

**ANNUAL REPORT**

**EXTERNALLY FUNDED RESEARCH**

**BRIGHAM YOUNG UNIVERSITY**

**1 SEPTEMBER 1985 - 31 AUGUST 1986**

Prepared by the Office of Research Administration  
C-37 Abraham Smoot Building



Brigham Young University

Office of Research Administration

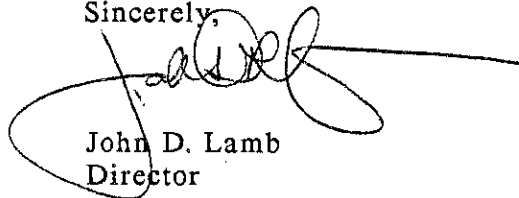
F. LaMond Tullis  
Associate Academic Vice President  
D-367 ASB  
Brigham Young University  
Provo, UT 84602

Dear Dr. Tullis:

The Office of Research Administration's *Annual Report on Externally Funded Research* is herein submitted for the year 1985-86. The report briefly describes the current organization of our office and provides detailed information on externally funded research programs and proposals at BYU. For the first time, we include detailed information in this year's report concerning royalty income from licensed technologies.

We continue our commitment to assist BYU faculty in developing strong research programs in all areas.

Sincerely,



John D. Lamb  
Director

JDL:cld

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## SUMMARY

This report summarizes the activity of faculty members, departments, colleges, research centers, and institutes participating in Sponsored Research at Brigham Young University.

It also reports on services provided by the Office of Research Administration. The mission of this office has traditionally been one of individualized service to relieve researchers at BYU of many administrative details associated with the procurement and maintenance of research funding, including all areas of pre- and post- award functions. It is hoped that the quality of these services has been instrumental in the encouragement of research activity at BYU.

New focus has been added to our office with recent changes in personnel. Programs and policies are being implemented to coordinate the university's patenting and licensing of technologies and software. A major goal of the office is to make these activities self-supporting, and to increase the benefits that can accrue to the university by improvements in policy.

During the 1985-86 academic year, 143 separate research awards were made to faculty members and \$14,912,737 were brought into the University to fund research, including \$8,475,638 as grants and contracts, \$2,080,034 as royalties, and \$4,357,065 as research-related gifts. These figures represent a 3% increase in the number of awards and a 71% increase in the funding level over the previous year. Research funding came as federal contracts (36%), state contracts (6%), private contracts (15%), gifts (29%), and royalties (14%). During the reporting year, 169 proposals were submitted to various agencies, representing a 4% decrease in proposal submission rate over the previous year. Also, during the year, 84 proposals were rejected.

**OFFICE OF RESEARCH ADMINISTRATION**

**ORGANIZATION**

## OFFICE OF RESEARCH ADMINISTRATION

### I. Organization

The Office of Research Administration serves under the direction of the Office of the Provost and Academic Vice President, Jae R. Ballif, and his Associate Academic Vice President, F. LaMond Tullis. The Office consists of a Director, Associate Director/Grants and Contracts, Associate Director/Technology Transfer, and Secretary, with part-time student assistants as needed.

### II. Personnel

Director: Dr. John D. Lamb, Associate Professor of Chemistry

Associate Director: Carol R. Hardman (Grants and Contracts)

Associate Director: Lee R. Phillips (Technology Transfer)

Secretary: Cynthia Daybell

### III. Responsibilities

#### A. Director

1. Represents the University's research programs to research organizations, funding agencies, and other universities.
2. Develops policies and procedures to foster research and to facilitate technology transfer.
3. Administers the university's patents and licensing of technologies and software.
4. Coordinates the preparation of large, inter-collegiate and inter-institutional research proposals.
5. Administers the activities of the Office dealing with the management of grants and contracts.

#### B. Associate Director/Grants and Contracts

1. Assists the Director in determining direction and policy for the Office of Research Administration.
2. Assists the Director in presentation of workshops and seminars.
3. Monitors office budget and expenditures.
4. Coordinates publicity regarding research awards.
5. Administers sponsored research contracts and grants and certifies all related expenditure documents.
6. Monitors government regulations pertaining to federal contracts and grants.
7. Assigns account numbers and records data on funded awards.
8. Monitors research budget accounts in conjunction with Financial

Services, to assure compliance with agency and university regulations and insure that corrective action is taken to avoid budgetary problems.

9. Prepares and submits closeout documentation as grants and contracts terminate.
10. Negotiates contracts and grants with funding agencies.
11. Assists Financial Services with audits of contracts as required.
12. Has responsibility for management of capital equipment on federal accounts and reports on such responsibility to funding agencies.
13. Maintains office awareness concerning BYU compliance with federal regulations pertaining to the use of human subjects in research.
14. Disseminates information relating to funding trends and opportunities of interest including publication of a monthly newsletter.
15. Maintains up-to-date reference files of funding sources, agency telephone numbers and addresses, and interests of BYU researchers.
16. Assists researchers with budget preparation for proposals, preparation of representations and certifications as needed and coordination of authorizing signatures on required documents.

C. Associate Director/Technology Transfer

1. The responsibilities of the Associate Director/Technology Transfer can be summarized under these headings:

a. Scientific:

- (1) Seeks out and identifies research developments which might be marketable.
- (2) Consults with faculty members concerning the market potential, patent potential, and license potential of marketable technologies.
- (3) Participates in the evaluation of proposed patents and makes recommendations for patents to be obtained.

b. Legal:

- (1) Finds and works with appropriate legal counsel to prepare and submit patent applications.
- (2) Maintains an active file of all current and pending patents.
- (3) Maintains a log of royalties and other incomes and their dispersal.
- (4) Assists the Director in the negotiation of license agreements with off-campus companies and identifies appropriate legal counsel to prepare formal agreements for signature.
- (5) Assists the Director in negotiating royalty agreements between BYU and inventors.
- (6) Is responsible to see that all documents contain appropriate language, although he does not prepare documents himself except in unusual circumstances.
- (7) He seeks legal office approval on all documents.
- (8) He relies on the legal office to insure that the University is properly protected in all documents.

c. Entrepreneurial:

- (1) Seeks out appropriate licensees for University technologies.
- (2) Provides counsel to small business spin-offs in establishing their companies.
- (3) Directs new small businesses to the various federal, local, state, and private organizations which can assist them in finding funding and getting established.

D. Secretary

1. Serves as the receptionist for the Office of Research Administration with specific responsibilities in handling the telephone and mail.
2. Serves as personal secretary to the Director of Research Administration.
3. Prepares and processes forms, reports, and correspondence for the Office of Research Administration.
4. Maintains a log and file of pending proposals submitted to various agencies by BYU researchers.
5. Obtains proper signatures on all documents, reproduces, distributes, and mails research proposals for faculty researchers as requested.
6. Prepares and maintains Federal Time & Effort Reports for students involved in federally sponsored research.
7. Maintains files of research salary payments and associated paperwork for researchers paid from research accounts.
8. Prepares a monthly activity report of proposals submitted, funded, and rejected for the Associate Academic Vice President.
9. Supervises the part-time student clerks.



**EXTERNAL FUNDS RECEIVED**

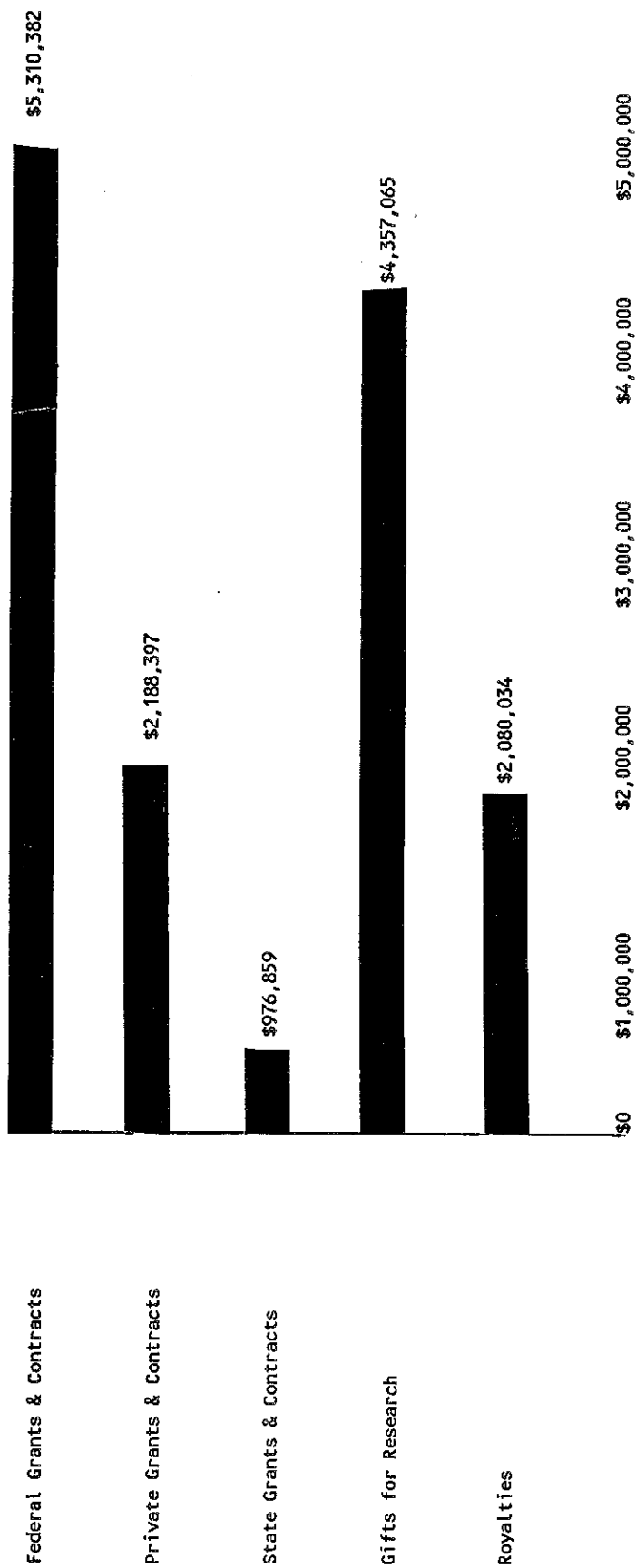
## EXTERNAL FUNDS RECEIVED

During the 1985-86 academic year, 143 separate research awards were made to faculty members, totalling \$14,912,737. There were 4 more awards made this year than the previous year. Sponsored research funding came from federal, state, and private sources.

In the breakdown of external funds received by college, state support received is included in the private sources (non-federal sources). "Gift" monies include only those gifts used to support research.

