

The life sciences are a cornerstone of California's identity as a hub for technological innovation. Local firms, laboratories, and universities perform research and development (R&D) that helps technological breakthroughs move from concept to commercialization. According to the California Life Sciences Association, the state was home to more than 3,400 companies, 310,000 employees, and 4,900 science and engineering PhDs in 2019. Despite these tremendous assets, the Golden State can do more to remain a national and global industry leader.

## California's Leadership in Life Sciences

California has one of the highest concentrations of life sciences industry employment in the nation. The Milken Institute State Technology and Science Index 2020 (STSI) ranked the state highly for job intensity (number of jobs per 100,000 total workers) across multiple life sciences occupations (see Table 1), and most workers had annual incomes higher than the national average for their occupations (see Table 2).

**Table 1: Job Intensity**

	Job Code	Calif. Rank	Calif. Intensity (per 100k)	Calif. Jobs (Total)	Top State	Top Intensity (per 100k)
Biochemists + biophysicists	19-1021	6 <sup>th</sup>	32	5,610	NJ	178
Microbiologists	19-1022	9 <sup>th</sup>	20	3,470	MD	71
Biological scientists	19-1029	5 <sup>th</sup>	61	10,650	MD	151
Medical scientists	19-1042	4 <sup>th</sup>	135	23,460	MA	466
Life scientists	19-1099	10 <sup>th</sup>	8	1,300	ND	25
Biological technicians	19-4021	17 <sup>th</sup>	56	9,740	MA	174

Source: US Bureau of Labor Statistics—Occupational Employment Statistics (2019)

**Table 2: Average Incomes**

	Job Code	Calif. Avg. Income	National Avg. Income	Top State	Top State Avg. Income
Biochemists + biophysicists	19-1021	\$107,830	\$108,180	IL	\$114,300
Microbiologists	19-1022	\$104,960	\$82,760	MD	\$105,840
Biological scientists	19-1029	\$96,640	\$87,590	MD	\$106,030
Medical scientists	19-1042	\$109,350	\$98,770	ME	\$130,310
Life scientists	19-1099	\$100,310	\$85,890	NC	\$100,440

Source: US Bureau of Labor Statistics—Occupational Employment Statistics (2019)

Despite a strong industry presence, California's business environment presents a challenging landscape. The state ranked No. 49 in the Tax Foundation 2021 State Business Tax Climate Index due to its high corporate, income, and sales tax rates. The state is notable for having few tax incentives to support new establishment growth, and the Milken Institute's STSI 2020 found that, while California ranked No. 6 in the nation for its average rate of net high-tech business formation from 2016 to 2018, it ranked No. 36 for high-tech employment growth during that span. A combination of public investment and targeted investment incentives in specific sectors could enhance job growth in life sciences occupations and further solidify (or enhance) California's standing as an innovation leader.

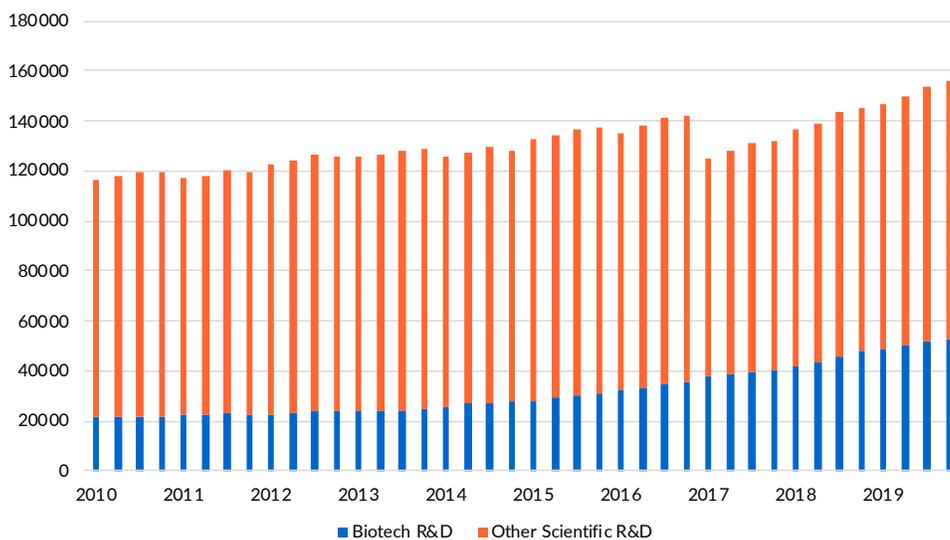
## Potential Impact of R&D Incentives

Although California's high-tax environment presents a challenge for many businesses, the state's tax incentive for R&D investment is a crucially important tool for firms to reduce their operating costs. Structured interviews conducted by the Milken Institute found that, while the specific impact of California's R&D tax credit on investment in life sciences (including biotechnology R&D) could not easily be quantified, the availability of the tax credit appeared to have had a major influence on firms' investment decisions.

