Annual Report on Research and Scholarship

FY2011 Financial Summary

Stephen R. Forrest
Vice President for Research

January 19, 2012

UNIVERSITY OF MICHIGAN
Office of the Vice President for Research

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The University fulfills three basic, interlocking functions: to educate youth in the widest possible variety of intellectual disciplines; to collect, increase, and disseminate knowledge that bears on these disciplines; and to perform those services for society, both individually and collectively, which, consistent with its education and research functions, it is peculiarly qualified to perform.

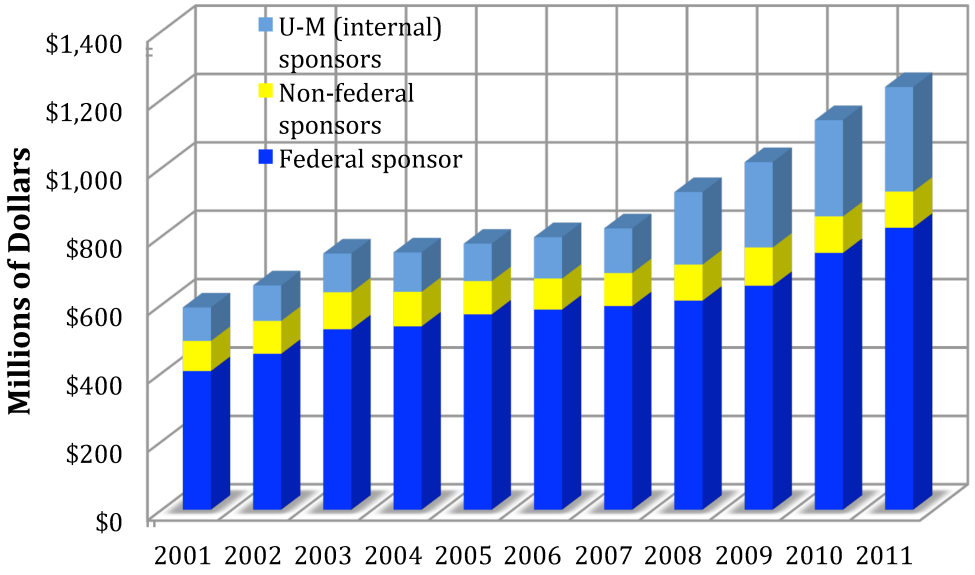
--Harlan Hatcher, Eighth President of the University of Michigan

On the occasion of the 90th annual report on research and scholarship at the University of Michigan, the words written in 1962 by President Harlan Hatcher in his forward to the 40th report on research continue to define the central role of research in our academic community. Conducting research as an integral part of the learning process—at both the graduate and undergraduate levels—has been critical to the success of our research enterprise, and to the success of our students as they go on to careers in industry, government, and academia.

More broadly, this approach to higher education is the foundation of the processes of innovation and entrepreneurship that drive our economy. The ideas and people emerging from academia have been the source of a broad range of new products, new processes, new companies, and entirely new industries.

