Status on Research Funding
At the University of Missouri
1999

Mardy T. Eimers
Senior Analyst
EimersM@umsystem.edu

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EXECUTIVE SUMMARY

This report highlights research funding at the University of Missouri using data provided by the National Science Foundation (NSF) and the Integrated Postsecondary Education Data System (IPEDS). More specifically, it examines research funding at the public AAU institutions and at the four campuses of the University of Missouri. NSF and IPEDS data have been used because they provide consistent data on research funding for all thirty-two public AAU institutions. Please note that the data used in this study are from fiscal years 1996 (research obligations) and 1997 (research expenditures). Although more recent data are available for the University of Missouri, these are the most recent data available for all public AAU institutions. References to the "University of Missouri" or the "University" refer to the four-campus system. Trends in research funding have been examined from 1990 to 1997 and from 1995 to 1997.

The key findings include:

Federal Research Expenditures

- On average, federal research expenditures at the University of Missouri have increased 9% over the past two years and 55% over the past seven years. This compares to an increase of 5% and 49%, respectively, at the public AAU institutions (Table 1).

- From 1995 to 1997, the University's market share in federal research expenditures among the public AAU institutions has increased from 1.11% to 1.16%. Although a modest increase, it does reverse the previous trend of declining market share (Table 2).

- In terms of federal research expenditures, the University of Missouri-Columbia ranked 31st among the 32 public AAU institutions in 1997. (Table 3).

- Particularly because of the influence of Washington University, the AAU estimated that 1,686 jobs have been created in St Louis because of increases in federal research funding since 1995. That compares to 137, 18, and 5 jobs created in Columbia, Kansas City, and Rolla, respectively (Table 7).

- Twenty-one of the thirty-two public AAU institutions in 1997 relied on one disciplinary area to provide the majority of their federal research expenditures. In each of these twenty-one cases the discipline area was life sciences (Table 8).

Restricted Research Expenditures

- Fifty-three percent of the total research expenditures at the University of Missouri were restricted in 1997. This would rank the University 30th among the public AAU institutions in terms of the percentage of restricted research expenditures (Table 12).

Industry-Sponsored Research Expenditures

- The University of Missouri secured $12.6 million in industry-sponsored research expenditures in 1997. Although there have been shifts among the campuses during the past seven years, this amount is essentially equal to 1990 levels (Table 13).

Federal Research Obligations

- The University of Missouri secured $58.4 million in federal research obligations in fiscal year 1996. This would rank 28th among the public AAU institutions (Table 15).

ORGANIZATION

The report has been organized into four sections:

Section I: Federal Research Expenditures (Tables 1–10)
Section II: Research Expenditures from Industry, State, Institution, & other Sources (Tables 11–13)
Section III: Federal Research Obligations (Tables 14-15)
Section IV: Definitions and Technical Notes

SECTION I:
FEDERAL RESEARCH EXPENDITURES

The federal research expenditures reported in this section include expenditures classified as science and engineering (S&E) research and development (R&D) funds. When trend data are examined, increases or decreases in funding are noted from 1990 to 1997 and from 1995 to 1997. In addition, a definition of *federal research expenditures* is provided in Section IV: Definitions and Technical Notes.

Table 1:
Public AAU Institutions: Trends in Federal Research Expenditures

Table 1 shows the trend in federal research expenditures for the public AAU institutions and the four campuses of the University of Missouri. Percentage increases in funds are displayed since 1990 and 1995.

- On average, federal research expenditures at the University of Missouri have increased 9% over the past two years and 55% over the past seven years. This compares to an increase of 5% and 49%, respectively, at the public AAU institutions.

- In terms of percentage growth from 1995 to 1997, Columbia (11%) and Kansas City (10%) outpaced the percentage growth in federal research expenditures among the public AAU institutions (5%).

- Since 1995, the University of Florida, UC-Los Angeles, UC-Berkeley, and UC-Santa Barbara, in that order, have made the most significant percentage gains among the public AAU institutions. There were eight public AAU institutions that noted decreases in federal research funding from 1995 to 1997.

Table 1. Trends in Federal Expenditures for Science and Engineering R&D at Public AAU Institutions from 1990 and 1995

Institution	1990	1995	1996	1997	% increase since 1990	% increase since 1995
U of Florida	64,614	79,361	86,973	94,231	46%	19%
U of California-Los Angeles	164,442	201,773	236,635	238,919	45%	18%
U of California-Berkeley	131,717	157,826	168,171	186,349	41%	18%
U of California-Santa Barbara	47,873	63,443	73,400	74,149	55%	17%
U of Colorado	116,394	169,666	177,517	192,201	65%	13%
U of Illinois-Urbana	117,168	139,078	145,514	156,366	33%	12%
U of Nebraska-Lincoln	22,686	36,897	32,352	41,269	82%	12%
Indiana U	57,155	86,041	90,881	96,087	68%	12%
U of Pittsburgh	90,700	144,487	149,960	160,833	77%	11%
U of Kansas	26,786	42,209	41,858	46,733	74%	11%
U of Washington	203,353	291,284	312,695	320,784	58%	10%
U of Maryland-College Park	66,410	94,071	99,688	102,928	55%	9%
U of Oregon	20,151	23,789	26,411	26,020	29%	9%
U of Michigan	180,456	275,956	281,062	296,028	64%	7%
Michigan State U	58,221	77,499	77,243	82,977	43%	7%
U of Texas-Austin	109,593	143,939	147,808	151,954	39%	6%
U of Iowa	79,046	103,115	105,646	108,534	37%	5%
SUNY-Buffalo	66,876	75,713	87,813	78,092	17%	3%
U of Minnesota	143,810	194,819	198,927	200,149	39%	3%
U of California-Irvine	52,492	69,655	72,994	71,472	36%	3%
U of Wisconsin-Madison	178,862	229,381	233,174	233,760	31%	2%
U of California-Davis	77,424	122,645	130,188	123,673	60%	1%
Ohio State U	78,878	122,660	118,811	122,582	55%	0%
Pennsylvania State U	136,656	187,481	190,688	185,206	36%	-1%
Purdue U	64,464	93,256	91,632	91,969	43%	-1%
U of N Carolina-Chapel Hill	92,468	156,626	157,034	153,985	67%	-2%
U of Virginia	58,801	85,244	75,256	82,488	40%	-3%
U of California-San Diego	182,555	284,445	291,917	274,860	51%	-3%
Rutgers, the State U of NJ	40,977	72,567	67,588	68,225	66%	-6%
U of Arizona	92,920	168,791	154,004	152,221	64%	-10%
Iowa State U	34,043	58,766	54,904	52,938	56%	-10%
Public AAU Institution Average	92,193	130,725	134,798	137,677	49%	5%
University of Missouri:						
Columbia	24,422	32,420	33,397	35,993	47%	11%
Kansas City	2,767	4,506	4,851	4,976	80%	10%
Rolla	3,863	5,834	5,587	6,022	56%	3%
St Louis	1,167	2,840	2,803	2,923	150%	3%
University Total	32,219	45,600	46,638	49,914	55%	9%
All Institutions (USA)	9,636,732	13,349,844	13,858,253	14,502,141	50%	9%

Source: National Science Foundation, Survey of Research and Development Expenditures at Colleges and Universities, FY 1997
Note: All dollar amounts in thousands.
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Figure 1:
Public AAU Institutions: Trend in Federal Research Expenditures

Figure 1 illustrates the growth in federal expenditures at the AAU public institutions and at the University of Missouri.

- The University would have to increase federal research expenditures from $49.9 million to $137.7 million (for a total increase of about $88 million) in order to equal the public AAU average in 1997. The gap was $85 million in 1995.

