



Overview and Summary of Recent Initiatives

Since the last BIO report, California voters approved Proposition 71 in 2004 with 59 percent of the vote, creating the **California Institute of Regenerative Medicine (CIRM)**. The referendum authorized \$3 billion in bond funding that would finance an annual competitive grant program over 10 years. During 2005, CIRM mounted a competition for its headquarters site, won by San Francisco, which contributed a rent-free office building at the Mission Bay development district (see below). Implementation of the CIRM grant program is currently delayed by litigation.

The University of California (UC) system continued to roll out its **Institutes for Science and Innovation**, two of which have bioscience components. The Cal Institutes, each financed by \$100 million in bonds backed by incremental indirect cost recovery, are expected to focus interdisciplinary research on topics of interest to the state's industrial community with potential of creating the next generation of high-growth companies. The state financing must be matched 2:1 by industry and 5 percent may be used to seed operations.

Leaders of the state's several BIO affiliates now hold a biannual life science industry summit with California cabinet secretaries, following up their collaboration in 2004 on a California Life Sciences Strategic Action Plan.

Building Bioscience R&D Capacity

Recent state investments in facilities

The most bioscience oriented of the Cal Institutes is the **Institute for Quantitative Biomedical Research (QB3)**, a collaborative of UC San Francisco (UCSF), UC Berkeley, and UC Santa Cruz. Since the last BIO report, QB3 opened its 152,000-square-foot headquarters at the UCSF Mission Bay campus. QB3 joins several other major bioscience facilities at Mission Bay, including two new buildings for programs in biology, genetics, and neuroscience and a new cancer institute. Overall, UCSF is raising \$1.5 billion to support development of the new campus.

The **California NanoSystems Institute (CNSI)**, a second Cal Institute that is a collaborative of UC Los Angeles (UCLA) and UC Santa Barbara, has programs in bionanotechnology. Its new building at UCLA was under construction at the time of this profile.

San Diego State University (SDSU) has added a 33,000-square-foot **BioScience Center** hosting its heart institute, center for microbial sciences, and other programs. SDSU is also adding a 50,000-square-foot **Coastal Waters Laboratory** with associated aquaria and greenhouses.

Research programs

The CIRM has been raising \$30 million to \$50 million in private funds to allow it to commence a mini-grant program while litigation advances concerning its governance structure.

Encouraging Academic/Industrial Interaction

The **UC Discovery Grant** (also known as the Industry/University Cooperative Research Program) offers challenge grants up to \$250,000 annually for up to 4 years to UC faculty conducting research in partnership with a California company, which must match 1:1. Of the seven program areas, two are in the biosciences: biotechnology and information technology for the life sciences. The program is funded at \$30 million annually for all fields.

California State University's Program for Education and Research in Biotechnology (CSUPERB) offers a similar grant up to \$30,000.

Moving Technology into the Marketplace

Commercializing university technology

Several universities, both public and private, have created programs to assist in the transfer of bioscience technology to entrepreneurial start-ups:

- UCSF has created and stationed at the Mission Bay campus a **Bioentrepreneurship Center**, which offers mentoring and training for faculty members whose discoveries might form the basis of a spin-off, as well as funding for translational drug development. The center is supported by the QB3 Institute.
- The University of Southern California (USC) raised \$22 million to create the **Mark and Mary Stevens Institute for Technology Commercialization (SITEC)** that has both an academic mission and a mandate to assist with the university's own technology portfolio. Although it is based at the engineering school, it is expected to have impact on the life sciences campus as well. The \$1 million annual income from the Stevens endowment supports SITEC.
- Also based at USC, but not part of the university, is the \$160 million Mann Institute for Biomedical Engineering, a program focused on commercialization. This is part of a larger national initiative by the Alfred E. Mann Foundation, based in Valencia.
- Caltech operates a privately endowed **Grubstake** program that makes grants for precommercialization research up to \$50,000.
- City of Hope cancer institute is initiating an **Enterprise Grants** program to assist researchers interested in spinning off companies.

Supporting bioscience entrepreneurs and emerging companies

BayBio has spun off a 501(c)(3) **BayBio Institute** that, among other activities, will conduct entrepreneurial training and mentoring.

