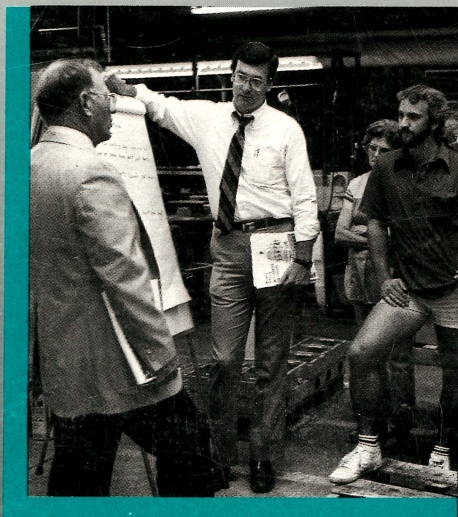
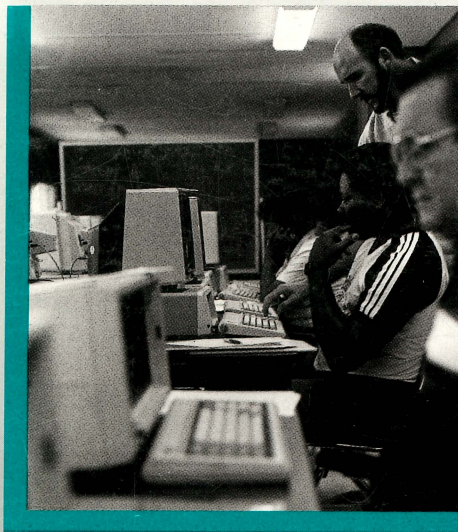
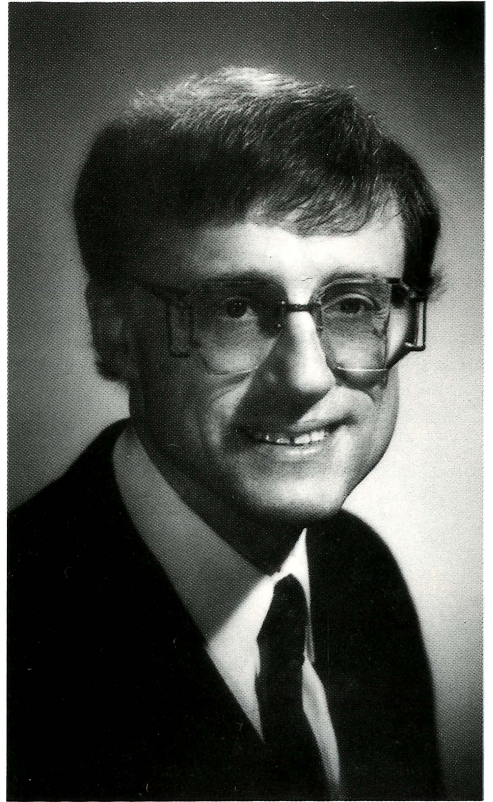


PARTNERSHIPS



*Working
together,
Missourians
and the
University
pursue
success
through
strength,
triumph
and
progress.*

On Partnerships



History and modern times are replete with examples of successful partnerships—in entertainment, exploration, government and business. It is hard to consider Hammerstein without thinking of Rodgers, Laurel without Hardy, Lewis without Clark, Sears without Roebuck or McDonnell without Douglas. Collaboration has been a key ingredient to the strength and success of much that has contributed to our quality of life.

Education too relies on the strength of other organizations, businesses and individuals. In a very genuine sense, the practical function of a modern university takes on a new dimension as satellite and microelectronic communication technologies expand our capacity for cooperation. Partnership at the University of Missouri is more than a catch word. It is an indispensable part of the way we carry out our responsibilities to Missouri and the rest of the world.

Increased productivity and strength result when different entities are joined together, or hybridized. This is a well-known scientific fact, and indeed, "hybrid vigor" has long produced higher yielding plants and animals for our farmers. Today, Missouri's strength and productivity are being increased by combining the resources of the University with those of a variety of public and private enterprises. The "hybrid vigor" of these partnerships is the principal focus of this report.

As a land-grant institution the University has been helping the people of Missouri for generations. The University of Missouri provides higher education and carries out research, but it also makes its skills readily available to Missourians through extension and public service activities.

And that is as it should be. Knowledge, after all, is the one resource that is not diminished with use; rather, it is enhanced. Although the University has never been an "ivory tower," in recent years we have made even greater efforts to reach out to business, industry and government, to help create a stronger state and, in so doing, a stronger University.

For when Missouri and its people grow stronger, so does its University. In joining hands in partnership, both the University and the external partner benefit. As every good teacher knows, when we teach we also learn. Organizations, individuals, communities and the University working together can accomplish what none of us can accomplish alone—a brighter future for present and succeeding generations of Missourians.

I trust that as you read about examples of partnerships we were involved in during 1985-86 you will gain a deeper understanding of the University and the ways it serves our state. Whether it is in developing new medical technologies, lending a hand to minority students, retraining factory workers or helping farmers, creating a better Missouri is a team effort that requires us all to work together.

C. Peter Magrath

C. Peter Magrath
President

PARTNERSHIPS

. . . In Focus

More than 11.5 million Americans lost their jobs between 1979 and 1984 because of plant shutdowns, relocations or diminishing business. Almost 3 million of those workers remained unemployed in 1985. And of those who found jobs, at least half took a cut in pay.

Figures like these gave rise to such programs as the University of Missouri-Kansas City's Project Refocus to help dislocated workers. The project, introduced by the private Human Services Testing and Retraining Inc., initially relied on UMKC supplementary services and became the sole responsibility of the University in 1985.

It is a successful partnership between the University and Kansas City area employers. In its first year under University administration, the project helped 89 percent of its participants find long-term jobs within three to six weeks. The average pay rate: \$7 per hour. The program was recognized this year by the U.S. Labor Department as one of the nation's 10 exemplary programs for dislocated workers.

Refocus does just that—it refocuses unemployed individuals on new career opportunities. Counselors work with job seekers to help them evaluate their skills, choose a new career path and find a job in that career—with no charge to the job seeker or employer.

Its success is based on a three-part approach: testing and assessment, which develops a focused job search and helps participants re-evaluate skills; job-hunting seminars, which teach the participants how to look for a job; and a direct placement service, which places Refocus counselors in the field to drum up corporate interest in the program and in the program's graduates.

"They have taught me how to look for a job," says Lee Raymond, energy manager for the city of Kansas City before budget constraints eliminated his job. "What I am learning now I also can use in possible future job hunts."

Companies support the project by hiring Refocus graduates. "The program is good for them because they want people who have been screened. We are directing good people their way," says Ray Mischon, project administrator.

In the past three years, 200 companies have hired Refocus participants.

The project's on-the-job training contracts are another attraction. If a company hires a Refocus graduate who needs training for a job, Refocus can pay for half the training cost. "If that training costs \$6 an hour for three weeks, then we'll pay the company \$3 an hour for three weeks," Mischon says.

The federal Job Training Partnership Act funds half the program. The remainder of the funding comes from the state and \$10,000 to \$15,000 a year in matching funds from the private sector.

Workers hired from Refocus ranks generated more than \$8 million in salaries and wages last year. Every dollar invested in the program produces \$4 to \$5 in area payroll expenses. On the average, the program shortens an individual's unemployed period by two to four months.

"It makes excellent money sense," Mischon says. "But the more important part of the program is intangible. You can see changes in people. They walk in thinking they will never work again, and within a couple weeks they have a new positive attitude."

Sheryl Royston, an insurance accounts reconciler whose employer left Kansas City, is one of the swelling ranks of unemployed Americans. But UMKC's Project Refocus has given her an edge.

"It is a very effective program," Royston says. "I was amazed at my confidence when I was calling for job interviews. The confidence came from what I had learned at Job Club (part of Project Refocus).

"Without Refocus I would be looking through the classified ads because I wouldn't know any other way to get a job. I also wouldn't be having as many interviews, because Refocus is teaching me how to get those interviews.

"The counselors don't let you get down. You drop that 'poor me' attitude and start to feel excited about the program. They give you confidence."



*Unemployed workers
committed to devoting 40 hours
a week to a search for a new
job find help through
Project Refocus.*

REFOCUS

PARTNERSHIPS

. . .Of Hope

Cancer of the liver is a death sentence for thousands of Americans each year. University of Missouri researchers and other scientists are participating in a team effort that may lead to a reprieve for victims of this deadly cancer and cancer of other internal organs.

The partnership involves the University of Missouri Research Reactor; the University of Missouri-Rolla Graduate Center for Materials Research; Theragenics, an Atlanta firm; the Upjohn Center at the University of Michigan-Ann Arbor; and Atomic Energy Canada Ltd.

Liver cancer is not one of the readily treatable cancers. It is a difficult cancer to treat surgically, and chemotherapy often fails because tumors in the liver are resistant to chemotherapy.

The treatment developed by the partnership uses glass microbeads that have been made radioactive through neutron bombardment at the University's reactor.

"MURR is an excellent reactor and is well-suited to do the initial reactor work, but we didn't have all the facilities on campus to complete the research," says Gary Ehrhardt, senior research investigator at the reactor. "In modern nuclear medicine you need different skills together to make a project succeed."

That is how the partnership evolved. Delbert Day, UMR Curators' Professor of ceramic engineering, developed the glass composition for the beads. Ehrhardt directed the radiation of the beads and the chemical testing. Theragenics, the Atlanta firm, signed a licensing agreement with UM for further development and commercialization. The Upjohn Center at the University of Michigan conducted the animal clinical studies, and the Canadian group provided liability coverage for human clinical studies in Canada.

"The nuclear center at the University of Missouri is unique in the United States and perhaps the world as an effective nuclear research and production-oriented facility that is operated in a very efficient and businesslike way," says John Russell, president of Theragenics. "Working with the people at UM has been very stimulating. Our relationship with

the professors and the nuclear center has been extremely productive."

Research similar to the UM group's studies first resulted in a method using plastic beads impregnated with a radioactive solution.

The use of glass beads is an improvement. "Glass totally confines the radioactive material to the liver," Day says. "With the plastic beads some fraction of the radioactivity escapes to other parts of the body. In our research the radioactive elements are chemically dissolved in a very durable glass from which it cannot escape. The glass is essentially totally insoluble in the body."