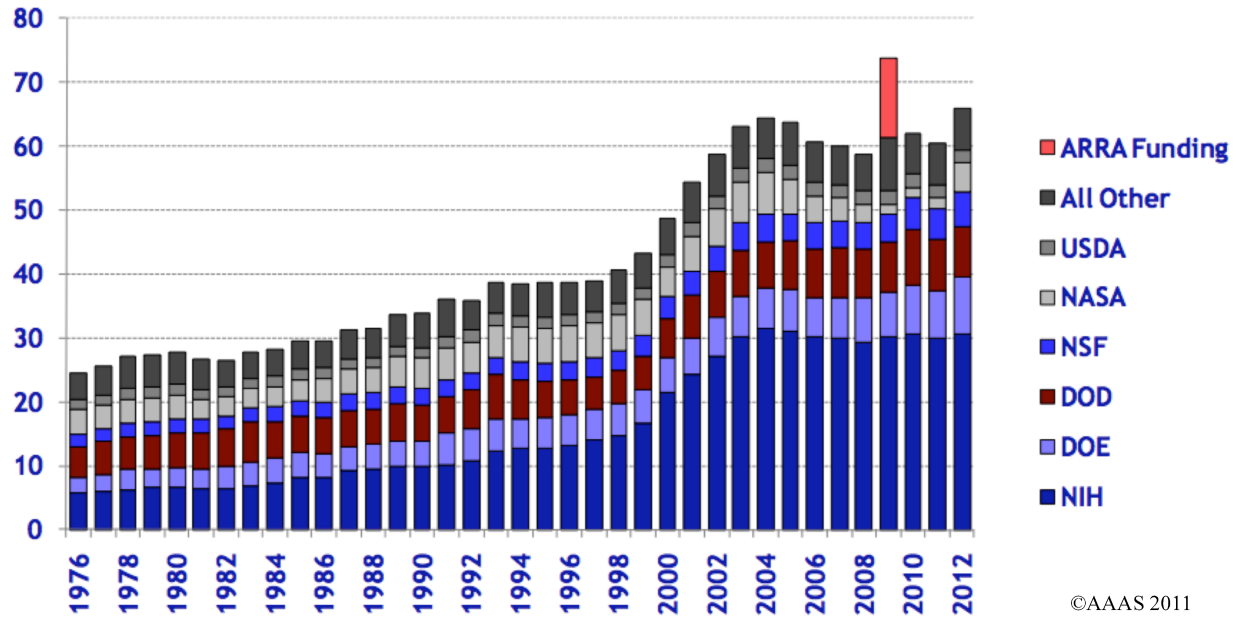
As a strong indicator of our continued strength and reputation as a research and educational institution, the University of Michigan expenditures in support of research, scholarship and creative activity continued to grow at a steady pace in Fiscal Year 2011 – total expenditures for the third year in a row surpassed $1 billion, reaching $1,236,510,624. The total is an increase of 8.5% over FY2010. Overall, the University's research portfolio is the largest in the country for a public university. In the most recent NSF report based on FY2009 research expenditures, U-M was listed first among public universities and second overall (see Appendix I). The University's research expenditures growth trend for the last decade is summarized in Figure 1.

Figure 1: Research Expenditures by Major Sponsor Group FY2001-2011



Total research expenditures have doubled over the last decade, and maintained a healthy level of growth in the last three years after several years of small increases. This growth is occurring in spite of a no-growth federal funding trend for research, indicating U-M's exceptionally strong competitive standing among its peers. This trend in federal funds for research through 2012 is shown in Figure 2. Due to the

Figure 2: Trends in Federal R&D by Agency, FY1976-2012
In billions of constant FY2011 dollars



addition of "stimulus" spending on research, federal R&D has shown a corresponding increase for 2010 and 2011. The longer-term prospects for federal R&D support are less certain.

Just under one-third of the University's total non-hospital budget comes from research funding, including the federal government, industry, and foundations. Table 1 shows the total research expenditures divided into the three major sponsor groups of federal, non-federal and University spending. Within the non-federal group, the industry, foundation and State of Michigan components are broken out. Indirect industry funding is the result of industry subcontracts where the original source of funds is the federal government, and thereby is counted in that major sponsor group

Table 1: U-M Research Expenditures by Major Sponsor Group, FY2011

Sponsor Group	Expenditures	% of total
Total Federal Government	$824,752,621	66.7%
Total Non-Federal Sponsors	$105,629,030	8.5%
*Industry (direct)***	*$40,839,950*	*3.3%*
Foundations	*$21,487,269*	*1.7%*
State of Michigan/Counties/Cities	*$1,838,644*	*0.1%*
Total U-M Funds	$306,128,972	24.8%
Total Research Expenditures	$1,236,510,624	

***subcontracts from industry under federal government as the prime sponsor are not included in this number; seeTable 3.*

Federal funding, which comprises two-thirds of the U-M's current research total, has long been the largest source of research support at the U-M. University internal funds allocated by schools and colleges, departments, the Office of the Provost, and OVPR – a vital factor contributing to the University's success in obtaining external funding – accounted for one-quarter of our spending in FY2011. We note that the sponsored research funding was obtained only through competitive proposals submitted by our faculty as is consistent with our "no earmark" policy, indicating that the U-M's long-term investment in faculty recruitment is paying off at this critical time.