Several of the formerly state-supported Regional Technology Alliances have evolved to become multisector commercialization centers:

- The former San Diego Regional Technology Alliance has merged with the CONNECT program that spun off from UC San Diego (UCSD) to become **RTA@Connect**. In this format, the successful Springboard program to prepare entrepreneurs will be continued, but in a context that involves multiple institutions in the San Diego region.
- The Los Angeles Regional Technology Alliance received designation and funding from the NIH to operate its **Commercialization Assistance Program**, providing guidance to SBIR Phase II recipients nationwide.
- The **Sacramento Area Regional Technology Alliance** also maintains an alliance with CONNECT to support technology entrepreneurs.

Making Capital Available

Pre-seed and seed capital

Life Science Angels, which performs due diligence for members of an informal angel network, is active in northern California. It does both biotechnology and medical-device deals.

Providing Space for Bioscience Companies

Incubators

Since the last BIO report, the San Jose Redevelopment Agency opened **BioCenter 1**, the first bioscience incubator among the four that it operates. The \$6.5 million project upgraded a 37,000-square-foot building in the Edenvale Technology Park in South San Jose. The incubator is operated for the agency by San Jose State University. Additional bioscience incubators include the following:

- **Photonic Incubator**, an 11,230-square-foot suite within the Beckman Laser Institute at UC Irvine.
- **Center for Training and Technology Incubation**, a 30,000-square-foot wet/dry incubator at the Innovation Village Research Park being developed by Cal State Polytechnic University at Pomona (below).

Informal bioscience incubation capacity may also be available at the following:

- Two of the Cal Institutes: **QB3** at Mission Bay (see below) and **CNSI** at UCLA
- **Los Angeles BioMedical Research Institute** (LA BioMed) at the Harbor-UCLA Medical Center campus, in collaboration with Southern California Biomedical Council.

Bioscience research parks

Under development

Several research parks with bioscience components are at various stages of development. The farthest advanced is **Mission Bay**, a 303-acre development district surrounding the new 43-acre UCSF campus of the same name. The first phase of campus construction is now nearly complete, and the surrounding commercial district saw its first commitment to speculative wet-lab space by Alexandria Real Estate Equities. Mission Bay is also home to the administrative headquarters of the CIRM. The City of San Francisco donated a 10-year lease to an office building in the residential/commercial segment of Mission Bay. Other bioscience parks in early stages of planning and development are as follows:

- **University Research Park** is a collaboration among the county, city, and UC Riverside to develop 39 acres and 17 more acres in Phase II. Early tenants include bioscience start-ups from UC Riverside and other institutions.
- **Biomedical Research Park** sits on 110 acres adjacent to the Health Science Center of USC in East Los Angeles.
- **UC Davis Research Park** is a 38-acre park adjacent to the UC agricultural campus, with 400,000 square feet of mixed-use space being developed on contract by a master developer, Carr America.
- **NASA Research Park**, a 213-acre site, is part of the planned redevelopment of Moffett Field at Ames Research Center. A building of 130,000 square feet is now open.
- **California State Polytechnic at Pomona** is developing a 65-acre Innovation Village Research Park, anchored by Red Cross Biomedical Services and currently developing a 120,000-square-foot multitenant office/laboratory facility.
- **City of Hope** cancer institute in Duarte is developing a 29-acre research park.
- **USC** is investigating feasibility of a research park at its Health Sciences Campus.

Addressing Talent Needs

Recruiting management talent

The USC SITeC program offers educational programs in commercialization for USC students.

Both USC and California State University at San Diego offer master's degrees in regulatory affairs.

The UCSD Rady School of Management is collaborating with BIOCOM and CONNECT on half-day skill-development courses for managers from biotechnology organizations in southern California.

Specialized postsecondary programs

The California Community Colleges maintain a system-wide **Applied Biological Technologies Initiative** headquartered at Ventura College. The initiative supports six centers organized geographically with the mission of servicing the needs of the biotechnology workforce in California.