The beads, which are each about half the thickness of a human hair, are irradiated and then injected into the diseased liver. They pass through the organ's blood system until they lodge in a capillary, which stops their progress. They then collect at that point and irradiate the surrounding tissue and destroy the cancer cells.

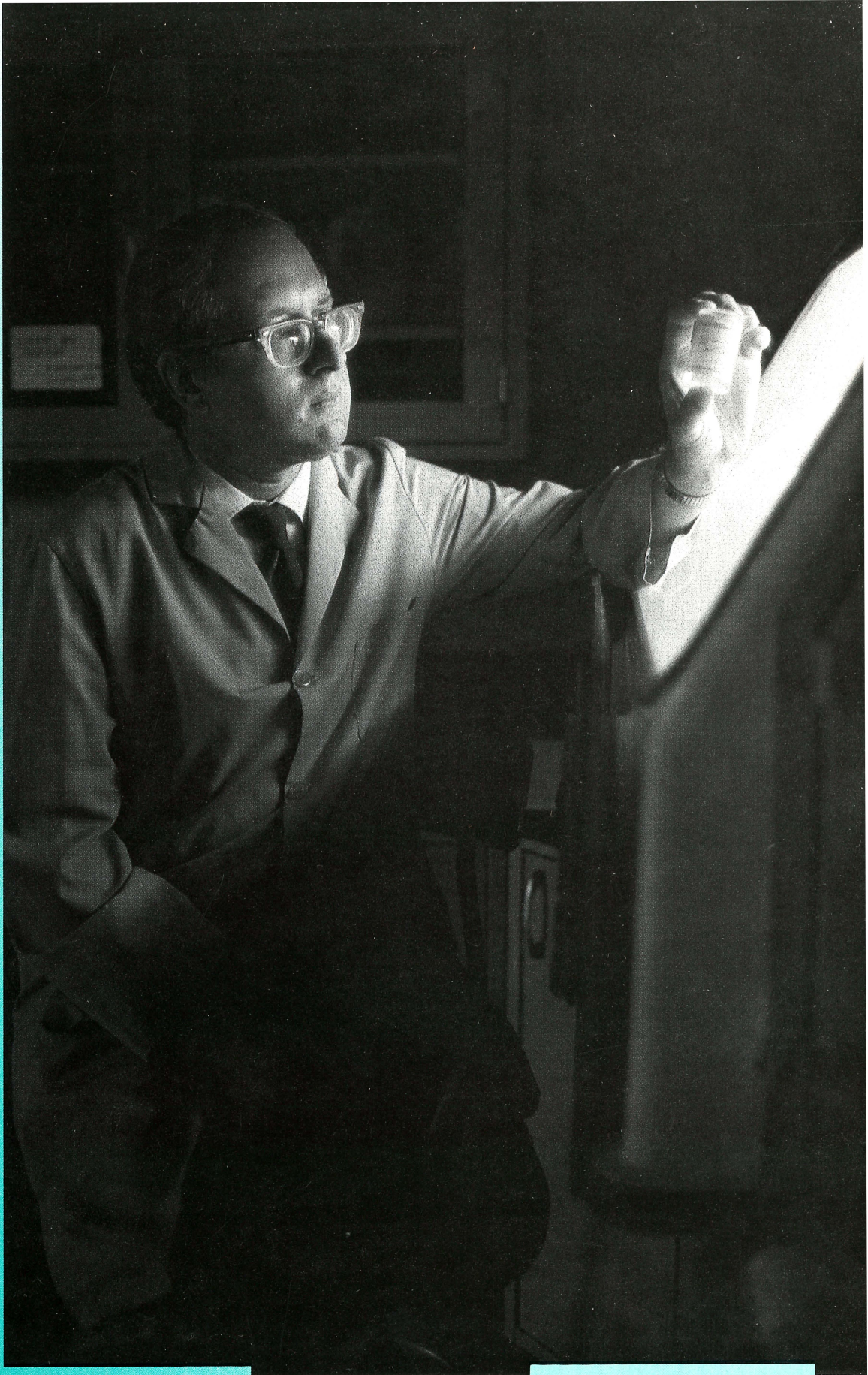
Initial animal testing of the beads was favorable. Recent treatment of a human in Canada also was successful. "We are very hopeful for continued success," Ehrhardt says.

By the end of 1986, an estimated 29 Americans are expected to die each day from cancer of the liver. And it is estimated that 13,600 new cases will have been diagnosed.

The number of deaths caused by liver cancer, one of the leaders in cancer deaths in the 1930s, has steadily decreased. But liver cancer remains among the most fatal of cancers.

A 1983 study found that although other forms of cancer are more prevalent, liver cancer causes 25 percent of all cancer deaths in the United States.

University of Missouri research for a new treatment is important because past research has concentrated on diagnosing, rather than treating, liver cancer. "Doctors are treating cancer of the liver in the same way now as they did when I was a resident 25 years ago," says James Butt, acting director of the gastroenterology and liver disease division of the University of Missouri-Columbia School of Medicine.



Gary Ehrhardt, a researcher at the University's nuclear reactor, directs the radiation of tiny glass beads used in a promising new treatment of liver cancer.

. . .For History

Face after face of the children who lined the tracks of a New York City railroad station suggested the uncertainty that must have consumed them as they waited for trains to carry them to new homes in the Midwest.

It was the late 1800s and early 1900s in New York City, and the city's streets were full of homeless children. The New York Children's Aid Society originated the idea of trains that would transport thousands of abandoned children to a better life in America's heartland.

Michael Patrick, a University of Missouri-Rolla English professor, in partnership with the Missouri Gerontology Institute and the Missouri Committee for the Humanities, is tracing the lives of former homeless children who were sent to the Midwest between 1854 and 1927. The personal histories of orphan trains passengers offer a glimpse of Missouri's history.

"The New York Children's Aid Society transported the orphans to Midwestern states for a chance at adoption, a new home and a better life," Patrick says. Twenty-six of the approximately 100,000 orphans sent to the Midwest are still living in Missouri.

Patrick is continuing research started by two folklorists from Trenton Junior College, Evelyn Sheets and Evelyn Trickel. The team has gathered documents, photographs and firsthand reports of people who rode the trains to the Midwest.

"The trains brought the children from one town to the next in Illinois, Michigan, Wisconsin, Kansas and Missouri," Patrick says. "Missouri was part of the program because of the way the railroad system was set up at the time."

Orphans that were not chosen at the whistle-stop placement ceremonies were sent back to New York. "One person I talked to as part of my research remembers as a little girl watching the presentation of the children at a local hotel. At the end of the night there was only one little boy left. This little girl ran home to get her mother and convinced her to adopt the boy," Patrick says.

Midwestern newspapers of the time had an optimistic view of the orphan trains, Patrick says. Midwesterners who gave the children homes were praised for their generosity, but some

Missourians began to suspect the goals of the Children's Aid Society by 1901. That year a state law was passed condemning the trains lawmakers described as "pouring carloads of children into the state."

Some orphans came from families financially strained by economic pressures. Many single parents had no choice but to give their children to the aid societies in New York City. Other children had been picked up from the streets of the city. Adoption in the Midwest often separated brothers and sisters but despite that disadvantage, the aid society saw new homes in the stable Midwest as an improvement over city life.

But life in the Midwest could be as hard as life on the streets of New York. Some orphans were adopted to work, and there were some cases of abuse.

Noah Lawyer and his three brothers arrived at the Savannah, Mo., train station in 1907 and were separated through adoption. Lawyer was adopted by a farm family that put the 7-year-old boy to work on the farm and sent him to school for only three months of each year. At age 18 he left the farm for good, finding work on the railroad and as a wrestler with a touring carnival.

Despite his years of labor on the farm, Lawyer is glad he made the trip west. He thinks he would not have survived in the city.

Even though there are other stories like Lawyer's, most orphans were treated well. One orphan refused an opportunity for a reunion with his real mother out of loyalty to his foster parents.

"Those who came out on the trains are flattered and surprised that someone is interested in their past," Patrick says. "They don't think of their lives as unique. Our research shows that most of the orphans came to terms with the fact that they had left their real parents behind in New York City."

A reunion for the orphan trains passengers was held Labor Day weekend in 1985. It was a time to reminisce as slides collected by the researchers stirred the memories of orphan trains passengers. Patrick calls it a happy time. "They were pleased to be remembered so well and to be part of the program.

"This research is all about personal history. These are ordinary

people with interesting stories. Personal history is a neglected but very important part of our folklore."

Patrick is organizing his notes into a book and working on a documentary film he hopes will air on Public Broadcasting Service stations. And he continues to get letters from people with a story to tell about the orphan trains.

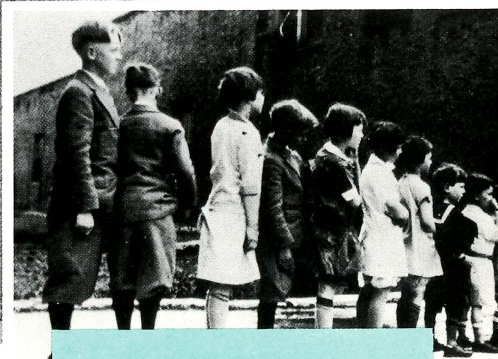
"Michael Patrick's unique research on the history made when trains brought orphans to Missouri is getting considerable exposure on public television and in the press, and we are delighted to have a role in the success of the project.

"The Missouri Gerontology Institute is involved because most of the people who rode the trains are getting up in years by now. Their reminiscences are good for them personally, and there also are benefits for the general public, younger people especially.

"Michael Patrick's research is giving these people a chance to reminisce and Missourians a chance to capture part of their heritage."

Robert Calsyn

Director, Missouri Gerontology Institute



More than a century after the first trainloads of orphaned children left New York, Michael Patrick is chronicling the lives of some of those passengers.

PARTNERSHIP

. . .In Learning

Education is on wheels in St. Louis. The students are factory workers at the north St. Louis County United Auto Workers-Ford plant, where University of Missouri-St. Louis microcomputer classes are the top attraction in an adult education program.

UMSL, St. Louis Community College and Webster University are partners with Ford in a project sponsored by the UAW-Ford National Development and Training Center. The project resulted from a 1982 UAW contract with Ford that ensured education funding for hourly workers.

