



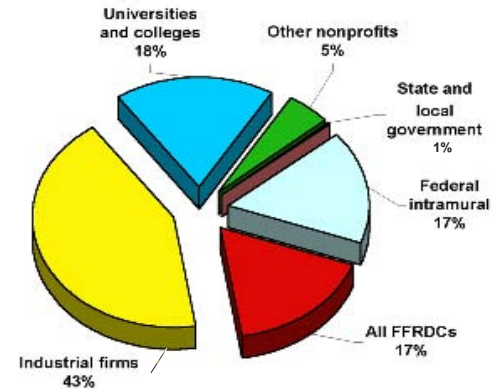
# California R&D 2007

## Federal Funds for Growth & Our Innovation Future

America's innovation future requires more federal investment in basic scientific research. Overall scientific research and development (R&D) promotes economic development, job growth, national security, competitiveness and global leadership.

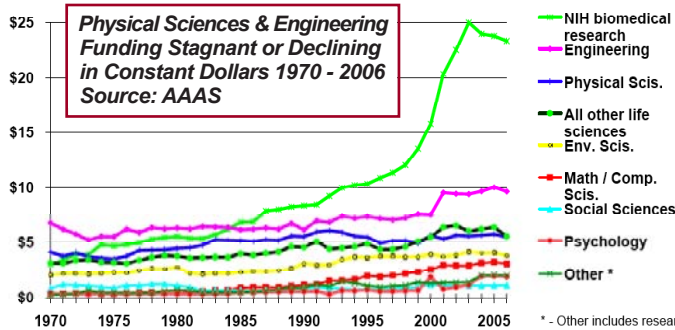
Basic research is primarily funded by the federal government for complex economic reasons. There is little or no incentive for the private sector to invest in frontier research because it is typified by high risk and low immediate reward. Yet, basic research benefits us all over a longer time period. It results in discovery, innovation and other end products and services — all derived from taxpayer investments in science. An estimated 73% of all patents granted in the U.S. are attributable to scientific research initially funded by the federal government.

### Federal R&D Funding in California by Performer 2003



**Federal investment in Basic Science Promotes Innovation:** Over the past 50 years, investment in R&D has produced *more than half* of the nation's economic growth. Prominent economists agree that no other investment has generated greater long-term return to the economy than scientific R&D.

### Decline of Federal Funding for Scientific Research in Physical Sciences & Engineering Over the Past 30 Years:

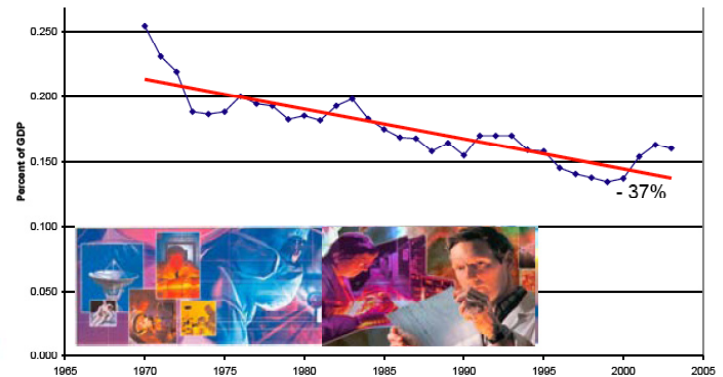


Life sciences - split into NIH support for biomedical research and all other agencies' support for life sciences.  
Source: National Science Foundation, *Federal Funds for Research and Development* FY 2004, 2005, 2006, 2009. FY 2005 and 2009 data are preliminary. Constant-dollar conversions based on OMB's GDP deflators. FEB. '07 © 2007 AAAS.

\* - Other includes research not classified (includes basic research and applied research); excludes development and R&D facilities)

### Federal Funding for Physical Sciences & Engineering as Percentage of GDP Declines Sharply

Source: ASTRA

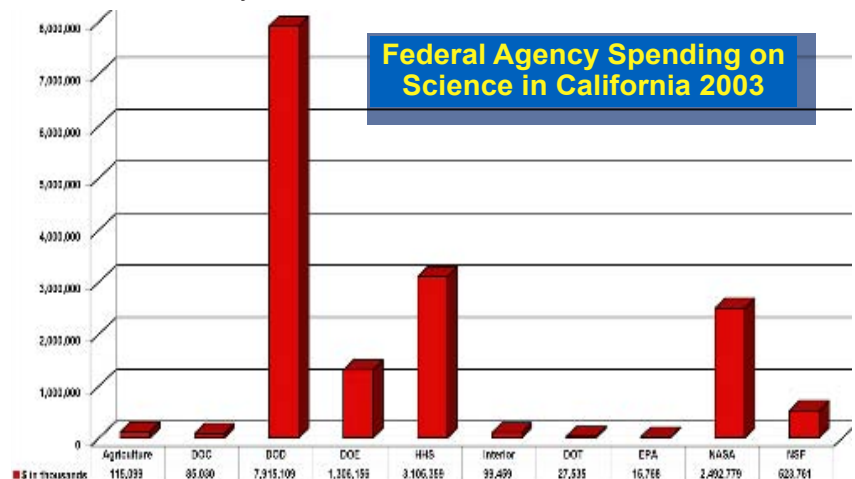


**California** ranked 1st among the 50 states and D.C. in federal R&D expenditures in FY 2002, with approximately \$15.7 billion spent. Overall R&D expenditures in FY 2002 were more than \$206 billion, making California 1st nationwide. With a gross state product (GSP) of \$1.55 trillion in 2004, California ranked 1st in the nation. Most major federal agencies provide funding for California R&D. In FY 2003, the Department of Defense (DOD) alone accounted for approximately \$7.9 billion of all federal R&D dollars spent in California. California is an R&D powerhouse accounting for about 20% of all federal R&D spending. Four of the top ten universities in federal R&D spending are located in California. Government-owned, privately operated facilities in the state include the Jet Propulsion Laboratory in Pasadena (operated by Calif. Institute of Technology), Lawrence Livermore National Lab and Berkeley National Lab (both operated by the University of California) and the Stanford Linear Accelerator Center (SLAC) at Stanford University.

