

FOCUS

On Research and Creative Productions at Morehead State University Vol. 12 & 13



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FOCUS

FOCUS is published with state funds under KRS 57.375 through an off-campus printing contract and is printed on recycled paper.

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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 committed to providing equal educational opportunities to all persons regardless of race, color, national origin, age, religion, sex, or disability in its educational programs, services, activities, employment policies, and admission of students to any program of study. In this regard the University conforms to all the laws, statutes, and regulations concerning equal employment opportunities and affirmative action. This includes: Title VI and Title VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Executive Orders 11246 and 11375, Equal Pay Act of 1963, Vietnam Era Veterans Readjustment Assistance Act of 1974, Age Discrimination in Employment Act of 1967, Sections 503 and 504 of the Rehabilitation Act of 1973, Americans with Disabilities Act of 1990, and Kentucky Revised Statutes 207.130 to 207.240. Vocational educational programs at Morehead State University supported by federal funds included industrial education, vocational agriculture, business education, home economics education and the associate degree program in nursing.

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FOCUS is published by the Morehead State University Office of University Marketing in conjunction with the Office of Research, Grants and Contracts and the Research and Creative Productions Committee.

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www.moreheadstate.edu

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Ronald D. Morrison: Distinguished Researcher



“Research remains, in my opinion, the single strongest asset to effective teaching” maintains Dr. Ronald Morrison, professor of English.

An MSU faculty member since 1988, Dr. Morrison has strong feelings about the relationship between teaching and research, and his curriculum vitae reflects the fact that he has worked diligently to develop both areas of his professional life. As a graduate student at the University of Kansas, he won several awards for teaching and scholarship, and in 2003 he won an Outstanding Teacher Award from the South Atlantic Association of Departments of English.

Dr. Morrison reports that winning the regional teaching award and the MSU Distinguished Researcher Award within a six-month period was an exhilarating but extremely humbling experience. Moreover, it was a chance to reflect further on the relationship between teaching and research.

“My own experiences, as an undergraduate and graduate student,” said Dr. Morrison, “convinced me that my best professors were teacher-scholars who actively engaged in research in their respective fields. While sound methodology and enthusiasm are certainly important for successful teaching, an instructor’s thorough engagement with a discipline through research is the single strongest asset to effective teaching.”

“I believe my students have benefited

from my active research agenda. While my research interests do not always directly

influence my teaching on a daily basis, when possible I have made an effort to teach the literary works that I have written about, and my research activities have greatly influenced my knowledge of the primary literary texts, the critical material that illuminates them, and the theoretical models that shape my discipline.”

Trained as a specialist in British Victorian literature, Dr. Morrison has published widely in his field and is a frequent presenter at state, regional, and national meetings and conferences in literary studies. In addition, he frequently reviews scholarly books for *Choice*, a journal published by the Association of College and Research Libraries, a division of the American Library Association. He has also been awarded five MSU Summer Research Fellowships and an MSU sabbatical leave.

While Dr. Morrison has broad research interests in literary studies, his scholarly productions reveal several themes to his work. Several of Dr. Morrison’s publications focus on gender roles in nineteenth-century literature and address such major figures as Thomas Hardy and Christina Rossetti. Dr. Morrison is also very interested in the nature of literary influence, and thus he has also published work exploring the influence of Victorian novelists and poets on

contemporary writers such as Rosario Ferré and Kim Newman.

For several years now, Dr. Morrison’s long-term research has focused on the literary influence of the Victorian Humane Movement, a multi-faceted social and political movement that is intimately connected to Victorian attitudes about science, social class, and imperialism. Dr. Morrison, who grew up on a farm in Kansas and who enjoys working with the donkey and mule that live on his “baby farm” in Rowan County, reports he is happy to have found a research project that connects the various parts of his life.

Dr. Morrison notes that his work is often cited in other scholarly publications, added evidence that his essays are being read and used in contemporary literary research. He is particularly proud that several works primarily designed for student application refer to his publications, further illustrating the link between teaching and research.

Dr. Morrison attended Marymount College of Kansas, then earned his M.A. (1984), M. Phil. (1986), and Ph.D. (1988) from the University of Kansas. At MSU, he has been involved in a range of faculty governance activities and has served as Chair of MSU’s Faculty Senate.

Frank A. Oddis: Distinguished Creative Productions Award

Frank Oddis, associate professor of music, has served as coordinator of the MSU Percussion Program since 1977 and is the recipient of the Distinguished Creative Production reward.

Professor Oddis performs with the Faculty Jazz Quartet at MSU, including their recently released compact disc recording *Blue Duck Suit*. He has worked as a freelance percussionist and drummer for many well-known celebrities and jazz artists, the national touring companies of *A Chorus Line* and *Annie*, and 20 annual performances for the Lexington Singers Pops Concerts.

Additionally, Professor Oddis performs as a percussionist with the West Virginia Symphony Orchestra and as a drum set artist for their annual Pops Series. Membership in the former Kentuckiana Brass and Percussion Ensemble led to performances at the Midwest Band and Orchestra Clinic, the Music Educators National Conference, and at the International Brassfest. The Percussion Ensembles at Morehead State University are nationally recognized and have won three Percussive Arts Society National Championships in Marching Percussion under Oddis' leadership.

Morehead State University and Professor Oddis have hosted a "Day of Marching Percussion" for sixteen years and are considered national pioneers and innovators in the area of indoor marching percussion ensembles. In addition to directing percussion ensembles at MSU, Professor Oddis serves as music arranger for the groups. His arrangements and compositions for percussion ensemble have been performed by university and high school percussion ensembles nationwide.

Most recently, the Morehead State University Concert Percussion Ensemble toured Beijing, China, performing at the Central Conservatory of Music and at the

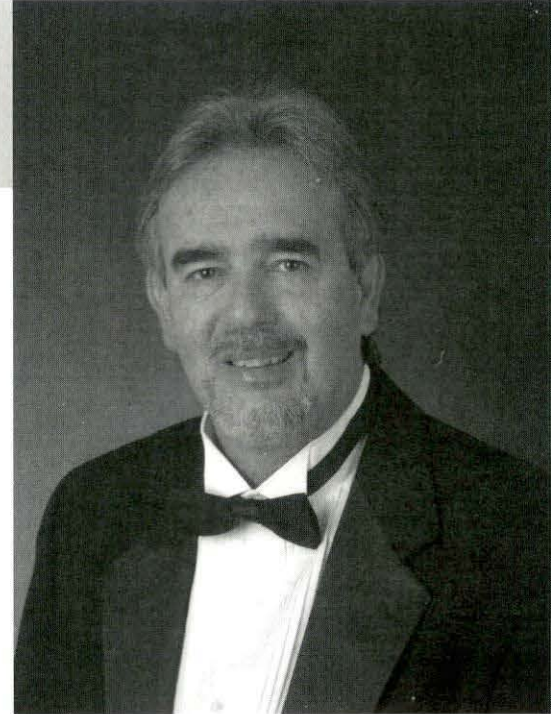
famed Beijing Concert Hall. "Though professional percussion ensembles exist," says Professor Oddis, "the medium is fostered primarily in universities throughout the world. The percussion ensemble has been my main focus for creative endeavors in music scoring and conducting throughout my career. Production of performances in this medium in its three forms, marching, indoor marching, and concert, involves the coordination of many elements including programming, staging, choreography, drill design, instrumentation, and props."

Professor Oddis has been recognized as an innovator and pioneer in indoor percussion activity by numerous national organizations including Bands of America, Percussive Arts Society (PAS), Drum Corps International (DCI), and the Indiana Percussion Association through invitations to evaluate the creative productions of percussion ensembles on a national and international level.

Under Professor Oddis' direction, the MSU percussion Ensemble has performed with some of the leading percussion soloists in the world including Dave Samuels, Bob Becker, Gary Gipson, Gordon Stout, Ruben Alvarez, and Chalo Eduardo.