Table 2 provides additional detail about the sources of research funding for FY2010 and FY2011, including the year-to-year change in dollar amounts, and percent. Additional details can be found in Appendix II.

Table 2: U-M Research Expenditures
Percent Change by Major Sponsor Group, FY2010-2011

Sponsor Group	FY10	% of total	FY11	% of total	$ Chg.	% Chg.
Total Federal	$750,937,273	65.9%	$824,752,621	66.7%	$73,815,348	9.8%
NIH	*$507,485,540*	*44.5%*	*$571,188,536*	*46.2%*	*$63,702,996*	*12.6%*
NSF	*$67,331,716*	*5.9%*	*$74,246,980*	*6.0%*	*$6,915,264*	*10.3%*
DOD	*$65,970,563*	*5.8%*	*$62,738,099*	*5.1%*	*$3,232,464*	*-4.9%*
Energy	*$27,145,008*	*2.4%*	*$35,409,948*	*2.9%*	*$8,264,940*	*30.4%*
N.A.S.A.	*$16,412,115*	*1.4%*	*$15,339,972*	*1.2%*	*-$1,072,143*	*-6.5%*
Transportation	*$10,456,674*	*0.9%*	*$7,782,251*	*0.6%*	*-$2,674,423*	*-25.6%*
Commerce	*$9,489,189*	*0.8%*	*$10,788,559*	*0.9%*	*$1,299,370*	*13.7%*
Total Non-Federal	$106,762,901	9.4%	$105,629,030	8.5%	-$1,133,871	-1.1%
Industry	*$39,269,613*	*3.4%*	*$40,839,950*	*3.3%*	*$1,570,337*	*4.0%*
Foundations	*$24,881,157*	*2.2%*	*$21,487,269*	*1.7%*	*-$3,393,888*	*-13.6%*
State of Mi./Local Govt.	*$3,792,924*	*0.3%*	*$1,838,644*	*0.1%*	*-$1,954280*	*-51.5%*
Total U-M	$249,658,394	24.6%	$281,793,811	24.7%	$32,135,417	12.9%
Total Expenditures	$1,139,493,986		$1,236,510,624		$97,016,638	8.5%

Table 3 gives a picture of the U-M's industry volume broken out by separate sources of private sector research support. While direct contracts with industry fell due to the significant economic downturn in which we still find ourselves, the U-M has seen growth via subcontracts from industry and from grants with companies, foundations and professional organizations. Overall, the nearly flat trend from FY2010 to FY2011 is most likely due to the ongoing economic trends, and their dampening effect on industry research spending.

Table 3: U-M Industry Research Support, FY2010-2011

	FY10	FY11	% Chg.
Industry Research (total)	$62,477,883	$61,601,746	-0.1%
Direct Contract	*$39,013,143*	*$40,839,950*	*4.6%*
Subcontract (on Federal Prime)	*$18,321,297*	*$16,547,962*	*-9.6%*
Corp. Foundations, Prof. Org., etc.	*$3,429,752*	*$1,340,566*	*-60.9%*
Other Industry Research	*$1,713,691*	*$2,873,268*	*67.6%*

Another useful snapshot of the research enterprise is the breakdown of expenditures by University unit. In Table 4, the expenditures for FY2011 are allocated to each school and college, and the percent change from FY2010 for each is noted. As has been the case for many years, the Medical School's portfolio is the largest on campus, at just over 44% of the University total. Engineering, LSA, ISR, and Public Health round out the top five. The OVPR Units category represents the sum of expenditures by the

