

# Annual Report on Research

FY2013 FINANCIAL SUMMARY





*In FY2013,  
University of Michigan's  
research expenditures  
grew by 4.3 percent  
over the previous year,  
capping a growth rate  
of 40 percent over  
the last decade.*

A close-up photograph of a woman with brown hair, wearing a white lab coat, looking intently at a petri dish held in her hand. The petri dish contains a bright green liquid. The background is blurred, showing other lab equipment and a bright light source.

## Overview

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In FY2013, the University of Michigan's research expenditures reached a record high of \$1.3 billion despite flat or declining total research expenditures at universities by the federal government, U-M's major research sponsor. This sustained growth is a measure of the university's strength in competing for research sponsorship as well as its continuing emphasis on diversifying its research base. In the federal arena, for example, a decline in total funding from Health and Human Services was largely offset by gains from the National Science Foundation as well as the departments of Energy, Defense, Transportation, and others. At the same time, we have been working to increase sponsorship from industry, foundations and other sources.

For much of the year, the debate on sequestration in Washington, D.C., cast a shadow over the future prospects for federal research funding, but the effects of the resulting cuts—intended for FY2014—had no impact on FY2013 results. Under any circumstances, however, the competition for the pool of available funds from the federal government will become intense moving forward, and it is essential to continue to strengthen our competitiveness and diversify our sources of funding. In addition to highlighting performance in 2013, this report identifies ongoing efforts and emerging opportunities that will help position the university to sustain the health and vitality of its research enterprise.



# Annual Research Performance

Total research expenditures at the Ann Arbor, Dearborn, and Flint campuses of the University of Michigan for Fiscal Year 2013 grew by 4.3 percent over the previous year to reach a total of \$1,328,721,165. This caps a growth rate of 40 percent over the last decade. It also places U-M among the top universities in the nation in total research volume.

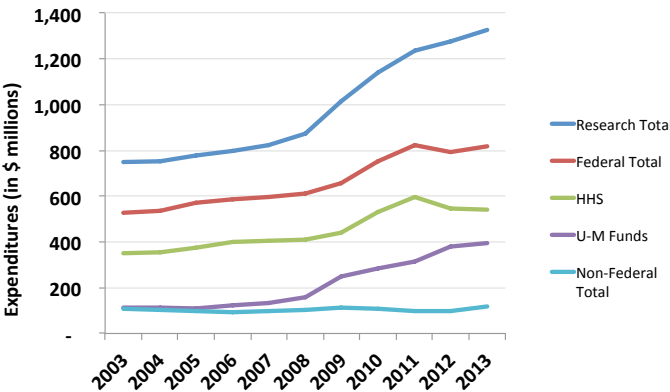
Table 1 shows the relative contributions of the major sponsors of U-M research, with the federal government now providing 61.5 percent of the total. The figure also shows the importance of our own internal investments in sustaining the excellence and vitality of our research enterprise, which is closely coupled with our educational programs.

TABLE 1. RESEARCH BY MAJOR SPONSORS

Sponsor Group	Expenditures	% of Total
Total Federal Government	\$ 817,706,572	61.5%
Total Non-Federal Sponsors	\$ 117,104,817	8.8%
Industry (direct)	\$ 48,909,843	3.7%
Foundations	\$ 28,702,517	2.2%
Other	\$ 39,492,457	3.0%
Total U-M Funds	\$ 393,909,775	29.6%
Total Research Expenditures	\$ 1,328,721,165	100%

Figure 1 highlights the overall trends over the decade from FY 2003 through FY 2013. Funding from the federal government is consistently the largest component of research expenditures, although it has begun to decline since reaching a peak in FY 2010, both in total volume and percentage of the total, for the first time in decades. Of that federal total, Health and Human Services (HHS) is by far the largest component, underscoring the broad range of health-related research at U-M, and it has also begun to take a downward turn as well. In recent years, internal investments have played a key role.

FIGURE 1. U-M RESEARCH EXPENDITURES



Federal agencies other than HHS are of increasing importance to the university's overall research portfolio, as highlighted in Figure 2. Investments in the University of Michigan Energy Institute, beginning in 2007, have helped the university win more funding from the Department of Energy in recent years, with an 11 percent rise in FY13. This investment builds on broad interdisciplinary strengths in energy research across campus, and has helped position the university for further growth in this important field.

