



# UNIVERSITY OF MASSACHUSETTS

*Amherst – Boston – Dartmouth – Lowell – Worcester – UMassOnline*

# FY 2009 Annual R&D Expenditures

UMass President's Office  
*Office of Institutional Research*  
March 2010

## Introduction

The *FY2009 Annual Research and Development Expenditures* Report presents information on the research and development expenditures for the University of Massachusetts System. It is based on data that our five campuses provide to the National Science Foundation (NSF) through its annual Survey of Research and Development Expenditures at Universities and Colleges. The report is comprised of three sections: Total R&D Expenditures (pages 1-7), Science & Engineering R&D Expenditures (pages 9-13), and Life Sciences R&D Expenditures (pages 14-15). In addition to the FY2009 data, this report also provides trend data in many cases.

### Major Highlights:

- **UMass Total R&D Expenditures** - Total FY2009 R&D expenditures for the University of Massachusetts System was reported at \$489.1 million, which represents a 12.4% increase from the FY2008 total of \$435 million.
- **Growth in Total R&D Expenditures (UMass versus All U.S. Institutions)** – Total R&D expenditures for the University of Massachusetts System has grown at a higher rate than the national trend for all U.S. institutions. In FY2008 (most recent comparison data available), while the UMass system reflected an annual growth rate of 9.5% over the previous year, All U.S. Institutions reflected a growth rate of 5.2%.
- **UMass R&D Expenditures in Science and Engineering** – In FY2009, an estimated \$469 million (95.8%) of our R&D expenditures are in the sciences and engineering (S&E).
- **UMass State Ranking in Science and Engineering R&D Expenditures** - Among Massachusetts colleges and universities, UMass continues to rank 3<sup>rd</sup> in S&E expenditures. UMass, MIT, Harvard and BU together account for 79% of the academic science and engineering R&D expenditures in the state. (Rankings based on FY 2008 data).
- **UMass R&D Expenditures by Funding Source (FY2009)** - In terms of funding sources for Science and Engineering research, 58% is from the federal government, 25% is from institutional sources, 3% is from state and local government, 6% is from industry and 8% is from other sources (e.g., private foundations).
- **UMass Areas of Funding Growth** – Between the reporting cycles FY2008-09, industry sponsorship dropped slightly by 1.7%, institutional funding increased 52%, other funding increased 18.2%, and federal funding stayed almost level from the prior year.
- **Life Sciences Continues to Comprise More Than Half of all R&D Expenditures at UMass** - At \$275 million, life sciences constitute more than half of UMass' total R&D expenditures (56.8%). FY2008 distribution of R&D expenditures by field is:

Life Sciences	56.1%	Social Sciences	4.1%
Physical Sciences	7.0%	Non Sciences/Engineering	4.2%
Engineering	15.7%	Psychology	2.7%
Computer Sciences	4.3%	Mathematical Sciences	0.7%
Environmental Sciences	4.4%	Other Sciences	0.7%

**A Note on Definitions and Criteria For ‘R&D Expenditures’** - According to the National Science Foundation Survey of Research And Development Expenditures,“(Separately budgeted) R&D Expenditures include all funds expended for activities that are specifically organized to produce research outcomes. These activities are either commissioned by an agency external to the institution or are separately budgeted by an organizational unit within the institution. Expenditures are funds actually spent by an institution during its fiscal year. Separately budgeted R&D equipment purchased from current funds includes all research equipment purchased under sponsored research project awards.” [www.nsf.org](http://www.nsf.org). Please note that the NSF R&D Expenditures data do not include research monies expended in any training or education activities. NSF Data Definitions on Funding Sources are as follows:<sup>1</sup>

**a. Federal Government.** Report awards for R&D (including direct and reimbursed indirect costs) by all agencies of the Federal Government.

**b. State and Local Governments.** Include funds for R&D (including direct and reimbursed indirect costs) from State, county, municipal, or other local governments and their agencies. Include here State funds that support R&D at agricultural and other experiment stations.

**c. Industry.** Include all awards for R&D (including direct and reimbursed indirect costs) from profit-making organizations, whether engaged in production, distribution, research, service, or other activities. Do not include awards from nonprofit foundations financed by industry; these should be included under “All other sources.”

**d. Institution Funds.** Report funds, including related indirect costs, that your institution spent for R&D activities from the following unrestricted sources: general-purpose State or local government appropriations; general-purpose awards from industry, foundations, or other outside sources; tuition and fees; endowment income; gifts; and other institutional funds. In addition, estimate your institution's on-campus and off-campus unreimbursed indirect costs associated with externally funded R&D projects, including mandatory and voluntary cost sharing. To estimate unreimbursed indirect costs, preferably on a project-by-project basis, use your appropriate on-campus or off-campus *negotiated research indirect cost rate(s)* multiplied by the corresponding base(s) minus actual indirect cost recovery.

**e. All Other Sources.** Include awards for R&D (including direct and reimbursed indirect costs) from nonprofit foundations and voluntary health agencies as well as from all other sources not elsewhere classified. Also include gifts from individuals that are restricted by the donor to research. Funds from foundations that are affiliated with, or granted solely to your institution, should be included under “Institution funds.” Funds for R&D received from a health agency that is a unit of a State or local government should be included under “State and local governments.”

Additional highlights as well as rankings and comparative data can be found in the expanded version of this report (to be released shortly). Please contact us at the University of Massachusetts President’s Office, Office of Institutional Research, if you would like to obtain a hard copy.

**Please Note:** Following the implementation system-wide of ERP research administration software in 2007, significant improvements have been made to the methodology used to gather, analyze, and report the FY2009 R&D Expenditures data. Although variations at the aggregate level are not overly significant, there might be a slight impact of possible methodological inconsistencies for trended data at the sub-category levels. Comparison to data from prior years should be made with this awareness, as campuses are currently in the process of reviewing their methodology.

Barbara Velardi  
Research Associate

Neena Verma  
Director of Institutional Research

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<sup>1</sup>Source: National Science Foundation Survey of Research and Development Expenditures at Universities and Colleges.

**TOTAL R&D EXPENDITURES**

- **FY2005 - FY2009**
  - UMass SYSTEM *1*
  - UMass Amherst *2*
  - UMass Boston *3*
  - UMass Dartmouth *4*
  - UMass Lowell *5*
  - UMass Worcester *6*
- **TOTAL R&D EXPENDITURES BY FIELD FY2009** *7*

**SCIENCE & ENGINEERING R&D EXPENDITURES**

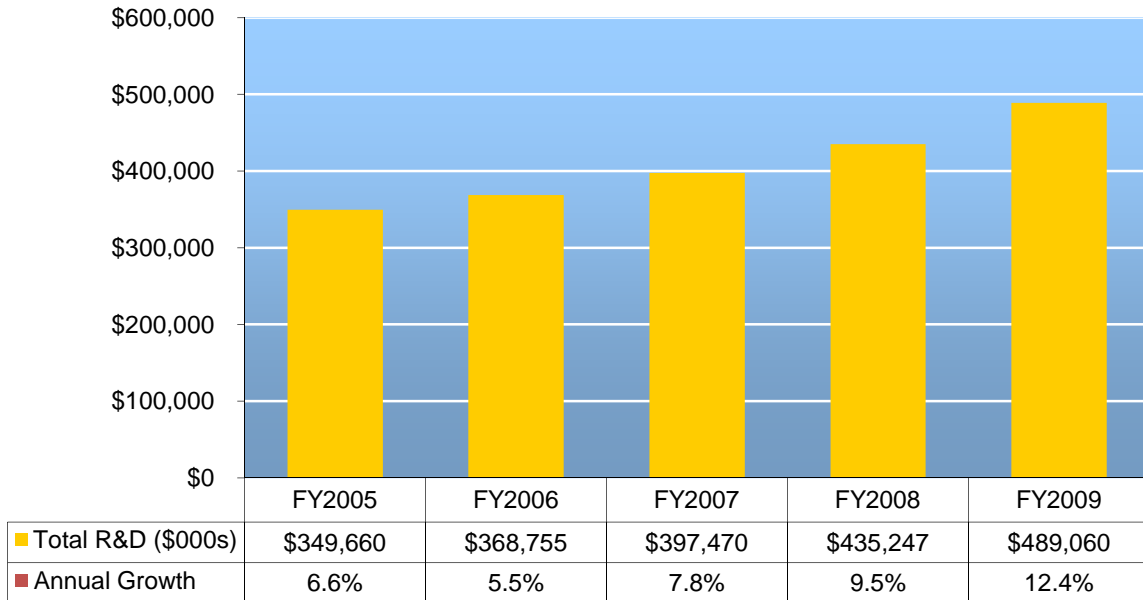
- **FY2005 - FY2009**
- **EXPENDITURES BY SOURCE FY2009** *9*
- **EXPENDITURES BY SOURCE FY2005 - FY2009** *10*
- **PERCENT BASIC RESEARCH FY2009** *12*
- **FEDERAL GOVERNMENT AGENCY SOURCES FY2009** *13*

