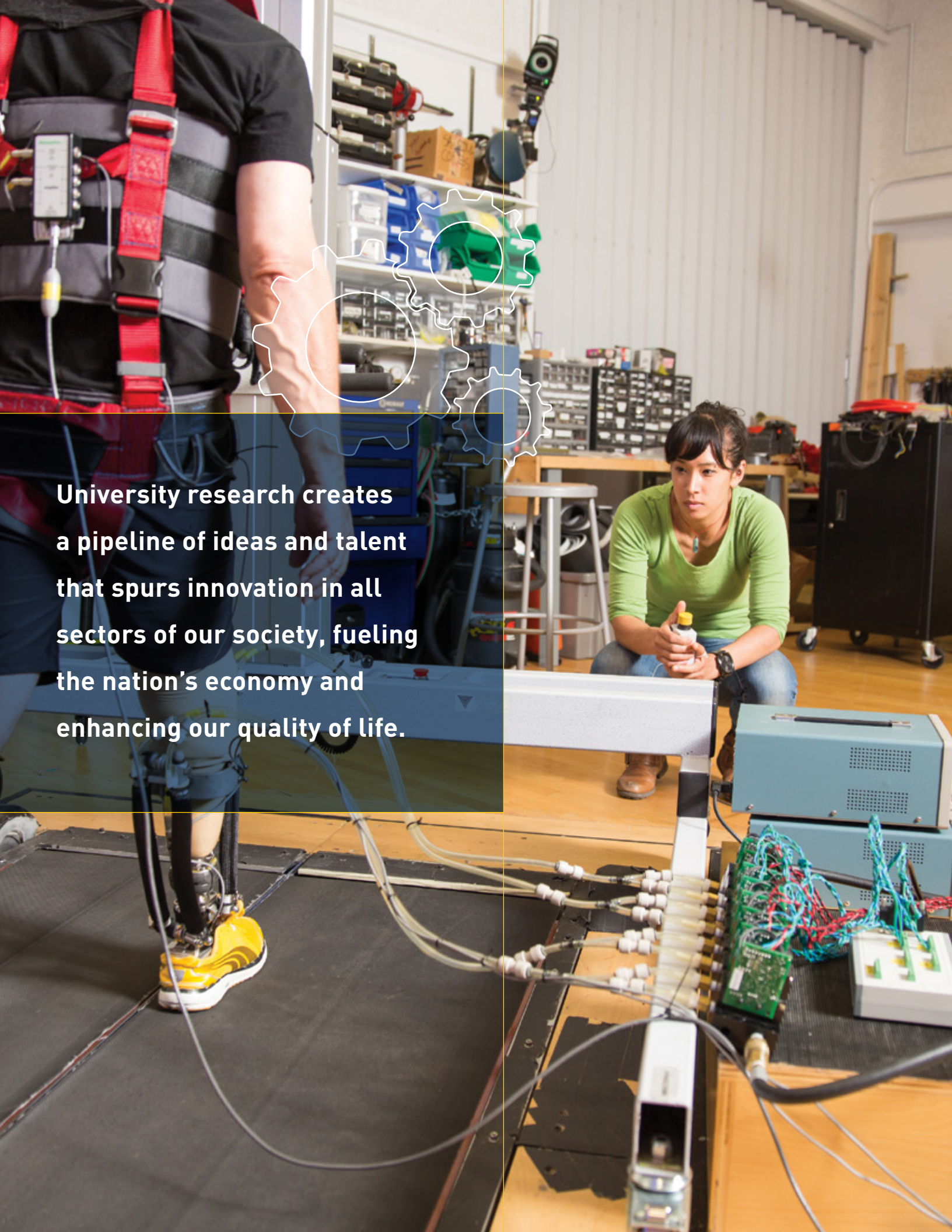
ANNUAL REPORT ON

RESEARCH FY 2015

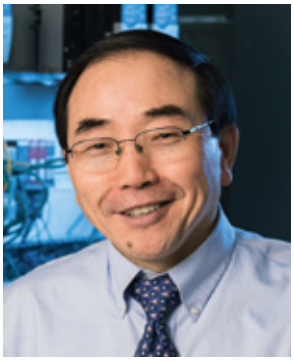
FINANCIAL SUMMARY

RESEARCH
UNIVERSITY OF MICHIGAN



University research creates a pipeline of ideas and talent that spurs innovation in all sectors of our society, fueling the nation's economy and enhancing our quality of life.

OVERVIEW



Investments in university research generate a stream of new ideas and insights in every field from medicine and engineering to public policy and the arts. And since university research is closely tied to education at both the graduate and undergraduate levels, these investments are central to our ability to prepare students to lay the foundations for our economic vitality and quality of life.

A university's volume of research is a measure of the competitiveness of its academic programs, as well as the number of students it can educate. In FY 2015 (July 1, 2014–June 30, 2015), the University of Michigan's research expenditures totaled $1.3 billion, just 0.7 percent below the previous year's total and exceeding the billion-dollar mark for the seventh straight year. This remains one of the highest levels in the nation and enables the university to sustain the breadth and excellence of its research enterprise.

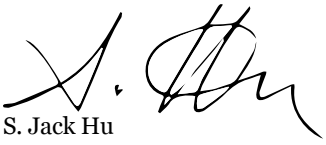
Funding from the federal government remained the principal source of research support at $738 million, or 56.8 percent of the total—a decline of $7.7 million, or 1 percent, from FY 2014. At the same time, funding from internal sources dropped by 3.7 percent. However, increased funding from non-federal sources has helped offset this decline. Direct research contracts from industry in particular showed promise, with an increase of almost 25 percent to a record high of $62 million.