As shown in Table 2, funds from the Department of Transportation got a dramatic boost of over 60 percent in the last year. This is a particular strength of U-M, and further investment in this multidisciplinary field is expected to help sustain growth.

FIGURE 2. U-M FEDERAL FUNDING BY AGENCY

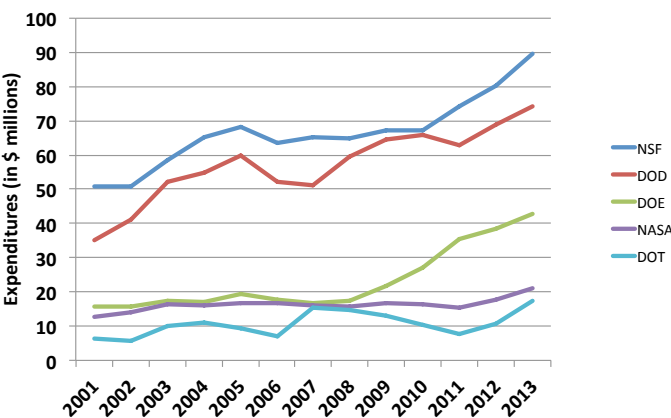


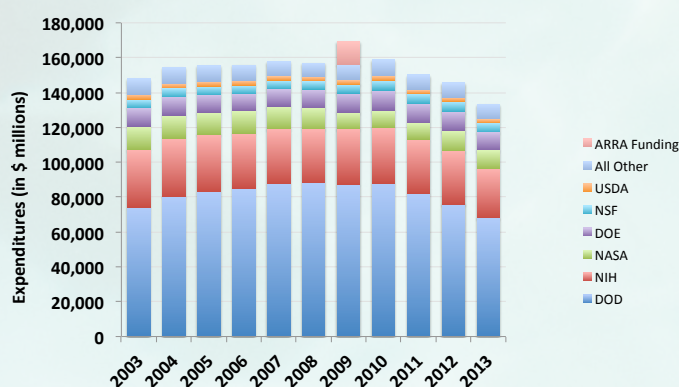
TABLE 2. PERCENT CHANGE BY MAJOR SPONSOR

Sponsor Group	FY12	% of Total	FY13	% of Total	\$ Change	% Change
Total Federal	\$ 795,050,477	62.4%	\$ 817,706,572	61.5%	\$ 22,656,094	2.8%
NIH	\$ 519,253,755	40.8%	\$ 509,676,889	38.4%	\$(9,576,866)	-1.8%
NSF	\$ 80,079,854	6.3%	\$ 89,704,539	6.8%	\$ 9,624,686	12.0%
DOD	\$ 68,728,687	5.4%	\$ 28,624,260	2.2%	\$ 1,224,944	4.5%
Energy	\$ 38,467,858	3.0%	\$ 42,697,378	3.2%	\$ 4,229,520	11.0%
NASA	\$ 17,684,488	1.4%	\$ 21,182,120	1.6%	\$ 3,497,632	19.8%
Transportation	\$ 10,766,820	0.8%	\$ 17,246,319	1.3%	\$ 6,479,499	60.2%
Education	\$ 9,289,301	0.7%	\$ 8,069,459	0.6%	\$(1,219,842)	-13.1%
Total Non-Federal	\$ 98,930,072	7.8%	\$ 117,104,817	8.8%	\$ 18,174,744	18.4%
Industry	\$ 42,823,532	3.4%	\$ 48,909,843	3.7%	\$ 6,086,311	14.2%
Foundations	\$ 22,547,465	1.8%	\$ 28,702,517	2.2%	\$ 6,155,053	27.3%
Other	\$ 34,915,529	2.7%	\$ 39,492,457	3.0%	\$ 4,576,928	13.1%
Total U-M Funds	\$ 380,044,349	29.8%	\$ 393,909,775	29.6%	\$ 13,865,426	3.6%
Total Research Expenditures	\$ 1,247,024,899	100%	\$ 1,328,721,165	100%	\$ 81,696,265	4.3%

It is also significant that although funding from the National Institutes of Health, one of U-M's largest sponsors, slipped by 1.8 percent, funds from the National Science Foundation rose by 12 percent, again reflecting the diversity of U-M's strengths. Further details on the level of funding from these sources and others are included in Appendix I.