Figure 1. Gap Between Federal R&D Expenditures for the UM System and the Public AAU Average, FY1990-97

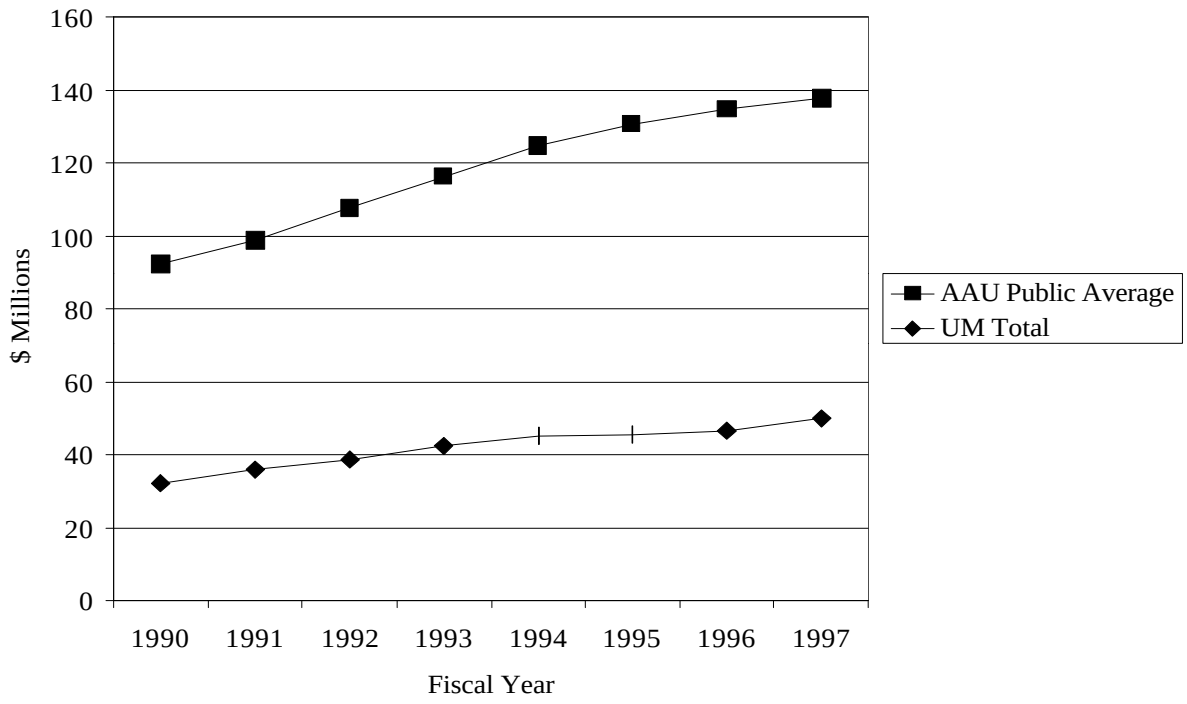

Table 2:
Public AAU Institutions: Market Share Increases and Decreases in Federal Research Expenditures

An alternative approach to understanding how well the University of Missouri has competed with other public AAU institutions is to examine the market share of each institution over time. That is, of the total federal research expenditures secured by the public AAU institutions in a given year, what percentage of that total has each institution secured? How has that institution's market share shifted from year to year? One advantage of market share analysis is that it helps to level the playing field among major and less-than-major players who compete for research dollars. In Table 2, market share of federal research expenditures has been calculated for the public AAU institutions in 1990, 1995, and 1997.

- Among the public AAU institutions, the market share for the University of Missouri held steady at 1.11% from 1990 to 1995. During the past two years, however, the University's market share has increased from 1.11% to 1.16%.

Table 2. Market Share Gain or Loss in Federal Expenditures for Science and Engineering R&D at Public AAU Institutions, 1990 to 1997

Institution	1990		1995		1997			
	$	Market Share	$	Market Share	$	Market Share	MS +/- since 1990	MS +/- since 1995
U of California-Los Angeles	164,442	5.69	201,773	4.92	238,919	5.53	-0.16	0.61
U of California-Berkeley	131,717	4.56	157,826	3.85	186,349	4.32	-0.24	0.46
U of Washington	203,353	7.04	291,284	7.11	320,784	7.43	0.39	0.32
U of Colorado	116,394	4.03	169,666	4.14	192,201	4.45	0.42	0.31
U of Florida	64,614	2.24	79,361	1.94	94,231	2.18	-0.05	0.25
U of Illinois-Urbana	117,168	4.05	139,078	3.39	156,366	3.62	-0.43	0.23
U of Pittsburgh	90,700	3.14	144,487	3.53	160,833	3.72	0.59	0.20
U of California-Santa Barbara	47,873	1.66	63,443	1.55	74,149	1.72	0.06	0.17
Indiana U	57,155	1.98	86,041	2.10	96,087	2.23	0.25	0.13
U of Michigan	180,456	6.24	275,956	6.73	296,028	6.86	0.61	0.12
U of Maryland-College Park	66,410	2.30	94,071	2.30	102,928	2.38	0.09	0.09
U of Nebraska-Lincoln	22,686	0.78	36,897	0.90	41,269	0.96	0.17	0.06
U of Kansas	26,786	0.93	42,209	1.03	46,733	1.08	0.16	0.05
University Total	32,219	1.11	45,600	1.11	49,914	1.16	0.04	0.04
Michigan State U	58,221	2.01	77,499	1.89	82,977	1.92	-0.09	0.03
U of Oregon	20,151	0.70	23,789	0.58	26,020	0.60	-0.09	0.02
U of Texas-Austin	109,593	3.79	143,939	3.51	151,954	3.52	-0.27	0.01
U of Iowa	79,046	2.73	103,115	2.52	108,534	2.51	-0.22	0.00
SUNY-Buffalo	66,876	2.31	75,713	1.85	78,092	1.81	-0.51	-0.04
U of California-Irvine	52,492	1.82	69,655	1.70	71,472	1.66	-0.16	-0.04
U of Minnesota	143,810	4.98	194,819	4.75	200,149	4.64	-0.34	-0.12
U of California-Davis	77,424	2.68	122,645	2.99	123,673	2.86	0.19	-0.13
Purdue U	64,464	2.23	93,256	2.28	91,969	2.13	-0.10	-0.15
Ohio State U	78,878	2.73	122,660	2.99	122,582	2.84	0.11	-0.15
U of Virginia	58,801	2.03	85,244	2.08	82,488	1.91	-0.12	-0.17
U of Wisconsin-Madison	178,862	6.19	229,381	5.60	233,760	5.41	-0.77	-0.18
Rutgers, the State U of NJ	40,977	1.42	72,567	1.77	68,225	1.58	0.16	-0.19
Iowa State U	34,043	1.18	58,766	1.43	52,938	1.23	0.05	-0.21
U of N Carolina-Chapel Hill	92,468	3.20	156,626	3.82	153,985	3.57	0.37	-0.26
Pennsylvania State U	136,656	4.73	187,481	4.57	185,206	4.29	-0.44	-0.29
U of California-San Diego	182,555	6.32	284,445	6.94	274,860	6.37	0.05	-0.58
U of Arizona	92,920	3.21	168,791	4.12	152,221	3.53	0.31	-0.59
		100.00		100.00		100.00		

Market Share (MS): An institution's federal research expenditures in a given year divided by the federal research expenditures for all public AAU institutions in the same year.

Source: National Science Foundation, Survey of Research and Development Expenditures at Colleges and Universities, FY 1997
Note: All dollar figures are in thousands.
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Table 3:
Public AAU Institutions: The University of Missouri's Rank in Federal Research Expenditures

Table 3 ranks the public AAU institutions in terms of federal research dollars secured in 1990 and 1997.

- In terms of federal research expenditures, the University of Missouri-Columbia ranked 31st among the 32 public AAU institutions in 1997.

Table 3. Federal Expenditures for Science and Engineering R&D: Changes in Rank Among the Public AAU Institutions between 1990 and 1997*