UAW and Ford sought university partners to offer on-site and off-site courses. The St. Louis universities each offer a variety of courses for Ford employees. "Each institution periodically meets to look at what workers say they are interested in," says Dave Klostermann, assistant dean for continuing education-extension at UMSL. "UMSL got in on the ground floor with computer classes because the other institutions were not in the position to put equipment out at the plant."

In a survey taken last fall, workers rated computer literacy as their No. 1 interest. "In our first microcomputer course there were about 12 to 15 people enrolled. The enrollment has been growing steadily since," Klostermann says.

UMSL's eight microcomputer courses now enroll 148 UAW-Ford employees. The classes were popular enough to inspire the installation of an on-site trailer to serve as a computer classroom. The trailer houses computer equipment available during class hours and on students' own time.

"UMSL is a good university to work with because it has an excellent reputation in the community," says Denise Harrell, life education adviser at the plant. "They also have been very cooperative and patient as we try to schedule classes around shift changes and unusual working hours. It's a program that is geared for the working adult, and UMSL has been very flexible in accommodating us."

"UMSL's goal is to provide education programs employees are looking for," Klostermann says. "We want to respond to their needs. And we hope that some employees

will be inspired to complete a degree."

Says Allan Crean, UMSL continuing education specialist and one of two computer instructors at the plant: "The reward comes from teaching these people. They are going back to class because they are interested, and they are there because they want to be there."

"People want to improve their personal skills," says Dave Devine, employee involvement and plant training coordinator at the Ford plant. "Employees want to better themselves. The assembly line is a tough place. In our mobile society, education can be a vehicle to a different job."

Devine says employees value improved personal skills, recognition and a voice in the workplace more than a huge salary. "Our employees rate money fifth in order of importance," he says.

"High technology is eating up traditional jobs. The '80s layoffs have created an awareness of a need for employee development and increased training to survive in a changing environment," says Paul Sanchez, United Auto Workers union benefit representative at the St. Louis UAW-Ford plant. "Labor's role in education has increased because of the increasing need for labor to understand the role of technology in the workplace."

Dave Klostermann, assistant dean for continuing education-extension at UMSL, explains why UMSL has taken higher education to the Ford plant. "Management and labor have seen the handwriting on the wall. Jobs are being replaced by computers. Our program helps employees learn to work with the new technology or provides them the needed education to move on to other jobs.

"It is a transitional experience. Employees have expressed a desire to have more education. This program gives them the opportunity to get that education at a convenient time and location."



Keith Heerlein is one of the instructors of computer courses taught to factory workers at a Ford plant in St. Louis.

PARTNERSHIPS

. . . For Health

It had been a formidable foe, until University of Missouri-Columbia researchers and a British-based pharmaceutical firm combined their talents to come up with an effective weapon.

The foe: the "blood brain barrier," a protective barrier around the brain that has, until now, prohibited the medical profession from practically monitoring blood flow inside the brain. The weapon: a drug that can cross the barrier.

The researchers' breakthrough may help in the diagnosis of Alzheimer's disease (which now can be positively diagnosed only by autopsy) and revolutionize the diagnosis and treatment of a range of other brain disorders. It also may lead to additional medical applications.

The breakthrough was made possible by a compound discovered and invented by UMC researchers. Propyleneamine oxime has properties that allow it to cross the blood brain barrier, easing the transmission from the bloodstream to the brain tissue of a commercially developed complex with radioisotope technetium-99m. One of the world's leading authorities on technetium chemistry has called the UMC compound the most significant scientific advancement in that field in the past five years, says David Troutner, professor of chemistry, who developed the compound in collaboration with Wynn Volkert, professor of radiology and biochemistry, and Richard A. Holmes, professor of medicine, radiology and nuclear engineering.

The combination of the UMC compound and the complex developed in the London labs of Amersham International, which manufactures radiochemicals and life sciences research products, permits cerebral blood flow to be monitored for more than 30 minutes, the time necessary to allow a special camera to create an image of "slices" of the brain.

Researchers have never been able to monitor brain blood flow simply and economically because of a protective barrier that acts as the brain's natural safety feature by keeping undesirable molecules out of the brain tissue. But this built-in protection also prohibited the passage of chemicals needed to monitor the brain's tissue. The Amersham-UMC chemical is the first diagnostic agent labeled with

technetium-99m to be soluble in the blood brain barrier.

"With this agent we can get an idea of how the blood flow is distributed in the brain and gain needed information on what is going on in the tissues," Volkert says.

Holmes has used the drug to map the blood flow in the brains of 45 humans. After reviewing the results, the Food and Drug Administration approved the University's request for the testing of an additional 150 patients.

"Some of those patients will be tested at three other hospitals—Columbia University, University of Texas in Dallas and the Medical College of Wisconsin in Milwaukee," Holmes says, "because we need to have other investigators validate our work, which has bordered on the spectacular."

FDA approval of the compound should make it available for use in the United States within two or three years.

Holmes has recorded excellent results in using the agent to diagnose transient ischemic attacks, which can warn of an inevitable stroke. "It is evidence of an ischemic attack that would be totally unrecognized by other methods," Holmes says.

Amersham International has presented the University its first royalty check on sales of the product in Europe. The University receives royalties on the sale of the product developed with the compound or its derivatives. The royalties range from 5 percent for sales up to \$2 million to 4 percent for sales that surpass \$4 million.

Based on successful European sales, Amersham projects that the agent will pull in \$100 million to \$150 million a year in American sales after FDA approval. "I think that is a modest projection," Holmes says. "Amersham will be the only company offering the product so they'll have a clear market for sales if the enthusiasm we've already seen for the product remains high."

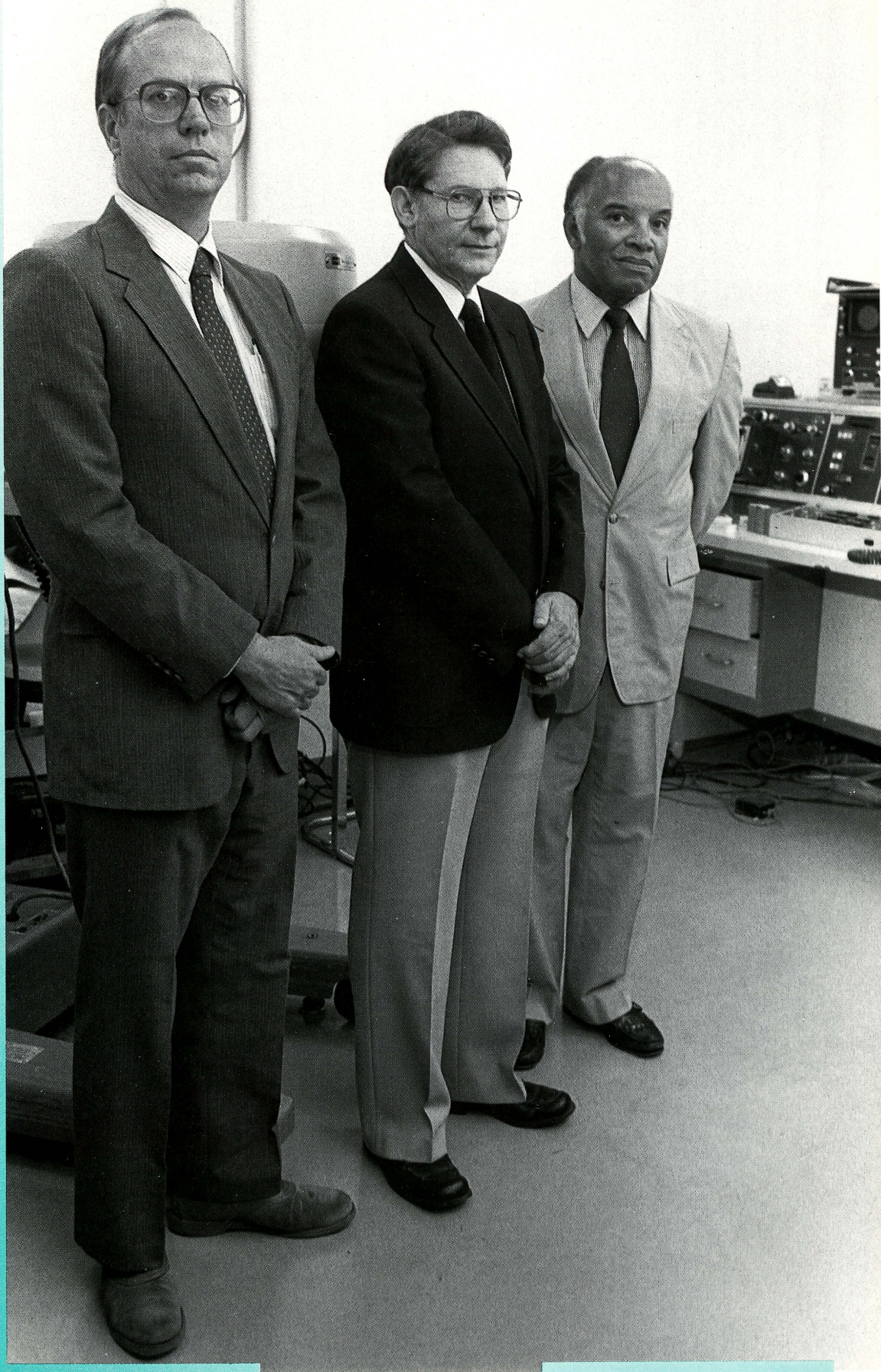
For now UMC continues its research, looking to understand the basic chemistry of the compound and its effects. "By understanding the basics, we may be able to advance to second generation knowledge of the compound," Troutner says. "Then we can put our heads together and see if maybe we can find something better."

"As state liaison to the Alzheimer's Disease and Related Disorders Association, I am proud of the leadership demonstrated by the University of Missouri in the international fight against brain disorders. The emotional and financial trauma inflicted by Alzheimer's disease on its victims and their families may soon be erased with the help of a University-developed compound that may aid in the diagnosis of this illness.

"More attention must be given to services—relevant research that can lead to an eventual cure. That is why it is so exciting to see that the crucial resources have been made available for this cooperative effort between UMC and Amersham International. This successful public/private partnership of concerned organizations in the scientific community illustrates the need for—and the potential of—similar research networks.

"It is an honor for me to lend my support, and my hope, for continued success. I am proud that Missourians are working together as a part of this medical research team. Missouri is a national leader in the field of Alzheimer's research, and I will continue to promote those efforts until this insidious disease is eliminated."