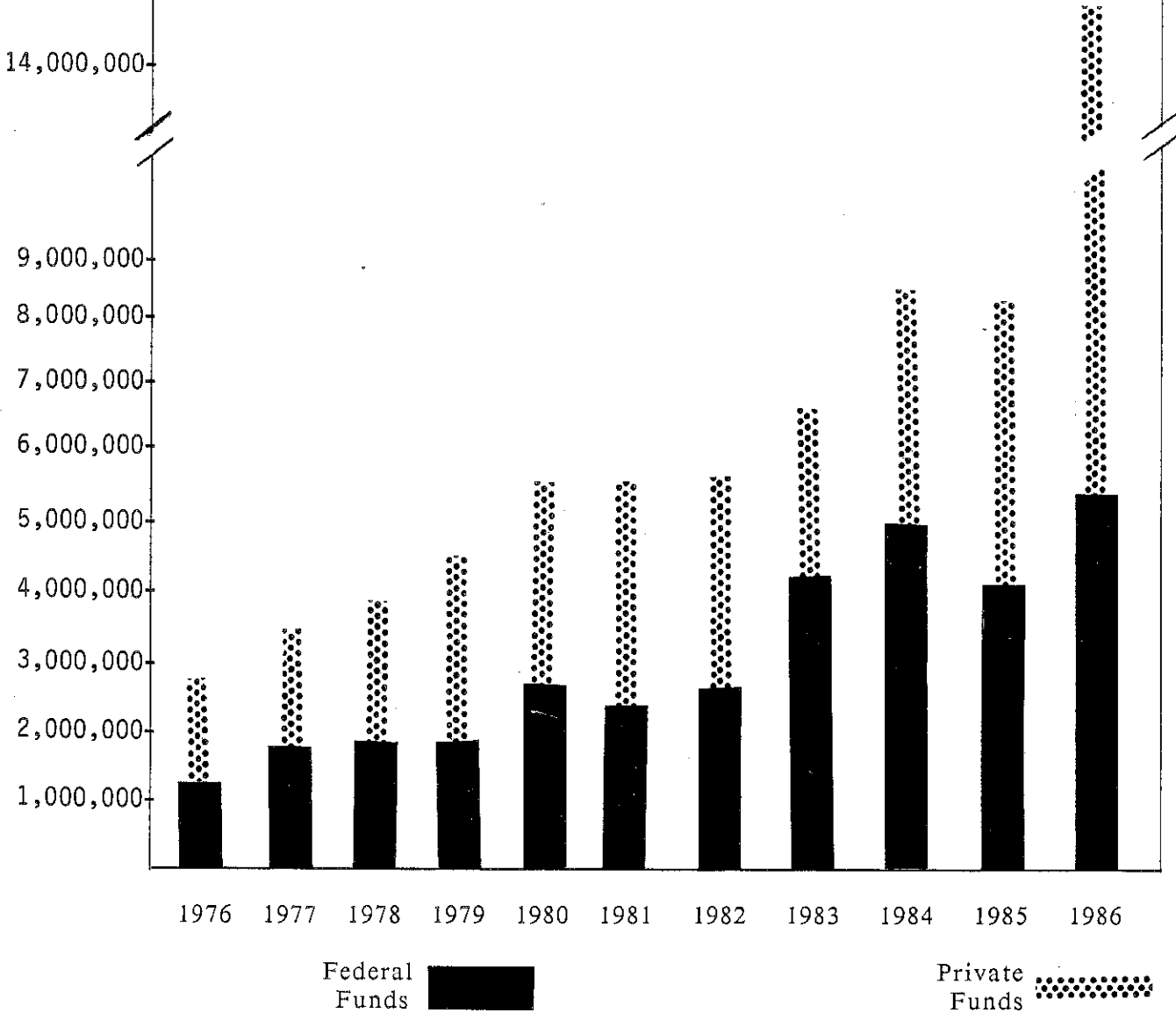
There were 169 proposals submitted during the 1985-86 academic year.

BREAKDOWN OF FUNDING SOURCES 1985 - 1986

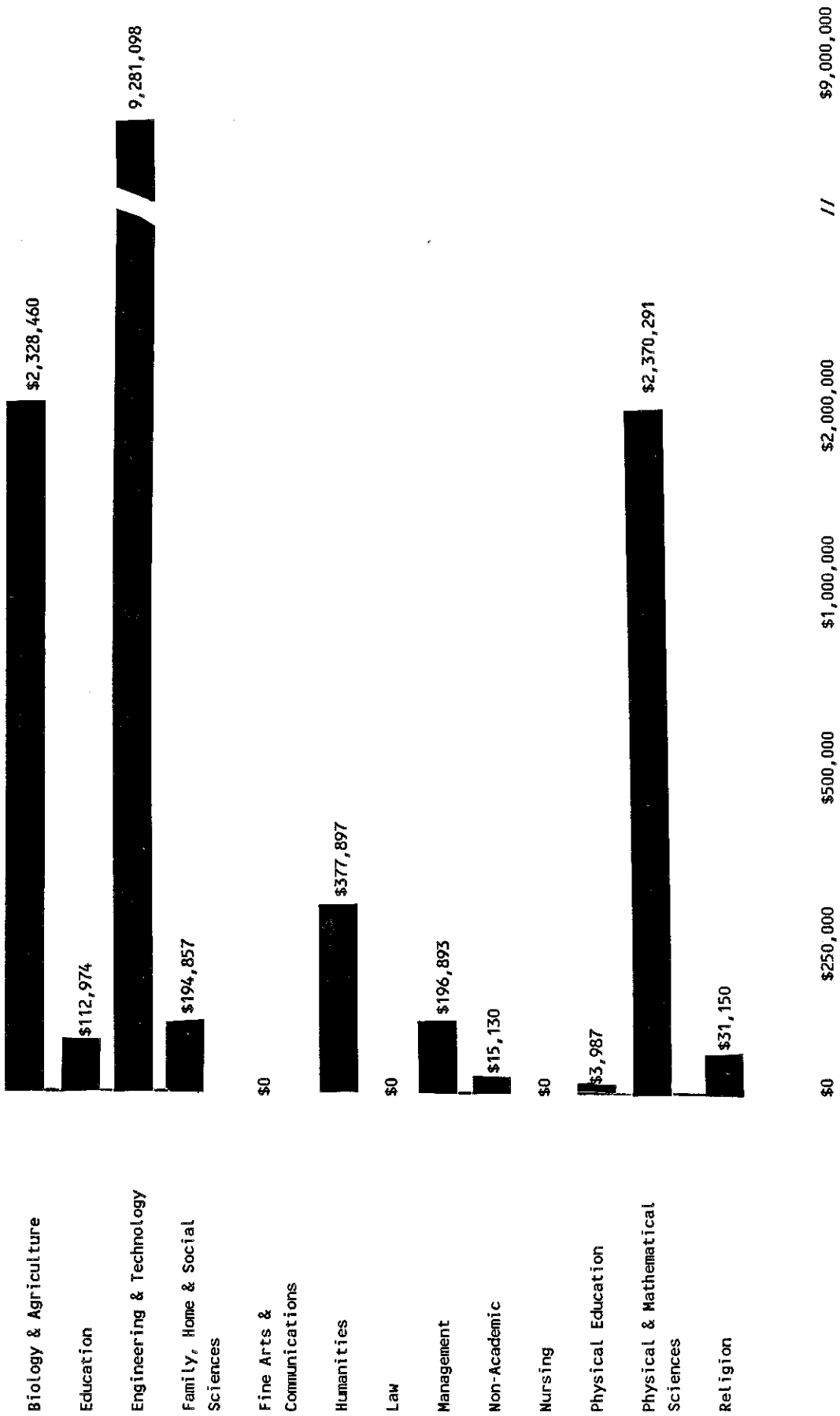


**EXTERNAL FUNDS RECEIVED**  
**(GRANTS, CONTRACTS, GIFTS & ROYALTIES)**  
**1976-1986**  
**(September 1 - August 31)**

Reporting Year	Federal	Private Dollars	Total	%Federal
1976	1,296,203	1,527,854	2,824,057	40%
1977	1,899,289	1,519,451	3,418,740	51%
1978	1,976,674	1,948,964	3,925,638	45%
1979	1,950,540	2,634,123	4,584,663	31%
1980	2,653,270	3,012,729	5,665,999	41%
1981	2,305,400	3,420,275	5,725,675	34%
1982	2,566,921	3,187,099	5,754,020	41%
1983	4,002,827	2,980,571	6,983,398	50%
1984	4,947,469	3,907,353	8,854,822	54%
1985	4,052,336	4,570,892	8,623,228	47%
1986	5,310,382	9,602,355	14,357,065	36%

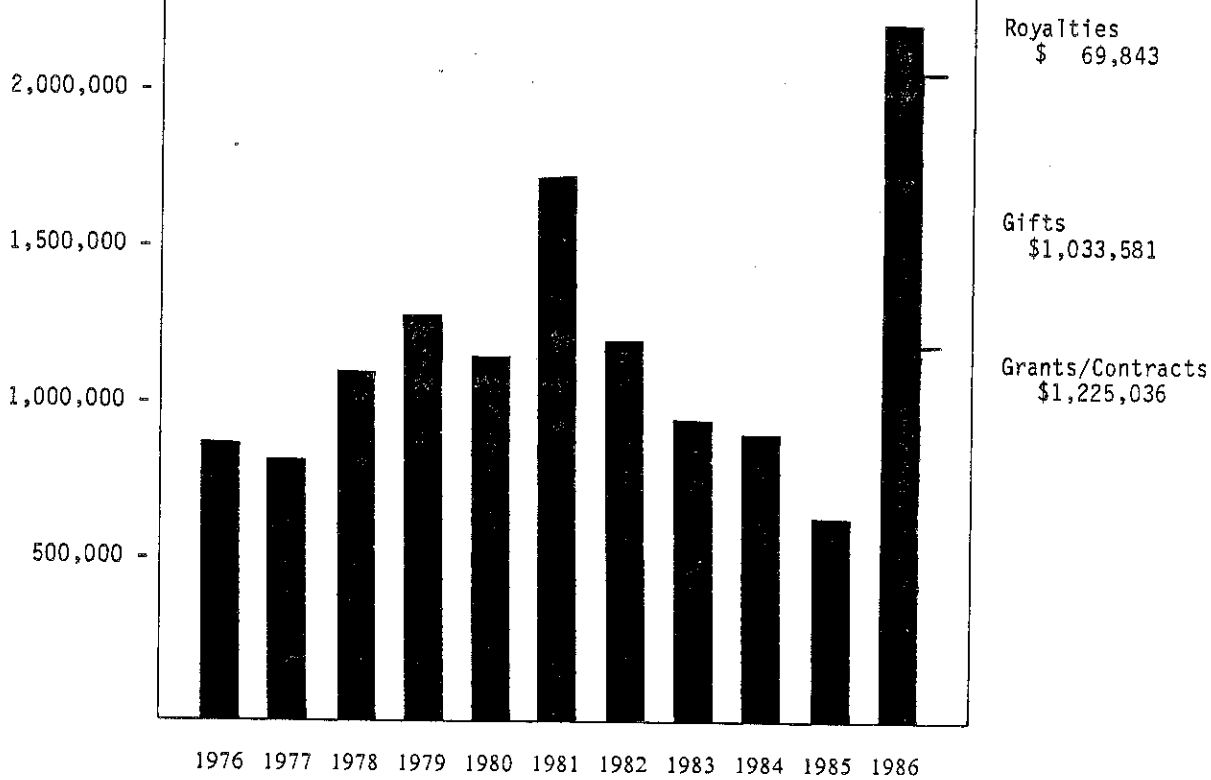


EXTERNAL FUNDS RECEIVED ACCORDING TO COLLEGE  
FOR THE YEAR SEPTEMBER 1, 1985 - AUGUST 31, 1986



**EXTERNAL FUNDS RECEIVED BY  
COLLEGE OF BIOLOGY & AGRICULTURE**

Reporting Year	Federal	Non-Federal	Total
1976	408,343	417,748	826,091
1977	345,393	433,740	779,133
1978	637,768	458,587	1,096,355
1979	786,778	542,525	1,329,303
1980	562,351	550,213	1,112,564
1981	484,985	1,253,576	1,738,561
1982	255,474	899,976	1,155,450
1983	594,845	321,768	916,613
1984	248,075	564,417	812,492
1985	94,197	524,319	618,516
1986	440,379	1,888,081	2,328,460

