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On the Cover:

Dr. Lynn Augsbach, left, assistant professor of psychology, and Dr. Suzanne Tallichet, assistant professor of sociology, with objects representative of their research.

Dr. Augsbach's top symbolizes her research into children's production of metaphor; the coal in Dr. Tallichet's hand came from the mine where she studies women coal miners of Appalachia.

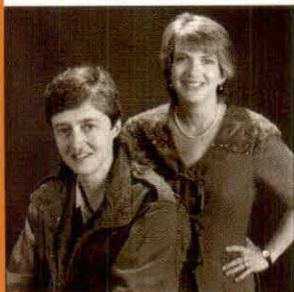
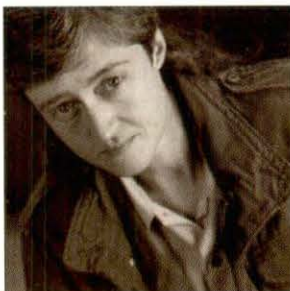


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FOCUS—a point to which something converges or from which something diverges—illustrates the ideals of Morehead State University for bringing the best research together and encouraging new efforts in distinctly different areas. The goal of FOCUS is 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 Eastern 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 ongoing projects underway in a variety of areas.

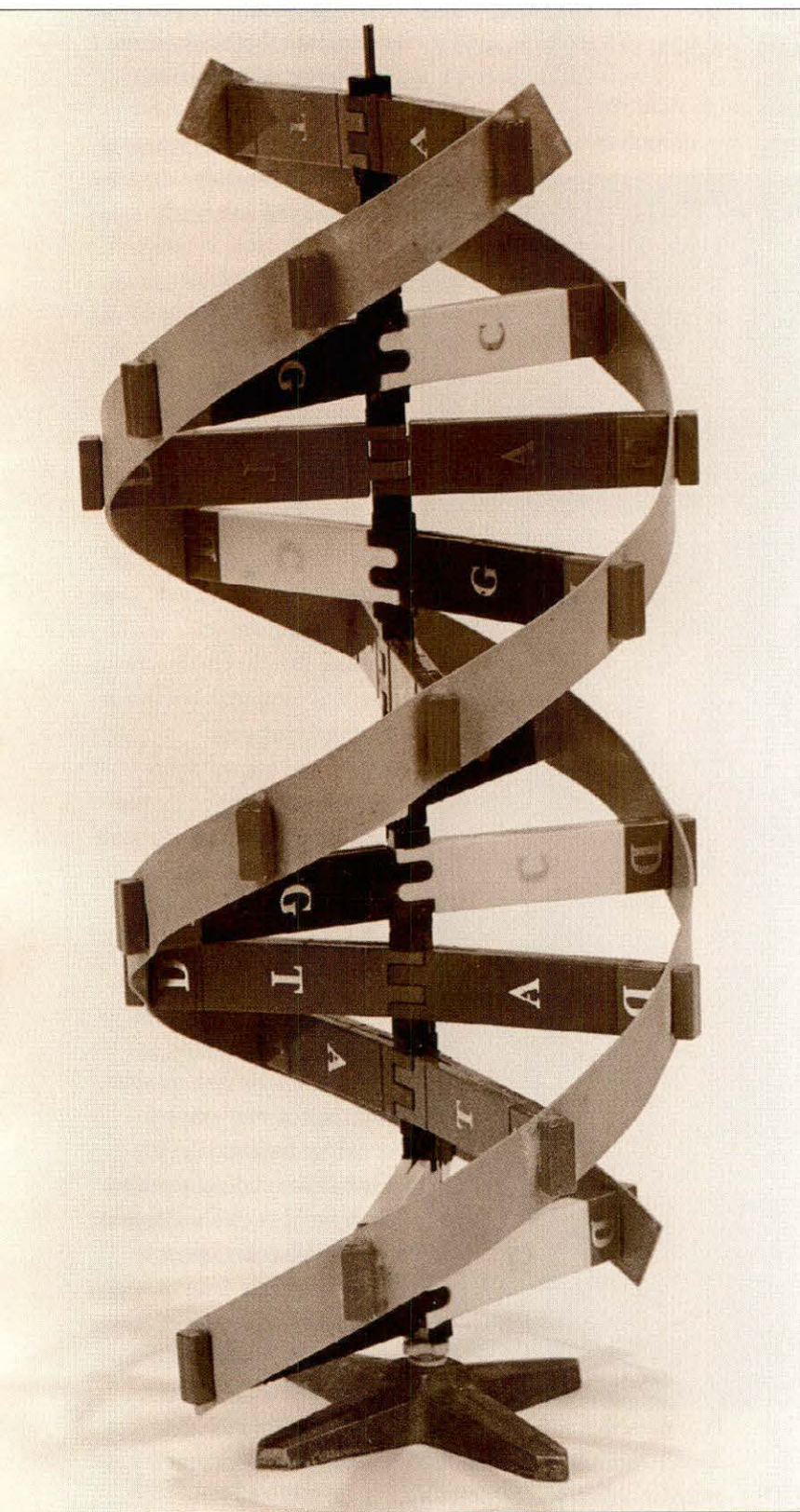
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Manipulatives such as this DNA model are used in science classrooms at all grade levels.

“We got to use real science stuff”

Eisenhower Grants help professors enrich science and math teaching

The Kentucky Council on Higher Education administers within the state the federally-funded higher education portion of the Eisenhower Mathematics and Science Program, which supports science and math projects in public and private schools, elementary through high school; the monies are awarded specifically to help conduct workshops and professional development for teachers. Dr. Robert Boram and Dr. Phyllis Oakes, Dr. John C. Philley and Dr. Victor Ramey, Dr. Charles Patrick, and Dr. Robert Lindahl received funding in support of their projects in 1994-95.

Using Facilitators to Enhance Primary Science Instruction

"The project's goals are to provide more science to primary school children, and to increase teacher involvement in science teaching," Dr. Robert Boram, associate professor of science, said of the project he co-directed with associate professor of education Dr. Phyllis B. Oakes.

The project involved 108 primary science teachers in 11 Eastern Kentucky schools (10 public, one parochial). The grant hired four certified primary teachers to teach science in these classrooms on selected days. These primary teachers, called practicum continuum teachers, spent five days in each classroom of each participating school per academic year; each time they left materials for six more weeks of activities. Every primary classroom in each school requested to participate. "Many teachers have science anxieties," Dr. Oakes explained, "and this helps them feel more comfortable with science."

Dr. Boram and Dr. Oakes recognized that teachers and administrators are concerned about the quality and quantity of science being taught in the primary classroom. In MSU's service region, KIRIS science scores generally rank near the bottom. This grant project has helped teachers get more science into the classroom. "If each teacher had 24 students, more than 2,500 students were reached through this grant," said Dr. Boram.

The participating teachers first came to the MSU campus before school started for two days of workshops. They themselves did all the projects their students would be asked to do.

Five cycles of science experiences (patterns, systems and interactions, scientific skills, evolutionary changes, and models/scale) were constructed from curriculum materials developed by PRISM teachers and under development from the Kentucky Department of Education's Division of Curriculum and Assessment. Each cycle lasted for five weeks.



Dr. Phyllis Oakes and Dr. Robert Boram helped primary teachers feel more comfortable with science.

These projects were collected and distributed to the teachers to take back to their schools for use in their classes.

When these tools were being used in the classroom, teachers were encouraged to ask their students very particular questions: What strategy did you use to arrive at an answer? What other strategy might you have used? What is the most important question? "We wanted to stress to the teachers that process is more important than the product," said Dr. Patrick.

Because the grant was budgeted for 25 teachers and only 17 attended the workshop, the extra money allowed Dr. Patrick to fund mini-grants for the teachers for extra materials for their classrooms "from scissors to software," he said. The grant also provided books for teachers. "Teachers received a lot of tools to take back to their classrooms," he added.

Follow-ups with participating teachers indicate that

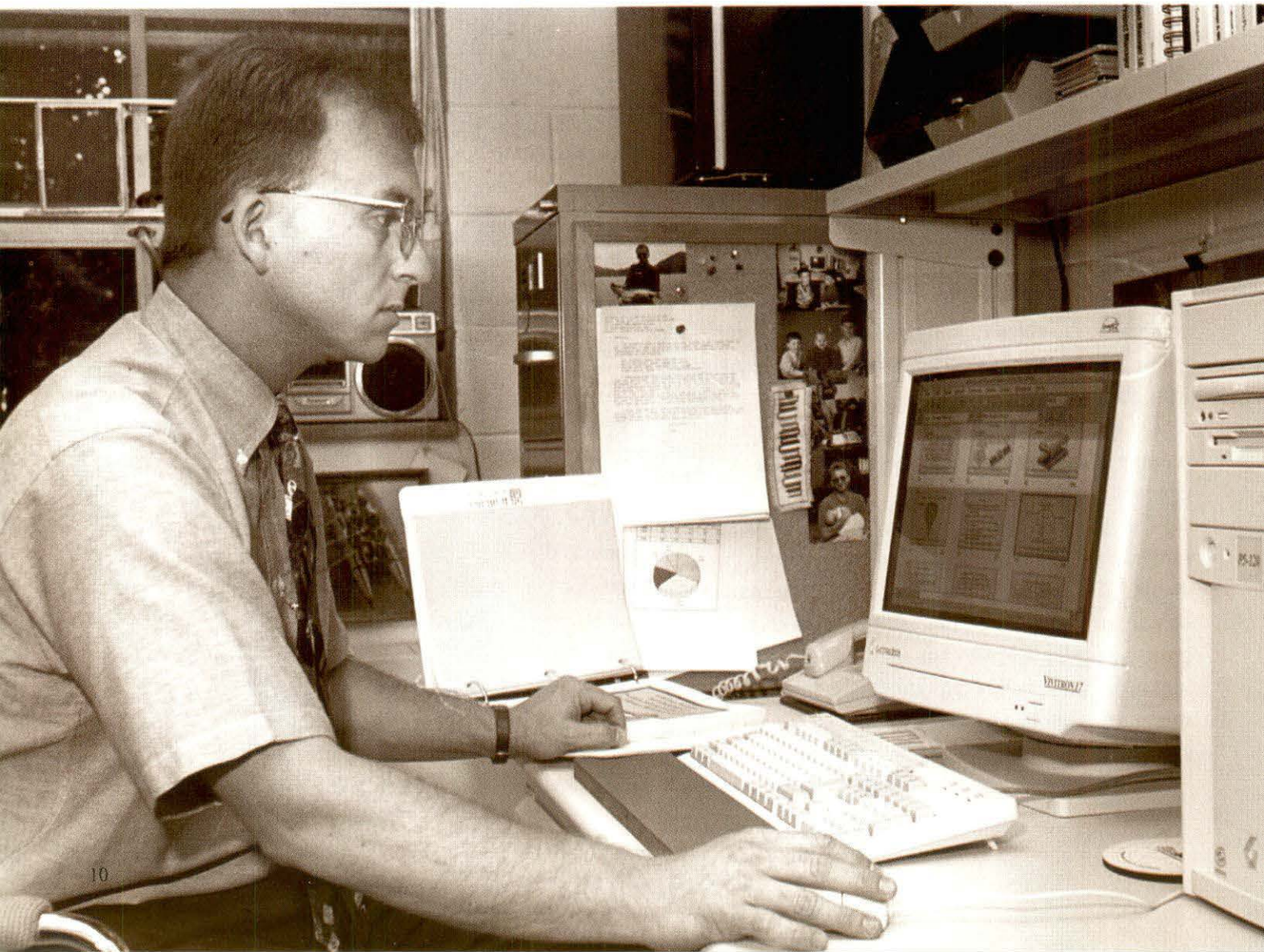
the workshops have had an impact. Three of four teachers said the critical thinking and problem solving experiences had helped them but they didn't have the tools to fully utilize it; all participants said they are now asking the right questions in developing their curricula.