1990			1997		
Rank	**Institution**	**$**	**Rank**	**Institution**	**$**
1	U of Washington	203,353	1	U of Washington	320,784
2	U of California-San Diego	182,555	2	U of Michigan	296,028
3	U of Michigan	180,456	3	U of California-San Diego	274,860
4	U of Wisconsin-Madison	178,862	4	U of California-Los Angeles	238,919
5	U of California-Los Angeles	164,442	5	U of Wisconsin-Madison	233,760
6	U of Minnesota	143,810	6	U of Minnesota	200,149
7	Pennsylvania State U	136,656	7	U of Colorado	192,201
8	U of California-Berkeley	131,717	8	U of California-Berkeley	186,349
9	U of Illinois-Urbana	117,168	9	Pennsylvania State U	185,206
10	U of Colorado	116,394	10	U of Pittsburgh	160,833
11	U of Texas-Austin	109,593	11	U of Illinois-Urbana	156,366
12	U of Arizona	92,920	12	U of N Carolina-Chapel Hill	153,985
13	U of N Carolina-Chapel Hill	92,468	13	U of Arizona	152,221
14	U of Pittsburgh	90,700	14	U of Texas-Austin	151,954
15	U of Iowa	79,046	15	U of California-Davis	123,673
16	Ohio State U	78,878	16	Ohio State U	122,582
17	U of California-Davis	77,424	17	U of Iowa	108,534
18	SUNY-Buffalo	66,876	18	U of Maryland-College Park	102,928
19	U of Maryland-College Park	66,410	19	Indiana U	96,087
20	U of Florida	64,614	20	U of Florida	94,231
21	Purdue U	64,464	21	Purdue U	91,969
22	U of Virginia	58,801	22	Michigan State U	82,977
23	Michigan State U	58,221	23	U of Virginia	82,488
24	Indiana U	57,155	24	SUNY-Buffalo	78,092
25	U of California-Irvine	52,492	25	U of California-Santa Barbara	74,149
26	U of California-Santa Barbara	47,873	26	U of California-Irvine	71,472
27	Rutgers, the State U of NJ	40,977	27	Rutgers, the State U of NJ	68,225
28	Iowa State U	34,043	28	Iowa State U	52,938
	University Total	32,219		University Total	49,914
29	U of Kansas	26,786	29	U of Kansas	46,733
30	U of Missouri-Columbia	24,422	30	U of Nebraska-Lincoln	41,269
31	U of Nebraska-Lincoln	22,686	31	U of Missouri-Columbia	35,993
32	U of Oregon	20,151	32	U of Oregon	26,020

Source: National Science Foundation, Survey of Research and Development Expenditures at Colleges and Universities, FY 1997
Note: All dollar amounts are in thousands.
P&B, 1/99
*** This table was revised on February 12, 1999.**

Table 4:
Private AAU Institutions: Trend in Federal Research Expenditures

Table 4 shows the trend in federal research expenditures for the private AAU institutions.

- Percentage growth in federal research expenditures since 1995 among the private AAU institutions was led by Rice University at 44%, followed by California Institute of Technology (36%), Washington University in St Louis (27%), and Stanford University (22%).

- During the past two years the private AAU institutions witnessed growth in federal research expenditures of 10%, while the public AAU institutions saw increases of 5% (Table 1). Since 1990, however, federal research expenditures among public AAU institutions grew 49% while the increase among private AAU institutions was 38%.

Table 4. Trends in Federal Expenditures for Science and Engineering R&D at Private AAU Institutions from 1990 and 1995

Institution	1990	1995	1996	1997	% change since 1990	% change since 1995
Rice U	19,997	26,429	33,238	37,935	90%	44%
California Institute of Technology	90,577	120,723	142,474	164,225	81%	36%
Washington U-St Louis	105,759	146,921	155,197	186,993	77%	27%
Stanford U	255,821	273,157	295,373	332,272	30%	22%
Northwestern U	62,183	90,387	100,810	108,292	74%	20%
U of S California	123,714	163,606	179,281	191,809	55%	17%
Emory U	52,367	92,724	95,237	108,522	107%	17%
Brown U	36,919	37,432	42,139	43,664	18%	17%
U of Chicago	96,327	104,587	114,123	121,683	26%	16%
MIT	233,813	273,543	271,544	311,396	33%	14%
Case Western Reserve U	70,515	107,192	109,901	120,992	72%	13%
Clark U	919	1,910	1,756	2,134	132%	12%
Brandeis U	18,819	22,741	23,233	25,233	34%	11%
Harvard U	154,090	203,965	203,047	222,612	44%	9%
Princeton U	51,559	63,903	69,386	69,667	35%	9%
Yale U	144,962	174,868	176,994	189,124	30%	8%
U of Pennsylvania	133,747	200,895	216,167	217,125	62%	8%
Carnegie Mellon	64,550	84,758	91,830	91,527	42%	8%
Vanderbilt U	66,747	92,185	95,684	98,744	48%	7%
Catholic U	6,783	6,467	5,901	6,910	2%	7%
Duke U	106,053	148,526	149,631	155,894	47%	5%
Columbia U	156,270	206,495	195,652	212,180	36%	3%
Johns Hopkins U	599,851	706,049	710,119	724,526	21%	3%
Syracuse U	18,924	19,341	18,361	19,554	3%	1%
New York U	80,756	93,759	90,010	94,117	17%	0%
Cornell U	171,249	207,391	203,082	205,521	20%	-1%
U of Rochester	105,644	125,897	112,933	118,477	12%	-6%
Tulane U	28,331	60,837	49,720	49,708	75%	-18%
Private AAU Institution Average	109,187	137,739	141,172	151,101	38%	10%

Source: National Science Foundation, Survey of Research and Development Expenditures at Colleges and Universities, FY 1997

Note: All dollar amounts in thousands.

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Table 5:
Private AAU Institutions: Market Share Increases and Decreases in Federal Research Expenditures

- Although its market share has dropped since 1990, Johns Hopkins University still maintains a market share of 17.1 among the private AAU institutions. Stanford University is second in market share at 7.9, MIT third at 7.4, and Harvard University fourth at 5.3.

Table 5. Market Share Gain or Loss in Federal Expenditures for Science and Engineering R&D at Private AAU Institutions since 1990 and 1995

	1990		1995		1997			
Institution	$	Market Share	$	Market Share	$	Market Share	MS +/- since 1990	MS +/- since 1995
Stanford U	255,821	8.37	273,157	7.08	332,272	7.85	-0.51	0.77
CA Institute of Technology	90,577	2.96	120,723	3.13	164,225	3.88	0.92	0.75
Washington U-St Louis	105,759	3.46	146,921	3.81	186,993	4.42	0.96	0.61
U of S California	123,714	4.05	163,606	4.24	191,809	4.53	0.49	0.29
MIT	233,813	7.65	273,543	7.09	311,396	7.36	-0.29	0.27
Northwestern U	62,183	2.03	90,387	2.34	108,292	2.56	0.53	0.22
Rice U	19,997	0.65	26,429	0.69	37,935	0.90	0.24	0.21
U of Chicago	96,327	3.15	104,587	2.71	121,683	2.88	-0.27	0.16
Emory U	52,367	1.71	92,724	2.40	108,522	2.57	0.85	0.16
Case Western Reserve U	70,515	2.31	107,192	2.78	120,992	2.86	0.55	0.08
Brown U	36,919	1.21	37,432	0.97	43,664	1.03	-0.18	0.06
Brandeis U	18,819	0.62	22,741	0.59	25,233	0.60	-0.02	0.01
Clark U	919	0.03	1,910	0.05	2,134	0.05	0.02	0.00
Catholic U	6,783	0.22	6,467	0.17	6,910	0.16	-0.06	0.00
Princeton U	51,559	1.69	63,903	1.66	69,667	1.65	-0.04	-0.01
Harvard U	154,090	5.04	203,965	5.29	222,612	5.26	0.22	-0.03
Carnegie Mellon	64,550	2.11	84,758	2.20	91,527	2.16	0.05	-0.03
Syracuse U	18,924	0.62	19,341	0.50	19,554	0.46	-0.16	-0.04
Vanderbilt U	66,747	2.18	92,185	2.39	98,744	2.33	0.15	-0.06
Yale U	144,962	4.74	174,868	4.53	189,124	4.47	-0.27	-0.06
U of Pennsylvania	133,747	4.37	200,895	5.21	217,125	5.13	0.76	-0.08
Duke U	106,053	3.47	148,526	3.85	155,894	3.68	0.22	-0.17
New York U	80,756	2.64	93,759	2.43	94,117	2.22	-0.42	-0.21
Columbia U	156,270	5.11	206,495	5.35	212,180	5.02	-0.10	-0.34
Tulane U	28,331	0.93	60,837	1.58	49,708	1.17	0.25	-0.40
U of Rochester	105,644	3.46	125,897	3.26	118,477	2.80	-0.66	-0.46
Cornell U	171,249	5.60	207,391	5.38	205,521	4.86	-0.74	-0.52
Johns Hopkins U	599,851	19.62	706,049	18.31	724,526	17.12	-2.50	-1.18
		100.00		100.00		100.00		

Market Share (MS): An institution's federal research expenditures in a given year divided by the federal research expenditures for all private AAU institutions in the same year.

Note: All dollar amounts in thousands.

Source: National Science Foundation, Survey of Research and Development Expenditures at Colleges and Universities, FY 1997 P&B, 1/99

Table 6:
Total Federal Research Expenditures by State, 1990 to 1997

Table 6 displays the total federal research expenditures secured by each of the fifty states and the District of Columbia. The states are ranked in descending order based on 1997 expenditure levels.