As percussion arranger, Professor Oddis was involved in composing and arranging music for the MSU Marching Band for 24 years and the MSU Indoor Marching Percussion Ensemble for 16 years, a creative endeavor that essentially creates a new textbook annually for each performing ensemble. The music composed and arranged for the indoor ensemble was offered in juried performances at the National Marching Percussion Forum four times, with three first place finishes and one second place.

Professor Oddis' interest and involvement in Brazilian music has led to the development of successful 21st Century



grants in Rowan and Montgomery counties of Kentucky, organizing at-risk students into Brazilian rhythm bands, similar to the groups that parade the streets during a Brazilian carnival.

Professor Oddis serves as adjudicator for DCI, PAS, Bands of America, and many other state and regional organizations. He is a clinician and endorser of Ludwig drums, Sabian cymbals, and Vic Firth sticks and mallets. Professor Oddis has presented educational workshops and conducted concerts nationwide and internationally in the Peoples Republic of China and Brazil.

Professor Oddis holds a Master of Music Performance degree from East Carolina University and a Bachelor of Music Education degree from Morehead State University.

An Examination of Congruency of Literacy Instruction from Middle Schools to High Schools in the Commonwealth of Kentucky

Mary Anne Pollock, Beverly M. Klecker, Mattie Decker, Dreama Price



Four MSU faculty members participated in “An Examination of Congruency of Literacy Instruction from Middle Schools to High Schools in the Commonwealth of Kentucky,” a research project funded by the Collaborative Center for Literacy Development (CCLD).

Dr. Mary Anne Pollock, principal investigator, and Dr. Beverly M. Klecker, principal researcher, collaborated with Professor Emeritus Dreama Price and Dr. Mattie Decker of MSU; Dr. Susan Edington, Dr. Mary Lou Yeatts, and Dr. Chandra Islam of Murray State University; and Dr. John Nelson of Pikeville College. The grant was funded for two years, 2002-2004, for \$79,242.

The purpose of the research study was to explore the questions: “Do teaching practices in schools with high reading achievement scores differ from teaching practices in schools with low reading achievement scores?” and “Are there differences in the inclusion of literacy goals in the Comprehensive School Improvement Plan between schools with high reading achievement scores and schools with low reading achievement scores?”

Using the 2002 10th grade reading scores from the Kentucky Core Content Test, a sample of 20 high schools and their feeder middle schools were randomly selected from the 25 highest scoring schools and the 25 lowest scoring schools in each of two geographical regions: Western Kentucky and Eastern Kentucky. During the spring of 2003, teachers in these schools who agreed to participate in the study responded to a survey identifying the classroom practices they use to facilitate reading across the curriculum. During the academic year of 2003-2004, classrooms of participating teachers were randomly selected; instruction in these classrooms was observed, and these teach-

ers were interviewed about their practices to support content area reading. Additionally, the Comprehensive School Improvement Plan (CSIP) for each respective school was examined.

The researchers from Morehead State University, Murray State University, and Pikeville College met in Elizabethtown in July 2003 to development the data gathering tools and in July 2004 to review and interpret data from the study.

Data analyses indicated there were differences found in teaching practices in schools with high reading achievement scores and in teaching practices in schools with low reading scores. Only one statistically significant ($p < .05$) difference was found by the Teacher Survey: “I use grouping (pairs to small groups) successfully to engage students in learning;” the mean rating for the High Scoring Schools was statistically significantly higher than the mean rating for the Low Scoring Schools. The means for both groups were above the scale midpoint of 3.00.

Additionally, from the Teacher Observation section of the study, there were two statistically significant differences between the observed frequencies of teacher practices in the High Scoring Schools and the Low Scoring Schools. However, these differences were in an unexpected direction. On both items, the teaching practices were observed more often in the Low Scoring Schools. (“Teacher takes time to develop vocabulary at the beginning of the lesson” and “Teacher engages students in using context clues for the vocabulary words at some point during the lesson.”)

In general, in the Teacher Interview data, the “flatness” of the data, that is, the lack of difference in measures between high scoring and low scoring schools was the most remarkable observation. Based on responses

to the surveys, observations, and interviews there seems to be little difference in teacher instructional practices that account for students’ achievement on the KCCT reading test.

There were few differences apparent in the Comprehensive School Improvement Plans of High Scoring and Low Scoring Schools. Professional development to improve support for reading instruction was higher in Low Scoring Schools; however, many of the CSIPs indicated that professional development was to be for English/Language Arts teachers rather than for all teachers in the schools.

The Low Scoring Schools mentioned “Support materials are provided for reading instruction,” more frequently (71%) than did the CSIPs of High Scoring Schools (52%). Sixty-seven percent of the High Scoring Schools planned to provide intervention for students of low reading ability while 57 percent of the Low Scoring Schools planned intervention for students of low reading ability. Low Scoring Schools may be focusing on increasing the reading ability of all of their students because their overall scores are so much lower.

Results of the study were presented in the final report to CCLD in August 2004. The results were presented through peer-reviewed conference presentations at the Midwestern Educational Research Association and the Mid-South Educational Research Association in fall of 2004. These papers [full text copies] are available electronically through the national Educational Resources Information Center (ERIC) through MSU’s library. One revised conference paper has recently been published in *Reading Improvement*, 42, (3), 149-157.

A Phonological Atlas of Kentucky English

Terry Irons

Contemporary socio-linguistic research has identified three sound changes in progress: the Northern Cities shift, the Southern shift, and the Low Back Vowel Merger. While some of these changes show regional variations among ethnic groups and sociological categories based on age, gender and class, others, particularly vowel fronting and low vowel merger, are found across regions and social classes.

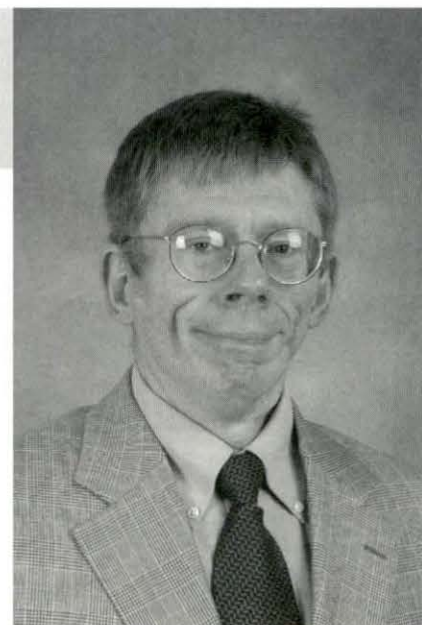
This project, funded by NSF EPSCoR and MSU's IRAPP, traced the progress of these ongoing mergers and shifts in Kentucky English. Largely neglected in recent scholarship, Kentucky represents an important transitional Zone between the North and the South, and it is important to examine the diffusion and spread of these conflicting changes in a region with a range of geographic, economic, and social heterogeneity in its urban/rural mix.

This project prepared an atlas of sound patterns in Kentucky English and attempted to

define regional speech boundaries on a basis of phonological features. Speech samples were collected from five regions across the Commonwealth and were analyzed using instrumental techniques of phonetic analysis. A Web site, www.phonoatlasky.net, provides access to the atlas.

In terms of intellectual merit, the project enlarged our knowledge of the pronunciation of English, especially in rural, economically-subsistent regions of Kentucky. Such information from rural areas is crucial data needed for testing and refining theories of language change.

Further, in terms of broader impact, the information gained helped advance the state of the art in speech recognition, where dialect diversity has been an obstacle limiting success. The project also involved undergraduate students in the development of research and technological skills appropriate in our developing economy.



A Study of Electroluminescence and Stability of CdTe Solar Cells

Kent Price

This project developed an electroluminescence laboratory at Morehead State University to integrate research on the stability of CdTe solar cells with the teaching of advanced undergraduate laboratory courses.