Figure 3 provides the context of broad trends in federal research spending. After a long period of steady growth since World War II, federally funded research reached a peak in 2010 (not including a short-term boost under the American Recovery and Reinvestment Act of 2009) of \$159 billion. At the end of FY 2013, total funding was down by about 10 percent in constant 2013 dollars from what it was ten years previously.

**FIGURE 3. FEDERAL FUNDING TREND BY AGENCY**



Over the same period, U-M showed a 22.4 percent net overall gain in federal funds, adjusted for inflation, showing the university's relative strength in competing for research funding.





Industry-supported research is a critical component of U-M's research mission. Working with companies keeps faculty and students informed about the needs and perspectives of industry, enriching the experience of our students both in the laboratory and the classroom, and better preparing them for the challenges they will face in industry. Moreover, having strong partnerships with industry has become a key asset in attracting funding from federal agencies as well as more companies.

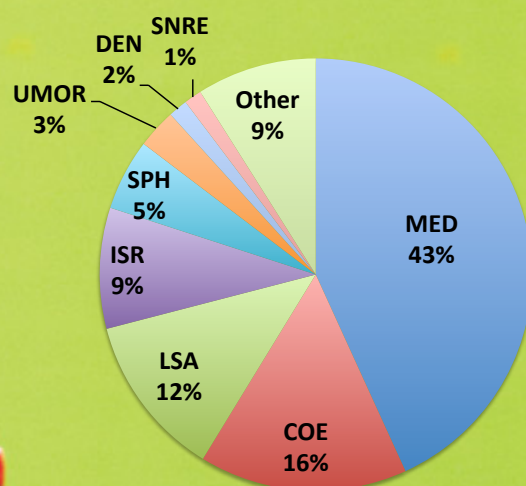
Table 3 provides a closer look at the total funding from industry, including subcontracts from federal contracts awarded to industry and corporate foundations as well as direct contracts. After remaining flat for several prior years, industry funding grew by 14 percent in FY2013 to a level that is now 8 percent of total externally sponsored research expenditures. This exceeds the national average of 5 percent of funding from industry for research universities estimated by the National Science Foundation.

**TABLE 3. INDUSTRY-FUNDED RESEARCH**

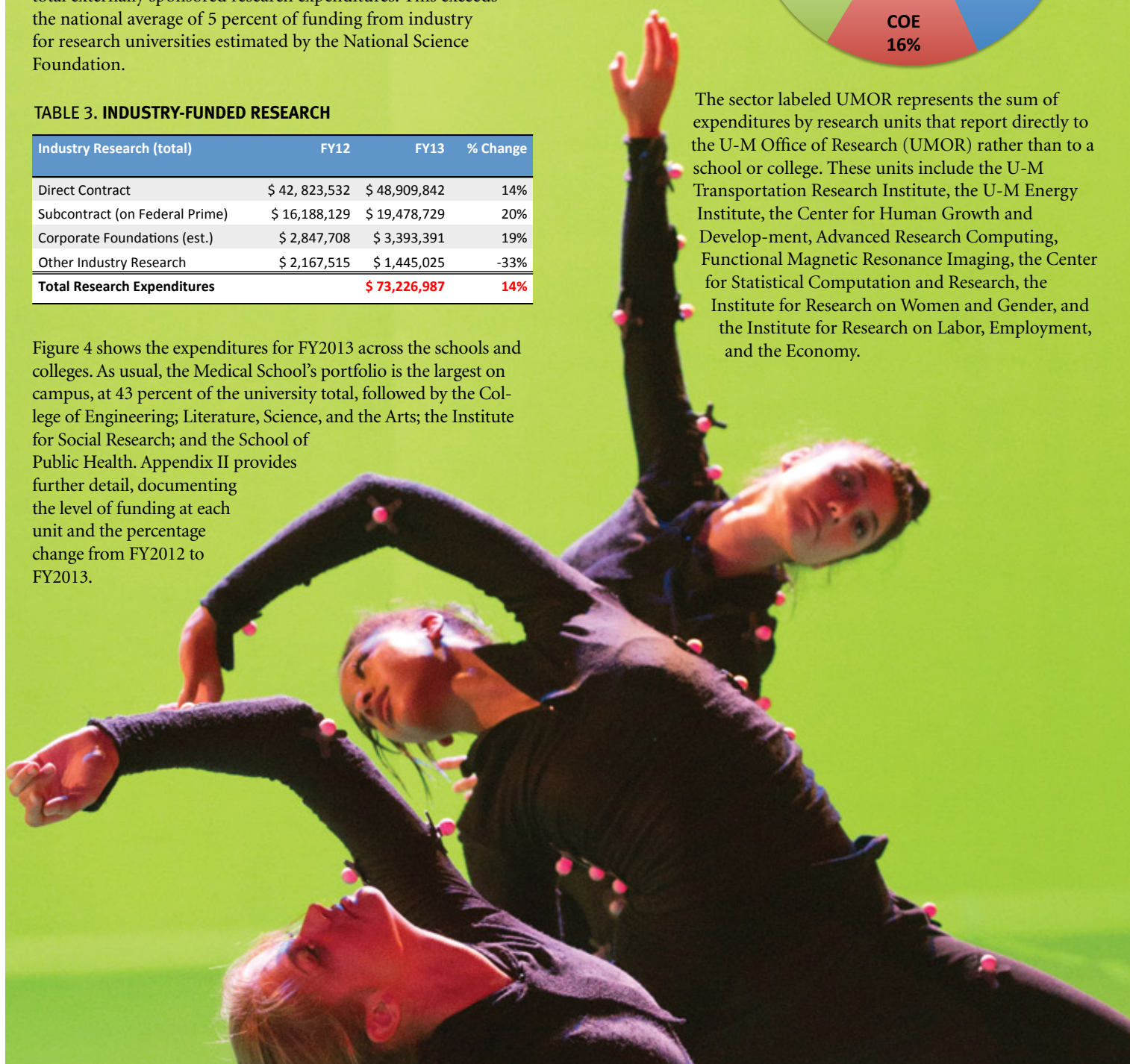
Industry Research (total)	FY12	FY13	% Change
Direct Contract	\$ 42, 823,532	\$ 48,909,842	14%
Subcontract (on Federal Prime)	\$ 16,188,129	\$ 19,478,729	20%
Corporate Foundations (est.)	\$ 2,847,708	\$ 3,393,391	19%
Other Industry Research	\$ 2,167,515	\$ 1,445,025	-33%
<b>Total Research Expenditures</b>		<b>\$ 73,226,987</b>	<b>14%</b>