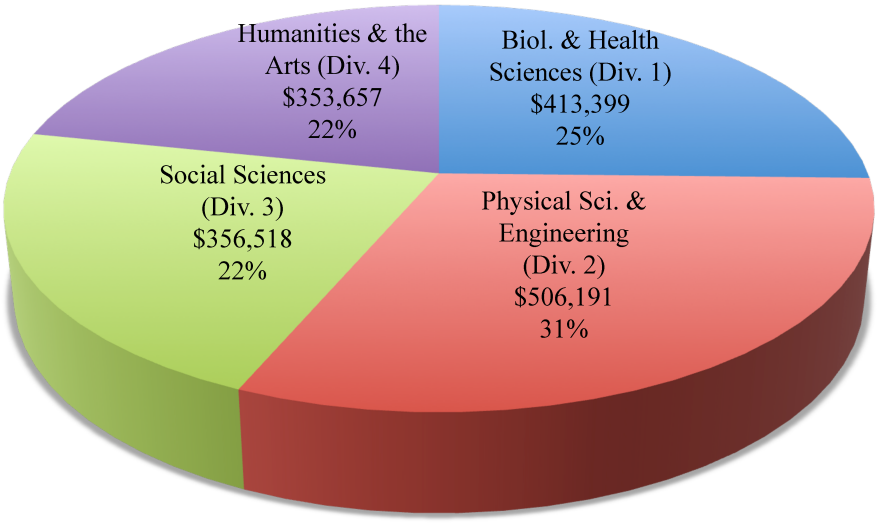
independent research units that report directly to OVPR rather than a school or college. Additional details of unit research expenditures can be found in Appendix III.

Table 4: Research Expenditures by Unit, FY2011

Unit	FY11	Change	Unit	FY11	Change
Medical School	$544.9M	9.3%	Rackham	$6.1M	1.4%
Engineering	$178.8M	-0.7%	Social Work	$5.6M	4.0%
LSA	$138.7M	24.6%	Nursing	$4.9M	-0.1%
ISR	$114.1M	13.7%	Kinesiology	$4.5M	4.3%
Public Health	$83.0M	35.6%	Information	$4.3M	12.8%
OVPR Units	$29.9M	-5.1%	Law	$3.7M	8.4%
Dentistry	$19.9M	1.1%	Public Policy	$3.6M	29.8%
SNRE	$15.3M	13.6%	Arch. & Urban Pl.	$1.1M	27.2%
Education	$12.0	15.2%	UM-Flint	$672K	16.0%
Pharmacy	$8.4M	3.6%	Music	$259K	-19.7%
Business	$7.4M	-4.9%	Art and Design	$101K	-26.5%
UM-Dearborn	$7.2M	16.1%	Other Units	$35.0M	4.4%

One significant way that OVPR contributes to research and scholarship in the schools and colleges is through its Faculty Grants and Awards Program. Figure 3 shows the breakdown of OVPR allocations for FY2011 by broad disciplinary area. The program provides bridging funds for projects, seed funding for junior faculty as well as for senior faculty who are changing research direction, and support in areas where sponsor funding is unusually constrained. Thus, almost one-fourth of the total funding from this program supports the Humanities and the Arts, although the total external funding brought in by these fields is less than 1% of our total research volume.

Figure 3: OVPR Faculty Grants and Awards Program Allocations by Division, FY2011



It is worth noting that while the federal government is our largest supporter of the research and graduate educational mission, it is not the sole supporter. Substantial support (24.8%) for these core activities is provided directly from university funds, and a much smaller proportion (3.3%) comes via the industrial sector. However, all of these several components fulfill essential roles in our ability to develop new ideas while building a highly educated workforce.