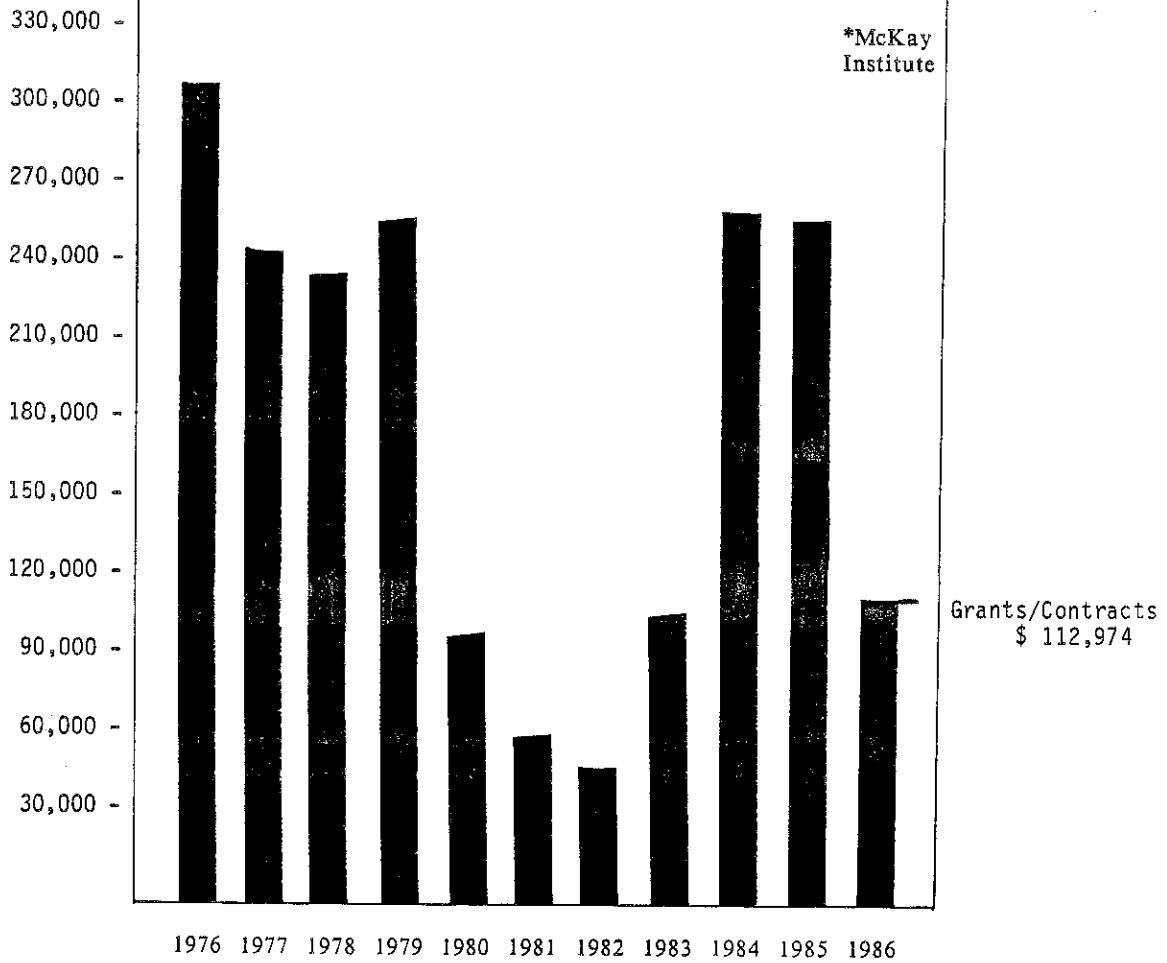


1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986

Year Ending  
August 31, 1986

**EXTERNAL FUNDS RECEIVED BY THE  
COLLEGE OF EDUCATION**

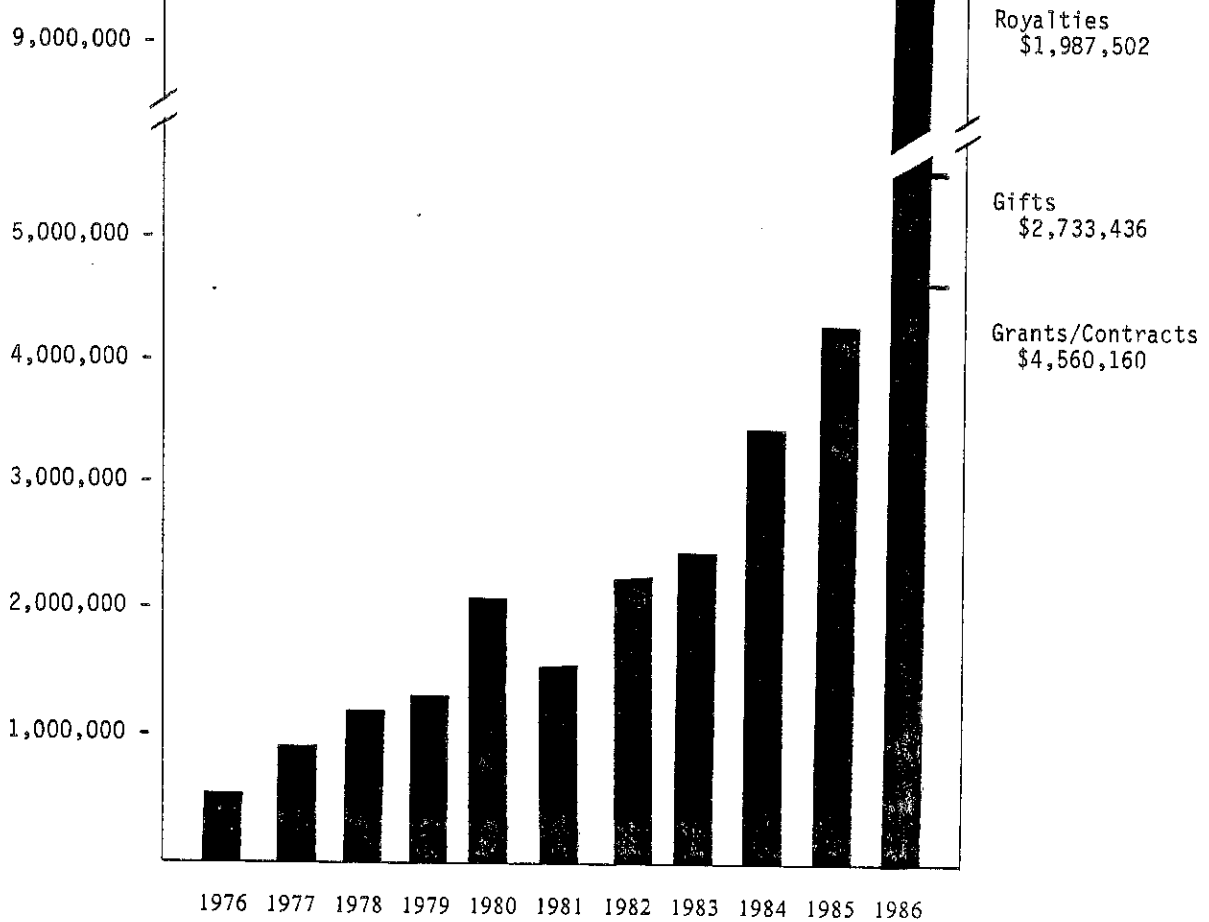
Reporting Year	Federal	Non-Federal	Total
1976	51,100	260,579	311,679
1977	47,000	195,400	242,400
1978	71,000	163,165	234,165
1979	44,118	206,544	250,662
1980	0	90,730	90,730
1981	0	59,000	59,000
1982	0	47,500	47,500
1983	74,678	35,120	109,798
1984	173,521	87,800	261,321*
1985	157,735	98,460	256,195
1986	110,974	2,000	112,974



Year Ending  
August 31, 1986

**EXTERNAL FUNDS RECEIVED BY THE  
COLLEGE OF ENGINEERING & TECHNOLOGY**

Reporting Year	Federal	Non-Federal	Total
1976	136,841	298,251	435,092
1977	561,049	429,871	990,920
1978	668,809	599,850	1,268,659
1979	359,720	1,016,569	1,376,289
1980	934,490	1,162,250	2,096,740
1981	786,432	776,271	1,562,703
1982	1,021,333	1,170,170	2,191,503
1983	717,784	1,510,074	2,227,858
1984	1,345,077	2,305,560	3,650,637
1985	1,622,373	2,577,953	4,200,326
1986	2,935,040	6,346,058	9,281,098



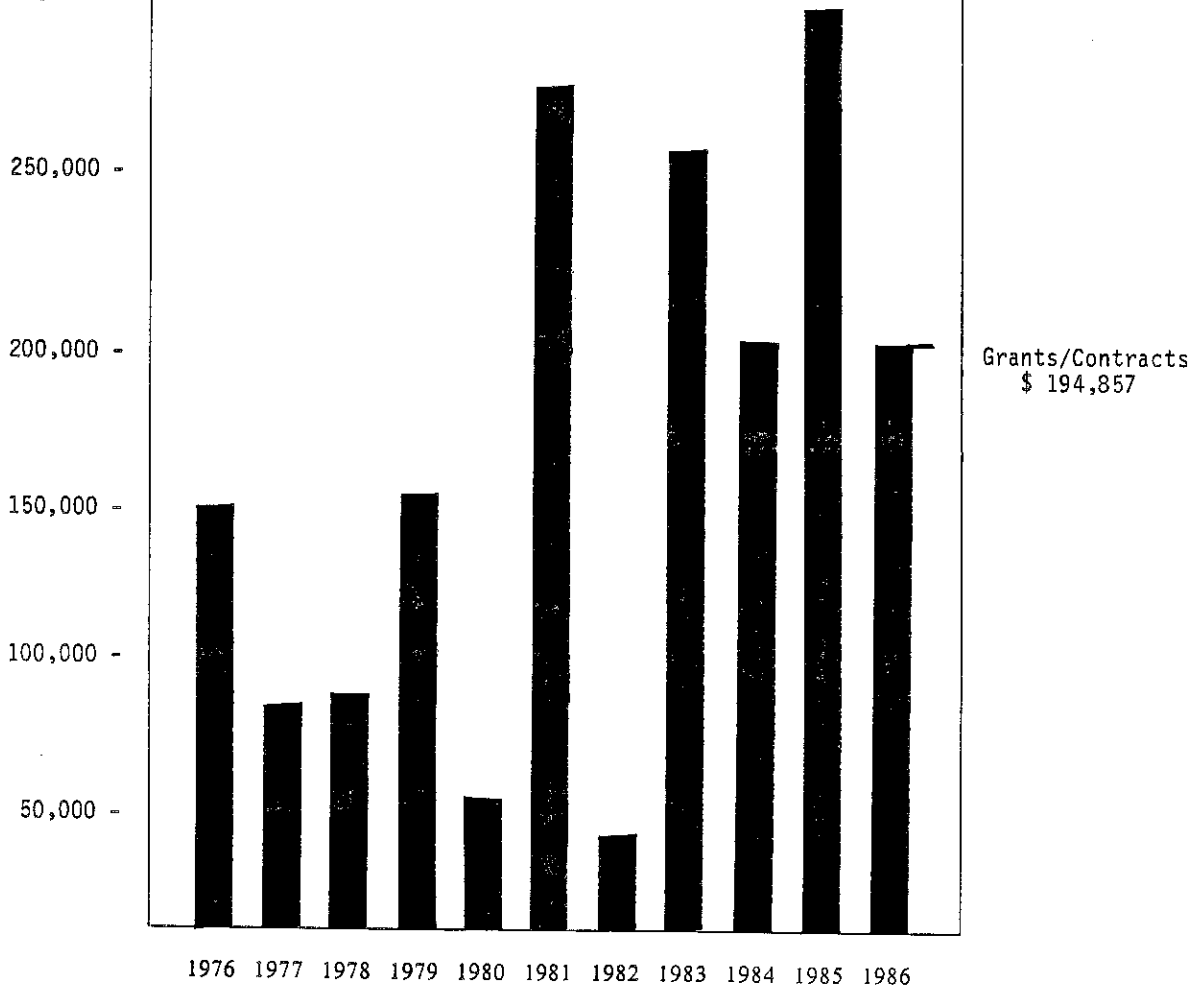
1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986

Year Ending  
August 31, 1986



**EXTERNAL FUNDS RECEIVED BY THE  
COLLEGE OF FAMILY, HOME & SOCIAL SCIENCES**

Reporting Year	Federal	Non-Federal	Total
1976	19,272	115,034	134,306
1977	5,330	64,711	70,041
1978	27,380	48,553	75,933
1979	36,732	99,777	136,509
1980	40,360	941	41,301
1981	58,786	213,741	272,527
1982	17,087	10,545	27,632
1983	179,437	69,129	248,566
1984	185,423	6,697	192,120
1985	226,478	167,701	394,179
1986	159,957	34,900	194,857

