

## Overview and Summary of Recent Initiatives

In the summer of 2003, Governor Brad Henry initiated the **Economic Development Generating Excellence (EDGE)** project, which included the recommendation to "Transform Oklahoma into the Research Capital of the Plains<sup>®</sup>." The EDGE plan proposed to achieve this by establishing a \$1 billion research endowment. Under the leadership of the Governor, plans to fund the \$1 billion EDGE endowment and structure and operate the endowment to support research and technology transfer in the private and public sector are progressing.

During the 2005 legislative session, in a first step toward this objective, HB 1193 created the **Dynamic Economy and Budget Security Fund**, which promotes research and development of critical sectors of the state's economy. The Legislature and Governor authorized the deposit of approximately \$93 million into the fund. In the 2006 legislative session, that \$93 million was used to fund other projects, but the money was replaced with new funding in the amount of \$150 million.

In March, 2005 Governor Brad Henry signed legislation establishing a \$475 million bond issue for a slate of higher education projects, much of which targets research and laboratory facilities. The Oklahoma Higher Education Promise of Excellence Act of 2005 also provided \$25 million in the form of a bond bank to finance future improvements at the state's colleges and universities. The final \$125 million in bonds of the \$475 million total is scheduled to be sold in the spring of 2006.

Among the projects to be funded with bond proceeds are the following:

- **University of Oklahoma:** A long-proposed cancer center; the first phase of a multiphase project for a new, freestanding, Chemistry and Biochemistry teaching and research-laboratory complex; and construction of a College of Allied Health Phase II building.
- **Oklahoma State University, Tulsa campus:** An Advanced Technology Research Center that will focus on the development of next-generation composites and materials for industries such as aerospace, biotechnology, telecommunications, and manufacturing.
- **Oklahoma State University, Okmulgee campus:** A Health Science and Technology Center focused on needs of rural Oklahomans and used for applied research, technology transfer, technical education, and clinical residency.

The **Oklahoma Center for the Advancement of Science and Technology (OCAST)**, created by the Oklahoma Legislature in 1987, offers a suite of programs to support research and development, facilitate technology transfer and commercialization, stimulate seed capital investment, and encourage manufacturing competitiveness. Programs supporting basic and applied research are open to the full range of

performers, including universities, nonprofits, and firms. Since its inception, OCAST has supported the development of the state's bioscience sector through the **Oklahoma Health Research (OHR) Program**, which is described below.

The **Oklahoma Medical Research Foundation (OMRF)** and the **Noble Foundation** are private institutions integral to the Oklahoma bioscience community. The OMRF research campus in Oklahoma City has grown substantially over the years; its annual budget is now over \$36 million. In 2004, OMRF completed a 5-year fund raising campaign, during which time over a third of the foundation's laboratories were renovated and an additional 100,000 square feet of new space was added. New core facilities included microarray, cell signaling, transgenic mouse production, and small animal MRI. The **Donald W. Reynolds Center for Genetic Research** was also completed. OMRF's operation is highly integrated with the facilities and strategies of the Oklahoma University (OU) Health Sciences Center. OMRF has spun off several local biomedical companies.

The **Noble Foundation**, based in Ada, explores and improves production agriculture techniques and advances plant science through research and discovery. The foundation's operations are conducted through three operating divisions—agricultural, plant biology, and forage improvement. The foundation is doing extensive work in plant genomics.

The **Presbyterian Health Foundation (PHF) Research Park** is a 27-acre biomedical research park developed by the Oklahoma City Urban Renewal Authority and PHF. It is located close to the OU Health Sciences Center, the OU School of Medicine, and OMRF. A key development is the aggressive building campaign by PHF, which has greatly increased the space available for, and the number of, businesses and R&D activities in the park.

## Building Bioscience R&D Capacity

### Recent state investments in facilities

In addition to the projects to be funded by the bond issue discussed in the overview, other investments include those below.

The **Stephenson Research and Technology Center**, located at the University of Oklahoma Research Campus in Norman, is a multiphase project to support interdisciplinary programs in the biosciences, bioengineering, and the OU Supercomputing Center. Phase 1 at \$27 million is nearing completion and includes 94,600 square feet of laboratory and office space. The \$25 million Phase 2 will add 100,000 square feet of laboratory and office space and will provide growth space for the university's chemistry and biochemistry research programs. The complex includes a Biological Lab Level 3 (BL-3) and secured areas to support homeland security research. It also includes space for private companies to collocate and collaborate with university research programs. In addition to other labs, the complex houses the **OU Microarray and Bioinformatics Core Facilities**, the **Advanced Center for Genome Technology**, and the **OU Bioengineering Center**.

