





THE LibQUAL+(TM) PROJECT

Assessing user satisfaction is an ongoing process for Camden-Carroll Library. Elsie Pritchard, dean of library services, needed to know that all patrons, especially students and faculty, were receiving the assistance and resources they needed from the library.

After applying for and receiving a LibQUAL+(TM) grant, she would have access to the program's rigorously tested Web-based survey. Once completed, she could identify weaknesses, find ways to improve services, and market the library. The survey would compare MSU to similar institutions nationwide on the basis of type and size.

In the fall 2006, faculty and students participated in the LibQUAL+ online service survey which was coordinated by Tom Kmetz, CCL's coordinator of research services.

To get the bigger picture, focus groups headed by faculty members hosted group discussions which included volunteer representatives from each college and most departments, along with a graduate class in sociology. Their goal was to explore the responses and recommend solutions.

Pritchard said the areas identified as needing improvement came as no surprise as she had pondered over these same issues. Graduate students requested more print and/or electronic journal collections and easy-to-use access tools that would

allow them to find things on their own. Locating subject-related materials can sometimes be a problem as well as gaining database access from remote areas.

Faculty members wanted more full-text journals and reference materials. They also requested more ways to help them increase productivity in their busy lives. Improvement in communication will help alleviate some of the problem and faculty members will be encouraged to make the library's staff aware of the specific items that are needed.

In cases where the cost for the needed resources is prohibitive, the library staff and faculty will work together to support the request.

"We are doing well when compared to other schools similar to MSU," Pritchard said. "By interpreting the results, we can better plan for the future."

The LibQUAL+(TM) project, sponsored by the Association of Research Libraries, was supported in part by a grant from the U.S. Department of Education's Fund for the Improvement of Postsecondary Education (FIPSE). The process allowed MSU to have access to a host of institutional survey information, to be used currently and in the future. (In photograph, from left, Mykie Howard, Tom Kmetz and Elsie Pritchard.)



MSU COMMITTED TO ENDING THE CYCLE OF CHILD ABUSE

Morehead State University, in partnership with the Kentucky Child Assault Prevention (KYCAP), is continuing its commitment to end the cycle of child abuse in East Kentucky.

During the three-year partnership, seven counties have participated in the KY CAP program each year: Boyd, Elliott, Greenup, Johnson, Lawrence, Martin and Morgan. The 824 confirmed incidences of abuse in 2004 dropped to 767 in 2005. While this is a sign of progress, statistics show that abuse remains a pervasive problem.

The KY CAP program looks to intervene in the abuse of children by addressing those at the highest risk, according to Dr. Wayne Willis, chair of MSU's Department of Professional Programs in Education. "The program currently focuses on school children in kindergarten through sixth grade; however, the age limit could be increased if funding were available," he said.

Having determined that KY CAP can make a difference, the partners will look at other ways to improve the results: to better publicize their work, enhance communication through use of digital technologies, develop an instrument for assessing school personnel's responses to the onsite activities for children, implement KY CAP training in the MSU classroom management and discipline classes and adequately train counseling faculty.

By establishing the role of a clearinghouse for KY CAP, the University will continue to maintain a Web site, as well as assist with the development of brochures, handouts, and educational information relevant to the program. The clearinghouse also will serve as a referral source with a contact person available at MSU to provide information and assistance, if needed.

Through this joint effort, the two entities hope to increase the services of the KY CAP education program to 25 schools in the East Kentucky service region through networking and collaborative support.

"It is imperative that we educate teachers and counselors to recognize the signs of abuse, neglect, or violence early in the cycle to prevent both current and future results of these behaviors on our future generations," Dr. Willis said. (In photograph, from left, Kathy Hinkle, KYCAP regional director, and Dr. Wayne Willis)

VISUAL TARGET TRACKING: IMPLICIT ACQUISITION OF MOVEMENT STRUCTURE

On a daily basis, we visually track the movement of objects in the world around us as they move in a structured manner. The ability of humans to learn this movement structure could facilitate visual tracking performance.

To date, there has been limited research on human visual learning of movement structure. Grants from Kentucky's NSF/EPSCoR program and Morehead State University's Research and Creative Productions Committee have allowed Dr. Gilbert Remillard, assistant professor of psychology, to examine systematically the human ability to learn visually the movement structure of a target as it moves from one location to another.

"The ability to learn the structure underlying sequences of events is a vital component of human cognition," Dr. Remillard said. "It allows humans (1) to learn to anticipate upcoming events on the basis of preceding events, (2) to learn new sequences of behavior, and (3) to learn to communicate through language, music and other mediums."

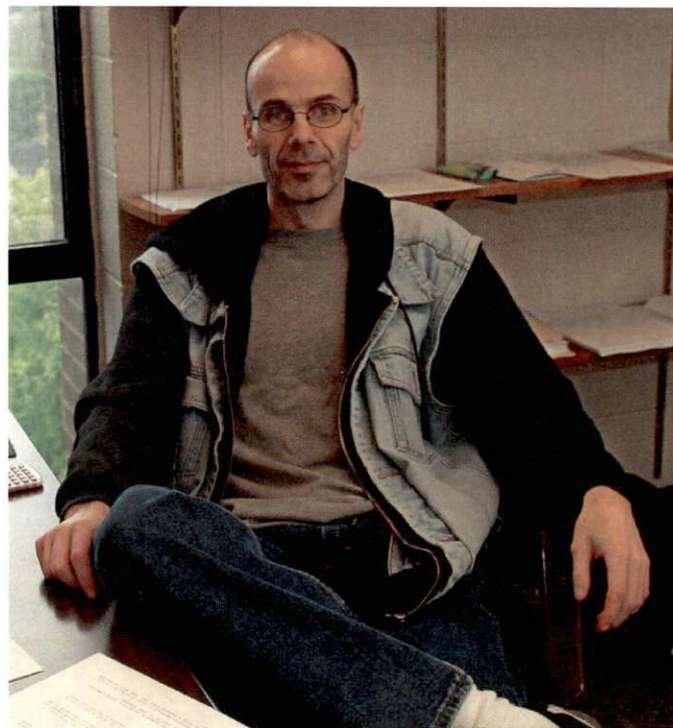
Psychologists have discovered that learning sequential structures can proceed with minimal effort and no conscious awareness of the structures, a form of learning termed "implicit sequence learning."

The serial reaction time (SRT) task is used to study implicit sequence learning, Dr. Remillard noted. "On each trial of the SRT task, participants are exposed to one of a number of possible events. An event is typically a stimulus to which the participant must respond and the event can be visual, spatial or auditory in nature."

Without the participants' knowledge, the sequence of events has an underlying structure. Some events are more likely than others to follow certain subsequences. For example, Event A is more likely than Event B to follow the subsequence C-D. In many studies, participants' response time performance on the SRT task reveals that they have learned the sequential structure, and subsequent performance on free-recall, cued-recall, or recognition tasks reveals that participants have no conscious awareness of the structure.