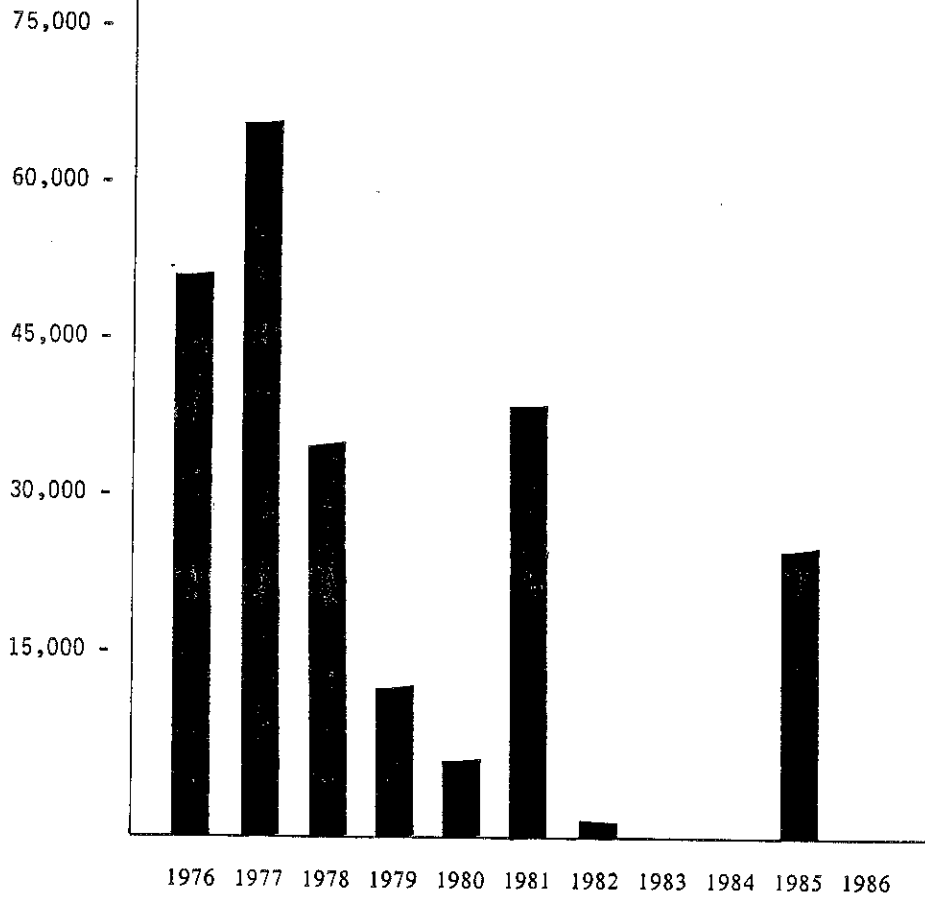


1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986

Year Ending  
August 31, 1986

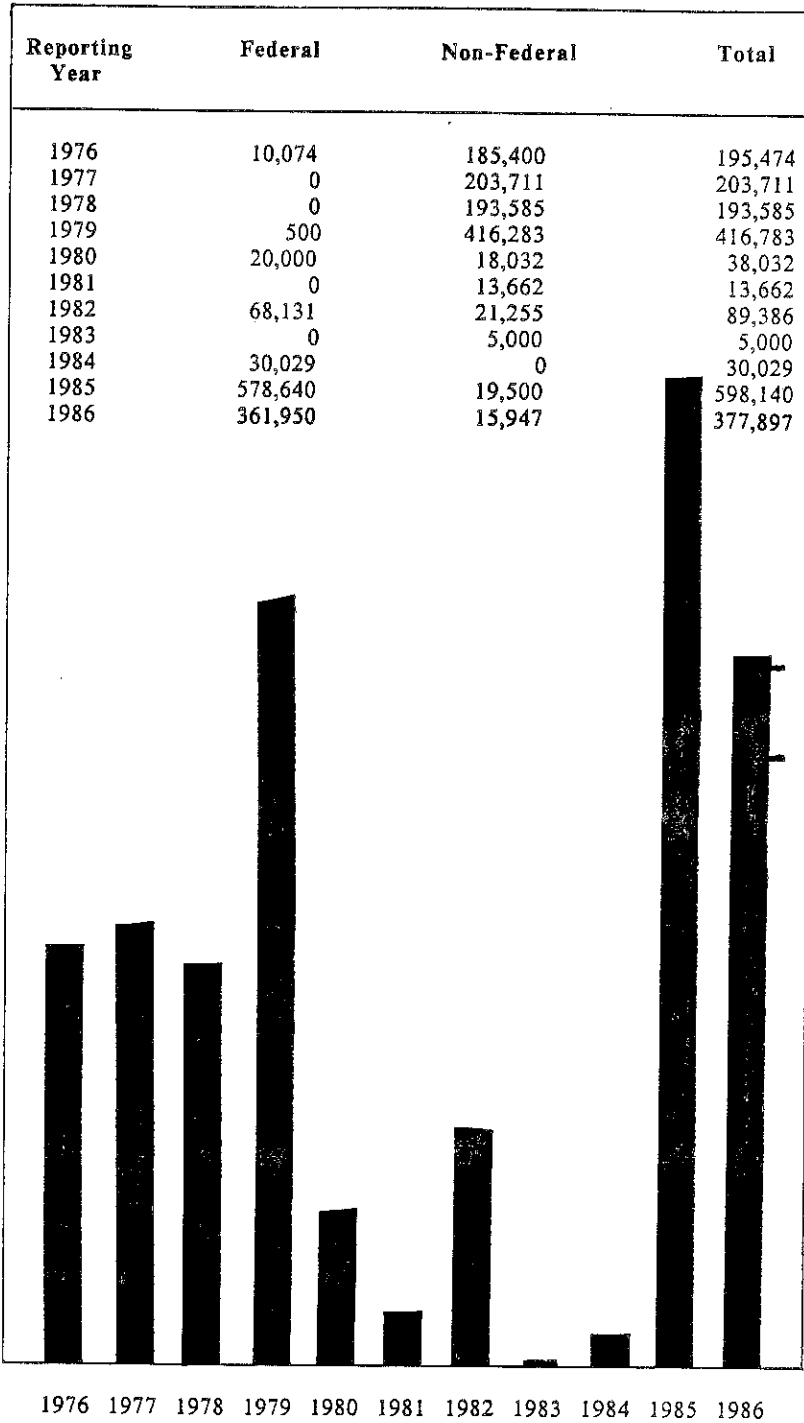
**EXTERNAL FUNDS RECEIVED BY THE  
COLLEGE OF FINE ARTS & COMMUNICATIONS**

Reporting Year	Federal	Non-Federal	Total
1976	35,000	14,340	49,340
1977	22,355	43,850	66,205
1978	7,415	26,500	33,915
1979	4,000	6,500	10,500
1980	0	4,356	4,356
1981	0	35,000	35,000
1982	0	250	250
1983	0	0	0
1984	0	0	0
1985	0	22,500	22,500
1986	0	0	0



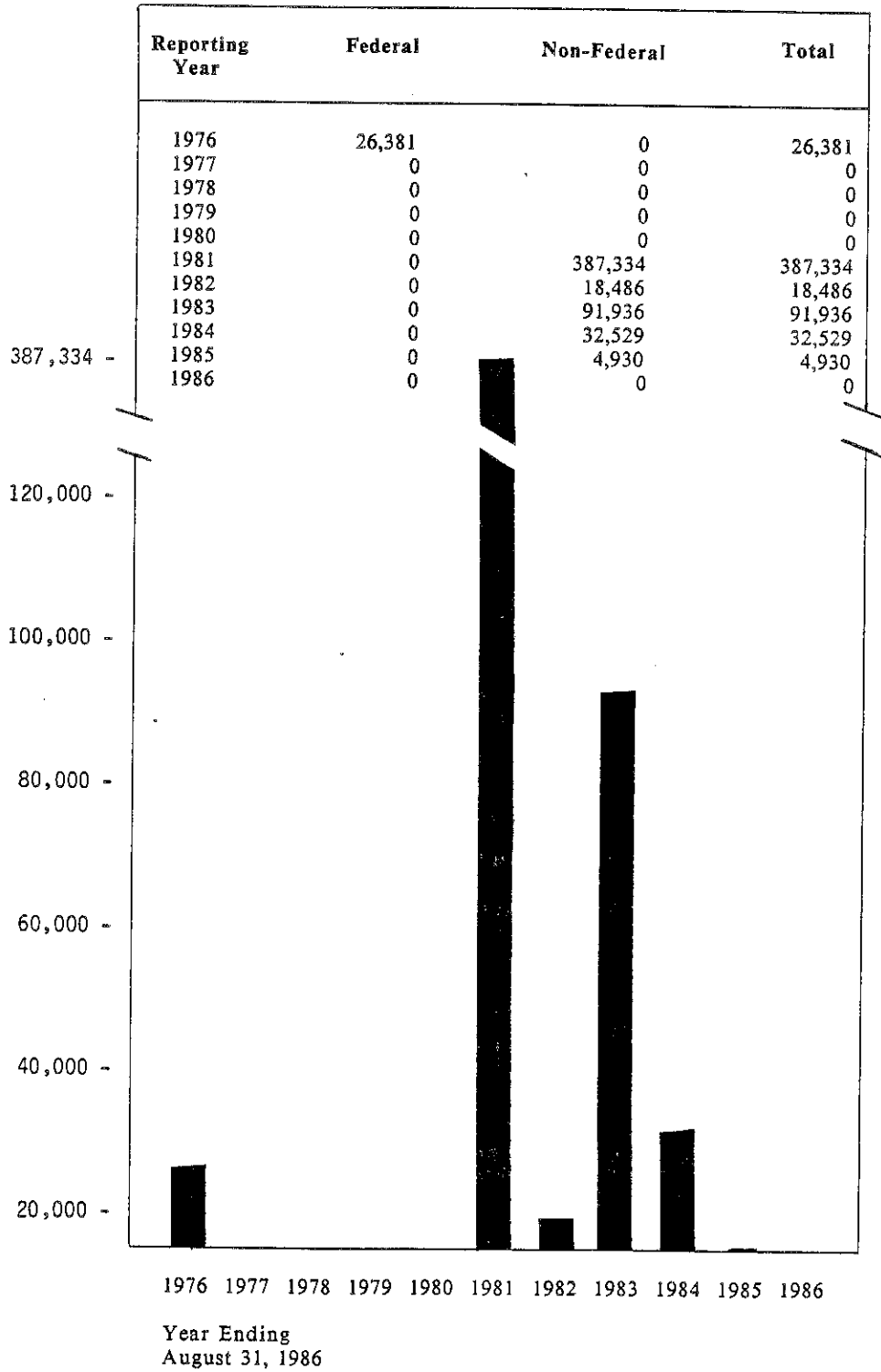
1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986  
Year Ending August 31, 1986

**EXTERNAL FUNDS RECEIVED BY THE  
COLLEGE OF HUMANITIES**



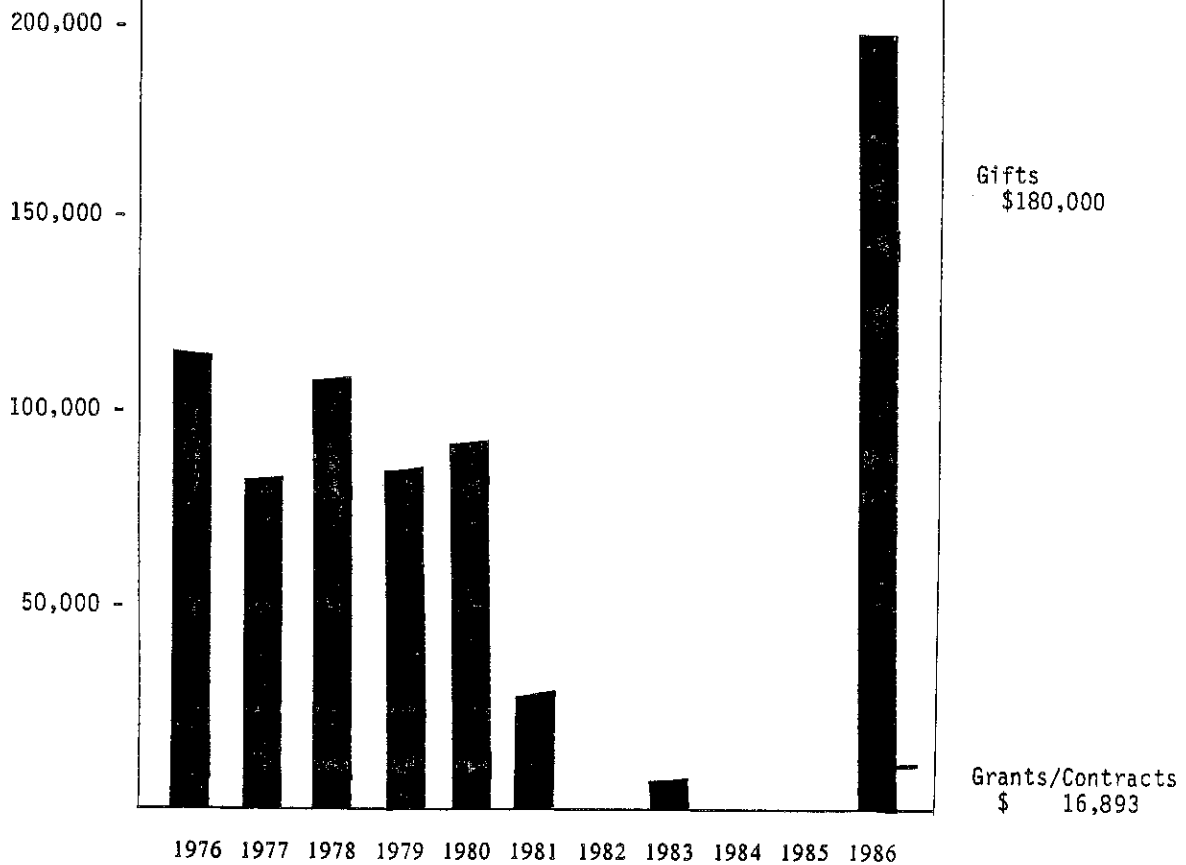
Year Ending  
August 31, 1986

**EXTERNAL FUNDS RECEIVED BY THE  
LAW SCHOOL**



**EXTERNAL FUNDS RECEIVED BY  
SCHOOL OF MANAGEMENT**

Reporting Year	Federal	Non-Federal	Total
1976	4,353	112,748	117,101
1977	27,904	50,000	77,904
1978	52,584	58,000	110,584
1979	78,700	0	78,700
1980	81,541	0	81,541
1981	18,428	6,000	24,428
1982	0	0	0
1983	9,200	250	9,450
1984	0	0	0
1985	0	0	0
1986	16,893	180,000	196,893

