THE UNIVERSITY OF MISSOURI-COLUMBIA ☆ SUMMARY OF GRANTS AND CONTRACTS & RESEARCH DIVISION





MU Research Scientists and Sales!

Scientists and Scholars at the University of Missouri-Columbia Continue to Attract Unprecedented Levels of Research Support

HE UNIVERSITY OF MISSOURI-COLUMBIA is leading the way in research funding. Over the past four years, MU's total expenditures - dollars spent by faculty scientists and scholars each year — have grown by 66 percent to \$129 million, the largest number ever recorded at the University.

The greatest gain came in the category of federal expenditures, a four-year increase of 66 percent to more than \$76.4 million. Federal research awards — funding committed for future expenditures — rose by an even greater margin, up 132 percent during the same period.

FY 2001 Annual Report

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www.research.missouri.edu

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According to figures recently compiled by the National Science Foundation, MU's jump in federal expenditures exceeded the growth rate of all 35 member public institutions of the Association of American Universities (see chart below). In addition, MU's total research awards have also increased dramatically, up 30 percent this year, and more than 75 percent during the past four

Because they provide an indication of future spending levels, figures for new grants provide a telling indication of the long-term prospects for an institution's research enterprise. In short, MU's numbers portend a bright future.

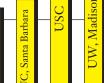
"No other university is growing at the same rate as the University of Missouri-Columbia," says Jack Burns, vice provost for research. "We are attributing it to the successful implementation of our research master plan. From hiring some of the best faculty and improving our grant-writing offices to creating new processes in our sponsored programs offices and establishing incentives for obtaining research grants, we have moved forward by a giant leap."

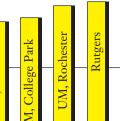
THE RESEARCH MASTER PLAN (summarized on pages 10 ▲ and 11 of this report), was itself an outgrowth of the chancellor's strategic planning process. The first goal of the MU plan? Increasing extramural funding and improving graduate programs. How has that been accomplished? By maximizing our resources and better utilizing faculty expertise.

"We've used the planning process to target our best areas of opportunity — that is, programs that already were good or very good," Burns explains. "We then added extra resources and faculty members to make them truly world class. Worldclass faculty produce more research funding because they produce the type of research that is deserving of support."

Currently there are dozens of MU projects and investigations that have shown themselves worthy of fiscal support from agencies both public and private. Among those that are particularly noteworthy:

■ A \$12.8 million, five-year award from NASA. This money, coupled with other grants from the federal and state governments, completes the \$30 million needed to start 20% construction of a new \$60 Life Sciences





Association of American Universities, selected member institutions' percentage growth rate in federal reservances

Externally Sponsored Grants and Contracts FY 2001 Instruction and Research Public Service Totals 1.999 **Proposals Submitted** 1,393 606 1,769 868 2,637 **Active Funded Projects** \$61,517,515 \$174,339,757 Newly Awarded/Project Total \$112,822,242 \$81,652,892 \$47,396,113 \$129,049,005 **Expenditures**

acres of woodlands. Many of these are privately owned and, too often, poorly managed. By helping landowners utilize previously inaccessible forest management research, Kurtz and his colleagues hope to stem a host of problems now

Brady Deaton. "We have a first-

class research faculty on campus,

Center at MU. By focusing their collaborative, cutting-edge research on areas of concern to all humanity - food security; prevention and treatment of disease; and the health of the environment — MU life scientists are poised to make discoveries that will improve the lives of millions of people around the world (see box,

endemic in our Heartland hardwoods.