Dr. Remillard's research utilized the

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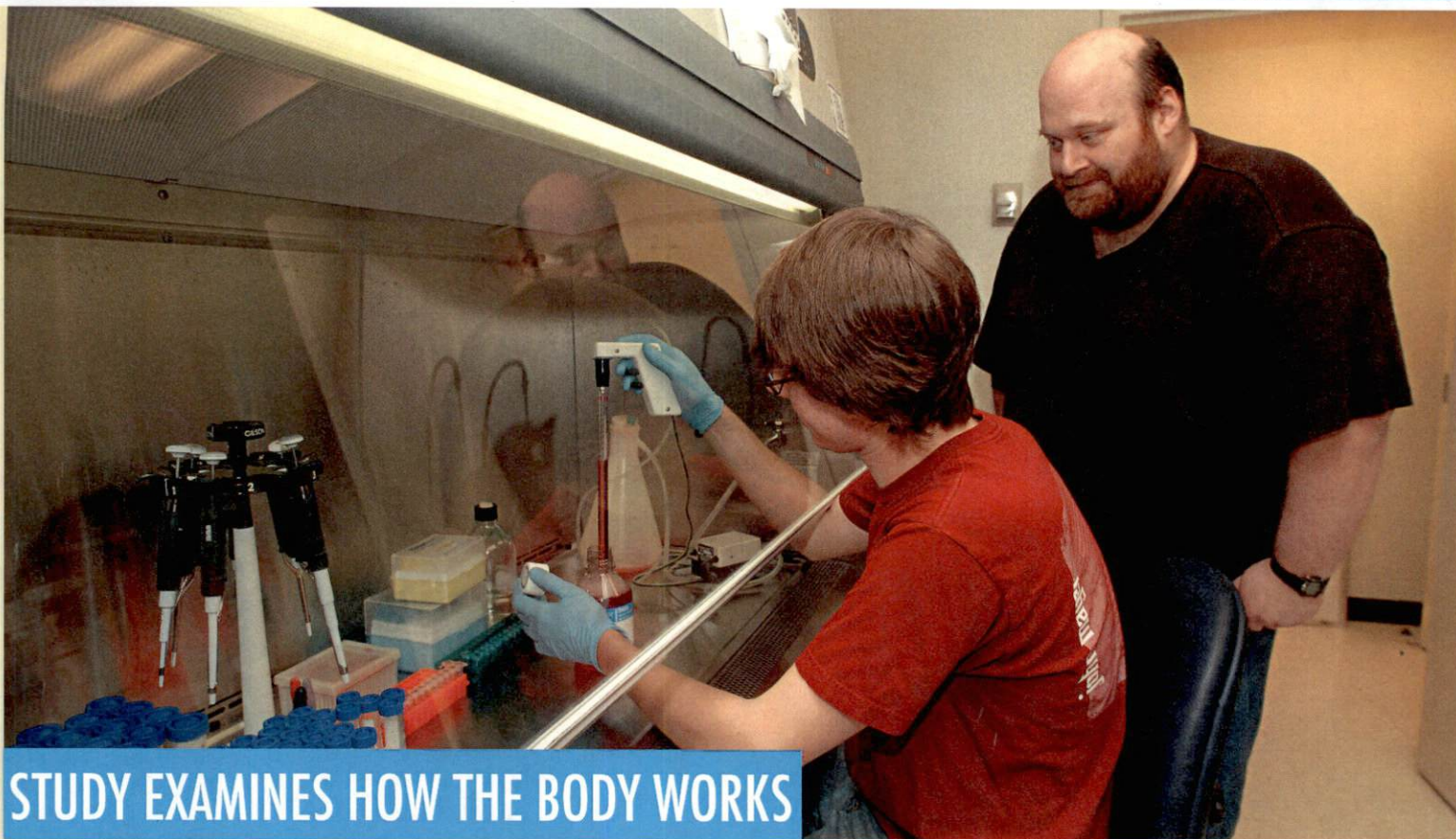
SRT task. He had research participants respond to the identity of a visual target as it moved from one spatial location to another on a computer screen. The identity of the target changed randomly from trial to trial but, unbeknownst to participants, the sequence of spatial locations had a subtle structure. The location of the target on trial t was probabilistically related to its location on trial $t - 2$. Also, for some participants, an attention-capturing distractor appeared along with the visual target but at a different spatial location than the target.

Dr. Remillard has discovered that people can learn to use the location of a target on trial $t - 2$ to predict its location on trial t despite being unaware of the existence of the contingencies. He also has established that the learning mechanism is unselective. Dr. Remillard notes, "That distractors with stronger attention-capturing properties produce greater impairments in learning than distractors with weaker attention-capturing properties suggests that the learning mechanism incorporates into the sequence representation whatever spatial

locations are the focus of visuospatial attention, even if those locations are completely irrelevant to the task at hand."

The project examined issues that had not previously been examined in literature and suggested further avenues of research. Exploring the mechanism by which orienting visuospatial attention to spatial locations causes those locations to become part of the sequence representation is one avenue, Dr. Remillard noted. Exploring the complexity limits on implicit sequence learning is another avenue. For example, could people learn to predict a target's likely location on trial t , given its location on trial $t - 3$, $t - 4$, and so on?

Research at this level requires one to remain abreast of the latest developments in computer programming, data analysis, research design methodology and various areas of perceptual and cognitive psychology, Dr. Remillard said. "This new knowledge can be passed on to psychology students in upper level statistics, research methodology and cognitive psychology courses."



STUDY EXAMINES HOW THE BODY WORKS

There is a continual effort to study how the body works and what effect one entity may have on another.

As alternations in smooth muscle function is becoming increasingly clear with development of cardiovascular disease, and the contractile properties of smooth muscle may change, it is essential to understand the normal contractile apparatus in smooth muscle to apply that information to the diseased state.

There are many differences in the contraction of striated and smooth muscle, according to Dr. Michael E. Fultz, assistant professor of biology at Morehead State University.

Smooth muscle demonstrates several properties that are interesting to physiologists. The myosin content of smooth muscle may be as little as 20 percent of that of striated muscle yet smooth muscle is capable of generating at least as much force as striated muscle. In addition to structural considerations, smooth muscle has the unique ability to slowly develop tension and then maintain this tension for extended periods. Remarkably, this maintenance of tension occurs at levels of energy expenditure of about 0.35 percent that in tetanized striated muscle, Dr. Fultz noted.

His proposal stated that remodeling of the cytoskeleton, in particular the actin

cytoskeleton, directly contributes to force development as well as tension maintenance. Through work started in 2000, it has been observed that the actin cytomatrix undergoes extensive reorganization in the contracting A7r5 smooth muscle cell.