The objectives of the research are to (1) construct an electroluminescence apparatus at MSU; (2) use the apparatus to study long and short term degradation mechanisms in CdTe-based solar cells; (3) disseminate the results at regional meetings and through national publications; and (4) train undergraduates in the basics of semiconductor physics, photovoltaics and basic laboratory techniques.

Thin-film CdTe photovoltaic devices are viewed as an important part of the nation's long-term energy strategy. These devices are much less expensive than conventional solar cells, but there are obstacles to their large-scale application. One such obstacle is the lack of knowledge of

the mechanism that causes degradation in the devices upon exposure to light.

Electroluminescence (EL) has the potential to provide important information regarding cell degradation but has not yet been systematically applied to CdTe-based solar cells. This project studied the EL from five types of CdTe-based solar cells and analyzed the results to obtain information about ratio of electron current to hole current and radiative recombination at the device junction.

The activity is of significant merit intellectually, since EL has not yet been used to study stability in CdTe solar cells and has the potential to yield important information on the degradation mechanism, but the broader impact is the involvement of MSU students in meaningful research in the field of semiconductor photovoltaics.



Appalachian Mathematics and Science Partnership

Gerald DeMoss

The Appalachian Mathematics and Science Partnership (AMSP) is an integrated initiative of nine institutions of higher education (IHE), fifty-one school districts, the Kentucky Science and Technology Corporation, and the Prichard Committee for Academic Excellence.

This cooperative partnership trains pre-service mathematics and science teachers in the service region in standards-based content, provides professional development and mentored support to in-service teachers implementing standards-based materials into their K-12 courses, increases student enrollment and achievement in advanced science and mathematics courses, and develops both a high quality education workforce in mathematics and science and a competent technological workforce in related fields.

Perhaps the single most important component in achieving the goals of the AMSP is development of partnership relationships that not only engage Science Mathematics and Technology (SMT) faculty and school district teachers and administrators in mutual contributions to SMT education reform but also cement partnering relationships across various levels within the broader AMSP.

While the project is defined in its simplest terms as a partnership among “nine IHEs, 51 school districts, the Kentucky Science and Technology Corporation, and the Prichard Committee for Academic Excellence,” the

reality is that natural partner affinities either already exist or have arisen out of efforts to address local mathematics and science education issues. The result is that the AMSP is also a network of other smaller cross-linked partnerships at various levels. The impetus that these smaller “partnerships within the partnership” provide for significant progress in meeting the goals of the AMSP is immense.

During the most recent funding year, this network of multiple partnerships has been the key vehicle advancing the science, mathematics, and program implementation strands and, in turn, the means for progress toward broader project goals in areas such as pre-service and in-service teacher development, student learning, program leadership development, and local mathematics and science improvement. All project activities occur in a collaborative environment across the major categories of activity—development, adaptation and implementation, mentored support, and research and assessment of project outcomes. Major planning and guidance in the selection of specific activity focuses come through the Initiative Advisory Councils and the AMSP Development Teams. These specific organizational structures, along with the Regional Program Coordinators, ensure partner representation across institutions and stakeholders and activity development that meets regional needs for improvement.

Higher Education Partners are inextricably involved with AMSP initiatives and have committed to significant program improvement efforts in pre-service programs for teachers and administrators and in-service training and mentoring support for teachers and administrators.

Mathematics and science faculty are involved in pre-service course development and in-service teacher training, maintain several student program opportunities and serve on AMSP Mathematics, Science, and Program Implementation Advisory Councils.

An essential ingredient of the project administration is the leadership of the local Principal Investigators (PI) at the IHE partners. The local PIs are college or department

administrators selected by the institution because of their administrative experience and interest in the development of partnership among IHEs and school districts to improve SMT education in the region.

In addition to meeting with central management regarding project strategies, planning, administration, and implementation, they administer their institution’s AMSP sub-award, recommend and negotiate faculty assignments for program implementation as well as recommended new initiatives that address AMSP’s goals and benchmarks and provide periodic reports on budget and activities.

A primary program implementation strategy for the development and sustenance of partnerships between institutions of higher education and local school districts has been the efforts of AMSP Regional Program Coordinators housed at four locations: The University of Kentucky, the University of Tennessee at Knoxville, Morehead State University and the University of Virginia’s College at Wise. These full-time regional program coordinators develop a communication network and partnership network that connect both school and district personnel, higher education faculty, and support organizations.

School district partners have committed to significant program improvement efforts, implementation of professional development and leadership training to enhance district curriculum and SMT enrollment and achievement, implementation of standards-based practices, and assistance in recruitment and development of teachers in mathematics and science disciplines.

Two National Advisory Panels assist AMSP in program planning and review. They are the National Advisory Board and the Research Advisory Council which has helped AMSP set its research agenda. The research agenda has been established and RFPs have been distributed to appropriate groups.

Achieving its mission entails the AMSP working in a systemic fashion in its partner school districts and institutions of higher education (IHE).



Computer Science and Mathematics (CSAM) Scholarship Program

Rodger Hammons, Lloyd Jaisingh, Russell May, Doug Chatham, Kathryn Lewis, Kenya Arrington, Carol Becker, Mike Hopper

The primary goal of the CSAM Scholarship Program is to increase the number of MSU students who graduate with a baccalaureate degree in computer science or mathematics and who become valuable employees in the technological workforce. Other goals for the CSAM scholarship program include increasing the number of well-educated and skilled employees in fields related to computer technologies and mathematics; improving educational opportunities for students; increasing retention levels for students majoring in mathematics or computer science; increasing the number of students in mathematics or computer science from underrepresented groups; improving student programs; and developing strong partnerships with technology-related businesses.

The CSAM Scholarship Program builds on existing MSU student support structures and provides additional assistance to scholarship recipients, including renewable scholarships of up to \$3125 per academic year; career development activities; faculty mentors; professional organization membership in the Mathematical Association of America (MAA), the Association for Women in Mathematics (AWM), or the Association for Computing Machinery (ACM); seminars; shadowing

experiences to work sites related to students' long-term career goals; and tutoring services.

All entering, current, and transfer students who meet the scholarship requirements are encouraged to apply. The requirements include admission as a full-time MSU student majoring in mathematics or computer science; US citizenship or status as a national, refugee alien, or permanent resident alien at the time of application; and qualification for financial aid in accordance with US Department of Education regulations; and demonstrated academic potential, based on several criteria such as high school grade point average, ACT scores, and letters of recommendation from instructors or counselors.

The CSAM management team may interview applicants that do not meet all these criteria, and special consideration may be given to applicants from underrepresented groups.

Partial support for this work was provided by the National Science Foundation's Computer Science, Engineering and Mathematics Scholarships Program under grant number DUE 0324106.



Perceptions and Adoption of E-Business and E-Commerce Information Technology in Appalachian Eastern Kentucky Small and Medium Enterprises

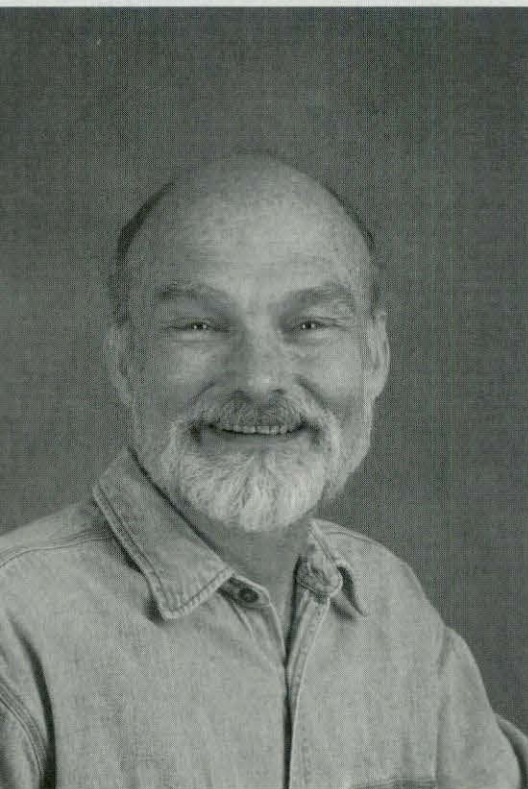
Scott A. Wymer, Elizabeth A. Regan

This project is an effort to understand the current perceptions and level of implementation of e-commerce and e-business technologies among small business within Appalachian Kentucky.