**LIFE SCIENCES R&D EXPENDITURES**

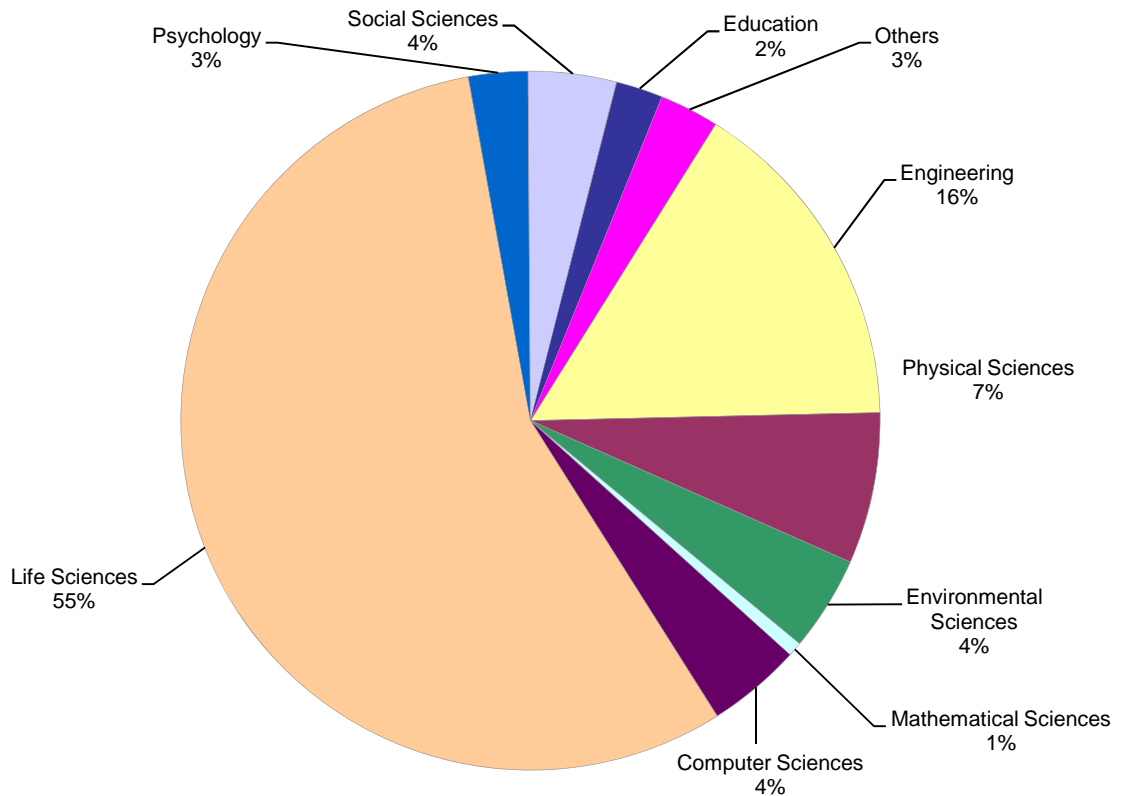
- **FY2005 - FY2009** *14*
- **EXPENDITURES BY FIELD FY2009** *14*
- **EXPENDITURES BY FIELD FY2005 - FY2009** *15*