The economic and social importance of ideas emerging from university research was explicitly acknowledged with the passage of the Bayh-Dole Act in 1980. This law provides incentives for universities to license the results of federally funded research to help ensure that the public will benefit from its deep investment in research. Through the work of the Office of Technology Transfer (OTT), the University has been a leader in encouraging the commercialization of research results. Figures 4 and 5 capture the key performance trends for OTT.

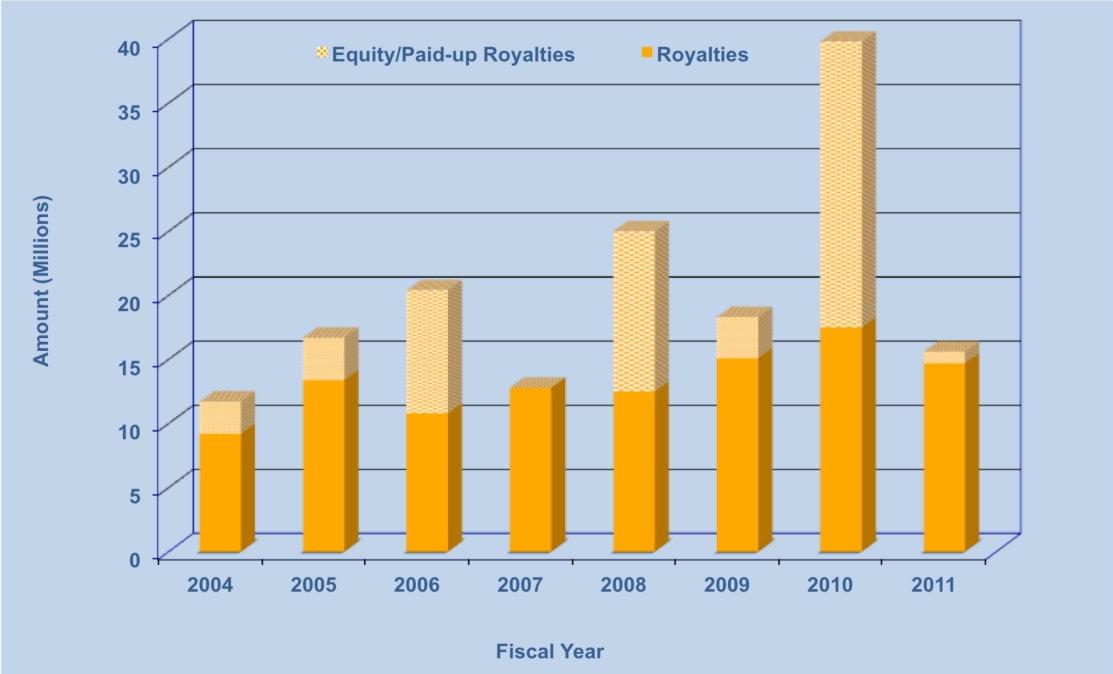
Figure 4 shows that there is a significant volume of invention reports and licensing agreements. Tech transfer revenues (Figure 5) can fluctuate considerably from year to year. That is, revenues can rise due to the presence of one or two large payments or an equity sale, while a drop may indicate that a large deal simply did not materialize in that particular year.

These tech transfer revenues are used to provide incentives to faculty inventors, to support additional high-impact research on campus, and to fund OVPR efforts at increasing industry research impact through direct project funding and support of the Business Engagement Center, the U-M Venture Center, the U-M Venture Accelerator at the North Campus Research Complex (NCRC), etc. It is significant to note that the University has been launching an average of one company based on U-M technologies every five weeks for the last ten years.

Figure 4: U-M Tech Transfer Results, FY2005-2011



Figure 5: Office of Technology Transfer Revenues, FY2004-2011



The Business Engagement Center (BEC), now four years old, provides a gateway for members of the private sector wishing to utilize U-M resources or partner with our faculty. The operation reports to both OVPR and the U-M Office of Development. The BEC maintains relationships with more than 1,000 companies and is contacted by over 300 new companies each year.