Although growth in industry support for research is critical to the vitality of U-M's programs, it does not replace the need for continuing support from federal agencies. Industry tends to support applied research—work that has clear, practical implications. Yet many of the most important innovations in the last several decades, as well as the basis of much applied research, have arisen from basic scientific inquiry aimed at an improved understanding of ourselves, our society, and the world around us. The federal government funds the great majority of basic research.

Looking ahead, the total number of research contracts awarded to U-M in FY 2015 rose by 9.1 percent, while the total dollar value of those awards rose by about 7.1 percent, reflecting a decline in the average value of awards. To further build the pipeline, U-M faculty increased the number of proposals submitted by 9.6 percent, with a dollar value increase of more than 8.4 percent.

The quality and impact of U-M research also remain strong. U-M placed fifth overall among all research universities worldwide, and second among all public research universities in an analysis conducted by Reuters to determine which institutions contribute the most to science and technology and have the greatest impact on the global economy. In addition, the Office of Technology Transfer reported record numbers of licensing agreements and startup companies for the year.

With its diverse strengths across disciplines and its longstanding reputation as a top-tier research university, U-M is well positioned to compete for existing funds, as well as to develop new sources of funding. As we move forward, we will draw on our inherent strengths in interdisciplinary research while seeking to build new partnerships with government, industry, and academia, in the U.S. and around the world, in order to sustain the breadth, excellence, and impact of our research enterprise.



S. Jack Hu
Vice President for Research
J. Reid and Polly Anderson Professor of Manufacturing

FACULTY AWARDS + SCHOLARSHIPS

A selection of honors received by U-M faculty from July 1, 2014 to June 30, 2015.

MACARTHUR FELLOW

Khaled Mattawa, *associate professor of English language and literature*

PACKARD FELLOWSHIPS FOR SCIENCE AND ENGINEERING

Daniel Rabosky, *assistant professor of ecology and evolutionary biology*

SCIENCE & SCILIFELAB PRIZE FOR YOUNG SCIENTISTS

Chelsea Wood, *assistant professor of ecology and evolutionary biology; fellow in the Michigan Society of Fellows*

GUGGENHEIM FELLOWSHIPS

- **Christiane Gruber,** *associate professor of Islamic art*
- **Howard Markel,** *George E. Wantz, M.D. Professor of the History of Medicine; professor of pediatrics and communicable diseases; director of the Center for the History of Medicine; professor of psychiatry; professor of history; professor of English language and literature; professor of health management and policy*
- **Eran Pichersky,** *Michael M. Martin Collegiate Professor of Molecular, Cellular and Developmental Biology*

ANDREW CARNEGIE FELLOWSHIP

- **John Ciorciari,** *assistant professor of public policy*
- **Arthur Lupia,** *Hal R. Varian Collegiate Professor of Political Science; research professor at the Institute for Social Research*

NATIONAL ACADEMY OF INVENTORS

Arul Chinnaiyan, *S.P. Hicks Endowed Professor of Pathology; professor of urology*

Stephen Forrest, *Peter A. Franken Distinguished University Professor of Engineering; Paul G. Goebel Professor of Engineering; professor of electrical engineering and computer science; professor of material science and engineering; professor of physics*

Shaomeng Wang, *Warner-Lambert/ Parke-Davis Professor of Medicine; professor of internal medicine; professor of pharmacology; professor of medicinal chemistry*

FELLOWS OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

- **Rane Curl,** *professor emeritus of chemical engineering*
- **Gregory Dressler,** *collegiate professor of pathology research; professor of pathology*
- **Deborah Goldberg,** *Elzada U. Clover Collegiate Professor of Ecology and Evolutionary Biology*
- **Daniel Goldman,** *Bernard W. Agranoff Collegiate Professor of Neuroscience; professor of biological chemistry; research professor at the Molecular and Behavioral Neuroscience Institute*
- **Tom Kerppola,** *professor of biological chemistry*
- **Roberto Merlin,** *Peter A. Franken Collegiate Professor of Physics; professor of electrical engineering and computer science*
- **Mark Newman,** *Anatol Rapoport Distinguished University Professor of Physics; professor of complex systems*
- **Patricia Ann Peyser,** *professor of epidemiology*

ALFRED P. SLOAN RESEARCH FELLOWS

- **Alan Boyle,** *assistant professor of computational medicine and bioinformatics; assistant professor of human genetics*
- **J. Alex Halderman,** *Morris Wellman Faculty Development Assistant Professor of Computer Science and Engineering; associate professor of electrical engineering and computer science*
- **Prabal Dutta,** *Morris Wellman Faculty Development Assistant Professor of Computer Science and Engineering; associate professor of electrical engineering and computer science*
- **Christine Aidala,** *assistant professor of physics*
- **Kai Sun,** *assistant professor of physics*
- **Andrew Snowden,** *assistant professor of mathematics*

NATIONAL SCIENCE BOARD'S VANNEVAR BUSH AWARD

President Emeritus James Duderstadt

AMERICAN ACADEMY OF ARTS AND SCIENCES (AAAS)

Philip Deloria, *Carroll Smith-Rosenberg Collegiate Professor of History and American Culture; professor of environment*

Mark Schlissel, *president*

NATIONAL ACADEMY OF EDUCATION

Pamela Moss, *professor of education*

NATIONAL ACADEMY OF ENGINEERING

S. Jack Hu, *vice president for research; J. Reid and Polly Anderson Professor of Manufacturing*

NATIONAL ACADEMY OF MEDICINE

Gonçalo Abecasis, *Felix E. Moore Collegiate Professor; chair of the Department of Biostatistics*

Carol Bradford, *Charles J. Krause, M.D. Collegiate Professor of Otolaryngology; chair of the Department of Otolaryngology-Head and Neck Surgery*

Eva Feldman, *Russell N. DeJong Professor of Neurology; director of the A. Alfred Taubman Medical Research Institute*

A. Mark Fendrick, *professor of internal medicine; professor of health management and policy*

Susan A. Murphy, *Herbert E. Robbins Distinguished University Professor of Statistics; research professor at the Institute for Social Research; professor of psychiatry*

Kathleen Marie Potempa, *dean of the School of Nursing; professor of nursing*

NATIONAL MEDAL OF ARTS

George Shirley, *Joseph Edgar Maddy Distinguished University Professor Emeritus of Music*

University Musical Society of the University of Michigan *(Ken Fisher, President)*

NATIONAL MEDAL OF SCIENCE

Robert Axelrod, *Mary Ann and Charles R. Walgreen, Jr. Professor for the Study of Human Understanding; professor of political science; professor of public policy*

Students received 28 Fulbright grants during the 2014–15 academic year—more than any other public university in the nation during that time period.