- The state of Missouri ranked 17th in 1997 in terms of total federal research expenditures. The State's federal research expenditures increase from $152 million in 1990 to nearly $261 million in 1997, an increase of 71%.

- Among twenty-five states that secured the most federal research expenditures in 1997, Missouri followed only Oregon (81%) and Alabama (77%) in terms of growth since 1990.

Table 6. Rank based on Federal Expenditures for Science and Engineering R&D by State, 1990 to 1997

1997 Rank	State	1990	1997	% change
1	California	1,378,820	2,028,296	47%
2	New York	902,794	1,151,542	28%
3	Maryland	729,675	927,015	27%
4	Massachusetts	649,104	915,187	41%
5	Texas	522,143	844,746	62%
6	Pennsylvania	515,094	807,553	57%
7	Illinois	352,786	529,803	50%
8	Michigan	276,078	453,776	64%
9	North Carolina	276,795	439,124	59%
10	Ohio	260,537	417,921	60%
11	Washington	230,237	365,814	59%
12	Georgia	218,498	347,407	59%
13	Florida	223,232	333,828	50%
14	Colorado	179,978	289,514	61%
15	Wisconsin	209,026	283,701	36%
16	Virginia	172,435	269,821	56%
17	Missouri	152,398	260,668	71%
18	Connecticut	190,388	242,385	27%
19	Alabama	130,208	230,894	77%
20	New Jersey	136,159	224,084	65%
21	Indiana	134,953	209,227	55%
22	Minnesota	143,810	200,149	39%
23	Tennessee	140,243	198,805	42%
24	Arizona	122,259	198,097	62%
25	Oregon	107,466	195,030	81%

Note: All dollar amounts in thousands.
Source: National Science Foundation, Survey of Research and Development Expenditures at Colleges and Universities, FY 1997
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Table 6 Continued --

Rank based on Federal Expenditures for Science and Engineering R&D by State, 1990 to 1997

1997 Rank	State	1990	1997	% change
26	Iowa	113,268	162,060	43%
27	Utah	126,619	158,237	25%
28	District of Columbia	86,292	153,846	78%
29	New Mexico	85,747	144,639	69%
30	Louisiana	83,213	128,017	54%
31	South Carolina	45,718	102,887	125%
32	Rhode Island	57,430	79,417	38%
33	Kentucky	38,249	75,649	98%
34	Kansas	43,478	75,116	73%
35	Hawaii	42,665	72,421	70%
36	Oklahoma	37,020	71,421	93%
37	New Hampshire	44,590	67,282	51%
38	Mississippi	43,724	62,350	43%
39	Nebraska	34,169	60,388	77%
40	Nevada	33,959	43,934	29%
41	Arkansas	17,485	35,021	100%
42	Vermont	30,555	34,042	11%
43	Delaware	17,588	32,031	82%
44	Montana	12,520	31,261	150%
45	West Virginia	22,906	29,623	29%
46	Alaska	31,896	28,127	-12%
47	North Dakota	20,815	24,207	16%
48	Idaho	14,361	18,103	26%
49	Maine	9,046	15,066	67%
50	Wyoming	12,207	15,003	23%
51	South Dakota	6,874	10,879	58%

Note: All dollar amounts in thousands.
Source: National Science Foundation, Survey of Research and Development Expenditures at Colleges and Universities, FY 1997
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Table 7:
Estimated Jobs Created: Total Federal Research Expenditures by Doctoral-Granting Institutions in Missouri, 1995 to 1997

Table 7 shows the change in federal research expenditures from 1995 to 1997 among the doctoral-granting institutions in Missouri. This table also includes a "jobs created multiplier" that estimates how many jobs are created for every million dollars in federal research funds that are secured by institutions in the state. For example, if the University of Missouri increased federal research funds four million dollars from 1997 to 1998, approximately 153 jobs (38.3 x $4 million) would be created in Missouri. A multiplier for each state was developed by the US Commerce Department's Bureau of Economic Analysis (BEA). Please note that the calculations in Table 7 do not account for possible inflationary effects on the number of jobs created.

- Since 1995 approximately 1,845 new jobs have been created because of the increases in federal research funding in the State of Missouri. Washington University has created the majority of these positions because of the $40 million increase that it has experienced.

- Particularly because of the influence of Washington University, it is estimated that 1,686 jobs have been created in St Louis because of increases in federal research funding since 1995. That compares to 137, 18, and 5 jobs created in Columbia, Kansas City, and Rolla, respectively.

Table 7. Estimated Jobs Created: The Contribution of Federal Expenditures for Science and Engineering R&D by Missouri Doctoral Institutions, 1995 to 1997

Institution	1995	1997	$ Increase	Jobs Created per Million $ *	Job Created since 1995	Share of Increase
Washington U	146,921	186,993	40,072	38.3	1,535	83%
UM-Columbia	32,420	35,993	3,573	38.3	137	7%
St Louis U	19,351	23,218	3,867	38.3	148	8%
UM-Kansas City	4,506	4,976	470	38.3	18	1%
UM-Rolla	5,834	6,022	188	38.3	5	0%
UM-St Louis	2,840	2,923	83	38.3	3	0%
Total	211,872	260,125	48,253		1,845	100%

* This multiplier, which is specific to the state of Missouri, is derived from a set of state multipliers developed by the US Commerce Department's Bureau of Economic Analysis (BEA) for the "College, Universities, and Professional Schools" sector.

Note: All dollar amounts in thousands.

Source: NSF, Survey of Research and Development Expenditures at College and Universities, FY1997; Bureau of Economic Analysis; Association of American Universities.

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Table 8:
Distribution of Federal Research Expenditures by Field

Table 8 displays the federal research expenditures by discipline area for the University of Missouri and public AAU institutions.

- In 1997 the majority of federal research funds expended by the public AAU institutions were in the life sciences (52%) followed by engineering (16%), the physical sciences (13%) and environmental sciences (7%). The remaining disciplines accounted for 12% of the expenditures.

- Twenty of the thirty-one public AAU institutions in 1997 (not including the University of Missouri) relied on one disciplinary area to provide the majority of their federal research expenditures. In every one of these cases the discipline area was life sciences.

- Where Columbia and Kansas City secured 72% and 91% of their federal expenditures from life sciences, respectively, Rolla garnered 65% of its federal funds in engineering and St Louis received 44% of its federal funds in physical sciences.

Table 8. Federal R&D Expenditures at the Public AAU Institutions by Science and Engineering Field, FY1997

Institution	Engi-neering	Physical	Environ-mental	Math & Computer	Life Sciences	Psycho-logy	Social Sciences	Other	Total
	Row Percentages								
U of Washington	6	4	16	2	67	2	2	0	320,784
University of Michigan	23	6	6	1	52	2	9	1	296,028
U CA San Diego	8	12	28	0	50	1	0	0	274,860
U CA Los Angeles	11	11	2	4	68	2	2	0	238,919
U WI Madison	15	11	8	4	52	5	5	0	233,760
University of Minnesota	12	7	2	5	70	3	1	0	200,149
University of Colorado	9	13	20	3	51	2	1	0	192,201
U CA Berkeley	23	30	1	3	38	2	2	1	186,349
Pennsylvania State U	43	9	8	3	27	3	6	2	185,206
University of Pittsburgh	3	6	0	1	85	2	2	1	160,833
U of Illinois Urbana	24	19	4	5	20	2	2	24	156,366
U of NC Chapel Hill	0	5	4	3	75	2	12	0	153,985
University of Arizona	8	33	4	5	47	1	3	0	152,221
U TX Austin	48	25	6	8	10	2	1	0	151,954
U CA Davis	7	8	4	2	78	1	0	0	123,673
Ohio State University	15	10	5	4	54	2	9	0	122,582
U of Iowa	7	12	0	1	77	2	2	0	108,534
U MD College Park	32	28	6	9	11	1	13	0	102,928
Indiana University	2	21	1	4	63	5	4	0	96,087
University of Florida	18	10	2	4	62	2	2	0	94,231
Purdue University	37	15	3	5	36	2	3	0	91,969
Michigan State University	7	22	0	3	57	2	9	0	82,977
University of Virginia	16	12	4	5	60	3	0	0	82,488
SUNY Buffalo	17	6	0	2	67	5	2	0	78,092
U CA Santa Barbara	39	23	14	9	4	6	6	0	74,149
CA Irvine	7	21	3	4	59	3	3	0	71,472
Rutgers the State U NJ	16	15	9	13	35	5	8	0	68,225
Iowa State University	34	10	1	6	36	0	12	1	52,938
University of Kansas	10	10	4	1	61	2	1	11	46,733
U of Nebraska Lincoln	9	10	21	2	53	1	4	0	41,269
University of Oregon	4	21	7	10	48	6	3	0	26,020
Public AAU Distribution	16	13	7	4	52	2	4	1	
University of Missouri:									
Columbia	9	4	1	2	72	4	8	0	35,993
Kansas City	0	5	0	3	91	0	1	0	4,976
Rolla	65	24	7	1	3	0	0	0	6,022
St Louis	0	44	0	2	11	19	24	0	2,923
University Total	14	9	1	2	62	4	8	0	49,914

Note: All dollar amounts in thousands.