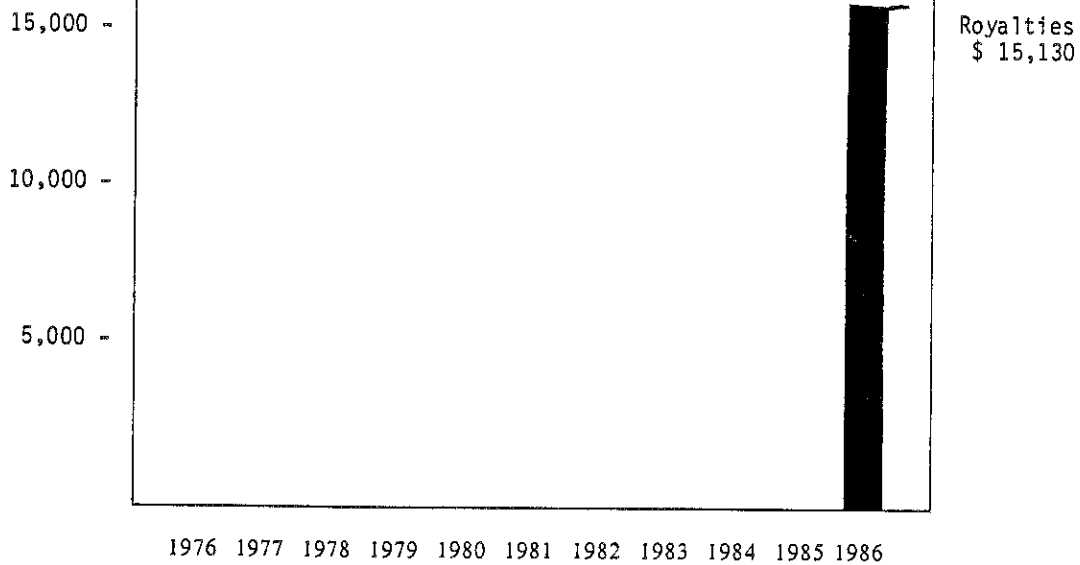


1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986

Year Ending  
August 31, 1986

**EXTERNAL FUNDS RECEIVED BY  
NON-ACADEMIC**

Reporting Year	Federal	Non-Federal	Total
1976	0	0	0
1977	0	0	0
1978	0	0	0
1979	0	0	0
1980	0	0	0
1981	0	0	0
1982	0	0	0
1983	0	0	0
1984	0	0	0
1985	0	0	0
1986	0	15,130	15,130



1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986

Year Ending  
August 31, 1986

EXTERNAL FUNDS RECEIVED BY THE  
COLLEGE OF NURSING

Reporting Year	Federal	Non-Federal	Total
1985	0	300	300
1986	0	0	0

1,000

750

500

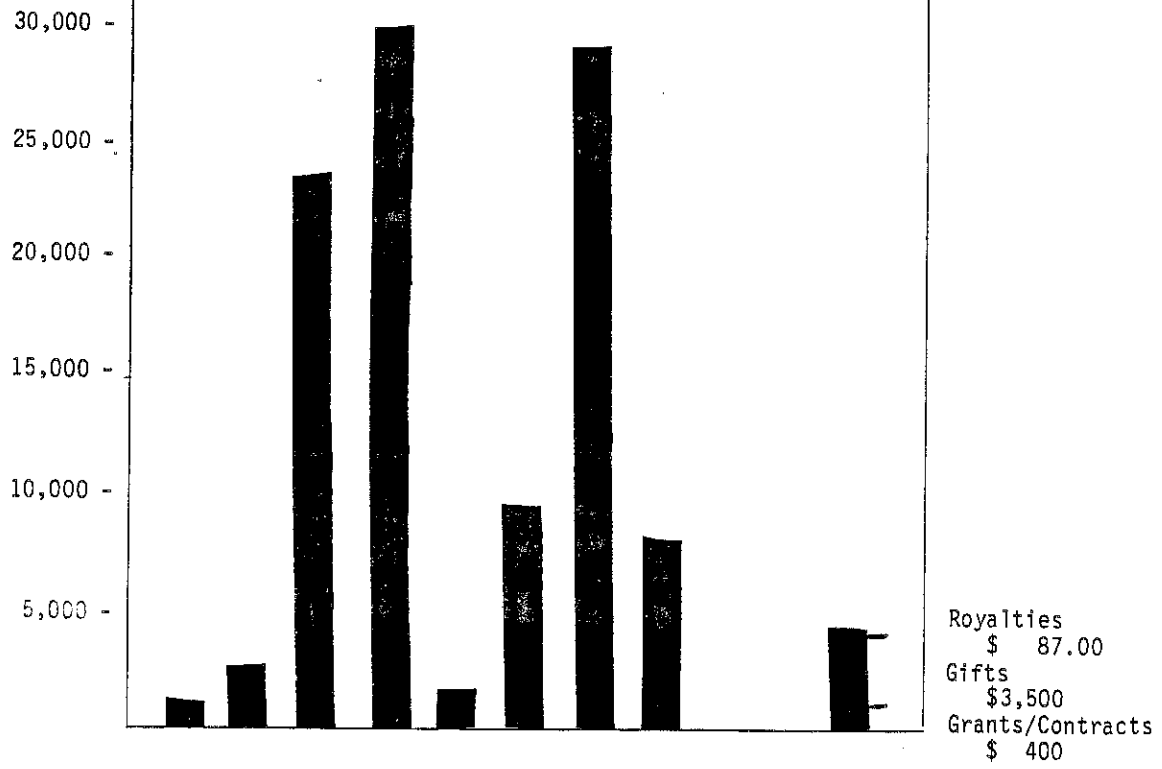
250

1985 1986

Year Ending  
August 31, 1986

**EXTERNAL FUNDS RECEIVED BY THE  
COLLEGE OF PHYSICAL EDUCATION**

Reporting Year	Federal	Non-Federal	Total
1976	0	600	600
1977	2,900	0	2,900
1978	0	24,700	24,700
1979	0	30,000	30,000
1980	0	1,500	1,500
1981	0	9,378	9,378
1982	0	29,800	29,800
1983	0	7,890	7,890
1984	0	0	0
1985	0	0	0
1986	0	3,987	3,987

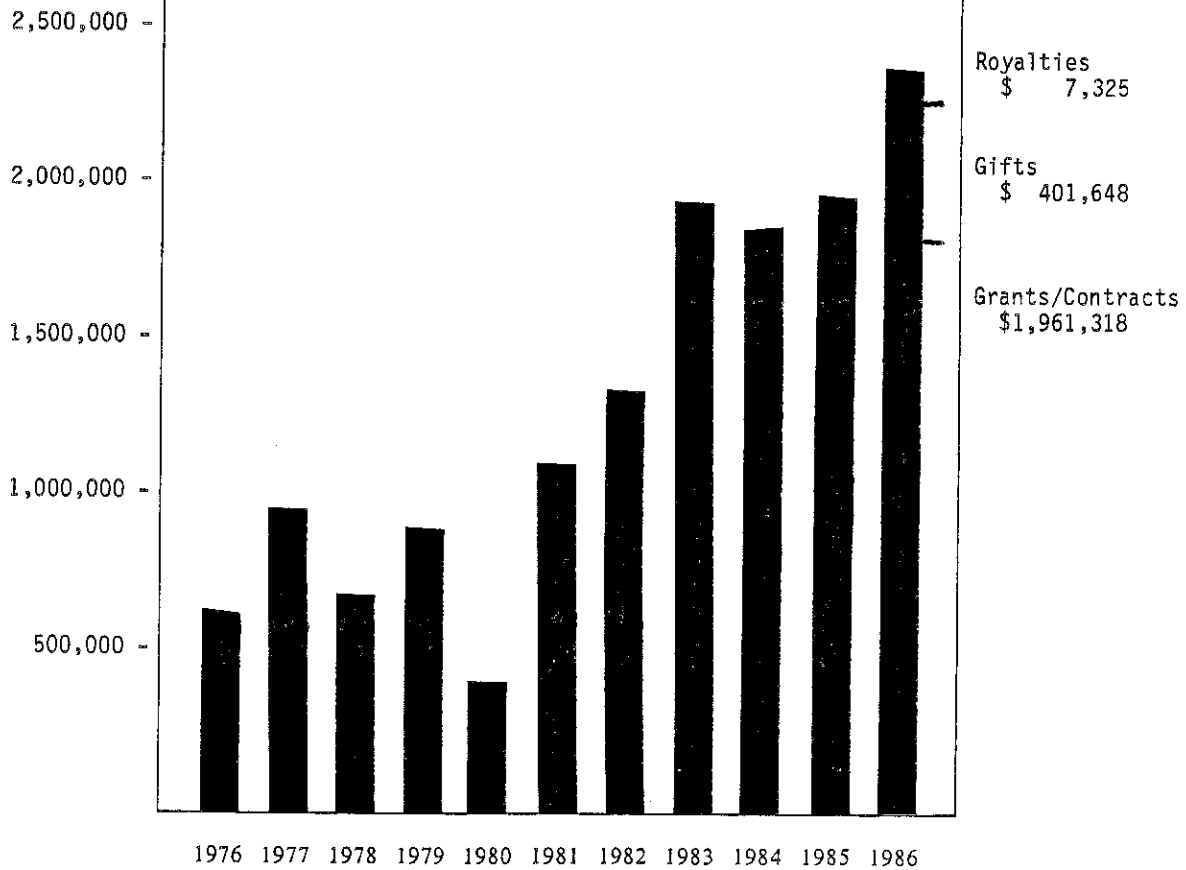


1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986  
Year Ending



**EXTERNAL FUNDS RECEIVED BY THE  
COLLEGE OF PHYSICAL & MATHEMATICAL SCIENCES**

Reporting Year	Federal	Non-Federal	Total
1976	517,506	90,736	608,242
1977	862,743	67,445	930,188
1978	483,508	205,235	688,743
1979	619,180	244,367	863,547
1980	420,196	11,846	432,042
1981	782,781	244,831	1,027,612
1982	890,832	473,678	1,364,510
1983	1,426,542	519,663	1,946,205
1984	1,229,354	655,891	1,885,245
1985	1,147,942	822,939	1,970,881
1986	1,254,039	1,116,252	2,370,291