Graphing Calculator Workshop for Middle and High School Mathematics Teachers

"The intent of this project was to conduct a TI-82 graphing calculator workshop for middle and high school mathematics teachers," said Dr. Robert Lindahl, professor of mathematics. The workshop was held June 19-23, 1995, at the Big Sandy Extended Campus Center in Prestonsburg.

"In addition to the traditional areas of algebra and geometry, certain applied topics in mathematics such as

One of Dr. Charles Patrick's goals was to help teachers help their students investigate different methods of learning.



probability, statistics, and discrete mathematical modeling were introduced and implemented using the graphing calculator. Strong emphasis was placed on individual and team problem-solving activities," he explained. "Core concepts, especially probability and statistics, and mathematical algorithms received a great deal of attention while research-based learning/teaching pedagogics were emphasized.

"The intent of this workshop is that teachers take the training, go into their school systems, and use the technology with their students. We use real-world problems to stimulate students to write portfolios in mathematics."

The 28 participants each received a workshop manual, a TI-82 graphing calculator, and other graphing calculator materials. Joyce Watson, mathematics coordinator for the Floyd County school system, served as the public school contact.

This is a representative problem from the workshop manual: "A large arrangement for a wedding is to have 45 flowers in it, consisting of carnations, roses, and orchids. The cost of carnations is 75 cents each, roses cost \$1.50 each, and orchids cost \$2.50 each. The total cost of the flowers is to be \$50. The number of carnations must equal twice the number of roses and orchids. Determine how many of each kind to order."

This past June (1996), Dr. Lindahl conducted a second workshop for teachers, also sponsored by an Eisenhower Mathematics and Science grant. This time greater funding allowed for the use of more advanced technology.

The workshop, entitled "Exploration in Science and Mathematics Using the TI-82/CBL Calculator Systems," encouraged teachers to merge science and math. The CBL (Calculator-Based Laboratory) system comes with three probes—temperature, light, and voltage (there are additional probes for motion detection, pH,

and a microphone). The probes gather data and, connected by a port, dump this data into the TI-82.

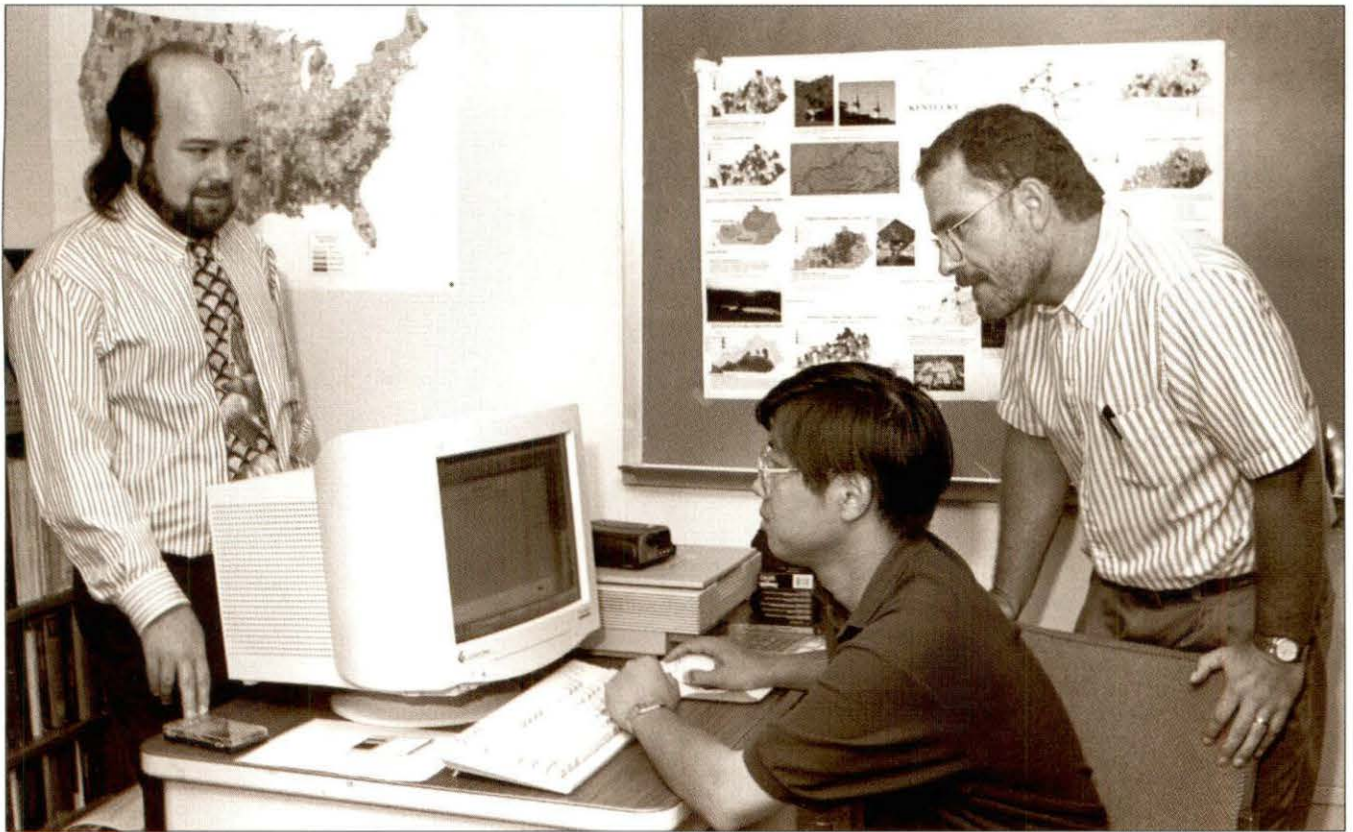
"This allows teachers and students to create scientific experiments and use the system to gather data," said Dr. Lindahl. The 30 participants all received a CBL system, TI-82 graphing calculator, additional probes, and the workshop manual.

In addition to his collaboration with Joyce Watson, he worked with two additional faculty members from MSU, Dr. Sharon Hudson, assistant professor of education, and Dr. Ron Fiel, professor of science. They had workshop participants break into teams and conduct scientific experiments using the technology. For example, they might record temperatures over a defined time span using the CBL probes, and then with the TI-82 graph the results into an equation.

"KERA places a strong emphasis on portfolio writing, the linking of science and math, and problem solving," Dr. Lindahl said. "These workshops revolve around these important components."

Dr. Robert Lindahl demonstrates the use of the Calculator-Based Laboratory system.





The energetic collaboration between, left to right, Dr. Timothy Pitts, Dr. Yu Luo, and Dr. Ron Mitchelson provides MSU's geography students with state-of-the-art mapping capabilities. The full-color maps behind the professors were produced in the new lab.

A New Geographical Understanding

“**T**he objective of the Spatial Analysis Laboratory is to achieve a better integration of the collection, analysis, and visual presentation of geographic information at the undergraduate level,” said Dr. Ronald L. Mitchelson, chair of the Department of Geography, Government, and History.

Dr. Mitchelson, along with assistant professors of geography Dr. Yu Luo and Dr. Timothy C. Pitts, assistant professors of geography, received funding from the National Science Foundation to recreate the department's computer lab in Rader Hall. The previous computer lab was not equipped to support any high-powered mapping, GIS (Geographic Information Systems), or multimedia presentation of spatial data. The limited hardware and software created restrictions on the exposure of students to up-to-date approaches to the field, and thus limited their marketability. But the fall 1996 semester began a new era in the way students are taught to apply the principles of geography at Morehead State University.

"We cannot separate any course from the computer," said Dr. Luo, the project's director, and added that the current GIS and mapping capabilities put MSU way ahead of the other geography programs in the state. Dr. Pitts said that every geography course will be making use of the new laboratory at some time during the semester, including the introductory courses.

About 25 students major in geography with an additional 45 minors. Five full-time geographers instruct approximately 700 students during the average semester. Geography courses are required or recommended electives in the general education program, the teacher education program, and the environmental science program. Geography courses are included as primary electives in several programs in the College of Business.

The Spatial Analysis Laboratory is intended to substantially improve undergraduate instruction for majors and minors within the geography program and in two targeted disciplines outside the program, environmental science and management/marketing. The total number of majors in these three programs exceeds 225 and has remained relatively stable over the past 5 years, according to Dr. Mitchelson.

"The Spatial Analysis Laboratory will be used to reform the entire geography curriculum, to educate our students with cutting-edge technology so that they are professionally trained and highly marketable," explained Dr. Luo. "Since geographic mapping is currently one of the top jobs, GIS is now required for all majors. We are integrating the systematic courses so that students can use the technology to answer such questions as 'Why do we have so much coal in the region? Why do we have so many yellow poplars?'" All systematic courses now require computer use.

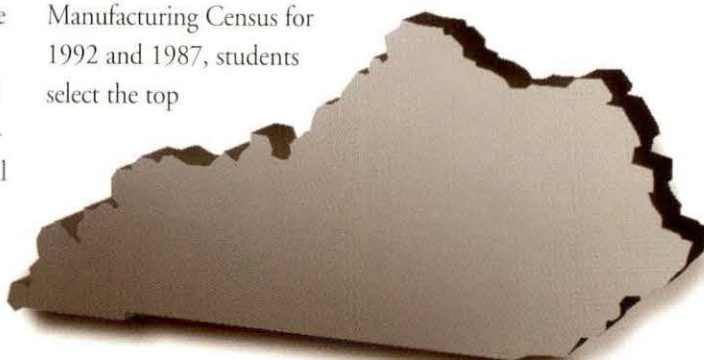
Dr. Pitts is excited about the department's ability to teach a class with every member at a machine, with the entire class working through projects together, at the same time. "Even big schools don't have this capability," he said.

Through coordinated integration of techniques and content courses, students will be able to apply computer and statistical knowledge in these courses as they advance through the program. Extensive hands-on, project-oriented, and cooperative learning will fully engage students in classes. "Because the majority of our students come from Appalachian Kentucky, most projects are related to the real world problems in the region, such as economic development, so that students can be personally and emotionally involved in the projects," said Dr. Luo. He added that it has been proven that female students can do better in extensive hands-on and cooperative computer learning environments.

A couple of examples of class projects follow.

(A) *Geographic Distribution of Landfills in Appalachian Kentucky*: Students locate all solid waste landfills in the region and digitize the sites, their surrounding land cover, and land use into Atlas GIS (a software program). They then import TIGER files to overlay all physical layers with landfills to observe potential relationships and environmental problems. Students evaluate the location appropriateness of each landfill based on its relation to human settlements, stream and road networks, dominant wind directions, soil, and local economy, particularly the poverty level. Then students map all of the sites with relevant layers overlaid. Finally they jointly compile all maps and their evaluations of each site into a color copy of the study. At the end of the semester, each student is required to run a PowerPoint slide show that includes maps, site photos, and appropriateness evaluation. They also will learn to use Vistapro with DEM data to make flight animations over the landfills. They also have to press their programs into CD.