Source: National Science Foundation/SRS, Survey of Research and Development Expenditures at Universities and Colleges, FY1997

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Table 9:
Market Share of Federal Research Expenditures within Each Discipline Area among the Public AAU Institutions

Table 9 displays each public AAU institution's market share within the eight discipline areas. The University of Missouri's federal research expenditures from the four campuses has been pooled.

- The discipline areas where the University of Missouri had secured the most significant market share were in the social sciences (2.2%), psychology (2.0%), life sciences (1.4%), and engineering (1.0%).

- Market share leaders in each discipline area were: Pennsylvania State in engineering (11.4%), UC Berkeley in the physical sciences (9.8%), UC San Diego in environmental sciences (24.3%), UT Austin in math and computer science (7.4%), University of Washington in life sciences (9.5%), UW Madison in psychology (11.7%), and University of Michigan in the social sciences (16.4%).

Table 9. Market Share in Federal R&D Expenditures by Discipline Area Among the Public AAU Institutions, FY1997

Institution	Engin-neering	Physical	Environ-mental	Math & Computer	Life Sciences	Psycho-logy	Social Sciences	Other	Total
				Column Percentages					
U of Washington	2.9	2.4	16.3	4.9	9.5	7.8	3.4	0.0	320,784
University of Michigan	9.7	2.9	6.1	2.9	6.8	4.4	16.4	3.3	296,028
U CA San Diego	3.3	5.9	24.3	0.7	6.1	2.6	0.8	0.4	274,860
U CA Los Angeles	3.7	4.5	1.9	6.1	7.2	5.2	2.1	0.0	238,919
U WI Madison	4.9	4.7	5.7	5.6	5.4	11.7	7.1	0.0	233,760
University of Minnesota	3.5	2.6	1.3	6.0	6.2	5.3	1.4	0.0	200,149
University of Colorado	2.5	4.3	12.3	4.3	4.3	4.4	1.4	0.0	192,201
U CA Berkeley	6.2	9.8	0.9	3.1	3.2	3.7	2.5	1.9	186,349
Pennsylvania State U	11.4	2.9	4.7	3.5	2.3	4.6	6.6	5.4	185,206
University of Pittsburgh	0.6	1.7	0.1	1.1	6.1	2.7	1.8	4.4	160,833
U of Illinois Urbana	5.5	5.1	1.8	4.9	1.4	3.3	2.3	70.1	156,366
U of NC Chapel Hill	0.0	1.3	1.8	3.4	5.1	3.1	10.6	0.0	153,985
University of Arizona	1.8	8.8	1.7	4.7	3.2	0.8	2.7	0.8	152,221
U TX Austin	10.6	6.8	2.7	7.4	0.7	2.4	1.2	0.0	151,954
U CA Davis	1.2	1.7	1.5	1.7	4.3	1.6	0.2	0.0	123,673
Ohio State University	2.7	2.2	2.0	3.0	2.9	2.8	6.3	1.0	122,582
U of Iowa	1.0	2.2	0.1	0.6	3.7	2.2	1.1	0.0	108,534
U MD College Park	4.8	5.0	2.0	6.1	0.5	1.3	7.8	0.0	102,928
Indiana University	0.2	3.6	0.3	2.3	2.7	5.2	2.2	0.1	96,087
University of Florida	2.5	1.6	0.5	2.6	2.6	2.0	1.0	0.6	94,231
Purdue University	4.9	2.4	0.8	3.1	1.5	1.5	1.4	0.4	91,969
Michigan State University	0.8	3.3	0.1	1.4	2.1	1.8	4.1	0.1	82,977
University of Virginia	1.9	1.8	1.1	2.6	2.2	2.2	0.1	0.1	82,488
SUNY Buffalo	1.9	0.8	0.1	1.2	2.3	3.5	0.8	0.0	78,092
U CA Santa Barbara	4.2	3.0	3.3	4.2	0.1	4.1	2.6	0.6	74,149
CA Irvine	0.7	2.7	0.6	2.0	1.9	2.0	1.2	0.0	71,472
Rutgers the State U NJ	1.6	1.8	1.9	5.7	1.1	3.0	3.2	0.1	68,225
Iowa State University	2.6	0.9	0.2	2.0	0.8	0.1	3.8	0.7	52,938
U of Missouri Total	1.0	0.8	0.2	0.6	1.4	2.0	2.2	0.0	49,914
University of Kansas	0.7	0.8	0.7	0.2	1.3	0.8	0.2	10.0	46,733
U of Nebraska Lincoln	0.5	0.7	2.8	0.6	1.0	0.3	0.9	0.0	41,269
University of Oregon	0.1	1.0	0.6	1.7	0.6	1.6	0.4	0.0	26,020
Public AAU Distribution	694,725	567,503	313,662	153,385	2,261,955	101,620	171,154	53,892	4,317,896

Source: National Science Foundation/SRS, Survey of Research and Development Expenditures at Universities and Colleges, FY1997
Note: All dollar amounts in thousands.
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Table 10:
Federal Research Expenditures per Full-time Faculty Member

In Table 10 the federal research expenditures secured in 1997 by each public AAU institution have been divided by the number of full-time faculty members that were employed at the institution. Reported in the table are the numbers of full-time faculty members according to two different but common definitions of "faculty." These two definitions of faculty have been provided because they are standard definitions frequently used by the public AAU institutions

IPEDS-STAFF
The definition of full-time faculty member used in the IPEDS-Staff report (IPEDS-S) includes all staff whose primary function is to teach, conduct research, and/or provide public service. These individuals must also hold academic rank (i.e., assistant professor, associate professor, etc.).

IPEDS-SALARY
The definition of full-time faculty member used in the IPEDS-Salary report (IPEDS-SA) includes only those faculty members who spend at least 50% of his or her time engaged in instructional activities. Thus, for example, the IPEDS-SALARY definition is not going to include those faculty members who are paid with external research funding, would not include most of the on-campus extension faculty, or faculty in medicine who received a significant portion of their salary from the physician's practice plan.

Discussion in this section will focus primarily on using the IPEDS-SA counts as the divisor.

- UC San Diego, the University of Washington, and the University of Colorado, respectively, expended the most research funds per full-time faculty member in 1997 among the public AAU institutions.

- There does appear to be an "economies of scale" among the public AAU institutions. That is, those institutions that secure the most dollars in federal research funding (e.g., University of Washington, University of Michigan, UC-San Diego, etc.) also tend to report higher levels of funding per full-time faculty member.

- Expenditures per faculty member, whether using the IPEDS-S or IPEDS-SA definition of faculty, tend to place the University of Missouri in the lower quartile among the public AAU institutions.