# UMASS System

## Total R&D Expenditures FY2005 - FY2009

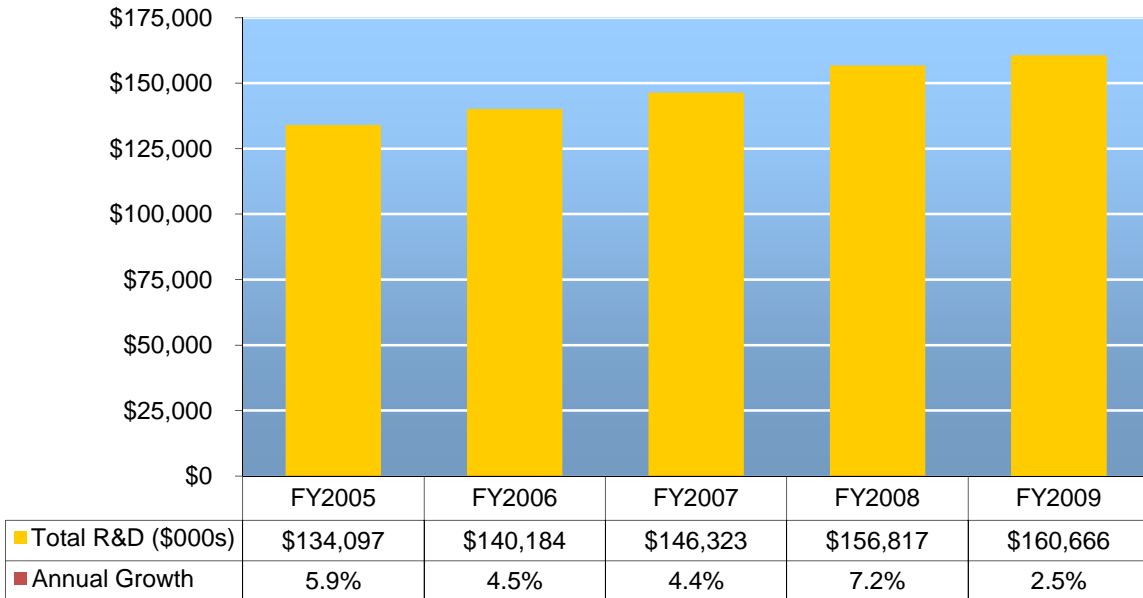


## Total R&D Expenditures FY2009

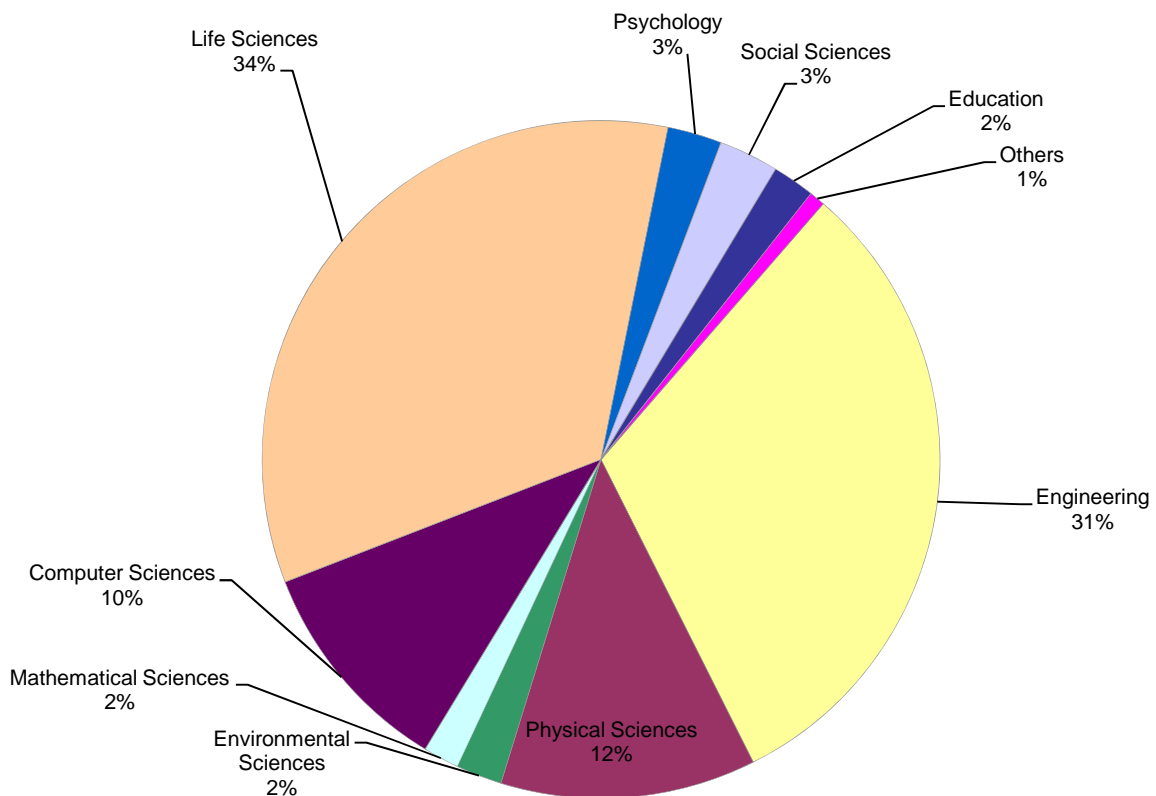


# Amherst

## Total R&D Expenditures FY2005 – FY2009

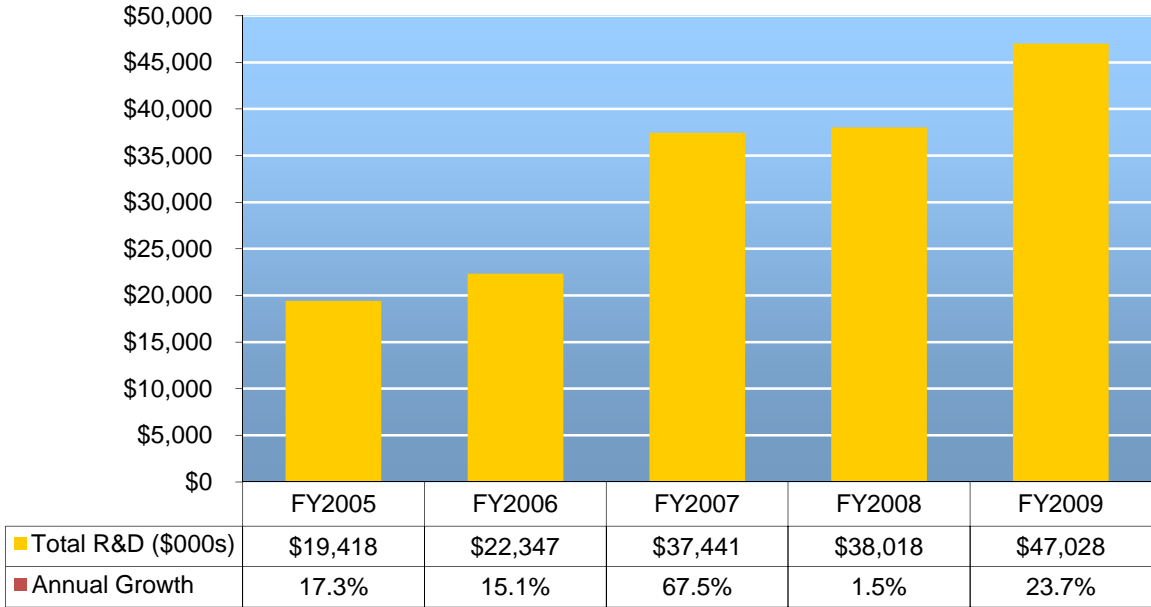


## Total R&D Expenditures FY2009

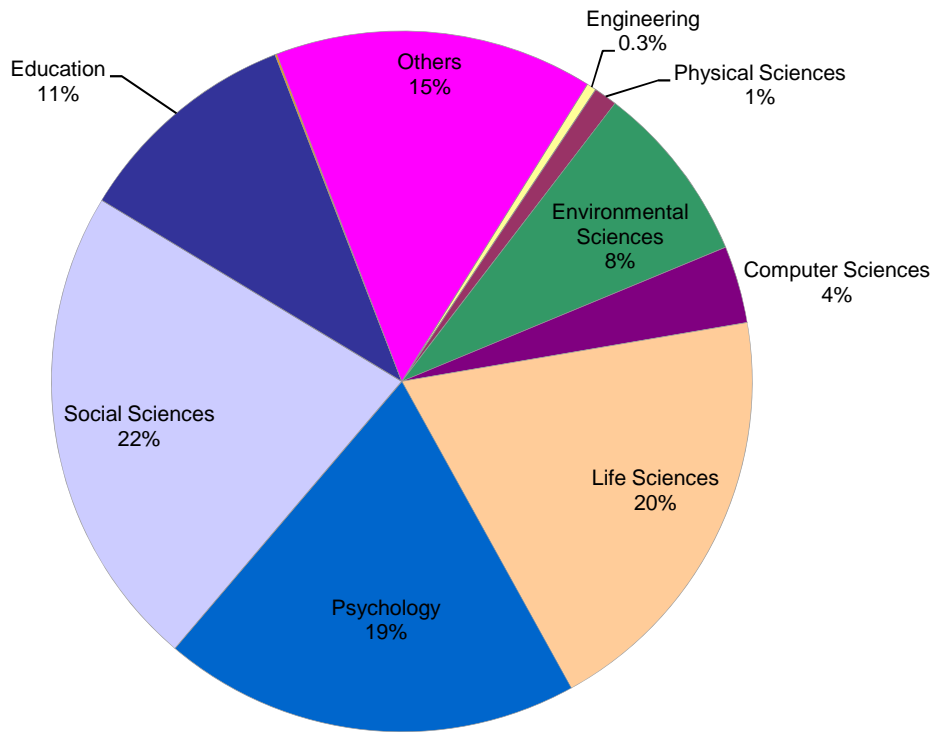


# Boston

## Total R&D Expenditures FY2005 – FY2009

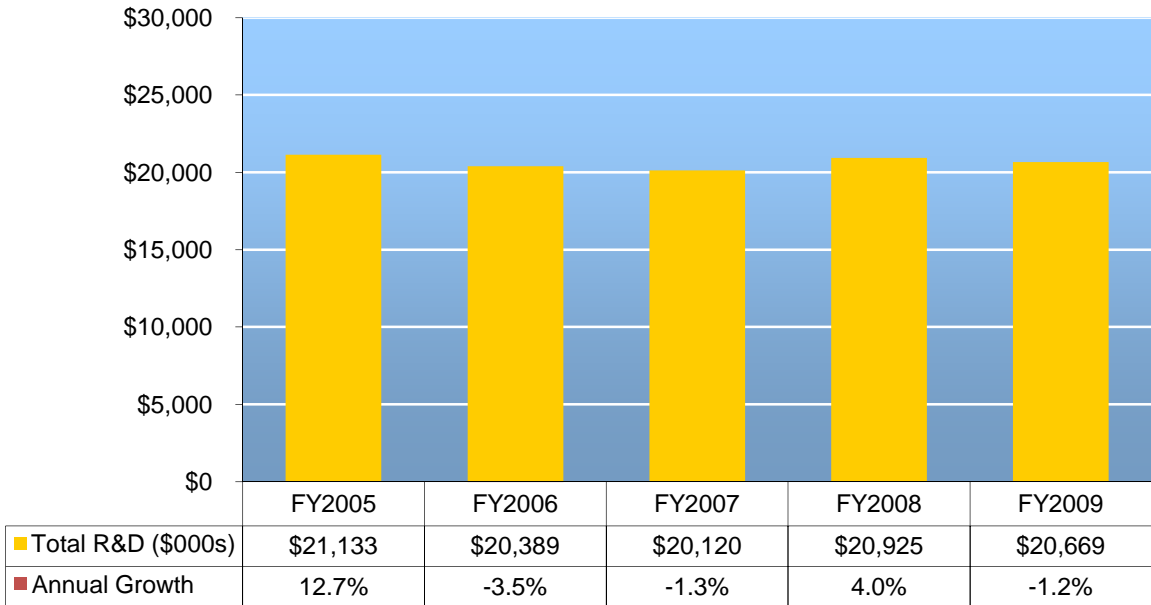