Figure 4 shows the expenditures for FY2013 across the schools and colleges. As usual, the Medical School's portfolio is the largest on campus, at 43 percent of the university total, followed by the College of Engineering; Literature, Science, and the Arts; the Institute for Social Research; and the School of Public Health. Appendix II provides further detail, documenting the level of funding at each unit and the percentage change from FY2012 to FY2013.

**FIGURE 4. RESEARCH EXPENDITURES BY UNIT**

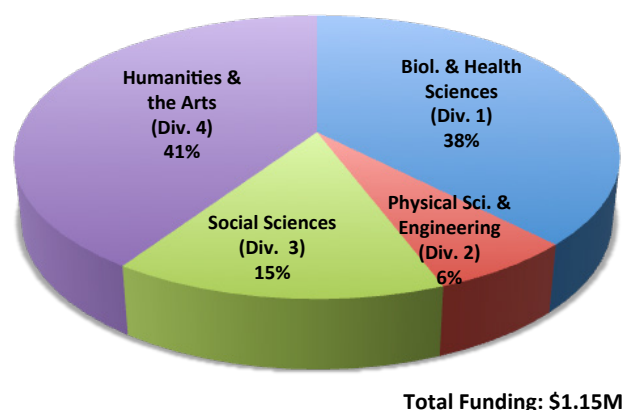


The sector labeled UMOR represents the sum of expenditures by research units that report directly to the U-M Office of Research (UMOR) rather than to a school or college. These units include the U-M Transportation Research Institute, the U-M Energy Institute, the Center for Human Growth and Development, Advanced Research Computing, Functional Magnetic Resonance Imaging, the Center for Statistical Computation and Research, the Institute for Research on Women and Gender, and the Institute for Research on Labor, Employment, and the Economy.



UMOR also helps spur research and scholarship across the university through its Faculty Grants and Awards Program. Figure 5 shows the breakdown of these awards for FY2013 by broad disciplinary area. The program provides bridging funds for projects, seed funding for young faculty as well as for senior faculty who are changing research direction, and support in areas where sponsored funding is unusually constrained. Thus, more than 40 percent of the total funding from this program supports the arts and humanities, although the total external funding brought in by these fields is less than 1 percent of our total research volume.