Furthermore, the nature of remodeling was dramatically different between the α -actin and β -actin domains; β -actin stress cables were observed to shorten during cell contraction without evidence of disassembly or formation of new structures. By comparison, α -actin appears to disassemble and subsequently reform into intensely staining peripheral column-like structures with associated filaments that have recently been termed podosomes.

According to research completed in 2003, it has been shown that smooth muscle, specific myosin II, also undergoes remodeling, with myosin undergoing dissolution and partial relocation with α -actin during the period of contraction.

Based on these results, Dr. Fultz and his colleagues have proposed that the remodeling of β -actin serves primarily to hold the cell in the contracted and shortened configuration, while α -actin and myosin remodeling is directly linked with force generation. Due to the differences observed between α -actin β -actin, and myosin remodeling, they stipulated it would not

be surprising if the remodeling of these cytoskeletal domains were regulated by different biochemical mechanisms.

The overall goal of Dr. Fultz's current project is to test the hypothesis that remodeling of the cytoskeleton plays a critical role in the contractile response of VSM. To achieve this goal, he utilizes the A7r5 smooth muscle cell, a model defined both in terms of the contractile response and nature of actin remodeling in contractile cells, as lacking a well-structured sarcomere.

The focus of his proposal centers on the effects of kinase inhibitors that have been shown to alter vascular smooth muscle tissue contractility and the relationship between contraction and cytoskeletal remodeling.

For purposes of this research, the A7r5 cell line was designated by the laboratory as a model of contraction in cells that lack a highly structured sarcomere, which included distinctly different modes of alpha and beta actin remodeling in response to contractile stimuli.

Previous work has defined α -actin remodeling in response to kinase inhibition. The current project investigated the effects of the kinase inhibitors on the alpha and beta-actin and myosin components of the cytoskeleton. (In photograph, Dr. Michael E. Fultz)

KBRIN AT MSU

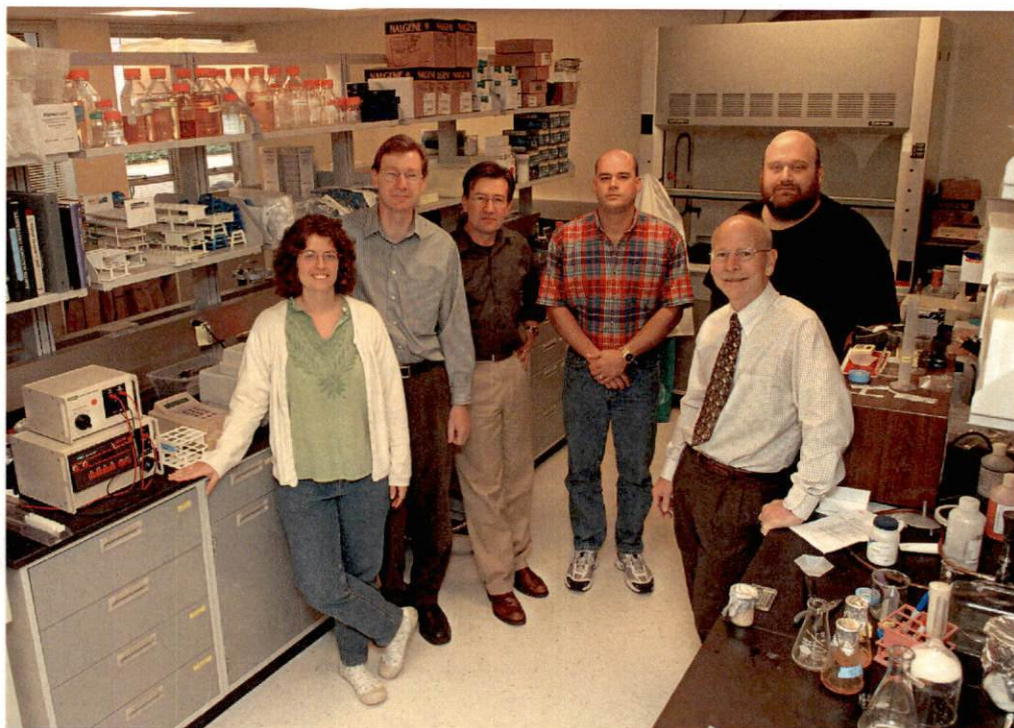
Student and faculty researchers in biomedical sciences at Morehead State University now have the resources and facilities to conduct cutting-edge research thanks to grant monies received through the Kentucky Biomedical Research Infrastructure Network (KBRIN).

Established in 2001 with the support of a major National Institutes of Health (NIH) grant award, the KBRIN is a multi-institutional partnership consisting of biomedical researchers from MSU and five other public universities including the University of Louisville (lead institution: Dr. Nigel G. F. Cooper, principal investigator), University of Kentucky, Eastern Kentucky University, Northern Kentucky University and Western Kentucky University. A follow-up five-year Idea Network of Biomedical Research Excellence (INBRE) award from NIH in 2004 continues to provide significant support (\$17 million) for this statewide network of biomedical researchers.

The major goals of the KBRIN include enhancing the statewide biomedical research capacity and infrastructure, supporting important health-related biomedical research projects, increasing the number of undergraduate students engaged in biomedical research and pursuing postgraduate careers in biomedical sciences, and enhancing the competitiveness of Kentucky researchers in pursuing federal level funding for their research.

Led by Dr. Bruce Mattingly, professor of psychology and associate provost for research and sponsored programs, along with biomedical researchers, Dr. Darrin DeMoss, a physiologist and professor of biological sciences, and Dr. Wesley White, a behavioral neuroscientist and professor of psychology, MSU has received almost \$2 million from this network in support of institutional infrastructure development initiatives and individual faculty biomedical research projects.

In addition to providing direct support for the research programs of Drs. DeMoss and White, this KBRIN funding also has been used to purchase core research equipment available for use by all biomedical researchers, to provide summer faculty research fellowships, to provide support for student stipends, research, and travel, and to fund a biomedical research seminar series.



(In photograph, from left, Dr. Janelle Hare, Dr. Wesley White, Dr. Doug Dennis, Dr. Darrin DeMoss, Dr. Michael Fultz, and Dr. Bruce Mattingly.)

Other MSU researchers that have received KBRIN support include: Dr. Michael Fultz, assistant professor of biological sciences; Dr. Janelle Hare, assistant professor of biological sciences; Dr. David Peyton, associate professor of biological sciences; and Dr. Ilun White, professor of psychology. These faculty members, along with Dr. David Magrane, former chair of the Department of Biological and Environmental Sciences, and Dr. Gerald DeMoss, dean of the College of Science and Technology, also are members of an on-campus steering committee that has guided the development of the KBRIN program at MSU.