Page 6).

at the same time toward an even more promising future. "Our investment from mission enhancement funds has begun to Want more data? Visit the 'query- building' pay dividends," says MU Provost

■ A \$4.18 million, fourvear award from the Kauffman Foundation for a program designed to

tool in the publications section of our web site: www.research.missouri.edu

long-term

40%

problems." □

improve early care and education programs for children. Directed by Kathy Thornburg, a professor of human development & family studies and president of National Association for the Education of Young Children, her "work force incentive pilot program" will provide increased funds for the recruitment, preparation and retention of early care and education professionals. Hiring and keeping highly qualified teachers is key, Thornberg's research has shown, to ensuring success in school for our state's youngest citizens.

and they are continuing to do outstanding work, bringing their knowledge from the laboratory to the classroom, the state and the world in an effort to provide solutions to 57% some of the world's MU Ranks immediate and No.1 in

50%

HESE AND OTHER SCHOLARLY ACTIVITIES underscore

L the continued vitality of MU research, while pointing

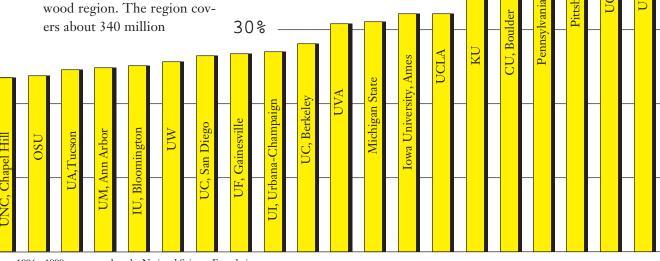
■ A \$4.14 million, four-year award from the US Department of Agriculture to a group of scientists led by William Kurtz, a professor of forestry, for a study aimed at sustaining natural resources in the nation's central hardwood region. The region cov-30%

AAU **Publics** Each year the National Science **Foundation** tallies federal dollars spent on research at America's most prestigious public universities. NSF's most recent rankings show the rate of growth at the University of Missouri-Columbia is

> No.1 — more than double the median rate of 24.7 percent.

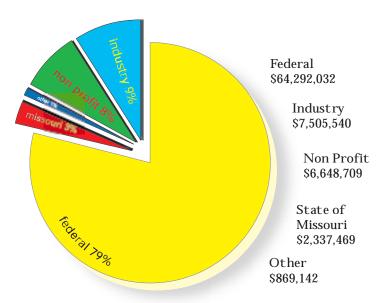
Growth

Among

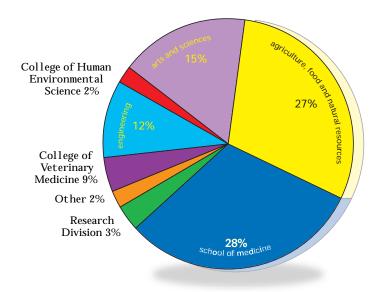


tures 1996 - 1999, as reported to the National Science Foundation.

SPONSORED RESEARCH



Fy 2001 Research Expenditures by Agency and Division





Sponsored Research Continues Its Unprecedented Climb

TOTAL SPONSORED research expenditures at the University of Missouri-Columbia for the first time topped \$81.5 million in FY 2001, with scientists and scholars working in the areas of medicine, biology and agriculture accounting for slightly more than 70 percent of that spending. Research expenditures from federal sources alone totaled more than \$64 million in FY 2001, an increase of 132 percent during the past four years.

"Our investigators have worked extremely hard, and this is just one demonstration of their success," said Michael Warnock, director of sponsored programs, of the federal gains. Warnock says he expects University researchers to post even greater gains in the future.

"We are doing everything we can to continue to improve these numbers," he said. "We are quickly gaining ground on our peer institutions in the AAU [Association of American Universities] and other public universities. However, we still have a long way to go to meet our target in the strategic plan to be among the top institutions in terms of federal expenditures."

The AAU was founded in 1900 to advance the international standing of American research universities. Today it provides information and support on issues related to graduate and undergraduate education, research funding, and research policy for many of the most prestigious, research-intensive universities in the United States.

Using figures compiled by the National Science Foundation, the association recently reported MU had jumped 11 spots in its annual funding rankings. The University now ranks No. 47 among the AAU's 63 public member institutions.