## Total R&D Expenditures FY2009

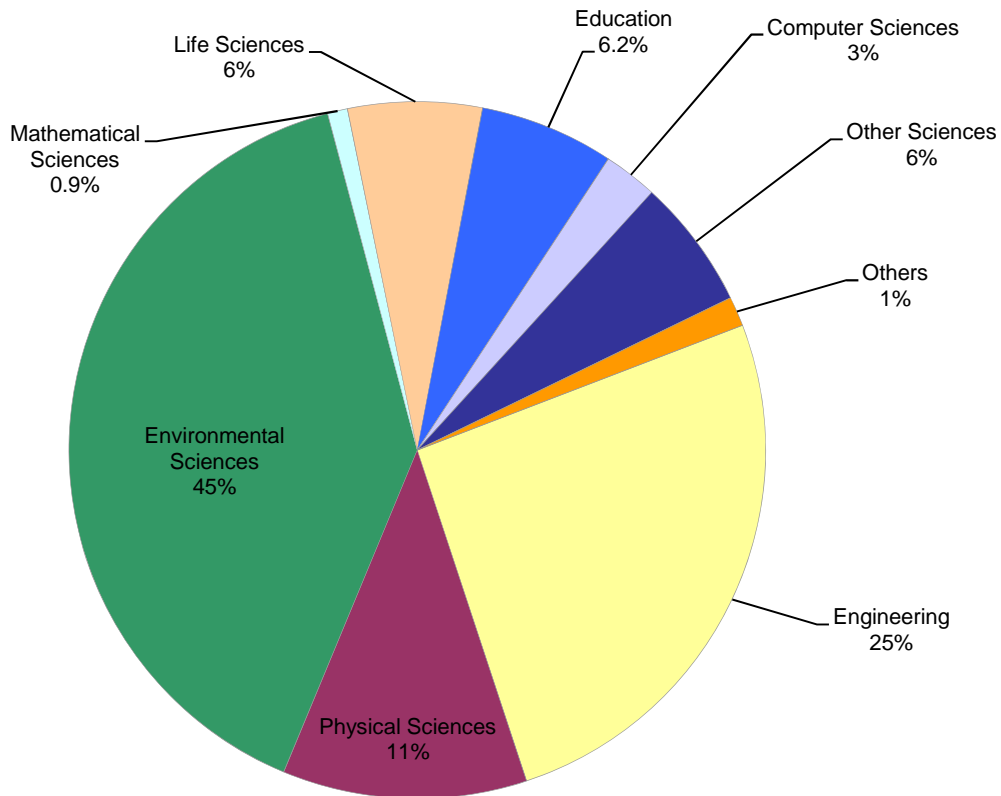


# Dartmouth

## Total R&D Expenditures FY2005 – FY2009



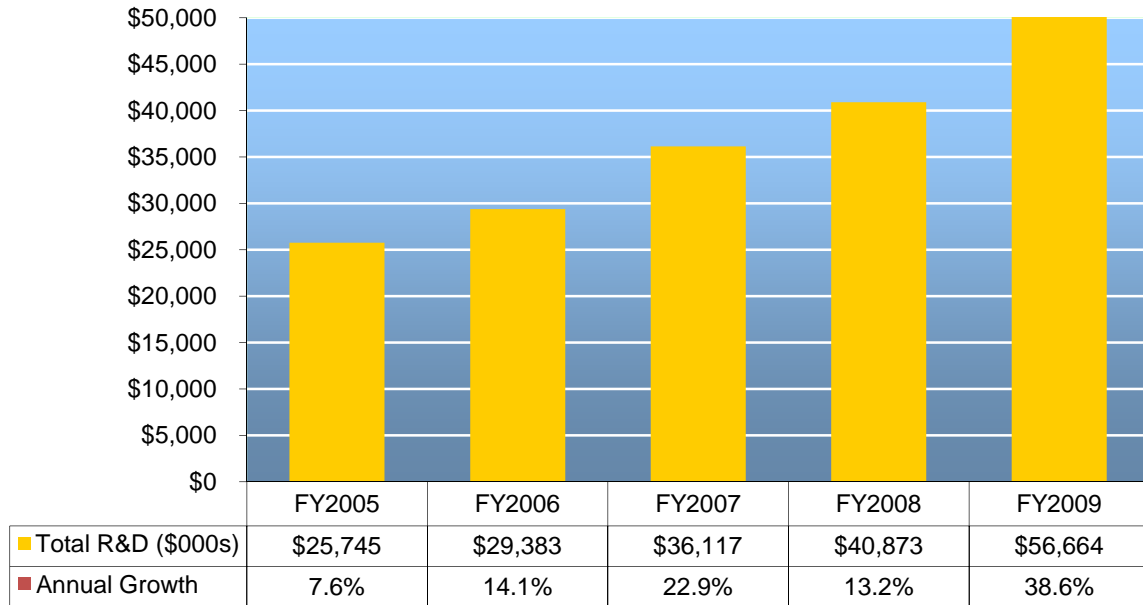
## Total R&D Expenditures FY2009



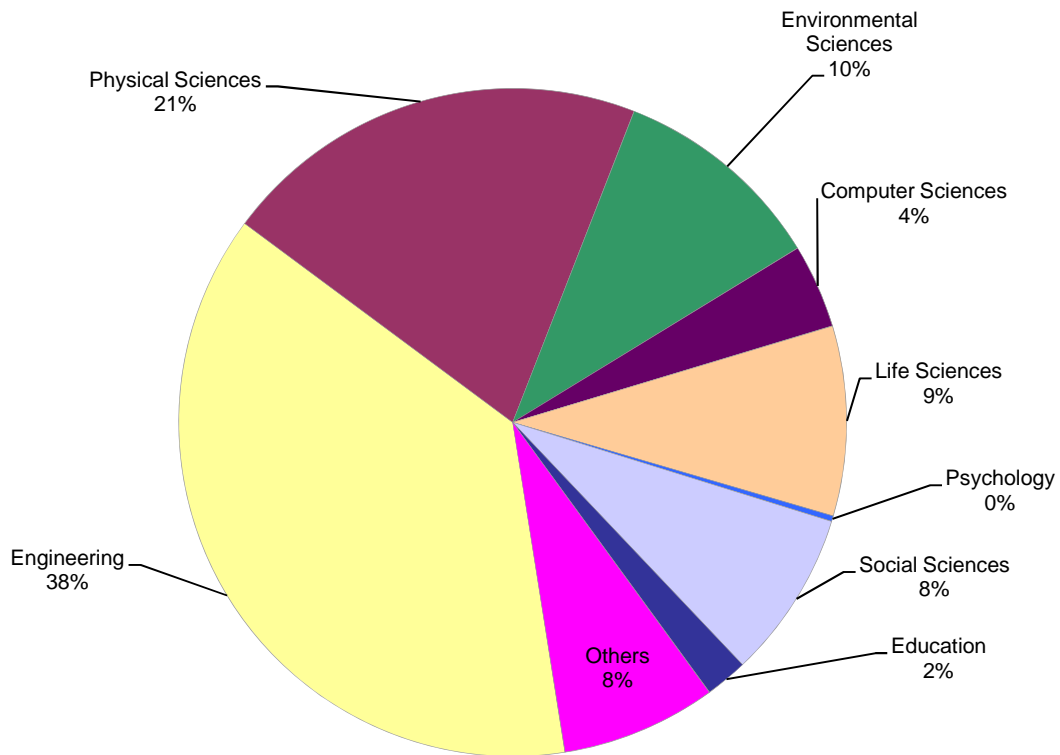


# Lowell

## Total R&D Expenditures FY2005 – FY2009

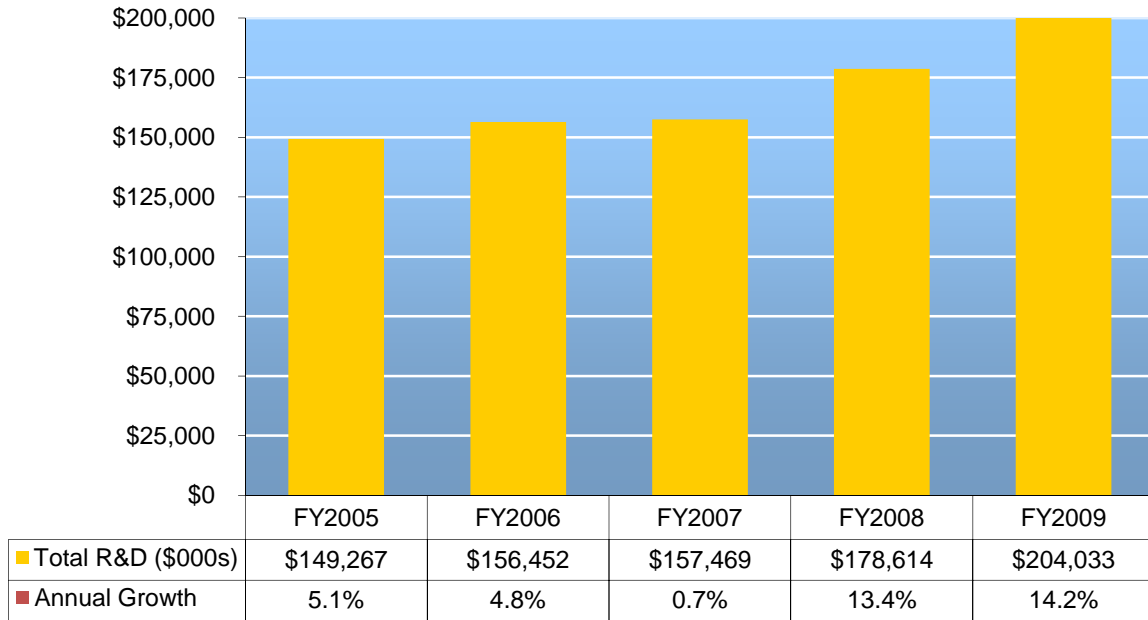


## Total R&D Expenditures FY2009



## Worcester

### Total R&D Expenditures FY2005 – FY2009



All of Worcester's R&D  
expenditures are in the Life  
Sciences.