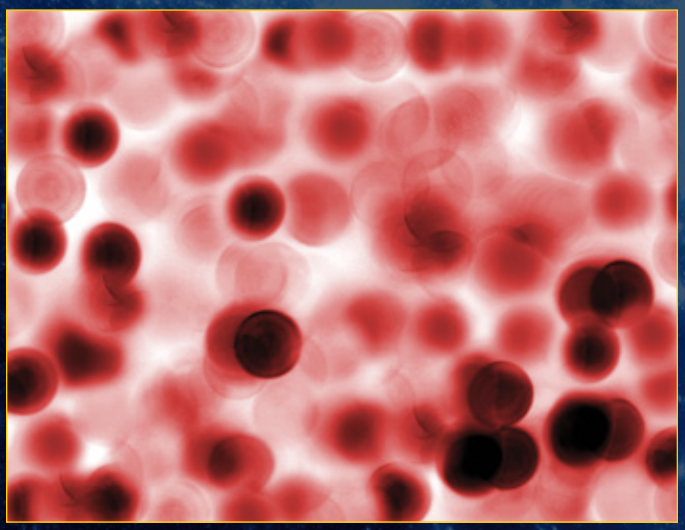
U-M research spans nearly every field from medicine and engineering to public policy and the arts. Here is a selection of key research achievements from across campus during FY 2015.

BASIC SCIENCE

U-M scientists and students with backgrounds in physics and astronomy are building components of a giant camera that will map 30 million galaxies' worth of the universe in three dimensions.

The Dark Energy Spectroscopic Instrument is being designed as part of an international collaboration to identify factors behind the accelerated expansion of our universe. The camera, which will be installed at the Kitt Peak National Observatory in Arizona, will create a high-definition, 3D map of a swath of the universe going back 10 billion light years.

By exploring how structure in the universe has evolved through time, scientists hope to uncover the tug-of-war between the forces of gravity and dark energy.



BIOLOGY

Research from the U-M Life Sciences Institute, led by Professor Ivan Maillard, has identified a gene critical to controlling the body's ability to create blood cells and immune cells from blood-forming stem cells.

The findings provide new insights into the underlying mechanics of how the body creates and maintains a healthy blood supply and immune system, both in normal conditions and in situations of stress.

Along with helping scientists better understand the body's basic processes, the discovery opens new lines of inquiry about the potential role of this particular gene, Ash1l, in cancers known to involve other members of the same gene family, like leukemia, or those where the gene might be highly expressed or mutated.

ELECTRONICS + MATERIALS

In a step that could lead to longer battery life in smartphones and lower power consumption for large-screen televisions, researchers at U-M, led by Professor Stephen Forrest, have extended the lifetime of blue organic light-emitting diodes (OLED) by a factor of 10.

Blue is one of a trio of colors used in OLED displays such as smartphone screens and high-end TVs. The improvement means that the efficiencies of blue OLEDs in these devices could jump from about 5 percent to 20 percent or better in the near future.

OLEDs are the latest and greatest in television technology, allowing screens to be extremely thin and even curved, with little blurring of moving objects and a wider range of viewing angles.

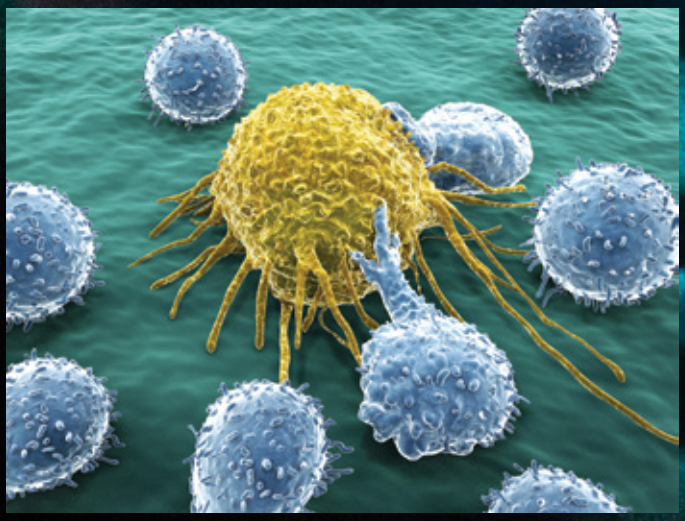
PHARMA

U-M researchers have described a new approach to discovering potential cancer treatments that requires a fraction of the time needed for more traditional methods.

They used a new platform to rapidly identify antibodies to fight breast, ovarian, and other cancers by replicating the native environment of cancer cells.

A team of researchers at the U-M Life Sciences Institute details an approach in which they embed cancer cells in a matrix of connective tissue, then inject the composite into mice to stimulate an immune response. The antibodies created are then screened for activity against human cancer cells.

The method was able to identify antibodies that stop breast cancer tumor growth in animal models, and researchers are investigating it as a potential treatment in humans.



SOCIAL SCIENCE

Government, industry, and foundations spend more than $65 billion each year on research at the nation's universities.