Expenditures and Awards

Sponsorship by the federal government, Missouri state government and various corporate and nonprofit agencies is crucial to the health of the University's research enterprise. In this report you will encounter charts and graphs that reflect the extent of these agencies' involvement in MU research. Most are expressed in terms of expenditures, which represent resources spent by a researcher during a given fiscal year. Others are expressed as awards, which show the total amount of funds available for use, money often expended over a period of years.

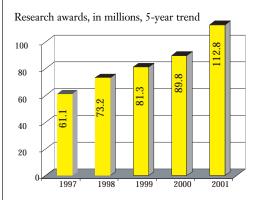
	Divisions	fy 1997	fy 1998	fy 1999	fy 2000	fy 2001	
FY 2001 Expenditures By Division	School of Medicine	\$15,821,470	\$17,301,497	\$19,498,039	\$20,745,297	\$23,239,999	
	College of Agriculture, Food and Natural Resources	\$15,390,333	\$15,564,866	\$19,700,082	\$23,077,327	\$22,399,175	
	College of Arts & Science	\$7,383,145	\$8,774,101	\$10,255,355	\$12,411,490	\$11,840,727	
	College of Engineering	\$4,419,830	\$4,241,247	\$6,388,906	\$8,476,383	\$9,732,166	
	College of Veterinary Medicine	\$3,717,511	\$3,931,851	\$5,747,790	\$5,030,682	\$7,247,528	
	Research Division	\$3,630,380	\$4,545,301	\$4,115,937	\$4,869,308	\$3,558,552	
	College of Human Environ. Sciences	\$639,580	\$970,114	\$1,409,540	\$1,154,854	\$1,392,658	
	College of Education	\$323,580	\$381,833	\$643,764	\$737,090	\$646,933	
	Sinclair School of Nursing	\$279,495	\$353,996	\$420,998	\$434,429	\$494,530	
	School of Journalism	\$516,698	\$510,612	\$897,479	\$527,928	\$448,479	
	School of Health Professions	\$40,304	\$43,351	\$150,981	\$188,808	\$321,030	
	Graduate School	\$0	\$1,205	\$15,382	\$255,187	\$208,931	
	Other	\$ 34,183	\$16,300	\$418,312	\$189,315	\$122,184	
	Total	\$52,196,509	\$56,636,274	\$69,662,565	\$78,098,098	\$81,652,892	

Research Expenditures; by sponsor type						
1	fy 1997	fy 1998	fy 1999	fy 2000	fy 2001	
Federal	40,024,534	41,393,268	52,094,879	61,681,306	64,292,034	
Industry	6,527,388	7,024,239	8,311,786	6,137,384	7,505,540	
NonProfit	3,214,618	5,207,628	6,007,521	7,065,910	6,648,709	
Other	330,982	681,298	944,192	694,599	869,142	
State of Missouri	2,098,987	2,329,841	2,304,187	2,518,899	2,337,467	
Total	52,196,509	56,636,274	69,662,565	78,098,098	81,652,892	
Research Awards; by sponsor type						
	fy 1997	fy 1998	fy 1999	fy 2000	fy 2001	
Federal	39,492,238	43,392,749	56,830,156	69,806,043	87,715,322	
Industry	9,061,583	14,012,907	10,357,669	10,067,530	14,748,041	
NonProfit	4,967,165	7,859,069	6,730,154	6,292,419	6,012,665	
Other	2,776,943	2,523,697	1,868,776	921,236	1,740,589	
State of Missouri	4,884,514	5,487,188	5,526,737	2,744,582	2,605,625	
Total	61,182,443	73,275,610	81,313,492	89,831,810	112,822,242	

Faculty Additions Promise Continued Growth for MU's Sponsored Research

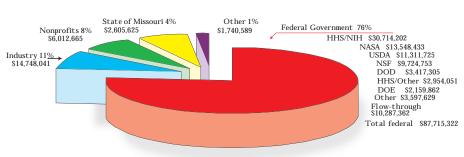
NE OF THE KEY components of MU's on-going mission enhancement process involves recruiting talented new faculty to expand the ranks of University scientists and scholars.