The BEC plays a key role as a partner in local economic development and works closely with other organizations such as Ann Arbor SPARK, Michigan Economic Development Corporation, and Chambers of Commerce around the state. Through these partnerships facilitated by the BEC, the University expands its footprint in the business community by helping to attract, retain and nurture high-growth companies. Recent successes in 2011 include BEC's role in attracting the U.S. Patent and Trademark Office satellite office to Detroit, and assisting in securing important research programs funded by Dow Chemical Corp.

Conclusion

In FY2011, U-M surpassed $1 billion in research spending for the third year. As shown in Appendix I below, U-M ranks first among public universities in total research expenditures as of 2009, and second only behind Johns Hopkins University, according to the most recent data from the National Science Foundation. This demonstrates the insight and ingenuity of our faculty and the proficiency and efficiency of our administrative systems, which have overseen significant growth in U-M's research volume over the last several years.

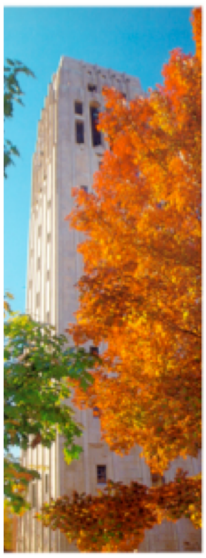
Looking ahead, OVPR anticipates that federal support for research is likely to be flat or to grow only slowly over the next few years, and certainly not at the pace it has over the last decade. A number of proactive steps are being taken to enhance the competitiveness of U-M researchers for this period of slow growth of federal funds. A major initiative for example is the reorganization of our contracting and grants organization (the Office of Research and Sponsored Projects) to ease the process of grant writing and submission for our extremely busy and creative faculty.

In addition to continuing its tradition of broad and deep support for faculty scholarship, the University is committed to increasing industry engagement. Our ability to capitalize on our culture of cooperation with industry, to build on our inherent strengths in interdisciplinary research, and to utilize the facilities at the North Campus Research Complex for new research programs will be keys to continuing the institution's research growth and success in the future.

At the same time U-M seeks to strengthen its role in encouraging entrepreneurship, innovation, spin-outs, and economic development. It is important to highlight U-M's involvement in the Advanced Manufacturing Partnership, a national initiative launched in 2011 that brings academia, industry, and government together to strengthen the nation's manufacturing sector. This is just one of a wide range of novel programs, partnerships, and activities that are under way across campus and beyond to ensure that the public benefits from the University's research activities and expertise.

Although the scientific, technological, and economic challenges society faces are in constant flux, we remain committed to the integration of research and education outlined so succinctly by President Harlan Hatcher fifty years ago. It has been at the heart of our effectiveness as a public institution in the past, and it will remain so in the future.

Appendix I: Rank of Top 10 Universities by Total Research Expenditures



Institution	FY 2008	FY 2009	% Change
Johns Hopkins	$1,681M	$1,856M	+10.4%
Michigan	$876M	$1007M	+14.9%
Wisconsin	$882M	$952M	+8.0%
UC-San Francisco	$885M	$948M	+7.1%
UCLA	$871M	$890M	+2.1%
UC-San Diego	$842M	$879M	+4.4%
Duke	$767M	$805M	+5.0%
Washington	$765M	$778M	+1.7%
Penn State	$701M	$753M	+7.4%
Minnesota	$683M	$741M	+8.5%

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Research and Development Expenditures at Universities and Colleges, FY 2009.

1) Total includes R&D expenditures for the federal Applied Physics Laboratory on the JHU campus.