In May 2004, the Legislature passed a new statute that officially recognized **OU-Tulsa** as one of the core components of The University of Oklahoma system. Major areas of research focus at OU-Tulsa will include cancer, diabetes and obesity, cardiovascular disease, infectious diseases and bioterrorism, neuroscience, new drug development, and health services research. The **Schusterman Center** at OU-Tulsa is slated to receive \$1 million of the higher education bond issue funding described in the overview.

## Research programs

The **OCAST Oklahoma Health Research Program** has been operating since 1986. It awards seed funds for research projects related to human health for 1 to 3 years at a maximum of \$45,000 per year with no matching funds required. Eligible applicants include Oklahoma universities and colleges, nonprofit research organizations, and private enterprises located in Oklahoma.

The **Oklahoma Applied Research Support (OARS) Program**, also managed by OCAST, was initiated to accelerate the development of technology (including biotechnology) with potential for producing a commercially successful product, process, or service that will benefit Oklahoma's economy. The program is described in more detail below.

## Faculty development programs

A subprogram within OCAST's OHR Program, the **Health Research Scientist Recruitment and Retention Program** supports the research projects of health research scientists who are new to Oklahoma for 1 to 3 years at a maximum of \$100,000 per year. The awards are specifically designed to increase the pool of health research talent in the state.

## Encouraging Academic/Industrial Interaction

The **OARS Program** accelerates the development of technology (including biotechnology) with potential for producing a commercially successful product, process, or service that will benefit Oklahoma's economy. Funding is provided to applied research projects under terms that increase industrial R&D investment and reward university/industry collaborative efforts. Awards are made to Oklahoma businesses, universities, and nonprofit research organizations for 1- to 3-year R&D projects. Awards range from \$10,000 to \$300,000. A minimum of \$1 matching support is required for each state dollar awarded.

The **OCAST STTR support** program helps small firms in Oklahoma compete for federal Small Business Technology Transfer (STTR) awards including those in biotechnology areas. The OCAST program offers Phase 0 financial incentives and proposal development assistance.

## Moving Technology into the Marketplace

The **Oklahoma Technology Commercialization Center**, an OCAST initiative managed by the private not-for-profit corporation i2E, works with Oklahoma companies, inventors, university and foundation researchers, and entrepreneurs to turn technological innovations into successful business enterprises.

## Making Capital Available

### Pre-seed and seed capital

The **OCAST Technology Business Finance Program**, funded by OCAST and administered by i2E, provides pre-seed financing and early-stage risk capital to Oklahoma-based start-up technology companies. The life sciences, medical devices and instruments, and agricultural sciences are among the industries eligible to receive financing from the program. All funds must be matched on a 3:1 basis from other sources and at least \$1 of every \$3 of matching funds must be provided in cash; the remaining

match can include in-kind contributions. Successful projects require repayment at a minimum of twice the investment and a maximum of five times the investment. Annual funding for the program is approximately \$800,000 to \$900,000, with average investments of \$100,000 to \$200,000. The life sciences account for approximately 40 percent of projects funded.

**OCAST SBIR Funding Programs** support companies applying for federal SBIR funding. The SBIR Phase I Incentive Program reimburses companies that have applied for Phase I SBIR funding. The program offers reimbursement for 50 percent of the proposal costs, up to \$5,000. The SBIR Matching Funds Program supports companies in between Phases I and II. Companies that have received Phase I funding and have applied for Phase II funding may seek 50 percent of the Phase I award, up to a maximum of \$25,000.

**Oklahoma Life Sciences Fund, LLC (OLSF)** is an Oklahoma limited liability company created to take advantage of private equity investment opportunities in the Oklahoma life sciences. The OLSF is \$5.1 million and invests in the most promising, very early-stage life-science companies that are not yet able to attract venture capital. The PHF is an investor in this fund.