These new researchers bring with them skills and expertise that will greatly expand the depth and range of sponsored investigations. "Only a relatively small number of mission enhancement faculty have been hired or have been on board long enough to contribute," said Jack Burns, vice provost for research. "These new faculty are one of the reasons I'm so optimistic about the future. All have been, or will be, hired with very high expectations — and in most cases with a successful track record. As they come on board, they should allow us to continue our momentum for some time to come."



Expenditures, in millions, 5-year trend 70 60 50 40 30 20 10 1997 1998 1999 2000 2001

FY 2001 New Project Awards by Funding Agency and Amount



Total fy 2001 Sponsored Research Awards \$112,822,242

TECHNOLOGY DEVELOPMEN

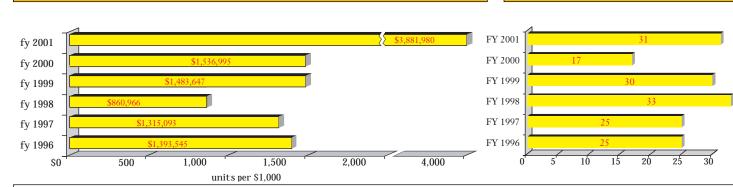
TE LIVE IN EXCITING TIMES. Rapid advances in biotechnology portend a revolution in the way we diagnose and treat disease. Advances in engineering and computer science have already accomplished a fundamental transformation of how we view and process the world. And today we stand at the threshold of a revolution in materials science, a new world in which, for example, molecular machines could radically alter practices in areas ranging from contemporary drug delivery systems to current methods of materials processing.

Researchers at the University of Missouri-Columbia are at the cutting edge of such technology developments. Through the leadership of the Office of Technology and Special Projects, MU is working to transfer the work of faculty scientists into innovative new products — products with the potential to generate revenue for the University and improve the lives of millions of people around the world.

Technology transfer typically involves patenting faculty discoveries and then licensing subsequent patent rights to corporate partners. It is a process that demands an entrepreneurial approach to scientific discovery, an approach the OTSP is working diligently to promote. If an MU-developed technology is robust enough to sustain a start-up company, for instance, we will assist in building a company around the technology. We will help forge a management and scientific team to launch the company. And we will stand beside the new company with a variety of crucial business support services. Basic research in the university laboratory is the foundation upon which knowledge is translated into products that solve problems, meet human needs, and spur economic growth. Through the OTSP, the University is working hard to ensure that these products have the widest possible impact.

Royalties from MU inventions

Patent applications filed



Breaking New Ground

Construction of MU's new \$60 million Life Sciences Center, to be named for Senator Christopher 'Kit' Bond (pictured at center), began with a groundbreaking ceremony September 8. Among the dignitaries attending were Thomas Payne, vice chancellor and dean of the College of Agriculture, Food and Natural Resources (shown left, speaking with Sen. Bond); Daniel S. Goldin, administrator of NASA (far left) and MU Chancellor Richard Wallace (far right). When completed in 2004, the 124,000 square foot Life Sciences Center will provide state-of-the-art research and instructional facilities for MU scientists working to enhance human health, boost food production, and improve the global environment.

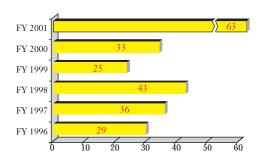


cular Modeling May One Day Help Curb the Growth of Cancers

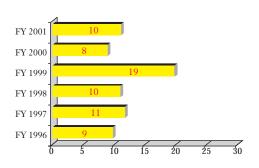
Using computers and an imaging technique called nuclear magnetic resonance spectroscopy, Steven Van Doren, an associate professor of biochemistry, is making visible things no microscope can reveal: individual molecules of a protein that may inhibit blood vessel growth to tumors. The National Institutes of Health, which has funded Van Doren's research with a \$771,000 grant, anticipates that his findings will be put to use quickly. "I think it's very important work," says Janna Wehrle, a biochemist at the NIH's National Institute of General Medical Science, which awarded Van Doren his grant. "It's an indication of how good basic science can have a lot of medical

Patent applications pending

payoffs in the not-too-distant future."



