



State Government Initiatives in Biotechnology 2001

PREPARED FOR:
Biotechnology Industry Organization (BIO)

PREPARED BY:
**Technology Partnership Practice
Battelle Memorial Institute and
State Science and Technology Institute**

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Executive Summary

Biotechnology today is a rapidly growing, global industry. According to a recent report prepared by Ernst and Young,¹ the biotechnology industry doubled in size between 1993 and 1999. In 1999, Ernst & Young estimates that the biotechnology industry generated 151,000 direct jobs and 287,000 indirect jobs. The industry produced revenues of \$20 billion directly and \$27 billion indirectly.

Recognizing the importance of the industry and its geographic concentration, states and regions are developing initiatives designed to foster an environment in which biotechnology companies can succeed and grow. These initiatives address the specific needs of biotechnology companies, which include

- Strong academic research institutions conducting basic research in the biosciences;
- Access to early-stage capital;
- Successful transfer of government-funded basic research for product commercialization;
- Specialized facilities, including wet laboratory space and specialized equipment;
- Highly skilled workforce; and
- Stable and supportive public policy structure.

To better understand the nature of the policies and programs established by state governments to support the development of the biotechnology industry, BIO engaged the Technology Partnership Practice of Battelle Memorial Institute, the State Science and Technology Institute, and PMP Public Affairs Consulting, Inc., to survey state government initiatives in biotechnology. This report summarizes the findings of the survey.

STATE BIOSCIENCE INITIATIVES

State governments are becoming more active and involved in identifying the opportunities presented by the growing bioscience industry. Factors that have contributed to this interest in biotechnology and life sciences include

- Public attention to human genome mapping that has heightened public interest in biotechnology;
- State tobacco settlements that have provided a source of funding for life sciences research;
- Demise of the dot.com phenomenon; and
- Recognition that the biotechnology industry represents not only an economic development opportunity, but also an opportunity to improve citizens' health and quality of life.

Survey Findings

States are adopting and implementing biotechnology or life sciences strategic plans and hiring biotechnology industry specialists to assist existing bioscience companies and to work with

1. *The Economic Contributions of the Biotechnology Industry to the U.S. Economy*, May 2000, Ernst & Young.

bioscience companies considering location in the state. Ten states reported having developed a biotechnology or life sciences strategic plan during the last four years. In addition, a number of metropolitan areas, led by business and higher education coalitions, have initiated far-reaching efforts to reposition their economies for the 21st century. Most of these regions are focusing on biotechnology.

Sixteen states are using their tobacco settlement funds for bioscience-related research and development. These funds are being used primarily to support biomedical research, much of which will focus on tobacco-related illnesses. Only three states reported that they are explicitly targeting some of the funding for technology transfer and commercialization.

States have substantially increased state funding for bioscience-related research centers, building modern facilities and fully equipped labs with state-of-the-art instrumentation. These initiatives are designed to address the need for research facilities, recruit research talent, and secure federal National Institutes of Health (NIH) and other research funding support.

States are putting in place initiatives that seek to respond to biotechnology firms' need for pre-seed and seed-stage venture capital. Twenty-eight states indicated in the survey that they have one or more publicly supported seed or venture funds that can invest in bioscience-related companies. Five states have publicly supported seed and venture funds that invest exclusively in bioscience related companies.

States recognize that finding space suitable for the development and growth of bioscience firms is a challenge. Nine states reported using traditional economic development programs, including loan, loan guarantee, and other public financing programs, to fund facilities for bioscience companies. Two states, Arkansas and Connecticut, have created specialized programs to support the development of bioscience facilities.

Biotechnology networking and trade associations have become commonplace across the states. Thirty-five states identified at least one bioscience networking organization; a dozen states noted more than one networking organization.

States continue to use their tax structures strategically to encourage private investment in biotechnology firms, to ease the tax burdens on such firms, and/or to even the "playing field" of biotechnology firms with traditional industries. The majority of the states have research and development tax credits, usually tied to the federal research and development tax credit. In addition, states offer sales and use tax exemptions and investment tax credits. Three states, Connecticut, Hawaii, and New Jersey, allow biotechnology companies to transfer tax benefits.

Bioscience research parks and incubators are under development in a number of states. While 26 states reported research parks that can or do house bioscience companies; only nine reported research parks focused exclusively on biosciences companies (although a number of initiatives to develop bioscience parks are in the planning stages). Fifteen states reported bioscience incubators, and another 19 states reported technology incubators that include wet lab space for bioscience companies as well as space for other technology companies.

Commercialization and business development support is provided by a majority of the states responding to the survey. In most cases, this assistance is not limited to any particular type of technology company. Several states have created dedicated centers that offer a full range of commercialization support services.