FIGURE 5. UMOR GRANTS AND AWARDS

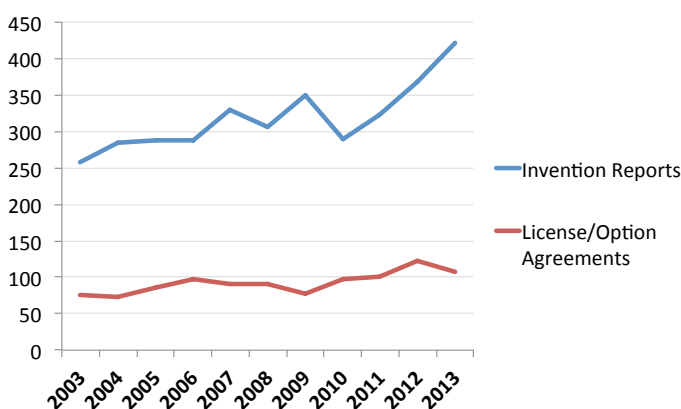


## Technology Transfer and Business Engagement

One of the responsibilities of a public research university is to help ensure that society realizes the benefits of the research it conducts. Of course, this is achieved most effectively by the students who carry the expertise gained in laboratories and classrooms on campus to a wide range of careers in industry, government, and non-governmental organizations across the nation and around the world. The Office of Technology Transfer (OTT) and the Business Engagement Center (BEC) also play a key role.

In FY2013, OTT reported 421 inventions, a record number. Figure 6 shows the steady rise of invention disclosures over the last ten years, with a sharp uptick since 2010 to a total of 3,246 for the decade. The number of option/license agreements each year has been rising more slowly, but the cumulative number over the last ten years has reached 945.

FIGURE 6. TECH TRANSFER RESULTS

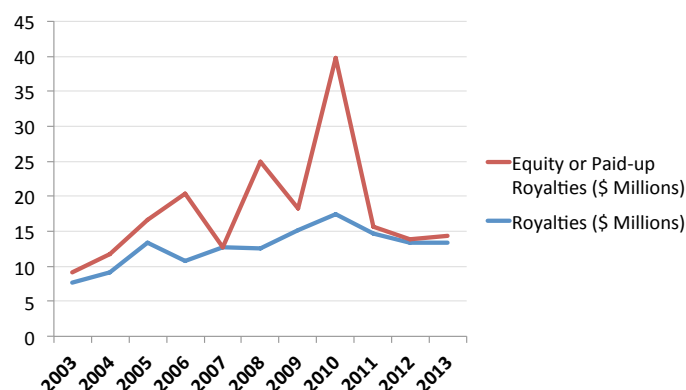


Some patents offer promise as the basis for new entrepreneurial companies. U-M launched nine new startups in FY2013 based on technology developed at U-M, and has averaged one new company every five weeks for the last ten years.

Figure 7 tracks the revenue from royalties and from equity and paid-up royalties over the last decade. The royalty revenue has shown steady growth, but the revenue from equity and paid-

up royalties fluctuates dramatically depending on specific deals occurring from year to year.

FIGURE 7. TECH TRANSFER REVENUES



The two revenue streams amounted to \$14.4 million in FY 2013. A portion of these funds provides incentives for faculty inventors. The administration's share goes to support potential high-impact research on campus, to support the Business Engagement Center, and to support the U-M Venture Center, which provides a variety of services for entrepreneurs and investors interested in startup opportunities based on technology developed at U-M.

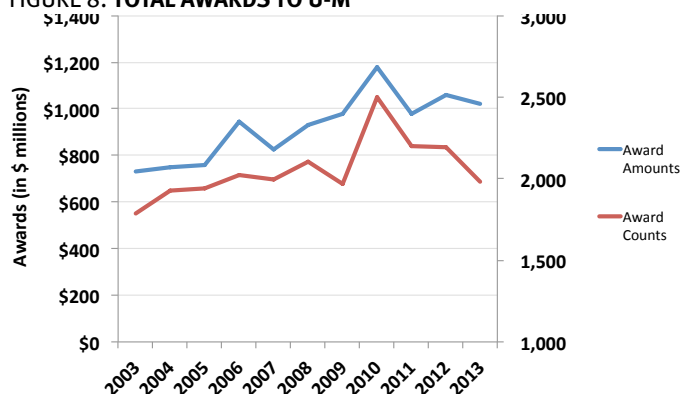
The Business Engagement Center played a central role in helping to boost industry investments in U-M research by 14 percent in FY2013. Founded in 2007, the BEC works to strengthen the university's ties to business and other community partners with the long-term goal of helping to revitalize the region's economy. The operation reports to both UMOR and the U-M's Office of Development.