Many of California's institutions of higher education offer a variety of bioscience courses and degree programs. Examples of recent offerings include the following:

- CSUPERB is collaborating with Southern California Biomedical Council (SCBC) to organize special workforce training programs for companies in the LA Basin (C-LAB) and may replicate the model in northern California as C-BAY. CSUPERB holds an annual faculty-student symposium on biotechnology and continues to offer grants of up to \$15,000 for curricular and short-course development across the CSU system.
- UC Berkeley received a 5-year, \$5.6 million grant from the Gordon and Betty Moore Foundation for a **Biology Scholars Program** that helps undergraduates from underserved communities become competitively qualified for admission to medical and graduate schools.
- USC's Center of Excellence in Genomic Science offers a summer institute in genomics and bioinformatics for undergraduates.
- UC's Biotechnology Research and Education Program offers Graduate Research and Education in Adaptive Bio-Technology (GREAT) training grants. The program makes 10 to 15 two-year training grants at \$50,000 a year for graduate students in the UC system for training at the interface of life sciences and other disciplines.
- Amgen Foundation donated \$2 million to the Keck Graduate Institute for a Bioprocessing Center used in various graduate programs including professional master's degrees in bioscience.
- With support from the U.S. Department of Labor, Biogen Idec, and Genentech, Mira Costa Community College in North San Diego County has opened a new biotechnology and bioprocessing training laboratory.
- BIOCOM offers five \$1,000 college scholarships annually to college-bound students with a commitment to the San Diego life science community, not including premedical students.

K-12 outreach programs

BIOCOM and the Southern California Biotechnology Center at Miramar College collaborate on a **Life Sciences Summer Institute** internship/boot-camp training for high school teachers and students.

Contacts

Jeff Newman
Technology and Commerce Partnership Manager
California Business, Transportation and Housing Agency
California Economic Development Program
7080 Hollywood Boulevard, Suite 900
Hollywood, CA 90028
(626) 422-5581
jnewman@commerce.ca.gov

BayBio is an independent, nonprofit 501(c)(6) trade association serving the life science industry in northern California. Its mission is to support the regional bioscience community through advocacy, enterprise support, and the enhancement of research collaboration.

Matthew M. Gardner
President
BayBio
395 Oyster Point Boulevard, Suite 117
South San Francisco, CA 94080
(650) 871-7101
mgardner@baybio.org

Representing the Greater San Diego and Southern California life sciences communities, BIOCOM focuses on initiatives that positively influence the growth of the life science industry, including capital formation, public policy, workforce development, and scientific discovery and development.

Joseph D. Panetta
President and CEO
BIOCOM
4510 Executive Drive, Plaza One
San Diego, CA 92121-3021
(858) 455-0300
jpanetta@biocom.org

The California Healthcare Institute (CHI) is an independent organization devoted to researching and advocating policy to forward the interests of California's biomedical community. Its mission is to research, develop, and advocate policies and actions that promote biomedical science, biotechnology, pharmaceutical and medical device innovation in California.

Todd E. Gillenwater
VP, Public Policy
California Healthcare Institute
1020 Prospect Street, Suite 310
La Jolla, CA 92037
(858) 551-6677
gillenwater@chi.org