It examined current levels of knowledge, awareness, and use of these technologies, as well as perceived barriers to implementation and adoption of these techniques among decision makers of small businesses in the region. Data was gathered through the use of mailed, self-completion survey instruments sent to approximately 3,000 businesses in the Eastern Kentucky region, with an expected response rate of 10 to 15 percent.

Despite many current state initiatives geared toward building technological innovation in Kentucky and the noted positive impact that the use of these technologies can have on small business, little research has been done to date to survey the current use of such technologies in Eastern Kentucky.

Results from this research can be generalized to look at issues of e-business technology adoption in similar isolated rural regions throughout the United States and the world.



Jack Weir: Distinguished Researcher

Dr. Jack Weir, professor of philosophy, is the Distinguished Researcher recipient.

Dr. Weir, a prolific researcher and author, began his career in the ministry after completing an M.Div. (1975) at Rice University and Ph.D. (1978) at Southwestern Baptist Theological Seminary before going back to the University of Chicago for the M.A. (1983) and Ph.D. (2004) in philosophy and a career in teaching and research. He has been at MSU since 1994, with an extensive record of teaching, publication, presentations, and editing for scholarly journals.

"My research has been broadly on three topics," said Dr. Weir, "religion, especially philosophy of religion, the relationship of science and religion, and biblical criticism; animal ethics; and environmental ethics."

His first refereed scholarly publication, in 1982, was a critical paper on the nature of fulfillment of the Old Testament in the New Testament.

"My work in animal ethics has centered

mainly on two issues," said Dr. Weir. "The moral status of nonhuman animals and vegetarianism. I argue that according to the two prevailing moral theories, utilitarianism and Kantianism, animals are not as morally considerable as humans."

Assigning lesser moral value to animals has led some other researchers to the assumption that individual animals can be subjected to horrible pains if the collective total is balanced. Whether animals have their own language or can understand human language are, according to Dr. Weir, important questions for assessing the moral status of animals.

In a presentation to the Society for Ethics and Animals, Dr. Weir began his work on the application of virtue ethics to animals. "My argument," says Dr. Weir, "is that animals can be virtuous, such as a loving cat, a friendly dog, etc., and that virtue-based ethics avoid some of the criticisms of utilitarian and Kantian-type ethics."



Travis Lockhart: Distinguished Creative Productions Award

Dr. Lockhart earned his B.A. from Baylor University, the M.A. from the University of Minnesota, and the Ph.D. from the University of Texas at Austin. He previously taught at Buena Vista College, University of Texas at Austin, and East Carolina University, and has been acting and directing for four decades.

"As Sanford Meisner, a distinguished American actor and teacher, once said," stated Lockhart, "Acting is really very simple. It just takes years to learn. 'The same could be said for directing, theater in general, and anything else worth pursuing in life.'"

Dr. Lockhart has learned well. "I have lived a substantial part of my life in imagination," he said. "I have come to believe in the value of that world in so far as it produces a means of sharing the experience of being human with others. Art in all its forms is a means of making the imagination possible. Storytelling, which is theater's first

function, is a branch of art."

Dr. Lockhart stated some basic principles of producing, performing and teaching theater based on his experiences.

Theater is a collaborative art and the nature of that collaboration needs to be understood by all the collaborators. All art, however, is collaborative because it depends upon the imagination of others, namely the audience.

The actor's task is essentially to connect imaginatively with the words of the playwright with their psychological and emotional implications. The most important work takes place between the lines, not on the lines. Dialogue is like the surface of a body of water. Ideally the acting process should be like breathing in and breathing out, and must seem just as inevitable.

Actors must nurture and protect their individuality. In the process of enlargement necessary to create and project a character

Travis Lockhart, Ph.D., professor and director of theater, who has taught at Morehead State University since 1982, is the Distinguished Creative Production recipient.

Market Mechanism for Environmental Improvement in an Inefficient Economy

Thomas Creahan



Dr. Weir's study of environmental ethics asks whether or not the environment has some kind of mind-independent (human-independent) value and whether obligations can be derived from that value. He argues that our identities are interdependent with the environment.

Three of Dr. Weir's environmental case studies have been published as articles, and "The Sweetwater Rattlesnake Roundup" has received the widest attention, being often cited and requested.

"The resources of the planet will not allow all peoples to live according to Western standards," says Dr. Weir, and adds that "for reasons of fairness and distributive justice, the affluent nations should make future sacrifices, not the poor and developing nations."

Economists often assume market efficiency because, under ideal conditions, markets are efficient. Efficient markets are relatively easy to model and the models often give straightforward and elegant results.

In the real world, however, markets and economies are not always perfectly efficient. While gains in efficiency can often be obtained by using market mechanisms, there might be even further gains if the markets themselves can become more efficient.

If there is one source of inefficiency, such as an externality like pollution, a simple market-based remedy like a Pigovian tax can restore efficiency. In modeling terminology, the partial equilibrium solution that restores efficiency in the inefficient market also assures an efficient equilibrium in the economy.

But, when multiple sources of inefficiency exist, things become more complicated.

The elegant partial equilibrium results are no longer efficient in a general equilibrium context. This is the second-best world. In general, if one or more first-order conditions for an optimal solution cannot be met, then the other conditions will not be optimal. If multiple sources of inefficiency

exist in a system, they tend to interact. The mechanism that would correct a single inefficiency (e.g., a Pigovian tax) would not be optimal for a second-best case with additional inefficiencies. Therefore, models that ignore some inefficiencies will not, in general, yield correct optimal results.

The literature on market mechanisms to alter environmental behavior in a second-best world has focused on the double dividend, the use of environmental taxes in the presence of pre-existing taxes. This research project was designed to explore other inefficiencies.

on stage, the actor inevitably invests the role with his own life experience and imagination. The best actors reveal a part of themselves in the process.

To repeat from above, "Acting is very simple. It just takes years to learn."

Dr. Lockhart summarized several of his productions in his presentation to the awards committee. For "The Women of Troy," the main goal in the collaboration was to create a primitive world in which violence and human sacrifice were common, and a world in which the devastation of war had rendered once noble victims physically and emotionally impoverished and conquerors dehumanized. The play was staged in Kibbey Theater, where a quasi-arena effect was created, and the chorus of women who are the core of the play were individualized while at the same time the choral values in the poetic passage were preserved.

For "The Elephant Man," the story of

a 19th Century young man who suffered from a severe physical disorder leaving him hideously deformed, Lockhart had the main character played by an actor who made no effort to use makeup or costumes to depict the character's misshapen nature. The actor portrayed the character by physically contorting his body and adjusting his movements to suggest his crippling deformity, thus always emphasizing the beautiful spirit which is his true nature.

Of the "Foxfire" performance, the style of the play required a natural, unpretentious delivery from all of us. An energized naturalness and a relaxed body and voice were essential. Comic moments must flow out of the reality of the world of the play. "Nothing is worse on stage than an actor caught

trying to get a laugh," said Lockhart.

