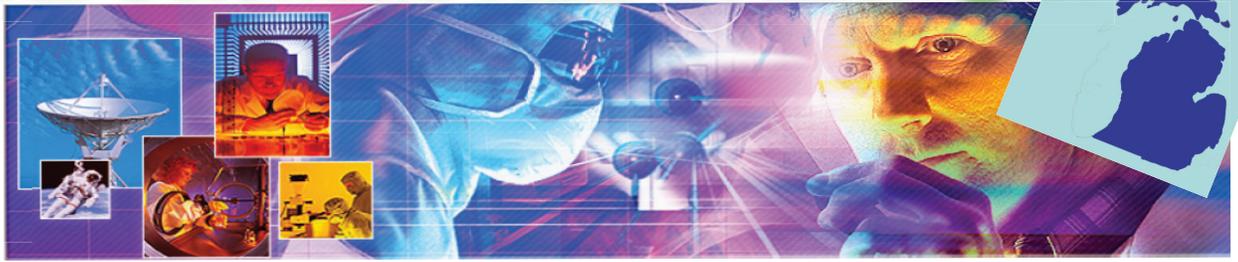


Federal Scientific R&D in Michigan



Federal scientific R&D is the “seed corn” of the 21st Century Economy. Taxpayer investment in R&D fuels innovation and makes our economy competitive. Without public funds invested in the “pipeline” of university-based research, there can be little or no basis for future job growth and our national security would be imperiled.

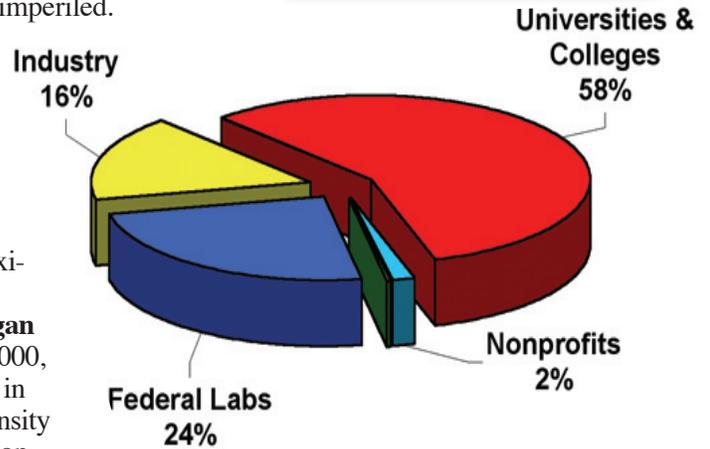
Over the past 50 years, our taxpayer investment in R&D has produced more than half of the nation’s economic growth. Prominent economists agree that no other investment generates a greater long-term return to the economy than scientific R&D.

MICHIGAN R&D IN COMPARISON: Michigan ranked 20th among the 50 states in federal R&D spent within the state, with approximately \$981 million in spent in FY 2000. Overall R&D expenditures from all sources were nearly \$18.9 billion in FY 2000, making Michigan 2nd nationwide. With a gross state product (GSP) of \$325 billion in 2000, Michigan ranked 6th in the nation. With a GSP per capita of \$38,838 in 2000, Michigan ranked 9th in the nation. Michigan had an R&D intensity (the ratio of R&D to GSP) of 5.81% for 2000, making it 1st in the nation.