U-M launched a new initiative at its Institute for Social Research that, starting in January, will coordinate efforts from across the country to provide rigorous measures of the impact of this investment on the economy, as well as on scientific progress.

The Institute for Research on Innovation and Science, led by Professor Jason Owen-Smith, will build the data and tools to allow researchers, government agencies, policymakers, and others to better understand such areas as job creation, contributions of university research teams, and economic trajectories of academic researchers.

SUSTAINABILITY

The U-M Water Center was awarded a five-year, $20 million cooperative-agreement contract to join the National Oceanic and Atmospheric Administration (NOAA) in overseeing research at a nationwide network of 28 coastal reserves.

The contract allows the Water Center to extend its reach beyond the upper midwest to help coordinate, with NOAA, the National Estuarine Research Reserve System's collaborative science program.

The program supports water-quality monitoring and long-term research on the impacts of land-use change, pollution, and habitat degradation in the context of climate change trends, with an overarching goal to improve stewardship of ecologically, socially, and economically significant estuaries.

MICHIGAN RESEARCH

AT A GLANCE

TECH TRANSFER

19

NEW BUSINESS STARTUPS

422

NEW INVENTION REPORTS

2ND

MOST INNOVATIVE PUBLIC UNIVERSITY

REUTERS

5,447

RESEARCH SUBMISSIONS VALUED AT MORE THAN

$4.3B

10TH

AMONG U.S. PUBLIC UNIVERSITIES IN THE NUMBER OF CITATIONS OF ITS PUBLISHED WORK

TIMES HIGHER EDUCATION WORLD UNIVERSITY RANKINGS

100

GRAD PROGRAMS RANKED IN

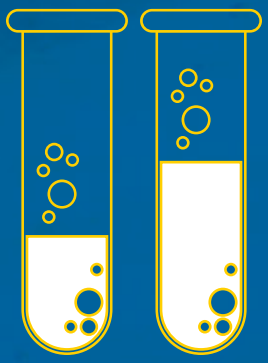
TOP 10

BY *U.S. NEWS & WORLD REPORT*

MORE THAN

1,400

UNDERGRADS PARTICIPATED IN RESEARCH LAST YEAR THROUGH UROP



2,011

RESEARCH AWARDS VALUED AT MORE THAN

$875MM

$1.3B

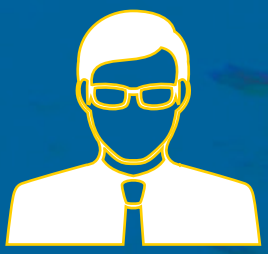
RESEARCH EXPENDITURES

2.8MM

SQUARE FEET OF LAB SPACE FOR RESEARCH AND TEACHING

$78MM

INDUSTRY-SPONSORED RESEARCH



7,701

FACULTY

ANNUAL RESEARCH PERFORMANCE

Total research expenditures at the University of Michigan for FY 2015, including the Ann Arbor, Dearborn, and Flint campuses, reached a total of $1,299,244,971, down by $9,371,387, or 0.7 percent, from FY 2014. This number includes externally and internally funded direct and indirect expenses and disbursements, including research initiative and startup expenses, research-related facilities and administrative expenses, and research equipment purchases.

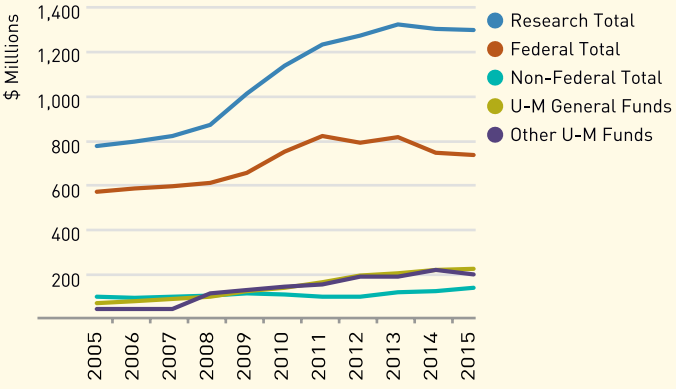
TABLE 1 shows the relative contributions of the major sponsors of U-M research. Federally funded research—by far the largest component—was down by by 1 percent, or $7.7 million, and internal investments were off by 3.7 percent, or $16.1 million. However, much of this was offset by a gain of 11.6 percent, or $14.4 million, in non-federal externally funded research, particularly from industry.

TABLE 1. MAJOR RESEARCH SPONSORS

Sponsor Group	FY 14	FY 15	% Change
Total Federal Government	$745,320,784	$737,623,556	-1.03%
Total Non-Federal Sponsors	$124,423,043	$138,847,873	11.59%
Industry (direct)	$49,690,483	$62,076,227	24.93%
Foundations	$31,663,206	$29,312,404	-7.42%
Other	$43,069,354	$47,459,243	10.19%
Total U-M Funds	$438,872,530	$422,773,541	-3.67%
Total Expenditures	**$1,308,616,358**	**$1,299,244,971**	**-0.72%**

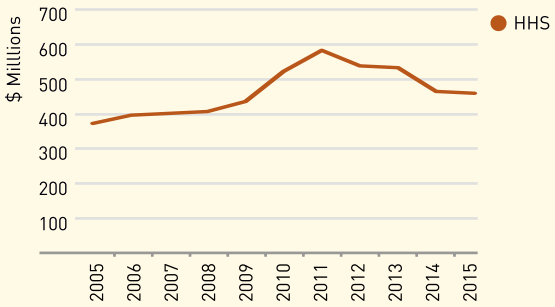
FIGURE 1 highlights the overall trends over the decade from FY 2005 through FY 2015. Funding from the federal government is consistently the largest component of research expenditures, although it has begun to decline since reaching a peak in FY 2010 both in total volume and percentage of the total.