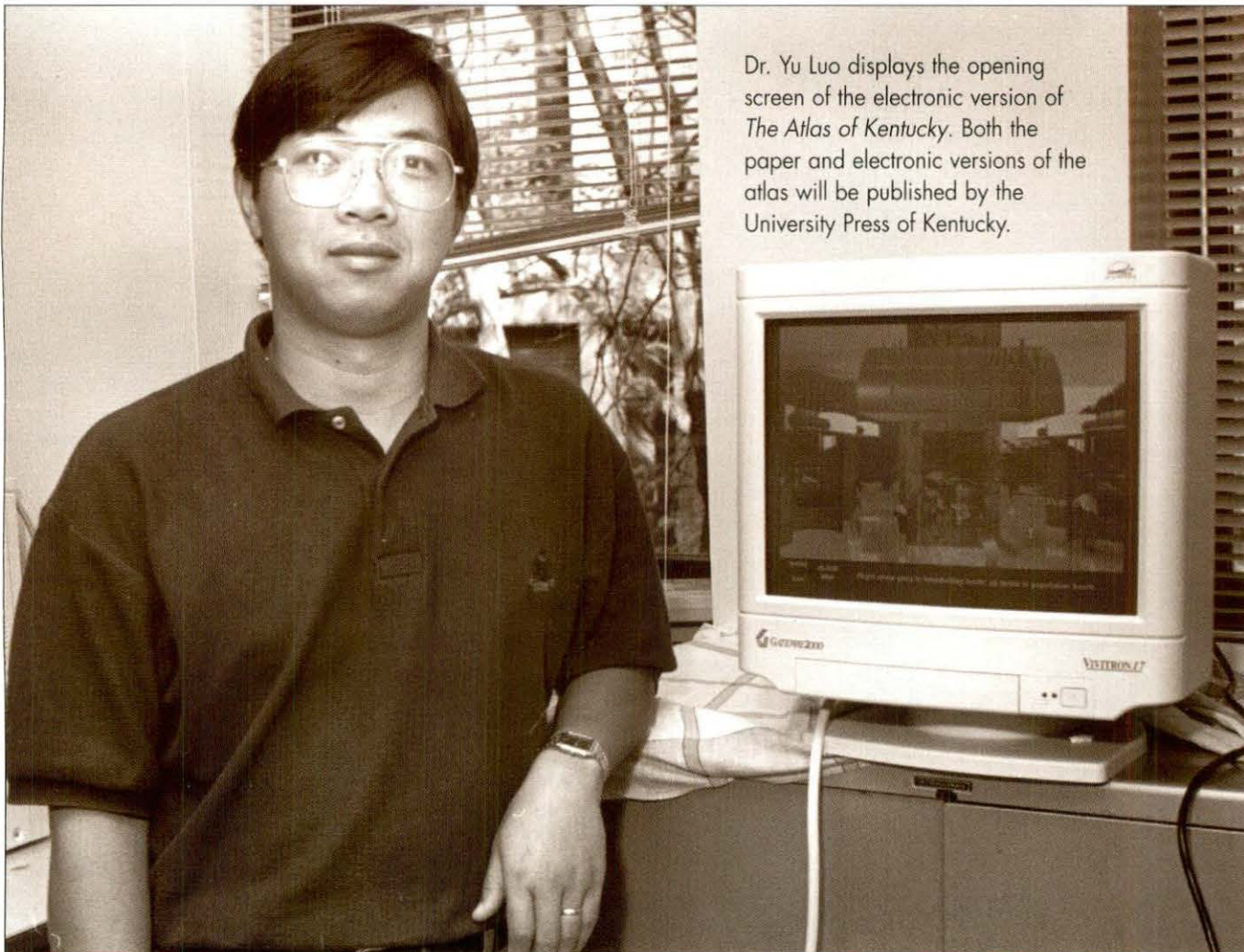
(B) *International Trade Reference Book for Appalachian Kentucky*: Based on U.S. Manufacturing Census for 1992 and 1987, students select the top



The objective of the Spatial Analysis Laboratory is to achieve a better integration of the collection, analysis, and visual presentation of geographic information at the undergraduate level.

10 most important industries in terms of employment, revenue, and growth trends in Appalachian Kentucky. Students then map employees, revenue, and growth trends of each industry at county level. However, the focus of this project is to use the Census Bureau information with U.S. Imports and Exports compact disks to identify the origins and destinations of major products of each of these industries, both raw materials and finished products. Then they map the products at county level. Finally students jointly compile their maps and statistics into a CD.

"Environmental disciplines are huge users of GIS technolo-



Dr. Yu Luo displays the opening screen of the electronic version of *The Atlas of Kentucky*. Both the paper and electronic versions of the atlas will be published by the University Press of Kentucky.

gy,” said Dr. Pitts. Now in cartography classes, which many environmental students take, the geographical information can be used and manipulated in more ways so as to produce environmental information geared to specific situations, including those mentioned in the landfill project—terrain, rock layers, wind direction, water, current land use, and many other characteristics have direct and interdependent effects on surface reactions. Use of computer imaging, various software programs, and quick output of color maps can make it easier for students to see how changing one variable will affect the others; it also makes it easier for them to keep track of as many variables and characteristics as possible.

Management and marketing classes are another field where greater technical capabilities in geography create exciting new ways to apply information. Planners can analyze market areas, look at where their stores are located, and decide where new ones would be successful, all from looking at a computer screen.

The most exciting thing about the new laboratory, accord-

ing to the professors, is seeing the students performing and working on projects. “I’ve already seen a great change in the students,” said Dr. Mitchelson. “Those bitten by the computer bug are in the lab constantly.” He explained that students are developing greater depth in their abilities to visualize data, especially at the upper division level.

“Three students are working on presentations for the next professional meeting in Georgia. This is something we have never seen before,” he said. “The technology makes them feel very powerful. It gets them motivated and enlivens their projects.” The students are preparing projects dealing with forest resources, the incidence of Lyme disease, and hazardous materials routes. “They can customize a map in a split second,” added Dr. Luo.

The lab is also providing expanded opportunities for the professors. “Without a doubt, teaching is greatly enhanced. This creates a platform for faculty to develop their own multi-media approaches in teaching and research, and this is happening very

rapidly," said Dr. Mitchelson.

He does see one drawback in heavy dependence on technology, and that is the loss of the art of hand drafting in cartography. "Now anyone can be a cartographer," he said, "and that is both good and bad." The bad is that it can sometimes lead to inaccurate, poor maps. For there is an art to computer cartography—"We lose one form of artisanship but we gain another."

The technology already has uses other than academic ones, including projects done for the city of West Liberty. "The lab is a good kick start for this kind of work," said Dr. Luo.

As happy as the professors are with the lab, located in 354 Rader Hall, future plans include the acquisition of Global Positioning Systems (GPS) technology. "Perhaps then a class could create a topographic map of the Eagle Lake area," said Dr. Pitts.

But one thing is certain: having first-hand experience with top-of-the-line geography technology and with their vitae and portfolios pressed into CD-ROM, MSU's geography students will be virtually impossible to beat.

Dr. Yu Luo & the electronic Atlas of Kentucky

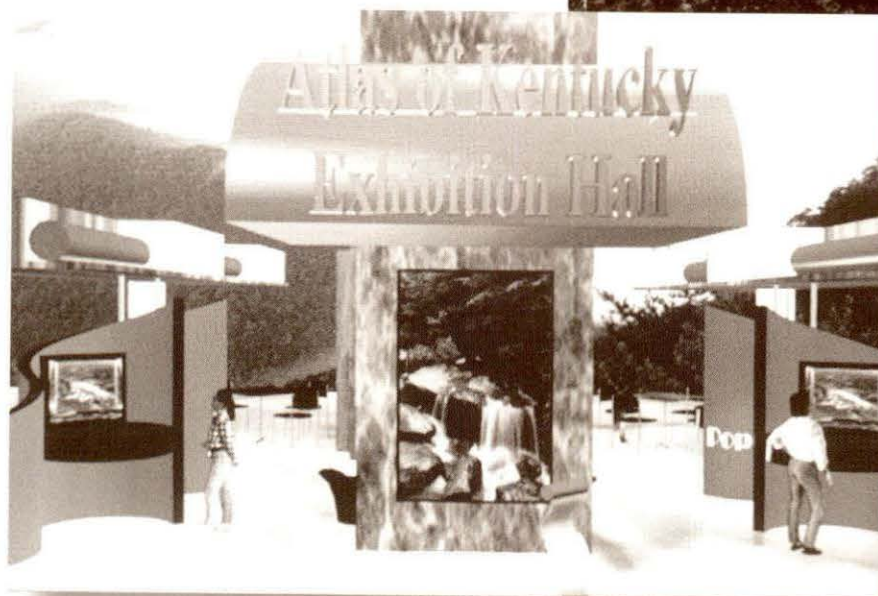
"We are professional geographers. We know the discipline very well. We want this atlas to be more than just pretty pictures, but a tool for users to learn things in a geographical way."

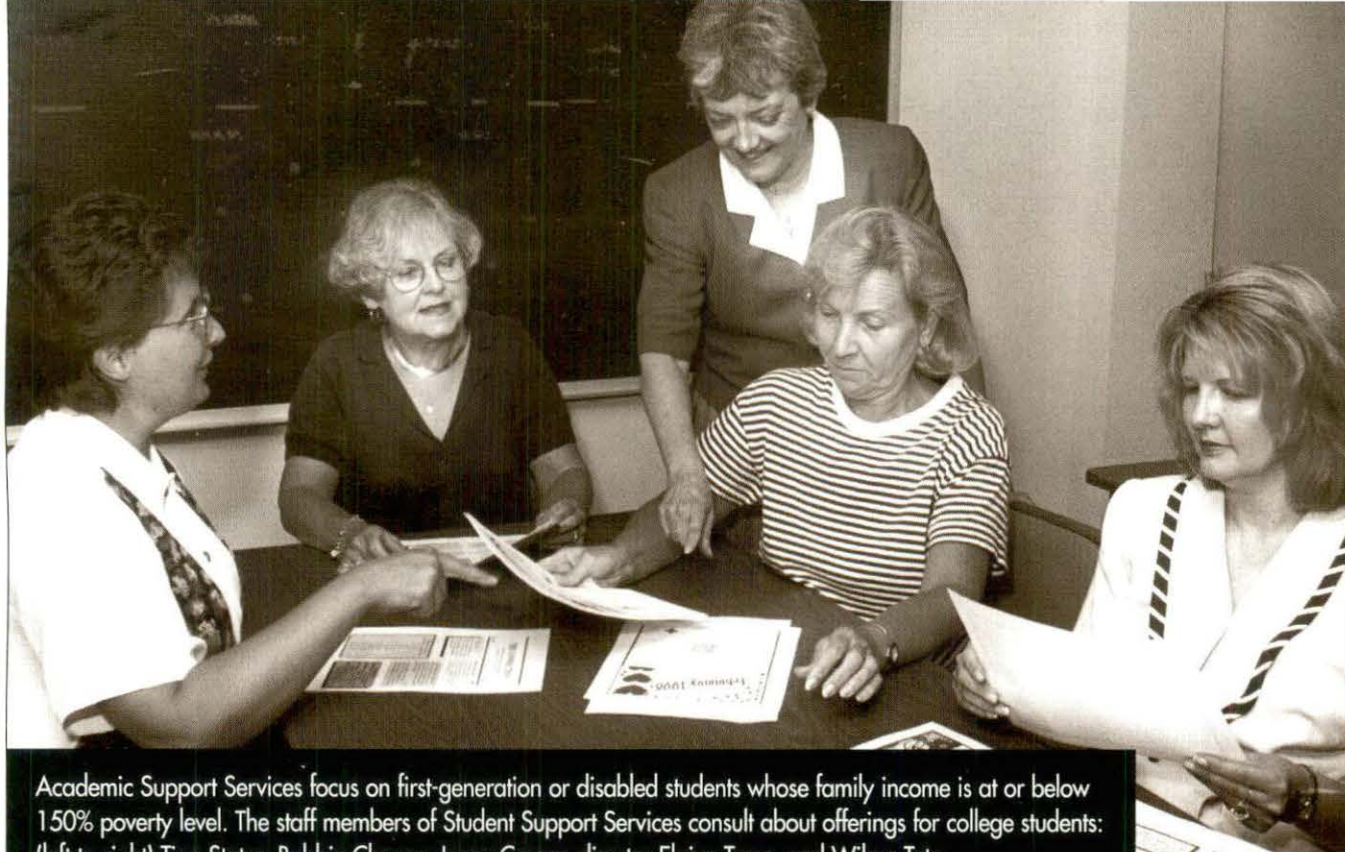
Dr. Yu Luo, formerly assistant professor of geography at Morehead State University and currently assistant professor of geography at Indiana State University in Terre Haute, was the professional called when the University Press of Kentucky asked for an electronic version of the state atlas. Both the CD and the paper copies will be available at the end of 1997.