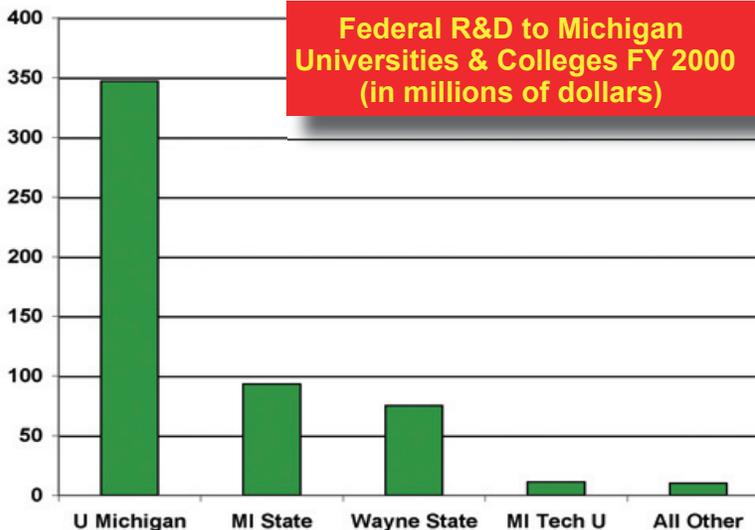
HOW FEDERAL R&D HELPS THE MICHIGAN’S ECONOMY GROW: Approximately 19% of all federal funds spent in Michigan (not including direct support of individuals) goes toward R&D. Most major federal agencies provide funding for Michigan R&D, foremost of which is the Department of Defense (DOD) which accounted for approximately 31% of all federal R&D dollars spent in Michigan in 2000. HHS (18%), NASA (12%), NSF (11%) and DOE (10%) accounted for another 39% of federal R&D expenditures in Michigan. The remaining federal R&D dollars spent in Michigan in 2000 came collectively from the Departments of Commerce, Interior, Agriculture, and several other agencies. The automotive industry remains the core of Michigan’s R&D enterprise. General Motors alone has over a dozen major R&D labs in the state.

R&D AND MICHIGAN JOBS: 51 of every 1,000 Michigan jobs is in the high tech sector. Of the 10.1 million scientists and engineers working in the U.S., more than 3.1 million were employed in S&E occupations, many included in the **190,982 high tech jobs** in Michigan in 2002. Yet despite continuing demand, universities are awarding fewer technical degrees nationwide. *As the primary source of funding for university research, the federal government is critical to the production of the nation’s future scientists and engineers ...*

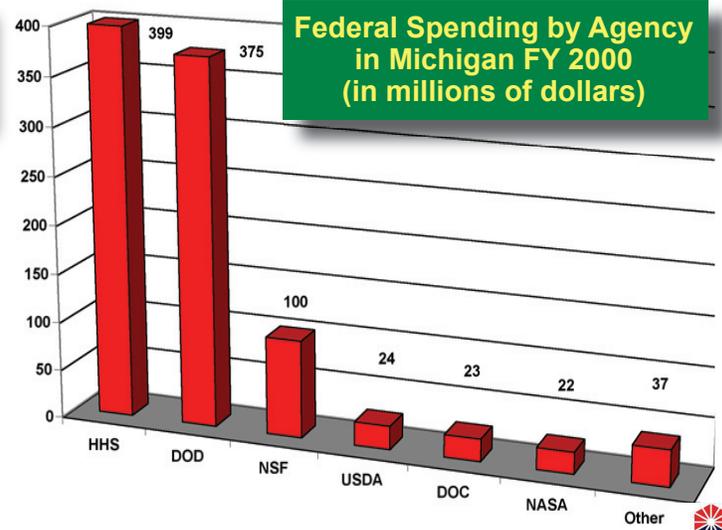
R&D Performers in Michigan FY 2000



Federal R&D to Michigan Universities & Colleges FY 2000 (in millions of dollars)



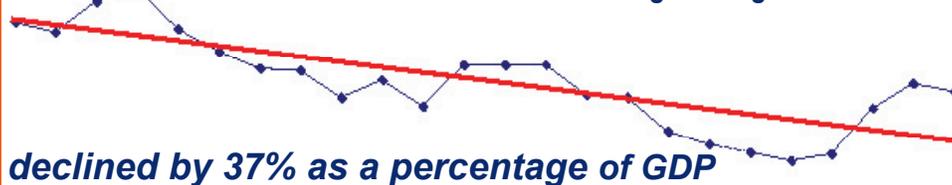
Federal Spending by Agency in Michigan FY 2000 (in millions of dollars)