Janet Ashcroft
First Lady of Missouri



Researchers behind a drug that could revolutionize diagnosis and treatment of brain disorders are Wynn Volkert, David Troutner and Richard Holmes.

. . .In Communication

Private enterprise and university researchers need each other more today than was once the case. With costs of operating research and development units increasing, private enterprise is turning to universities, where nearly half of all research in the United States is conducted, for the research needed to advance technology. And universities need the financial support private enterprise can provide.

Such shifting in tradition is exemplified in a unique partnership between the University of Missouri-Kansas City and United Telecommunications Inc.

United Telecom approached UMKC with the idea of a joint research program because the company "felt a need for a program here and they were willing to make the commitment to get it started," says Richard Hetherington, director of the UMKC computer science program.

UMKC established a graduate program in computer and telecommunications technology by hiring qualified faculty and acquiring the necessary research equipment. In three years the UMKC computer science program grew from a smattering of classes to a strong department with 11 faculty members and more than 100 graduate students in a telecommunications and computer networking program.

United Telecom committed \$2.5 million to the five-year agreement. The money supplements faculty salaries, pays for equipment for research and teaching laboratories and funds projects UMKC researchers propose in their specialty areas.

Business and industry reap the new knowledge generated by University research. The University and its students benefit by ensuring that faculty stay current enough to be effective teachers in such a fast-changing field. It also gives students practical experience through internship opportunities and participation in research projects.

The University contributes to the program's cost. "Budget support for the program has picked up every year. We can recruit top professors comfortably because we know the support is there. We made six hiring offers in 1985, and five were accepted," Hetherington says. "Other universities making offers were getting only one or two

acceptances from the same number of offers."

"The UMKC program is attractive because of the all-out support from the University and from United Telecom," says Jagan Agrawal, who joined the faculty from the University of Southwestern Louisiana. "We have a free hand in designing courses that are relevant for students and that will benefit the community. The funding support from United Telecom and the daily contact with the scientists there make for a very productive program."

The partnership is believed to be the only program of its kind in American higher education. Hetherington says three central components explain the program's success.

"First of all, the contract is unusual. It provides protection for University academic freedom and flexibility, but it also protects the corporation's vested interest in the research. Secondly, it combines computer science and electrical engineering. The blending of those two disciplines in one field marks the future of telecommunications. And finally, it offers practical experience to students and professors and technical updating to United's scientists.

"United Telecom is a resource pool for us," Hetherington says. "Our people can interact with United Telecom scientists and stay in touch with the telecommunications profession."

"Scientists at United Telecom are business-oriented and applied-oriented," Agrawal says. "We are oriented to research and academics. It is a unique combination that results in many new ideas. United Telecom can apply our research. That means there is a very good potential that our research will be implemented in the field and not just rest on a shelf."

The program will remain research-oriented to ensure that faculty members stay in touch with the field and their colleagues around the world. "I can't see a computer science program staying viable unless the faculty is heavily involved in research," Hetherington says.

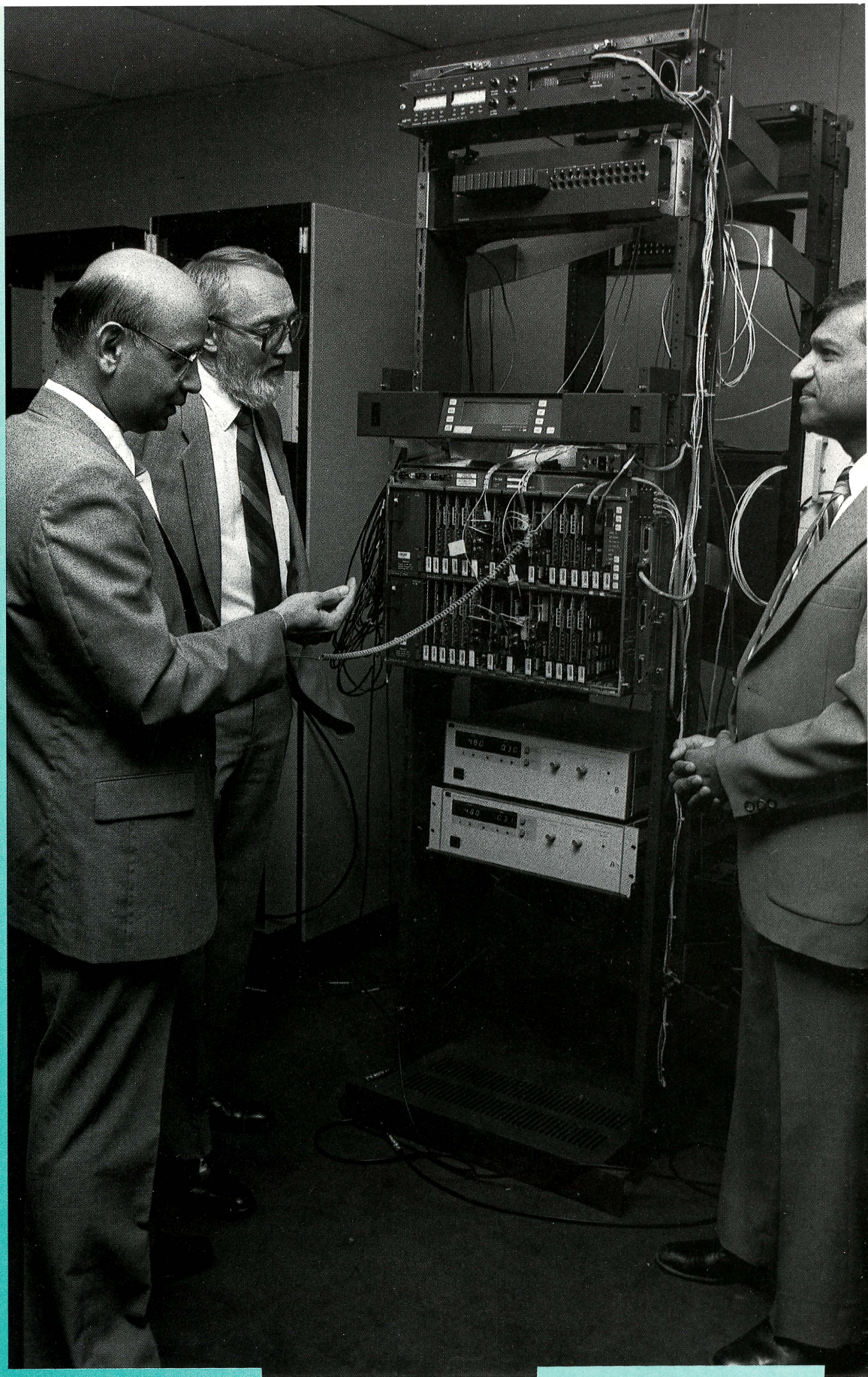
"Computers and communications technologies are coming closer and closer to the point where it will be almost impossible to determine where computing stops and communication begins, or vice versa. Early recognition of these trends resulted in this unique partnership between UMKC and United Telecommunications Inc.

"United Telecom is in the information services business and is judiciously deploying state-of-the-art technology. The partnership with UMKC offers United Telecom the means to augment its own technical strength. The faculty at UMKC can focus on long-term issues and carry on theoretical studies that will allow United Telecom to enhance its competitive position. The close working relationship facilitates selection of research areas of interest to the industry in general, not just United Telecom.

"The UMKC program will be of great benefit to the metropolitan Kansas City area as well. The success of the educational program and research publications will help achieve needed national recognition. This, together with UMKC's graduates, can create an environment to attract high-tech industries as well as students from all parts of the country."

Sushil Munshi

*Vice President, Technology Planning
United Telecommunications Inc.*



A partnership advancing the field of telecommunications includes Sushil Munshi of United Telecommunications and Richard Hetherington and Jagan Agrawal of UMKC.

. . . To Give Hope

University Extension's Alternatives for the '80s home-based business committee wanted to work with home-based businesses to bolster their success. But there was a problem.

"Home-based business covers such a wide range, from beekeeping to zebras," says Betty Feather, chairwoman of the home-based business committee. But one group largely untouched in the past by University Extension was Missouri's artisans.

"We saw that they had a problem. They had talent and good products, but they lacked marketing skills and services to help them get what they should for labor and investment," Feather says. Artisans often rely on word-of-mouth and newspaper stories for their advertising, and some are shy about charging a fair price for their product.

The committee—part of the larger Alternatives for the '80s effort to seek new ways to generate income for Missourians—developed the idea of a mail-order catalog featuring the works of selected artisans. The catalog, "Best of Missouri's Hands," is intended to increase the Missouri arts market by providing national exposure for the artisans' wares.

Extension put out a call for artisans, and the responses came pouring in. A jury judged the 800 entries submitted by 371 artisans and selected 180 for the catalog, 208 pages of crafts priced from \$5 to \$5,000, with most priced between \$50 and \$100.

Book distributors, St. Louis and Kansas City airports and tourist areas have expressed interest in selling the catalog. Retailers from six major retailing states also will be contacted.

"There was some skepticism at first from the artisans because they are not a traditional extension audience, and they had never worked with us before," Feather says. "The partnership has opened up a lot of different avenues. It was interesting and challenging to work with a new group."

The partnership continues beyond the catalog. Artisans and the home-based business committee met for a conference on operating a home-based business. Artisans came from Farmington to Fulton with the products of their skills: from miniature log cabins to working ceramic water fountains.

A French chocolate confectioner, the only food entry, became involved with the program for the national advertising that will result from the catalog's distribution. "That's the only way I can afford to advertise nationally," says Neika Z. Soisson of Sullivan.

"The conference was excellent," says Edie Pigg, assistant director of the "Best of Missouri's Hands" project. "The artisans were very receptive and networked with one another sharing information.

"As far as the future of the program, we hope the catalog increases sales of artisans' products and that the give-and-take between the artisans and the University increases."

"Extension gave me the courage to step out, to improve my craft and to try new things," says Catharine Kenny, one of Missouri's artisans featured in "Best of Missouri's Hands."

Kenny is a pyrographic (woodburning) artist in Skidmore. Pyrography is an uncommon fine art, although Kenny says many people learn the basics as a child. She has taken the art beyond its humble beginnings and expanded its possibilities to whimsical scenes for wooden eggs, boxes and wall hangings.

"I didn't know my work was any good," she says. "But through University Extension I found encouragement as well as advice on the business end."



Catharine Kenny's hands are among the best of Missouri's hands being promoted by University Extension.