### Venture capital

The State of Oklahoma created the **Oklahoma Capital Investment Board (OCIB)** in 1993 to mobilize equity and near-equity capital for investment in companies with significant potential to create jobs and enhance the economy of Oklahoma. OCIB is an institutional investor, operating as a fund of funds. It contributes to the building of the venture capital industry in Oklahoma by supporting investments in professionally managed seed and venture capital partnerships. OCIB has supported investment in 16 venture capital funds, which in turn have attracted investment of more than \$100 million to Oklahoma projects, including bioscience companies.

Under the **Venture Capital Tax Credit**, investment in qualified venture capital companies creates a transferable income tax credit or premium tax credit. Venture capital companies must be capitalized at a minimum of \$5 million and invest at least 55 percent of those dollars in qualified Oklahoma companies over a 10-year period. The credit equals 20 percent of the cash invested.

## Providing Space for Bioscience Companies

### Incubators

The **Center for Business Development** at the Meridian Technology Center in Stillwater offers 15,000 square feet of office space and/or laboratory and engineering space. Of its current seven tenants, one is a bioscience company. The State of Oklahoma provides special tax incentives for incubator clients. The Center for Business Development is an Oklahoma Department of Commerce–certified business incubator, which automatically qualifies its clients for a 10-year, **state income tax exemption**.

### Bioscience research parks

The **PHF Research Park** is a 27-acre biomedical research park developed by the Oklahoma City Urban Renewal Authority and PHF. It is located close to the OU Health Sciences Center, the OU School of Medicine, and OMRF. PHF completed the first building in the research park in 1996. Today, the research park is completing its sixth building, with a master plan for four more. With 550,000 square feet of Class A wet-lab and office space, the research park is currently home to 34 tenants.

## Addressing Talent Needs

### Specialized postsecondary programs

The biotechnology program at **Oklahoma City Community College (OCCC)** offers a 2-year, 65-credit, associate's degree program or a 44-credit certificate of mastery, both designed to prepare students to enter the job market directly after completion. OCCC is also benefiting from the statewide higher education bond issue with the **Health Profession Education Center** expansion, which will provide an additional 30,000 square feet of health profession classrooms, laboratories, student clinical practice space, high-tech patient simulator laboratories, and specialized recruitment and health profession offices.

The **University of Central Oklahoma** offers a biotechnology degree.

OCAST's OARS Program supports student and faculty internships in Oklahoma R&D facilities to encourage greater numbers of students to prepare for careers in scientific and technical fields. OARS funding for **R&D Faculty and Student Intern Partnerships** supports 1- to 2-year projects requiring a minimum of \$10,000 per year and a maximum of \$50,000 per year of OARS funds. An individual student or faculty member may intern for up to 1 year.

### Pending Proposals

**Senate Bill 1056** would help fund the start-up cost for creating two **diabetes research facilities** based on the OU campuses in Oklahoma City and Tulsa. OU anticipates a need for start-up funds of \$15 million, with \$10 million to \$12 million of that going to pay for the actual bricks and mortar and \$3 million to \$5 million for operations, researchers, and matching grants. The facilities would provide critical care treatment, conduct research, and provide outreach programs for medical centers around the state.

Governor Henry's FY 2007 budget proposal includes \$390 million for various economic development and research initiatives including an **increase in funding for the OCAST Health Research Program** and a **\$180 million state bond issue** that includes \$60 million each for projects at the University of Oklahoma and Oklahoma State University. The proposed bond issue includes \$60 million for a new "credit facility" that would allow private research entities, such as foundations, to borrow at low cost to develop research and development facilities.

Part of the University of Oklahoma's \$60 million would go toward expanding the capabilities of the new cancer research center and establishing the diabetes research center.

The **Greater Oklahoma City Chamber of Commerce** recently issued a **Regional Bioscience Strategic Plan** for Oklahoma's bioscience corridor. Planning is underway to determine potential funding sources for these proposed initiatives:

- Formation of an Oklahoma Bioscience Collaborative
- Funding the proposed \$1 billion EDGE research endowment
- Creation of an Oklahoma Bioscience Opportunity Fund for short-term funding of research, recruitment of faculty and investigators, purchase of equipment, and construction of laboratories and facilities

- Creation of a Technology Development Fund to support commercialization of technology owned by universities and research organizations
- Creation of a bioscience early-stage seed fund to help attract additional venture capital to the state.