Patents issued



Teaming Up to Fight Deadly Diseases

ADVANCES IN PROTEOMICS — the study of the structure and function of proteins — represent a crucial next stage in the genomics revolution. By better understanding the composition, or proteome, of each type of cell or tissue, scientists can begin unravelling the complicated biochemistry of deadly diseases — cancer chief among them. In June, MU announced a partnership with Proteome Systems, an Australia-based leader in proteomic research technologies. The company's expertise will provide new weapons for the Univeristy's expanding role in this new, genetics-based war on cancer.

"This partnership is going to give us the resources to answer important questions," says Stephen Alexander, professor of molecular biology and a leader of MU's proteomics team. "Now that the human genome has been identified, this is the next step. Even though scientists know all the different genes in the body, it still does

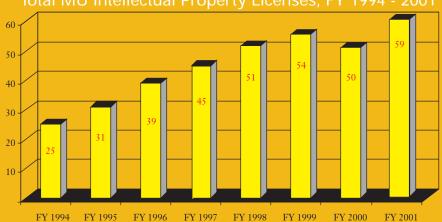


The next step in genomics research

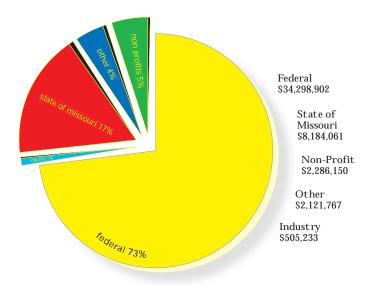
not explain why a liver is different than a lung or why a healthy lung is different from a cancerous lung."

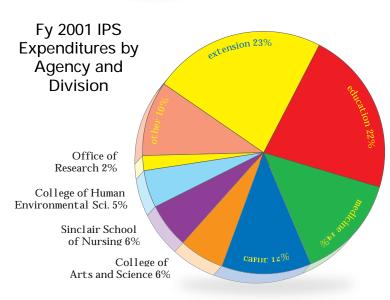
In addition to hiring several new faculty members for proteomics investigations, the University has also committed several labs to proteomics research, paving the way for additional advances in cancer research at MU.

Total MII Intellectual Property Licenses FV 1004 - 200



Instruction & Public Service





Certy mages photo

IPS Expenditures and Awards Also Post Impressive Gains

INSTRUCTION AND PUBLIC SERVICE (IPS) activities, conducted in concert with scholarly and scientific research, comprise an integral part of the mission of America's land grant universities.

At MU, a public institution where research, education and public service are powerfully integrated, we are pleased to report that during the previous fiscal year sponsored IPS projects have continued to grow rapidly. In fiscal year 2001, total IPS expenditures approached \$50 million, while award totals topped \$60 million for the first time in our history. University Extension and the College of Education each accounted for close to 25 percent of sponsored IPS funding, with programs in agriculture and medicine also performing well.

An important tool for maintaining this upward trend has been the Program for Research Infrastructure and Matching Expenses, or PRIME fund. The \$1.2 million fund allows MU to provide up-front cost matching for groups of investigators requesting support from external agencies, thus reducing the dollar amounts requested and increasing the chances of a proposal's success. PRIME funds have been particularly helpful to investigators seeking support from government agencies — the single most important source of MU research funding.

As in previous years, the federal government in FY 2001 remained the largest sponsor of MU research, with the National Institutes of Health and the Department of Education contributing the greatest number of federal dollars. Missouri state government was also a major source of funding in FY 2001, weighing in at 17 percent of total support.