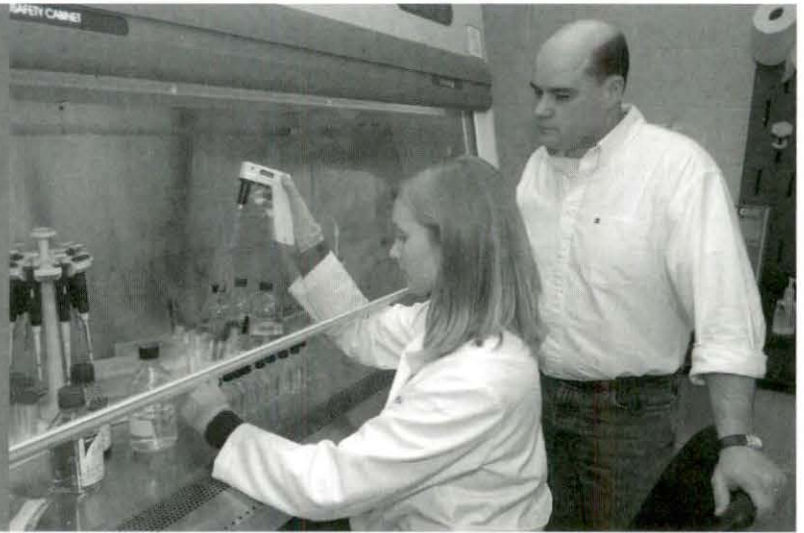
"Equus" was the opening production in the new Lucille Little Theater, with Lockhart in the physically demanding role of Martin Dysart, one of the lengthiest in contemporary drama. "I found it vital to underplay and simply receive from my fellow actors," said Lockhart.

The decades of MSU students who have "simply received" from Travis Lockhart know how well he performs, whether his role is actor, director, or teacher.

Molecular Mechanisms of Estrogen-Related Bone Resorption

Darrin DeMoss, David Peyton

Dr. DeMoss (standing) and Christine Pendleton-Senior Biology Major.



The primary objective of this project is to enhance understanding of the mechanisms of increased bone resorption resulting from estrogen deficiency. Investigations combining organismal, cellular, and molecular level techniques are simultaneously being utilized to facilitate an understanding of this mechanism. The analysis of changes in gene transcription will focus on estrogen and the effects of calcium channel antagonists on skeletal physiology. Specific target genes will be assayed to elicit their role in bone resorption in osteoclast and osteoblast cell lines.

To monitor the fluctuations in intracellular calcium, estrogen and non-estrogen treated cell lines will be compared with that of the effects of an array of calcium channel blockers like verapamil, nifedipine, and diltiazem on OVX rats to determine if changes in basal and stimulated bone resorption parameters are similar. At the organismal level metabolic bone degradation markers will be utilized for measuring skeletal bone resorption in urine previously collected and stored from experimental groups of rats with the same variety of calcium channel antagonists. The doses of estrogen and channel antagonists were also given together in order to determine if the effects of these compounds are additive in reducing bone resorption.

The results will provide insight into the specific parameters of skeletal bone resorption in the intact animal, including broader understanding of the effect of estrogen deficiency on basal and stimulated resorption. The studies involving a variety of calcium channel antagonists, which influence intra-

cellular calcium levels, are crucial to the understanding of the mechanism by which estrogen-mediated attenuation of bone resorption is elicited at both the organismal and molecular level. This experimental approach is unique in that it will allow the integration of investigations at various organizational levels in order to determine whether estrogen acts directly or indirectly to decrease skeletal bone resorption, a mechanism that appears to be very similar to the calcium channel antagonists that have also been shown to reduce bone loss.

The long-term goal is to determine the mechanisms mediating age-related osteoporosis. The major objective is to determine the mechanisms of increased bone resorption, which accompanies estrogen deficiency.

The study will examine the hypothesis that bone resorption is regulated by the influx of Ca^{++} , and that estrogen reduces resorption through the suppression of this mechanism. The experiments will focus on the effects of estrogen and calcium channel antagonists on skeletal physiology, utilizing techniques at the organismal, cellular and molecular level. The specific project aims are to determine: what aspects of bone resorption (basal and/or stimulated) are affected by estrogen; whether estrogen and calcium channel blockers have similar effects on bone resorption; whether altered intracellular Ca^{++} levels are correlated with whole animal bone resorption; and the temporal regulation of the genes involved in bone remodeling.

Drugs classified as calcium antagonists have been in use since the 1960s and are among the most frequently prescribed drugs

for the treatment of cardiovascular disease. Although chemically diverse these drugs share the property of inhibiting the action of the voltage-gated L-type calcium channels. The ability of these drugs to decrease smooth muscle and myocardial contractility results in both clinically desirable antihypertensive and antianginal effects.

Once the mechanistic role of the calcium channel blockers has been established, the plan is to address what impact these drugs have had on adult bone mass. The established principle of decreasing bone formation resulting in increasing bone resorption following the attainment of peak bone mass illustrates the need for a more comprehensive understanding of the action of these drugs.

Experimental evidence suggest that calcium channel antagonists decrease osteoblastic activity, thus decreasing the activity of the bone forming cells at a time when bone formation is already exceeded by bone resorption, thus exacerbating the situation. Clinical medicine is treating one ailment and may possibly be causing another.

The benefits of this type of treatment for cardiovascular disease may significantly outweigh the adverse effects on the skeletal system. These studies may shed light on the increase in osteoporosis over the past 20 years and particularly within the male population instead of simply attributing it to a longer life span.

This investigation will provide insight into which of the drugs does not increase resorptive activity while at the same time providing maximal cardiovascular protection, improving the physician's decision during drug selection.

A Spectroscopic Technique for Determining the Leaf Nitrogen Concentration of Crop Plants

Zachary Bortolot, C. Brent Rogers

Determining the proper amount of nitrogen (N) fertilizer to apply to a field is very important. Insufficient application may lead to decreased yields, and excessive application may lead to environmental degradation and plant health problems.

To determine the amount of N fertilizer to apply, leaf N concentrations are often used in conjunction with interpretation guidelines. This project involves determining whether a new procedure developed in 2003 can be used to accurately determine

leaf N concentrations in three crop plants that are important in Kentucky corn, wheat, and orchard grass.

The procedure uses a device called a spectroradiometer that measures reflectance at multiple wavelengths. Based on experiments using tree leaves, this procedure has been proven to be accurate, rapid, and inexpensive. It is also sensitive to site and species differences.

To conduct the evaluation, 360 pots of three crop species were grown under 20 fer-

tilization levels. After reaching the desired growth levels, the new procedure was used to determine leaf N concentration using spectroscopic data collected under ideal and realistic conditions.

This research is significant because it has the potential to improve the ability of growers to apply nitrogen properly, leading to improvements in yield, environmental quality, and food security.

Acquisition of a Scanning Electron Microscope for Multi-Disciplinary Research and Education

Eric Jerde, Ann Macintosh, Charles Mason, Sean O'Keefe, William Grise



As the only four-year public institution of higher learning in the Appalachian region of East Kentucky, one of Morehead State University's commitments is to improve the quality of life for the local community and surrounding region. Among the many strategies for meeting this commitment is the introduction of modern technologies to the region and education in the application of these technologies.

This project funded the purchase of a JEOL JSM-6380LV scanning electronic microscope (SEM) housed within the Department of Physical Sciences. In addition to this state-of-the-art imaging electron optics, this instrument also contains an integrated Energy Dispersive Spectrometer (EDS) for quantitative chemical analysis, and can also operate in a "low-vacuum" mode.

Four disciplines on the MSU campus and one outside industry have been identified that are committed to making use of the instrument, and there are many other potential users on and off the campus.

Projects include:

- * Geotechnical analysis of igneous rocks (Geology)
- * Species determination and characterization of microfossils (Geology)
- * Art pigment degradation studies (Chemistry)
- * Imaging of nanoscale solid-state electronics (Chemistry)
- * Species determination and characterization of tiny insects (Biology)
- * Morphologic characterization of pollen (Geology)
- * Quality assurance and materials characterization training (Industrial and Engineering Technology)
- * Alloy characterization for ball bearing production (local industry)

The instrument will also be integrated into the classroom and student research, and over 100 students per year will benefit.