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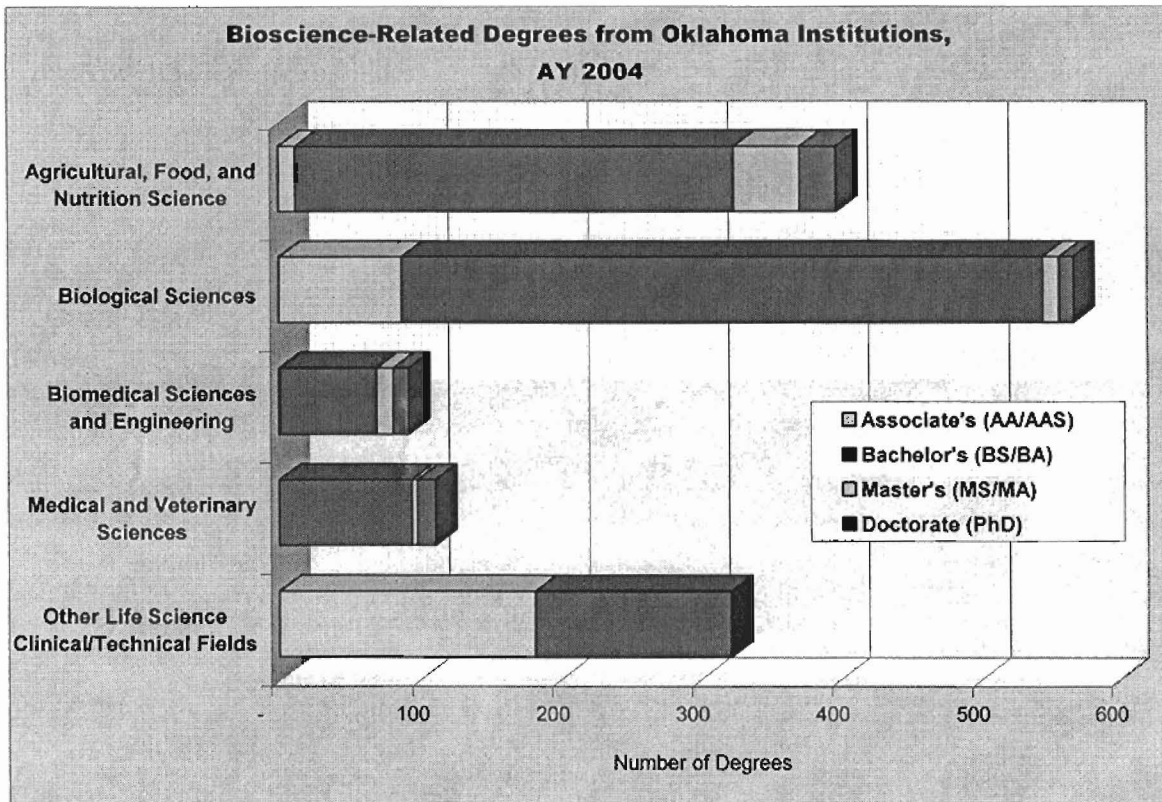
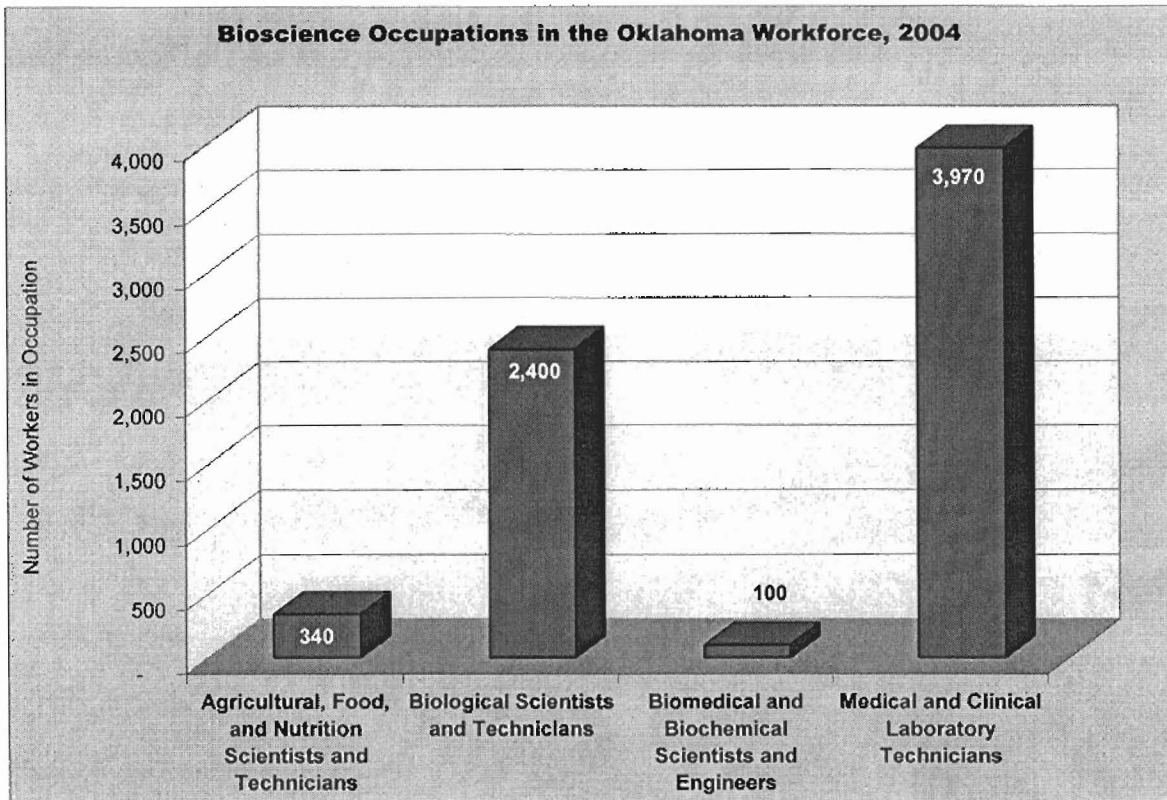
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Industry Subsector	Oklahoma	United States
<b>Agricultural Feedstock &amp; Chemicals</b>		
Establishments 2004	17	2,111
2001-2004 Establishment % Change	-14.7%	0.4%
Employment 2004	629	104,893
2001-2004 Employment % Change	-35.7%	-6.9%
Share of U.S. Employment	0.6%	100.0%
Location Quotient	0.58	n.a.
Average Annual Wage 2004	\$50,263	\$63,383
Direct-Effect Employment Multiplier	6.84	10.91
Total Employment Impact	4,305	1,212,094
<b>Drugs &amp; Pharmaceuticals</b>		
Establishments 2004	21	2,589
2001-2004 Establishment % Change	-8.7%	-0.6%
Employment 2004	329	313,207
2001-2004 Employment % Change	-28.8%	2.7%
Share of U.S. Employment	0.1%	100.0%
Location Quotient	0.10	n.a.
Average Annual Wage 2004	\$45,359	\$79,303
Direct-Effect Employment Multiplier	4.70	9.51
Total Employment Impact	1,547	2,731,321
<b>Medical Devices &amp; Equipment</b>		