Innovative Instruction

To succeed in today's global economy, mathematic skills are a must. But testing indicates that by the eight grade, math competency among U.S. students doesn't measure up to those of their international peers. MU professors Bob and Barbara Reys are helping American kids catch up. At the Reys' "Show-Me Project: A National Center for Standards-based Middle Grades Mathematics Curriculum," University curriculum and instruction researchers are working with classroom teachers to design and implement programs that help students embrace the challenges, and enchantment, of complex problem solving. Pilot programs indicate their efforts are paying off. More schools are adopting standards, and test scores are up. Perhaps most important, according to a teacher in suburban St. Louis' Kirkwood School District, "students are excited about doing math." The National Sciences Foundation has been a major supporter of the Reys' efforts, awarding almost \$6 million to Barbara Reys and the Show-Me Project during the previous fiscal year.

		FY 1997	FY 1998	FY 1999	FY 2000	FY 2001
Ç	University Extension	7,739,441	6,625,760	6,920,903	5,997,721	10,973,395
	College of Education	8,012,425	9,225,449	10,014,316	11,168,476	10,560,061
<u>_</u> <u>.</u> 2	School of Medicine	5,442,381	5,942,224	5,729,159	5,666,927	6,599,422
na /is	College of Agriculture, Food and Natural Resources	1,960,579	6,279,080	4,876,383	6,543,284	5,568,708
ter Div	Sinclair School of Nursing	1,279,680	1,610,803	1,939,666	2,378,638	2,967,157
Exter 3y Div	College of Arts & Science	2,523,998	2,417,366	2,712,316	2,144,178	2,695,248
	College of Human Environ. Sci.	1,266,730	1,917,722	1,994,767	1,817,681	2,312,026
••	Office of Research	415,020	649,181	448,676	586,203	919,230
PS p, l	Office of the Provost	638,732	724,218	713,988	922,322	818,328
<u>요</u> 요	Graduate School	902,196	634,083	971,457	680,182	807,219
	College of Engineering	720,684	603,596	838,144	647,171	806,205
01 S	College of Veterinary Medicine	281,728	341,418	415,269	235,748	739,569
200 sors	Student Affairs	87,335	94,041	135,886	161,124	503,429
2(S	School of Journalism	131,297	112,754	101,082	291,459	358,325
Ξ̈́	School of Law	99,402	108,900	34,109	73,786	216,782
E Ø	School of Health Related Prof.	0	87,852	199,731	313,886	209,176
щă	College of Business	1,510,317	1,364,183	1,488,532	875,658	117,188
S	Other	103,097	0	124,176	75,675	224,645
	TOTAL	33,115,042	38,738,630	39,658,560	40,580,119	47,396,113

IPS Expenditures; By sponsor type

Federal

Industry

Network of Grant Writers Helps Boost **MU Award Totals**

WARD TOTALS for instruction and public arAservice at MU are at an all-time high, up more than 70 percent over fiscal year 2000. This upsurge would not be possible without a concurrent rise in the quantity and quality of proposals submitted — a rise due in no small part to the efforts of the Research Division's campus-wide network of professional grant writers. Grant writers are trained to assist

and "prospect" for funding opportunities. The network, organized by the Research Division's Director of Grant Writing and Publications Mary Licklider, is comprised of 17 grants writers working both in the Office of Research and various MU schools and colleges. During fiscal year 2001 members of the grant writing network assisted investigators in submitting close to \$85 million in new proposals, according to Licklider. "Our network of grant writers is a crucial element in efforts to provide targeted support for investigators seeking research and IPS funding," she says. "So far they've have been very successful."

NonProfit 1,301,525 1,525,774 1,754,691 1.654.131 2.286.150 2,121,767 1,121,926 Other 1.799.055 2.054.355 1,586,466 State of Missouri 5,095,738 5,124,678 4,713,766 6,585,174 8,184,061 Total 33,115,042 38,738,630 39,658,560 40,580,119 47,396,113 IPS Awards; by sponsor type FY 1997 FY 1998 FY 1999 FY 2000 FY 2001 Federal 18.556.252 21.646.037 31.077.243 45.612.729 18.074.250 State of Missouri 15,623,044 8,324,713 14.357.159 14.864.855 7,951,856 NonProfit 1,405,376 1,576,114 1,935,247 2,850,862 5,754,954 1,568,250 2,256,720 1,147,246 1,369,939 Other 3.716.333 Industry 564,307 675,512 473,215 754,592 455,180 38,117,425 37,999,172 41,176,074 43,781,799 61,517,515 faculty scientists and scholars write, coordinate,