Since joining the KBRIN, MSU has made significant progress in meeting its institutional goals as well as those of the statewide network. Indeed, a recent five year pre- and post-KBRIN assessment demonstrated more than a 100 percent increase in: 1) the number of MSU students involved in biomedical research with faculty mentors; 2) the number of MSU students presenting research papers and posters at scientific conferences; 3) the number of MSU students accepted into Ph.D programs in biomedical sciences after graduation; and 4) the number of NIH research grants submitted by, and awarded to MSU faculty.

In addition to these achievements, KBRIN funding also has been instrumental in the enhancement and expansion of our physical research infrastructure. KBRIN

funding combined with an MSU match (\$150,000 total), for example, was used to completely renovate the HVAC system in the Department of Psychology's behavioral neuroscience laboratories in Ginger Hall in 2004. Further, with KBRIN support, Dr. Wesley White has been able to equip the neuroscience labs with state-of-the-art behavioral and neurophysiological testing equipment.

Perhaps the most important infrastructure advancement resulting from the KBRIN project was the October 2007 opening of a new 2,300 square foot molecular biology core research facility in Lappin Hall. Developed at a cost of more than \$800,000 of MSU, KBRIN, and NSF-EPSCoR funds, the new University-wide core laboratory provides faculty and students from several disciplines (agriculture, biology, neuroscience, psychology) dedicated research space with the latest in biotechnology equipment.

Few regional public universities have such a laboratory for research into the formation, structure and function of macromolecules essential to life, such as DNA and other nucleic acids and proteins, according to Dr. DeMoss.

"Molecular biology is a key element of modern bioscience research, and we are proud to have this new facility to further strengthen our already strong programs in the sciences and to give our students more opportunities for research," said MSU

President Wayne D. Andrews. "Advances like this new lab are among the reasons why our students continue to be admitted to graduate and professional schools far above national and state averages."

"This is an exciting development for all of our professors and students whose research interests incorporate any of the biosciences," Dr. DeMoss said. "We are deeply indebted to Dr. Bruce Mattingly and Dr. David Magrane for their leadership in the establishment of this core facility."

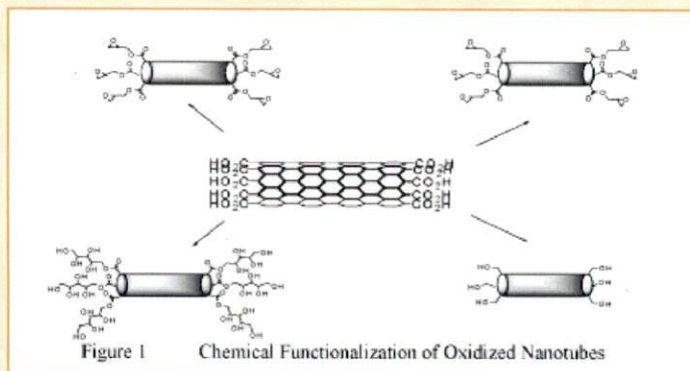
In honor of Dr. Magrane's retirement after more than 30 years of service to biology students and faculty, the new laboratory was



recently named in his honor after former students and colleagues raised \$25,000 to start a research endowment to support the new laboratory.

According to Dr. Mattingly, "MSU was invited to participate in the KBRIN due to the excellence of its faculty, the outstanding individual research proposals submitted by Drs. DeMoss and White, and our institutional commitment to the development of a competitive biomedical research program at the national level. Clearly, the level of success achieved by this program at MSU over the past few years demonstrates the excellence and commitment of our faculty, students, and administrative leaders. To reach our goal of being the best public university in the south, continued progress in providing high quality research facilities for faculty and students in all disciplines is essential".

RESEARCH COULD IMPACT NATIONS SECURITY



A Morehead State University faculty member is the collaborating investigator for a project that brings together several universities and an industrial partner to tackle the problem of increased security threats to our nation and around the world.

The University of Kentucky is the primary institution with Morehead State and Eastern Kentucky University, as well as Koppers Inc. in Pennsylvania as partners or collaborators on the project. The research will be completed with a \$1,000,000 grant from the Department of Homeland Security awarded through UK and the Center for Applied Energy Research with MSU receiving \$25,000.

This project focuses on the ability of nanotubes to alter the properties of polymers used in construction materials, according to Dr. Mark Blankenbuehler, MSU associate professor of chemistry. "Discovered within the last 15 years, nanotubes are simply forms of carbon that have a long, cylindrical shape," he said, noting that many applications have been proposed for such a structure including medical applications in drug delivery and the development of molecular wires.

Versatile, multifunctional materials and methods are needed for new building construction and for retrofitting existing structures to address critical infrastructure protection issues relating to blast mitigation. The development of effective, low cost, modular wall panels to provide blast protection, electromagnetic shielding, radiological protection and chemical agent removal is necessary to maintain operability of essential facilities when subjected to terrorist attack or natural disasters.

New materials and means of delivery are also required to mitigate or nullify the effects of explosive devices that are deliberately placed in urban or industrial locations, aimed at causing the maximum loss of life or critical injury to civilian, security or law

enforcement personnel and severely disrupting the processes of normal life. Such improvised explosive devices (IEDs) are often aimed at soft targets to cause the maximum devastation to a civilian population.

"An easily transported system that can be deployed at the source of the incident

is required to counter or render safe the device and thereby thwart the intentions of extremists," Dr. Blankenbuehler said. "Such a system also could offer a similar mollifying effect on potentially explosive accidental incidents that occur in otherwise innocuous situations."

The plan is to develop and demonstrate the construction of modular wall panels and sprayable coatings for the construction or retrofitting industries that greatly reduce the impact of explosive blasts. These materials based on carbon foams, carbon fiber monoliths and carbon nanotubes will simultaneously offer high impact resistance, electromagnetic interference (EMI) shielding for secure site construction or retrofit, chemical agent adsorption capabilities, and radiological shielding.

To mitigate the effects of an explosion at its source, a nanotube reinforced urethane foam with high energy absorption capacity suitable for blast containment will be developed with the capability of neutralizing the effects of improvised explosive devices. The material will be a self-foaming liquid, which can be sprayed onto an IED, vehicle or other target and will then expand, and crosslink to provide a blast absorbing, flame resistant containment vessel of any shape with radiological or electromagnetic shielding capabilities. Similarly, a sprayable, non-foaming, rapidly curing nanotube-epoxy formulation will be developed.

"The primary goal of the research at MSU is to synthesize oxidized derivatives of multi-walled nanotubes (MWNTs)," Dr. Blankenbuehler said. "Nanotubes can be oxidized to form new tubes with different functional groups. These groups influence the properties of the nanotube, and when mixed with polymer feedstocks, will form polymer systems with new properties."

"BRIDGING THE CHASM"

Public school practitioners do not always have access to needed resources in their respective fields or there may have been a lack of training or professional development in a specific content area.