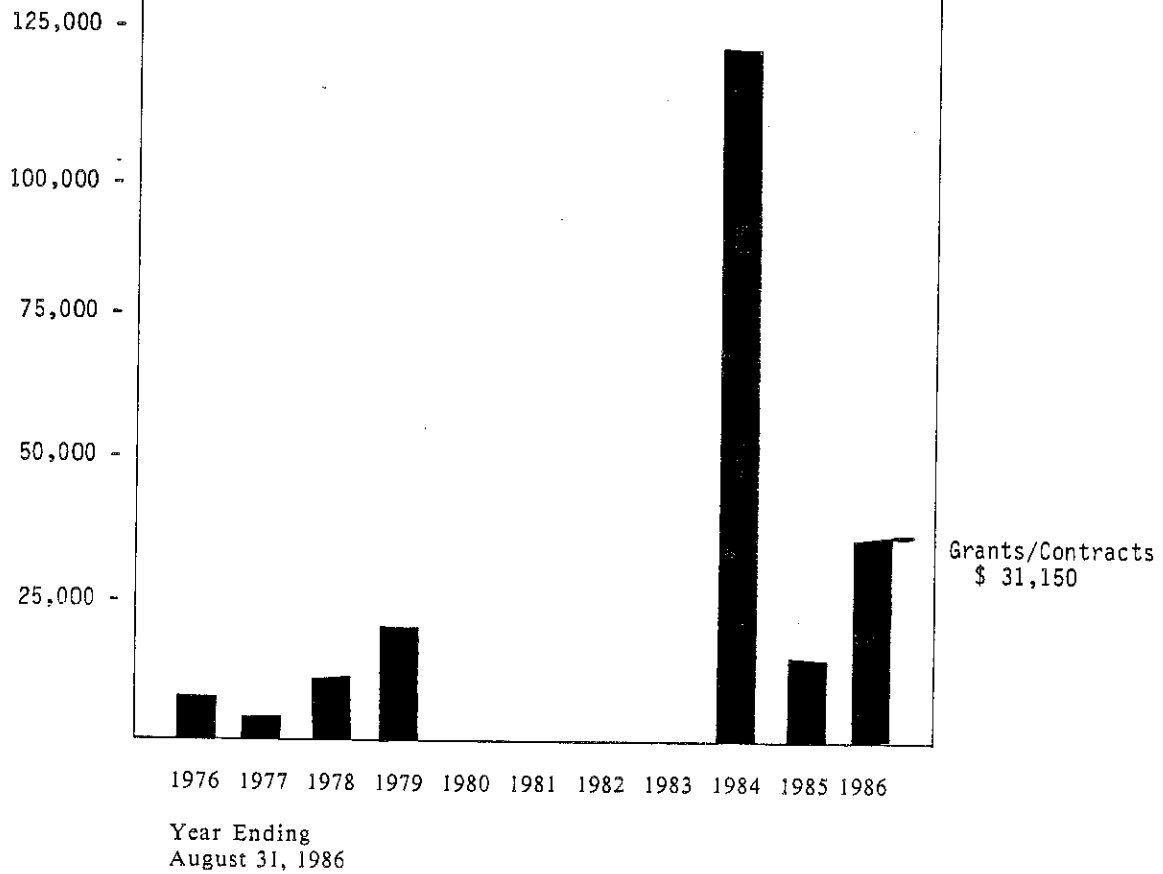


1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986

Year Ending  
August 31, 1986

**EXTERNAL FUNDS RECEIVED BY  
RELIGIOUS INSTRUCTION**

Reporting Year	Federal	Non-Federal	Total
1976	0	5,750	5,750
1977	0	2,000	2,000
1978	0	7,000	7,000
1979	0	18,713	18,713
1980	0	0	0
1981	0	0	0
1982	0	0	0
1983	0	0	0
1984	122,350	0	122,350
1985	0	11,416	11,416
1986	31,150	0	31,150



**RESEARCH GRANT/CONTRACT AWARDS**

**BY COLLEGE AND DEPARTMENT**

RESEARCH GRANT/CONTRACT AWARDS  
1985 - 1986

Investigator	Granting Agency	Title	Period	Type	Amount
<u>BIOLOGY &amp; AGRICULTURE</u>					
<u>Botany &amp; Range Science</u>					
Rex Cates	U.S.D.A.	Bark Beetle/Fungal Dynamics	2 years	F	\$ 100,000
Jack Sites	Nat'l Science Foundation	Population Cytogenetics	2 1/2 years	F	58,807
Howard Stutz	Utah Internat'l.	Revegetation of Mined Soils	20 months	P	137,617
Kimball Harper	Rotary Award	Student Research	Open	P	300
Kimball Harper	Forest Service	Sagebrush as Browse on Winter Range	60 months	F	10,800
Kimball Harper	Forest Service	Shrub Die-off & Plant Succession	3 1/2 years	F	3,500
Steve Whisenant	Forest Service	Triclopyr Residues & Persistence	4 1/2 years	F	16,129
Darrell Weber	Nat'l Science Foundation	Alternate Biological Source of Rubber	2 1/2 years	F	33,000
Darrell Weber	Forest Service	Die-off of Wildland Shrubs	2 years	F	26,000
Paul Cox	Nat'l Science Foundation	Presidential Young Investigator Award	2 1/2 years	F	25,000
Paul Cox	Various Sponsors	Donor & Matching Funds	1 1/2 years	P	55,000
			Department Total		\$ 466,153
<u>Food Science &amp; Nutrition</u>					
Clayton Huber	Basic American Foods	Non-Enzymatic Browning	1 year	P	\$ 5,000
Clayton Huber	Norbest	Shelf-Life Basted & Non-Basted Turkeys	Open	P	5,000
John H. Johnson	Nutra-Products, Inc.	Nutritionally Valuable Commercial Foods	4 months	P	3,200
Lynn Ogden	Norbest	Consumer Acceptability/Treated Turkeys	1 year	P	3,500
			Department Total		\$ 16,700
<u>Microbiology</u>					
Marcus Jensen	Utah Turkey Board	Turkey Studies	1 year	P	\$ 6,000
Marcus Jensen	Utah Dept. Agriculture	Turkey Studies	10 months	P	6,000
			Department Total		\$ 12,000
<u>Zoology</u>					
Richard Tolman	Nat'l Science Foundation	Science Update Course	2 1/2 years	F	\$ 65,693

Investigator	Granting Agency	Title	Period	Type	Amount
Richard Baumann	Calif. Fish & Game	Macroinvertebrate Fauna Studies	4 months	P	9,719
William Winder	Nat'l Institute Health	Liver Metabolism/Exercise	7 months	F	51,392
William Winder	Nat'l Institute Health	Control of Liver Metabolism/Exercise	80 months	F	50,058
Glive Jorgensen/ Gary Booth	Environmental Labs	Effects of Furadan on Birds	11 months	P	244,663
Glive Jorgensen/ Gary Booth	Environmental Labs	Furadan Avian Corn Study	8 months	P	306,579
Richard Heckmann	Nevada Wildlife	Parasites & Disease Pahrump Poolfishes	1 year	P	<u>2,079</u>

Department Total \$ 730,183

COLLEGE TOTALS \$1,225,036

EDUCATION

Educational Administration

Larrie Gale	Department of Education	New Approach to Effective Teaching	2 years	F	\$ 110,974
Larrie Gale	BBC	ESL Courseware	Open	P	<u>2,000</u>

Department Total \$ 112,974

COLLEGE TOTAL \$ 112,974

ENGINEERING & TECHNOLOGY

Chemical Engineering

Merrill Beckstead	Naval Weapons Center	Mathematical Modeling of DDT	Open	F	\$ 24,985
Merrill Beckstead	A.F.O.S.R.	Particle Combustion Solid Propellants	57 months	F	49,980
Merrill Beckstead	Hercules	Combustion Ammonium Nitrate Propellants	2 1/2 years	F	40,000
Merrill Beckstead	Hercules	Temp. Sensitivity Solid Propellants	2 1/2 years	F	40,000
Merrill Beckstead	Naval Weapons Center	DDT Computer Model	46 months	F	24,990
Douglas Bennion	Office of Naval Research	High Power Short Pulse Battery Fund.	1 year	F	499,620
Douglas Bennion	Rotary Award	Student Research	Open	P	400
Calvin Bartholomew	Inst. of Gas Tech.	Steam Reform of Light Hydrocarbons	9 months	P	29,367
Calvin Bartholomew	Department of Energy	Metal Support Interactions	3 years	F	83,788
Calvin Bartholomew	Sandia	Surface Catalytic Studies of Cobalt	3 months	P	15,000

Investigator	Granting Agency	Title	Period	Type	Amount
Calvin Bartholomew	DOE/PETC	Deactivation of Iron Catalysts	3 years	F	175,000
William Hecker	Corning	Monolithic-Supported Catalysts	1 year	P	28,384
Richard Rowley	Nat'l Science Found.	Liquid Mixture Transport Properties	1 1/2 years	F	61,018
Douglas Smoot	Department of Energy	Coal Structure/Coal Conversion Process	2 years	F	94,841
Douglas Smoot	Department of Energy	Energy Consortium	4 years	P	46,500
Douglas Smoot	Department of Energy	Oxidation Rates/Explosive Limits	28 months	F	59,105
Douglas Smoot	EPRI	Energy Consortium	open	P	55,838
Douglas Smoot	Utah Power & Light	Energy Consortium	open	P	25,000
Douglas Smoot	Nat'l Science Found.	Advanced Combustion Engineering Ctr.	5 years	F	1,250,000
Douglas Smoot	State of Utah	Center of Excellence	5 1/2 years	P	500,000
Douglas Smoot	DOE, Grand Forks	Oxidation Rates & Explosive Limits	28 months	F	71,428
James Christensen	GPA	Enthalpies of Absorption	39 months	P	50,000
James Christensen	American Chem. Soc.	Ternary Heat of Mixing	2 years	P	35,000
Department Total					\$3,260,244
<u>Civil Engineering</u>					
Steven Benzley	Naval Weapons Ctr.	Cosmic Mastran Target Code	1 year	F	4,255
Steven Benzley	Morton Thiokol	Enhancements to Finite Element Reformat	3 months	F	12,100
Steven Benzley	Naval Weapons Ctr.	CV-Prime for CAEDM	9 months	F	20,220
Steven Benzley	Naval Weapons Ctr.	Enhancements to Finite Reformattng	Open	P	10,000
Leslie Youd	USGS	Nat'l map of Liquefaction Hazard	1 year	F	6,539
Leslie Youd	USGS	Map of Liquefaction Hazard	1 year	F	46,623
Leslie Youd	EPRI	Saturated Cohesionless Soils	2 years	P	89,846
Leslie Youd	USGS	Analyses of Soil Samples	7 months	F	2,360
Richard Balling	Nat'l Science Found.	Related Discrete Variables	1 1/2 years	F	56,949
Arnold Wilson	Utelite	IMSI Insulated Block Wall System	4 months	P	4,127
Woodruff Miller	Ut. Div. Water Resources	Landsat Evaluation	4 months	P	6,000
Woodruff Miller	Bureau of Reclamation	Snowmelt-Run-off Model	6 months	F	7,788
Woodruff Miller	Ut. Dept. of Agriculture	Evaluation of Cover Types	9 months	P	10,000
Woodruff Miller	Ut. Div. Water Resources	Evaluation of Bear River Wet Lands	4 months	P	5,288
Bruce Nay	Hughes Aircraft	Movie/BYU Enhancements	5 months	F	39,334
Bruce Nay	Daikin Industries	DYNA - Movie BYU	1 month	P	596
Michael Stephenson	NAVY	NAVGRAPH	27 months	F	36,770
Michael Stephenson	Sandia	Enhancements to Movie - BYU	1 year	P	5,047