FIGURE 1. U-M RESEARCH EXPENDITURES



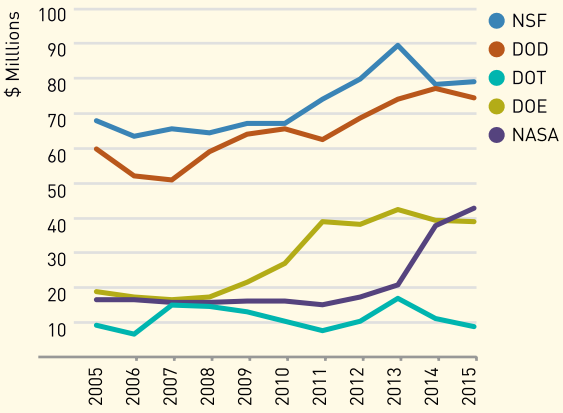
Of the federal total, Health and Human Services, which includes the National Institutes of Health, is by far the largest component, underscoring the broad range of health-related research at U-M. Its recent downward turn of 1.3 percent, or $6.1 million, shown in FIGURE 2 is largely responsible for the overall decline in federal funding. The sharp increase in funding that peaked in 2011 and eased off in recent years arose primarily from the short-term infusion of funds under the American Recovery and Reinvestment Act of 2009 (ARRA), as well as from a major collaborative oncology research program that was temporarily housed at U-M.

FIGURE 2. HHS FUNDING AT U-M



Federal agencies other than Health and Human Services support the diversity of the university's overall research portfolio, as highlighted in FIGURE 3. There has been steady growth in funding from several agencies over the last decade, and although U-M experienced a decline from the National Science Foundation (NSF) last year, the upward trend returned in FY 2015.

FIGURE 3. U-M FEDERAL FUNDING BY AGENCY



Funds from the National Aeronautics and Space Administration (NASA) saw a continuing upward trend, growing by 13.4 percent last year, largely from a major long-term award to develop a satellite

system to improve weather prediction. There was a significant decline from the Department of Transportation (DOT) in FY 2015, but substantial new investments by industry in mobility research will help position the university for further growth from both government and industry in this area in coming years.

FIGURE 4 shows the longer-term trend in federal research funding. At the end of FY 2015, total funding was $64.7 billion, a 4.7 percent decrease in constant dollars from what it was ten years previously. There was a short-term boost in the middle of the decade under the American Recovery and Reinvestment Act of 2009. Over the same period, U-M showed a 6 percent net overall gain in federal funds, adjusted for inflation, showing the university's relative strength in competing for research funding.

FIGURE 4. TRENDS IN FEDERAL RESEARCH FUNDING

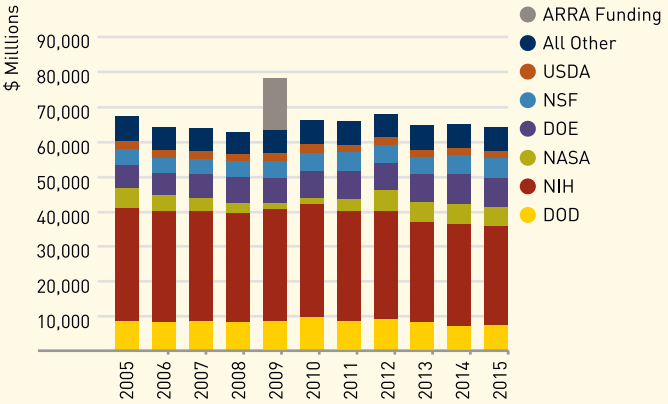


TABLE 2 provides a closer look at the total funding from industry, including subcontracts from federal contracts awarded to industry and corporate foundations, as well as direct contracts. Industry funding is now almost 9 percent of total externally sponsored research expenditures, exceeding the national average of 5 percent of funding from industry for research universities estimated by the National Science Foundation.

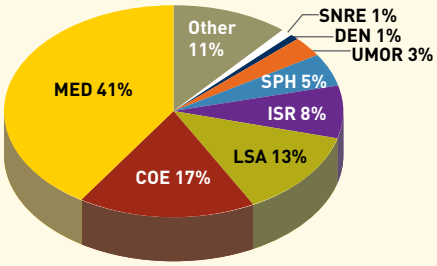
TABLE 2. INDUSTRY-FUNDED RESEARCH

Industry Research (total)	FY14	FY15	% Change
Direct Contract	$49,630,593	$62,057,886	25.04%
Subcontract (on Federal Prime)	$13,395,401	$12,128,400	-9.46%
Corporate Foundations (est.)	$2,834,941	$2,430,527	-14.27%
Other Industry Research	$959,489	$1,875,647	95.48%
Total Expenditures	**$66,880,424**	**$78,492,460**	**17.47%**

Further detail on the level of funding from these sources and others are included in APPENDIX I.

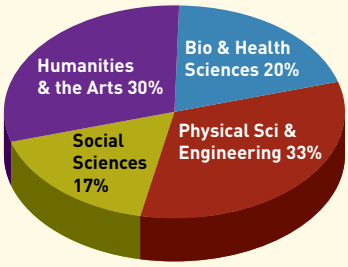
FIGURE 5 shows the expenditures for FY 2015 across U-M's 19 schools and colleges. As usual, the Medical School's portfolio is the largest on campus, at 41 percent of the university total, followed by the College of Engineering; the College of Literature, Science, and the Arts; the Institute for Social 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 FY 2014 to FY 2015.

FIGURE 5. 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 a school or college. These units include: the U-M Transportation Research Institute; the Energy Institute; the Mobility Transformation Center; 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.

FIGURE 6. UMOR GRANTS & AWARDS



UMOR also helps spur research and scholarship across the university through its Faculty Grants and Awards Program. FIGURE 6 shows the breakdown of these awards for FY 2015 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, about 30 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 U-M's total research volume.