PARTNERSHIPS

. . . Of INROADS

The spotlight is on talented St. Louis minority students in a program that prepares them for a starring role in the corporate world. The St. Louis affiliate of INROADS Inc. is helping minority students make their debut, and the University of Missouri-St. Louis has had a major supporting role in that effort since INROADS came to St. Louis.

INROADS began in Chicago 16 years ago to develop strong minority talent, especially in business and engineering. The second INROADS affiliate was opened in St. Louis in 1973; the national office of INROADS Inc. was moved to St. Louis several years later.

Today, some 800 firms are involved nationwide through 26 INROADS affiliates. Sponsoring companies provide paid internships for students and also pay a fee to INROADS to cover the cost of such services as recruiting, counseling, training and tutoring.

UMSL, which was the first St. Louis area university to participate in INROADS, won an expanded role in INROADS programs when high school students joined college students as participants. Along with other institutions of higher education, UMSL has become a vital partner in the effort to prepare minority students for real-world challenges. (The University's campuses in Columbia, Rolla and Kansas City also participate in INROADS programs.)

"The INROADS people approached us to provide training programs for pre-collegiate students," says Donald Driemeier, dean of UMSL's School of Business Administration. "Every summer we do just that for students preparing for their senior year in high school, who have expressed an early interest in business administration or engineering."

The pre-collegiate program at UMSL includes college preparatory classes in English, mathematics, economics and business. Students also attend classes at other universities, including Southern Illinois University at Edwardsville and Washington University in St. Louis.

"All the students are individuals," says Sally Fitzgerald, an UMSL faculty member who teaches English to pre-collegiate INROADS students. "Some know exactly what they want

to do, and others have three or four paths open to them. They are highly motivated, outstanding students."

For Maurice Johnson, a senior at Horton Watkins High School in Ladue, the pre-collegiate program is a head start for a college degree in business administration and economics. "I've known since the middle of my junior year that I was interested in business and economics," he says. "INROADS is a good program because it helps you to succeed and shows you how to succeed."

"The students have been very positive about the program," says Don Shipley, assistant director of INROADS/St. Louis. "They recognize the opportunity that the program is offering, and they also realize that they will have to work very hard. They're excited about the possibility of becoming part of INROADS again in college, and they look forward to the possibility of an internship with one of the sponsoring companies."

"The INROADS collegiate program gives talented minority students assistance and the background they need to be a successful college student and a successful graduate in areas where they can become a productive part of the American mainstream," Driemeier says. "The pre-collegiate program enables INROADS to identify students who express an interest in business or engineering and to give these students the extracurricular training they need for college entrance.

"This is clearly a successful program; that is not a marginal call. The proof of the program's success is in what has happened to graduates of INROADS/St. Louis. In general, they have all been very successful and continue to be very active in the St. Louis area."

"Companies have trouble finding good employees, especially good minority employees. INROADS identifies potentially good minority employees early on. A company can sell a student on the firm and teach the student the business through internships. After four summers of internships, the company knows whether the student would make a good employee. And the intern has been provided the opportunity to build a relationship with a potential employer.

"One of our goals is to show students that a quality education is available in Missouri. If they go to school in this area, it is more likely they will stay to work for a St. Louis company. Working with UMSL has helped us let students know about the quality of education in their own back yard."

Judith Elamin
Director, INROADS/St. Louis



INROADS benefits such students as Maurice Johnson, second from left. With him are Sally Fitzgerald (left) and Anita McDonald, instructors, and Don Shipley.

PARTNERSHIP

...Teaming Up

Working smarter—not harder—could be the motto of TEAM, a University of Missouri and state government partnership dedicated to helping Missouri's small- to medium-sized businesses help themselves.

"Our goal is to increase productivity and product quality while reducing cost," says John Amos, coordinator of Team Effort Advances Missouri and director of the University of Missouri-Rolla Center for Applied Engineering, which initiated TEAM. "Reduced costs can lead to increases in market share, and a larger market share increases employment."

The program is a joint effort between UMR's engineering management department and UM-Columbia's industrial engineering department. It is a basic, practical and general approach based on problem-solving teams—groups of people collectively solving problems and finding opportunities to enhance productivity and product quality.

When the program started, representatives of companies interested in the TEAM concept attended educational and training sessions in Jefferson City, St. Louis and Kansas City. The sessions were followed by TEAM visits to the businesses and telephone conversations to help executives implement management approaches suggested by TEAM. This was followed by frequent contact with the businesses.

"Once we presented the basics, the burden of the effort fell on the companies," says Michael Leonard, chairman of the industrial engineering department at UMC. "We were there to help them solve any problems, but essentially it was each company's responsibility to make these new concepts work."

The program helps businesses improve productivity and quality enhancement efforts. TEAM suggestions are intended to effect a permanent change in a firm's operations through total company participation in the effort.

"We want to make everyone conscious of quality," Amos says. "If a defect is not corrected, it will cost 50 cents to correct it the next time and 10 times more each time after that. It's worse if a defective product gets to the customer, who

has to bring it back.

"We have got to have a serious commitment to the program from top management," Amos says. "If they're not committed to change, then no one else will be. We start with them and work down."

One of the beneficiaries of TEAM is Durham Co. of Lebanon, a manufacturer of electrical metering enclosures. "We were reluctant to become involved at first because we didn't think we were doing anything wrong," says Doug Russell, president of the company. "But we became interested in the concepts that are the basis of the program—especially the participation of all employees in the decision-making process and the emphasis of improved productivity through improved quality.

"To be competitive in today's marketplace and to stay ahead of international competition in our domestic markets, we have to focus on continued improvement of our products and processes. The TEAM program helped us realize that. We have been very pleased with the support from the University and the state as we implement these new concepts."

After applying TEAM concepts, Durham's unit production increased 18 percent with 8 percent less working hours than the previous year. Total labor cost as a percentage of sales revenues was held virtually constant because of the productivity and quality improvements.

A grant from the state created TEAM in 1984. The group has worked formally with 20 Missouri-based companies and is in various phases of the program with approximately 20 other firms. If state funding continues, TEAM will work with approximately 50 companies throughout 1986.

"When we began the program, the state was very concerned about Missouri manufacturing," Amos says. "They realized that foreign competition was a problem for Missouri firms."

In recent years, more and more American consumers have chosen foreign products over those made in America. This increased competition has forced American manufacturers to rethink long-established production modes.

The low cost of products made overseas is another obstacle for American manufacturers. Until recently, higher productivity in American companies justified higher labor costs. Over the last 10 years, however, American productivity has shown sluggish growth, crawling along at a 1 percent increase each year.

During these same years, the productivity rate of many foreign countries grew 3.5 percent to 5.5 percent annually. Several foreign countries will have productivity levels equal to or greater than the United States by the last half of this decade.



*John Amos, Doug Russell and
employees of Durham Co.
discuss TEAM concepts.*

PARTNERSHIP S

. . . To Harvest

Missouri agriculture is in transition as farmers respond to changing times.

The transition opens the door to opportunities for new and expanded markets for small-scale producers. The state's fruit and vegetable growers are one such group.

University of Missouri-Columbia home economics extension and the Missouri Department of Agriculture via UMC's Harvest to Health program are helping the growers take advantage of the opportunities.

"We studied the status of agriculture in Missouri, and one of the things we perceived as a missing link was emphasis on the small producer," says Karla Hughes, associate professor and University Extension food and nutrition specialist. "We're helping growers overcome a lack of awareness about how to effectively market their products. The program is one of economics. If Missourians eat more fruits and vegetables, producers will have a bigger market. In turn it helps the economy of the state."

Agriculture in the state traditionally has emphasized the bigger producers, large animals and major crops. The Harvest to Health program is a response to the changing agriculture scene, a lack of awareness about Missouri-grown fruits and vegetables and dietary guidelines that encourage an increase in fruit and vegetable consumption.

"Fruit and vegetable growers have a smaller market because there is a lack of awareness about their products in the state and the variety of ways that the products can be used," Hughes says.

The program's first year was dedicated to contacting producers and developing informational brochures for them to use at their stands or at farmers markets.

Pamphlets on peaches, tomatoes, green beans, corn, blueberries and strawberries are being circulated, and brochures on other commodities are on the way. Each brochure features an introduction to the fruit or vegetable and facts on using, preserving, freezing and drying the product.

The brochures are a hit with growers. "The grape brochure is not even off the press yet, but the grape growers have already contacted us for an additional 5,000 copies," Hughes says.

"We had a very favorable reaction from the growers in our first year because we had something to show them. We weren't just telling them about this great new program. We actually had brochures ready for them to use. We have the materials, so now we can talk about different outlets for the products."

"I plan to put the pamphlets right by my cash register," says Joyce Sapp, a Columbia strawberry grower and owner of a pick-your-own operation. "It's especially good for berries because people don't have as many ideas on how to use them as they do with tomatoes. I think the brochures are going to be very valuable for growers."

"The responsibilities of the Department of Agriculture do not include extensive educational programming," Hughes says. "When there is a land-grant university in the state, the university should have the major responsibility for education. The agriculture department has been helping us work directly with the growers and telling us what the growers need."

The program has much work still ahead. Apples, nuts and pumpkins remain to be marketed this year. And Hughes hopes the University's partnership with the state will extend beyond the agriculture department. She wants to work with the Department of Tourism to produce a promotional piece for the "Wake Up to Missouri" campaign.

"In the last several years there has been increased interest in the production of fresh fruits and vegetables in the state. Producers are looking for alternatives to supplement their present farming program. The fact that most fruit and vegetables consumed in Missouri are brought in from other states makes fruit and vegetable production an attractive alternative.

"Some consumers are not aware of the many ways to handle a product in a fresh form. The University's Harvest to Health group has the expertise and background to put together an informational publication. Producers can use the brochures to promote their product by showing how to use it. It's an opportunity to sell more products and to inform consumers about alternatives.

"We have an effective partnership with the University. The Harvest to Health program helps us to promote producers' products, and we help by letting the University know what producers need."