### Total R&D Expenditures By Field FY2009

FIELD	UMA FY2009	% of UMA Total	% of Field	UMB FY2009	% of UMB Total	% of Field	UMD FY2009	% of UMD Total	% of Field	UML FY2009	% of UML Total	% of Field	UMW FY2009	% of UMW Total	% of Field	System FY2009	% of Total
<b>Engineering (Total)</b>	<b>\$ 50,123</b>	<b>31.2%</b>	<b>65.1%</b>	<b>\$ 209</b>	<b>0.4%</b>	<b>0.3%</b>	<b>\$ 5,325</b>	<b>25.8%</b>	<b>6.9%</b>	<b>\$ 21,341</b>	<b>37.7%</b>	<b>27.7%</b>	<b>\$ -</b>			<b>\$ 76,998</b>	<b>15.7%</b>
Aeronautical & Astronomical	\$ -			\$ -			\$ -	0.0%	#DIV/0!	\$ -			\$ -			\$ -	0.0%
Bioengineering/Biomedical	\$ -			\$ -			\$ 28	0.1%	20.6%	\$ 108			\$ -			\$ 136	0.0%
Chemical	\$ 20,593	12.8%	97.1%	\$ -			\$ -			\$ 620	1.1%	2.9%	\$ -			\$ 21,213	4.3%
Civil	\$ 6,607	4.1%	76.2%	\$ -			\$ 808	3.9%	9.3%	\$ 1,253	2.2%	14.5%	\$ -			\$ 8,668	1.8%
Electrical	\$ 15,267	9.5%	76.0%	\$ 205	0.4%	1.0%	\$ 914	4.4%	4.6%	\$ 3,691	6.5%	18.4%	\$ -			\$ 20,077	4.1%
Mechanical	\$ 6,982	4.3%	61.7%	\$ -			\$ 598	2.9%	5.3%	\$ 3,737	6.6%	33.0%	\$ -			\$ 11,317	2.3%
Metallurgical & Materials	\$ -		0.0%	\$ -			\$ 890	4.3%	20.2%	\$ 3,516	6.2%	79.8%	\$ -			\$ 4,406	0.9%
Other	\$ 674	0.4%	6.0%	\$ 4	0.01%	0.0%	\$ 2,087	10.1%	18.7%	\$ 8,416	14.9%	75.3%	\$ -			\$ 11,181	2.3%
<b>Physical Sciences (Total)</b>	<b>\$ 19,577</b>	<b>12.2%</b>	<b>57.3%</b>	<b>\$ 507</b>	<b>1.1%</b>	<b>1.5%</b>	<b>\$ 2,342</b>	<b>11.3%</b>	<b>6.8%</b>	<b>\$ 11,766</b>	<b>20.8%</b>	<b>34.4%</b>	<b>\$ -</b>			<b>\$ 34,192</b>	<b>7.0%</b>
Astronomy	\$ 3,940	2.5%	100.0%	\$ -			\$ -			\$ -			\$ -			\$ 3,940	0.8%
Chemistry	\$ 9,534	5.9%	67.1%	\$ 355	0.8%	2.5%	\$ 1,937	9.4%	13.6%	\$ 2,382	4.2%	16.8%	\$ -			\$ 14,208	2.9%
Physics	\$ 6,076	3.8%	37.9%	\$ 152	0.3%	0.9%	\$ 405	2.0%	2.5%	\$ 9,384	16.6%	58.6%	\$ -			\$ 16,017	3.3%
Other	\$ 27			\$ -			\$ -			\$ -			\$ -			\$ 27	0.0%
<b>Environmental Sciences (Total)</b>	<b>\$ 3,543</b>	<b>2.2%</b>	<b>16.5%</b>	<b>\$ 3,919</b>	<b>8.3%</b>	<b>18.2%</b>	<b>\$ 8,183</b>	<b>39.6%</b>	<b>38.1%</b>	<b>\$ 5,856</b>	<b>10.3%</b>	<b>27.2%</b>	<b>\$ -</b>			<b>\$ 21,501</b>	<b>4.4%</b>
Atmospheric	\$ -			\$ -			\$ -			\$ -			\$ -			\$ -	
Earth Sciences	\$ 2,665	1.7%	31.2%	\$ 10	0.0%	0.1%	\$ -			\$ 5,856	10.3%	68.6%	\$ -			\$ 8,531	1.7%
Oceanography	\$ 8	0.0%	0.1%	\$ 2,861	6.1%	25.9%	\$ 8,183	39.6%	74.0%	\$ -			\$ -			\$ 11,052	2.3%
Other	\$ 870			\$ 1,048	2.2%	54.6%	\$ -			\$ -			\$ -			\$ 1,918	0.4%
<b>Mathematical Sciences (Total)</b>	<b>\$ 2,753</b>	<b>1.7%</b>	<b>85.4%</b>	<b>\$ 16</b>	<b>0.0%</b>	<b>0.5%</b>	<b>\$ 194</b>	<b>0.9%</b>	<b>6.0%</b>	<b>\$ 262</b>	<b>0.5%</b>	<b>8.1%</b>	<b>\$ -</b>			<b>\$ 3,225</b>	<b>0.7%</b>
<b>Computer Sciences (Total)</b>	<b>\$ 16,738</b>	<b>10.4%</b>	<b>78.8%</b>	<b>\$ 1,678</b>	<b>3.6%</b>	<b>7.9%</b>	<b>\$ 518</b>	<b>2.5%</b>	<b>2.4%</b>	<b>\$ 2,310</b>	<b>4.1%</b>	<b>10.9%</b>	<b>\$ -</b>			<b>\$ 21,244</b>	<b>4.3%</b>
<b>Life Sciences (Total)</b>	<b>\$ 54,733</b>	<b>34.1%</b>	<b>19.9%</b>	<b>\$ 9,237</b>	<b>19.6%</b>	<b>3.4%</b>	<b>\$ 1,286</b>	<b>6.2%</b>	<b>0.5%</b>	<b>\$ 5,206</b>	<b>9.2%</b>	<b>1.9%</b>	<b>\$ 204,033</b>	<b>100.0%</b>	<b>74.3%</b>	<b>\$ 274,495</b>	<b>56.1%</b>
Agricultural	\$ 23,088	14.4%	97.8%	\$ -			\$ 531	2.6%	2.2%	\$ -			\$ -			\$ 23,619	4.8%
Biological	\$ 23,323	14.5%	23.0%	\$ 3,020	6.4%	3.0%	\$ 711	3.4%	0.7%	\$ 1,531	2.7%	1.5%	\$ 72,851	35.7%	71.8%	\$ 101,436	20.7%
Medical	\$ 7,237	4.5%	6.3%	\$ 3,493	7.4%		\$ -			\$ -			\$ 104,417	51.2%	90.7%	\$ 115,147	23.5%
Other	\$ 1,085	0.7%	3.2%	\$ 2,724	5.8%	7.9%	\$ 44	0.2%	0.1%	\$ 3,675	6.5%	10.72%	\$ 26,765	13.1%	78.0%	\$ 34,293	7.0%
<b>Psychology (Total)</b>	<b>\$ 4,157</b>	<b>2.6%</b>	<b>31.0%</b>	<b>\$ 9,049</b>	<b>19.2%</b>	<b>67.4%</b>	<b>\$ 62</b>	<b>0.3%</b>	<b>0.5%</b>	<b>\$ 151</b>	<b>0.3%</b>	<b>1.1%</b>	<b>\$ -</b>			<b>\$ 13,419</b>	<b>2.7%</b>
<b>Social Sciences (Total)</b>	<b>\$ 4,592</b>	<b>2.9%</b>	<b>23.0%</b>	<b>\$ 10,544</b>	<b>22.4%</b>	<b>52.9%</b>	<b>\$ 183</b>	<b>0.9%</b>	<b>0.9%</b>	<b>\$ 4,606</b>	<b>8.1%</b>	<b>23.1%</b>	<b>\$ -</b>			<b>\$ 19,925</b>	<b>4.1%</b>
Economics	\$ 1,615	1.0%	57.9%	\$ 1,155	2.5%	41.4%	\$ -	0.0%	0.0%	\$ 17	0.0%	0.6%	\$ -			\$ 2,787	0.6%
Political Science	\$ 862	0.5%	22.3%	\$ 3,000	6.4%	77.5%	\$ 11	0.1%	0.3%	\$ -	0.0%	0.0%	\$ -			\$ 3,873	0.8%
Sociology	\$ 1,285	0.8%	58.6%	\$ 856	1.8%	39.1%	\$ 49	0.2%	2.2%	\$ 1	0.0%	0.0%	\$ -			\$ 2,191	0.4%
Other	\$ 830	0.5%	7.5%	\$ 5,533	11.8%	50.0%	\$ 123	0.6%	1.1%	\$ 4,588	8.1%	41.4%	\$ -			\$ 11,074	2.3%
<b>Other Sciences (Total)</b>	<b>\$ -</b>			<b>\$ 1,478</b>	<b>3.1%</b>	<b>40.4%</b>	<b>\$ 1,250</b>	<b>6.0%</b>	<b>34.1%</b>	<b>\$ 933</b>	<b>1.6%</b>	<b>25.5%</b>	<b>\$ -</b>			<b>\$ 3,661</b>	<b>0.7%</b>
<b>TOTAL, SCI &amp; ENG FIELDS</b>	<b>\$ 156,216</b>	<b>97.2%</b>	<b>33.3%</b>	<b>\$ 36,637</b>	<b>77.9%</b>	<b>7.8%</b>	<b>\$ 19,343</b>	<b>93.6%</b>	<b>4.1%</b>	<b>\$ 52,431</b>	<b>92.5%</b>	<b>11.2%</b>	<b>\$ 204,033</b>	<b>100.0%</b>	<b>43.5%</b>	<b>\$ 468,660</b>	<b>95.8%</b>

### Total R&D Expenditures By Field FY2009

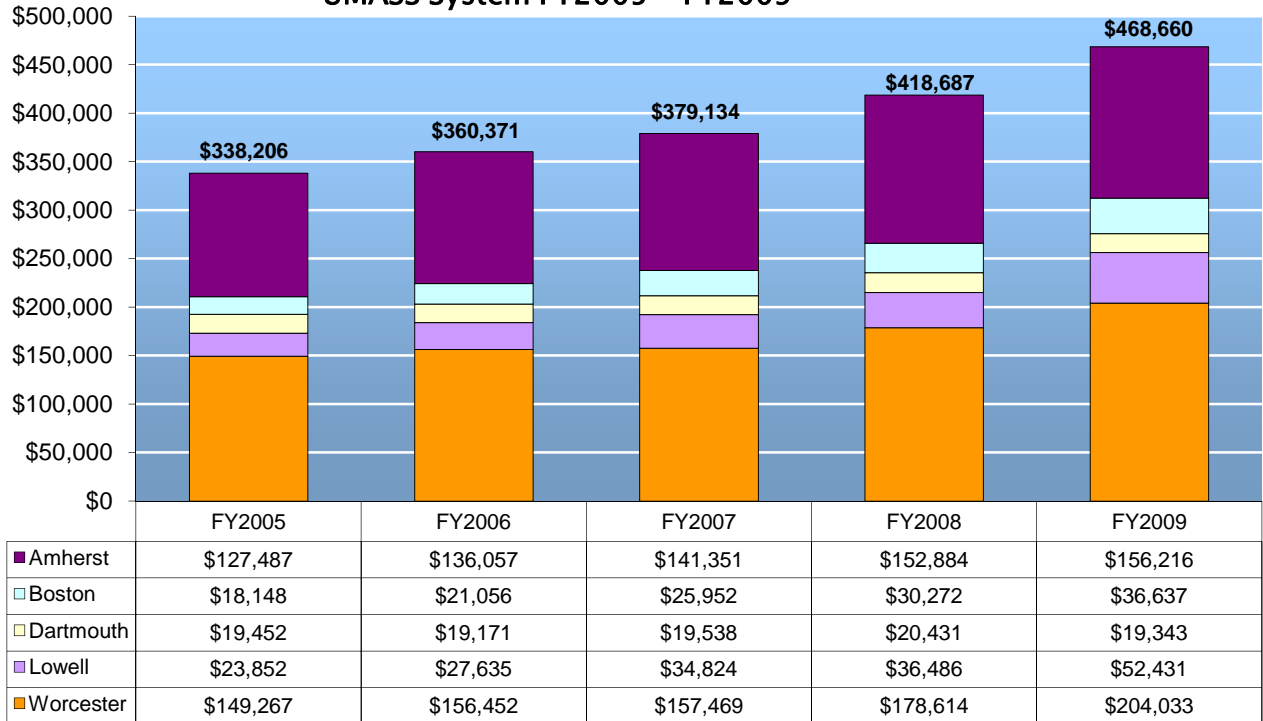
FIELD	UMA FY2009	% of UMA Total	% of Field	UMB FY2009	% of UMB Total	% of Field	UMD FY2009	% of UMD Total	% of Field	UML FY2009	% of UML Total	% of Field	UMW FY2009	% of UMW Total	% of Field	System FY2009	% of Total
Education	\$ 3,246	2.0%	30.6%	\$ 4,919	10.5%	46.3%	\$ 1,288	6.2%	12.1%	\$ 1,165	2.1%	11.0%	\$ -			\$ 10,618	2.2%
Law	\$ 155	0.1%	100.0%	\$ -	0.0%	0.0%	\$ -			\$ -	0.0%	0.0%	\$ -			\$ 155	0.0%
Humanities	\$ 239	0.1%	11.7%	\$ 679	1.4%	33.3%	\$ 10	0.0%	0.5%	\$ 1,109			\$ -			\$ 2,037	0.4%
Visual and Performing Arts	\$ 20	0.0%	29.0%	\$ 34	0.1%	49.3%	\$ 8	0.0%	11.6%	\$ 7	0.01%	10.1%	\$ -			\$ 69	0.01%
Business and Management	\$ 680	0.4%	41.7%	\$ 577	1.2%	35.4%	\$ 19	0.1%	1.2%	\$ 355	0.6%	21.8%	\$ -			\$ 1,631	0.3%
Comm., Journalism & Library Sci	\$ 110		84.6%	\$ 12	0.0%	9.2%	\$ -		0.0%	\$ 8	0.0%	6.2%	\$ -			\$ 130	0.0%
Social Work	\$ -		0.0%	\$ 42		100.0%	\$ -		0.0%	\$ -		0.0%	\$ -			\$ 42	
Other Non-Science and Engin.	\$ -		0.0%	\$ 4,128	8.8%	72.2%	\$ 1	0.0%	0.0%	\$ 1,589	2.8%	27.8%	\$ -			\$ 5,718	1.2%
<b>TOTAL, NON-SCI &amp; ENG FIELDS</b>	<b>\$ 4,450</b>	<b>2.8%</b>	<b>21.8%</b>	<b>\$ 10,391</b>	<b>22.1%</b>	<b>50.9%</b>	<b>\$ 1,326</b>	<b>6.4%</b>	<b>6.5%</b>	<b>\$ 4,233</b>	<b>7.5%</b>	<b>20.8%</b>	<b>\$ -</b>			<b>\$ 20,400</b>	<b>4.2%</b>
<b>TOTAL, SCI &amp; ENG FIELDS</b>	<b>\$ 156,216</b>	<b>97.2%</b>	<b>33.3%</b>	<b>\$ 36,637</b>	<b>77.9%</b>	<b>7.8%</b>	<b>\$ 19,343</b>	<b>93.6%</b>	<b>4.1%</b>	<b>\$ 52,431</b>	<b>92.5%</b>	<b>11.2%</b>	<b>\$ 204,033</b>	<b>100.0%</b>	<b>43.5%</b>	<b>\$ 468,660</b>	<b>95.8%</b>
<b>GRAND TOTAL</b>	<b>\$ 160,666</b>		<b>32.9%</b>	<b>\$ 47,028</b>		<b>9.6%</b>	<b>\$ 20,669</b>		<b>4.2%</b>	<b>\$ 56,664</b>		<b>11.6%</b>	<b>\$ 204,033</b>		<b>41.7%</b>	<b>\$ 489,060</b>	<b>100.0%</b>