The Perception of Focus

Kathryn Carlson

“The focus of a sentence,” said Kathryn Carlson, assistant professor of English, “is the new or contrastive information which the sentence conveys. Focus is essential to the semantic contribution of a sentence to a discourse, and is affected by sequence. For example, in the context of ‘What did John buy?’, the sentence ‘John bought a dog’ has the focus on ‘dog.’ The same sentence following the question ‘Who bought a dog?’ has the focus on ‘John.’”

Carlson’s research is intended to find out whether objects are interpreted as focused more often than subjects, how such a bias might interact with focus indicators like accents or “only,” and how effective different focus indicators are.

These questions are addressed by using the techniques of probe recognition and phoneme monitoring. Responses to focused words or sounds in focused words are faster than responses to non-focused words,



because focus draws attention and helps items persist in memory. This project studies both visual and auditory processing to determine whether objects are more focused than subjects in sentences without focus indicators.

The perception of focus is an important part of language understanding, since it allows perceivers to identify the informative content of an utterance and correctly link it to previous and future utterances. Knowledge of how this process works is important to psycholinguistic theory and also to applied language fields. For example, more complete understanding of the contribution of prosodic focus to processing could be useful in text-to-speech and human-computer interaction engineering projects, enabling more natural and comprehensible output. Knowing where perceivers expect focused information to be and what affects their decision could aid research in training and communications devices for language-impaired populations.

MIS Faculty Perceptions Regarding the Organizational & End-User Information Systems (OEIS) Model Curriculum for Information Technology Education

C. Steven Hunt

As technologies and organizational dynamics change, information technology (IT) managers seek employees that have the background to match the current needs of the organization. Information systems employees often gain their preparation in a university IS program, therefore, the university

faculty must continually evaluate whether their IT programs are in congruence with the needs of the students while equipping them for a career in their chosen field. Knowing the educational gaps that exist between what IT managers view as critical end-user skills and the curriculum that is currently being implemented in information systems

undergraduate programs, the Office Systems Research Association (OSRA) published an updated 2004 Model Curriculum in Organizational End-User Information Systems (OEIS). The OEIS model is a guide for undergraduate curriculum design in the area of information technology (IT), developed by IT educators and IT professional:

through numerous web-based and face-to-face group sessions.

The OEIS curriculum model guides educators who plan programs to prepare four-year college graduates for entry-level positions that support end-user computing through analysis, design, implementation, and evaluation of information technology. Designed as either an option under information systems programs or a stand-alone business program, the model stresses communication, business process analysis, human factors, and training. The model recommends these areas in addition to technical content and business administration fundamentals necessary for functioning in positions related to end-user support. The standard common body of knowledge courses typically required by colleges of business, including an introduction to computer information systems and a business communication course, are assumed.

Today's college graduates have received more computing knowledge than ever. Already computer literate, IS graduates may require more time spent on other aspects (oral and written communication skills, analytical skills, and content knowledge). The OEIS model attempts to place skill and theory in action (e.g., case studies; planning, design, implementation, and evaluation; technical training and delivery methods).

The great diversity in the IS job market make necessary a diverse program. The OEIS meets each of these concerns from the perspective of the practitioner. OEIS is characterized by its variety, flexibility, quick response, and informality, often working in congruence with enterprise-wide databases and transaction processing systems (i.e., payroll, accounting, insurance application, claims process, and reservation systems). The model's structure is a set of thirteen courses comprised of core courses (essential content), optional courses (determined by local needs analyses and program maturity), and a highly recommended support course in application development. The 2004 published model identifies outcomes (objectives), content, an approach to teaching, and resources for each course. The model's developers stressed the need for flexibility in applying the model and the need to emphasize program outcomes in lieu of specific courses.

Because of the direct relationship between end-user information systems and MIS, the researchers sought to probe the

perceptions of those in the Association of Information Systems (AIS) faculty membership and MIS job placement directory who had either listed end-user computing and/or microcomputer applications as their teaching or research interest area. The research was an assessment and validation of the importance of the newly designed Organizational and End-user Information Systems (OEIS) Model Curriculum objectives based upon the perceptions of this AIS stratified sample. Even though the curriculum has been developed and approved by the sponsoring organization, an inadequate research base existed regarding the perceptions of



the potential adopters. Moreover, to date there has been no current research conducted to judge its potential for implementation at the undergraduate level. Specifically, the purposes of the study were (a) to assess the level of importance of the OEIS Model Curriculum content and (b) to determine the current availability of OEIS course offerings at selected colleges and universities. The research study sought answers to the following questions:

1. Does congruence exist among AIS faculty who have a strong interest in end-user information systems, regarding the level of importance of the model curriculum?
2. What is the current status of OEIS course offerings at the colleges and universities wherein the MIS faculty currently teach?

Responses from MIS educators revealed

that 87.8% of the faculty is from public universities. A majority (82.9%) of the institutions and faculty are affiliated or closely allied with a school/college of business. In 70.7% of the institutions, the OEIS component is staffed by 10 or more faculty members. Approximately 41% of the respondents have 16 or more years of teaching experience. The largest concentration of institutions (31%) has student enrollments of more than 20,000 students. The majority of the faculty (58.5%) indicated that an OEIS curriculum either currently exists or the institution is in the process of implementing this type of concentration within their respective college/university.

MIS academicians have shown that the OEIS curriculum designers and the associated content objectives of the 2004 OEIS Curriculum Model do indeed have value and is of considerable importance. In addition to its importance, the faculty validated that the curriculum does have merit in preparing OEIS students for participation, as end user support personnel, in a digital, knowledge-based economy of unbridled change. The implications are especially important for colleges and universities that have adopted only portions of the model's content. Educators should keep in mind that the faculty respondents were evaluating objectives and outcomes, not courses. In cases where whole courses, as presented by the model, are not possible, educators should consider incorporating content related to the highest-rated objectives into existing IS courses.

With this available research base, MIS academicians now have a validated framework and guide for implementation of a track or emphasis in end-user information systems at the undergraduate level. To enhance these programmatic efforts, institutions of higher learning must ensure that avenues are made available for professional development in this area. What educators do to facilitate the implementation process (at each institutional level) will be the practical application of this research process. Collaboration of all those involved with end-user information systems will help achieve this goal.



Wild Mountain Thyme

Roma Prindle

A new work for the stage, celebrating Appalachian and Celtic music, dance, folk culture and tradition premiered in Duncan Recital Hall in the Baird Music Building. “Wild Mountain Thyme,” written by MSU associate professor of music Dr. Roma Prindle, was presented by Morehead State University OperaWorks, and featured Morehead’s own White Horse String Band and bagpiper Ross Martin.

“Wild Mountain Thyme,” a ritual springtime play, is the result of several years of research by Dr. Prindle. It is loosely based on the genre that is found from Elizabethan through Victorian era England known as wooing plays. It recreates some of the springtime and May Day practices brought to the Kentucky Highlands by Celtic peoples from southwestern England and Wales, and incorporates traditional Appalachian and Celtic springtime customs, folk dance and music. The common root of the music of these two cultures will be highlighted by performances on mountain fiddle, dulcimer, banjo, bass fiddle, guitar and mandolin. An English country dance, Black Nag, and two Appalachian dances, Circassian Circle

and one version of the Kentucky Running Set, will be performed by the cast. All of the vocal selections are settings of traditional music from Appalachia and the Celtic areas of southwestern England and Wales. A story within the story also unfolds, as the orphaned daughter of a coal miner, an immigrant from Wales to the southeast Kentucky mountains, falls in love with the son of an absentee coal baron.