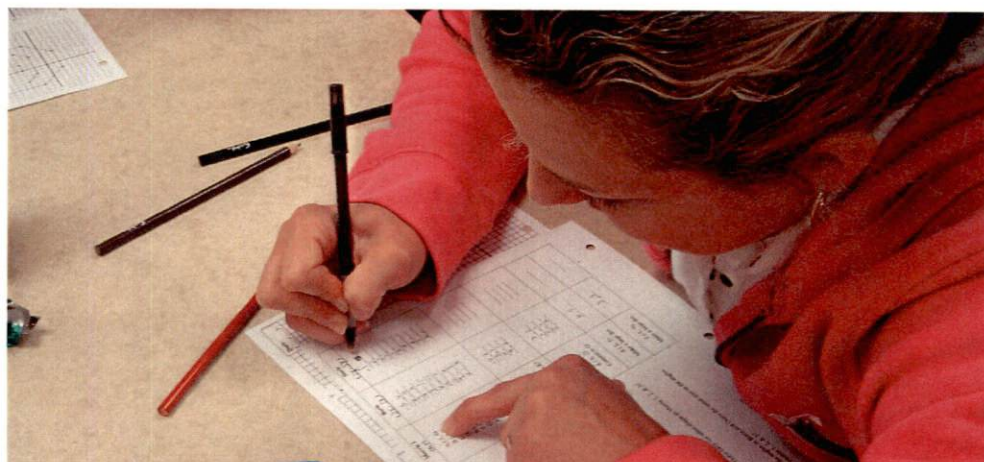
To fill the void, "Building the Chasm," the Morehead State University Mathematics and Science Partnership-Tiered Mentoring Program (TMP) was initiated with funding provided by the KDE (Kentucky Department of Education). Its mission: to increase the knowledge base of middle school mathematics and science teachers through their involvement in field research under the guidance of experienced research scientists.

The program was administered through the College of Science and Technology with Dr. Gerald DeMoss, dean of the college, as the principal investigator. Six research-based university faculty members, whose research relates directly to science and/or math, were selected to participate.

The faculty and their area of expertise included: Dr. Dora Ahmadi; chair of the Department of Mathematics and Computer Science, mathematics; Dr. Maureen Doyle, assistant professor of computer science/Dr. Youqiu You, assistant professor of industrial technology, mathematics; Dr. Mark Blankenbuehler, associate professor of chemistry, chemistry; Dr. Eric Jerde, associate professor of geology, earth science; Dr. Ben Malphrus, director of the Space Science Center, earth and space science; and Dr. Brian Reeder, professor of biology, environmental science.

In the TMP, each university researcher partnered with two experienced middle school teachers (mentors) to develop a cadre of 12 well-trained, content competent master teachers of mathematics and science. The mentors joined the MSU researchers, using a directed research model, to become actively involved in research projects in biology and environmental science, earth science, astrophysics, mathematics, computer science, and chemistry.

In the next step, the mentors paired with 1-2 beginning teachers (mentees) by involving them in some aspect of the research projects and by assisting them in content understanding, curriculum development, and individual growth as academicians and teacher-professionals.



Through this procedure, participants would work toward meeting TMP's goals:

- To improve teacher competencies in life science, earth science, space science, computer science, chemistry and mathematics;
- To improve teacher instructional strategies and best practices in mathematics and science education;
- To involve teachers and students in scientific research;
- To improve student exposure to effective mathematics and science instruction via the increase in teacher competencies;
- To develop a cadre of well-trained mathematics and science teacher who will ultimately assume leadership roles and who will mentor beginning teachers.

"Through this process, all the mentors and most mentees gained hands-on field research experience in their content specialty area," said Dr. DeMoss. "Our long term goal was to see an increase in middle school student math and science proficiency scores.

"It was expected that the participants would take the knowledge gained through scientific inquiry and other content rich, knowledge-based skills and integrate them into their curricula to create more innovative and exciting lessons for their middle school students," he added.

As with anything new, the TMP project had its share of minor obstacles and set backs. One of the major challenges faced by the research faculty was the logistics associated with finding the time to complete their research agenda and mentoring goals embedded within the TMP. Partnering middle grade teachers came from various academic backgrounds and they had different levels of educational attainment which required additional time in the research setting to master established research objectives.

Among the positive notes in the post-program survey, participants cited having only one mentee at a given time allowed them a greater degree of interaction and flexibility in fostering the inclusion of new teaching strategies within the content areas as based

on their work with the university faculty.

The attitude survey data, self-reported by the mentors and mentees, showed that the middle school teachers viewed their individual experiences and knowledge gained through their participation in the TMP as a very positive and rewarding professional growth experience. They believe their overall investment of time and energy in the program will provide long-term benefits to the students they teach and the school systems/communities they serve.

Additionally, the mentors and mentees have established functional, sustainable partnerships with university faculty to provide continued professional growth opportunities in the future.

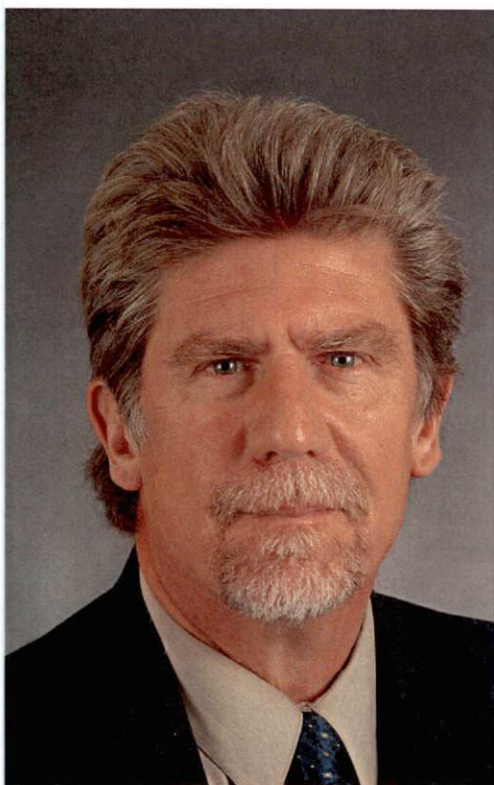
Teacher participants spent significant time in laboratories and in the field working alongside university researchers on their projects. A significant number of presentations resulted from the research projects in which teacher participants presented the findings at state and national conferences.

"The TMP mentors and mentees received invaluable experience and a deeper understanding in their content knowledge-base by conducting real-time laboratory and field research, and the university researchers promoted their research agendas in the process," Dr. DeMoss noted.

A long term goal, that may not be measurable, would be having a student that was more enthusiastic toward learning math and science content, therefore increasing math and science achievement levels.

The project followed a three-year time-frame. The first year was devoted to designing the experiments, developing instrumentation and research strategies and initiating the data collections. In the second year, time was devoted to experimentation and measurement. During the last year, university and middle grade teachers dedicated their efforts to data analysis and interpreting the results for dissemination, presentation and/or publication.