The BEC now maintains relationships with more than 1,000 companies and is contacted by over 200 new companies each year. In addition to encouraging investment in U-M research, it serves as a gateway to the expertise and resources in the U-M community, including educational programs and access to student talent.

# Looking Ahead

Although the University of Michigan has achieved record levels of research expenditures in the last several years, the prospects for a continued rise are not strong for the immediate future. Figure 8 shows that the trend in awards—the total number and value of contracts won each year from external sources. Since many awards are spent over a specified period of years, this chart is a measure of the pipeline for expenditures. The chart shows that both the number and the value of awards have been declining in recent years, and that the average size of awards has been declining.

FIGURE 8. TOTAL AWARDS TO U-M



In this challenging climate, U-M is taking several steps to sustain the excellence of its research enterprise and position it for future growth. These include the following:

**Submit proposals for larger projects that build on innovative partnerships and the university's interdisciplinary strengths**—With the broad strengths of its 19 schools and colleges and its culture of cooperation across disciplines, U-M is able to pull together teams from diverse fields to address the full complexity of challenges that face society. One of UMOR's key goals moving forward is to encourage the development of new opportunities in this arena.

**Strengthen industry outreach**—Even with an increase of 14 percent in the volume of industry-sponsored research in FY2013, there is room for further growth. The Business Engagement Center has refocused its strategy to increase its efforts to help develop mutually beneficial partnerships with industry.

**Expand clinical trials**—Clinical trials represent an opportunity to build on one of the university's strengths. Working with UMOR's Office of Research and Sponsored Projects, the group that manages the submission of all research proposals and negotiates all research contracts, the Medical School is stepping up its efforts to expand its efforts in this area.

**Seek more funding from foundations**—U-M's Office of Foundation Relations has recently enhanced its resources and support for faculty seeking funding from foundations.

**Pursue philanthropic gifts for research**—With the launch of a comprehensive fundraising campaign in the Fall of 2013, U-M has an opportunity to work with the Office of University Development to boost efforts to seek funding for research from philanthropic sources.

**Develop more international partnerships**—In addition to diversifying sources of research funding, international partnerships enrich research and education by bringing together the complementary strengths and perspectives of other cultures to address common challenges.

**Streamline the proposal submission process and improve faculty productivity**—UMOR's Office of Research and Sponsored Projects is working with faculty and administrators across campus to improve the efficiency and effectiveness of its processes, and is well positioned moving forward.

Below are two examples of initiatives from FY2013 that highlight innovative approaches to developing U-M's research enterprise.

In November of 2012, U-M launched **MCubed**, a two-year, \$14 million program designed to forge new collaborations across disciplines and kick-start novel research. MCubed awarded \$60,000 to each of 222 teams of three researchers from at least two disciplines who agreed to collaborate on a proposed project. Funded projects spanned nearly every field on campus. More than 70 percent of participants reported working with at least one new collaborator, and 90 percent expect to have submitted an external grant proposal based on related work within a year.

The **U-M Mobility Transformation Center (MTC)** was formally launched in the spring of 2013 as an ambitious public/private R&D partnership to develop the foundations of a commercially viable ecosystem of connected and automated vehicles for moving people and goods. This novel collaboration with companies from multiple industries, the federal government, the state government, the City of Ann Arbor, and other academic institutions will work together to envision and shape the future of mobility. It draws on U-M's long-term relationships with industry; its ability to address the interrelated technical, social, economic, regulatory, and business challenges; and the strengths of the region to lead a transformation that will dramatically improve the safety, sustainability, and accessibility of ground transportation in our society.

The MTC builds on a \$30 million project funded by the US Department of Transportation in which U-M researchers outfitted nearly 3,000 private cars, trucks, and buses in Ann Arbor with wireless devices to communicate information that can be used to alert drivers to potential crash situations to each other as well as to similar devices located at intersections, curves, and freeway sites in the area. Data gathered from this pilot is being used to inform future policy decisions by the USDOT, and industry has used the deployment as a test bed for new ways to address this emerging market. Work at the MTC will include expanding the Ann Arbor deployment across the entire city, creating a deployment that extends across southeast Michigan, and developing a system of 2,000 connected and automated vehicles in Ann Arbor.