The electronic atlas is being designed as a tool children can use as well as those who want more in-depth information. The paper version will incorporate more than 800 maps and 200 photographs, which will be imbedded into the electronic version; however in the electronic version users will be able to input their own data to further analyze data already present.

The electronic atlas of Kentucky is interactive, and begins with a short "film" from the state tourism department and a rendition of "My Old Kentucky Home."

Dr. Luo is testing the chapters in schools as he completes them, and hopes to have the atlas finished by the end of the summer in 1997. Upon completion of the project, Kentucky will be one of a handful of states with a CD version of its atlas.





Academic Support Services focus on first-generation or disabled students whose family income is at or below 150% poverty level. The staff members of Student Support Services consult about offerings for college students: (left to right) Tina States, Bobbie Chaney, Jenny Crager, director Elaine Tyree, and Wilma Tate.

Towards *success* in education

MSU's Academic Support Services focus on at-risk students

What does it mean when we say a student is at risk? According to Dr. Daniel J. Connell, director of Academic Support Services, "at risk" means one or more of the following: the student is a first-generation college student (parents do not have college degrees); the student's family financial situation falls into the poverty category (for a family of four, an annual income of \$24,000 or less); the student has a learning or physical disability, or the student is encountering other environmental factors or situations which decrease the likelihood of educational success.

In MSU's 22-county service region, that encompasses a very large number of students. In Rowan County, for instance, the percentage of individuals 19 years of age or older without a four-year college degree *not* enrolled in post-secondary education was 84.6%; in Bath County, 92.2%, and in Magoffin County, 98.5%. The average statewide in Kentucky was 87.6%, and the national average was 83.1%.

The percentage of low-income families living below 150% of poverty level was higher than state and national averages: Rowan County, 36.1%; Bath County, 33.9%, and Magoffin County, 55.6%. The state average was 25.2% and the national average 16.5%. (All these figures are from the 1990 U.S. Census.)

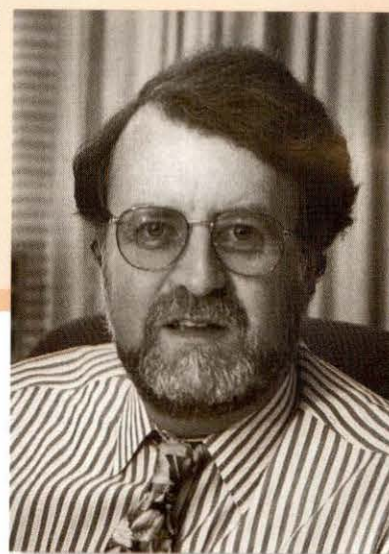
These five federally-funded programs

are designed to address and significantly reduce the unique barriers to school success of children and adults in rural Appalachian counties.

In general, these counties are some of the persistently poorest and neediest counties in the United States; persistently poor counties are those counties whose median per capita incomes have been in the bottom fifth of a ranking of all United States counties since 1950.

Poverty affects the school success of children as evidenced by high dropout rates, low high school graduation rates, and low

attendance rates. Students are enticed to drop out and take menial jobs for the immediate income rewards, leaving bleak prospects for the future. This low level of academic achievement contributes to the continuing cycle of poverty. The result of this poverty is that Kentucky ranks near the bottom of the 50 states in the rate of high school graduates over the age of 25.



Dr. Dan Connell is director of Academic Support Services.

The common theme for all the programs operated through Academic Support Services is concern for those at risk of being successful in education. "We provide a unique continuum of services from the primary grades through a college education," stated Dr. Connell.

Five of the programs operated within Academic Support Services will be highlighted in this article.

Educational Talent Search begins with students in the 6th grade and follows them through college. The approximately 1,100 students in the program are at-risk youngsters whom teachers or counselors feel have academic potential; the program's counselors encourage students to complete high school and then enroll in post-secondary education. Upward Bound is for 105 high school students who are involved in intense academic preparation providing exposure to the latest in education, science and math, foreign languages, and writing, including a six-week residential summer program. The Commonwealth Educational Opportunity Center provides advocacy, financial aid and educational information and application assistance, and career planning and preparation to non-traditional students age 19 and older. Student Support Services works intensely with all these students while they are on campus as long as there is academic need.

These four programs are part of TRIO. Federally-funded TRIO programs (initially just three programs) have helped students from low-income families to finish high school, to enter college, and to successfully graduate. MSU has four of the six total programs. The U.S. House of Representatives has recommended an 8% budget increase for TRIO, with bi-partisan support.

While TRIO programs are 30 years old, a newer addition to the Academic Services Center is MSUCorps. MSUCorps targets school-age children (K-12) to make them academically successful; post-secondary education is not necessarily the goal. It involves tutoring, mentoring, home visits, and parental involvement in the schools. MSUCorps is an arm of AmeriCorps.

Another common bond between the programs is regional emphasis. Although the specific counties served varies by program, all in general focus on MSU's 22-county service region of

the Eastern Kentucky counties of the southern Appalachian Mountains.

"All truly have genuine support from a variety of colleges, public school systems, and public agencies," said Dr. Connell. "There is a lack of territoriality, a willingness of people with diverse backgrounds to support these programs."

Besides providing quality services to the region, the programs serve as a laboratory for applying new and innovative educational approaches to working with at-risk or disadvantaged students. With 30 years of experience, the TRIO programs have identified effective recruitment and retention strategies as well as contributed to understanding the reasons persons from disadvantaged backgrounds enroll and graduate at lower rates than the overall population. "Many of the commonly accepted best practices in the recruitment and retention of college students were first tried in the TRIO programs," Dr. Connell said.

The MSUCorps program is also serving as a model for using volunteers to help overcome barriers to educational achievement in rural areas. Because of its success, the MSUCorps model is being replicated in other communities.

TRIO programs

TRIO programs are committed to providing real educational opportunity for all Americans regardless of race, ethnic background, or economic circumstance. In 1965 Congress established a series of programs to help low-income Americans enter college and graduate. While student financial aid programs help students overcome financial barriers to higher education, TRIO programs help students overcome class, social, academic, and cultural barriers to higher education.

As mandated by Congress, two-thirds of students served must



Educational Talent Search project director Carolyn DeHoff says, "We know that what we are doing is making a difference in the lives of the students we serve."

come from families with low incomes where neither parent graduated from college. Nationwide more than 1,750 TRIO programs currently serve nearly 700,000 low-income Americans.

TRIO programs are structurally integrated into college campuses, and are individually focused and intensive. They have had a consistent funding source for 30 years and are non-bureaucratic in that they provide direct services to students.

A. Educational Talent Search

The goals of Educational Talent Search are to encourage students to complete high school and to then enroll in post-secondary education. Services provided include career exploration/planning, academic advisement, financial aid information and application assistance, secondary and post-secondary orientation, decision making and goal setting, study skills and test-taking strategies, post-secondary educational program information, tutoring/mentoring, group/individual counseling, assistance with post-secondary admissions applications, and ACT preparation. Services are provided to 15 middle and 14 high schools in 13 counties of northeastern Kentucky. The

program currently serves 1,142 eligible participants of whom 76% meet both low-income and first-generation criteria.

According to project director Carolyn DeHoff, counselors stress to students the connection between their school experience and the world of work. They do this by providing educational activities to the participants in a classroom setting throughout the school year. In addition to the in-school activities, opportunities are provided for field trips to area businesses/industries, colleges, vocational schools, and museums. The five full-time counselors work with the same students from the time they enter the program, as early as in the 6th grade, until they finish high school (unless a stu-

dent moves into a district served by a different counselor), providing a consistent, reliable contact throughout their middle and high school years.

A key component of the project is the involvement of parents/guardians and family. Parents receive information on how they can become fully involved in their son's or daughter's educational process at their local school. Home visits are made as soon as a participant enters the program. Parents receive newsletters three times per year with additional educational support information; middle and high school participants also receive newsletters specifically targeted to their objectives.

"More than 75% of the senior participants enroll in some type of post-secondary institution, which is significantly higher than the college-going rate of 50% for the region," said DeHoff. They were provided assistance in completing their FAFSA forms and admissions applications to the institutions of their choice.

"The program's success is the result of the dedication of our counselors," said DeHoff. The five counselors, Kimberly Cox, Lisa Keeton, Hillary Lewis, Suzanne Mantooth, and Janet Stinson, as well as DeHoff herself, come from backgrounds similar to those of the students they serve.

B. Upward Bound

Upward Bound is a preparatory program designed for low-income, first-generation high school students to generate the skills and motivation necessary to complete secondary education and

enter and succeed in a program of post-secondary education. The program serves 105 students from ten Eastern Kentucky counties. 83% of 1995 Upward Bound graduates entered a program of post-secondary education last year.

Jennifer Cady, Upward Bound project director, explained that the program is much more than the summer residential program with which most are familiar. "Upward Bound provides a number of services during the school year," said Cady. "Students come into the program as freshmen and remain throughout their high school careers. This is primarily an academic program, but cultural and counseling components are also available."

During the school year, Upward Bound participants have monthly visits from their counselors who meet with the students as a group to discuss careers or questions about academics and college. Counselors also check on the students' grades, and talk with teachers and school counselors. Once a month students are brought to the MSU campus for classes—seniors discuss filling out college forms, how to read a schedule book, etc.; juniors work on preparing to take the ACT; freshmen and sophomores take writing, math, or science workshops. Enrichment sessions conducted two Saturdays per month at the high school focus on academic tutoring and topics such as critical thinking skills.

The summer six-week residence program is the best-known part of Upward Bound. During this period, students live in MSU's residence halls and take a variety of morning and afternoon classes taught by Upward Bound teachers. "We team teach a morning session of math, science, and English so that students can see how these subjects integrate," said Cady. Afternoon sessions offer a variety of elective courses; these have included weightlifting, supernatural literature, Native American and African American studies, creative writing, Spanish, French, dance, astronomy, sign language, Appalachian literature, genetics, calculus, and the history of rock and roll. Cady said that this past summer, an instructor offered courses on calligraphy and costuming, and participating students did some of the costuming for the local theatre production *Fiddler on the Roof*, for which they received acknowledgment in the program. Evening and weekend activities include movies and visits to the Jenny Wiley theatre and to Kings Island, plus a four-day cultural trip to a large city, such as Atlanta, Chicago, or Washington, D.C.

For seniors who have just graduated from high school, the summer residency functions as a bridge program to the collegiate world. Participants enroll in two MSU general education courses, with supervised study and job-shadowing components.