Appendix II: Volume of Research Expenditures By Sponsor (FY2010-2011)

SOURCE	FY 2010	PERCENT OF TOTAL	FY 2011	PERCENT OF TOTAL	PERCENT CHANGE
FEDERAL SOURCES					
Health and Human Services					
National Institutes of Health	507,485,540	44.5%	571,188,536	46.2%	12.6%
Centers for Disease Control	13,208,585	1.2%	11,044,603	0.9%	-16.4%
Centers for Medicare & Medicaid Administration	3,373,731	0.3%	3,785,734	0.3%	12.2%
Health Resources & Services Administration	1,870,868	0.2%	1,148,470	0.1%	-38.6%
Food and Drug Administration	526,623	0.0%	1,145,137	0.1%	117.4%
Substance Abuse and Mental Health Services	917,788	0.1%	41,006	0.0%	-95.5%
Other HHS	3,449,434	0.3%	5,725,241	0.5%	66.0%
Total Health and Human Services	530,832,569	46.6%	594,078,727	48.0%	11.9%
National Science Foundation	67,331,716	5.9%	74,246,980	6.0%	10.3%
Department of Defense					
Army	26,854,241	2.4%	26,904,994	2.2%	0.2%
Air Force	14,795,761	1.3%	13,480,893	1.1%	-8.9%
Navy	11,470,483	1.0%	10,637,004	0.9%	-7.3%
Other	12,850,078	1.1%	11,715,208	0.9%	-8.8%
Total Department of Defense	65,970,563	5.8%	62,738,099	5.1%	-4.9%
Energy	27,145,008	2.4%	35,409,948	2.9%	30.4%
N.A.S.A.	16,412,115	1.4%	15,339,972	1.2%	-6.5%
Commerce	9,489,189	0.8%	10,788,559	0.9%	13.7%
Education	8,341,857	0.7%	9,331,514	0.8%	11.9%
Transportation	10,456,674	0.9%	7,782,251	0.6%	-25.6%
Environmental Protection Agency	1,969,105	0.2%	3,571,278	0.3%	81.4%
Homeland Security	2,519,190	0.2%	2,407,570	0.2%	-4.4%
Social Security Administration	2,154,618	0.2%	2,355,789	0.2%	9.3%
Justice	2,020,501	0.2%	1,897,779	0.2%	-6.1%
Nuclear Regulatory Commission	810,660	0.1%	772,439	0.1%	-4.7%
Agriculture	1,183,790	0.1%	735,592	0.1%	-37.9%
Museum and Library Services, Institute of	330,422	0.0%	671,399	0.1%	103.2%
Smithsonian Institution	344,443	0.0%	443,736	0.0%	28.8%
Agency for International Development	586,105	0.1%	432,385	0.0%	-26.2%
State	459,906	0.0%	415,406	0.0%	-9.7%
Interior	453,218	0.0%	396,526	0.0%	-12.5%
Housing and Urban Development	1,019,494	0.1%	276,592	0.0%	-72.9%
Verterans Affairs	63,574	0.0%	167,761	0.0%	163.9%
Library of Congress	337,528	0.0%	80,508	0.0%	-76.1%
National Archives and Records Administration	67,576	0.0%	62,274	0.0%	-7.8%
Central Intelligence Agency	255,622	0.0%	23,781	0.0%	N/A
Labor	10,400	0.0%	0	0.0%	-100.0%
National Endowment for the Humanities	111,415	0.0%	-25,579	0.0%	-123.0%
Other Federal	260,015	0.0%	351,335	0.0%	35.1%
Total Federal Government	750,937,273	65.9%	824,752,621	66.7%	9.8%
NON-FEDERAL SPONSORS					
Industry	39,269,613	3.4%	40,839,950	3.3%	4.0%
Foundations	24,881,157	2.2%	21,487,269	1.7%	-13.6%
Public Charities	15,468,081	1.4%	15,885,246	1.3%	2.7%
Other (includes Universities & Gifts)	7,847,686	0.7%	10,077,758	0.8%	28.4%
Endowment	7,501,223	0.7%	8,386,282	0.7%	11.8%
Trade and Professional Associations	7,508,958	0.7%	6,303,146	0.5%	-16.1%
State of Michigan & Local Michigan Authorities	3,792,924	0.3%	1,838,644	0.1%	-51.5%
International Organizations	245,780	0.0%	615,788	0.0%	150.5%
Foreign National Governments	247,479	0.0%	194,947	0.0%	-21.2%
Total Non-Federal Sponsors	106,762,901	9.4%	105,629,030	8.5%	-1.1%
Total Sponsored Research	857,700,174	75.3%	930,381,651	75.2%	8.5%
UNIVERSITY OF MICHIGAN SOURCES					
University of Michigan Funds	281,793,811	24.7%	306,128,972	24.8%	8.6%
TOTAL RESEARCH EXPENDITURES	1,139,493,986	100.0%	1,236,510,624	100.0%	8.5%