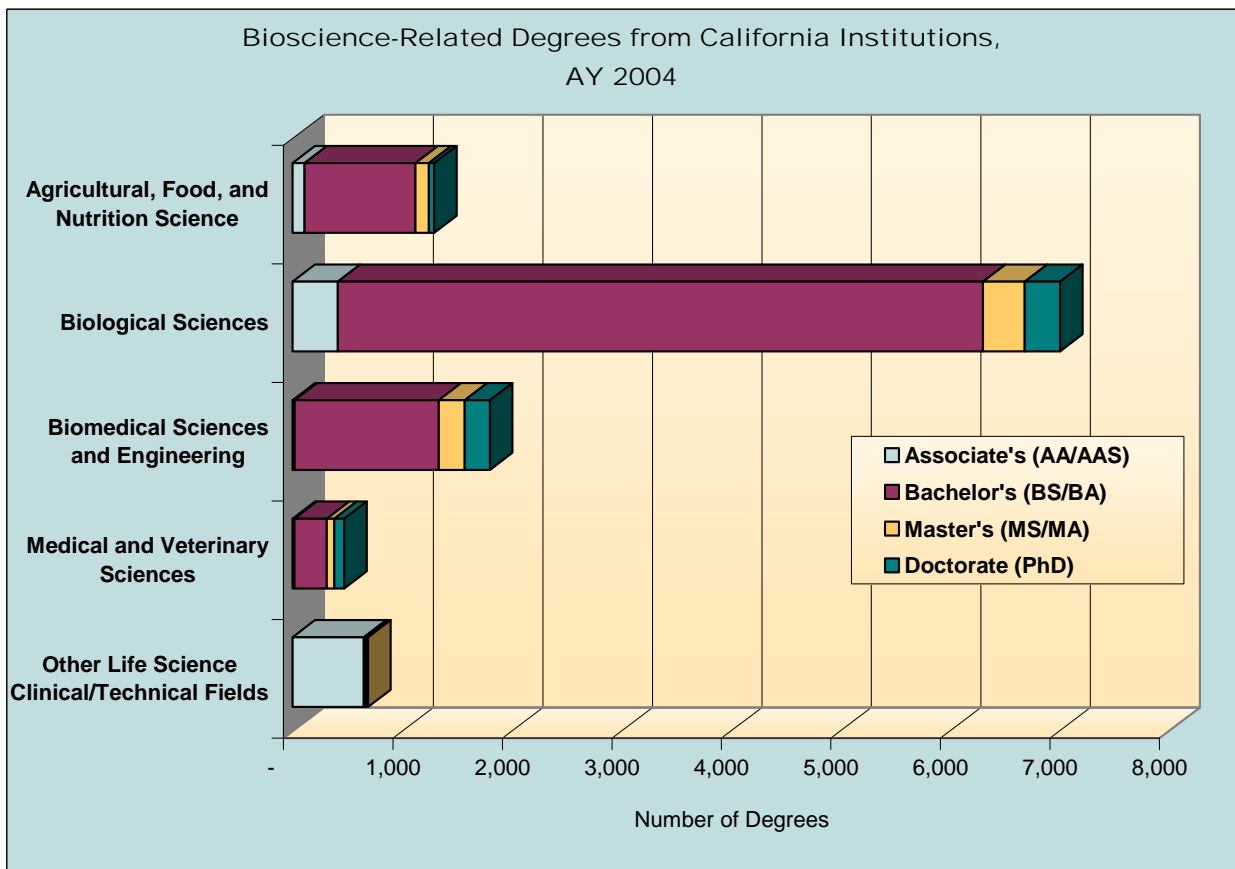
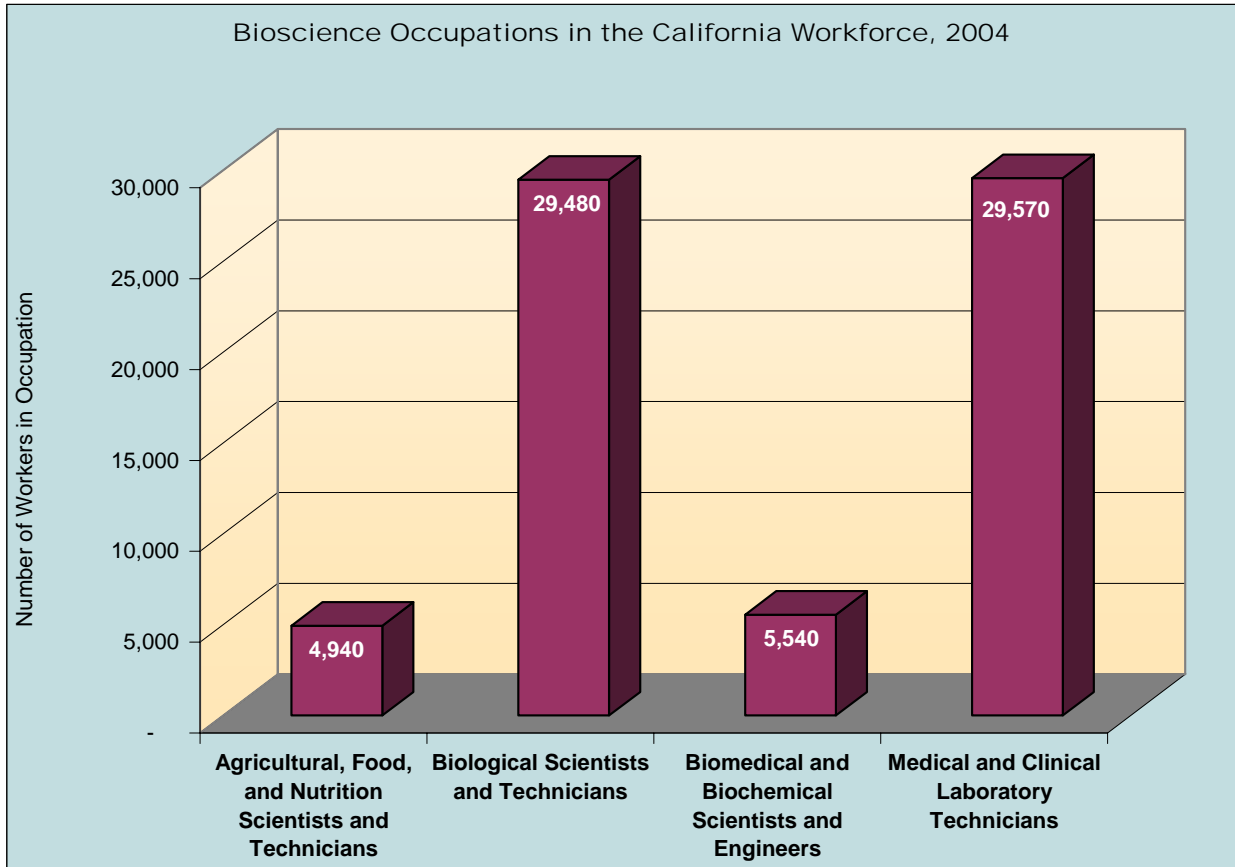
The Southern California Biomedical Council (SCBC) is the trade association of the Greater Los Angeles Life Sciences industry. The mission of the SCBC is to promote and support the life sciences industry in the region for job creation and economic growth.