Investigator	Granting Agency	Title	Period	Type	Amount
Michael Stephenson	Ford Design Center	Computer Conceptualizations	3 months	P	18,800
Stanley Klemetson	USDA/BARD	Heat Transfer/Aquaculture	40 months	F	<u>28,500</u>
		Department Total			\$ 411,242
<u>Electrical Engineering</u>					
Douglas Chabries	FBI	Adaptive Lattice Filter Convergence	2 months	F	\$ 9,950
Douglas Chabries	FBI	Adaptive Sensor Processing	6 1/2 months	F	8,000
Douglas Chabries	Hughes Aircraft	Sonar Signal Processing	3 1/2 years	P	60,000
Douglas Chabries	Adaptive Digital Systems	Adaptive Sensor Processing for Localization	3 months	P	8,000
Douglas Chabries	Sperry	Data Compression Algorithms	8 months	P	7,500
Douglas Chabries	Sperry	Vision & Image Processing	10 months	P	40,000
Douglas Chabries	State of Utah	Center of Excellence	34 months	P	250,000
Wynn Stirling	Navy	Underwater Acoustic Surveillance	1 year	F	<u>39,942</u>
		Department Total			\$ 423,392
<u>Mechanical Engineering</u>					
Brent Adams	NSF	Biaxial Materials Testing System	29 months	F	\$ 64,876
Brent Adams	Department of Energy	Grain Boundary Structure Creep Cavitation	13 months	F	50,979
Brent Adams	Nat'l Science Foundation	Presidential Young Investigators Award	30 months	F	25,000
Brent Adams	Various Sponsors	Donor & Matching Funds	30 months	P	75,000
Paul Eastman	General Motors	Engineering Materials Course	10 months	P	82,400
Kenneth Chase	Vitro Tec.	Advanced Technology Review	1 month	P	4,575
Alan Parkinson	Garrett Turbine	Development of Mesh Generator	1 1/2 years	P	<u>15,000</u>
		Department Total			\$ 317,830
<u>Technology</u>					
Kay Mortensen	CRTC	MAXICAD	Open	P	\$ 123,880
Greg Jensen	Harward Irrigation Inc.	CAD Residential Sprinkler Design	1 year	P	1,551

Investigator	Granting Agency	Title	Period	Type	Amount
Max Raisor	CALMA Corp.	CALMA Training Package	9 months	P	<u>22,021</u>
		Department Total			\$ 147,452
		COLLEGE TOTAL			\$4,560,160
<u>FAMILY, HOME &amp; SOCIAL SCIENCES</u>					
<u>Economics</u>					
James McDonald	Nat'l Science Foundation	Statistical Distributions in Economic Models	3 years (50%)	F	\$ 16,893
		Department Total			\$ 16,893
<u>Family Sciences</u>					
Terrance Olson	OAPP	Family Centered Prevention	1 year	F	\$ 133,123
		Department Total			\$ 133,123
<u>Political Science</u>					
Donna Lee Bowen	NEH	A Middle East Reader	1 year	F	\$ 9,941
		Department Total			\$ 9,941
<u>Psychology</u>					
Allen Bergin	Alumni Association	Maeser Award	Open	P	\$ 5,000
		Department Total			\$ 5,000
<u>School of Social Work</u>					
Reed Blake/ John Christiansen	Utah Division of Mental Health	Data Collection	1 month	P	\$ 4,900
		Department Total			\$ 4,900



Investigator	Granting Agency	Title	Period	Type	Amount
<u>Comprehensive Clinic</u>					
Richard Bednar	USU	Parents as Facilitators in Language Development	1 year	P	\$ 25,000
		Department Total			\$ 25,000
		COLLEGE TOTAL			\$ 194,857
<u>HUMANITIES</u>					
<u>Humanities, Classics &amp; Comparative Literature</u>					
Randall Jones	University of Iowa	Development of Video Materials	1 year	P	\$ 10,900
Frank Otto	Department of Defense	CALICO	2 1/2 years	F	165,707
		Department Total			\$ 176,607
<u>Linguistics &amp; Special Languages</u>					
Frank Otto	Department of Defense	Interactive Language Simulation Systems	13 months	F	\$ 196,243
		Department Total			\$ 196,243
		COLLEGE TOTAL			\$ 372,850
<u>MANAGEMENT</u>					
James McDonald	Nat'l Science Foundation	Statistical Distributions in Economic Models	3 years (50%)	F	\$ 16,893
		Department Total			\$ 16,893
		COLLEGE TOTAL			\$ 16,893



Investigator	Granting Agency	Title	Period	Type	Amount
John Lamb	EG&G	Strontium Analysis	9 months	P	25,603
John Lamb	American Potato	Analytical Methodologies	1 year	P	28,559
Byron Hunter	Uniroyal Inc.	Blowing Agents	1 year	P	32,037
Paul Farnsworth	Nat'l Science Foundation	Inductively Coupled Plasma	40 months	F	50,000
Steven Goates	DOE/PETC	Chromatography/Spectroscopy	4 years	F	<u>174,986</u>
		Department Total			\$1,595,684
<u>Computer Sciences</u>					
Duane Call	Computer Systems Arch.	High-Speed Numerical Processor	7 months	P	\$ 47,700
		Department Total			\$ 47,700
<u>Geology</u>					
Wade Miller	National Geographic Soc.	Dry Mesa Paleontology	1 year	P	\$ 13,555
Myron Best	Nat'l Science Foundation	Anatomy of Intracontinental Magmatic Zone	41 months	F	65,200
Keith Rigby	Alumni Association	Maeser Award	Open	P	<u>5,000</u>
		Department Total			\$ 83,755
<u>Mathematics</u>					
Robert Speiser	Nat'l Science Foundation	Research Conference	1 year	F	\$ 5,000
James Cannon	Nat'l Science Foundation	Geometric Topology/Fundamental Group	17 months	F	<u>29,800</u>
		Department Total			\$ 34,800
<u>Physics &amp; Astronomy</u>					
Neil Rasbaud	Nat'l Science Foundation	Travel Grant	1 1/2 years	F	\$ 10,807
Doug Jones	JPL	Magnetic Field Data	87 months	P	10,000
Larry Knight	Department of Energy	Diffraction of Soft X-Rays	1 year	F	140,000
Larry Knight & James Thorne	Lawrence Livermore Lab	Analysis of Multilayer Performance	4 months	F	14,928
Steven Jones	Los Alamos	Muon Catalysis/Fusion Reaction	4 months	F	<u>23,644</u>
		Department Total			\$ 199,379
		COLLEGE TOTAL			\$1,961,318

Investigator	Granting Agency	Title	Period	Type	Amount
<u>RELIGIOUS EDUCATION</u>					
<u>Ancient Scripture</u> Kent Brown	NEH	Microfilming Coptic & Arabic Manuscripts	3 years	F	\$ 31,150
			Department Total		\$ 31,150
			COLLEGE TOTAL		\$ 31,150
			GRAND TOTAL		\$8,475,638

**SOURCE BREAKDOWN**

**GRANTS & CONTRACTS**

SOURCE BREAKDOWN FOR RESEARCH  
GRANTS & CONTRACTS  
1985 - 1986

Type of Organization	Dollars Awarded	# of Awards	Type of Organization	Dollars Awarded	# of Awards
<u>PRIVATE</u>			<u>PRIVATE (Continued)</u>		
Adaptive Digital Systems	\$ 8,000	1	Jet Propulsion Lab.	\$ 10,000	1
Aerovironment	\$ 41,460	2	National Geographic Soc.	\$ 13,555	1
Alumni Association	\$ 15,000	3	Naval Weapons Center	\$ 10,000	1
American Chemical Society	\$ 35,000	1	Nevada Wildlife	\$ 2,079	1
American Potato	\$ 28,559	1	Norbest	\$ 8,500	2
Basic American Foods	\$ 5,000	1	Nutra-Products Inc.	\$ 3,200	1
Bireley Foundation	\$ 28,476	1	Provo Rotary	\$ 1,500	4
British Broadcasting	\$ 2,000	1	SCE	\$ 95,190	3
CALMA Corporation	\$ 22,021	1	Salt River Project	\$ 31,470	1
CRTC	\$ 123,880	1	Sandia	\$ 20,047	2
California Fish & Game	\$ 9,719	1	Sonoma Tech.	\$ 19,770	1
Computer Systems Arch.	\$ 47,700	1	Sperry	\$ 47,500	3
Corning	\$ 28,384	1	State of Utah	\$ 750,000	2
Coordinating Research	\$ 39,902	1	Uniroyal Inc.	\$ 32,037	1
Daikin Industries	\$ 596	1	Univ. of Iowa	\$ 10,900	1
Department of Energy	\$ 46,500	1	Univ. of Minnesota	\$ 1,500	1
Deseret Research Institute	\$ 32,856	1	Utah Dept. of Agriculture	\$ 16,000	2
EG&G	\$ 25,603	1	Utah Div. of Mental Health	\$ 4,900	1
EPRI	\$ 231,652	4	Utah Div. of Water Resources	\$ 11,288	2
Environmental Labs.	\$ 551,242	2	Utah International	\$ 137,617	1
Finnigan	\$ 14,200	1	Utah Power & Light	\$ 25,000	1
Ford Design Center	\$ 18,800	1	Utah State University	\$ 25,000	1
GPA	\$ 50,000	1	Utah Turkey Board	\$ 6,000	1
Garrett Turbine	\$ 15,000	1	Utelite	\$ 4,127	1
Gas Research Institute	\$ 148,633	1	Various Sponsors	\$ 130,000	2
General Motors	\$ 82,400	1	Vitro Tec.	\$ 4,575	1
Harvard Irrigation Systems	\$ 1,551	1			
Hughes Aircraft	\$ 60,000	1			
Inst. of Gas Technology	\$ 29,367	1	TOTAL	\$3,165,256	75

SOURCE BREAKDOWN FOR RESEARCH  
GRANTS & CONTRACTS  
1985 - 1986

Type of Organization	Dollars Awarded	# of Awards	Type of Organization	Dollars Awarded	# of Awards
<b>FEDERAL</b>					
AFOSR	\$ 49,980	1			
Bureau of Reclamation	\$ 7,788	1			
Department of Defense	\$ 361,950	3			
Department of Education	\$ 110,974	1			
Department of Energy	\$ 1,468,751	15			
Federal Bureau of Investigation	\$ 17,950	2			
Forest Service	\$ 56,429	4			
Hercules	\$ 80,000	2			
Hughes Aircraft	\$ 39,334	1			
Lawrence Livermore Lab.	\$ 14,928	1			
Los Alamos	\$ 23,644	1			
Morton Thiokol	\$ 12,100	1			
National Institutes of Health	\$ 101,450	2			
National Science Foundation	\$ 1,906,936	16			
National Endow. Humanities	\$ 41,091	2			
Naval Weapons Center	\$ 74,450	4			
Navy	\$ 76,712	2			
OAPP	\$ 133,123	1			
Office of Naval Research	\$ 499,620	2			
U.S. Drug Administration	\$ 128,600	2			
U.S. Geological Survey	\$ 104,572	4			
<b>TOTALS</b>	<b>\$ 5,310,382</b>	<b>68</b>			

**GRANT/CONTRACT AWARDS**

**BY AMOUNT**



GRANT/CONTRACT AWARDS BY AMOUNT

DOLLAR AMOUNTS	NUMBER OF AWARDS	% OF TOTAL AWARDS BY #	DOLLARS AWARDED	% OF TOTAL AWARDS BY \$
70 to \$10,000	39	27	\$ 174,815	2
\$10,000 to \$25,000	20	14	\$ 317,849	4
\$25,000 to \$50,000	39	27	\$1,390,351	16
\$50,000 to \$100,000	26	18	\$1,713,503	20
\$100,000 to \$200,000	11	8	\$1,549,258	18
\$200,000 to \$500,000	6	4.5	\$1,579,862	19
\$500,000 PLUS	<u>2</u>	<u>1.5</u>	<u>\$1,750,000</u>	<u>21</u>
TOTALS	143	100	\$8,475,638	100

**SPONSORED RESEARCH ACTIVITY**

**(Grants and Contracts)**

**BY COLLEGE & DEPARTMENT**

**SPONSORED RESEARCH PROPOSALS  
(GRANTS AND CONTRACTS)**

During the 1985-1986 year, 169 proposals were submitted to various agencies for funding. This was a decrease of seven over the previous year. During this same year 143 contracts were funded, and 84 were rejected.