Perry Klossner
Missouri Department of Agriculture



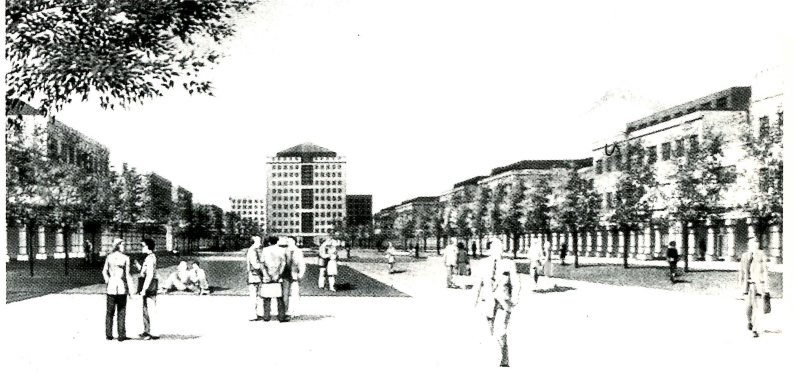
This harvest may be a more successful harvest—for the grower and the state—with the help of Harvest to Health. Pictured are Karla Hughes and producer Joyce Sapp.

PARTNERSHIPS

. . .In the Making

The partnerships the University of Missouri has forged or strengthened during 1985-86 are rich with the promise of growth—growth that not only enriches the partners but also benefits Missourians whose lives are affected by such partnerships.

Not content with the successes of past and present partnerships, the University of Missouri is making plans for other cooperative ventures that will carry on the tradition of combining knowledge and resources of all partners. Such associations create hope for the Missouri of tomorrow.



This is our goal: to increase economic development and employment for the state and to enhance research capabilities for business and industry.

That is the hope the University has for its Missouri Research Park being developed near St. Louis and North Campus Development under way adjacent to the University of Missouri-Kansas City campus. The state is the University's partner in development of the research parks.

The Missouri Research Park on 246 acres will attract private firms involved in research and development activities in agribusiness, computing, robotics, medicine, chemistry and engineering. When the park is fully leased in 10 to 12 years, it promises to employ 4,000 to 5,000 people. The project will depend on academic research strengths of several area universities,

including all UM campuses, Washington University and St. Louis University.

UMKC's campuslike park will produce up to 5,000 new jobs for Kansas City. The development's 2 million square feet will house research and development offices and laboratories of private companies and government agencies and facilities for University researchers. The first building could be completed as early as 1988.

This is our goal: to prepare Missouri for the opportunities of the 21st century.

The University of Missouri is playing a major role in Missouri's look ahead by cooperating in Missouri Opportunity 2000, a commission the governor has charged with guiding Missouri into the next century by identifying crucial issues and options that will contribute to the development of the best and brightest future for Missourians. The commission includes representatives of agriculture, business, labor, government, the academic community and civic leadership.

The University is well-suited to be a partner with the state. The University's network of staff, its access to information and its inherent interest in projects to increase human knowledge make it ideal for providing administrative and technical support and background research for the commission's work.



This is our goal: to help a university serve people through education in a country torn by conflict but rich with hope.

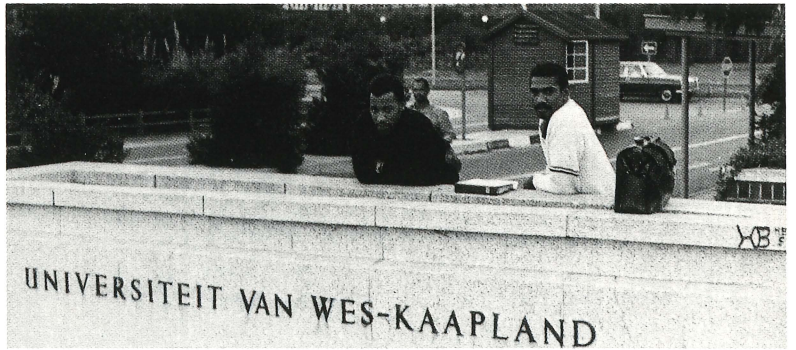
The University is embarking on an innovative and precedent-setting cooperative educational program with South Africa's University of the Western Cape. The program will promote academic cooperation between the two universities.

U.S. State Department officials have called the program an imaginative and positive approach to helping South African blacks. Proposed are collaborative activities that include cooperative academic support programs and services, short-term exchange programs for faculty and students and special projects of mutual interest.

This is our goal: to help St. Louis develop further a successful college preparatory program for its high school students.

Until budget restraints put an end to a St. Louis college preparatory program, more than 90 percent of the program's graduates went on to college.

Now, St. Louis School Superintendent Jerome B. Jones and University of Missouri-St. Louis Chancellor Marguerite Ross Barnett have revived the partnership. UMSL faculty members again will work closely with students in a similar college preparatory program that promises to continue increasing the number of pupils who attend college and improving their chances of success.



This is our goal: to enhance educational opportunities for minority students interested in medical careers.

UM and Lincoln University together will establish a program with a goal of identifying and recruiting minority college students with an interest in premedical science programs at the University of Missouri-Columbia and Lincoln University.

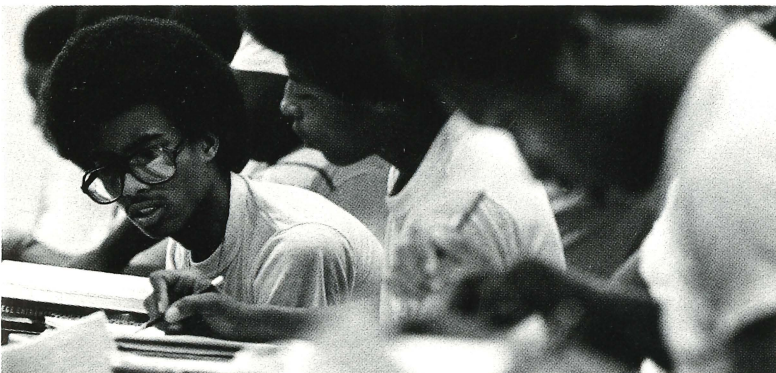
The proportion of minorities in Missouri exceeds 11 percent, but only 2.7 percent of the state's licensed physicians are black or native American. Of Missouri's 114 counties, 102 lack a minority physician and 11 have no physician. The goal of the UM-Lincoln University partnership is to enlarge the pool of minority physicians in the state by increasing the number of minority students who enter and graduate from the UMC School of Medicine.

This is our goal: to strengthen the state livestock industry.

To do that, the University has signed the largest licensing agreement in its history, authorizing Pfizer Inc. to market a patented chemical agent for animal sterilization or castration. The compound, called Kastrin, was developed by a UMC medical school professor.

The compound has promising benefits. Chemical castration of cattle is preferable to surgical castration because the weight gain that follows the chemical injection results in more lean and tender meat and less fat. Chemical castration is 100 percent safe, while surgical castration can result in problems ranging from infection to death of the animal.

Financial gains stem from greater growth of cattle chemically castrated and increased feed efficiency.



This ends the examples of partnerships that hold promise for the future. But the University of Missouri's efforts to strengthen cooperative endeavors with other organizations for the good of all Missouri will not end.

PARTNERSHIPS

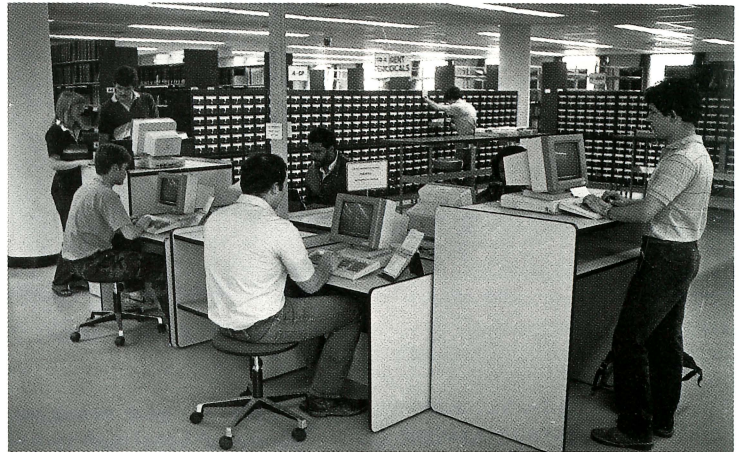
On these pages are brief examples of partnerships the University of Missouri was involved in during 1985-86.

To Help People

Hospital food has a bad reputation, and UMC human nutrition researchers say it also is a nutritional disaster for postoperative patients. Over the past three years, researchers, in partnership with Ross Laboratories, have sought a low-residue liquid diet for postoperative patients. The research resulted in a nutritionally complete product to replace the standard hospital clear liquid diet. Providing adequate nutritional support after surgery should hasten recovery, reduce hospitalization time and cut total medical costs.

The St. Louis Blues hockey team, University Extension at UMSL and the Center for the Study of Sport in Society at Northeastern University are helping Blues players continue their education. Because an athlete's career is not a lifelong career, the program helps athletes prepare for the time when they will not be earning a living in athletics. It is hoped the program will ease athletes' road back to education following their athletic careers.

Teaching health care educators how to care for the elderly is the goal of a joint effort between the Columbia and Kansas City campuses. A third participant is the U.S. Department of Health and Human Services, which provides funding. The Missouri Geriatric Education Center uses faculty from the arts and sciences colleges and the medical and nursing schools on both campuses as well as the School of Health Related Professions at UMC and the schools of dentistry and pharmacy at UMKC.



Improved education of library service professionals is the goal of a cooperative program among the UMC library and informational science school, the St. Louis County Library, the St. Louis Public Library and the St. Charles City-County Library. Through an innovative learning option, "Intern with a Mentor," students work with selected mentors from the three libraries to gain experience in public libraries while pursuing a 36-hour graduate degree program.

Realizing that students bound for college athletics may experience more than just academic problems, UMKC developed a pilot program called the Summer Program for High School Athletes. The goal of the program, a partnership of the community and the University, is to alert high school students in the Kansas City area to the critical issues they're going to face as they make the transition from high school to college athletics.

The UMSL School of Nursing and St. Louis City Schools work together to provide classes to pregnant school children. Classes cover health issues, with specific classes on pregnancy, child care and other appropriate topics.

A summer camp for gifted children has resulted from a partnership among UMKC, St. Paul's Episcopal Day School and the Kansas City Association for the Gifted. Gifted children have unique problems, so the camp helps children deal with the isolation many gifted children feel in school.

The University's Environmental Trace Substances Research Center works with the Department of Conservation in studying PCBs in water, sediments and fish from several regions of the state. The work determines the suitability of fish for human consumption and provides vital information about the extent and sources of pollution in lakes and streams.