Table 10. Federal Expenditures for Science and Engineering R&D per Full-time Faculty Member at Public AAU Institutions

Institution *	Federal Research Expenditures	Full-time Faculty		Expenditures per faculty member ($)	
		IPEDS-S	IPEDS-SA	IPEDS-S	IPEDS-SA
U of California-San Diego	274,860,000	1,836	679	149,706	404,801
U of Washington	320,784,000	5,229	1,649	61,347	194,532
U of Colorado	192,201,000	2,155	1,062	89,188	180,980
U of California-Los Angeles	238,919,000	3,041	1,355	78,566	176,324
U of Wisconsin-Madison	233,760,000	NA	1,380	NA	169,391
U of Michigan	296,028,000	2,905	1,760	101,903	168,198
U of California-Berkeley	186,349,000	2,365	1,234	78,795	151,012
U of N Carolina-Chapel Hill	153,985,000	2,100	1,112	73,326	138,476
U of Minnesota	200,149,000	2,345	1,446	85,351	138,416
U of Pittsburgh	160,833,000	3,212	1,247	50,073	128,976
U of Arizona	152,221,000	1,998	1,314	76,187	115,846
U of California-Santa Barbara	74,149,000	1,107	660	66,982	112,347
Pennsylvania State U	185,206,000	2,637	1,708	70,234	108,434
U of Iowa	108,534,000	1,787	1,024	60,735	105,990
U of Illinois-Urbana	156,366,000	2,295	1,756	68,133	89,047
U of Texas-Austin	151,954,000	2,223	1,759	68,355	86,387
U of Virginia	82,488,000	1,822	972	45,273	84,864
SUNY-Buffalo	78,092,000	1,213	926	64,379	84,333
U of Maryland-College Park	102,928,000	2,404	1,336	42,815	77,042
Indiana U	96,087,000	1,591	1,278	60,394	75,185
Purdue U	91,969,000	1,914	1,469	48,051	62,607
Ohio State U	122,582,000	NA	1,979	NA	61,941
U of Florida	94,231,000	3,264	1,575	28,870	59,829
Iowa State U	52,938,000	1,393	1,016	38,003	52,104
Rutgers, the State U of NJ	68,225,000	1,817	1,357	37,548	50,276
U of Kansas	46,733,000	1,224	958	38,181	48,782
Michigan State U	82,977,000	3,284	1,851	25,267	44,828
U of Oregon	26,020,000	830	664	31,349	39,187
U of Nebraska-Lincoln	41,269,000	1,479	1,083	27,903	38,106
U of California-Davis	123,673,000	2,526	NA	48,960	NA
U of California-Irvine	71,472,000	1,357	NA	52,669	NA
University of Missouri:					
Columbia	35,993,000	2,421	913	14,867	39,423
Kansas City	4,976,000	721	468	6,902	10,632
Rolla	6,022,000	364	267	16,544	22,554
St Louis	2,923,000	513	348	5,698	8,399
University Total *	49,914,000	4,019	1,996	12,420	25,007

Source: IPEDS-Staff (FY1998), IPEDS-Salaries (FY1998), NSF, R & D Expenditures at Colleges and Universities (FY1997).

* The UM System employs 463 full-time faculty members (University extension) according to the IPEDS-S. These faculty were not included in any of the averages.

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Definitions: The IPEDS-Staff (IPEDS-S) definition includes all full-time staff whose primary function is to teach, conduct research, and/or provide public service. These individuals must also hold academic rank (i.e., assistant professor, associate professor, etc.).

The IPEDS-Salary (IPEDS-SA) definition includes only those full-time faculty members who spend at least 50% of their time engaged in instructional activities.

SECTION II:
RESEARCH EXPENDITURES FROM INDUSTRY, STATE, INSTITUTION, AND OTHER SOURCES

Universities have sources other than federal agencies for funding research operations on their campus. These sources include funds from state & local agencies, business & industry, and funds that are provided by the institution itself. Typically, funds that are provided by a source external to the institution (e.g., federal agency, state agency, industry, etc.) for a specific research purpose are labeled .restricted expenditures.. That is, they are .restricted. because the external agency has provided the funds for a specific research project and these funds must be spent on this project. On the other hand, unrestricted research expenditures are generally provided by internal sources (e.g., governing board, the institution, etc.) and can be used for a research purpose determined by the institution.

Generally speaking, the higher the percentage of restricted research expenditures the better because the institution is using external sources to fuel its research endeavors. In addition, it is probably even more favorable if these restricted research expenditures originate from federal or industry sources in contrast to state & local sources. That is, state funds that are used to fuel research at public universities are still commitments of the state.s resources. Further, research funds provided by federal agencies.in contrast to state agencies.typically provide a higher percentage of the indirect costs affiliated with the research project.

Table 11:
Sources of Research Expenditures

Table 11 shows the sources of research expenditures for the public AAU institutions. The institutions are arranged in descending order, based on the institution's percentage of research funds that are provided by the federal government.

- The University of Oregon, University of Pittsburgh, University of Washington, and UC Santa Barbara received over 75% of their research expenditures from the federal government, ranking them at the top among the public AAU institutions.

- Among the thirty-two public AAU institutions, Columbia would rank last in the percentage of research funds it secures from the federal government (27%). Kansas City (40%), Rolla (28%), and St Louis (35%) did better but would still be included in the lowest quartile of the public AAU institutions.

- The University of Missouri funds a higher percentage of its research program (45% to 48%, depending on which campus) with institutional funds than the other public AAU institutions.

Table 11. Total R&D Expenditures at the Public AAU Institutions by Source of Funds, FY1997

Institution	Federal Government	State and Local	Industry	Institutional*	Other	Total
University of Oregon	83%	1%	1%	10%	5%	31,487
University of Pittsburgh	79%	1%	5%	8%	8%	202,533
U of Washington	78%	3%	9%	8%	2%	409,959
U CA Santa Barbara	78%	2%	3%	10%	7%	94,796
U CA San Diego	73%	4%	5%	10%	9%	378,061
University of Virginia	72%	4%	7%	8%	9%	114,085
University of Colorado	71%	2%	3%	10%	13%	269,816
U of NC Chapel Hill	70%	14%	1%	15%	0%	221,380
U CA Los Angeles	64%	2%	5%	15%	13%	374,629
U TX Austin	64%	8%	13%	14%	2%	239,021
U CA Irvine	63%	3%	9%	13%	11%	113,187
University of Michigan	61%	1%	6%	21%	11%	483,485
U of Iowa	59%	3%	9%	22%	7%	184,414
Indiana University	58%	1%	3%	26%	12%	165,354
SUNY Buffalo	58%	4%	11%	10%	18%	135,663
U WI Madison	56%	9%	4%	21%	11%	419,810
University of Minnesota	55%	14%	7%	15%	9%	363,095
U of Illinois Urbana	55%	13%	4%	24%	5%	286,470
Pennsylvania State U	54%	4%	17%	25%	0%	339,955
University of Arizona	53%	3%	5%	35%	4%	285,278
U CA Berkeley	52%	14%	5%	22%	7%	356,813
U CA Davis	48%	7%	4%	33%	8%	255,070
U MD College Park	48%	24%	2%	18%	8%	215,927
Purdue University	45%	10%	13%	32%	0%	206,588
Michigan State University	44%	17%	4%	30%	5%	190,178
University of Kansas	43%	9%	8%	35%	6%	108,893
Ohio State University	42%	16%	13%	21%	8%	289,100
Rutgers the State U NJ	37%	12%	5%	39%	7%	183,038
U of Nebraska Lincoln	35%	33%	4%	26%	2%	117,100
University of Florida	35%	24%	9%	29%	3%	271,365
Iowa State University	34%	30%	5%	27%	3%	155,433
Public AAU Average	57%	9%	7%	20%	7%	
University of Missouri:						
Columbia	27%	14%	6%	48%	5%	132,432
Kansas City	40%	1%	8%	45%	5%	12,335
Rolla	28%	4%	13%	48%	7%	21,235
St Louis	35%	9%	5%	48%	4%	8,359

* Institutional funds include 1) institutionally financed funds and 2) unreimbursed costs.
Source: NSF, Survey of Research and Development Expenditures at Colleges and Universities, FY 1997.
Note: Dollar amounts in thousands.
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Table 12:
Restricted and Unrestricted Research Expenditures

Table 12 shows the restricted and unrestricted research expenditures for the public AAU institutions.

- The University of Washington (95%), UC San Diego (91%), and the University of Colorado (90%) received the highest percentage of restricted research funds among the public AAU institutions. The public AAU institutions average 80% in restricted research expenditures.

- Fifty-three percent of the total research expenditures at the University of Missouri were restricted in 1997. This would rank the University 30th among the public AAU institutions in terms of the percentage of restricted research expenditures.