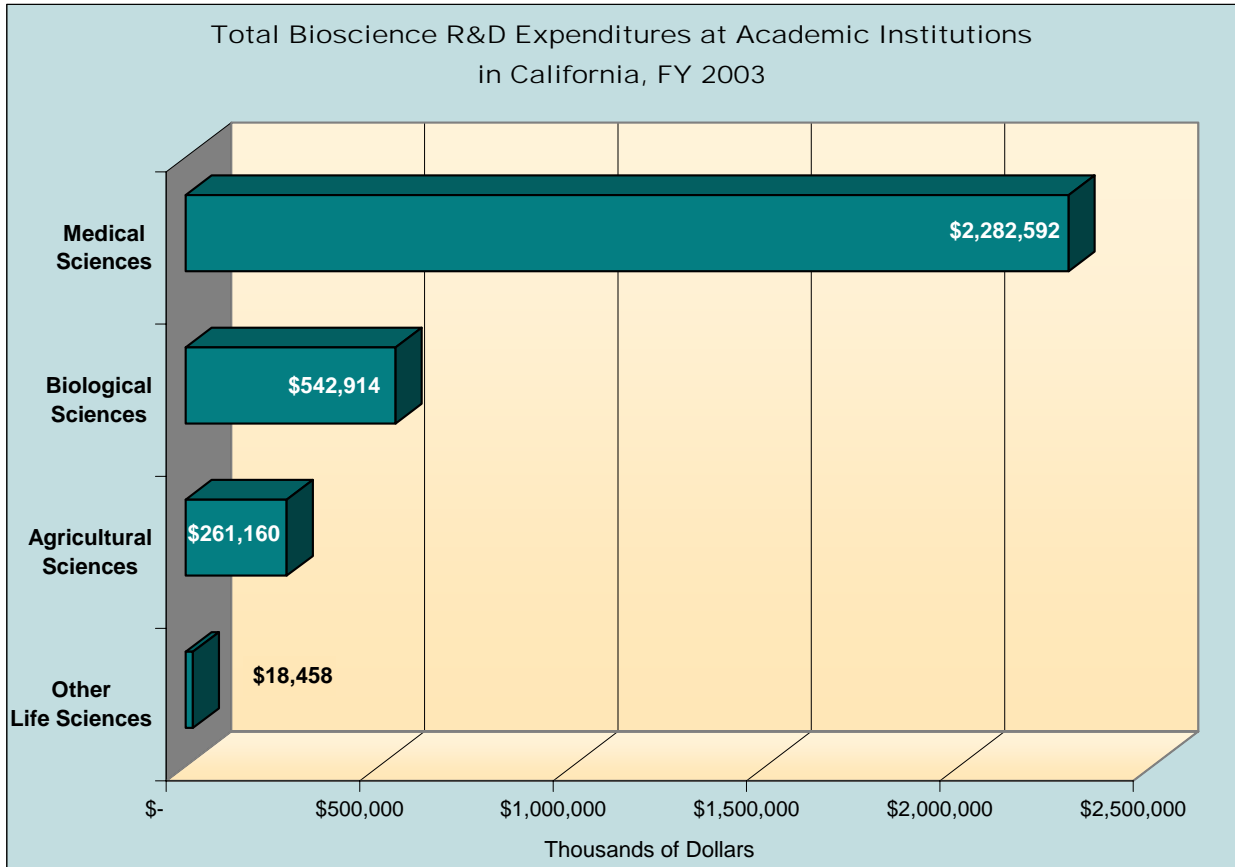
Ahmed A. Enany
President and CEO
Southern California Biomedical Council
444 South Flower Street, 34th floor
Los Angeles, CA 90071
(213) 236-4890
enany@socalbio.org