The creation of “Wild Mountain Thyme” was made possible through a 2003 Summer Teaching Fellowship awarded to Dr. Prindle from MSU’s Research and Creative Productions Committee. A Regional Creative Productions grant from the Institute for Regional Analysis and Public Policy (IRAPP) was also awarded to OperaWorks to help make regional presentations of the work possible.

In keeping with the regional and heritage emphasis, the work was also presented for an invited audience of public school students from the Morehead State University service region. Another regional performance took place when the show traveled to Oak Hill, Ohio, for a benefit performance in this Welsh settlement town.

OperaWorks was invited by the Cooper-

ative Center for Study Abroad to present the work in seven performances on a twelve-day tour to southeast England and Wales. These performances included St. Gregory’s College in Bath, England; a traditional performance pub in Cornwall, England; the Open Air Museum of Welsh Life in Cardiff, Wales; a Medieval Banquet at Conwy Castle, Wales; and a performance at a church in Flint, Wales, where the ensemble united voices with the Flint Welsh men’s choir.

The cast of Wild Mountain Thyme included: Leslie Allnatt, Louisville; Noelle Barnes, Cynthia; Nick Donahoe, Ashland; James Hay, Tollesboro; Jeremy Howard, Oak Hill, OH; Diana Knoll, Morehead; Chris Lipscomb, Louisville; Joey McConnell, Central City; Dr. Mark Minor, Morehead; Ryan Mussetter, Xenia, OH; Stephanie Puckett, Mt. Sterling; Stephanie Reeves, Wittensville; Brenda Rigsby, Morehead; Bobby Shouse, Jackson; Melissa Spalding, Louisville; Brandon Thompson, Louisa; and Andrea Trusty, West Liberty.

Jazz Quartet CD

Steven Snyder, Gordon Towell



Dr. Gordon Towell, associate professor of music, and Dr. Steven Snyder, assistant professor of music, released their new CD *Sketch Pad* on March 17 and 18th at the Jazz Factory in Louisville. This CD features seven original compositions by saxophonist Gordon Towell and pianist Steven Snyder, both jazz faculty members at Morehead State University. These compositions are performed by a quintet consisting of some of the Midwest's finest jazz musicians joined by one of Canada's best jazz trumpeters.

Joining Steven in the rhythm section are Jason Tiemann, drums, and Tyrone Wheeler, bass. Jason and Tyrone are two of the most in-demand musicians in the Midwest and can be heard on a regular basis at the Jazz Factory and the Blue Wisp Jazz Clubs. The quintet also features Brad Turner on trumpet. Brad is one of the finest jazz trumpeters from Canada and has won numerous awards for his performance including the Canadian Juno. This artistic endeavor was made possible through a Creative Productions grant from Morehead State University. Morehead State art professor Gary Mesa-Gaido did the artwork and layout for the CD. This CD has been featured on NPR and the Canadian Broadcasting Corporation.

Steven Snyder is originally from Pittsburgh, where he began his study of jazz piano with Frank Cunnimondo. He graduated from the University of North Texas with bachelors and masters degrees after

playing in the One o'clock Lab Band. He also holds a D.M.A. in Piano Performance from the University of Texas at Austin. He has performed in France, Brazil, Portugal, Sweden, Finland, Taiwan and the United States. His work has included playing with Randy Brecker, Jerry Bergonzi, Gustavo Bergali, Brannen Temple and Blaze, and Odd Man Out as well as appearing with his own trio.

Gordon Towell originally comes from Calgary, Alberta, Canada. He holds a B.Ed. in music education from the University of Alberta, an M.M. in jazz studies from Indiana University and a D.M.E. with a cognate in jazz studies from the College Conservatory of Music at the University of Cincinnati. Gordon has performed with many national and international artists, and has conducted throughout Canada and the U.S. He was the recipient of the 2001 MSU Distinguished Creative Productions Award.

Special guest artist Brad Turner is from Vancouver, Canada. He is one of Canada's best-known jazz musicians. He has won multiple Juno Awards for his work with electric jazz ensemble Metalwood, and has been nominated for his acoustic jazz recordings. He holds a Bachelors degree from Western Washington University and a Masters from the University of North Texas. Brad also plays piano, bass, drums, and is well known as a composer.

Determination of the Role of *umuD* in the Response to DNA Damage

Janelle Hare



"We are studying a protein that is present in an altered form in one type of bacteria," said Janelle Hare, assistant professor of biology. This type of protein is well-studied in many other bacteria, where it has a certain size, and performs certain functions by interacting with another protein after it cuts itself into two pieces.

Basically, we have found that in one bacterium, this same protein is extra-large, doesn't have the opportunity to interact with its "partner" protein, and may or may not even cut itself into two pieces. In fact, it has an unexpected function—regulating the production of other proteins. But it still highly resembles the well-studied protein. So it appears that this protein, in its altered form, is doing new things for the cell.

We're trying to find out how it does this (biochemically, as a protein), and genetically, what other proteins it regulates in the cell. It addresses the basic concept of how organisms adapt to change: change in proteins, and change in environmental conditions (in our case, damage to the cell's DNA).

Dr. Hare's research investigates how biological organisms respond to the common environmental stress of DNA damage. DNA contains the information needed to make every protein in an organism, and if this genetic information is changed or damaged, the wrong proteins may be made, which can result in genetic diseases.

Thus, all organisms, from bacteria to humans, possess ways to repair DNA damage. In humans, the inability to correctly repair damaged

DNA can result in various forms of colon, breast, and ovarian cancers. But before a cell can repair damaged DNA, it needs to detect DNA damage, and then turn on the cellular machinery needed to fix the damage.

The "SOS response" model of how bacteria sense and respond to DNA damage has been developed by studying *Escherichia coli* bacteria. In this model, when a cell's DNA is damaged, many proteins are specifically expressed and perform DNA repair, synthesis, and cell growth functions. *umuD* and *umuC* are two of the proteins that are induced by DNA damage. Under conditions of DNA damage, *umuD* cleaves itself, then binds to *umuC* and helps repair damaged DNA. Cleavage of *umuD* is required for this action, and uncleaved *umuD* actually interferes with its function.

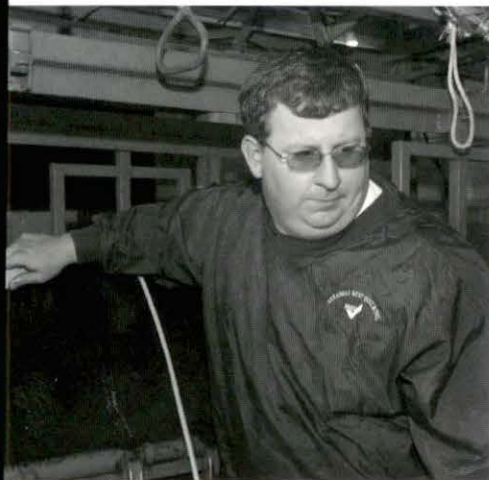
Dr. Hare's research investigates how the bacterium *Acinetobacter baylyi* strain ADP1 (ADP1) responds to DNA damage. ADP1 is easily manipulated in the lab, lives naturally in the soil, and does not cause disease, unlike *Escherichia coli*, which lives in animal

intestines and can occasionally cause disease.

Understanding the many ways in which cells can respond to DNA damage helps scientists understand basic cellular mechanisms that prevent cancer and repair cells after ultraviolet light or pollutant exposure. Our studies, and those of our collaborator Dr. Leslie Gregg-Jolly, of Grinnell College, suggest that ADP1 may have unusual ways of coping with DNA damage. Thus, this research may show new mechanisms by which cells can achieve DNA repair responses.