Upward Bound started on the MSU campus in 1966, and many of its grad-

uates have gone on to make names for themselves in the worlds of law, medicine, and education. Students are selected for participation largely on the recommendation of their high school counselors—students who have the potential (who may not currently be living up to that potential) to do well in college courses.

Two full-time counselors work with Jennifer Cady: Elizabeth Dalzell and Lisa Hedges.

C. Commonwealth Educational Opportunity Center

Dail Howard, project director for the Commonwealth Educational Opportunity Center (CEOC), describes the service's mission as two-fold: to disseminate information about financial aid to low income, first-generation college adults, and to provide counselors who help prospective students apply for financial aid and admission to the post-secondary school of the student's choice. (Counselors are prohibited from pushing MSU since this is a federal program, although approximately 50% of CEOC students choose this University.)

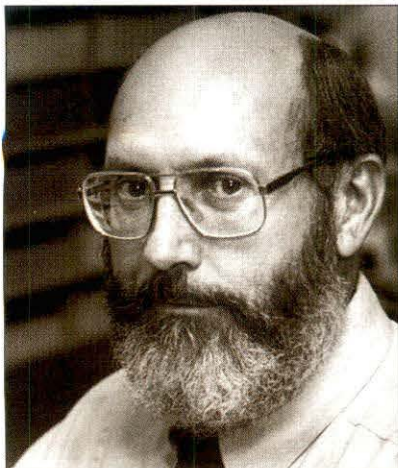
"The program is designed to be a real provider of services," said Howard. "Transportation and accessibility in our 20-county area is often a problem, so ours is designed as an outreach program." A counselor visits every county in the service area at least once per week. Counselors are based at each of the extended

Upward Bound staff (l-r) Elizabeth Dalzell, Lisa Hedges, director Jennifer Cady, and Sharon Williams help students make the transition between high school and college.



campus centers in Ashland, Prestonsburg, and West Liberty, as well as on the MSU campus. They generally travel three days a week, visiting central locations such as adult learning centers to help students and prospective students with their problems. Each travels with a cell phone and a fully-equipped laptop computer, which enables them to file financial aid applications electronically.

Howard said that counselors try to show interested individuals doors of opportunity. "They encourage people to get their GED because they can see that getting a GED is not an end but



CEOC director Dail Howard helps non-traditional students get into college.

a beginning. Many times counselors have been told, 'You're the first person who's ever told me I could do anything.'"

Because they work with those who dropped out of high school for one reason or another or who have been out of high school for a long time, counselors often need to explain things that younger, more tradi-

tional students take for granted. "Sometimes students don't know that you have to train for a career, that you don't just walk in off the street and ask for a job as a nurse. Or they may need to correct misperceptions, such as those of a student who said she needed to attend a four-year college rather than a two-year college because she was a slow learner, assuming that one would take four years to cover what the other did in two." They counsel students of all ages, from 19 to some in their sixties; the program was even utilized by one woman who was in her eighties.

One of the program's goals is to provide meaningful services to at least 1,500 persons per year, and enroll at least 40% of those in a post-secondary program. In the CEOC's five-year history, they have provided services to more than 1,700 students per year with an annual post-secondary enrollment rate in excess of 750.

As many as 91% of the students served meet the criteria of being low income, first-generation students, and 83% are age 28 or older.

CEOC counselors are Carol Naugher, Penny Felty, Amy McLoney, and Elizabeth Marie Bishop. They also provide information on GED and ACT testing. They can arrange for interested students guided tours of colleges and post-secondary schools, and function much the same way for these students as a high school counselor would.

D. Student Support Services

Student Support Services is a student-oriented program which offers tutoring, academic advising, mentoring, specialized instruction and courses, and personal, career, and/or financial aid counseling. To be eligible, students must be first-generation or disabled college students from families whose income is at or below 150% poverty level. Approximately one-third of the students at Morehead State University meet this criteria.

Elaine Tyree, project director, explains some of the problems these students encounter at post-secondary institutions: they include significant deficiencies in basic academic skills; high rates of academic probation and suspension; poor academic preparation at the secondary level; cultural deprivation and rural isolation; isolation of minority students; lack of exposure to the college environment; lack of academic confidence; lack of peer and career role models, and a reluctance to use institutional resources.

"Student Support Services is designed to provide the maximum in high quality services and activities to 215 eligible students each year," said Tyree. "The project's goals include retaining and graduating eligible project participants enrolled at the University and fostering a supportive institutional climate."

"Fostering a supportive institutional climate" includes courses which emphasize individual attention and group problem solving; the availability of professional counselors to help students understand and cope with the challenges of college; preregistration advisement, drop/add counseling, and monitoring of academic progress, and individual tutoring provided on an "as needed basis" for a variety of general education courses in understanding course content, preparing for exams, and managing study time. Throughout the semester, workshops are offered to enhance students' academic and personal growth, and may include such topics as financial aid, motivation, and social and communications skills. Cultural enrichment trips are planned each semester to broaden participants' experiences through attending theatrical and musical productions and visiting museums and other places of interest such as Mammoth Cave.

Since 1992, Tyree has been conducting a running survey of results achieved by participants in Student Support Services and comparable University students (low income and like ACT scores) who do not participate in the program. "The results are astounding," she said.

Students who enrolled at MSU in the fall of 1992 participating in Student Support Services had much higher retention rates: 87% returned as sophomores, 79% as juniors, and 60% completed their senior year. For nonmember students, 70% returned for the sophomore year, 63% returned as juniors, and 41% completed their senior year. Tyree sees this as obvious proof that her program is having the effects for which it was designed.

Three full-time counselors work with Elaine Tyree: Jenny Crager, Tina States, and Wilma Tate.

MSUCorps

"It's a wonderful program. We've done some really great work."

Steve Swim, coordinator of MSUCorps, describes his program, part of AmeriCorps, as being "designed to allow people to give something back to their communities through service for educational money later on."

MSUCorps, coordinated by Morehead State University, is designed to improve the level of educational success of high-risk school-age children by providing comprehensive tutoring, mentoring, and services to 600 at-risk students and their parents in 13 Eastern Kentucky counties using 31 full-time AmeriCorps members. Members work in teams with staff from 32 Family Resource Centers and Youth Services Centers to provide tutoring and parental involvement; they also work with community volunteers to create a mentoring program.

Potential members must demonstrate leadership and a willingness to be part of a team of service providers. The members must be at least 18 years of age and a high school or GED graduate. Because of close contact with school-age children, each member must complete a police check and health screening.

Current volunteers range in age from 18 to mid-40s; for the most part, they are teachers, social workers, and students. Volunteering "provides rich life experiences," Swim said.

The at-risk children served by MSUCorps are those not being helped by other programs (such as Educational Talent Search). They make an effort not to duplicate programs so that more students may be served.

"Kids have someone taking an active interest in them, and someone they can talk to," said Swim, and this is what seems to make the difference in situations where classrooms are often too crowded for teachers to be able to give each child sufficient individual attention, and where parental interest and support are often lacking. More than 80% of the contacted children have increased academically; approximately 80% have higher attendance rates; 75% have a better attitude toward school in general. He said that members work very little with special education children because they do not have the training, and added that members are not counselors, teachers' aids, or clerical workers.

Members do, though, receive a "tremendous amount" of train-

ing. All are certified in CPR by the American Red Cross; this year 60% became CPR instructors, and next year the goal is 100%. Members can then take this skill to the community and provide training for teachers, parents, counselors, and community members. They also receive training in conflict resolution, are certified tutors, and will be training to find ways of helping teachers and parents work together.

The effects the members have reach beyond academic improvement. A school in Camargo in Montgomery County, Swim said, went from having no parent volunteers to more than

200 as a result of MSUCorps involvement. A member mentoring some middle school girls at another school found that low self-esteem was causing many of their problems. Because several of the girls had no running water in their homes, the member found early-morning shower facilities for them, and provided hygiene and cosmetic products, helped them with their hair, etc. Their subsequent academic improvement was astounding.

Swim also said that learning about the problems children have to contend with

on a daily basis has made him a better parent.

When members finish their service, MSUCorps helps them enroll in college or find a job. Members may serve for a maximum of two years.

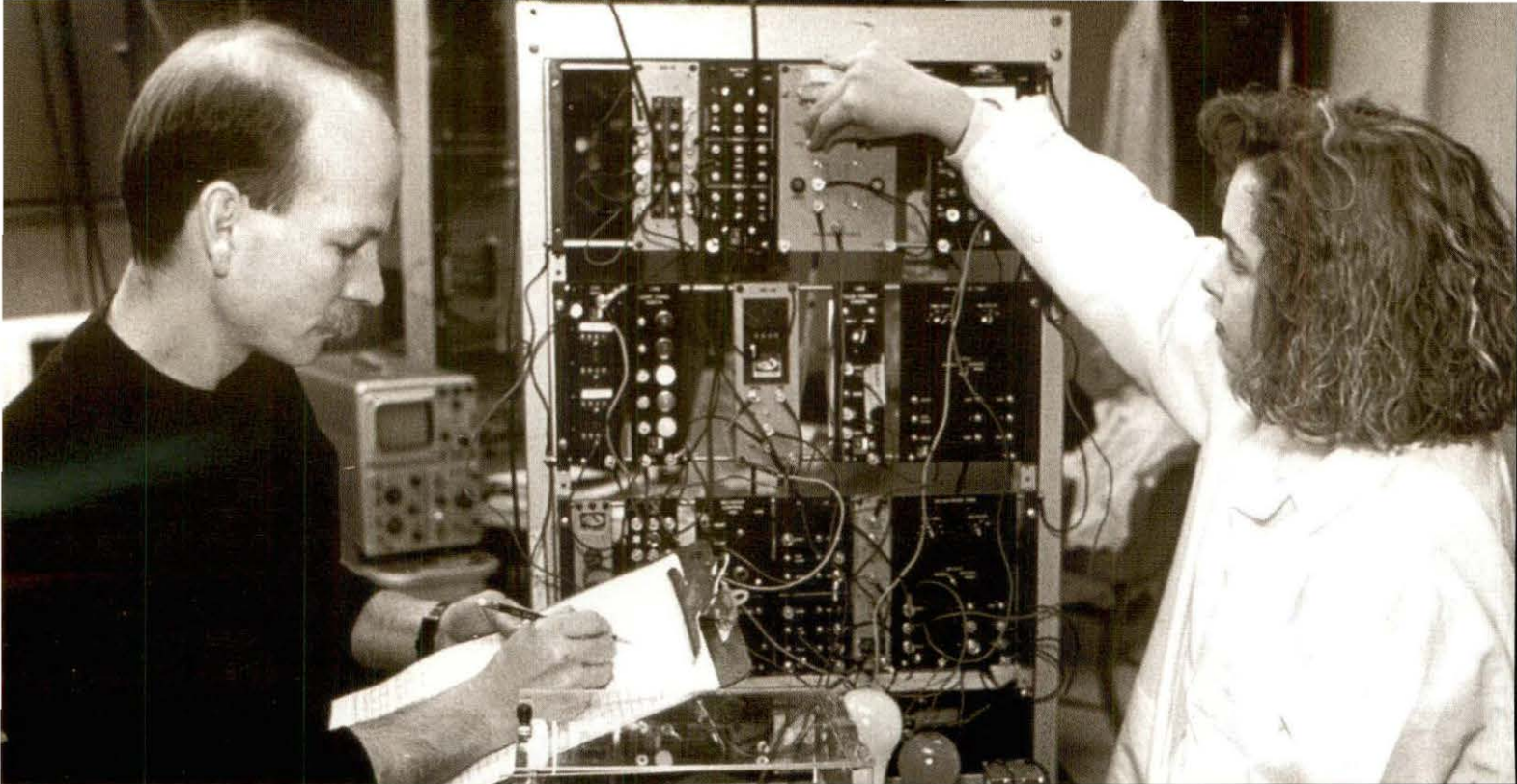
Members perform 1700 hours of service within nine months to a year, and receive a living allowance, not a wage, of \$7,945. "The member is not an employee of anyone," said Swim. Upon completion, the member is eligible for an educational award of \$4,725, which is received in voucher form. The voucher, which must be used within seven years, may be used for any fees chargeable to a university or college, including paying off student loans. Members do not receive any of this as actual money.