2007 DISTINGUISHED CREATIVE PRODUCTION AWARD RECIPIENT



George Eklund has established himself as a contender in the field of poetry writing.

His poems have regularly appeared in journals with such major authors as Hyden Carruth, Adrienne Rich, Marvin Bell, John Ashbery, David Wagoner, Gerald Stern, W.S. Merwin and Donald Revell.

He was included in a major international anthology published by Simon and Schuster and was a featured poet in Ireland's Virtual Writer. He was the first runner-up in Poets & Writers 2004 contest and has had works placed in a variety of publications across the U.S.

At the state level, the Kentucky Arts Council recognized Eklund with its Professional Assistance Grant in 1990 and 2004. He was awarded the Al Smith Fellowship in Poetry in 1992.

Since joining Morehead State University's faculty in 1989, he has published more than 100 poems.

Eklund, associate professor of English, was the 2007 recipient of the University's Distinguished Creative Production Award, one of the most prestigious awards given by the institution.

He was honored to be recognized for his creative work:

"For me to join the list of previous

winners is especially meaningful, since these artists and musicians have been my inspiration for many years. To imagine myself among them is both gratifying and humbling.

"When an institution honors a poet, it indicates that language and freedom of expression are valued highly by the University. I am pleased and proud to know that Morehead State University has a strong tradition for celebrating creative excellence along with scholarly achievement.

"I hope the tradition of this award gives students a very positive understanding of how the institution values its artists. I hope they can see that their own creative work is part of Morehead State's mission to serve the region and the nation," he added.

The Morehead community is a great place for writers, Eklund said, noting that he had benefited greatly from the high level of interest and support that is generated for the literary arts. He cited the Kentucky Folk Art Center, CoffeeTree Books, the MSU Bookstore and the Department of English, Foreign Languages and Philosophy as instruments in making the town and the University a hospitable place for writers.

"Visiting authors are always impressed with the level of interest and support at work in our community," he said. "I have always felt this nurturing environment as important to the growth of my own work; it's one of the reasons I have stayed here for 18 years."

Eklund is interested in writing poems that celebrate the human experience in all of its darkness and light. His most recent work distinguishes itself by marrying the traditions of the English lyric/narrative with the experiments of the post-structural poetics of association and deconstruction.

"I want to write poems that are attentive to human stories and feelings. At the same time, I am interested in both traditional and the nonlinear methods of communicating the human experience," he said. "I aspire to write poems that synthesize linearity and abstraction in creating discernable worlds made real by genuine human experience."

In addition to his works in national and regional journals, he has published two chapbooks of poems, "The Sorrow of the King" in 1993 and "Assemblage Without Technique" in 2006.

Chapbooks, which are usually smaller

collections than full-length volumes, first appeared in the 18th century and have made a resurgence because of the rising small press movement.

"The chapbook is a much desired and respected avenue for contemporary poets to reach an audience, especially since trade publication houses have essentially abandoned the publication of contemporary poetry," Eklund said.

Whether its journals, chapbooks or full-length volumes, publishing poetry comes with many challenges. For each publication, literally thousands have to be competed against. For lesser known publications, there may be 3,000 submissions while major works may draw upward to 20,000 submissions per year.

"The competition is immense and the resources for such literary publishing are limited," Eklund said. "For the working poet, two to four publications per year are considered a strong showing.

"I am just very proud to be able to continue to do what I love and be recognized for my accomplishments."

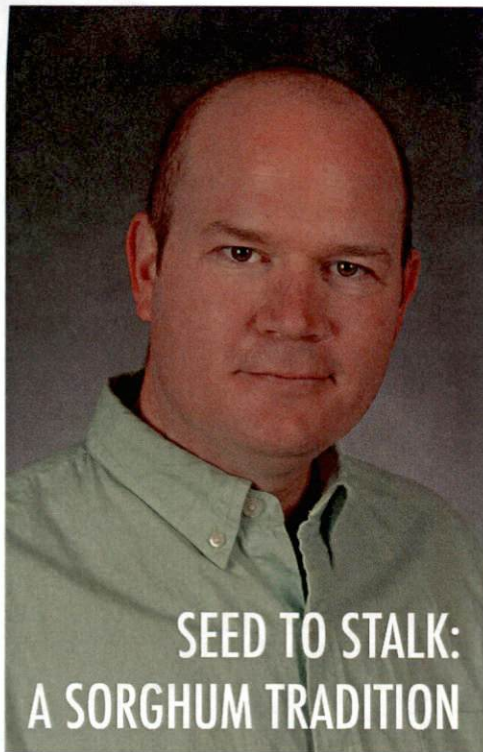
GEORGE EKLUND'S WORK:

POEMS PUBLISHED IN:

The American Poetry Review
The Massachusetts Review
The Laurel Review
CrazyHorse
Willtow Springs
Plainsongs
Widener Review
Poet and Critic
The Midwest Quarterly

CHAPBOOKS PUBLISHED:

Gone West of Sunrise Highway
The Sorrow of the King
Assemblage Without Technique



Jeffrey Hill has been making videos for more than 15 years documenting a variety of subjects, individuals and groups,

which has included musicians, storytellers, Kentucky folk artists and comedians.

A project funded by a Creative Productions grant through Morehead State University's Institute for Regional Analysis and Public Policy that he completed in 2007, has gained him the most notoriety to date.

When Hill relocated from Michigan to Morehead in 2002, he was introduced to sorghum making, a dying industry in Kentucky and a process that was unfamiliar to him.

Hill linked up with Ron Welch, a member of one of the last families in Menifee County who still produce sorghum. Welch agreed to let Hill tell his story.

For approximately 10 months, Hill visited the farm, capturing the planting, growing and harvesting the grain crop. He continued through the process of extracting the sweetness from the stalks and boiling it down to a liquid that can be used as table syrup or to sweeten baked goods.

Throughout his works, Hill strives to bring the person to life. "Welch is the only voice in this video," he said. "I want to capture the personal identity of the individual and what

they do."

With the taping complete, Hill sought assistance from some advanced production students who were studying electronic media. They packaged the final product which was made available to numerous state university and public libraries.

Hill is pleased with the video and honored that it aired on "Kentucky Life," the most successful local program on KET (Kentucky Educational Television). The video also debuted in Africa, where sorghum is an important food crop.

The film, "Seed to Stalk: A Sorghum Tradition," was screened at various film festivals internationally, including St. John, Canada; Swaziland, South Africa; as well as in Texas and North Carolina where it received awards.

A highlight for Hill, assistant professor of mass communication in MSU's Department of Communication and Theatre, was the screening in Anchorage, Alaska, at the Anchorage International Film Festival. There, he made a presentation on the video and the process involved.