FY 1997

315,259

24,221,919

FY 1998

550,935

31,050,478

FY 1999

569,380

30,413,313

FY 2000

-10,259

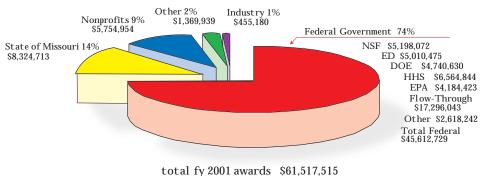
30,664,047

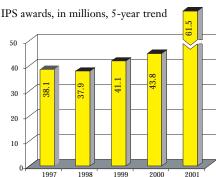
FY 2001

505,233

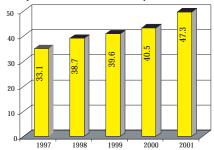
34,298,902

New IPS Awards By Funding Agency and Amount





IPS expenditures, in millions, 5-year trend

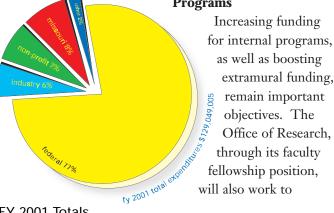


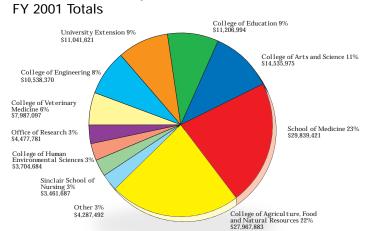
MU RESEARCH 2001 AND BEYOND.

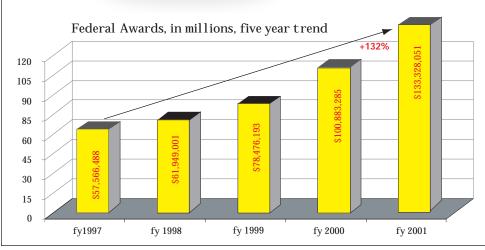
Our Plan for the Future? Expanding the Bounds of Research and Scholarship for Missouri and the Nation

HE GOALS OF THE 2001-02 MASTER PLAN for Research and Technology Development have remained relatively constant, but the objectives and action steps reflect the successes of recent years.

Goal 1: Strengthen Academic Programs







increase support for MU humanities. Supported projects already underway include the Missouri River Institute, the Lewis and Clark Bicentennial Initiative, and a new MU Center for the Humanities and Fine Arts.

Goal 2: Enhance Research Communications

Communication within the Research Division remains a priority. *Illumination*, the division's magazine of research, scholarship and creative achievement, now reaches 12,000 subscribers in all 50 states. The new compact format of the annual grants and contracts report, received a positive response from readers, as did our new Web-based query tool that allows easy referencing of detailed research-related fiscal information.

We will continue to share information about policies and to seek advice about making our communications as efficient and service-minded as possible.

Goal 3: Facilitate Sponsored Projects

In fiscal year 2000, the Office of Sponsored Program Administration boasted a reduction in mean proposal review time from 6.8 to 3 days and, in mean award implementation time, from 31 to 16 days. MU's sponsored programs operation last year received favorable marks on a nationwide benchmarking study. Written policies and procedures, additional reductions in grant processing times, and initiation of electronic signature capabilities will make for further sponsored project efficiency in the coming fiscal year.

Goal 4: Research Compliance

MU's response to the rapidly shifting compliance environ-

ment has been both positive and remarkable. Last year we accomplished a full audit of human subjects research; hired directors for both of MU's animal research offices; launched an IRB Web training site; and hosted an AAALAC site visit. While increasing staffing levels in some compliance offices remains among our 2002 objectives, we have also seen much progress toward making responses to investigators and form processing more accurate and timely.