Source: Campus NSF surveys. All dollars are in thousands.

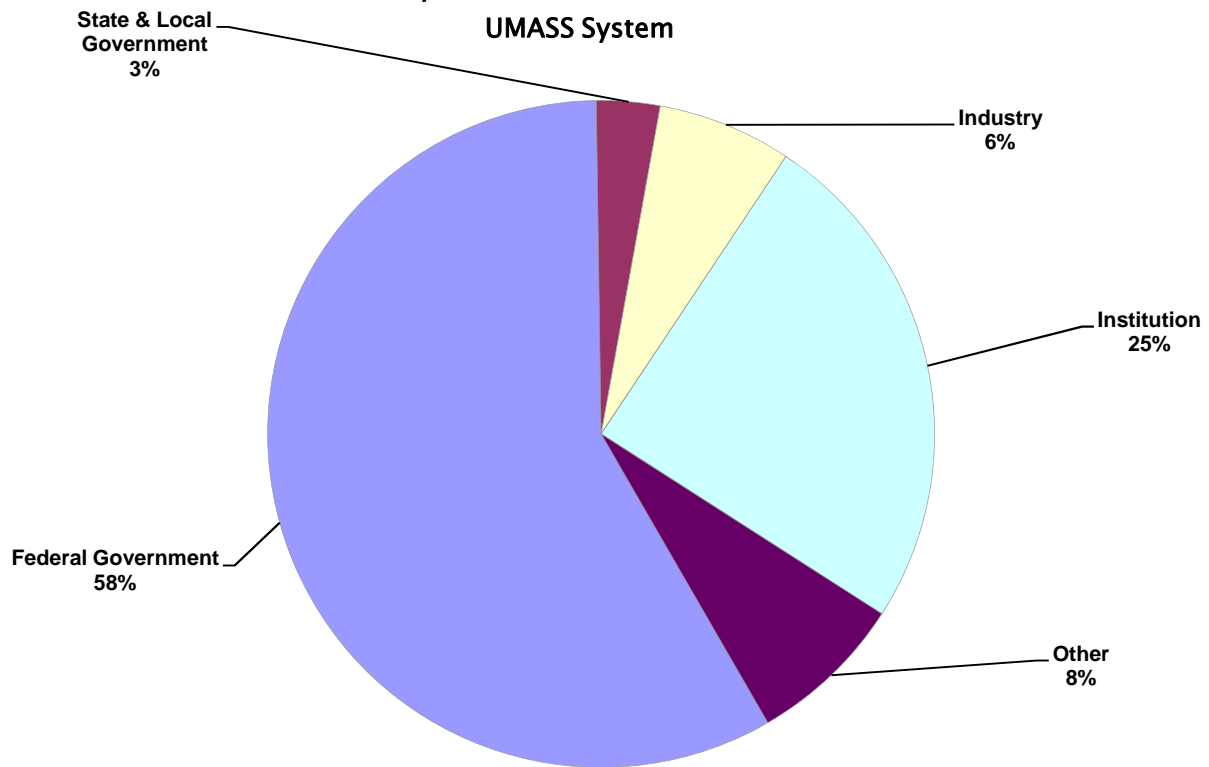
Note: % of Total is the percentage each field represents of total campus or system R&D expenditures in all fields.

% of Field is the percentage of the UMass system's expenditures in a particular field represented by that campus.

## Science and Engineering R&D Expenditures UMASS System FY2005 – FY2009



## Science and Engineering R&D Expenditures by Source of Funds FY2009 UMASS System



Source: Campus NSF surveys. All dollars are in thousands.

**Science and Engineering R&D Expenditures by Source  
FY2005 – FY2009**

	Total R&D Expenditures								
	FY05	FY06	FY07	FY08	FY09	5-Year Change FY05 - FY09		1-Year Change FY08 - FY09	
						\$	%	\$	%
Amherst	\$127,487	\$136,057	\$141,351	\$152,884	\$156,216	\$28,729	22.5%	\$3,332	2.2%
Boston	\$18,148	\$21,056	\$25,952	\$30,272	\$36,637	\$18,489	101.9%	\$6,365	21.0%
Dartmouth	\$19,452	\$19,171	\$19,538	\$20,431	\$19,343	-\$109	-0.6%	-\$1,088	-5.3%
Lowell	\$23,852	\$27,635	\$34,824	\$36,486	\$52,431	\$28,579	119.8%	\$15,945	43.7%
Worcester	\$149,267	\$156,452	\$157,469	\$178,614	\$204,033	\$54,766	36.7%	\$25,419	14.2%
<b>System</b>	<b>\$338,206</b>	<b>\$360,371</b>	<b>\$379,134</b>	<b>\$418,687</b>	<b>\$468,660</b>	<b>\$130,454</b>	<b>38.6%</b>	<b>\$49,973</b>	<b>11.9%</b>

	Federal R&D Expenditures								
	FY05	FY06	FY07	FY08	FY09	5-Year Change FY05 - FY09		1-Year Change FY08 - FY09	
						\$	%	\$	%
Amherst	\$66,921	\$69,642	\$71,974	\$79,736	\$80,163	\$13,242	19.8%	\$427	0.5%
Boston	\$6,326	\$8,610	\$9,152	\$12,001	\$13,536	\$7,210	114.0%	\$1,535	12.8%
Dartmouth	\$9,852	\$9,515	\$11,456	\$13,087	\$9,667	-\$185	-1.9%	-\$3,420	-26.1%
Lowell	\$17,608	\$18,741	\$20,045	\$22,406	\$23,083	\$5,475	31.1%	\$677	3.0%
Worcester	\$130,680	\$136,141	\$131,226	\$145,113	\$145,834	\$15,154	11.6%	\$721	0.5%
<b>System</b>	<b>\$231,387</b>	<b>\$242,649</b>	<b>\$243,853</b>	<b>\$272,343</b>	<b>\$272,283</b>	<b>\$40,896</b>	<b>17.7%</b>	<b>-\$60</b>	<b>0.0%</b>

	State & Local Government R&D Expenditures								
	FY05	FY06	FY07	FY08	FY09	5-Year Change FY05 - FY09		1-Year Change FY08 - FY09	
						\$	%	\$	%
Amherst	\$3,873	\$5,684	\$5,638	\$4,699	\$5,439	\$1,566	40.4%	\$740	15.7%
Boston	\$2,481	\$1,662	\$1,207	\$701	\$949	-\$1,532	-61.7%	\$248	35.4%
Dartmouth	\$5,039	\$5,069	\$2,210	\$1,641	\$1,312	-\$3,727	-74.0%	-\$329	-20.0%
Lowell	\$180	\$601	\$969	\$1,088	\$1,466	\$1,286	714.4%	\$378	34.7%
Worcester	\$139	\$35	\$0	\$895	\$5,265	\$5,126	3687.8%	\$4,370	488.3%
<b>System</b>	<b>\$11,712</b>	<b>\$13,051</b>	<b>\$10,024</b>	<b>\$9,024</b>	<b>\$14,431</b>	<b>\$2,719</b>	<b>23.2%</b>	<b>\$5,407</b>	<b>59.9%</b>

**Science and Engineering R&D Expenditures by Source  
FY2005 – FY2009**

	Industry-Sponsored R&D Expenditures								
	FY05	FY06	FY07	FY08	FY09	5-Year Change FY05 - FY09		1-Year Change FY08 - FY09	
						\$	%	\$	%
<b>Amherst</b>	\$4,724	\$5,934	\$5,195	\$8,182	\$8,505	\$3,781	80.0%	\$323	3.9%
<b>Boston</b>	\$0	\$0	\$275	\$552	\$333	\$333	NA	-\$219	-39.7%
<b>Dartmouth</b>	\$1,252	\$1,680	\$762	\$807	\$816	-\$436	-34.8%	\$9	1.1%
<b>Lowell</b>	\$4,755	\$4,423	\$5,222	\$6,299	\$6,772	\$2,017	42.4%	\$473	7.5%
<b>Worcester</b>	\$8,018	\$9,465	\$16,266	\$15,192	\$14,090	\$6,072	75.7%	-\$1,102	-7.3%
<b>System</b>	<b>\$18,749</b>	<b>\$21,502</b>	<b>\$27,720</b>	<b>\$31,032</b>	<b>\$30,516</b>	<b>\$11,767</b>	<b>62.8%</b>	<b>-\$516</b>	<b>-1.7%</b>