Appendix III: U-M Volume of Research Expenditures by University Unit (FY2010-2011)

UNIT	FY 2009 *	FY 2010	FY 2011	Average Percent Change	2009-10 Change	2010-11 Change
Architecture & Urban Planning, Taubman	1,371,319	833,342	**1,059,760**	-6.0%	-39.2%	27.2%
Art and Design	131,090	137,759	**101,187**	-10.7%	5.1%	-26.5%
Business, Ross School of	9,324,220	7,767,901	**7,386,928**	-10.8%	-16.7%	-4.9%
Dentistry	16,207,652	19,710,470	**19,928,275**	11.4%	21.6%	1.1%
Education	12,820,924	10,418,751	**12,000,661**	-1.8%	-18.7%	15.2%
Engineering	160,152,222	180,098,936	178,835,243.94	5.9%	12.5%	-0.7%
Graduate School, Rackham	5,099,480	5,967,005	**6,050,911**	9.2%	17.0%	1.4%
Information	4,171,725	3,845,026	**4,338,032**	2.5%	-7.8%	12.8%
Kinesiology	3,455,873	4,304,343	**4,489,032**	14.4%	24.6%	4.3%
Law	4,533,395	3,429,652	**3,716,568**	-8.0%	-24.3%	8.4%
Literature Science, and the Arts	85,365,727	111,307,842	**138,744,879**	27.5%	30.4%	24.6%
Medical School	445,782,418	498,423,751	**544,851,959**	10.6%	11.8%	9.3%
Music	321,465	322,199	**258,795**	-9.7%	.2%	-19.7%
Natural Resources and the Environment	12,831,821	13,422,397	**15,253,078**	9.1%	4.6%	13.6%
Nursing	4,851,284	4,877,672	**4,874,672**	.2%	.5%	-0.1%
Pharmacy	7,265,991	8,141,865	**8,436,679**	7.8%	12.1%	3.6%
Public Health	54,035,097	61,197,153	**82,963,054**	24.4%	13.3%	35.6%
Public Policy, G Ford School of	2,449,488	2,743,505	**3,562,054**	20.9%	12.0%	29.8%
Social Work	4,485,564	5,356,536	**5,568,391**	11.7%	19.4%	4.0%
Institute of Social Research	97,370,651	100,371,693	**114,107,739**	8.4%	3.1%	13.7%
OVPR Units	35,353,145	31,450,963	29,856,262	-8.1%	-11.0%	-5.1%
Other Units	26,698,354	36,030,471	37,604,359	19.7%	35.0%	4.4%
UM Dearborn	6,289,130	6,212,081	**7,209,890**	7.4%	-1.2%	16.1%
UM Flint	551,901	579,255	**672,045**	10.5%	5.0%	16.0%
University Administration	826,530	745,543	624,884	-13.0%	-9.8%	-16.2%
Unassignable Services	14,819,448	21,797,875	4,015,283	N/A	N/A	N/A
Grand Total	1,016,565,913	1,139,493,986	1,236,510,624	10.3%	12.1%	8.5%

* Beginning in FY 2009, the University began including Medical School's Faculty Group Practice departmental research activity that operates in the Auxilary Fund. The inclusion of this activity increased research expenditures by $44,205,667 for FY 2009 and $53,250,834 in FY 2008



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