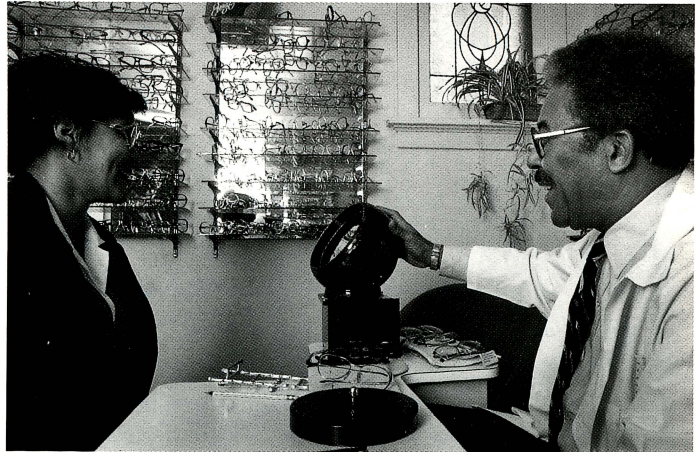


Vision is their business. The UMSL School of Optometry, the St. Louis Optometric Society and the Optometric Center, in cooperation with television station KPLR, sponsored free visual testing as a kickoff event for "Save Your Vision Week."

Cooperative programs between UMR and two Egyptian universities promise to improve the quality of life for Egyptians living in the mid-delta region of the Nile River and the country's northwestern coast. Faculty members are working with Tanta University to provide expanded research opportunities in the area of soil, microbiology and public health. As part of the exchange program with Alexandria University, faculty members are working together to analyze and compare the quality of ground water with rectified Nile River water to determine whether it is suitable for human consumption.

The University's research reactor teams up with industry and research staffs at other universities to find answers that will improve human life. The reactor is participating with a research team in China on a project to examine the relationship of selenium and Keshan's disease, a degeneration of heart muscle resulting in acute heart failure and death. The condition generally strikes people before age 21.

The Missouri Division of Family Services and the UMC social work school deliver training on the investigation techniques of child abuse and neglect cases. Family services, police department and juvenile justice division employees receive training aimed at developing



a higher level of investigation skills and increasing team work among the investigatory agencies.

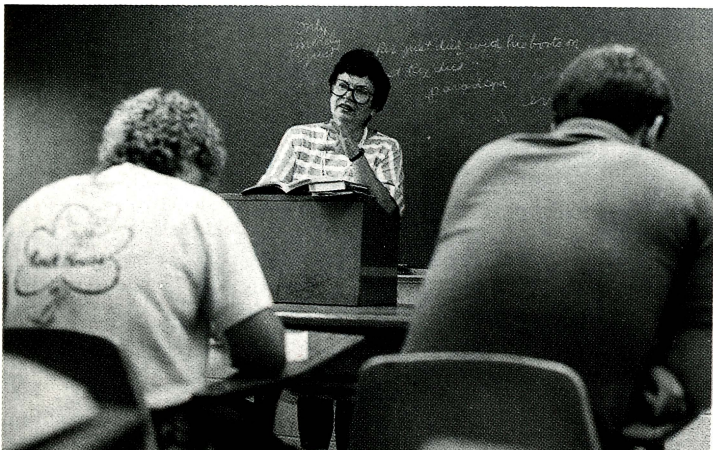
. . . To Improve Business

Help in forming and strengthening small-business enterprises is the goal of Missouri Ingenuity, a not-for-profit organization funded by the state of Missouri and the city of Columbia to work in cooperation with UM in the belief that small businesses have a significant impact on the economy. Missouri Ingenuity reviews proposals from inventors and entrepreneurs. Promising ideas are presented to Missouri Ingenuity's for-profit division, Incentives of Missouri, which forms a corporation with the entrepreneur to help the entrepreneur reach full potential in production and employment.

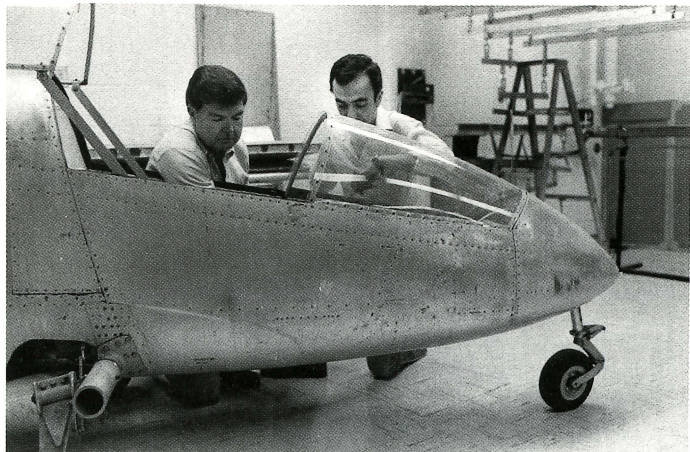
Improved writing skills is the goal of a partnership between University Extension and private business and industry in St. Louis. Realizing that most employees could benefit from a refresher course in writing and correspondence, extension teams up with industry leaders to provide training for employees. Employers in St. Louis have responded positively to the classes. UMSL extension now offers 40 programs that can serve 600 people or more.

UMKC's Center for Business Innovation encourages entrepreneurship and provides expertise that small businesses need to survive. The first seven organizations taking advantage of the Center for Business Innovation are now busy building their businesses through a unique partnership between UMKC and the private sector.

The UMC College of Business and Public Administration reaches out to small businesses across the state through a small-business development program. The counseling service, funded by University Extension and the Small Business Administration, offers advice to businesses through extension personnel, college faculty members and students.



PARTNERSHIPS



Creation of safer and more efficient cars is the goal of UMR research conducted for Ford Motor Co. Donald Cronin's computer study of steering mechanisms was considered in the design of the Ford Taurus and Mercury Sable. Most of his research for Ford deals with developing mathematical models and computer-aided designs that focus on structural dynamics, body dynamics and mechanical vibrations.

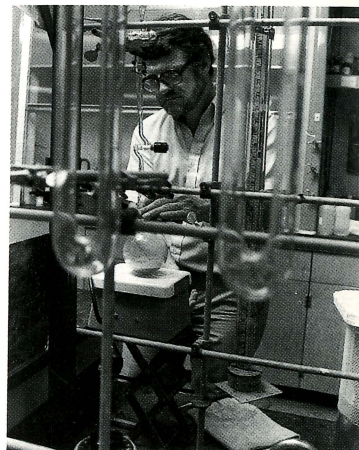
The Missouri Institute for Executive Development at UMC is a unique partnership between business and public administration professionals who provide continuing education for managers and supervisors in the private sector. Recognizing the need for lifelong learning, the institute offers more than 50 conferences, short courses and seminars in several subject areas. Programs are tailored to each business and professional situation.

Faculty members and students in the UMSL Center for Business and Industrial Studies develop analytical tools, provide independent assessment of organizational processes and help develop systems to improve organizational productivity for business organizations in the metropolitan area.

A cooperative research project between UMR and the Environmental Trace Substances Research Center is developing ways to analyze lead toxicity. Such a method would be helpful in issuing state and national emission discharge permits for the lead industry. The Department of Natural Resources and the U.S. Environmental Protection Agency are co-sponsors of the project.

A team effort has combined the power of the UMSL Center for Business and Industrial Studies, a consortium of five corporate sponsors and funds from the Missouri Research Assistance Act to create the UMSL Business Database and Information Service, which maintains a detailed demographic and economic data base for nationwide studies in marketing and strategic planning.

The UMR chemistry department helps companies understand and utilize current developments in the field of paints and coatings. The "Interact with Industry" program works closely with the St. Louis Society for Coatings, a group of 25 paint companies, and the Kansas City Society for Coatings, a group of 23 companies.



Missouri businesses can turn to any of the four UM campuses for engineering expertise and assistance. Each campus houses a Missouri Business and Industry Productivity Center. Since 1978, the centers have given advice to businesses throughout the state on how to save jobs, improve production efficiency, increase sales and increase employment.

UMKC's professional development office, a division of the Henry W. Bloch School of Business and Public Administration, offers help to nearly 1,500 community management professionals by sponsoring 100 management development programs, many of which are co-sponsored by area professional and trade associations.

Maintaining St. Louis' reputation as a leader in science and technology is one goal of UMSL's proposed Project Succeed. To reach this goal, the project will establish a Center for In-Service Science and Technology Training to provide retraining in the areas of science and technology for employees of the many international corporations with headquarters in the St. Louis area. The training will enable employees to stay up-to-date on developments in their field.

Research at the UMR high-pressure waterjet laboratory is resulting in standards and techniques that will guide the future of the waterjet industry. Waterjets—devices that shoot water through tiny holes at extremely high pressure—are revolutionizing the way things are cut, cleaned or broken. The waterjet's medical applications include its use as a tool to wash embedded dirt out of wounds. The waterjet can be controlled to lift out dirt without damaging tissue.

. . . To Combine Strengths

Twelve local historical societies and one historical museum have been established this year with the help of the Missouri State Historical Society. The society also works with the Missouri Highway Department to offer historical information at rest areas along the state's major highways.

Johnny can't read, but can he use a computer? UMSL's Child Development Center, in collaboration with Florida State University and Houston College, received a grant from IBM to research young children's use of microcomputers.

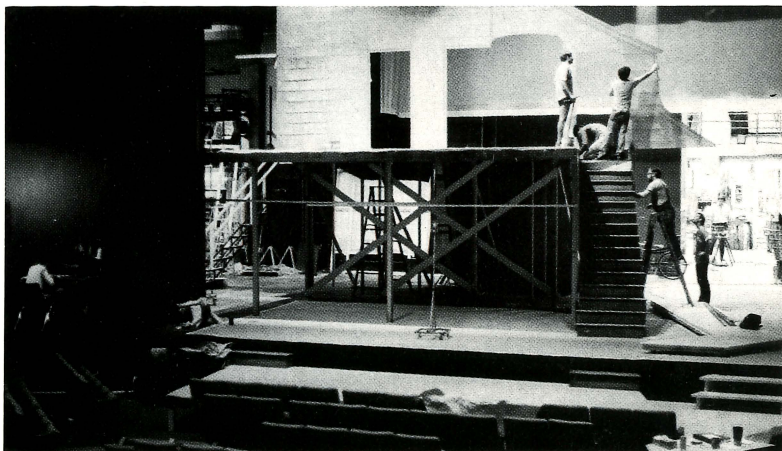


Through the partnership of the UMKC theater program and the Missouri Repertory Theater Board of Trustees, the Missouri Repertory Theater exemplifies UMKC's commitment to the performing arts. Efforts of trustees are complemented by efforts of the Missouri Repertory Theater Guild, a group of volunteers with assigned responsibilities for many areas of the repertory company.