Federal Scientific R&D in Michigan



The U.S. Economy doubled from \$5.4 trillion to \$10.7 trillion between 1980 — 2003 ... while Federal R&D Investment in the Physical & Mathematical Sciences and Engineering ...



declined by 37% as a percentage of GDP

Scientific Research Fuels Economic Growth through Discovery. Discovery Drives Innovation. Innovation Drives the Market, and the Market Drives the Economy. Science= Jobs

Productivity growth in **Michigan** is driven largely by investment in scientific research & development — particularly investments in the physical sciences, mathematics and engineering. Over the last 10 years, while federal funding for health science research has increased, federal support for most other scientific disciplines has actually declined in constant dollars. Four federal agencies are responsible for almost 90% of federal support for physical science, mathematics, and engineering — DOE (28%), NASA (23%), DOD (23%) and NSF (13%). In a recent study, a National Academy of Sciences panel states that “... the 1990’s saw the beginning of a change in the federal research portfolio that may not bode well for the future — in particular, a decline in support of several physical science and engineering fields.”



How Michigan Ranks

- 8th in Population (2000)
- 4th in R&D per Capita (2002)
- 13th in Doctoral Scientists (1999)
- 7th in Doctoral Engineers (1999)
- 8th in S&E Doctoral degrees awarded, 2000
- 29th in Civilian scientists and engineers as a percentage of the workforce 2002
- 10th in Industry investment in R&D as a percentage of Gross State product
- 6th in patents awarded to state residents, 2000 (3,724 total)
- 20th in patents awarded to companies or individuals per 1,000 workers
- 9th in total Federal Expenditures 2002
- 20th in Fed. R&D Obligations, 2002
- 34th in Venture Capital invested as a percentage of GSP
- 36th in High Tech Employment as % of total employment (2002) *
- 13th in High Tech Average Wage 2002 *
- 25th in Online Population 2002 **
- 23rd in State New Economy Index 2002 **
- 23rd in Workforce Education (a weighted measure of advanced degrees, bachelor’s degrees, etc.) **
- 14th in percentage of workforce employed by foreign companies **



Michigan Lost 10,800 High Tech Jobs During 2001- 2002 (— 5%)

67% of all federal R&D funds were spent in only 10 states and D.C. in 2000. **Michigan** ranked 20th in overall federal R&D dollars obligated for that year.

Although industry has increased its R&D in a recent years, industry allocates about 70% of its R&D to product development and less than 6% to basic science research. Because 60% of all U.S. basic research funding comes from federal sources, there is growing concern that reductions in federal research in the physical sciences, math, and engineering will ultimately harm innovation in industries heavily reliant on these sciences — including defense, aerospace and information technology.

Michigan’s economy was severely affected by the loss of DOD funding as a result of the post-Cold War cut backs in defense spending in the early 1990’s, but it is fighting its way back in several key research areas. The **University of Michigan** is one of the top research universities in the country and received \$347 million in federal R&D grants in FY 2000, ranking it sixth in federal R&D funds for universities. **Michigan State** is 55th among U.S. universities in receipt of federal R&D funding.

Michigan performs more than 7 percent of all R&D nationwide because of its strength in industry-funded R&D, particularly the automotive sector. It has historically garnered a very small amount of federal R&D funding (about 1%) in spite of representing about 3.5% of the U.S. population.

51 of every 1,000 private sector workers in Michigan have jobs with high tech firms. While the state lost 10,800 high-tech jobs (— 5%) in 2001-2002, about 46,300 jobs are in **Engineering Services**, 42,200 in **R&D and Testing Labs**, and 40,900 in **Computer Systems Design & Related Services**.

Sources: U.S. Census Bureau, U.S. Bureau of Labor Statistics, National Science Foundation, National Venture Capital Association, NASDAQ, * American Electronics Association CyberStates 2003, ** Progressive Policy Institute, 2002