California's total employment in scientific R&D services grew substantially over the past decade, rising almost 34 percent from 2010 to 2019. The growth rate in biotech R&D was even higher, increasing nearly 146 percent over the same period (see Figure 1). Since 2015, average weekly wages in biotech R&D have also been consistently higher than they have in scientific R&D services (see Figure 2). These trends suggest that targeted support for R&D in the life sciences industry (including but not necessarily limited to biotech) has had a substantial positive impact on both job creation and wage increases.

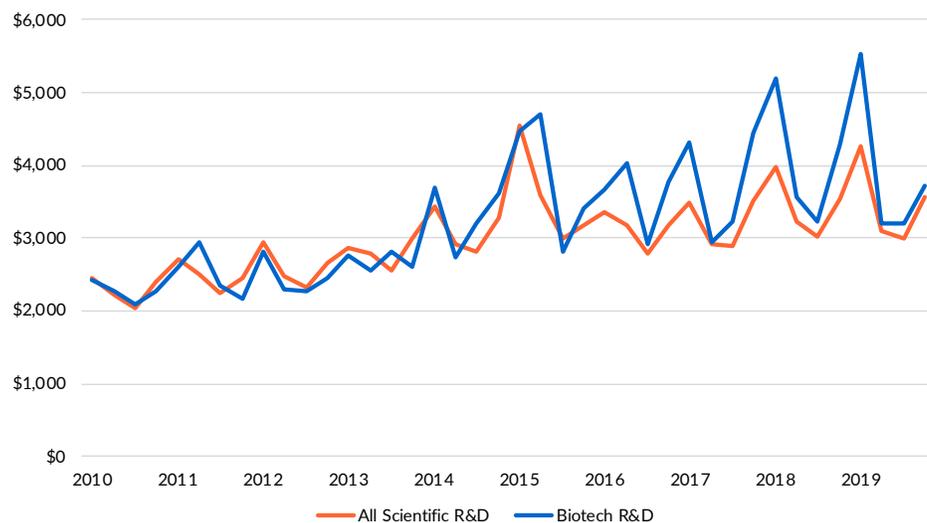
In June 2020, Governor Newsom signed into law Assembly Bill No. 85, which placed a \$5 million cap on the size of the R&D tax credit and eliminated a net operating loss provision from the corporate tax code. The effects of these changes on industry R&D investment in California are not yet clear. However, without the reduction in operating costs supported by the tax credit, surveys found that many life sciences firms (particularly large firms) were open to shifting the sites of R&D activities or making new investments outside California based on access to talent in other locations, particularly those with lower costs and more attractive business incentives. (Similar trends have been reported in other high-tech industries.) If investment in life sciences R&D (particularly biotech) faces a sustained slowdown or cuts, it could lead to a decline in the number of high-paying jobs available to state residents.

**Figure 1: Employment in Scientific R&D Services**



Source: California Employment Development Department (2020)

**Figure 2: Average Weekly Wages in Scientific R&D Services**



Source: California Employment Development Department (2020)

## Opportunities to Promote More Equitable Development

Over the past decade, California's recovery from the Great Recession was characterized by growing inequality between and within specific regions. The state must address these gaps if it wants to maintain its innovation advantages, and discussions about pandemic recovery offer an inflection point for considering new strategies to promote life sciences industry growth across the state. Several metros currently have little to no local industry presence (see Figure 3) or substantially lower incomes in life sciences jobs (see Figure 4).