Goal 5: Nurture Technology Development

The Office of Technology and Special Projects, now two years old, is already seeing nice results (see pages 6-7): Patent applications and licensing income doubled in 2001; OTSP assisted in the the start-up of four new MU research-related companies; and the mean review time for intellectual property language in research agreements dropped from 8.6 to 2.3 days. In FY 2002, work will continue toward the launch of a business incubator facility designed to help more start-up companies take advantage of MU-developed technologies.

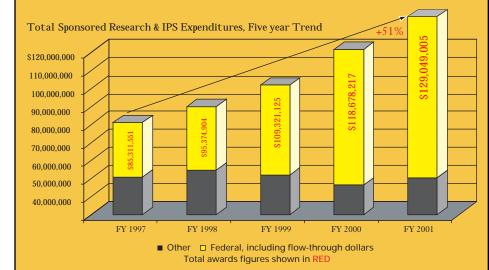
Goal 6: Facilitate Governmental Relations

Visits from federal agency personnel, a coherent agenda, work toward master agreements with state agencies, and leadership in shepherding major new initiatives have proved to be successful strategies in the research division's contribution to MU's governmental relations.

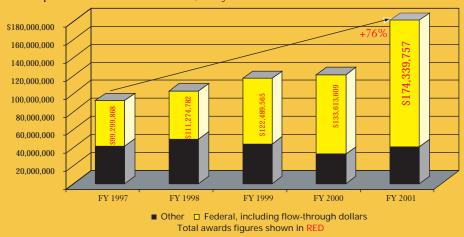
TE ARE PROUD of the accomplishments detailed in this year's master plan update. They reflect not only successful teamwork within the Research Division, but also a new spirit of cooperation among division members and the larger community of researchers and scholars in Missouri and across the nation. You can access the complete 2001-02 Master Plan for Research and Technology Development via a link on our Web site: www.research.missouri.edu.

Research and Instruction & Public Service FY 2001 Totals

ISCAL YEAR 2001 saw funding levels unparalleled in MU history, with total expenditures topping \$129 million (up more than 50 percent over the past four years) and total awards surging to almost \$175 million (a rise of 76 percent over FY 1997). These totals represent impressive gains, indicating a rate of research growth unmatched by MU's peer institutions. But in a world where millions look to science and technology for solutions to pressing problems, investigators at MU understand the need to continue their aggressive pursuit of new opportunities in research, and thus expanding the bounds of scientific and scholarly achievement. This pursuit points to a future in which the University will take its place among the upper echelon of the nation's research institutions, though officials acknowledge MU has much ground to cover. "We've got a lot of room to grow, no doubt about it," says Vice Provost for Research Jack Burns. "But how do you get there? You've got to start by growing faster than everybody else."



Total Sponsored Research & IPS Awards, Five year Trend







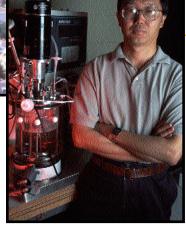
University of Missouri-Columbia Office of Research 205 Jesse Hall Columbia, MO 65211

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mission

THE UNIVERSITY OF MISSOURI-COLUMBIA, established in 1839, is the oldest public research institution west of the Mississippi River. MU's mission in research and student education is to provide enhanced opportunities and challenges in the humanities, arts, sciences and selected professional fields. MU also aspires to achieve national and international prominence for its research and educational contributions. As such, we are committed to building on our research strengths in basic and applied biological and biomedical





sciences; nuclear and related physical and engineering sciences; and selected social and behavioral sciences. We will continue to strengthen our leadership role in agriculture and journalism. And because of our large enrollment of undergraduates, MU will enhance the core disciplines required for all those seeking baccalaureate degrees, giving special attention to areas such as languages and mathematical sciences that provide the necessary foundation for a truly educated citizenry.