States have created bioscience workforce development initiatives that address a range of the educational spectrum. These include establishing biotechnology two-year associate degree programs, creating new master and doctoral level programs in the biosciences, creating mechanisms to gain input from bioscience companies on their skill training and worker education needs, and initiating new delivery approaches to reach students.

CONCLUSION

In the New Millennium, interest in the biosciences is growing rapidly. This report describes initiatives underway in 41 states, designed to support and grow this emerging industry—one that only a few years ago was perceived as interesting to only a handful of states. These state investments in research, education, and technology infrastructure will benefit not only the biosciences, but other technology industry as well.

While America's bioscience firms must be global in outlook, they are based locally in communities, regions, and states throughout the nation. And they are finding increased opportunities for collaboration—with higher education institutions, with public and non-profit sectors, and with private investment communities. Private decisions and actions will determine which states and regions fully blossom, but the widespread range of initiatives documented in this report shows considerable interest by private and public leaders throughout the country in the opportunities that the bioscience industry presents.



BIO represents more than 1,000 biotechnology companies, academic institutions, state biotechnology centers, and related organizations in all 50 U.S. states and 33 other nations. BIO members are involved in the research and development of health-care, agricultural, industrial, and environmental biotechnology products.

This report is available on BIO's website www.bio.org. For more information contact Patrick Kelly or Allison Kender at (202) 857-0244.

Introduction

Biotechnology today is a rapidly growing, global industry. As did telecommunications and computer technology, biotechnology may revolutionize the economy and reshape labor-intensive industries into knowledge-based companies.

Increasingly, the results of biotechnology research and development are entering the approval pipeline, and major breakthroughs are occurring rapidly. New and groundbreaking medical, genetic, and biological engineering achievements, including mapping the human genome, seem to occur almost daily. Only two decades ago, terms such as “DNA,” “gene-splicing,” and “genomics” were used and understood only by a select few. Today, they are recognized by high school students, by Wall Street entrepreneurs, and on Main Street, USA. Developing and emerging new fields, such as genomics, proteomics, and bioinformatics, are likely to profoundly affect the future.

The value and size of the biotechnology industry continues to grow. According to a recent report to BIO, prepared by Ernst & Young,² the biotechnology industry doubled in size between 1993 and 1999. In 1999, Ernst & Young estimates that the biotechnology industry generated 151,000 direct jobs and 287,000 indirect jobs. The industry produced revenues of \$20 billion directly and \$27 billion indirectly. Annually, the industry itself spends \$11 billion on research and development, not including funds expended in higher education and other non-profit organizations. And the industry paid \$10 billion in tax revenues to all levels of government in 1999. These statistics show that the biotechnology industry is an important part of the economic landscape. Its further growth will only increase its significance.

The United States is a world leader in researching, designing, and producing biotechnology products through the application of various technologies in areas as diverse as agricultural chemicals, pharmaceuticals, and medical procedures. Yet, the biotechnology industry is not spread evenly throughout the nation. As a sector in which interactions among different industries, as well as between researchers and practitioners, are vital to development and progress, the biotechnology industry is concentrated in select areas of the United States, particularly in major urbanized regions on both coasts.

Recognizing the importance of the industry and its geographic concentration, states and regions are developing initiatives designed to foster an environment in which biotechnology companies can succeed and grow. These initiatives address the specific needs of biotechnology companies, which include

- **Strong academic research institutions conducting basic research in the biosciences.** While nearly all technology fields owe their start to breakthroughs in basic research, a distinguishing feature of the biosciences is their continued strong linkages between basic research and industry development. Clearly, as the biosciences progress and integrate leading technologies, the industry will need more, rather than less, basic research.

2. The Economic Contributions of the Biotechnology Industry to the U.S. Economy, May 2000, Ernst & Young.

- **Access to early-stage capital.** How can small, start-up companies with high-quality research and personnel find the funding to get up and running? And, if they are already established, where do they get the funds to bring their products to the marketplace? These problems have confounded small biotechnology companies across the nation for years.
- **Successful transfer of government-funded basic research for product commercialization.** Businesses need intellectual property to move into the laboratory for commercialization. The mission of universities is to create and share information through public disclosure. The challenge in the relationship between businesses and universities is to devise ways that create appropriate conversion of public discoveries and inventions into commercial products.
- **Specialized facilities, including wet laboratory space and specialized equipment.** The equipment needs at the early stages of a biotechnology company's development are unique among technology industries. Facilities costs are among the most significant expenses for a new biotechnology firm.
- **Highly skilled workforce.** Like any knowledge-based industry, biotechnology companies need a supply of qualified, trained workers. To meet the demands of newly emerging fields, new curricula and programs need to be developed by educational institutions working in close partnership with the biotechnology industry.
- **Stable and supportive public policy structure.** Biotechnology companies need a regulatory climate and environment that encourage and support the growth and development of their industry. Policies that restrict research, such as prohibitions against specific types of research or price controls on drug products, can have a negative effect on a company's ability to raise much-needed capital. Tax policies can help provide additional capital.