The UMC veterinary medical diagnostic laboratory and the Missouri Department of Agriculture work together to identify Missouri livestock and poultry disease problems and reduce the chance of epidemics.

An UMSL extension program has its finger on the public's pulse and provides valuable information to regional groups. The public policy extension program provides bimonthly public opinion polls for the Missouri Radio Network and technical assistance for such agencies as the University City School District and the St. Louis County Municipal League.

Medical school is a family affair at UMKC, where parents of students form the Friends of the UMKC School of Medicine. Groups based in St. Louis and central, southeast and southwest Missouri finance lectureships, short-term loans and scholarships.



On the Truman campus in Independence, one of UMKC's three campuses, Friends of the Truman Campus is dedicated to the development of higher education in both the city and campus communities. Composed of concerned citizens and civic and business leaders, Friends of the Truman Campus contributes every year to scholarship funds and sponsors cultural and educational activities for the community.

PARTNERSHIPS

UMC is the lead institution in an agricultural research project in Liberia. The project links UMC's ag college with the Mid America International Agricultural Consortium to develop the Liberian Central Agricultural Research Institute, a semiautonomous division within the Ministry of Agriculture.



A cooperative agreement between UMR and the National Cheng Kung University in Taiwan is providing for an exchange of faculty members for research, teaching, consultation and advanced studies in many areas of engineering.

"Jobs of Note" recruits musically talented inner city high school students to entertain the people of Kansas City at street-corner concerts. Partners with the University are Payless Cashways Inc., which funds the project; the Boys and Girls Clubs of Greater Kansas City, which administers the program; and musicians from UMKC's Conservatory of Music, who provide instruction. "Jobs of Note" is an opportunity for young musicians to learn through classes, workshops, concerts and exposure to musical professionals.

A UMR ceramic engineering professor reached for the stars and made it—thanks to the help of the U.S. space program. An experiment developed by Delbert Day, UMR Curators' Professor of ceramic engineering, was part of the scientific payload on board the space shuttle Columbia's October 1985 flight. The project dealt with glass formation and may be of importance for the U.S. materials-processing-in-space program.

Advancing cultural educational and service programs at UMKC is the goal of an agreement between the campus and the Nelson/Atkins Gallery of Art. In partnership with the gallery, UMKC shares appointment of three art experts.

UMC arts and science faculty members apply their academic skills in collaborative efforts with state, county and local agencies. For example, Sam Stout, anthropology, works with sheriff's departments, the highway patrol and medical examiner's offices to identify human skeletal findings. Ed Kaiser, chemistry, assists the Columbia police and fire departments in handling emergencies involving hazardous materials.

The UMKC Booster Club continues to forge a strong partnership with UMKC athletes, many of whom benefit from association with this group of UMKC alumni, parents, students, faculty and staff and members of the Kansas City community.



...For Opportunity

UMR educational programs go coast to coast, thanks to the school's membership in the Association for Media-Based Continuing Education for Engineers and the National Technological University. Non-credit courses produced by the 33 major universities that belong to the organization are marketed by AMCEE on videotape or through satellite transmission. NTU, an all-videotape university, markets credit video courses produced by its 21 members for engineering master's degree work.

Educational programs for local, area and regional labor leaders are the result of a partnership initiated by UMKC's extended programs office. The office has organized the Institute for Labor Studies, a joint effort among UMKC, Longview Community College and Labor Beacon Communications Inc.

University Extension sponsors employment workshops in rural communities where Missourians have been displaced by the farm crisis. Extension joins with local business leaders, the Missouri Job Service, area chambers of commerce, vocational and technical schools and

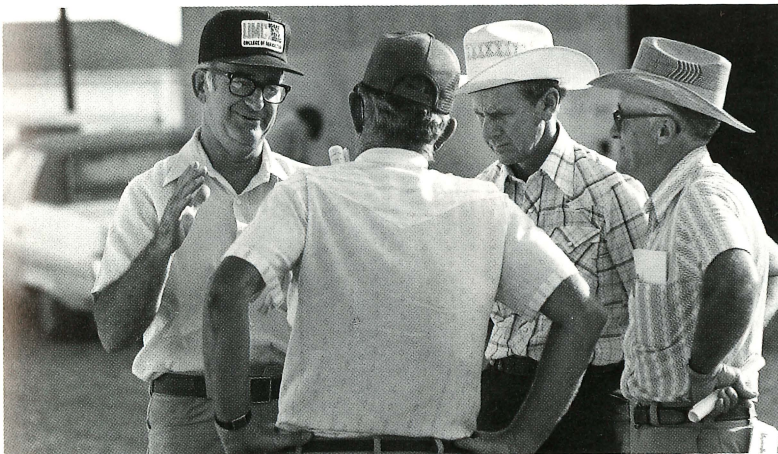
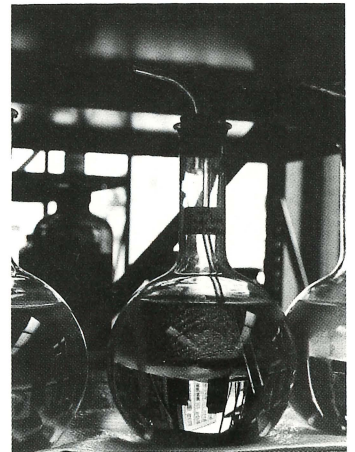
the UMC Career Planning and Placement Center to serve several hundred Missourians. The workshops benefit employers as well as potential employees.

Through a cooperative effort among the UMC ag school, the Missouri Pork Producers Association, the state ag department and Ralston Purina, statewide feeding trials were held to determine status and improvement in swine performance and carcass traits.

To help rural Missourians explore alternative sources of income, University Extension staff members assist former soybean and corn growers market potatoes for use by Frito-Lay. The project was funded by an extension innovation grant designed to create new educational opportunities for Missouri citizens. Learning how to produce and market the potato crop was easier with the help of other partners: the Center for Applied Research at Northwest Missouri State University, MFA Inc., the Tennessee Valley Authority and American Express. Frito-Lay assisted by writing guaranteed purchase agreements with the potato producers and providing seed potatoes and equipment to get started.

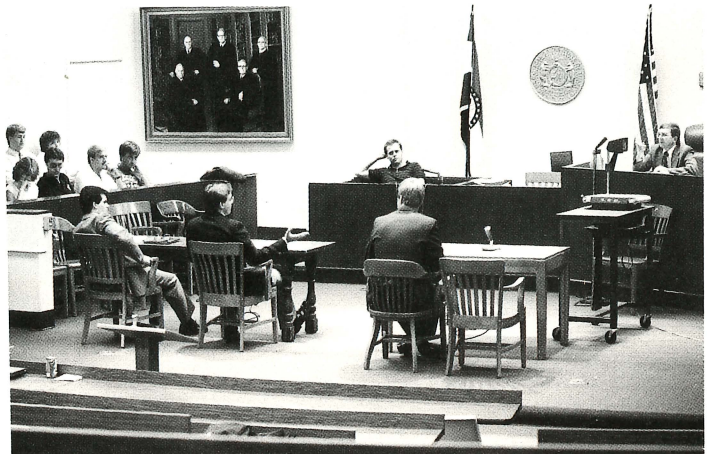


Arts and sciences continuing education at UMR offers "Summer with the Sciences" to enhance the teaching of mathematics and sciences at the elementary school level. Elementary school teachers learn about coordination between mathematics and the sciences, the use of calculators, the interdisciplinary nature of learning, development of materials for classroom use and self-education concepts.



The UMC law school opens doors to minority and disadvantaged college graduates interested in studying law by hosting a program with the Council on Legal Education Opportunities. CLEO students study legal subjects and develop writing skills. On successful completion of the course, students are considered for admission to law schools across the country.

The long arm of the law reaches out for help from the UMSL Center for Business and Industrial Studies. The center has worked with the St. Louis County Board of Police Commissioners on questions of administrative structure, scope of training, financing and location for the Greater St. Louis Police Academy.



Board of Curators and UM President



Board of Curators members and the board's student representative join UM's president for a portrait on the UM-Rolla campus. From left to right are Tom K. Smith of Ladue, 1986 board president; W.H. "Bert" Bates of Kansas City, vice president; Peter H. Raven of St. Louis; James S. Anderson of Springfield; John P. Lichtenegger of Jackson; Jeanne V. Epple of Columbia; Edwin S. Turner of Chillicothe; UM President C. Peter Magrath; Doug Russell of Lebanon; Eva Louise Frazer of St. Louis; and Kevin B. Edwards, student representative and UMR student.

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The Year Financially

If the University of Missouri were included in the Fortune magazine list of the 500 largest U.S. industries, its multimillion dollar annual revenues would rank it 410th, behind 11 Missouri-based corporations. Its assets of \$1.6 billion would rank it in the top 200 in the list of 500, ahead of all but six Missouri firms.

Although not an industrial company, the University can be thought of as a conglomerate whose business is higher education. It is one of the state's largest innkeepers, operating 8,500 residence hall beds; it serves 4.3 million meals annually; it is among the state's largest owners of farmland, with 20,000 acres; it is responsible for a newspaper and radio and television stations; it operates the largest non-governmental nuclear reactor in the United States; and it has its own police forces, lawyers, architects, engineers, accountants, real estate managers and insurance professionals.

Operating revenues for 1985-86 totaled \$616 million, of which 40 percent was provided by the state, 16 percent by student fees, 14 percent by hospital patient fees, 8 percent by the federal government, 4 percent by private gifts, grants and contracts, and the rest by auxiliary enterprises, investments and other sources.

Spending patterns have changed dramatically in the past decade. A comparison of 1985-86 spending patterns with those of 1974-75 reveals that the University has redirected \$18.9 million from support expenses in student services, institutional support, and operation and maintenance of the plant to the primary missions of instruction, research, public service and academic support.

Further financial information is provided in financial reports of the 1985-86 year. Copies may be requested from James T. McGill, vice president for administrative affairs, 215 University Hall, University of Missouri, Columbia, MO 65211.



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