SUMMARY OF SPONSORED RESEARCH PROGRAMS  
1985-1986

College/Department/ Institute	No. of Faculty in Department	No. of Faculty Submitting	No. of Proposals Submitted	No. of Proposals Pending	No. of Awards	Dollars Awarded
<b><u>BIOLOGY &amp; AGRICULTURE</u></b>						
Agriculture Economics	6	0	0	0	0	\$ 0
Agronomy & Horticulture	9	0	0	0	0	0
Animal Science	10	0	0	0	0	0
Benson Institute	1	0	0	0	0	0
Botany & Range Science	17	6	13	8	11	466,153
Food Science & Nutrition	10	4	4	1	4	16,700
Microbiology	14	1	2	0	2	12,000
Zoology	29	6	6	2	7	730,183
TOTALS	96	17	25	11	24	\$ 1,225,036
<b><u>EDUCATION</u></b>						
Curriculum/Instructional	14	1	2	1	0	\$ 0
Educational Administration	12	0	0	0	2	112,974
Educational Psychology	21	1	2	1	0	0
Elementary Education	30	1	1	1	0	0
Secondary Education	15	0	0	0	0	0
TOTALS	92	3	5	3	2	\$ 112,974
<b><u>ENGINEERING &amp; TECHNOLOGY</u></b>						
Chemical Engineering	15	10	17.5	7	24	\$ 3,260,244
Civil Engineering	18	9	22	4	20	411,242
Electrical Engineering	17	3	11	5	9	423,392
Industrial Education	13	1	1	1	0	0
Mechanical Engineering	14	8	7	2	7	317,830
Technology	21	4	7	2	3	147,452
CAM Laboratory	1	2	2	4	0	0
TOTALS	99	37	67.5	25	63	\$ 4,560,160

College/Department/ Institute	No. of Faculty in Department	No. of Faculty Submitting	No. of Proposals Submitted	No. of Proposals Pending	No. of Awards	Dollars Awarded
<u>FAMILY, HOME &amp; SOCIAL SCIENCES</u>						
Anthropology	8	0	0	0	0	0
Clinics	5	0	0	0	1	25,000
Clothing & Textiles	10	0	0	0	0	0
Economics	11	1	1.5	0	.5	16,893
Family & Demographic Inst.	3	0	0	0	0	0
Family Sciences	31	2	2	2	1	133,123
Geography	7	0	0	0	0	0
History	34	0	0	0	0	0
Home Economics Education	7	0	0	0	0	0
Intrnt'l & Area Studies	4	0	0	0	0	0
Institute of Church History	3	0	0	0	0	0
Political Science	20	0	0	0	1	9,941
Psychology	26	0	0	0	1	5,000
Social Work	9	2	2	1	1	4,900
Sociology	20	0	0	0	0	0
TOTALS	198	5	5.5	6	5.5	194,857

<u>FINE ARTS &amp; COMMUNICATIONS</u>						
Art	14	0	0	0	0	0
Art & Design	6	0	0	0	0	0
Communications	28	0	0	0	0	0
Design	11	0	0	0	0	0
Music	44	0	0	0	0	0
Theatre & Cinematic Arts	17	0	0	0	0	0
TOTALS	120	0	0	0	0	0

<u>HUMANITIES</u>						
Asian & Near East Languages	17	0	0	0	0	0
Calico	3	0	0	0	0	0
English	65	1	1	1	0	0
French & Italian	13	0	0	0	0	0
Germanic & Slavic Languages	15	2	3	1	1	0
Humanities Classics	20	0	0	0	3	176,607
Library/Information Science	7	1	1	0	0	0

College/Department/ Institute	No. of Faculty in Department	No. of Faculty Submitting	No. of Proposals Submitted	No. of Proposals Pending	No. of Awards	Dollars Awarded
<u>HUMANITIES (Continued)</u>						
Linguistics	12	0	0	0	1	\$ 196,243
Philosophy	9	0	0	0	0	0
Spanish & Portuguese	22	3	2	1	0	0
TOTALS	183	7	7	3	5	\$ 372,850
<u>LAW SCHOOL</u>						
Law Library	7	0	0	0	0	0
Faculty	27	1	1	1	0	0
TOTALS	34	1	1	1	0	0
<u>MANAGEMENT</u>						
Institute of Public Mgt.	11	0	0	0	0	0
Information Management	16	0	0	0	0	0
Institute of Business Mgt.	34	0	0	0	0	0
Managerial Economics	11	1	.5	0	.5	16,893
Organizational Behavior	13	0	1	0	0	0
School of Accountancy	29	0	0	0	0	0
School of Management	1	1	1	1	0	0
Skaggs Inst.	1	0	0	0	0	0
TOTALS	116	1	2.5	1	.5	\$ 16,893
<u>MEDIA SERVICES</u>						
	1	1	1	1	0	0
<u>NURSING</u>						
	37	1	1	1	0	0
<u>PHYSICAL EDUCATION</u>						
Health Sciences	15	0	0	0	1	\$ 400
Physical Education (Dance)	12	0	0	0	0	0
Physical Education (Sports)	59	2	2	2	0	0
Recreation/Youth Leadership	14	0	0	0	0	0
TOTALS	100	2	2	2	1	\$ 400

College/Department/ Institute	No. of Faculty in Department	No. of Faculty Submitting	No. of Proposals Submitted	No. of Proposals Pending	No. of Awards	Dollars Awarded
<u>PHYSICAL &amp; MATH SCIENCES</u>						
Chemistry	32	16	28	14.5	31.5	\$ 1,595,684
Computer Science	20	3	2	1	1	47,700
Geology	12	2	5	1	3	83,755
Mathematics	39	3	6	2	2	34,800
Physics & Astronomy	29	5	10.5	3.5	4.5	191,379
Statistics	<u>14</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
TOTALS	149	29	51.5	22	42	\$ 1,961,318
<u>RELIGIOUS INSTRUCTION</u>						
Ancient Scriptures	22	0	0	0	1	\$ 31,150
Church History & Doctrine	<u>25</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
TOTALS	47	0	0	0	1	\$ 31,150
<u>INSTITUTES &amp; CENTERS</u>						
Cancer Research Ctr	<u>16</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
TOTAL	16	0	0	0	0	\$ 0
<u>STUDENT LIFE</u>						
Aerospace Study	5	0	0	0	0	\$ 0
Council & Personal Service	19	0	0	0	0	0
Military Science	6	0	0	0	0	0
Multicultural Education	4	0	0	0	0	0
Career Education	<u>6</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
TOTAL	40	0	0	0	0	\$ 0

**EXPENDITURES OF EXTERNAL FUNDS**



**RESEARCH EXPENDITURES BY CATEGORY**  
(From Restricted Sponsored Research "5-" Accounts Only)

1985-1986

**Wages & Salaries**

Administrative Salaries	\$ 134,134
Full-time Faculty Salaries	737,891
Spring Faculty Salaries	222,733
Faculty Overload	209,171
Summer Faculty Salaries	208,483
Part-time Faculty Salaries	53,592
Staff Salaries	103,961
Student Assistant Salaries	369,824
Student Wages	720,183
Temporary Non-student Wages	299,881
Honorariums	0

	\$3,059,853
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**Other**

Consultants	\$ 103,561
Salary Benefits	365,225
Building & Equipment Rental	5,380
Computer Services	126,726
Capital Equipment	1,001,984
Travel & Per Diem	398,997
Supplies	471,126
Telephone	--
Publications	11,364
Student Fellowships	33,462
Subcontracts	460,953
Departmental Indirect Costs	17,484
University Indirect Costs	1,446,790

	\$4,443,052
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<b>GRAND TOTAL 1985-86</b>	<b>\$7,502,905</b>
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<b>Grand Total 1984-85</b>	<b>\$6,434,583</b>
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## Expenditures of External Funds

by

### Department and College

(From Restricted Sponsored Research "5-" Accounts Only)

September 1, 1985 - August 31, 1986

College & Department	Total
<b><u>Biology &amp; Agriculture</u></b>	
Agricultural Economics	\$ 5,924
Agronomy & Horticulture	55
Animal Science	(11,189)
Benson Institute	(2,066)
Botany & Range Science	348,089
Food Science & Nutrition	130,124
Microbiology	18,223
Zoology	572,239
	<hr/>
College Total	\$ 1,061,399
<b><u>Education</u></b>	
Educational Administration	\$ 24,604
Instructional Science	43,651
Center for Study of Education	120,782
	<hr/>
College Total	\$ 189,037
<b><u>Engineering &amp; Technology</u></b>	
Chemical Engineering	\$ 1,457,556
Civil Engineering	454,303
Electrical Engineering	191,958
Mechanical Engineering	429,941
Technology	134,571
	<hr/>
College Total	\$ 2,668,329
<b><u>Family, Home &amp; Social Sciences</u></b>	
Anthropology	\$ 0
Economics	39,530
Family & Demographic Institute	0

College & Department	Total
<b><u>Family, Home &amp; Social Sciences (Continued)</u></b>	
Family Science	\$ 173,273
History	53,655
Home Economics	0
Psychology	3,130
Sociology	7,375
Political Science	4,459
Comprehensive Clinic	19,082
Social Work	4,685
<b>College Total</b>	<b>\$ 305,189</b>
<b><u>Fine Arts &amp; Communications</u></b>	
Art	\$ 5,221
Theatre	0
<b>College Total</b>	<b>\$ 5,221</b>
<b><u>Humanities</u></b>	
Asian & Slavic Language	\$ 32,973
Linguistics	1,882
Humanities Research Center	506,044
Humanities Classics	0
<b>College Total</b>	<b>\$ 540,899</b>
<b><u>Law</u></b>	
	\$ 39,101
<b>College Total</b>	<b>\$ 39,101</b>
<b><u>Nursing</u></b>	
	\$ 0
<b>College Total</b>	<b>\$ 0</b>

College & Department	Total
<u>Physical Education</u>	
Men's Physical Education	\$ 326
<b>College Total</b>	<b>\$ 326</b>
<u>Physical &amp; Math Sciences</u>	
Cancer Research Center	\$ 100,738
Chemistry	1,545,467
Computer Science	53,277
Geology	46,872
Mathematics	24,419
Physics & Astronomy	591,814
<b>College Total</b>	<b>\$ 2,362,587</b>
<u>Religious Education</u>	
	\$ 59,025
<b>College Total</b>	<b>\$ 59,025</b>
<u>School of Management</u>	
Business Management	\$ 136
<b>College Total</b>	<b>\$ 136</b>
<u>Other</u>	
ASBYU Student Research	\$ 16,290
Other	(3,317)
<b>Other Total</b>	<b>\$ 12,973</b>
<u>Institutes</u>	
Thermochemical Institute	\$ 258,684
<b>Inst. Total</b>	<b>\$ 258,684</b>
<b>GRAND TOTAL 1985-1986</b>	<b>\$ 7,502,906</b> =====
<b>Totals for 1984 - 1985</b>	<b>\$ 6,434,583</b> =====

**ROYALTIES**

**ROYALTY AGREEMENTS**  
**SEPTEMBER 1, 1985 THROUGH AUGUST 31, 1986**

<u>COLLEGE</u>	<u>ACCOUNT NAME</u>	<u>PRINCIPLE INVESTIGATOR</u>	<u>EXTERNAL REVENUE</u>
Bio. & Agriculture	M-9	Marcus Jensen	\$ 52,763.00
	Schering Turkey	Marcus Jensen	14,179.73
	PTSP	Stephen Wood	2,900.00
Eng. & Technology	Texture.BYU	Brent Adams	5,000.00
	CAM Software	Dell Allen	852,000.00
	1984-85 Dist.	Dell Allen	149,600.00
	Developer	Richard Balling	0.00
	Optdes.BYU	Richard Balling	15,775.00
	DAVINCI	Steven Benzley	0.00
	ROSETTA & SQUIRE	Steven Benzley	500.00
	Movie-BYU	Hank Christiansen	927,222.00
	Shopsmith	John Clegg	0.00
	Linear Amplification	John Clegg	0.00
	Hunt	Ariel Davis/ John Clegg	2,621.09
	Viscometry	Richard Hanks	0.00
	Scem I.BYU	Ivin Holt	3,334.02
	Jergens	Greg Jensen	10,450.00
	SMART	Edward Red	21,000.00
	Deformation Software	Thomas Sederberg	0.00
	Fine Arts & Comm.	Touring Wheelchair	Douglas Stout
Humanities	Plato-Otto	Frank Otto	146.53
Info. Systems	BYU Concordance	Monte Shelley	15,130.25
Library Science	Dialtwig	Boyce	0.00
Phys. Education	Bang Toe Exerciser	Blauer Bangerter	87.00
Phys. & Math Sci.	Recovery of Cesium	Reed Izatt	0.00
	Chromatography	Milton Lee	100.00
	Polysiloxane Polymer	Milton Lee	0.00
	Liquid Crystalline	Milton Lee	0.00
	Compound		
	Dialyzing Injection	Frances Nordmeyer	0.00
	Store & Receive Energy	Bevan Ott	0.00
	Process & Photoradiation	James Thorne	0.00
	Tetrahedral Anvil	Tracy Hall	<u>7,225.00</u>
		<b>TOTAL</b>	