LOST HISTORY AND STOLEN IDENTITY

Throughout the world, battlefields are important to how people see themselves and their history. At times, however, foreign governments seek to distort the past for their own political needs. Governments which administered Ukraine--be they Poland, Russia, Germany or Austria--sought to downplay any reference to Ukrainian national identity and Ukrainian national history. As a result, many of the historical things we take for granted as American citizens were denied or destroyed in Ukraine.

To help find the events which gave legal recognition to the modern Ukrainian state, in 2002 Dr. Adrian Mandzy, associate professor of history at Morehead State University, began studying the battlefields of Great Revolt of 1648. Working with colleagues and students from Poland, Ukraine and the U.S., he undertook a five-year battlefield study of the 1649 Battlefield of Zboriv. Funding for this research was made possible by two separate Fulbright-Hays Fellowships.

The project has revealed a wealth of new information about the battle and the events that helped shape the history of modern

Eastern Europe. In conducting the battlefield survey, Dr. Mandzy uncovered a section of the 1649 Zboriv battlefield. As a result, the area was declared a historical landmark and a registered archaeological site.

Dr. Mandzy is an internationally recognized scholar in the field of battlefield studies. Based on his previous work, he was asked to head an international team to look at the Poltava battlefield in Ukraine in 2006. Fought in 1709, this battle established the Russian Empire and witnessed the end of Ukrainian political power. Ukraine's ally, Sweden, never recovered from the defeat at Poltava.

The initial survey of the battlefield in 2007 indicated that the current Russian-built commemorative victory monuments are not in the place of the actual engagement. Further research is planned for fall 2008. Swedish National Television is making a series of films about the project and one of Sweden's most prestigious book publishers is helping to sponsor the research. A monograph about the project will be published in Ukrainian, Swedish and English in 2009.



THE 3 Rs ARE STILL IMPORTANT TODAY



What do math and reading have in common? Constructing meaning is a desired end result for anyone who is reading or who is “doing” math. Today we use the term “literacy” instead of “reading” to denote that the act of making meaning goes beyond what we have historically termed as “reading.”

Consider today’s 21st century learners moving from middle grades to high school—literacy challenges require students to be able to comprehend complex texts, use unfamiliar and technical vocabulary, and analyze a variety of texts and media in multiple subject areas and in different formats. The three Rs as we knew them—the basic elements of a primary school curriculum: reading, ’riting (writing), and ’rithmetic (arithmetic)—are demanding much more of today’s learners than from years past.

School districts can address these needs by developing coordinated approaches to reading and writing instruction, building faculty skills through professional development, and insuring that literacy in the mathematics classroom is held to high standards with the intention of increasing student achievement in both reading and mathematics.

Reading and mathematics are two critical areas of need documented in Eastern Kentucky schools, especially at the middle and high school levels. “However, this is not just a problem in Eastern Kentucky as national and state reports indicate that

students in the middle and high school grades are not making significant progress in both math and literacy,” said Dr. Cathy Gunn, dean of the College of Education at Morehead State University.

College of Education faculty took on that challenge through an Improving Educator Quality (IEQ) grant, funded by the Kentucky Council on Postsecondary Education. The project is titled “Effectively Integrating the 3Rs: Enhancing Mathematics Instruction and Achievement in Middle and High School Classrooms” as a play on the three Rs of the past.

“Not only did we receive the first ever IEQ grant for MSU, but also the Council awarded a second year of funding because of the grant’s critical focus on reading in middle and high school mathematics instruction,” Dr. Gunn noted. Faculty in the College of Education and in the College of Science and Technology have teamed up to work with teachers in Eastern Kentucky schools to improve both math and literacy instruction.

Activities with University and grant participants are intended to foster the development of active, engaged, independent readers in middle and high school mathematics classrooms who can understand math concepts when their teachers use effective math and literacy strategies in combination.

This project focuses on improving mathematics achievement through the integration of instructional strategies that have been found effective in reading literacy achievement. Because a focus on changing instructional practices appears to have made a significant difference in both elementary and middle grades reading academies, the faculty believes there is promise in using some of those same literacy instructional practices for the teaching of mathematics.

Mathematics instructors from the College of Science and Technology are engaging with middle and high school mathematics teachers to align literacy instructional practices across mathematics courses at all levels. The College of Education provides professional development opportunities in literacy instructional practices.

Following the successful Kentucky Reading Academy methodology, a Teacher Leadership Academy was held for middle and high school teachers in June 2007 and those teachers have been working with MSU

mentors on their instructional practices through the current academic year.

What are teachers learning in these academies? Professional development includes modeling to enhance the knowledge and skills of teachers in the use of research-based instructional practices (with a focus also on at-risk students and students with disabilities), data driven decision making, multiple assessment strategies, reading in the content areas, interdisciplinary and real-world connections, differentiated instruction, concentration on improving mathematics instruction, the use of a variety of print materials for math instruction, incorporation of practical workplace reading strategies, and strategies to address different learning styles.

Participants from the first year of the project teach in Lawrence, Martin, Knott, and Letcher county schools. A cadre of participants from the first year will attend leadership training this summer and these teacher leaders will provide mentoring support throughout the rest of the year to Year Two participants.

“This strategy of developing leaders builds capacity in schools as K-12 teachers are mentored in not only making changes in their classrooms, but in scaffolding their peers so the university support is no longer needed by the third year,” Dr. Gunn said.

Middle and high school teachers from around MSU’s service region are currently being recruited to participate during the second year. A culminating event will be scheduled for late spring 2009, where participants will be able to showcase their work from the two-year project.

The Council on Postsecondary Education has provided additional funding, allowing MSU to host a mini-conference for dissemination of information to other math teachers, special education teachers, pre-service teachers, and district instructional personnel throughout our region. These supplemental monies will allow MSU to invite a national speaker, Rick LaVoie, whose expertise is in differentiated instruction and specifically learners who have been identified with learning disabilities.

This IEQ project is one example of many in which the College of Education and its partners, including the College of Science and Technology, are engaging with the region to make a difference in K-12 student achievement.

WEST LIBERTY AREA INNOVATION CENTER



Whether you're a garage inventor, a university faculty member with a new piece of technology, or a software developer with the next "killer app," trying to introduce your product to market isn't easy.

The West Liberty Area Innovation Center was created to help entrepreneurs commercialize new technology. Whether one desires office space, technical assistance in obtaining financing, help with intellectual property, or assistance with specialized legal issues, the IC provides this assistance to start-up and existing businesses with such needs. Typical IC clients include inventors, software developers, and other technology-based enterprises.

Since its inception in 2004, the center has been addressing the shortcomings in the region's technology and innovation-based business sector. The project is located in the Morehead State University Regional Enterprise Center which serves as a resource facilitator and advocate in an education environment founded on the concepts of entrepreneurship and regional economic development.