**Figure 3: Metro Job Intensity**

	19-1021	19-1022	19-1029	19-1042	19-1099	19-4021
Bakersfield	0	0	11	59	0	13
Chico	0	0	0	0	0	0
Fresno	0	0	16	65	0	46
Los Angeles-Long Beach-Anaheim	7	9	42	115	6	31
Merced	0	0	0	0	0	0
Oxnard-Thousand Oaks-Ventura	0	11	36	202	0	0
Riverside-San Bernardino	3	9	27	48	4	17
Sacramento-Roseville	13	17	67	79	23	116
San Diego-Carlsbad	143	0	153	253	0	129
San Francisco-Oakland-Hayward	79	25	112	250	8	63
San Jose-Santa Clara	59	20	73	167	0	122
San Luis Obispo-Paso Robles	0	0	0	0	0	0
Santa Cruz-Watsonville	0	0	102	91	0	36
Santa Maria-Santa Barbara	0	0	31	60	0	20

Source: US Bureau of Labor Statistics—Occupational Employment Statistics (2019)

**Figure 4: Metro Average Incomes**

	19-1021	19-1022	19-1029	19-1042	19-1099	19-4021
Bakersfield			\$83,320	\$101,720		\$49,060
Chico						
Fresno			\$72,580	\$98,170		\$38,190
Los Angeles-Long Beach-Anaheim	\$91,730	\$90,400	\$98,210	\$103,000	\$89,990	\$49,840
Merced						
Oxnard-Thousand Oaks-Ventura		\$87,450	\$79,800	\$123,650		\$46,980
Riverside-San Bernardino		\$92,940	\$81,860	\$104,950	\$85,700	\$50,270
Sacramento-Roseville	\$78,630	\$88,000	\$78,910	\$105,390	\$59,760	\$50,490
San Diego-Carlsbad	\$83,220	\$117,950	\$89,210	\$101,370	\$113,130	\$51,700
San Francisco-Oakland-Hayward	\$124,400	\$104,580	\$108,200	\$120,470		\$60,040
San Jose-Santa Clara	\$137,490	\$112,670	\$110,040	\$113,240		\$65,010
San Luis Obispo-Paso Robles						
Santa Cruz-Watsonville			\$115,950	\$112,250		\$53,190
Santa Maria-Santa Barbara			\$80,810	\$111,190		\$51,050

Source: US Bureau of Labor Statistics—Occupational Employment Statistics (2019)

Regions with fewer jobs or lower incomes (including the Central Valley, Inland Empire, and Sacramento Valley) still have valuable assets to support growth in the life sciences. These regions host institutions within the University of California and California State University systems, including several at which the life sciences account for a majority of R&D spending (see Table 3).

**Table 3: University R&D**

	MSA (Region)	Total R&D Spending	Life Sciences R&D Spending	Life Sciences R&D as Spending as Percent of Total
UC Davis	Sacramento–Roseville	\$789 million	\$588 million	74.60%
UC Riverside	Riverside–San Bernardino	\$168 million	\$85 million	50.70%
UC Merced	Merced	\$38 million	\$7.7 million	20.20%
Humboldt State	Eureka–Arcata	\$15 million	\$7.5 million	50.20%
Cal Poly San Luis Obispo	San Luis Obispo–Paso Robles	\$16 million	\$6.3 million	38.70%
Fresno State	Fresno	\$9.0 million	\$4.7 million	52.50%
CSU Monterey Bay	Salinas	\$5.8 million	\$3.7 million	63.30%
CSU San Bernardino	Riverside–San Bernardino	\$17 million	\$1.9 million	11.40%
Sacramento State	Sacramento–Roseville	\$21.4 million	\$1.3 million	6.40%
CSU Chico	Chico	\$2.4 million	\$1.2 million	47.70%
CSU Stanislaus	Modesto	\$1.4 million	\$1.0 million	73.70%
CSU Bakersfield	Bakersfield	\$5.6 million	\$430,000	7.70%

Source: National Science Foundation, Higher Education R&D Expenditures (2018)

As other states become more attractive targets for life sciences investment due to lower costs and similar access to talent, California may need to reconsider the value of place-based investment incentives that leverage the state’s potential advantages, including institutions of higher education. With the proper incentives, universities can help attract industry investment. Beyond restoration of the R&D tax credit, these other measures can support the sector’s sustainable growth:

**Tax voucher to facilitate place-based investment.** An incentive for place-based investment could facilitate more job creation in the short term while lowering tax burdens in future years, once investments become profitable. It would also send a clear signal that California values more equitable access to the benefits of high-technology clusters, particularly in lower-cost regions of the state.

**Refundable R&D tax credit for small businesses and startups.** Some small businesses cannot utilize existing R&D tax credits because they face little to no tax burden (particularly startups at the pre-revenue stage). Targeted policies to refund a percentage of unused research credits could facilitate greater investment by these firms in activities with the potential to generate future revenues.

**Exemption from R&D tax credit ceiling for funding university research.** Basic research conducted at or with institutions of higher education (and other research organizations) may take longer to bear fruit commercially. Increasing public-private partnerships can further defray the costs of this work and generate additional opportunities for technology and firm spinoffs from these labs.