As part of this project, U-M is working with the state government and the business community to position Michigan as the global R&D center for the future of mobility. Plans call for raising \$100 million through 2021 to support the MTC, half from industry, a fourth from the federal government, and a fourth from internal investment from U-M.





## Conclusion

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U-M's core missions in research, education, and patient care are closely interrelated and mutually reinforcing. Continued investments in research are central to our ability to attract top faculty and students, and to prepare our students for the role they will play as the innovators who go on to shape all aspects of our economy and society. These investments also support the generation of new ideas and insights in our laboratories that have practical implications in fields ranging from medicine to mobility. The recent decline in the level of funding from the federal government, which has been key to the richness and productivity of university research, poses a serious challenge moving forward. But with its diverse strengths across disciplines and its longstanding reputation as a top-tier research university, U-M is well positioned to compete for funds from current sources as well as to develop new sources of funding. As we move forward, we must build on our inherent strengths while being willing to adapt with the times as we build new partnerships with government, industry, and academia, in the U.S. and around the world.

# Appendix I:

## Volume of Research Expenditures By Sponsor

	FY 2012	% OF TOTAL	FY 2013	% OF TOTAL	% CHANGE
<b>FEDERAL SOURCES</b>					
Health and Human Services					
National Institutes of Health	519,253,755	40.8%	509,676,889	38.4%	-1.8%
Centers for Disease Control	12,400,911	1.0%	14,493,928	1.1%	16.9%
Centers for Medicare & Medicaid Administration	4,582,114	0.4%	6,020,633	0.5%	31.4%
Substance Abuse and Mental Health Services	1,445,190	0.1%	1,329,014	0.1%	-8.0%
Food and Drug Administration	1,149,673	0.1%	1,322,643	0.1%	15.0%
Health Resources & Services Administration	220,559	0.0%	98,854	0.0%	-55.2%
Other HHS	7,004,250	0.5%	8,200,941	0.6%	17.1%
Total Health and Human Services	546,056,452	42.9%	541,142,902	40.7%	-0.9%
National Science Foundation	80,079,854	6.3%	89,704,539	6.8%	12.0%
Department of Defense					
Army	27,399,316	2.2%	28,624,260	2.2%	4.5%
Air Force	11,903,952	0.9%	16,516,329	1.2%	38.7%
Navy	14,227,639	1.1%	16,031,640	1.2%	12.7%
Other	15,197,780	1.2%	12,985,027	1.0%	-14.6%
Total Department of Defense	68,728,687	5.4%	74,157,256	5.6%	7.9%
Energy	38,467,858	3.0%	42,697,378	3.2%	11.0%
NASA	17,684,488	1.4%	21,182,120	1.6%	19.8%
Transportation	10,766,820	0.8%	17,246,319	1.3%	60.2%
Education	9,289,301	0.7%	8,069,459	0.6%	-13.1%
Commerce	8,162,708	0.6%	6,683,762	0.5%	-18.1%
Environmental Protection Agency	4,195,456	0.3%	3,439,913	0.3%	-18.0%
Social Security Administration	1,983,638	0.2%	2,797,705	0.2%	41.0%
Justice	1,485,218	0.1%	1,931,233	0.1%	30.0%
Agriculture	1,443,306	0.1%	1,917,553	0.1%	32.9%
Homeland Security	1,914,152	0.2%	1,369,212	0.1%	-28.5%
Nuclear Regulatory Commission	841,129	0.1%	919,899	0.1%	9.4%
Agency for International Development	825,895	0.1%	797,006	0.1%	-3.5%
Museum and Library Services, Institute of	934,880	0.1%	718,025	0.1%	-23.2%
National Intelligence Office	555,670	0.0%	663,169	0.0%	19.3%
Veterans Affairs	22,416	0.0%	611,499	0.0%	2628.0%
State	554,721	0.0%	519,986	0.0%	-6.3%
Smithsonian Institution	394,276	0.0%	464,231	0.0%	17.7%
Interior	204,636	0.0%	355,735	0.0%	73.8%
Federal Reserve	37,084	0.0%	211,265	0.0%	469.7%
National Endowment for the Humanities	88,032	0.0%	62,260	0.0%	-29.3%
Housing and Urban Development	278,310	0.0%	35,640	0.0%	-87.2%
Other Federal	55,491	0.0%	8,506	0.0%	-84.7%
Total Federal Government	795,050,478	62.4%	817,706,572	61.5%	2.8%
<b>NON-FEDERAL SPONSORS</b>					
Industry	42,823,532	3.4%	48,909,843	3.7%	14.2%
Foundations	22,547,465	1.8%	28,702,517	2.2%	27.3%
Public Charities	16,341,347	1.3%	17,634,952	1.3%	7.9%
Other (includes Universities & Gifts)	8,562,565	0.7%	8,991,510	0.7%	5.0%
Trade and Professional Associations	7,136,048	0.6%	8,263,065	0.6%	15.8%
State of Michigan & Local Michigan Authorities	556,750	0.0%	3,461,688	0.3%	521.8%
International Organizations	744,241	0.1%	834,988	0.1%	12.2%
Foreign National Governments	218,124	0.0%	306,255	0.0%	40.4%
Total Non-Federal Sponsors	98,930,072	7.8%	117,104,816	8.8%	18.4%
Total Sponsored Research	893,980,550	70.2%	934,811,389	70.4%	4.6%
<b>UNIVERSITY OF MICHIGAN SOURCES</b>					
University of Michigan Funds	380,044,349	29.8%	393,909,775	29.6%	3.6%
TOTAL RESEARCH EXPENDITURES	1,274,024,899	100.0%	1,328,721,164	100.0%	4.3%