AmeriCorps is the national service initiative signed into law by President Clinton in 1993 under the National and Community Service Trust Act, and is designed to engage Americans of all ages, races, and educational and socioeconomic backgrounds in community service. MSUCorps is one of several programs administered through the Corporation for National Service and the Kentucky Community Service Commission.

To provide maximum support for the members, two assistant coordinators, Betty Karrick and Beverly Tadlock, work with Steve Swim.



Christy Redmond, coordinator of Family Resource Center at Camargo, is recognized by MSUCorps Coordinator Steve Swim for her involvement in this program.



$C_{17}H_{21}NO_4$:
Cocaine &

Dr. Bruce Mattingly, shown here with student, Kristen Rase, is one of MSU's most distinguished researchers.

Brain Neurochemistry

ERYTHROXYLON COCA IS A SOUTH AMERICAN SHRUB WITH FIVE-PETALLED white flowers and red berries, commonly found wild in Peru, Bolivia, and Ecuador. For centuries, the Indians of these areas have chewed coca leaves mixed with limestone, for pleasure or as a stimulant in order to withstand hunger, thirst, and difficult working conditions. These leaves contain cocaine.

Ingested in small amounts, cocaine produces feelings of well-being and euphoria, a decrease in appetite, and an increase in energy and mental stimulation. Repeated or prolonged use, though, results in anxiety, depression, paranoia, confusion, insomnia, and convulsions which can cause death. The euphoric effects of cocaine are, psychologically, extremely addicting.

Dr. Bruce Adams Mattingly, professor of psychology and faculty representative on MSU's Board of Regents, has been studying the neurochemical and behavioral effects of chronic stimulant abuse for more than a decade. Based on his research, which has received international attention, Dr. Mattingly and his students have published more than 40 scientific articles and presented more than 80 papers at state, regional, and national meetings. His past research has been supported by more than 25 intramural and extramural grants, including several through the Kentucky/EPSCoR program of the National Science Foundation.

He recently was awarded a three-year federal grant totaling more than \$100,000 from the National Institute on Drug Abuse, a division of the National Institutes of Health (NIH).

The grant project, which runs through June 1998, is entitled "Receptor-Dependent Sensitization to Cocaine." According to University officials, this is the first NIH research grant received by an MSU faculty member.

"Cocaine is a highly addictive drug which produces its pleasurable effects by altering brain neurochemistry in the brain regions controlling emotions and motivations," he said. "The chronic abuse of cocaine appears to produce long-term changes in brain neurochemistry which may lead to the appearance of a number of psychiatric disorders ranging from panic attacks to paranoid psychosis."

In laboratory animals, the repeated administration of cocaine and other stimulants results in the development of behavioral sensitization. Behavioral sensitization is said to occur when a given dose of a drug produces a progressively greater behavioral effect with repeated exposure. In other words, the animal becomes supersensitive to the drug. Once developed, this supersensitivity appears to be relatively permanent, persisting for weeks, months, and in some cases even years after drug withdrawal. A great deal of evidence suggests that the neurochemical alterations mediating the development of behavioral sensitization in animals are the same as those responsible for behavioral disorders resulting from chronic cocaine abuse in humans. Consequently, behavioral sensitization has become the number one animal model to study the long-term behavioral and neurochemical effects of cocaine and other stimulants.

Although cocaine produces a variety of neurochemical effects in the central nervous system, most of Dr. Mattingly's research has focused upon cocaine-induced changes in brain dopamine systems. Dopamine is a chemical neurotransmitter released by nerve endings in several key areas of the brain. Different dopamine systems within the brain appear to modulate different behavioral functions. A reduction in the level of dopamine in the nigrostriatal dopamine system, for example, is responsible for a severe movement disorder known as Parkinson's disease. In contrast, an overactive dopamine system has been postulated to be the cause of many of the positive symptoms of schizophrenia. Another dopamine system, the mesolimbic dopamine pathway, appears to be critically involved in the appreciation of pleasurable or rewarding stimuli. This latter pathway appears to be activated naturally to provide a sense of pleasure in whatever people find rewarding, like chocolate or sex or a job well done. Not surprisingly, nearly all drugs of abuse, including cocaine, heroin, and even nicotine, artificially activate this pathway. This pathway also appears to be responsible for the arousing or stimulating effects of cocaine and other stimulant drugs.

Although dopamine systems are often portrayed as unitary systems, recent research in molecular neuroscience has identified five distinct dopamine receptor subtypes within each system. The exact function, and significance, of these distinct dopamine receptor subtypes is largely unknown.

"The chronic abuse of cocaine appears to produce long-term changes in brain neurochemistry which may lead to the appearance of a number of psychiatric disorders ranging from panic attacks to paranoid psychosis."

The major objective of Dr. Mattingly's current research project is to determine the involvement of these specific dopamine receptor subtypes in the development of behavioral sensitization to cocaine. He hopes to be able to identify the critical receptors involved and to find drugs which will either minimize or reverse the enduring effects of repeated cocaine administration.

In Dr. Mattingly's laboratory, rats are treated daily with cocaine and the locomotor stimulant effects of the drug are measured in computerized activity monitors. The monitors, purchased through this grant, are square Plexiglas boxes which have 48 photocell beams and detectors along the walls. The rats' movements are continuously detected and this information is fed into the computer which calculates a variety of indices of locomotion. In many experiments, prior to giving the rats cocaine, Dr. Mattingly pretreats the rats with other drugs that selectively block a specific type of dopamine receptor within the brain. Often these are experimental drugs not currently available for use therapeutically. In other experiments, Dr. Mattingly treats the animals with various combinations of experimental drugs that selectively stimulate only certain subclasses of dopamine receptors, and then later determines

whether these treatments alter the rats' responsiveness to cocaine. The purpose of these types of experiments is to determine the specific receptor subtype(s) responsible for long-term changes in responsiveness to the cocaine. The daily test schedule for his experiments usually takes between ten to twelve hours per day, and, depending upon the objective, an experiment may require up to thirty consecutive days of testing. Therefore, you can usually find Dr. Mattingly and his students in the laboratory on most nights, weekends, and holidays.

In this research as well as in all his previous research projects, Dr. Mattingly has provided exceptional research experiences for his undergraduate students. "When I first came to MSU as a student, certain doors were opened for me, so that I was able to become involved in research as a student. This changed the direction of my life," Dr. Mattingly said. "In my teaching, I try to create the kinds of experiences that were here for me when I was a student." His students not only assist with research, but present their findings at professional meetings and often publish them in prestigious journals. They have frequently won research paper awards at the annual Kentucky Academy of Science meetings, and most have continued their education into graduate or professional schools.

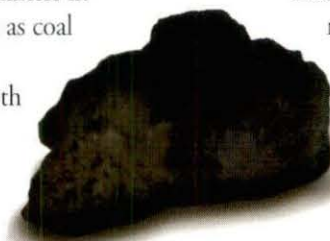
"Worldwide, the major researchers and research institutions in this field know about our work, and most assume that MSU is a doctoral-degree granting institution," Dr. Mattingly said. "Most are surprised to learn that my research is conducted primarily by undergraduate students."

“The coal you mine has no gender. It’s not female coal or male coal,” United Mine Workers of America president Richard L. Trumka told a gathering of women miners in 1980. Despite his support, blue-collar jobs such as coal mining tend to be difficult for women to break into, and often these careers are fraught with both subtle and overt sex discrimination.

Dr. Suzanne E. Tallichet, assistant professor of sociology, began focusing on the lives of

attention to them than they have to the former group of working women.”

Historically women have always worked in family mines but were not allowed to work in large mines; the first woman began officially working underground in July 1973. When attorney and women’s employment advocate Betty Jean Hall was not allowed to visit a mine with a group in the early seventies, she recognized



WOMEN UNDERGROUND

Dr. Suzanne Tallichet and the history of women coal miners in the Appalachian region

women coal miners while a doctoral student in rural sociology at Pennsylvania State University. Her dissertation examined coal-mining women’s problems with advancement and identified factors by which job-level sex segregation was established and maintained underground. In the summer of 1995 she received grant funding from MSU to return to the mine where her original research was done to conduct a follow-up study of these women. She has also received a grant from MSU for the summer of 1996 to return to the mine but this time to talk directly to the male miners about their experiences and opinions about how mining has changed since women have been working underground.

Although much has been written about women’s entry into the work force, less is known about women hired in non-traditional blue-collar occupations. Rural women working in these occupations have been seriously neglected by researchers, according to Dr. Tallichet, for most studies have documented the experiences of urban women in non-traditional white-collar jobs. “Because researchers have greater access to and greater psychological affinity for the latter, they have simply paid more

Dr. Suzanne Tallichet began her studies of Appalachian women coal miners as a doctoral student at Penn. State. She is shown here after a day underground.



that no woman would be allowed to work there. (One excuse was the traditional belief that a woman in the mine was bad luck.) Ms. Hall took it as her personal crusade to see this changed, and she helped form an organization called the Coal Employment Project (CEP). In 1978, CEP won a class-action lawsuit against several major coal companies over sex discrimination in hiring; as part of the settlement the companies began hiring one woman for every three men.

The physical work environment has been described as “eerie, weird, or spooky.” Most underground mines are located in remote or isolated rural areas. The mine is a series of interconnecting and parallel passageways through which miners, machinery, air, and coal are moved in and out of the mine. “The average height of the ceiling inside a mine is approximately 5 1/2 feet,” said Dr. Tallichet. “In most cases, the section of the mine where miners work is about two miles from the entrance.

“Coal mines are noisy and dirty. They are also physically threatening places to work because the dangers inside them are unpredictable and omnipresent,” said Dr. Tallichet. “Problems with roof supports, ventilation, light-

ing, access, and coal extraction and conveyance are always present. Accidents nearly always involve earth, fire, water, methane gas, or some combination thereof. Roof falls are the leading cause of death."

Mining itself is physically demanding. Equipment which must be worn includes a battery-powered headlamp attached to a hard hat and an oxygen "self-rescuer." At the face (where the coal is mined from the seam), miners extract the coal by machine, which is then mechanically loaded onto shuttle buggies or conveyor belts, both of which take the coal out of the mine. Once coal is cut from the face, the shifting rock overhead needs to be stabilized more permanently to keep the roof from collapsing. Thus, roof bolting is crucial to the work process because it is very unsafe and illegal to work under an unsupported roof. By union contract, a miner can refuse to work in an area she or he deems unsafe.

"Coal mining continues to be an occupation with a strong masculine-identified subculture," Dr. Tallichet continued. Since work underground is highly specialized, this great interdependency has resulted in a strong buddy system.

Dr. Tallichet's research has been conducted at an underground mine in southern West Virginia, where she has both formally and informally interviewed 20 women miners (14 of whom she interviewed in depth), some of the men with whom they worked, security guards, an engineer, and the superintendent. She was accepted quite well by most of the women, who showed little reluctance to speak with her, although a couple feared for their jobs if they did. She was initially introduced as "the lady from Penn State to talk with the lady miners," (as a doctoral student) which may explain why the men were less inclined to be interviewed. In general her studies have focused on sex discrimination within the mine. The dilemma that women find themselves in is that mining is traditionally a masculine environment and to be accepted the women had to mine like a man; yet the men never let them forget that they were not men, and many of the women felt obligated to ignore their femaleness while having it brought up to them constantly.