To better understand the nature of the policies and programs established by state governments to support the development of the biotechnology industry, BIO engaged the Technology Partnership Practice (TPP) of Battelle Memorial Institute, the State Science and Technology Institute (SSTI), and PMP Public Affairs Consulting, Inc., to survey state government initiatives in biotechnology. Battelle is a private, non-profit organization recognized worldwide for technology development, management, and commercialization. TPP provides consulting services on technology-based economic development programs to states, universities, and non-profit technology organizations across the nation. The mission of SSTI, a non-profit organization, is to enhance initiatives that apply science and technology for economic growth, particularly at the state level. SSTI is the only organization in the country dedicated exclusively to researching and enhancing cooperative technology programs. PMP Public Affairs Consulting, Inc. is an independent consulting firm serving the public and constituent relations needs of various life sciences-related companies and associations.

Part I of this report contains an analysis of the survey findings based on data collected from 48 states. Seven of these states reported no activities that focused exclusively on biotechnology companies. Individual profiles describing activities that are under way or proposed in the other 41 states are presented in Part II.

State Bioscience Initiatives

State governments are becoming more active and involved in identifying the opportunities presented by the growing bioscience industry. State interest in the biosciences is probably as strong as any seen in the past decade. The following factors have contributed to this renewed state interest in biotechnology and life sciences:

- **Public attention to human genome mapping.** Media coverage of mapping human gene characteristics, and of proteomics, has heightened public interest in biotechnology.
- **State tobacco settlement.** State government agreements with the tobacco industry have provided governors and legislatures with newly found revenues for life sciences research, although relatively few states to date have allocated these funds in this fashion.
- **Demise of the dot.com phenomenon.** Investment advisors, economic development officials, and others are seeing that the business model for dot.com companies rested on shaky foundations and that patient capital can be better devoted to other areas of business opportunity, including the biosciences.
- **Disease treatment and prevention.** Elected officials recognize that developing new products and procedures to treat and prevent diseases are areas of strong interest to their constituents and that the biotechnology industry represents not only an economic development opportunity, but an opportunity to improve citizens' health and quality of life.

BIOSCIENCE INDUSTRY DEFINITIONS

BIO defines biotechnology as “the use of the cellular and molecular processes to solve problems or make products.” This definition includes firms that use cells and biological molecules for applications in medicine, agriculture, and environmental management. It excludes pharmaceutical companies (except for distinct biotechnology divisions), contract research organizations, and equipment manufacturers.

States generally operate under a broader definition, but some still define biotechnology to include primarily firms involved in research and development of biological processes and related areas of agricultural biology. This traditional narrow definition results in relatively few firms nationally, with distinct concentrations in a handful of states. A broader definition, generally termed “life sciences,” includes medical devices and instruments and the pharmaceutical industry, and in some cases may include medical labs, hospitals, and medical centers. The third, broadest definition, called “biosciences,” incorporates all of the above and includes agricultural chemicals and research and testing.

This survey showed that 29 states have collected data on their biotechnology industry.³ But, states' definitions of biotechnology vary greatly. Some states use the narrower “biotechnology” definition; some use the broader “life sciences” and “biosciences” definitions; some use their own combination. Table 1 shows the number of states that reported including a particular sector in their definition of the bioscience industry. In their definitions, 22 of the states included drugs and

3. For the purposes of this report, the terms “biotechnology,” “life sciences,” and “biosciences” are used interchangeably.

Table 1: State Bioscience Industry Definitions

Industry	SIC Code	Number of States Including Sector in Definition of Bioscience Industry
Animals/Veterinary Specialties	027, part of 074	5
Drugs and Pharmaceuticals	283	22
Agricultural and Other Organic Chemicals	286,287	10
Lab and Analytical Instrumentation	part of 382	6
Medical Instruments	384	17
Hospitals	806	4
Medical Laboratories	807	3
Research Development and Testing Services	873	19

pharmaceuticals, 19 included research development and testing services, and 17 included medical instrument companies. However, beyond these three core industry groupings, considerable variety in definitions exist across the states. Without a standard definition, it is impossible to aggregate the states' data on number of bioscience companies and number of employees.