## Appendix II:

### Volume of Research Expenditures by Major University Units

UNIT	FY 2011	FY 2012	FY 2013	AVERAGE % CHANGE	2011-2012 CHANGE	2012-2013 CHANGE
Architecture & Urban Planning, Taubman	1,059,760	1,420,748	1,740,682	28.3%	34.1%	22.5%
Art & Design, Stamps School of	101,187	98,331	178,971	39.6%	-2.8%	82.0%
Business, Ross School of	7,386,928	11,338,880	11,456,643	27.3%	53.5%	1.0%
Dentistry	19,928,275	18,595,638	19,053,882	-2.1%	-6.7%	2.5%
Education	12,000,661	12,816,451	12,836,415	3.5%	6.8%	0.2%
Engineering	178,835,243	190,457,291	206,688,130	7.5%	6.5%	8.5%
Graduate School, Rackham	6,050,911	2,470,693	533,497	-68.8%	-59.2%	-78.4%
Information	4,338,032	3,884,498	5,257,657	12.4%	-10.5%	35.3%
Kinesiology	4,489,032	4,384,641	4,609,684	1.4%	-2.3%	5.1%
Law	3,716,568	3,946,113	3,782,373	1.0%	6.2%	-4.1%
Literature Science, and the Arts	138,744,879	157,898,889	162,242,959	8.3%	13.8%	2.8%
Medical School	544,851,959	557,001,734	573,886,046	2.6%	2.2%	3.0%
Music, Theatre & Dance	258,795	243,865	400,411	29.2%	-5.8%	64.2%
Natural Resources & the Environment	15,253,078	15,911,362	17,553,526	7.3%	4.3%	10.3%
Nursing	4,874,672	5,640,236	7,052,606	20.4%	15.7%	25.0%
Pharmacy	8,436,679	8,443,617	8,884,239	2.7%	.1%	5.2%
Public Health	82,963,054	73,225,851	70,858,034	-7.5%	-11.7%	-3.2%
Public Policy, G Ford School of	3,562,054	3,801,122	3,870,939	4.3%	6.7%	1.8%
Social Work	5,568,391	5,062,691	4,499,704	-10.1%	-9.1%	-11.1%
Institute of Social Research	114,107,739	115,914,869	120,200,002	2.6%	1.6%	3.7%
OVRP Units	29,856,262	34,821,728	38,987,820	14.3%	16.6%	12.0%
Other Units	38,229,243	35,013,189	42,584,474	6.6%	-8.4%	21.6%
UM-Dearborn	7,209,890	5,662,540	6,442,964	-3.8%	-21.5%	13.8%
UM-Flint	672,045	800,932	634,471	-8.8%	19.2%	-20.8%
Unassignable Services	4,015,284	5,168,989	4,485,037	N/A	N/A	N/A
<b>GRAND TOTAL</b>	<b>1,236,510,624</b>	<b>1,274,024,899</b>	<b>1,328,721,165</b>	<b>3.7%</b>	<b>3.0%</b>	<b>4.3%</b>





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