Table 12. Restricted and Unrestricted Research Expenditures at Public AAU Institutions, FY1997

Institutions	Unrestricted	Restricted	Total	Percentage Restricted
U of Washington	17,091	322,180	339,271	95%
U CA San Diego	26,166	252,107	278,273	91%
University of Colorado	12,844	111,341	124,185	90%
Ohio State University	19,377	163,884	183,261	89%
U of Iowa	14,119	113,926	128,045	89%
U CA Los Angeles	33,216	254,792	288,008	88%
U CA Santa Barbara	8,851	64,171	73,022	88%
University of Virginia	14,721	102,688	117,409	87%
University of Pittsburgh	21,476	144,541	166,017	87%
Iowa State University	16,320	107,558	123,878	87%
University of Minnesota	42,177	261,025	303,202	86%
University of Michigan	50,868	305,093	355,961	86%
U CA Irvine	12,850	75,001	87,851	85%
U of NC Chapel Hill	22,423	130,055	152,478	85%
U CA Berkeley	44,776	216,355	261,131	83%
Purdue University	19,861	94,594	114,456	83%
U TX Austin	40,001	185,735	225,736	82%
Michigan State University	25,955	119,369	145,324	82%
University of Oregon	6,306	26,477	32,783	81%
Pennsylvania State U	46,575	189,945	236,520	80%
SUNY Buffalo	12,088	48,927	61,014	80%
U of Illinois Urbana	56,287	166,900	223,187	75%
Indiana University	14,254	40,880	55,134	74%
U WI Madison	100,131	286,619	386,749	74%
University of Arizona	54,546	140,401	194,947	72%
U MD College Park	47,208	118,172	165,380	71%
U CA Davis	54,123	132,473	186,596	71%
University of Kansas	22,289	34,980	57,269	61%
Rutgers the State U NJ	52,979	75,945	128,924	59%
University of Florida	124,942	128,951	253,893	51%
U of Nebraska Lincoln	46,853	32,552	79,405	41%
Public AAU Average	34,893	143,472	178,365	80%
University of Missouri:				
Columbia	46,153	47,499	93,652	51%
Kansas City	3,457	5,601	9,057	62%
Rolla	5,697	8,990	14,687	61%
St Louis	2,823	3,768	6,591	57%
University Total	58,130	65,858	123,988	53%

Notes: 1) The figures reported in this table are from the IPEDS Finance (F-1) report and not from NSF, the source used for all previous tables. 2) Please note that this table does not include indirect costs. 3) All dollar amounts in thousands.
Source: IPEDS F-1
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Table 13:
Industry-Sponsored Research Expenditures

Table 13 shows the growth in industry-sponsored research expenditures for the public AAU institutions from 1990 to 1997 and from 1995 to 1997. The institutions are arranged in descending order based on their level of growth in dollars since 1995. Please note that a definition of *industry-sponsored research expenditures* is provided in Section IV: Definitions and Technical Notes.

- Over the past two years the University of Texas, University of Florida, and UC San Diego have shown the largest gains in industry-sponsored research expenditures among the public AAU institutions.

- The institutions that lead the public AAU group in terms of industry-sponsored research are Pennsylvania State University ($56.6 million), the University of Washington ($37.7 million), and Ohio State University ($36.7 million).

- The University of Missouri secured $12.6 million in industry-sponsored research expenditures in 1997. Although there have been shifts among the campuses during the past seven years, this amount is essentially equal to 1990 levels ($12.8 million).

Table 13. Industry-Sponsored R&D Expenditures at Public AAU Institutions Since 1990 and 1995

Institution	1990	1995	1996	1997	$ Gain/Loss since 1990	$ Gain/Loss since 1995
U TX Austin	3,507	3,257	15,029	29,887	26,380	26,630
Ohio State University	14,744	21,827	30,870	36,685	21,941	14,858
University of Florida	12,237	10,611	17,532	24,478	12,241	13,867
U CA San Diego	9,135	11,363	15,130	19,266	10,131	7,903
Pennsylvania State U	34,806	50,225	52,771	56,666	21,860	6,441
U CA Los Angeles	8,310	14,892	15,788	19,586	11,276	4,694
U of Iowa	6,827	11,359	14,862	15,712	8,885	4,353
U CA Berkeley	10,892	13,842	15,128	17,125	6,233	3,283
University of Michigan	27,128	28,987	34,975	31,411	4,283	2,424
U WI Madison	12,123	12,948	13,871	14,832	2,709	1,884
University of Colorado	7,426	7,607	8,902	9,403	1,977	1,796
University of Pittsburgh	6,481	8,208	7,880	9,753	3,272	1,545
U of Nebraska Lincoln	3,394	3,145	3,465	4,651	1,257	1,506
U CA Davis	7,461	8,053	9,387	9,362	1,901	1,309
U CA Irvine	3,115	9,139	10,391	10,445	7,330	1,306
SUNY Buffalo	2,118	13,390	13,186	14,480	12,362	1,090
Rutgers the State U NJ	6,754	7,797	7,079	8,848	2,094	1,051
Purdue University	11,632	25,147	25,720	26,090	14,458	943
U of NC Chapel Hill	2,179	2,403	2,592	3,311	1,132	908
U of Washington	22,215	36,892	36,180	37,744	15,529	852
University of Minnesota	18,086	23,427	23,726	24,196	6,110	769
Iowa State University	5,525	8,017	7,407	8,499	2,974	482
U CA Santa Barbara	2,655	2,576	2,988	2,876	221	300
University of Kansas	4,473	8,149	9,356	8,201	3,728	52
U of Illinois Urbana	20,762	11,832	12,365	11,761	-9,001	-71
University of Arizona	10,246	15,300	13,106	14,964	4,718	-336
Michigan State University	4,557	7,853	6,818	6,973	2,416	-880
Indiana University	2,316	5,815	5,357	4,242	1,926	-1,573
University of Virginia	6,406	15,442	4,552	7,627	1,221	-7,815
U MD College Park	14,229	25,431	24,044	5,009	-9,220	-20,422
Public AAU Average	10,058	14,164	15,349	16,469	6,411	2,305
University of Missouri:						
Columbia	9,130	10,114	8,164	8,449	-681	-1,665
Kansas City	1,383	636	622	1,044	-339	408
Rolla	2,186	1,316	2,036	2,696	510	1,380
St Louis	69	409	354	407	338	-2
University Total	12,768	12,475	11,176	12,596	-172	121

Source: National Science Foundation, Survey of Research and Development Expenditures at Colleges and Universities, FY 1997

Note: All dollar amounts in thousands.

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SECTION III:
FEDERAL RESEARCH OBLIGATIONS

Tables 14 and 15 show the total federal research obligations for the public AAU institutions. Both tables are organized based on the federal agency that has promised the funding: USDA, Department of Defense (DOD), Health and Human Services (HHS), Department of Energy (DOE), NASA, NSF, Department of Education (ED), and Other agencies. Table 14 displays the dollar amounts of obligations and Table 15 displays contribution of each agency to the institution's total federal obligations. The federal obligations are for 1996, the most recent year available. Please note that a definition of *federal research obligations* is provided in Section IV: Definitions and Technical Notes.

Table 14:
Federal Research Obligations by Agency

- The following universities garnered the most in federal obligations among the public AAU institutions in the federal agency categories noted below:

USDA:	Iowa State University	$25.8 million
DOD:	Pennsylvania State University	$63.8 million
HHS:	University of Washington	$218.8 million
DOE:	University of Washington	$19.4 million
NASA:	University of Arizona	$21.7 million
NSF:	University of California at San Diego	$48.3 million
ED:	University of Kansas	$4.9 million

Table 14. Federal Obligations for Research and Development at the Public AAU Institutions by Agency, FY 1996