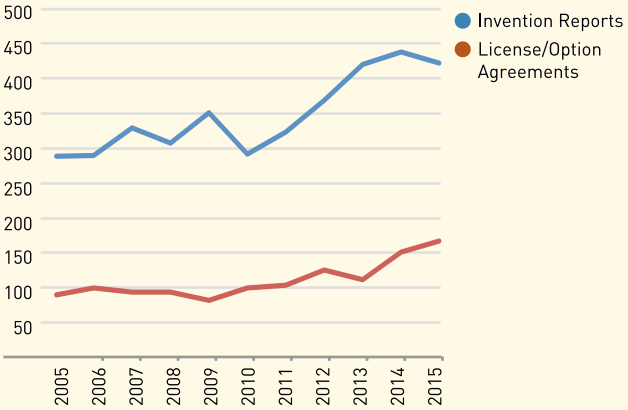
TECHNOLOGY TRANSFER

The Office of Technology Transfer (OTT) plays a central role in helping to ensure that society realizes the benefits of the research conducted on campus.

OTT's activities last year placed it in the top ten among U.S. universities. In FY 2015, a record 160 patents were issued, and U-M researchers submitted 422 new invention reports.

FIGURE 7 shows the steady rise of invention disclosures over the last 10 years, reaching a total of 3,535 for the decade. In addition, the office negotiated a record 148 option/license agreements last year with both new and existing companies, up 10.8 percent from the previous year's record.

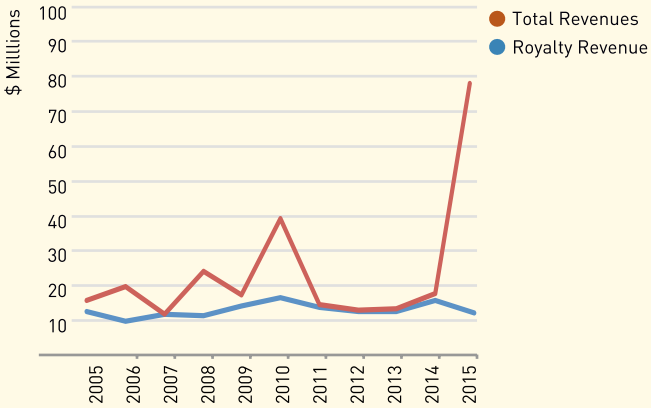
FIGURE 7. TECH TRANSFER RESULTS



OTT's Venture Center brings together talent, funding, and resources to help launch startup companies based on intellectual property developed at U-M. The Center launched a record 19 new startups in FY 2015, and has averaged one new company every four weeks over the last 10 years.

FIGURE 8 tracks revenue from tech transfer operations over the last decade. Royalty revenue has remained stable, and total revenue, which includes revenue from liquidated equity from startups and up-front royalty payments, fluctuates considerably depending on specific deals occurring from year to year. In FY 2015, total revenues reached a record $78 million, largely from the monetization of royalties on a license for a drug developed to treat Gaucher disease, an inherited disorder that affects many of the body's organs and tissues. The spike in revenues in 2010 came from the monetization of royalties on FluMist, an influenza virus vaccine delivered as a nasal mist.

FIGURE 8. TECH TRANSFER REVENUES



A portion of these funds provides incentives for faculty inventors. The administration's share goes to support potential high-impact research on campus, the Business Engagement Center, and the U-M Venture Center.

BUSINESS ENGAGEMENT

The Business Engagement Center (BEC), which reports jointly to UMOR and the University of Michigan Office of Development, serves as a gateway for companies to access the expertise and resources in the U-M community, including educational programs and access to student talent. Its goal is to help industry find opportunities to invest in U-M research and to provide philanthropic support to the university.

Working to lay the groundwork for broader and stronger relationships, the BEC hosted 767 visits last year, and it now maintains ongoing relationships with more than 1,200 companies. Total research expenditures from industry rose by 17.5 percent in FY 2015 to $78 million. Philanthropic contributions rose by 2.7 percent to $38 million, yielding a total of $117 million in industry support, a 16 percent increase to a record high.

PLANNING FOR THE FUTURE

In recent years, the rate of growth in federal funding, which has fueled much of university research for the last several decades, has slowed considerably, contibuting to further competition for those funds. Progress is under way on a number of fronts to diversify and strengthen U-M's research enterprise in today's challenging climate:

- **Build the pipeline of new projects**—TABLE 3 shows that the total number of research contracts awarded to U-M in FY 2015 rose by 9.1 percent. However, the total dollar value of those awards rose by about 7.1 percent, continuing the recent trend of smaller awards. To further build the pipeline, U-M faculty submitted 9.58 percent more research proposals with an increase of 8.38 percent in dollar value, as shown in TABLE 4.

TABLE 3. NUMBER AND VALUE OF AWARDS

	Number of Awards	Value of Awards
FY 2015	2,011	$ 875,653,562
FY 2014	1,843	$ 817,525,144
Difference	168	$58,128,418)
% Change	9.12%	7.11%

TABLE 4. NUMBER AND VALUE OF SUBMISSIONS

	Number of Submissions	Value of Submissions
FY 2015	5,447	$ 4,338,446,054
FY 2014	4,967	$ 4,013,200,065
Difference	476	$ 335,292,304
% Change	9.58%	8.38%