Industry Subsector	California	United States
Agricultural Feedstock & Chemicals		
Establishments 2004	193	2,111
2001-2004 Establishment % Change	-10.2%	0.4%
Employment 2004	5,104	104,893
2001-2004 Employment % Change	7.1%	-6.9%
Share of U.S. Employment	4.9%	100.0%
Location Quotient	0.42	n.a.
Average Annual Wage 2004	\$47,937	\$63,383
Direct-Effect Employment Multiplier	5.18	10.91
Total Employment Impact	26,434	1,212,094
Drugs & Pharmaceuticals		
Establishments 2004	438	2,589
2001-2004 Establishment % Change	1.4%	-0.6%
Employment 2004	40,503	313,207
2001-2004 Employment % Change	3.4%	2.7%
Share of U.S. Employment	12.9%	100.0%
Location Quotient	1.12	n.a.
Average Annual Wage 2004	\$100,843	\$79,303
Direct-Effect Employment Multiplier	7.33	9.51
Total Employment Impact	296,895	2,731,321
Medical Devices & Equipment		
Establishments 2004	2,381	15,190
2001-2004 Establishment % Change	0.6%	0.2%
Employment 2004	73,115	411,460
2001-2004 Employment % Change	-5.5%	-3.6%
Share of U.S. Employment	17.8%	100.0%
Location Quotient	1.54	n.a.
Average Annual Wage 2004	\$73,193	\$56,449
Direct-Effect Employment Multiplier	3.47	4.56
Total Employment Impact	253,985	1,817,705
Research, Testing, & Medical Laboratories		
Establishments 2004	2,901	20,565
2001-2004 Establishment % Change	18.7%	19.4%
Employment 2004	70,872	413,550
2001-2004 Employment % Change	6.3%	8.2%
Share of U.S. Employment	17.1%	100.0%
Location Quotient	1.48	n.a.
Average Annual Wage 2004	\$76,427	\$65,414
Direct-Effect Employment Multiplier	2.65	3.15
Total Employment Impact	187,711	1,272,936
TOTAL PRIVATE SECTOR		
Establishments 2004	1,166,460	8,156,137
2001-2004 Establishment % Change	12.6%	4.8%
Employment 2004	12,618,530	109,249,195
2001-2004 Employment % Change	-0.4%	-0.7%
Share of U.S. Employment	11.6%	100.0%
Location Quotient	n.a.	n.a.
Average Annual Wage 2004	\$44,021	\$39,003

Source: Battelle calculations -- based on Bureau of Labor Statistics QCEW data from the Minnesota Implan Group, RIMS II Employment Multipliers from the Bureau of Economic Analysis, and the Census Bureau's Economic Census.

Note: n.a. = metric is not applicable.





	California	United States	Rank
University R&D Expenditures, FY 2003			
Total (\$ thousands)	\$5,362,683	\$40,104,621	1
Life Science R&D (\$ thousands)	\$3,137,202	\$24,062,088	1
Percent of Total R&D	58.5%	60.0%	
Life Sciences Per Capita	\$88.41	\$82.74	
Change in Life Sciences FY 1999–2003	53.9%	52.7%	
NIH Support to Institutions, FY 2004			
Total (\$ thousands)	\$3,619,590	\$22,556,459	1
Per Capita Expenditures	\$102.00	\$77.56	
Change in Expenditures FY 2000–2004	61.0%	53.2%	
Higher Education Degrees in Bioscience Fields, AY 2004	11,274	111,329	1
Bioscience Occupations in the Workforce, 2004	69,530	616,140	1