Establishments 2004	157	15,190
2001-2004 Establishment % Change	-0.4%	0.2%
Employment 2004	1,342	411,460
2001-2004 Employment % Change	-12.0%	-3.6%
Share of U.S. Employment	0.3%	100.0%
Location Quotient	0.32	n.a.
Average Annual Wage 2004	\$37,249	\$56,449
Direct-Effect Employment Multiplier	2.45	4.56
Total Employment Impact	3,285	1,817,705
<b>Research, Testing, &amp; Medical Laboratories</b>		
Establishments 2004	228	20,565
2001-2004 Establishment % Change	28.3%	19.4%
Employment 2004	2,619	413,550
2001-2004 Employment % Change	-8.0%	8.2%
Share of U.S. Employment	0.6%	100.0%
Location Quotient	0.61	n.a.
Average Annual Wage 2004	\$49,615	\$65,414
Direct-Effect Employment Multiplier	2.26	3.15
Total Employment Impact	5,917	1,272,936
<b>TOTAL PRIVATE SECTOR</b>		
Establishments 2004	86,974	8,156,137
2001-2004 Establishment % Change	2.0%	4.8%
Employment 2004	1,130,201	109,249,195
2001-2004 Employment % Change	-3.4%	-0.7%
Share of U.S. Employment	1.0%	100.0%
Location Quotient	n.a.	n.a.
Average Annual Wage 2004	\$30,451	\$39,003