Institution	USDA	DOD	HHS	DOE	NASA	NSF	ED	OTHER	TOTAL
University of Washington	3,692	33,908	218,814	19,401	8,958	46,346	2,064	14,328	347,511
U of Michigan	724	31,360	180,806	7,971	11,358	38,512	1,442	10,250	282,423
U of CA San Diego	284	30,492	136,010	13,575	11,323	48,298	0	17,252	257,234
U of WI Madison	19,378	12,165	122,380	15,880	10,972	44,820	0	5,543	231,138
U of CA Los Angeles	306	16,880	160,121	15,849	9,138	20,847	2,301	1,211	226,653
U of Minnesota	19,671	13,624	133,903	6,127	2,702	34,571	2,073	8,013	220,684
U of Colorado	193	12,845	108,564	4,569	16,460	30,991	2,007	21,787	197,416
PA St U University Park	21,938	63,826	57,417	5,161	9,396	27,986	479	3,990	190,193
U of NC Chapel Hill	641	8,239	146,118	1,674	436	10,989	4,535	8,521	181,153
U of CA Berkeley	19,984	15,250	62,510	6,856	19,457	45,405	723	4,847	175,032
U of Pittsburgh	0	3,990	142,356	1,737	1,047	11,850	3,240	1,740	165,960
U of IL Urbana-Champaign	20,450	23,839	29,469	2,759	4,977	58,387	2,211	1,808	143,900
University of Arizona	8,043	16,755	53,707	4,612	21,727	21,945	2,454	7,115	136,358
U of TX Austin	376	53,423	19,364	10,343	8,205	28,191	1,482	2,305	123,689
Ohio State U	21,740	6,554	46,301	5,735	5,225	17,535	342	7,637	111,069
U of CA Davis	9,223	4,445	57,348	13,553	2,270	17,520	669	5,240	110,268
University of Iowa	263	3,213	84,880	1,283	6,672	8,124	342	1,739	106,516
U of MD College Park	12,102	17,273	8,496	7,865	18,430	29,472	0	9,835	103,473
University of Florida	17,668	10,492	48,389	3,427	5,033	15,088	1,188	1,812	103,097
Indiana U	72	2,053	68,933	3,663	834	20,386	1,154	2,883	99,978
U of Virginia	5	6,345	61,252	3,354	5,332	13,930	836	3,151	94,205
Purdue University	22,477	12,708	20,659	8,799	2,180	19,894	195	1,399	88,311
Michigan State University	22,490	3,620	21,126	4,432	457	27,096	122	6,082	85,425
Rutgers St U of NJ	11,173	10,251	21,215	5,835	2,174	18,072	0	9,658	78,378
U of CA Irvine	642	5,361	42,990	5,367	2,794	11,943	0	764	69,861
U of CA Santa Barbara	181	16,454	6,928	4,390	4,093	28,061	97	4,050	64,254
Iowa State University	25,817	1,445	6,522	4,980	1,270	10,324	0	8,617	58,975
University of Kansas	112	1,567	30,946	2,578	947	8,615	4,865	132	49,762
SUNY at Buffalo	122	4,370	26,245	35	441	9,559	5	2,823	43,600
U of Nebraska Lincoln	15,784	2,738	3,184	0	927	14,114	0	5,296	42,043
University of Oregon	351	1,871	11,624	2,951	288	8,340	3,776	701	29,902
Public AAU Average	8,900	14,431	68,986	6,283	6,307	24,104	1,245	5,824	136,079
University of Missouri:									
Columbia	21,330	1,585	15,609	669	542	4,391	969	151	45,246
Kansas City	0	50	3,793	173	22	1,018	0	5	5,061
Rolla	0	686	426	999	536	2,310	0	142	5,099
St Louis	0	365	1,394	0	95	1,021	0	117	2,992
University Total	21,330	2,686	21,222	1,841	1,195	8,740	969	415	58,398

Key: USDA = Department of Agriculture, DOD = Department of Defense, HHS = Department of Health and Human Services, ED = Education, DOE = Department of Energy, NASA = National Aeronautics and Space Administration, NSF = National Science Foundation, Other = Department of Commerce, Environment Protection Agency (EPA) and Other.
Notes: 1) All dollar amounts in thousands. 2) Institutions listed in descending order based on total obligations.

Source: NSF/SRS, Survey of Federal Science and Engineering Support to Universities, Colleges, and Non-profit Institutions, FY 1996.
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Table 15:
Federal Research Obligations by Agency

- Most of the public AAU institutions (twenty of thirty-two) received the largest portion of their federal research obligations from the Department of Health and Human Services.

- The University of Missouri received the majority its federal obligations from the USDA (37%), followed by HHS (36%), NSF (15%) and DOD (5%).

- The University of Missouri secured $58.4 million in federal research obligations in fiscal year 1996. This would rank 28th among the public AAU institutions.

Table 15. Federal Obligations for Research and Development at the Public AAU Institutions by Agency (per agency percentage contribution), FY 1996

Institution	USDA	DOD	HHS	DOE	NASA	NSF	ED	OTHER	TOTAL
	Row Percentages								
University of Washington	1	10	63	6	3	13	1	4	347,511
U of Michigan	0	11	64	3	4	14	1	4	282,423
U of CA San Diego	0	12	53	5	4	19	0	7	257,234
U of CA Los Angeles	0	7	71	7	4	9	1	1	226,653
U of Minnesota	9	6	61	3	1	16	1	4	220,684
U of Colorado	0	7	55	2	8	16	1	11	197,416
PA St U University Park	12	34	30	3	5	15	0	2	190,193
U of NC Chapel Hill	0	5	81	1	0	6	3	5	181,153
U of CA Berkeley	11	9	36	4	11	26	0	3	175,032
U of Pittsburgh	0	2	86	1	1	7	2	1	165,960
U of IL Urbana-Champaign	14	17	20	2	3	41	2	1	143,900
University of Arizona	6	12	39	3	16	16	2	5	136,358
U of TX Austin	0	43	16	8	7	23	1	2	123,689
Ohio State U	20	6	42	5	5	16	0	7	111,069
U of CA Davis	8	4	52	12	2	16	1	5	110,268
University of Iowa	0	3	80	1	6	8	0	2	106,516
U of MD College Park	12	17	8	8	18	28	0	10	103,473
University of Florida	17	10	47	3	5	15	1	2	103,097
Indiana U	0	2	69	4	1	20	1	3	99,978
U of Virginia	0	7	65	4	6	15	1	3	94,205
Purdue University	25	14	23	10	2	23	0	2	88,311
Michigan State University	26	4	25	5	1	32	0	7	85,425
Rutgers St U of NJ	14	13	27	7	3	23	0	12	78,378
U of CA Irvine	1	8	62	8	4	17	0	1	69,861
U of CA Santa Barbara	0	26	11	7	6	44	0	6	64,254
Iowa State University	44	2	11	8	2	18	0	15	58,975
University of Kansas	0	3	62	5	2	17	10	0	49,762
SUNY at Buffalo	0	10	60	0	1	22	0	6	43,600
U of Nebraska Lincoln	38	7	8	0	2	34	0	13	42,043
University of Oregon	1	6	39	10	1	28	13	2	29,902
Public AAU Average	6	11	51	4	5	18	1	4	132,911
University of Missouri:									
Columbia	47	4	34	1	1	10	2	0	45,246
Kansas City	0	1	75	3	0	20	0	0	5,061
Rolla	0	13	8	20	11	45	0	3	5,099
St Louis	0	12	47	0	3	34	0	4	2,992
University Total	37	5	36	3	2	15	2	1	58,398

Notes:1) In descending order based on total obligations. 2) All dollar amounts in thousands.
Key: USDA = Department of Agriculture, DOD = Department of Defense, HHS = Department of Health and Human Services, ED = Education, DOE = Department of Energy, NASA = National Aeronautics and Space Administration, NSF = National Science Foundation, Other = Department of Commerce, Environment Protection Agency (EPA) and Other.

Source: NSF/SRS, Survey of Federal Science and Engineering Support to Universities, Colleges, and Non-profit Institutions, FY 1996.

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SECTION IV:
DEFINITIONS AND TECHNICAL NOTES

The following definitions, provided by the National Science Foundation (NSF), are most relevant to the tables in this report:

> *Federal research expenditures:* when funds for research from the federal government are actually spent they are then considered .expenditures.. For example, if the University received a two-year, two million dollar grant from NASA in FY1993 and spent $1.5 million the first year and $0.5 million in the second year, the federal expenditures would be $1.5 million for FY1993 and $0.5 million for FY1994. The reporting of expenditures, in contrast to obligations, provides a more accurate picture of an institution.s research performance because it represents funds that have been already spent as compared to funds that have been promised or are expected. Furthermore, expenditure figures are less likely to show major shifts from year to year because funds received for multi-year grants are only reported in the year that they are spent.
>
> *Federal research obligations:* the amounts for research orders placed, contracts awarded, services received, and similar transactions during a given period, regardless of when the funds were appropriated and when future payment of money is required. For example, if the University were awarded a two-year, two million dollar grant from NASA in FY1993, the award amount would be recorded as two million dollars in obligations in FY1993.
>
> *Industry-sponsored research expenditures:* these are funds provided by profit making organizations and expended by the University for research-related purposes. These amounts are reported in the fiscal year that they are expended.

The National Science Foundation has historically reported research obligations and expenditures from a number of different perspectives. In this report, specifically, academic Science & Engineering (S&E) obligations and expenditures for Research & Development (R&D) are examined. Thus, funds received from the federal government for Plant, Facilities & Equipment; Fellowships, Traineeships, and Training Grants; General Support; and for other categories have been excluded. For brevity, "Science and Engineering" and "Research and Development" have not been repeated in the text of this document.

Questions or Comments

Questions or comments should be directed to Mardy T. Eimers, Senior Analyst, 104 University Hall, Office of Planning and Budget, University of Missouri System, (573) 882-3412, eimersm@umsystem.edu.