	Institutional R&D Expenditures								
	FY05	FY06	FY07	FY08	FY09	5-Year Change FY05 - FY09		1-Year Change FY08 - FY09	
						\$	%	\$	%
<b>Amherst</b>	\$42,887	\$45,773	\$48,755	\$49,556	\$50,647	\$7,760	18.1%	\$1,091	2.2%
<b>Boston</b>	\$6,731	\$7,007	\$11,122	\$13,048	\$15,993	\$9,262	137.6%	\$2,945	22.6%
<b>Dartmouth</b>	\$3,305	\$2,907	\$4,855	\$4,253	\$7,164	\$3,859	116.8%	\$2,911	68.4%
<b>Lowell</b>	\$1,309	\$3,870	\$8,588	\$6,693	\$21,110	\$19,801	1512.7%	\$14,417	215.4%
<b>Worcester</b>	\$1,583	\$2,377	\$1,385	\$2,626	\$20,916	\$19,333	1221.3%	\$18,290	696.5%
<b>System</b>	<b>\$55,815</b>	<b>\$61,934</b>	<b>\$74,705</b>	<b>\$76,176</b>	<b>\$115,830</b>	<b>\$60,015</b>	<b>107.5%</b>	<b>\$39,654</b>	<b>52.1%</b>

	Other R&D Expenditures								
	FY05	FY06	FY07	FY08	FY09	5-Year Change FY05 - FY09		1-Year Change FY08 - FY09	
						\$	%	\$	%
<b>Amherst</b>	\$9,082	\$9,024	\$9,789	\$10,711	\$11,462	\$2,380	26.2%	\$751	7.0%
<b>Boston</b>	\$2,610	\$3,777	\$4,196	\$3,970	\$5,826	\$3,216	123.2%	\$1,856	46.8%
<b>Dartmouth</b>	\$4	\$0	\$255	\$643	\$384	\$380	9500.0%	-\$259	-40.3%
<b>Lowell</b>	\$0	\$0	\$0	\$0	\$0	\$0	NA	\$0	NA
<b>Worcester</b>	\$8,847	\$8,434	\$8,592	\$14,788	\$17,928	\$9,081	102.6%	\$3,140	21.2%
<b>System</b>	<b>\$20,543</b>	<b>\$21,235</b>	<b>\$22,832</b>	<b>\$30,112</b>	<b>\$35,600</b>	<b>\$15,057</b>	<b>73.3%</b>	<b>\$5,488</b>	<b>18.2%</b>

Source: Campus NSF surveys. All dollars are in thousands.

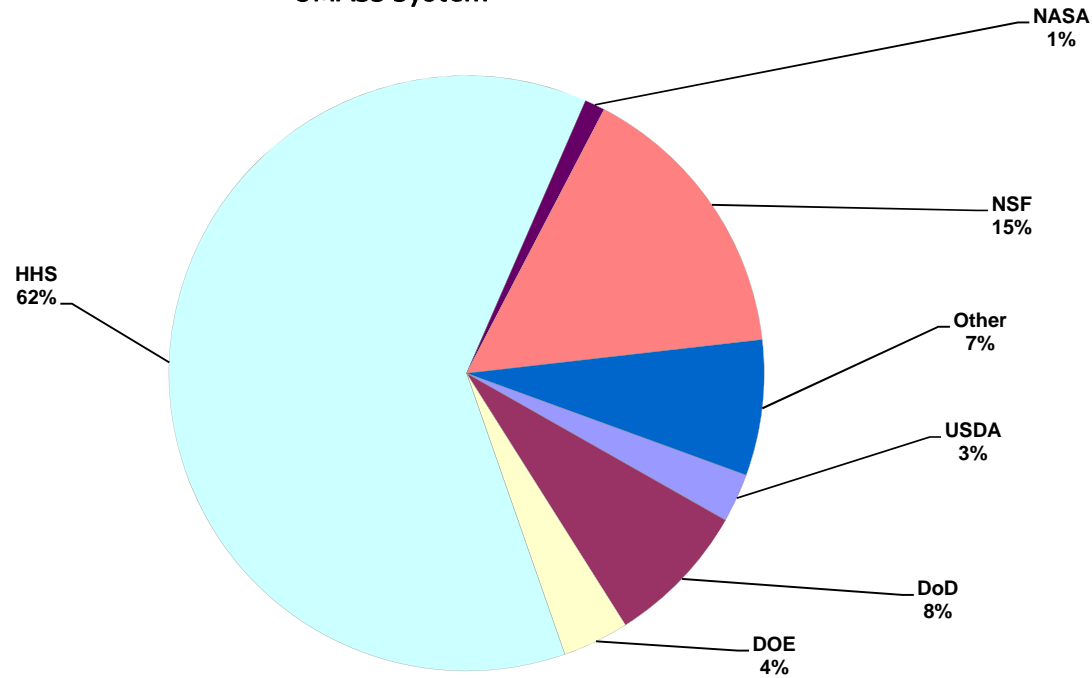
**Science and Engineering R&D Expenditures  
Percent Basic Research FY2009**

<b>FY09 Basic Research as a Percent of:</b>		
	<b>Federal R&amp;D</b>	<b>Total R&amp;D</b>
<b>Amherst</b>	70%	70%
<b>Boston</b>	55%	53%
<b>Dartmouth</b>	94%	89%
<b>Lowell</b>	74%	74%
<b>Worcester</b>	66%	49%

Source: Campus NSF surveys.



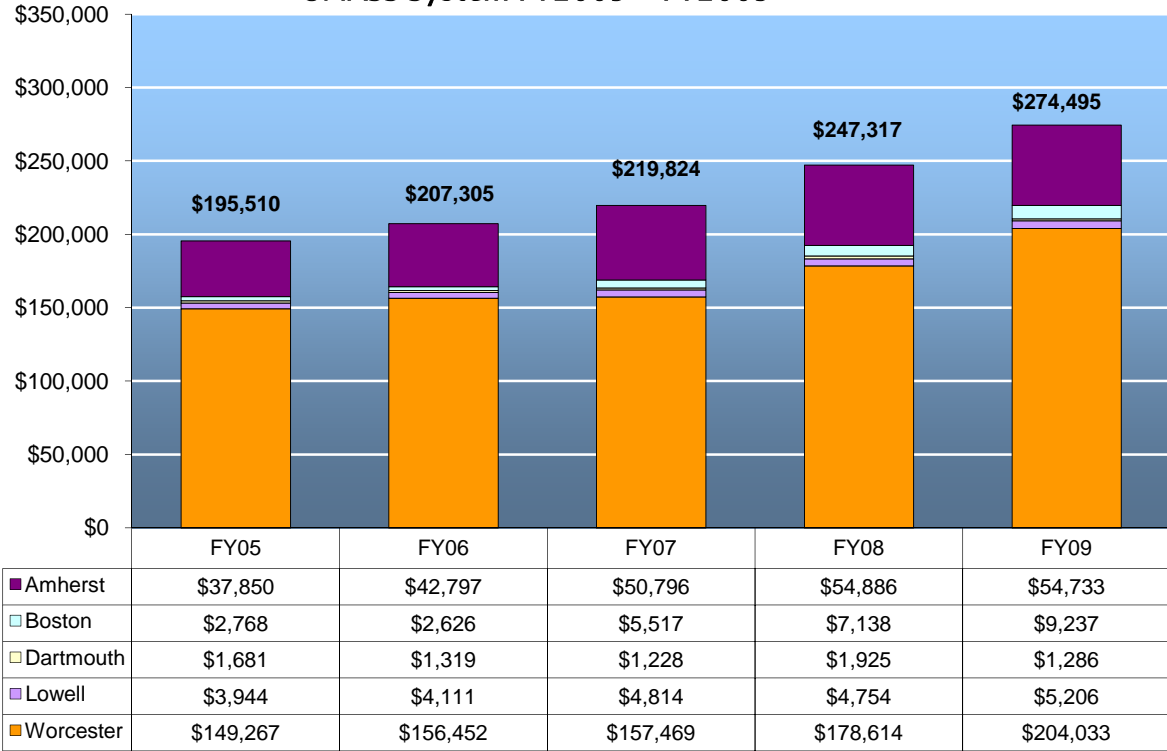
**Science and Engineering R&D Expenditures  
by Federal Government Agency Sources FY2009  
UMASS System**