STATE BIOTECHNOLOGY STRATEGIES

Ten states reported having developed a biotechnology or life sciences strategic plan. All but one of these were developed in the past four years. Four states reported having developed a science and technology or economic development strategic plan that includes a focus on the biosciences. In the early 1990s, Maryland and Massachusetts developed strategic plans that are still being implemented. In a number of cases, state biotechnology associations have played a key role in the development of the state's strategic plan. Arkansas, Hawaii, and Michigan are among the states that have developed bioscience strategic plans. This information is summarized in Table 2.

- In Arkansas, the University of Arkansas for Medical Sciences developed the *Arkansas Biotechnology Strategy*, which proposes to expand the state's base of bioscience companies by creating an agricultural medicine industry in Arkansas, creating an infrastructure of service providers to serve the biotechnology and medical technology industry, and attracting out-of-state pharmaceutical- and biotechnology-related businesses to locate facilities in Arkansas.
- In 1999, Hawaii developed *Biotechnology in Hawaii: A Blueprint for Growth*, which recommends a number of strategies for growing Hawaii's biotechnology industry. These strategies include expanding venture capital for the biotechnology sector; implementing a tax structure that provides incentives for high technology product development companies, such as biotechnology; improving the transfer of university-developed technologies; and developing a bio-age curriculum. The state is in the process of implementing these recommendations.
- Michigan's Economic Development Corporation completed the *Michigan Life Sciences Strategy* in mid-2000. It provides a policy framework and proposes strategies and actions to guide the state's efforts in building a stronger life sciences industry. The strategy proposed ways to make use of Michigan's Life Sciences Corridor tobacco settlement funds for

Table 2: State Bioscience Strategies

State	Bioscience Strategic Plan	Technology Strategic Plan Including Bioscience Focus	Year Adopted
Arkansas	X		2000
Connecticut		X	1998
Florida	X		1998
Hawaii	X		1999
Louisiana		X	2000
Maryland	X		1991
Massachusetts		X	1993
Michigan	X		2000
Minnesota	X		2001
Missouri	X		2000
New Mexico	X		1999
New York	X		NA
Oregon	X		1999
Vermont		X	1996

implementation. Strategies include investing in research infrastructure, building an entrepreneurial culture, creating an image of Michigan as a leading life science center, addressing workforce needs, and creating a positive business climate for life sciences companies.

The most interesting phenomenon in the past year has been the emergence of regional efforts to address biotechnology. A number of regions, led by business/higher education coalitions, have initiated far-reaching efforts to reposition their economies for the 21st century. Such efforts focus more often on biotechnology than on other technology areas, including information technologies. The following regions are engaged in efforts to grow their bioscience sectors: St. Louis, Columbus, Pittsburgh, Peoria, San Antonio, Cincinnati, and Indianapolis, among others.

STATE BIOTECHNOLOGY INDUSTRY SPECIALISTS

Whereas state technology organizations historically hired generalists to serve all technology areas, states have begun to recognize that dedicated professional staff knowledgeable and familiar with the biotechnology industry are essential. These specialists, with in-depth knowledge and understanding of the industry, can link state financial, regulatory, and other programs and package them in ways to assist the biotechnology entrepreneur. Twelve states reported having staff dedicated to working with biotechnology industries: Delaware, Georgia, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Mexico, Ohio, Utah, and Virginia. These staff are usually responsible for coordinating biotechnology and life sciences initiatives, assisting existing companies with regulatory issues, working with bioscience companies considering locating in the state, and acting as liaison between government and the industry.

RECENT TRENDS

Data collected in the survey of state bioscience initiatives reveal the following trends. Details on individual initiatives can be found in the state profiles.

Use of Tobacco Settlement Funds for Bioscience-Related Research and Development

A recent study by the National Conference of State Legislatures showed that 15 states have passed budgets and/or enabled legislation to use some portion of their tobacco settlements for bioscience-related efforts. In addition, in Missouri, the governor has signed an executive order to spend \$22 million of its tobacco settlement for bioscience-related research next year.

The 16 states that have appropriated funds for biotechnology research have done so in many different ways. Michigan, the first state to dedicate tobacco settlement funds for bioscience research, has allocated \$50 million a year over a 20-year period for an effort called the *Michigan Life Sciences Corridor*. Of this \$50 million, 40 percent will be used to fund basic research at four **Michigan** research institutions, 50 percent will be used to fund collaborative university/industry research projects aimed at developing commercial products and processes, and 10 percent will be used for commercialization activities aimed at bringing products to market. Ohio created a *bio-medical research and technology transfer trust fund* and allocated 2.7 percent of its first year settlement dollars to it. The allocation will increase to 13 to 14 percent for the following three years. This means that the research fund will be funded at \$4.4 million initially and will increase to as much as \$24.3 million a year over the first four years. Other states that have appropriated or dedicated tobacco settlement funds to biomedical or tobacco-related research include Colorado, