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Patents Granted to U.S. University and Colleges

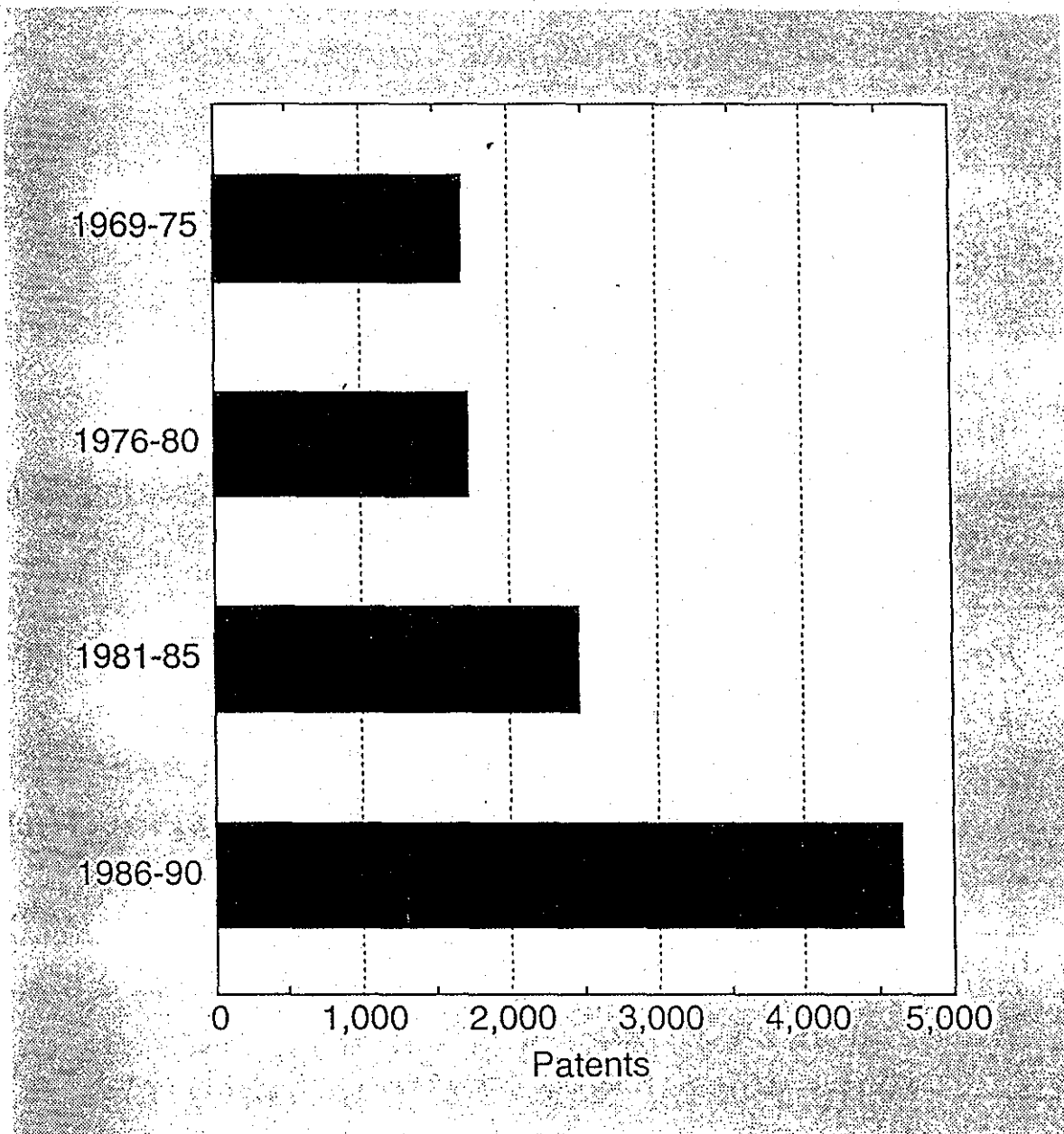


FIGURE #1

Patents Awarded to Top 100 Academic Research Performers

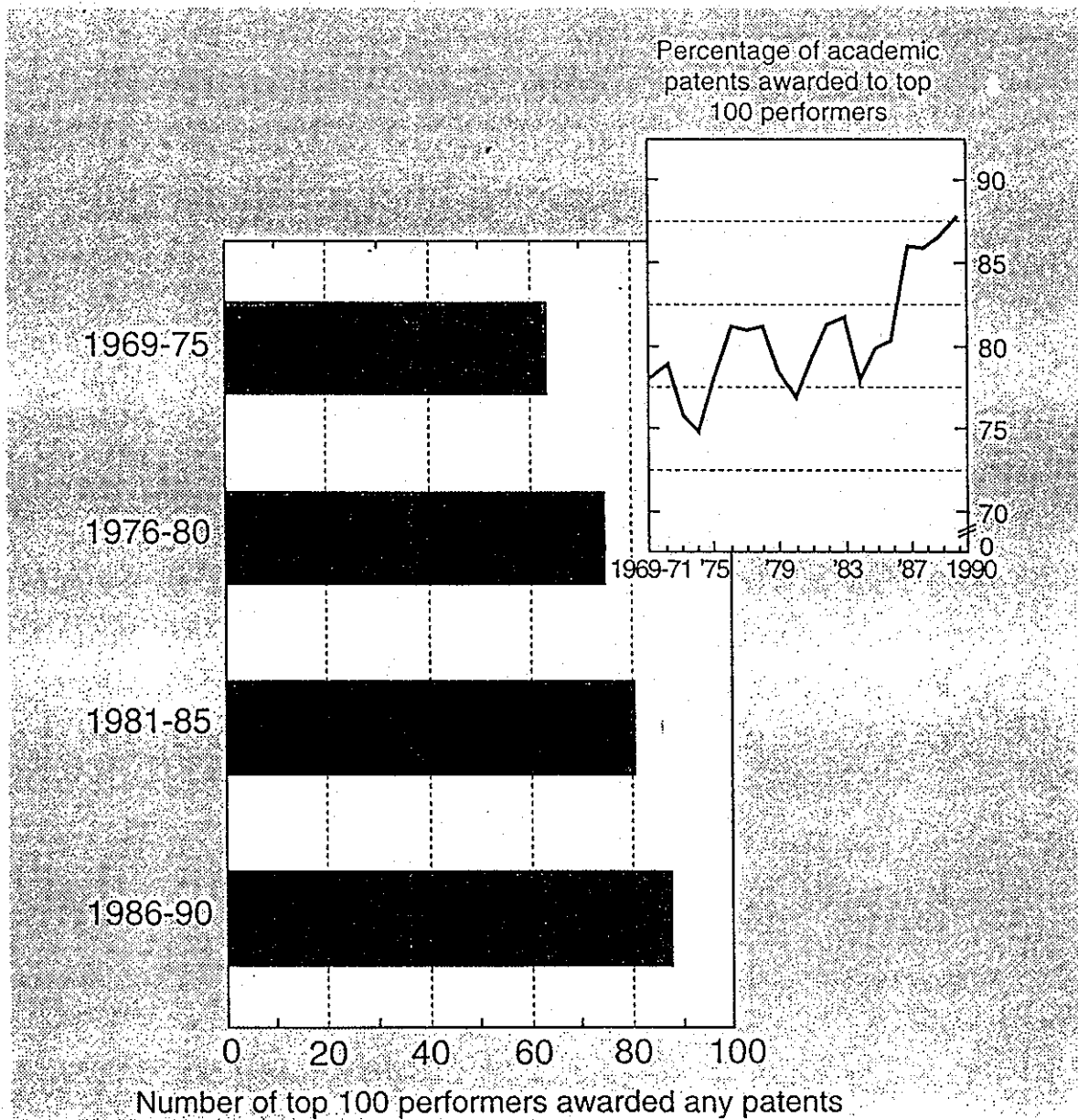


FIGURE #2

Patents to universities doubled in past six years

Number of U.S. patents issued

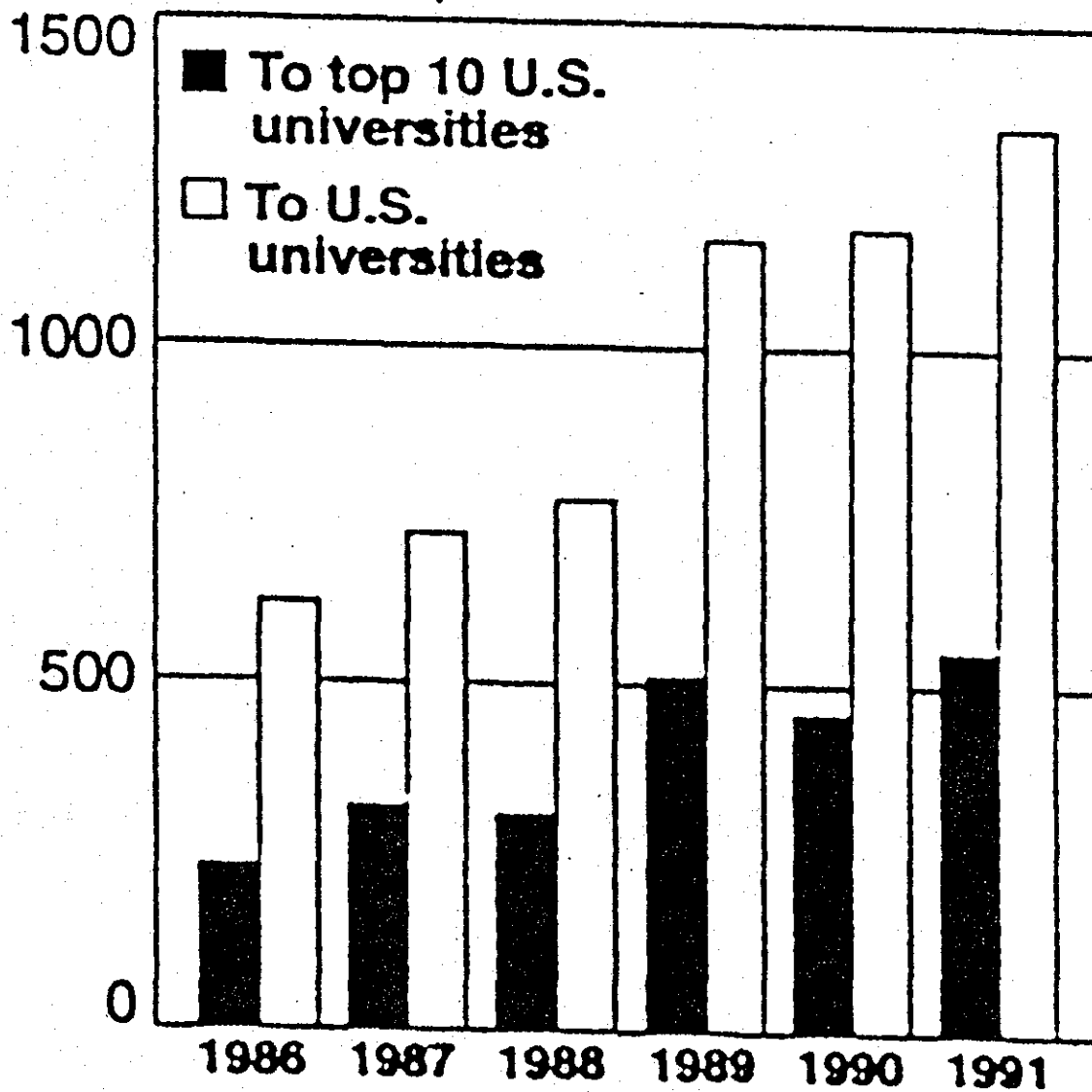


FIGURE #3

MIT Leads in U.S. Patents Awarded to Universities - 1991

	Number of U.S. Patents Issued in 1991	R&D Spending in 1990 (\$ Millions)
Massachusetts Inst. of Technology	105	\$ 312
University of California	87	1344
University of Texas	83	405
Stanford University	57	306
University of Wisconsin	45	310
University of Florida	44	140
Cornell University	41	300
Iowa State University	38	116
California Institute of Technology	36	106
University of Minnesota	31	292
State University of New York	26	191
Johns Hopkins University	26	669
University of Michigan	22	311

FIGURE #4

Patents Awarded to the 100 Academic Institutions with the Greatest R&D Volume: 1969-1990

(30 Institutions Shown)

	Total	1969-71	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
ALL ACADEMIC PATENTS.....	10,559	630	237	258	249	320	357	363	367	262	390	436	457	433	551	585	670	817	805	1,217	1,155
Patents to top 100 R&D performers....	8,399	476	181	189	180	242	281	285	289	199	290	335	360	343	416	453	521	682	671	1,022	984
Massachusetts Institute of Technology...	1,109	94	28	40	37	44	59	39	53	43	44	66	51	47	47	35	45	63	63	101	110
University of California	752	59	16	25	22	17	22	25	23	1	2	38	42	48	46	42	54	67	60	81	62
California Institute of Technology.....	428	29	17	14	15	27	18	16	18	12	26	16	19	16	15	16	23	27	18	56	30
Stanford University	415	3	3	6	7	16	19	18	10	4	11	10	4	16	36	38	33	48	54	43	36
University of Wisconsin.....	338	15	12	13	8	17	20	25	13	7	28	26	17	13	16	17	17	11	20	27	16
Iowa State University	332	42	11	14	20	15	14	15	12	8	12	12	15	10	14	21	9	15	15	28	30
University of Minnesota.....	258	15	9	6	4	5	3	5	6	7	6	12	10	5	6	11	16	28	26	40	38
Cornell University	243	11	1	2	3	5	10	10	10	7	11	8	6	10	14	20	13	30	16	22	34
University of Texas.....	222	0	0	0	0	0	0	1	2	0	1	6	7	5	8	20	25	21	21	51	54
Johns Hopkins University.....	214	9	7	5	4	10	3	9	10	4	6	9	8	6	10	15	18	18	21	27	15
Purdue University.....	204	16	10	4	1	13	15	12	6	4	13	15	11	11	14	18	9	4	2	11	15
University of Utah.....	198	15	8	3	2	5	7	6	12	17	12	7	14	15	9	11	7	12	9	13	14
University of Illinois.....	189	17	7	8	9	9	14	11	11	6	10	8	7	8	8	10	12	4	9	15	6
Ohio State University	176	38	12	8	3	4	7	9	8	0	3	4	5	8	3	10	5	12	14	13	10
University of Florida	153	0	0	1	1	2	2	0	1	3	7	4	0	6	10	7	10	13	21	33	32
State University of New York.....	112	0	0	0	0	0	0	0	0	0	1	2	8	2	11	5	11	18	10	25	19
Georgia Institute of Technology.....	112	6	0	3	5	1	1	2	2	5	3	7	8	3	6	11	9	9	7	8	16
University of Michigan.....	109	0	0	0	4	0	2	8	2	4	4	1	2	2	1	1	10	6	14	23	25
Harvard University	105	0	0	0	0	0	0	1	2	0	4	3	11	10	7	1	2	9	17	15	23
University of Rochester.....	100	0	0	0	0	0	4	2	4	0	6	7	8	9	6	2	8	9	11	11	13
University of Southern California.....	98	0	0	2	3	4	5	6	15	6	7	2	5	1	7	5	5	4	7	8	6
Northwestern University	91	12	0	2	1	0	0	2	7	5	7	1	7	3	2	2	8	10	10	7	5
University of Kentucky.....	86	8	2	3	6	0	0	1	3	2	5	4	6	6	7	5	7	4	7	6	4
University of Iowa.....	78	2	0	0	0	0	3	3	2	5	4	4	5	3	4	1	8	8	6	8	12
University of Virginia.....	78	0	0	1	3	0	3	7	8	6	1	3	8	4	2	1	4	3	4	8	12
University of Pittsburgh.....	75	0	0	0	0	0	0	0	0	2	6	3	2	5	8	3	8	10	6	11	11
Indiana University.....	72	24	5	2	0	1	4	4	7	2	2	1	0	3	2	4	0	3	1	6	1
Columbia University	72	0	0	0	0	0	0	0	0	0	0	0	0	2	3	4	7	6	15	19	16
University of Missouri.....	72	0	0	0	2	3	5	0	6	4	1	2	9	5	4	0	3	8	9	5	6
University of Pennsylvania.....	71	4	1	2	2	1	2	5	5	3	1	1	1	2	4	5	1	2	1	9	19

FIGURE #5

Patents Awarded to U.S. Universities by Technology Class: 1969-1990

Technology Class	1969-75	1976-80	1981-85	1986-90
73 Measuring and Testing	69	59	71	105
128 Surgery	68	67	110	224
600 Surgery	5	5	11	13
604 Surgery	7	11	36	78
606 Surgery	14	8	21	54
204 Chemistry: electrical and wave energy	41	36	65	92
250 Radiant energy	38	54	46	117
324 Electricity: measuring and testing	30	16	37	129
350 Optics, systems and elements	20	24	42	119
356 Optics, measuring and testing	19	24	31	86
372 Coherent light generators	15	14	27	74
424 Drug, bio-affecting and body treating compositions	52	69	137	261
435 Chemistry: molecular biology and microbiology	58	84	192	446
436 Chemistry: analytical and immunological testing	23	56	72	65
437 Semiconductor device manufacturing process	5	14	26	50
514 Drug, bio-affecting and body treating composition	46	119	225	464
530 Chemistry: peptides or proteins; lignins or reaction products thereof	9	14	79	117

FIGURE #6

**Patenting and Licensing of
Technology Resulting from NIH or NSF - Funded Research
(Fiscal Years 1989 and 1990)**

Universities	Patent Applications Filed	Licenses Granted		License Income
		Patents	Other	
All Surveyed	690	329	207	\$82.0
Top Five	274	203	156	67.1

Dollars in Millions

**Income From Exclusive and Nonexclusive License
for NIH or NSF Funded Technology
(Fiscal Years 1989 and 1990)**

Universities	Licenses Granted		License Income	
	Exclusive	Nonexclusive	Exclusive	Nonexclusive
All Surveyed	197	339	\$29.3	\$52.7
Top Five	99	263	20.6	50.8

Dollars in Millions

**Patenting and Licensing of Technology Resulting
From All Sources of Funding
(Fiscal Years 1989 and 1990)**

Universities	Patent Applications Filed	Licenses Granted		License Income
		Patents	Other	
All Surveyed	2,043	731	779	\$113.1
Top Five	893	393	481	81.8

Dollars in Millions

FIGURE #7

Individual Universities' Patent and Licensing Activities

Fiscal (1989 and 1990)

Surveyed university	Invention disclosures	Patent		Licenses granted		License Income
		applications filed	Patents received	Patents	Other	
Alabama	95	11	7	9	6	\$ 457
California						
Berkeley	96	62	22	9	11	808
Los Angeles	83	47	17	6	1	421
San Diego	72	49	14	7	0	1,009
San Francisco	101	98	37	12	0	11,394
Santa Barbara	30	16	13	1	68	83
California						
Institute of Technology	61	44	29	9	2	803
Carnegie Mellon	65	15	12	4	5	166
Chicago	86	45	24	10	4	98
Colorado	135	71	17	79	1	3,762
Columbia	109	51	37	12	29	11,540
Cornell	181	141	54	36	30	1,186
Duke	105	49	23	8	14	605
Harvard	165	61	37	37	36	2,568
Illinois	104	25	23	12	58	672
Indiana	47	9	8	10	2	251
Johns Hopkins	141	57	18	8	3	1,059
Maryland	79	16	3	13	5	208
MIT	609	411	200	64	43	5,213
Michigan	162	75	44	2	19	716
Michigan State	64	30	8	10	1	12,053
Minnesota	309	118	83	84	0	2,286
North Carolina	138	39	10	10	4	685
Northwestern	57	20	15	5	3	232
Pittsburgh	51	21	19	4	4	483
Princeton	45	20	19	3	0	157
Purdue	102	40	31	15	56	1,084
Rochester	67	18	30	5	6	442
Southern						
California	99	30	15	6	40	283
Stanford	311	79	62	120	256	24,786
Washington						
University	100	52	22	16	27	598
University of						
Washington	148	38	14	46	24	3,024
Wisconsin	225	125	48	35	0	21,999
Yale	108	50	21	17	14	1,170
Yeshiva	30	10	0	7	7	754
Total	4,380	2,043	1,036	731	779	\$113,055

FIGURE #8

AUTM MEMBERSHIP

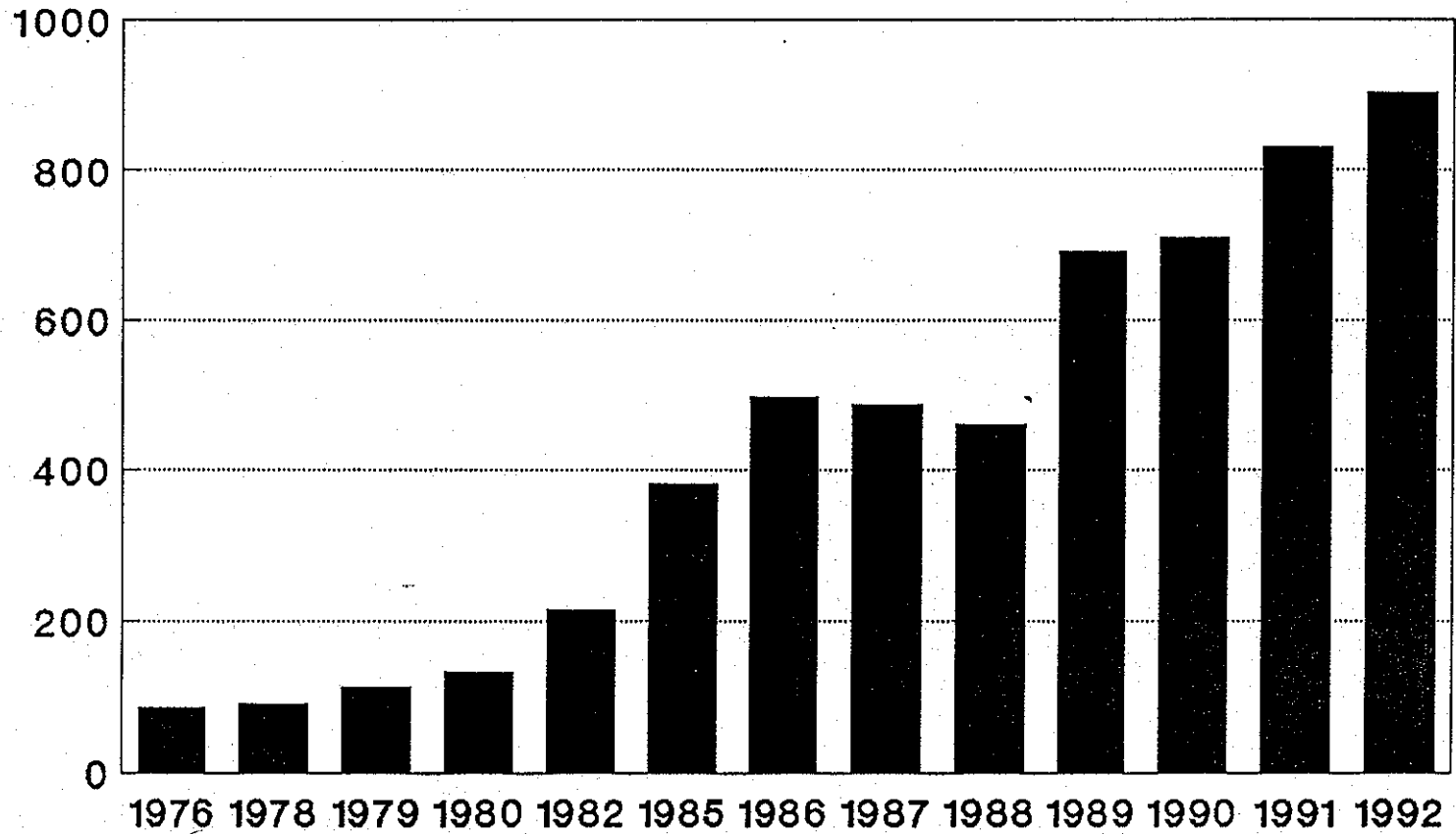


FIGURE #9

National and Academic R&D Expenditures by Character of Work and Performer: 1991

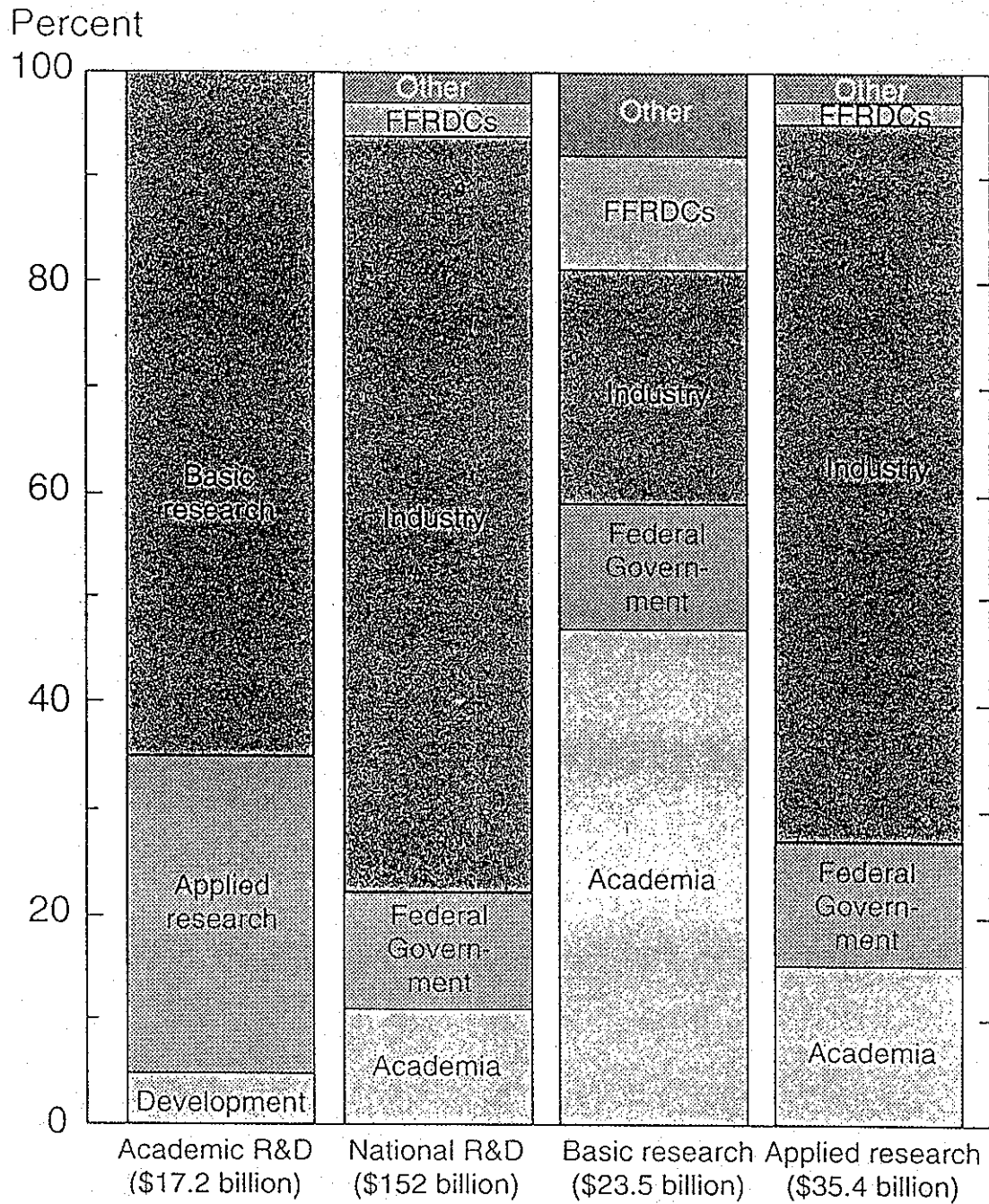
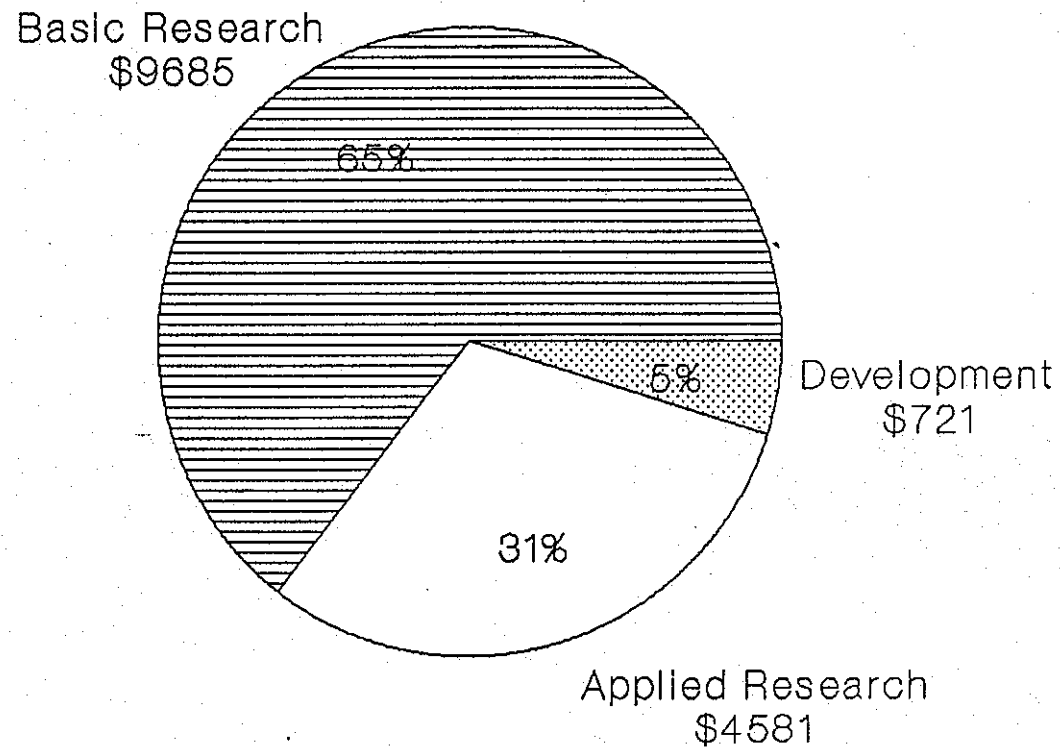


FIGURE #10

Character of University R&D Spending 1989



Millions of Current Dollars

R&D Expenditures at the top 100 University and Colleges, by Source of Funds: 1989

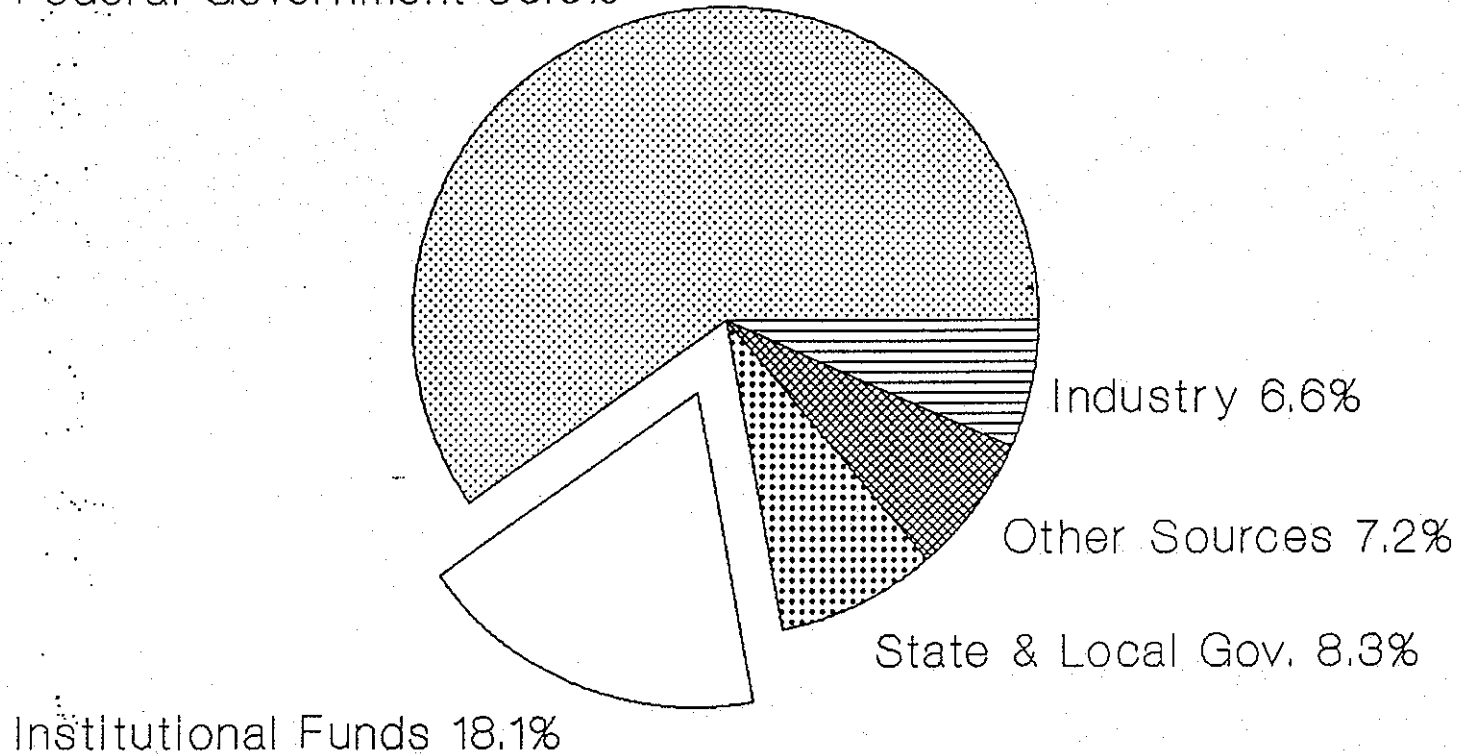
(Top 20 Shown)

Academic institutions' ranking	Institu- tional category	Total	Federal Gov't	State and local gov't	Industry	Academic institutions	All other sources
Thousands of dollars							
Total, all institutions¹		14,556,179	8,550,551	1,238,860	983,574	2,700,657	1,082,539
1 Massachusetts Institute of Technology	Private	287,157	215,140	3,211	39,650	6,692	22,464
2 Cornell University	Private	286,733	157,984	40,405	16,627	49,157	22,560
3 Stanford University	Private	285,994	238,650	392	13,764	14,261	18,927
4 University of Wisconsin-Madison	Public	285,982	169,452	49,054	11,035	37,916	18,525
5 University of Michigan	Public	280,905	174,875	2,533	22,023	61,626	19,848
6 University of Minnesota	Public	258,614	132,880	42,542	12,389	43,713	27,090
7 Texas A & M University-all campuses	Public	250,706	93,584	65,179	21,204	63,053	7,686
8 University of California-Los Angeles	Public	227,828	159,002	3,479	7,548	32,975	24,824
9 University of Washington	Public	221,712	182,453	3,795	19,135	13,181	3,148
10 Pennsylvania State University- all campuses	Public	219,930	114,646	8,907	30,256	66,036	85
Total, 1st 10 institutions		2,605,561	1,638,666	219,497	193,631	388,610	165,157
11 University of California-San Francisco	Public	219,446	159,906	8,770	6,226	24,269	20,275
12 Johns Hopkins University ¹	Private	217,295	168,267	2,087	11,013	17,577	18,351
13 University of California-San Diego	Public	216,991	171,479	3,288	6,824	19,057	16,343
14 University of Illinois-Urbana	Public	210,590	114,398	25,838	15,785	47,336	7,233
15 University of California-Berkeley	Public	209,967	124,371	7,154	8,480	59,984	9,978
16 Harvard University	Private	209,519	143,451	1,135	10,461	16,602	37,870
17 University of Texas-Austin	Public	193,337	94,311	15,724	2,694	64,591	16,017
18 University of California-Davis	Public	180,297	72,718	10,322	8,039	79,601	9,617
19 Georgia Inst. of Technology-all campuses	Public	174,664	98,048	1,093	21,346	54,177	0
20 University of Arizona	Public	174,119	80,533	7,257	9,729	66,070	10,530
Total, 1st 20 institutions		4,611,786	2,866,148	302,165	294,228	837,874	311,371

FIGURE #12

Academic Institutions Fund a Fifth of all Academic R&D

Federal Government 59.9%



**Fiscal 1989 Academic R&D
Expenditures = \$15 Billion**

Source: National Science Foundation

Sources of R&D Funds at Public Institutions by Sector: 1980 vs 1989

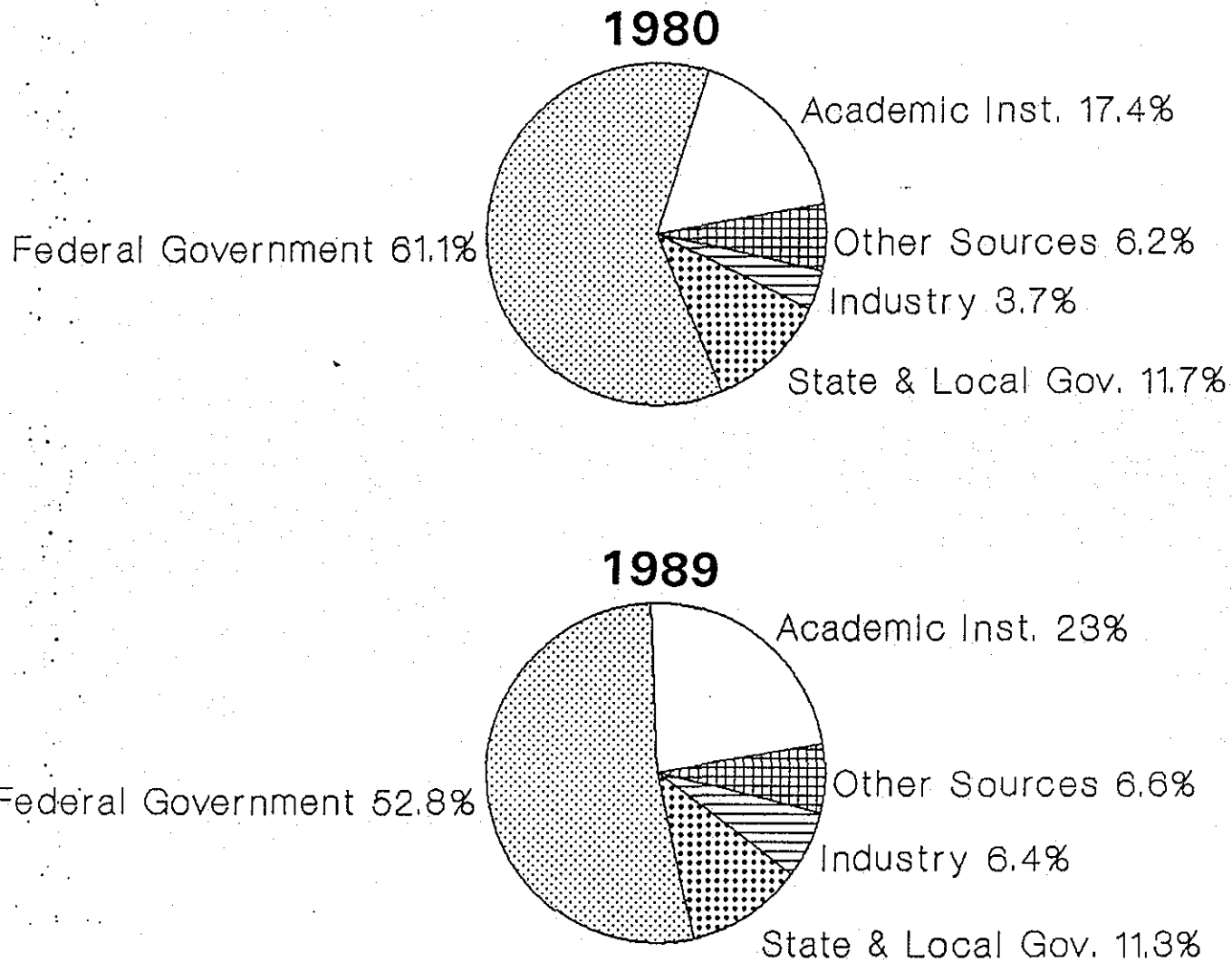


FIGURE #14

Sources of R&D Funds at Private Institutions by Sector: 1980 vs 1989

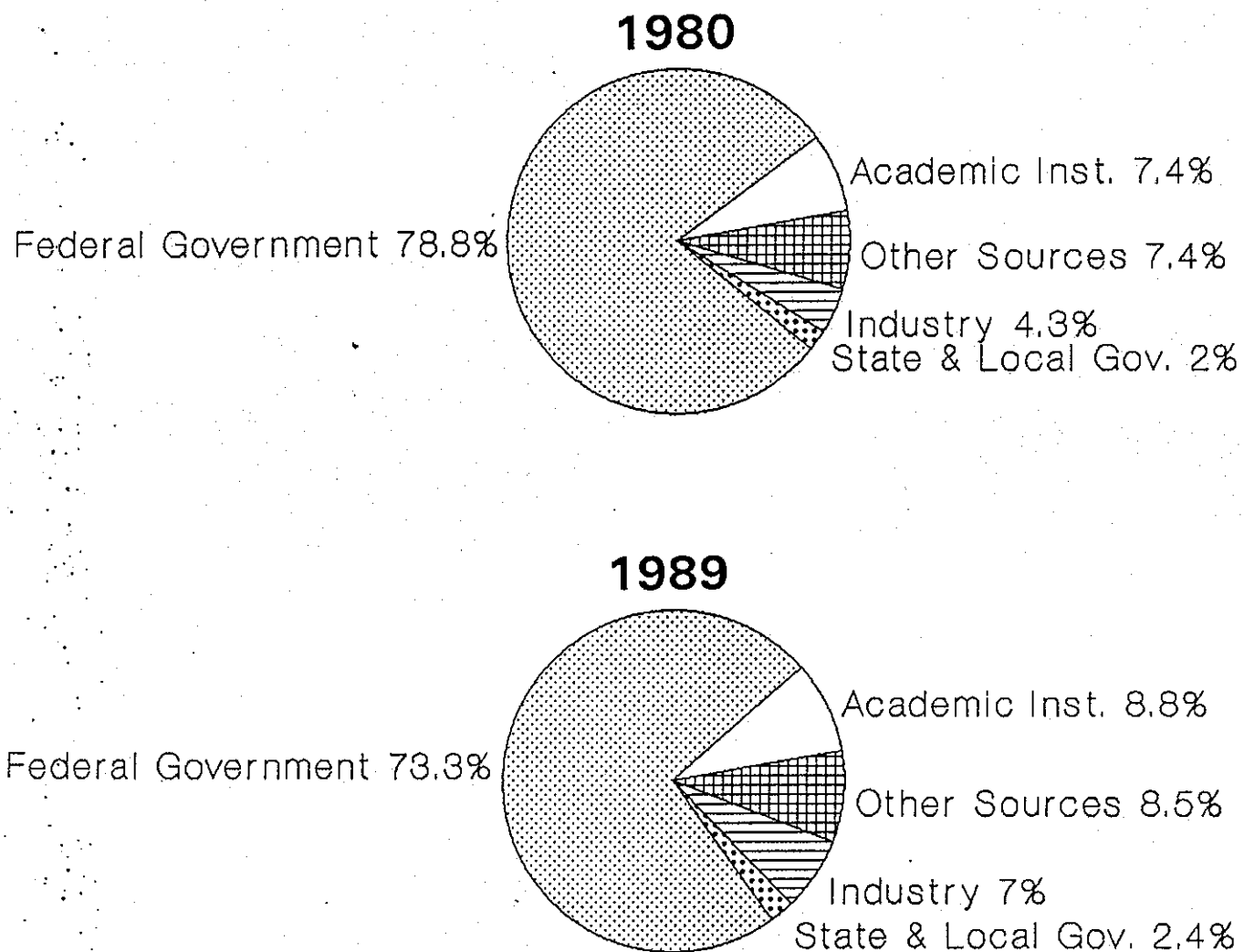


FIGURE #15

Federal Technology Transfer Act of 1986

Principal Points

- Amends the Stevenson-Wydler Act of 1980 (PL 96-480)
- Strengthens Policy Making Technology Transfer Part of Lab Mission
- Lab with More Than 200 S&E Personnel Must Have a Full Time **Orta**
- Each Agency must Report Annually with Budget Submission
- Establishes the Federal Laboratory Consortium
- Provides Authority for Government Labs to Enter into Cooperative R&D Agreements
- Provides 15% of Royalties to Inventors and the Majority of the Balance to Labs

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TECHNOLOGY
APPLICATION

U.S. Patent Granted by Nationality of Inventor and Year of Grant: 1963-1990

	Total	1963-76	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
TOTAL	1,902,916	924,876	65,263	66,098	48,850	61,810	65,766	57,882	56,855	67,186	71,649	70,778	82,860	77,799	95,262	89,982
U.S. origin	1,227,516	674,289	41,480	41,251	30,076	37,351	39,221	33,891	32,867	38,354	39,549	38,078	43,462	40,416	50,036	47,195
U.S. corporations owned	882,489	486,886	29,561	29,418	21,143	25,963	27,621	24,081	24,037	27,997	28,943	27,305	31,267	29,267	35,717	33,283
U.S. Government owned	38,244	23,268	1,484	1,233	961	1,232	1,116	1,003	1,044	1,229	1,125	1,013	973	728	865	970
U.S. individuals owned	300,270	161,580	10,249	10,399	7,803	9,939	10,240	8,538	7,558	8,881	9,245	9,453	10,853	10,066	12,989	12,477
Foreign owned	6,513	2,555	186	201	169	217	244	269	228	247	236	307	369	355	465	465
Foreign origin	675,400	250,587	23,783	24,847	18,774	24,459	26,545	23,991	23,988	28,832	32,100	32,700	39,398	37,383	45,226	42,787
U.S. owned	53,798	25,013	1,968	1,962	1,364	1,694	1,839	1,715	1,658	2,029	2,268	2,166	2,442	2,146	2,848	2,686
Foreign owned	621,602	225,574	21,815	22,885	17,410	22,765	24,706	22,276	22,330	26,803	29,832	30,534	36,956	35,237	42,378	40,101
Foreign corporations	512,515	175,152	17,880	18,873	14,446	18,662	20,546	18,587	19,020	22,988	25,716	26,223	31,977	30,575	36,937	34,933
Foreign governments	7,667	2,553	215	249	186	253	249	369	336	438	482	477	551	453	443	413
Foreign individuals	101,420	47,869	3,720	3,763	2,778	3,850	3,911	3,320	2,974	3,377	3,634	3,834	4,428	4,209	4,998	4,755
Foreign origin	675,400	250,587	23,783	24,847	18,774	24,459	26,545	23,991	23,988	28,832	32,100	32,700	39,398	37,383	45,226	42,787
European Community	337,183	149,763	12,316	12,646	9,538	12,198	12,934	11,346	10,937	12,729	13,826	13,877	16,246	15,080	17,684	16,063
Japan	203,580	43,481	6,217	6,910	5,250	7,124	8,387	8,149	8,792	11,109	12,743	13,198	16,539	16,137	20,100	19,444
West Germany	152,706	63,310	5,537	5,850	4,527	5,745	6,250	5,408	5,423	6,254	6,665	6,795	7,815	7,300	8,286	7,541
United Kingdom	73,534	38,901	2,654	2,722	1,910	2,406	2,475	2,134	1,931	2,271	2,495	2,408	2,777	2,581	3,091	2,778
France	57,500	25,094	2,108	2,119	1,604	2,088	2,181	1,975	1,895	2,162	2,398	2,365	2,868	2,655	3,134	2,854
Switzerland	32,935	14,679	1,219	1,226	862	1,081	1,135	990	1,000	1,206	1,340	1,311	1,593	1,488	1,957	1,848
Canada	32,628	15,388	1,346	1,330	1,025	1,265	1,239	1,147	1,017	1,174	1,233	1,208	1,373	1,244	1,358	1,281
Sweden	20,835	8,179	756	725	596	805	883	752	625	794	919	995	1,183	1,075	1,291	1,257
Italy	20,422	9,500	862	826	573	822	766	685	623	701	857	883	948	776	834	766
The Netherlands	18,283	7,902	708	659	525	654	641	618	626	726	766	721	921	805	1,060	951
Belgium	6,869	3,242	255	264	185	244	263	224	205	240	240	242	294	302	357	312
USSR	6,580	3,128	394	412	354	460	373	209	222	214	147	116	121	96	160	174
Hungary	1,909	505	80	66	63	87	98	112	106	111	108	131	127	94	129	92
East Germany	690	53	26	24	19	35	52	59	54	68	53	53	64	46	50	34
Taiwan	3,072	52	52	29	38	65	80	88	65	98	174	208	343	457	592	731
South Korea	807	51	5	12	4	8	15	14	26	29	38	45	84	95	157	224
Hong Kong	527	139	9	21	13	27	33	18	14	24	25	30	34	41	47	52

SOURCE: Patent and Trademark Office, *Patenting Trends in the United States, 1963-1989* (Washington, DC: August 1990).

Science & Engineering Indicators - 1991

FIGURE #17