- **Create larger projects that draw on the university's interdisciplinary strengths and innovative partnerships**—In FY 2015, operations began at U-M's Mobility Transformation Center, an ambitious public/private R&D partnership, to develop the foundations of a commercially viable ecosystem of connected and automated vehicles. This novel collaboration is bringing faculty from across campus together with companies from multiple industries, the federal government, the state government, the City of Ann Arbor, and other academic institutions to envision and shape the future of mobility. With this project well under way, others are in the planning stages.
- **Encourage new innovative research ideas**—MCubed, a unique program established in 2012 to provide seed funding to kick-start novel interdisciplinary research projects, launched a second round of funding that supported more than 225 projects in the fall of 2015. The first round supported 200 new research projects that involved collaborations among 700 faculty and has so far led to $29 million in new grants.
- **Strengthen industry outreach**—Building on successes in FY 2015, U-M's Business Engagement Center is working with faculty to engage industry in mutually beneficial projects in a wide range of fields. One key focus moving forward is in the area of data sciences, which has broad potential for application in industries ranging from health care to finance.
- **Expand clinical trials**—As part of an ongoing effort, U-M increased the number of awards for clinical trials by almost 28 percent to a total of $61.7 million in FY 2015.
- **Seek more funding from foundations**—The U-M Office of Research and the Office of Foundation Relations have partnered to improve outreach to faculty about foundation funding, recruiting more than $60 million in foundation funding in 2015.
- **Pursue philanthropic gifts for research**—In coordination with a university-wide campaign, U-M is now working with the Office of University Development to boost efforts to seek research funding from philanthropic sources.
- **Develop more international partnerships**—U-M faculty have strong relationships with the international research community, which enrich research and education by bringing together the complementary strengths and perspectives of other cultures to address common challenges. Plans are in motion to expand these ties in the coming fiscal year.
- **Streamline the proposal submission process**—UMOR's Office of Research and Sponsored Projects, which oversees the proposal submission and negotiation process, has an ongoing effort with faculty and administrators to improve the efficiency and effectiveness of research administration processes.
- **Help improve faculty productivity**—UMOR's Office of Research Ethics & Compliance is working to clarify and expedite the increasingly time-consuming processes related to complying with regulations, with an eye toward freeing up faculty time to focus on actual research. The Office of Research is also launching an effort to explore further ways to reduce the administrative burden on faculty.
- **Communicate the value and impact of university research**—Following the launch of a new U-M research website and a broadly distributed research newsletter in FY 2015, further efforts are under way at U-M to highlight the role of university research in the economy, competitiveness, and quality of life to key decision makers in government and industry, as well as the public.

APPENDIX I:
Volume of Research Expenditures By Sponsor

	FOR THE YEAR ENDED JUNE 30,			FISCAL YEAR CHANGE
	2015	2014	DOLLAR ($)	PERCENTAGE (%)
INTERNALLY FUNDED RESEARCH				
Designated Fund	$42,797,579	$44,646,192	$(1,848,613)	-4.1%
Expendable Restricted Fund	59,199,318	56,711,612	2,487,706	4.4%
General Fund	225,580,703	218,597,842	6,982,862	3.2%
Auxiliary Fund (Med School)	95,195,940	118,916,885	(23,720,945)	-19.9%
Subtotal University Funds	422,773,541	438,872,530	(16,098,989)	-3.7%
EXTERNALLY FUNDED (SPONSORED) RESEARCH				
Federal:				
Agriculture, Department of	2,505,739	2,580,153	(74,413)	-2.9%
Commerce, Department of	6,119,852	6,021,149	98,703	1.6%
Defense, Department of	74,712,047	77,500,664	(2,788,618)	-3.6%
Air Force, Department of the	12,661,566	13,362,044	(700,478)	-5.2%
Army, Department of the	31,108,493	31,134,791	(26,298)	-0.1%
Navy, Department of the	14,418,934	15,006,125	(587,191)	-3.9%
Other	16,523,054	17,997,704	(1,474,650)	-8.2%
Director of National Intelligence, Office of the	113,793	352,183	(238,391)	-67.7%
Education, Department of	6,215,278	7,395,585	(1,180,307)	-16.0%
Office of Student Financial Assistance Programs	1,068,712	1,140,034	(71,322)	-6.3%
Other	5,146,566	6,255,551	(1,108,985)	-17.7%
Energy, Department of	39,098,970	39,504,823	(405,854)	-1.0%
Environmental Protection Agency	2,780,258	2,483,589	296,669	11.9%
Federal Reserve System	188,776	36,442	152,334	418.0%
Health and Human Services, Department of	466,612,833	472,693,086	(6,080,253)	-1.3%
Centers for Disease Control and Prevention	14,616,202	13,688,820	927,382	6.8%
Centers for Medicare and Medicaid Services	9,245,861	6,551,851	2,694,010	41.1%
Food and Drug Administration	1,206,265	1,193,278	12,987	1.1%
Health Resources and Services Administration	240,093	114,383	125,710	109.9%
National Institutes of Health	430,002,068	441,252,732	(11,250,664)	-2.5%
Substance Abuse and Mental Health Services Administration	1,295,594	1,353,851	(58,257)	-4.3%
Other	10,006,751	8,538,172	1,468,578	17.2%
Homeland Security, Department of	859,940	1,098,600	(238,661)	-21.7%
Housing and Urban Development, Department of	-	24,248	(24,248)	-100.0%
Institute of Museum and Library Services	98,071	194,645	(96,574)	-49.6%
Interior, Department of the	237,265	254,231	(16,966)	-6.7%
Justice, Department of	2,323,765	2,264,861	58,905	2.6%
Labor, Department of	6,351	-	6,351	
National Aeronautics and Space Administration	43,173,240	38,061,841	5,111,399	13.4%
National Endowment for the Humanities	119,105	158,362	(39,256)	-24.8%
National Science Foundation	79,236,809	78,493,661	743,148	0.9%
Nuclear Regulatory Commission	638,495	441,644	196,851	44.6%
Smithsonian Institution	541,611	494,903	46,708	9.4%
Social Security Administration	1,734,990	2,379,431	(644,441)	-27.1%
State, Department of	472,947	382,765	90,182	23.6%
Transportation, Department of	8,896,059	11,475,417	(2,579,358)	-22.5%
Federal Highway Administration	4,137,571	8,239,439	(4,101,867)	-49.8%
National Highway Traffic Safety Administration	2,230,845	1,514,108	716,737	47.3%
Other	2,527,642	1,721,871	805,772	46.8%
United States Agency for International Development	735,555	942,221	(206,666)	-21.9%
Veterans Affairs, Department of	201,807	86,279	115,528	133.9%
Subtotal Federal	737,623,556	745,320,784	(7,697,228)	-1.0%
Non-Federal:				
Foreign Corporations	14,456,316	12,235,017	2,221,299	18.2%
Foreign Foundations	386,821	1,233,490	(846,669)	-68.6%
Foreign National Government	1,089,086	280,693	808,393	288.0%
Foreign Other (Univ/Gifts)	3,414,752	3,437,472	(22,721)	-0.7%
Foreign Public Charities	-	3,733	(3,733)	-100.0%
Foreign Trade/Prof Assns	687	15,253	(14,566)	-95.5%
International Organizations	364,936	485,984	(121,048)	-24.9%
Local Authorities in Michigan	34,300	50,000	(15,700)	-31.4%
U.S. Corporations	47,619,911	37,455,466	10,164,445	27.1%
U.S. Foundations	28,925,583	30,429,716	(1,504,134)	-4.9%
U.S. Other (Incl Univ + Gifts)	8,705,523	7,439,240	1,266,282	17.0%
U.S. Public Charities (+ Hosps)	19,843,530	18,910,909	932,621	4.9%
U.S. State of Michigan	1,613,607	1,626,423	(12,816)	-0.8%
U.S. Trade/Prof Assns	12,392,823	10,819,647	1,573,176	14.5%
Subtotal Non-Federal	138,847,873	124,423,043	14,424,830	11.6%
Subtotal Sponsored Research	876,471,429	869,743,828	6,727,602	0.8%
Total Volume of Research Expenditures	**$1,299,244,971**	**$1,308,616,358**	**$(9,371,387)**	**-0.7%**