The 3,500 square foot incubator, managed by Johnathan Gay, enables the center to deliver on its mission to promote and support new economy

innovations and business growth. It assists new and emerging businesses by providing space at competitive market rates, supportive services and networking opportunities.

The IC is a cooperative service of MSU's College of Business and Eastern Kentucky University's Center for Economic Development, Entrepreneurship and Technology. Dr. Bob Albert, dean of the college, has oversight of the center which is directed by Gay.

"We help entrepreneurs and inventors who have a piece of technology that has some commercial application. Many of the folks we work with are new to the world of business, so we help with all facets of business development. Probably the most important thing we do is help businesses find financing. Over the past four years, we've helped technology businesses, often with little more than an idea, leverage more than \$1 million in financing," said Gay.

The center continues to work with technology clients throughout MSU's service region. A few of the areas the IC has provided help to businesses over the years include patent assistance, FDA compliance, and introductions to venture and angel capitalists.

REMOTE SENSING OF TRIPLETT CREEK WATERSHED

The health and integrity of aquatic ecosystems are strongly influenced by the surrounding landscape. It is important for local watershed managers and scientists to understand how these influences impact aquatic communities at different spatial scales and over time.

That was the basis of research supported by a Morehead State University Research and Creative Productions grant awarded to two professors who served as coprincipal investigators; Dr. Christine McMichael, assistant professor of geography in the Institute for Regional Analysis and Public Policy, and Dr. David Smith, associate professor of biology in the Department of Biological and Environmental Sciences.

An ecosystem is described as a natural functional unit consisting of all living organisms (plants, animals and microbes) in the area, interacting with all the non-living physical factors of the environment. For their study, the researchers focused specifically on the 487 km² Triplett Creek watershed, located in the Daniel Boone National Forest in Rowan County.

"The project will contribute to the growing area of applied landscape-water resources research, as well as the literature

in remote sensing, water resources and environmental science," said Dr. McMichael.

The task of assessing water quality was accomplished by two methods of analyses: a biological survey to determine if the water was supportive of sensitive organisms (macroinvertebrates) requiring clean or moderately clean water, or if it contained



organisms generally tolerant of pollutants, and a review of satellite imagery to evaluate a "snapshot" of electromagnetic radiation reflected from the landscape.

Water quality is affected by a number

of factors, according to Dr. Smith. "In our region water quality is primarily degraded by sediment from soil washing into streams, and the presence of bacteria (potentially causing disease), influenced by inadequate septic systems and mammals (wild and domestic)."

Remotely sensed data for the watershed was obtained from a Landsat Thematic Mapper satellite image processed to produce selected landscape condition indices (e.g., greenness and wetness). Resulting data were imported into a Geographic Information Systems (GIS) database and geographically linked to the macroinvertebrate-based metrics.

The researchers then analyzed the relationships between landscape condition indices and macroinvertebrate-based metrics using a range of multivariate statistical techniques including Principal Components Analysis and Canonical Correspondence Analysis.

Findings from the study were compared with those from related work in the remote sensing, water quality and aquatic ecosystem literature. These results will contribute to the growing area of applied landscape-water resources research and will be utilized by watershed managers.



KY-HMP

IMPROVING ECONOMIC DEVELOPMENT, EDUCATION
AND SAFETY ACROSS KENTUCKY

Whether it is for a home or a business, a highway, waterway or utility facility, efficient and safe construction activities depend on establishing a strong infrastructure and requires lots of time, evaluation and financial resources. For instance, one of the first considerations in any project is determining a feasible location. Does it have accurate elevation, or is it sitting on a fault line or in a floodplain area? Are these data readily available? In the past, these resources have been limited in Kentucky, slowing down development, inhibiting construction and siphoning scarce funds from other projects.

Progress has been made in securing this information and making it accessible to all interested parties, according to Dr. Timothy S. Hare, assistant professor of anthropology in Morehead State University's Institute for Regional Analysis and Public Policy. Working through the Kentucky Height Modernization Project (KY-HMP), a team is building the infrastructure necessary to support all individuals and businesses that have a need.

"This information collected through KY-HMP will have an impact on the country but especially on the state," Dr. Hare said. "For future homeowners, they can make a better decision on where to build or buy a home. For prospective businesses, it will lower the hurdle by decreasing the costs, allowing them to establish facility sites in Kentucky. This will support the economy in ways that were not possible before," he added.

A federally-funded program, Kentucky Height Modernization is a cooperative effort

of the Kentucky Division of Geographic Information, Kentucky Transportation Cabinet and MSU's IRAPP. Height Modernization builds the geospatial infrastructure necessary to establish accurate, reliable heights using Global Positioning System (GPS) technology in conjunction with traditional leveling, gravity and remote sensing information. With it, there is an improvement in the knowledge of elevation, the most basic of mapping and planning tools, making access to it better, faster and cheaper.

While the work continues, sixteen base stations have already been established, in addition to the four already provided by IRAPP, utilizing GPS equipment and recording information on an around-the-clock basis.

One working station is located on the MSU campus. Information from the first systems is already available for free through the Internet at the CORS Web site. A number of business and government agencies are already using the existing data provided.

Since coming to MSU nearly five years ago, Dr. Hare has been actively involved in this project because of his background in geospatial technology. He wants to educate the members of his community to use the new technologies and make better choices

for a safe environment. Dr. Hare and other team members are spearheading outreach activities for teachers, business people and government officials to support development and use of the expanding geospatial resources in the state. The central hub for these services is the Web site of the Kentucky Center for Geospatial, Education, Research and Outreach (KCGERO). These activities are especially targeting teachers so they can better motivate students in math and science.

Analyses performed by several other states have shown that Height Modernization has yielded substantial savings for future routine and necessary projects in an array of concerns.

The geodetic infrastructure is based on the development and maintenance of geodetic reference systems and reference frames to support surveying, mapping and researching with the necessary accuracy and integrity. The resulting geodetic control and model provide the ability to derive products, meeting the needs of a broad spectrum of users and applications. Completing the goal, which will be done in three phases, is estimated to take three to five years, depending on funding.

Phase one included the establishment of geodetic control to improve the regional geoid model and provide a reference frame

for surveying and remote sensing. Currently, the second phase is developing an accurate Digital Elevation Model (DEM) from data collected by Light Detection and Ranging (LIDAR) and calibrated to the geodetic control. Phase three consists of the creation of products which make the geodetic control and DEM accessible to a broad range of users, packaging it with statewide digital



orthophotography.

Funding for KY-HMP's phase one was provided by a \$500,000 appropriation grant by Congress to NOAA's National Geodetic Survey for Geodetic Surveying in Kentucky. Providing oversight is the Kentucky Geodetic Consortia, a collaborative project team comprised of representatives from MSU, the Kentucky Division of Geographic Information, Kentucky Transportation Cabinet and a host of selected organizations.

FOCUS

On Research and Creative Productions at Morehead State University