She found that the supervisor can cause much of the problems of women being unable to advance. All miners need a certain amount of training and experience to advance; because of supervisors' job assignments, it is often difficult for women to accumulate the necessary hours to do so. Clean-up jobs almost automatically go to women, and the one woman miner on her crew may find herself expected to clean up the men's trash after meals. Assignment to clean-up jobs, such as shoveling, makes it difficult for women to have the requisite experience with

machinery and equipment to bid on a higher grade job. (All new miners begin at the same job level and work their way through higher job grades to advance. Job advancement occurs through bidding on posted, open jobs, which are to be awarded to whomever has the most seniority and the most experience, meaning that whoever gets the job must already know how to do it.) Many men seem to feel that women don't know anything about machinery (implying that they are too dumb to learn), with the result that they are unable to bid out of lower-paying, more physically-demanding work (where many remain despite the belief that women are not strong enough to mine coal).

Dr. Tallichet found that sexual harassment might take the form of verbal harassment, direct propositioning for sexual favors, or sexual slandering and isolation. For example, some women were told outright that they did not belong in the mines and had no business taking a man's job away from him.

(Encouragingly, only approximately 15% of the men perpetuated sexually-harassing behavior.) Despite the gender-based problems, women still seek out and tenaciously keep coal mining jobs because they need to work to support themselves and their families, and even the lowest-paid mining jobs pay much better than other "service" and minimum-wage jobs available in these rural areas.

In recent years, the union (UMWA) has increasingly supported women miners, who may file grievances against management. However, the most important support system for the women miners is the women themselves.

"Based on what one woman said to me, the message is clear," said Dr. Tallichet. "She remarked, 'One woman don't stop their show,' and it was up to the other women in the mine to show the same resistance. Through networking and consciousness raising, women can support one another and begin to foster group cohesion and a common identity. By being concerned and attentive to each other's needs and problems, they can collectively begin to chip away at the legitimacy of men's definitions of the women as inferior or abnormal. The impetus for change must come from the women themselves." One of the changes Dr. Tallichet found when she revisited the mine five years after her original study was greater solidarity among the women.

Dr. Tallichet has published her findings in reputable journals including *Gender & Society*, and is completing a book on women coal miners in Appalachia. She has had book chapters accepted for *More Than Class: Studying Power in U.S. Workplaces*, edited by Ann Kinsolver, and *Gender and Natural Resources*, edited by Carolyn Sachs.



Dr. Suzanne Tallichet

Keeping the Book Arts *alive*

CLARA KEYES LOVES BOOKS. NOT JUST READING THEM, CARING FOR THEM, and helping others use them, but making them as well.

Keyes, head of special collections at Camden-Carroll Library, recently compiled, produced, and distributed a

descriptive bibliography of Kentucky's Larkspur Press, supported by an MSU Summer Research and Creative Productions Fellowship.

Larkspur Press was founded by Gray Zeitz in 1974. Zeitz learned the craft of hand printing from the University of Kentucky's Carolyn Hammer (whose husband Victor designed a typeface, American Uncial, which is often used in Larkspur publications), and set up shop with a press she had given him.

Not only has he published some of Kentucky's best known and most highly respected authors (including Wendell Berry, Guy Davenport, James Baker Hall, Gurney Norman, and Bobbie Ann Mason), he does so in a very unique and labor-intensive way. Larkspur Press uses only old techniques—hand-set type, hand printing, and hand binding, often with hand-made papers—to produce books, chapbooks, and broadsides in limited editions.

Keyes became interested in book arts when she discovered Larkspur Press in 1980, and pursued that interest by learning book binding, paper marbling, and

Clara Keyes frequently offers community education classes in paper marbling and book binding.



Encounter. Thomas Merton and D.T. Suzuki. Correspondence.

ENCOUNTER | THOMAS MERTON & D.T. SUZUKI | Edited by |
Robert E. Daggy, Ph.D. | Larkspur Press | 1988

Colophon: The type used in this book is Joseph Blumenthal's Emerson and Victor Hammer's American Uncial. Both have been set in a stick and printed on a handfed C&P using Mohawk Letterpress paper. A special edition was printed on Iyo paper and bound by hand. The edition of 1060, of which 60 are special, was made by Jeff Edmondson, Dave Smith and Gray Zeitz at Larkspur Press in Monterey, Kentucky 40359. This is number: []
Collation: xiii-xx 1-104, 6 5/6 x 9 5/8 in.

Notes: The special edition was bound by Carolyn Whitesel using paper specially marbled by her for the edition; spine covered in painter's canvas. The edition of 1000 is bound in gray cloth-covered boards; issued with ivory dust jacket.

other related skills. While a graduate student in library science, she took courses in the history of books and printing, and descriptive bibliography, which "focuses on the book as a physical object, and is usually applied to books from the hand-press period, in which each copy can be unique, in that pages with ink smudges or upside-down type could have been incorporated into the edition. Descriptive bibliography is an attempt to define an 'ideal copy' which may or may not exist." Because Larkspur Press editions are printed using hand-craft techniques, many of the conventions of descriptive bibliography can be applied to the books. Keyes is quick to point out, though, that Gray Zeitz, unlike printers of the earlier period, checks each sheet for quality as it comes off the press, and any which are not perfect are discarded.

She visited the Press to physically examine and measure the books and broadsides not in CCL or other library collections. Once this was done, the information was put into a data base format, and her first bibliography, covering the press from 1975 through 1990, appeared in *The Kentucky Review*. For Larkspur Press' 20th anniversary, she decided to issue the updated bibliography in booklet form.

collation, and binding.

Larkspur Press' Gray Zeitz praises Clara Keyes. "I support her work. It's excellent."

Keyes explains the bibliography's significance: "Arts and crafts have become important to the Kentucky economy, and the craft of fine printing has quietly flourished in the commonwealth for the past forty years, with several private, institutional, and hobby presses in operation. Larkspur Press has possibly enjoyed the greatest commercial success of these ventures, and has made a tremendous impact on book arts and the native literary life of the commonwealth. This project serves to bring the work of Larkspur Press to the attention of Kentucky libraries and their users, provide a catalog for building collections in book arts and Kentucky literary studies, and assist collectors and other interested parties in accurately identifying Larkspur Press publications. It also provides detailed publication information, such as number of copies printed in both regular and special editions, type of materials used, and all contributors such as illustrators and press workers."

Her next project is to establish a Web page for her descriptive bibliography, which will incorporate scanned illustrations from the books' covers and text pages.

"I wanted my bibliography to look like a Larkspur Press publication, so I used a font which mimics Hammer's American Uncial, which is on the cover. Gray gave me the cover paper, and the inside is eighty-pound paper run on a copy machine from laser printer output." She bound the copies by hand using linen thread.

"This is not an annotated bibliography," Keyes cautions. It focuses not on the information the book contains but rather on its physical appearance, including size, font type, ink colors,

The Cuban-American Experience

"I am interested in how Cuban exiles and first-generation Cuban-Americans define themselves, their identity and cultural history, as a result of having ties to two different cultures," explains Elizabeth Mesa-Gaido, assistant professor of art. "This is due to my own family experience, being that my parents were born and raised in Cuba and came to the United States as political exiles. I was born and raised in the United States, and have been exposed to and influenced by both Cuban and American cultures."

Mesa-Gaido, who was recently an Al Smith Fellow (Kentucky Arts Council), received funding from Morehead State University and the Kentucky Foundation for Women to create a multi-media installation based on the Cuban-American experience.

Multi-media refers to art techniques combined with other disciplines, in this case audio and video. This component of the installation is made up of interviews with Cuban exiles in the United States and first-generation Cuban-Americans. The interviews were conducted primarily in Miami (Mesa-Gaido herself grew up in Pittsburgh). Cuban exiles were asked about their backgrounds, why they left Cuba, what they left behind, and how they got here; first-generation Cuban-Americans were likewise asked about their backgrounds, what they knew about their parents' backgrounds, and what types of cultural conflicts they perceive. Mesa-Gaido renarrated all the stories, translating from Spanish when necessary, using her own voice for consistency. Using Adobe Premier software, she created video animations of four minutes at most, short enough so people would watch them all the way through.

She created large mixed-media organic forms. "I am interested in natural forms, yet these are somewhat abstract so that people can interpret them however they want." They were created using chicken wire, papier mache, cotton cloth, paint washes, and a final coating of "thick and tactile" beeswax. "I know that generally pieces of art in galleries are not supposed to be touched," says Mesa-Gaido, "but I wanted people to touch these."

The 14 forms were installed on the walls to "create the experience of being surrounded by art." Some of the forms contained



Elizabeth Mesa-Gaido is a first generation Cuban-American; a portion of her installation on the Cuban-American experience is shown.



audio, some contained video, and some were left empty. The museum-goers had to look inside each form's funnel to find out what was inside—the installation was meant to be interactive. The artist says she was told of kids holding up other kids so they could see into the forms while the work was on exhibit at the Indianapolis Art Center.

Mesa-Gaido was assisted in this project, which was exhibited this fall in New York, by assistant professor of art Gary Mesa-Gaido.

"The project is significant in several respects. I hope to have demonstrated to audiences the diversity within the art world. My work is diverse because of the combination of various materials, techniques, and disciplines, making it difficult to categorize. In addition, my installations have roots in art work such as that of the Mexican Muralists, who illustrated that art work could not only be aesthetic, but could convey political and social messages to the viewers as well.

"I hope this installation will lead to a greater understanding about exiles or immigrants, at a critical time in United States history when there are large numbers of immigrants wanting to become U.S. citizens," Elizabeth Mesa-Gaido continues. "People have become very hostile towards letting immigrants into the United States, forgetting the history of immigration in the majority of their own families.

"Finally, I want to communicate to those who share similar experiences as those heard in the installation, not just exiles but first-generation Americans. It is important for people to be aware of others who have similar experiences and understand that they are not alone."

Decentralization in Contemporary China

"Decentralization, the devolution of administrative authority from a central or high level to a local or lower level in the governmental hierarchy, has been one of the major components of Deng Xiaoping's economic reform strategies. My study raises the question of why the Chinese central government is willing to share its monopoly of economic decision-making with local governments."

Dr. Xiaobo Hu, assistant professor of government, wrote his doctoral dissertation on *The Political Economy of Decentralization and Resource Allocation in Contemporary China*. To facilitate the development of the dissertation into a book, Dr. Hu received a grant from Morehead State University (and additional travel funding from the office of Dr. John Philley, executive vice president for academic affairs) to return to China to conduct a case study of consumer goods (bicycles) to contrast the case of producer goods in the dissertation.

Dr. Hu explained that there are two approaches to Chinese studies. One is the old, traditional way that depends heavily upon myth and learning the traditions and languages of the past 2,000 years, and which looks at China as being apart from the rest of the world. He disagrees, and follows the newer tradition of applying universally accepted hypotheses in political economics. "Together with the rise in new literature [about China], this shows that the Chinese political economy can contribute to our understanding of politics in general, as well as politics in America, not just our understanding of politics in China."

Dr. Hu's research addresses a set of three essential and mutually related questions: Why does decentralization occur at all in centralized planned economies like China's? Why are there swings in decentralization over time? Why are there variations in decentralization across economic sectors?