APPENDIX II:
Volume of Research Expenditures by Major University Units

UNIT	FY 2013	FY 2014	FY 2015	AVERAGE % CHANGE	2013-2014 CHANGE	2014-2015 CHANGE
Architecture & Urban Planning, Taubman	1,740,682	1,450,112	1,382,735	-10.7%	-16.7%	-4.6%
Art and Design, Stamps School of	178,971	342,008	213,167	26.7%	91.1%	-37.7%
Business, Ross School of	11,456,643	10,999,550	11,165,973	-1.2%	-4.0%	1.5%
Dentistry	19,053,882	19,070,595	17,708,485	-3.5%	.1%	-7.1%
Education	12,836,415	12,004,397	9,778,673	-12.5%	-6.5%	-18.5%
Engineering	206,688,130	217,941,206	225,830,559	4.5%	5.4%	3.6%
Graduate School, Rackham	533,497	1,068,365	577,218	27.1%	100.3%	-46.0%
Information	5,257,657	5,974,336	5,806,592	5.4%	13.6%	-2.8%
Kinesiology	4,609,684	5,591,674	6,371,699	17.6%	21.3%	13.9%
Law	3,782,373	4,437,137	5,837,909	24.4%	17.3%	31.6%
Literature Science, and the Arts	162,242,959	170,122,601	174,840,298	3.8%	4.9%	2.8%
Medical School	573,886,046	553,270,557	535,444,490	-3.4%	-3.6%	-3.2%
Music	400,411	584,243	593,211	23.7%	45.9%	1.5%
Natural Resources And The Environment	17,553,526	14,564,753	14,055,461	-10.3%	-17.0%	-3.5%
Nursing	7,052,606	6,485,579	5,979,368	-7.9%	-8.0%	-7.8%
Pharmacy	8,884,239	9,772,746	10,066,176	6.5%	10.0%	3.0%
Public Health	70,858,034	64,788,103	67,345,171	-2.3%	-8.6%	3.9%
Public Policy, G Ford School of	3,870,939	4,366,167	3,628,047	-2.1%	12.8%	-16.9%
Social Work	4,499,704	4,856,401	4,593,626	1.3%	7.9%	-5.4%
Institute for Social Research	120,200,002	111,122,463	110,204,136	-4.2%	-7.6%	-0.8%
UMOR Units	38,987,820	36,265,535	36,156,663	-3.6%	-7.0%	-0.3%
Other Units	42,584,474	41,815,847	42,139,534	-.5%	-1.8%	0.8%
UM-Dearborn	6,442,964	7,730,141	6,494,750	2.0%	20.0%	-16.0%
UM-Flint	634,471	730,177	855,101	16.1%	15.1%	17.1%
Unassignable Services	4,485,037	3,261,665	2,175,924	-30.3%	-27.3%	-33.3%
GRAND TOTAL	**1,328,721,165**	**1,308,616,358**	**1,299,244,971**	**-1.1%**	**-1.5%**	**-0.7%**

NOTES TO APPENDIX I AND II:

The university receives sponsored research funds directly and indirectly from industry, which totaled approximately $78 million in 2015 and $67 million in 2014, a 16% increase.

- Federal sponsored research includes federal projects received by the university via corporations, which totaled approximately $12 million in 2015 and $14 million in 2014.
- Non-federal sponsored research funded by U.S. and Foreign Foundations includes amounts received by the university via corporate foundations, which totaled approximately $2 million in 2015 and $3 million in 2014.
- Non-federal sponsored research funded by U.S. Trade/Professional Assns and the State of Michigan includes projects received by the university via corporations, which totaled approximately $2 million in 2015 and $1 million in 2014.

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