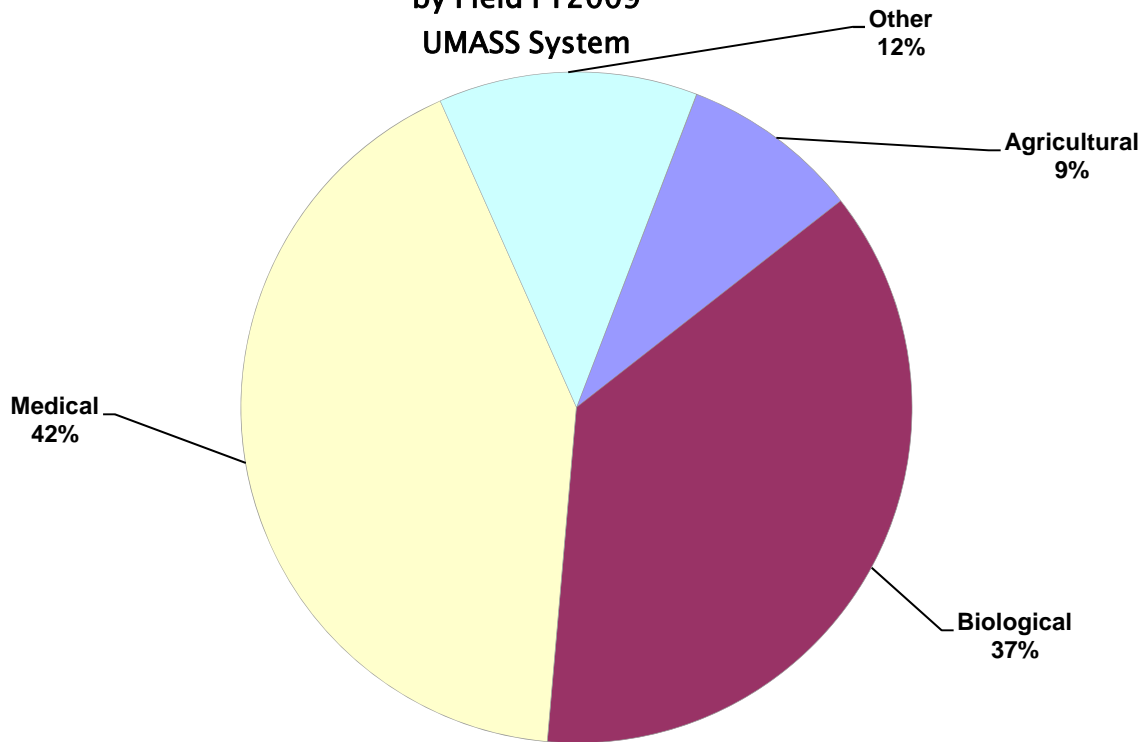
	Total Federal \$	USDA	% of Campus Total	DoD	% of Campus Total	DOE	% of Campus Total	HHS	% of Campus Total	NASA	% of Campus Total	NSF	% of Campus Total	Other	% of Campus Total
<b>Amherst</b>	\$ 80,163	\$ 6,559	8.2%	\$ 8,330	10.4%	\$ 7,737	9.7%	\$ 17,637	22.0%	\$ 1,856	2.3%	\$ 33,945	42.3%	\$ 4,099	5.1%
<b>Boston</b>	\$ 13,536	\$ 23	0.2%	\$ 138	1.0%	\$ 87	0.6%	\$ 2,606	19.3%	\$ 46	0.3%	\$ 2,368	17.5%	\$ 8,268	61.1%
<b>Dartmouth</b>	\$ 9,667	\$ 639	6.6%	\$ 1,775	18.4%	\$ -	0.0%	\$ 703	7.3%	\$ 127	1.3%	\$ 1,449	15.0%	\$ 4,974	51.5%
<b>Lowell</b>	\$ 23,083	\$ -	0.0%	\$ 11,097	48.1%	\$ 460	2.0%	\$ 4,993	21.6%	\$ 350	1.5%	\$ 4,128	17.9%	\$ 2,055	8.9%
<b>Worcester</b>	\$ 145,834	\$ -	0.0%	\$ -	0.0%	\$ 1,513	1.0%	\$ 142,603	97.8%	\$ 617	0.4%	\$ 438	0.3%	\$ 663	0.5%
<b>System</b>	\$ 272,283	\$ 7,221	2.7%	\$ 21,340	7.8%	\$ 9,797	3.6%	\$ 168,542	61.9%	\$ 2,996	1.1%	\$ 42,328	15.5%	\$ 20,059	7.4%

Source: Campus NSF surveys. All dollars are in thousands.  
Note: HHS includes NIH

### Life Sciences R&D Expenditures UMASS System FY2005 – FY2009



### Life Sciences R&D Expenditures by Field FY2009 UMASS System



Source: Campus NSF surveys. All dollars are in thousands.

**Life Sciences R&D Expenditures by Field  
FY2005 – FY2009**

	Life Sciences R&D Expenditures								
	FY05	FY06	FY07	FY08	FY09	5-Year Change FY05 - FY09		1-Year Change FY08 - FY09	
						\$	%	\$	%
<b>Amherst</b>	\$37,850	\$42,797	\$50,796	\$54,886	\$54,733	\$16,883	44.6%	-\$153	-0.3%
<b>Boston</b>	\$2,768	\$2,626	\$5,517	\$7,138	\$9,237	\$6,469	233.7%	\$2,099	29.4%
<b>Dartmouth</b>	\$1,681	\$1,319	\$1,228	\$1,925	\$1,286	-\$395	-23.5%	-\$639	-33.2%
<b>Lowell</b>	\$3,944	\$4,111	\$4,814	\$4,754	\$5,206	\$1,262	32.0%	\$452	9.5%
<b>Worcester</b>	\$149,267	\$156,452	\$157,469	\$178,614	\$204,033	\$54,766	36.7%	\$25,419	14.2%
<b>System</b>	<b>\$195,510</b>	<b>\$207,305</b>	<b>\$219,824</b>	<b>\$247,317</b>	<b>\$274,495</b>	<b>\$78,985</b>	<b>40.4%</b>	<b>\$27,178</b>	<b>11.0%</b>

	Agricultural								
	FY05	FY06	FY07	FY08	FY09	5-Year Change FY05 - FY09		1-Year Change FY08 - FY09	
						\$	%	\$	%
<b>Amherst</b>	\$17,017	\$19,183	\$20,795	\$24,478	\$23,088	\$6,071	35.7%	-\$1,390	-5.7%
<b>Boston</b>	\$0	\$0	\$0	\$0	\$0	\$0		\$0	
<b>Dartmouth</b>	\$1,180	\$744	\$739	\$602	\$531	-\$649	-55.0%	-\$71	-11.8%
<b>Lowell</b>	\$0	\$0	\$0	\$0	\$0	\$0		\$0	
<b>Worcester</b>	\$0	\$0	\$0	\$0	\$0	\$0		\$0	
<b>System</b>	<b>\$18,197</b>	<b>\$19,927</b>	<b>\$21,534</b>	<b>\$25,080</b>	<b>\$23,619</b>	<b>\$5,422</b>	<b>29.8%</b>	<b>-\$1,461</b>	<b>-5.8%</b>

	Biological								
	FY05	FY06	FY07	FY08	FY09	5-Year Change FY05 - FY09		1-Year Change FY08 - FY09	
						\$	%	\$	%
<b>Amherst</b>	\$16,309	\$17,996	\$22,757	\$22,823	\$23,323	\$7,014	43.0%	\$500	2.2%
<b>Boston</b>	\$1,417	\$1,439	\$2,345	\$3,384	\$3,020	\$1,603	113.1%	-\$364	-10.8%
<b>Dartmouth</b>	\$190	\$263	\$465	\$970	\$711	\$521	274.2%	-\$259	-26.7%
<b>Lowell</b>	\$1,036	\$885	\$1,378	\$1,477	\$1,531	\$495	47.8%	\$54	3.7%
<b>Worcester</b>	\$58,543	\$61,571	\$56,562	\$63,980	\$72,851	\$14,308	24.4%	\$8,871	13.9%
<b>System</b>	<b>\$77,495</b>	<b>\$82,154</b>	<b>\$83,507</b>	<b>\$92,634</b>	<b>\$101,436</b>	<b>\$23,941</b>	<b>30.9%</b>	<b>\$8,802</b>	<b>9.5%</b>

**Life Sciences R&D Expenditures by Field  
FY2005 – FY2009**

	<b>Medical</b>								
	FY05	FY06	FY07	FY08	FY09	5-Year Change FY05 - FY09		1-Year Change FY08 - FY09	
						\$	%	\$	%
<b>Amherst</b>	\$1,804	\$3,191	\$5,401	\$6,575	\$7,237	\$5,433	301.2%	\$662	10.1%
<b>Boston</b>	\$0	\$0	\$2,984	\$2,934	\$3,493	\$3,493		\$559	19.1%
<b>Dartmouth</b>	\$0	\$0	\$0	\$0	\$0	\$0		\$0	
<b>Lowell</b>	\$2,886	\$0	\$0	\$0	\$0	-\$2,886	-100.0%	\$0	
<b>Worcester</b>	\$69,314	\$76,250	\$82,470	\$93,501	\$104,417	\$35,103	50.6%	\$10,916	11.7%
<b>System</b>	<b>\$74,004</b>	<b>\$79,441</b>	<b>\$90,855</b>	<b>\$103,010</b>	<b>\$115,147</b>	<b>\$41,143</b>	<b>55.6%</b>	<b>\$12,137</b>	<b>11.8%</b>

	<b>Other Life Sciences</b>								
	FY05	FY06	FY07	FY08	FY09	5-Year Change FY05 - FY09		1-Year Change FY08 - FY09	
						\$	%	\$	%
<b>Amherst</b>	\$2,720	\$2,427	\$1,843	\$1,010	\$1,085	-\$1,342	-55.3%	\$75	7.4%
<b>Boston</b>	\$1,351	\$1,187	\$188	\$820	\$2,724	\$1,537	129.5%	\$1,904	232.2%
<b>Dartmouth</b>	\$311	\$312	\$24	\$353	\$44	-\$268	-85.9%	-\$309	-87.5%
<b>Lowell</b>	\$22	\$3,226	\$3,436	\$3,277	\$3,675	\$449	13.9%	\$398	12.1%
<b>Worcester</b>	\$ 21,410	\$18,631	\$18,437	\$21,133	\$26,765	\$8,134	43.7%	\$5,632	26.7%
<b>System</b>	<b>\$ 25,814</b>	<b>\$25,783</b>	<b>\$23,928</b>	<b>\$26,593</b>	<b>\$34,293</b>	<b>\$8,510</b>	<b>33.0%</b>	<b>\$7,700</b>	<b>29.0%</b>

Source: Campus NSF surveys and WebCASPAR. All dollars are in thousands.