ADP1 has some of the characteristics of a typical SOS response, but also has some unique features. For example, ADP1 has a mutation removing most of the *umuC* gene and its *umuD* gene is 150% the size of *umuD* genes of other bacteria. Because the remaining *umuC* gene fragment is too small to make a *umuC* protein, Dr. Hare's research asks: what is *umuD* doing in the cell without its *umuC* partner? One possibility is that the ADP1 *umuD* gene makes a protein that is similar to *umuD*, but not actually *umuD*.

Dr. Hare's newest project seeks to move beyond making observations of how genes such as *umuD* are different in ADP1 cells and learn the functional effects of these unusual genes on the overall process of a cell responding to DNA damage. In ADP1, the known DNA damage response gene, *agc14* is made in amounts 10- to 15- fold greater after DNA damage. Surprisingly, her group recently showed that genetically engineered ADP1 cells lacking *umuD* were unable to turn on expression of a when the cell suffered DNA damage: *agc14* expression dropped by 83%. Strikingly enough, however, another gene that is not responsive to DNA damage but responds to a certain nutritional signal was unaffected by the absence of *umuD*. This suggests that *umuD* is a specific regulator of DNA damage-responsive gene.



Effects of Bull Fertility Parameters After Administration of Transdermal Ivermectin Anthelminic

Philip Prater, Troy Wistuba, Les Anderson

the bull, resulting in proper reproductive health.

Clinically anecdotal evidence of bull infertility associated with the use of a transdermal preparation of the anthelminic ivermectin has been reported. Other than unclear references on the product label, there is no research data available to either support or refute these clinical reports of bull infertility.

The objective of this study was to evaluate the reproductive parameters of 20 mature bulls before and after a therapeutic dose of transdermal ivermectin is administered to the bulls. Bulls were housed under identical environmental and nutritional conditions, and separated into treatment and control groups. The control group received a placebo for topical administration, and the treatment group received a dose of topical ivermectin.

Bulls were evaluated by standardized semen parameters at pre-treatment, 14 days, 28 days, and 60 days post-treatment. Differences were compared by analyzing the variation between control and treatment groups. Statistically significant reductions in scrotal circumference were noted over time in the treatment group as compared to the control group.

No other semen quality parameters demonstrated any statistically significant variation between treatment and control groups. The study would indicate that there is no significant detriment to the fertility of beef bulls that are treated for parasites with a topical application of the anthelminic ivermectin and its transdermal vehicle.

Beef cattle production in Kentucky is the third largest agricultural system in the state based on income from farm products. Beef cattle operations are currently the most important source of agricultural income for producers in Eastern Kentucky due to the continued decline in tobacco production.

Beef bulls account for one half of a herd's genetic potential and, therefore, must be able to perform the appropriate reproductive functions to deliver the afore mentioned genetic material. Routine veterinary care for beef bulls mandates the use of anti-parasitic medications for proper systemic health of



Sequencing the Lateral Root Primordium (L.R.P.) Gene from Japanese Knotweed (*Polygonum cuspidatum*)

Carol Wymer

and in ditches, that has drastically altered local ecosystems by displacing native plants and encroaching on public spaces.

One method of propagation for the Japanese knotweed is to produce adventitious roots on stem cuttings that fall into the water. The LRP1 gene is of interest because its expression has been correlated to the formation of adventitious roots.

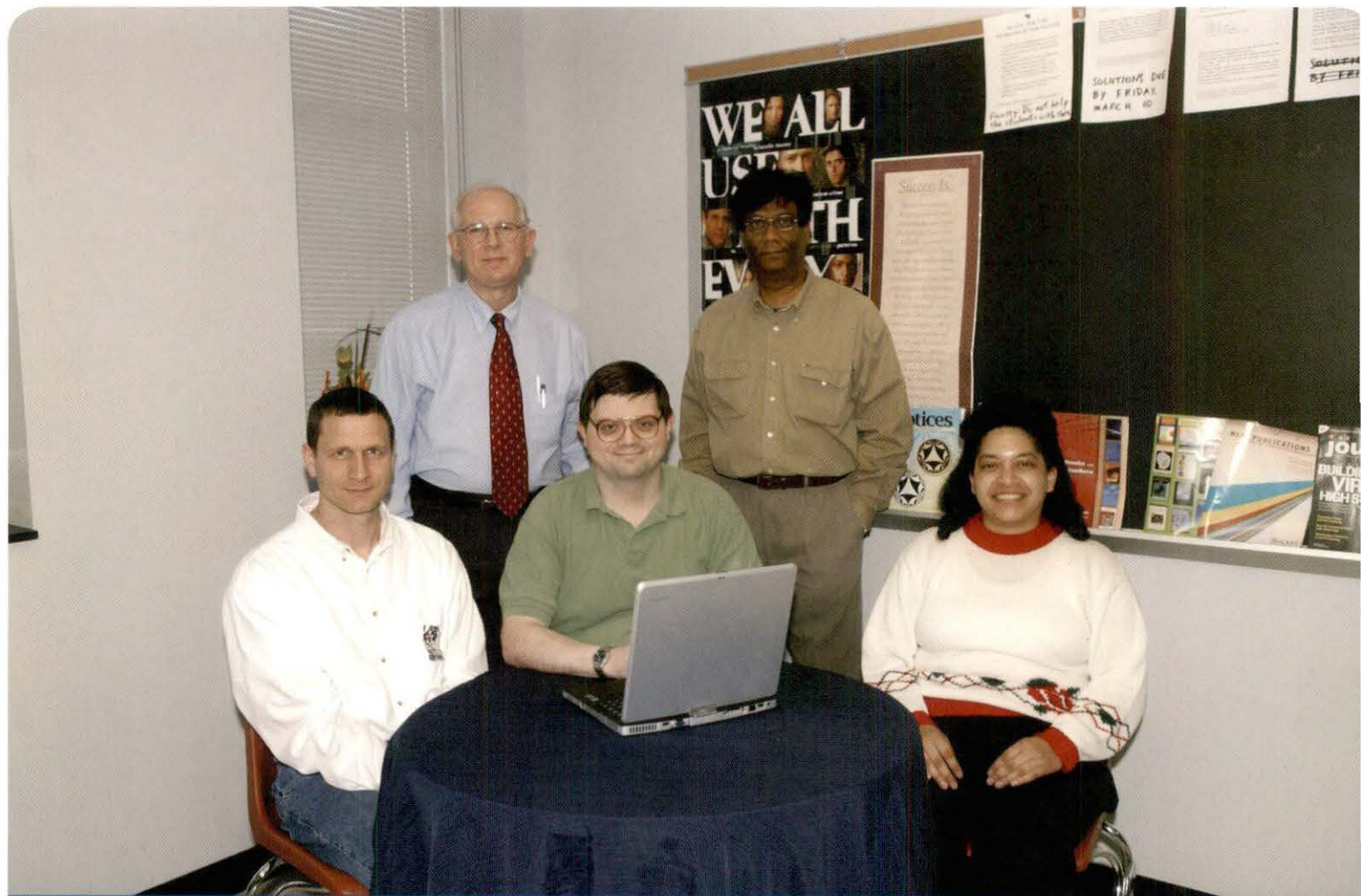
The research objective was accomplished by using the Polymerase Chain Reaction (PCR) to isolate pieces of DNA corresponding to this gene. The sequence of these DNA pieces was determined through a stepwise series of reactions that are also based on PCR.

The research has significance in basic science because the molecular mechanism of adventitious root formation is not understood and the molecular details of Japanese knotweed have not been characterized or studied by many groups.

In the East Kentucky region, knowledge gained from this study will allow refinement of the management techniques currently in place for Japanese knotweed, a species actively battled by county and state employees as it encroaches into public spaces.

This research is an effort to determine the sequence of the Lateral Root Primordium 1 (LRP1) gene from the Japanese knotweed (*Polygonum cuspidatum*).

The Japanese knotweed is an invasive pest, one that prefers to live along streams



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