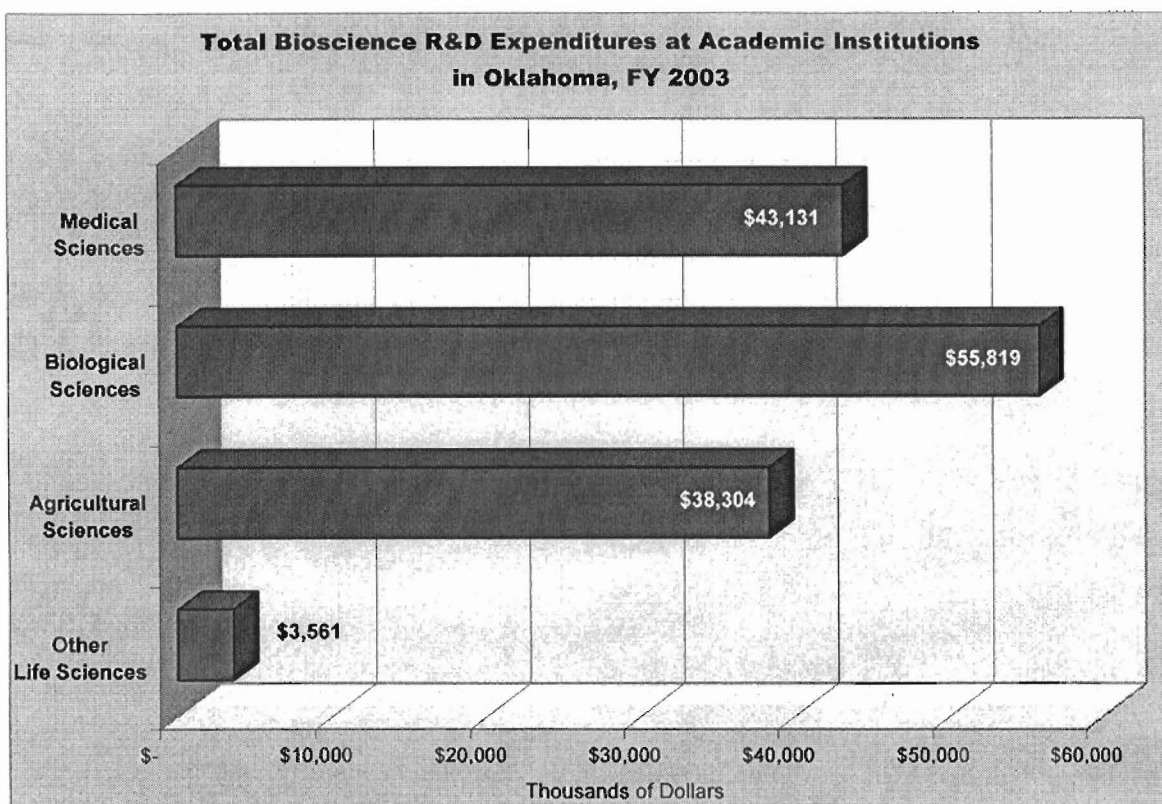
Source: Battelle calculations -- based on Bureau of Labor Statistics QCEW data from the Minnesota Implan Group, RIMS II Employment Multipliers from the Bureau of Economic Analysis, and the Census Bureau's Economic Census

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









	Oklahoma	United States	Rank
<b>University R&amp;D Expenditures, FY 2003</b>			
Total (\$ thousands)	\$295,098	\$40,104,621	35
Life Science R&D (\$ thousands)	\$140,816	\$24,062,088	35
Percent of Total R&D	47.7%	60.0%	
Life Sciences Per Capita	\$40.10	\$82.74	
Change in Life Sciences FY 1999-2003	26.2%	52.7%	
<b>NIH Support to Institutions, FY 2004</b>			
Total (\$ thousands)	\$87,856	\$22,556,459	35
Per Capita Expenditures	\$25.02	\$77.56	
Change in Expenditures FY 2000-2004	97.7%	53.2%	
Higher Education Degrees in Bioscience Fields, AY 2004	1,490	111,329	30
Bioscience Occupations In the Workforce, 2004	6,810	616,140	29