"Social science requires a very different approach than natural science," said Dr. Hu. "Natural science can test its hypotheses in labs, but social science cannot. In the past, most social sciences studied fixed, established systems (democracy, dictatorship, totalitarianism, etc.), but as the field developed it has become harder and harder to understand transitions between one system and another. If each is so absolute, why should it change? These transitions are becoming more and more important to understand. China provides us with a unique opportunity to study a system in transition from a Communist/Leninist party state and a Stalinist planned economy. Lenin and Stalin would not have given any of their power to others. We can study how and why and what the changes are, and the political mechanisms that lead to economic change."

In a Leninist party state, an elite party at the center makes decisions for everyone. In a Stalinist planned economy, almost every-



Dr. Xiaobo Hu has been a research fellow at the Development Research Center of the State Council in the People's Republic of China.

thing is owned by the central government, which makes economic plans for everyone down to the local level. There should be no social waste, nothing which cannot be sold, and no unemployment. "This is not possible," said Dr. Hu.

He believes that many answers to the questions of decentralization are not satisfying, including economic ones, for decentralization does not necessarily increase efficiency.

Dr. Hu's research is finding that the cause is politics at the central government, or, more precisely, conflicts of interest at the central government that drive decentralization reforms. "We now have leaders willing to give up power in order to gain a reciprocal support with local groups. In this sense, China is not a case of totalitarianism, but fragmented authoritarianism. Many groups are fighting for leadership, so they have a need of support from locals, including internal ministries, for their leadership and their policies, especially when there is a power struggle or a succession crisis between different elites. This is something we can find in politics everywhere."

Dr. Hu plans to continue researching similar questions, and enjoys sharing his findings with his students. "This is very important to me, and students find it interesting," he said. "Because of this research, my teaching becomes more resourceful."

A unique integration of science & art

"Art is evolutionary," according to assistant professor of art Gary Mesa-Gaido. "It does not have to have a stringent set of agendas."

A grant from MSU is allowing him to explore these facets of his own artistic development as well as to chronicle in a visual way some of the disparities between modernism and postmodernism as it applies to the visual arts.

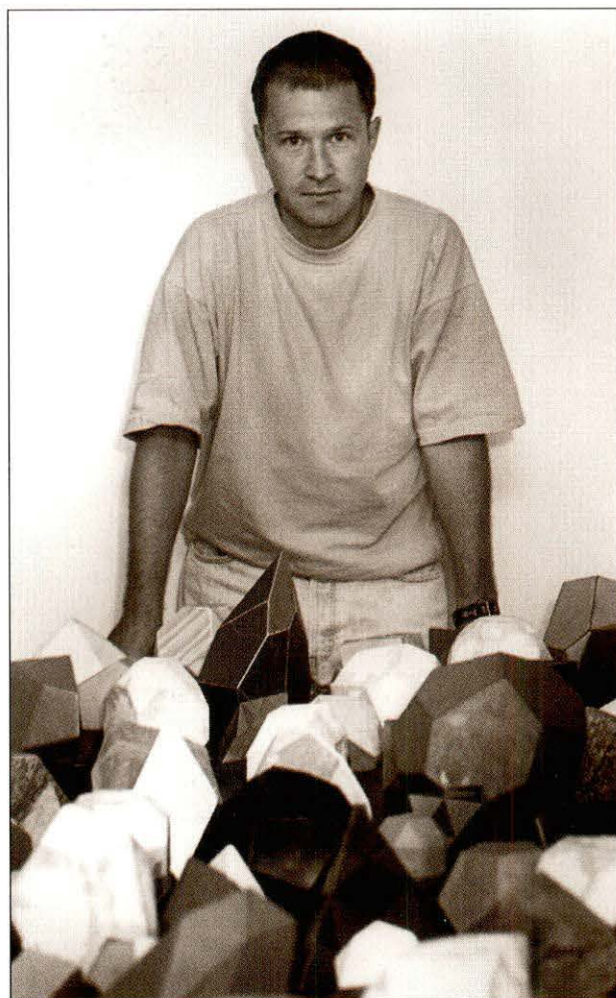
The goal of the project, entitled "A Sculpture Piece: Hundreds of Polyhedrals," is to create approximately 210 small polyhedral forms, hand made from various materials. The work is currently in progress.

Mesa-Gaido began the project as a way of tying together themes already present in his art. "I have always been interested in both science and art," he explained. He believes the two are connected in many ways, and mentions that many discoveries in both areas have come about because of serendipity.

A polyhedral is a solid form having many faces. An ordered polyhedral form is one that is created from a known formula or equation. These forms are predictable, and include Platonic forms (cubes, tetrahedrons, dodecahedrons, etc.) and Archimedean forms (which involve a combination of Platonic forms, such as a cube octahedron). Other polyhedral forms defy the predictability of traditional thought and are manifestations of chaos theory.

"Chaos theory was developed in the 1960s by meteorologists and quickly influenced other disciplines. The fundamental concept is that everything is unpredictable and uncontrollable," he said. "Chaos theory recommends that rather than set up human systems and create equations to try to make sense of a random and chaotic universe, we should study chaotic and dissimilar patterns within complex systems, such as planetary motions and weather patterns, to understand nature more comprehensively." His project uses ordered and random polyhedrals to illustrate ideas about human systems and chaos theory.

He designed the forms on the computer and then physically created the objects based on the computer forms. The grant allowed him to purchase software to build and combine forms in computerized space, and with computer animation to see the polyhedrals from multiple points of view, including from the inside. This way he can understand important information about the forms before actually constructing them in real dimensions.



These polyhedrals are products of largely postmodern methods utilized by artist Gary Mesa-Gaido.

The polyhedrals themselves are constructed using both traditional and non-traditional materials, such as wood, stone, bronze, aluminum, paper, and wax. Some of the wood and the stones utilized to create the forms are found objects which add to the randomness of the piece, signifying chaos theory.

"The project is significant in several ways," said Mesa-Gaido. "By combining sculpture with painting, ceramics, and computer art, this project demonstrates that an artist does not need to be restricted to working in only one discipline; this project also demonstrates the combination of a variety of materials within one project. This sculpture piece also merges the fields of art and science. This is especially important at this time of reform in Kentucky education, when KERA is emphasizing the collaboration between various areas of study which have been isolated from one another in the past."

RESEARCH ABSTRACT

Daniel Seth continues his studies in invariant imbedding

$$\begin{aligned} \frac{dR_E}{dx}(x, \beta, y_e, y_i) &= \sigma b \delta(y_e - y_i) + s \sigma p(y_e, y_i) + 2\sigma(f-1)R_E(x, \beta, y_e, y_i) \\ &+ s \sigma \int_0^\beta [p(y', y_i)R_E(x, \beta, y_e, y') + p(y_e, y')R_E(x, \beta, y', y_i)] dy' \\ &+ \sigma \int_0^\beta \left[bR_E(x, \beta, y_e, y') + \int_0^\beta s p(y'', y')R_E(x, \beta, y_e, y'') dy'' \right] \\ &\times R_E(x, \beta, y', y_i) dy', \quad 0 \leq x \leq \alpha, \quad 0 \leq y_e, y_i \leq \beta \end{aligned}$$

To a non-mathematician, the work of Dr. Daniel Seth, associate professor of mathematics, may seem highly esoteric and abstract. Yet his recent grant from DOE/EPSCoR, for a project entitled "Resolution of Kernels of Integro-differential Equations of Two-Dimensional Transition Operators of Invariant Imbedding Models," is helping him understand real, practical information with relevance to the nuclear industry, x-rays and electromagnetic imaging, and sun-related skin cancer.

What do these topics have in common? The understanding of each finds its basis in the reflection, transmission, and absorption of particles.

Particles striking any object may respond in one of several ways. Absorption occurs when a particle enters an object and remains within it. Transmission is when a particle enters an object, travels through it, and exits from the other side. Reflection measures how many particles bounce back from the place they initially strike. Particles may also enter an object, bounce around inside it, and exit in another place.

The mathematical model of Dr. Seth, for predicting the expected number of particles exiting the same face of the region (reflection), is a Riccati type of nonlinear equation. "This nonlinearity makes the problem very difficult to resolve on a computing device," explained Dr. Seth.

Using the "magic of numerical analysis and linear algebra," the equation can be simplified to a Sylvester equation ($AX - XB = D$), which can be solved using computer methods.

The nonlinear equation is solved by "tricking it" with the solution of the simpler equation. "We make an educated guess at the solution of a Riccati equation, use it to solve the resulting Sylvester equation, update our Riccati guess with the Sylvester equation solution, and so on, until the solution of the Sylvester equation and our last updated guess are very close," he said. When the results are close enough, the two equations can be said to have converged with one another, to a solution of the Riccati equation.

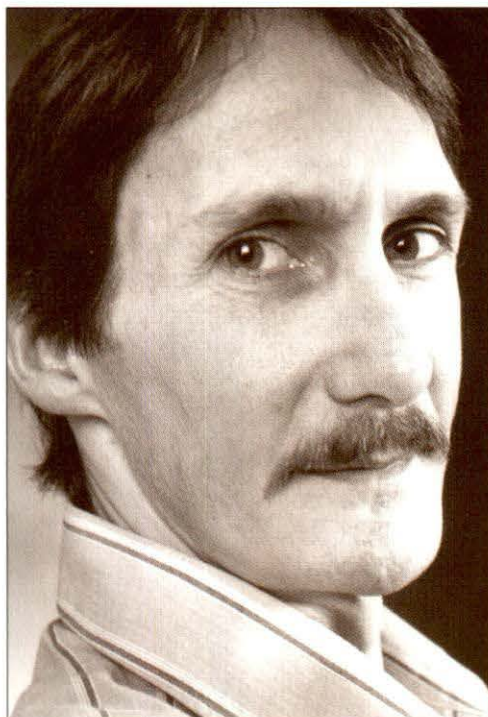
Computer computations were completed on the CONVEX EXEMPLAR, a state-of-the-art parallel computer, at the University of Kentucky computing center, using the software package STR-SYL, created by UK's Dr. Zhaojun Bai, one of the leading experts at solving nonlinear equations using the computer. Equations that take a minute to run on the EXEMPLAR take three hours to run on the PC in Dr. Seth's office.

The easiest practical application of this research to understand involves the nuclear reactor, in which a concrete wall is built thick enough so the people who work there won't be irradiated by the high-energy particles jumping around inside it—the particles

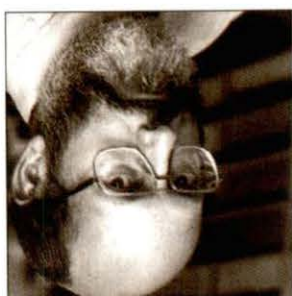
must reflect and not transmit. Dr. Seth explained that the problems at Chernobyl resulted from the use of older designs. When the containment vessel broke, a delay in shutting down the power allowed more harmful radiation to be released.

"This kind of model (equation) can also be used in studying the amount of harmful particles that come from the sun through the atmosphere. It's also relevant to the application of electromagnetic waves in medical imaging. In CAT scans, the electromagnetic waves interact differently with different types of body organs; for example, bone is a better reflector than is flesh, so bone is easy to see," said Dr. Seth.

Dr. Seth was assisted in his research by undergraduate student Keith Roe, who worked on parallel computing for this same problem, utilizing the kind of research that was described in the previous issue of *Focus*, which contained a major article on Dr. Seth's research.



Dr. Daniel Seth hopes to expand his studies to include three dimensions in addition to the two-dimensional rectangles he studies, but computers currently cannot store enough information to run this kind of problem.



BETTY JEAN WILSON
CCL

gift