Of the 10.1 million scientists and engineers working in the U.S., more than 3.1 million were employed in Science and Engineering occupations. Many of those made up California's 904,920 high tech jobs in 2004. 72 of every 1,000 private sector workers are employed by high tech companies and 41%, or \$47.8 billion, of the state's exports were high tech in 2005.

Current trends show an overall reduction of federal funding for basic research in the physical and engineering sciences. To maintain U.S. competitiveness, innovation and growth, federal funding for basic scientific research in these disciplines must remain strong. Our future, as a state and a nation, depend on it.

### Federal Agency Spending on Science in California 2003



# How *California* Ranks 2007

Rank	General Demographic & Economic Indicators	California	Total U.S.
1	Population as of July 1, 2006 (thousands)	36,457	299,398
1	Civilian labor force, 2003 (thousands)	17,460	147,569
11	Personal income per capita, 2006 (dollars)	\$38,956	\$36,276
40	Income Distribution (ratio of mean family income in top 1/4 to family income in bottom 1/4)	11.92	9.98
50	5 Year Change 1999-2004 in New Business Creation (percentage)	— 37.07%	— 8.94%
6	Percent of total wage & salary jobs in High Tech Industry 2003	8.39%	5.51%
1	Gross state product, 2005 (billions of dollars)	\$1,622	\$12,410
8	R&D per capita 2003	\$1,683	\$1,003
1	High Tech Jobs Gained/Lost in State 1999-2004	— 102,600	— 295,750
27	Manufacturing Investment 2003 (measures ability to renew & expand production capacity)	5.60%	6.00%
<b>Academic Indicators &amp; Degree Production</b>			
12	S&E Graduate Students per one million population, 2003	1,799	1,524
1	Doctoral engineers, 2001	21,040	112,760
1	S&E doctorates awarded, 2002	3,232	24,558
1	S&E post doctorates in doctorate-granting institutions, 2002	7,299	45,171
1	S&E graduate students in doctorate-granting institutions, 2002	48,044	482,211
1	Public higher education current-fund expenditures, 2001 (millions of dollars)	\$22,675	\$170,024
<b>Workforce Indicators</b>			
3	Technology & Science Workforce Composite Index, 2004 Score (Milken Institute)	83.56	55.25
14	Industrial Diversity 2003 (Herfindahl Index, indicating degree of diversity within State's traded sector)	4.69	6.74
8	High Tech Workers <i>per</i> 1,000 Private Sector Workers, 2004 (Employment Concentration)	71.76	51.06
1	High Tech Average Wage, 2004	\$90,554	\$72,440
7	Human Capital Investment Composite Index, 2004 Score (Milken Institute)	67.11	51.25
<b>R&amp;D Spending by Source, R&amp;D Indicators, Awards, &amp; Patents</b>			
1	Total Federal expenditures, 2002 (millions of dollars)	\$206,401	\$1,896,317
1	Federal R&D obligations, 2002 (millions of dollars)	\$15,686	\$83,764
1	Total R&D performance, 2003 (millions of dollars)	\$59,664	\$291,864
1	Industry R&D, 2002 (millions of dollars)	\$39,644	\$182,403
1	Academic R&D, 2002 (millions of dollars)	\$4,882	\$36,314
1	Number of SBIR awards, 1999-2002	3,923	19,383
4	Patents issued to state residents per one million population, 2004	601.83	286.32
2	Research & Development Inputs Composite Index, 2004 score (Milken Institute)	80.32	51.51
19	Businesses Created from University R&D (# of spin-outs per \$1 billion spent) 2000-2002	13.36	11.70
19	Academic R&D <i>per capita</i> , 2003 (\$ spent on R&D by academic institutions per capita)	\$151.13	\$137.05
7	SBIR Grants Awarded, 2006 (\$ per worker)	\$23.68	\$12.72
<b>Venture Capital &amp; Entrepreneurial Indicators</b>			
50	Absolute Change in Venture Capital Investments, \$ per worker, 1999-2004	— 632.84%	— 63.04%
1	Venture Capital Investments in 2005 (millions of 2005 \$)	\$10,316	\$21,856
1	Venture Capital Numeric Change 2004 - 2005 (in millions of 2005 \$)	+ \$395	\$44.7
4	<i>Economic Dynamism - 2007 State New Economy Index</i> (measures 6 aspects of dynamism)	12.92	10.0
5	Overall <i>State New Economy Index Score 2007</i>	82.9	62.1

Sources: U.S. Department of Commerce, Bureau of Economic Analysis; U.S. Department of Commerce, Census Bureau; National Science Foundation/Science Resources Study Division; U.S. Bureau of Labor Statistics; Milken Institute; National Venture Capital Association; U.S. Patent & Trademark Office; U.S. Office of Management & Budget; U.S. Small Business Administration; Milken Institute; Ewing Marion Kauffman Foundation; Information Technology & Innovation Foundation.

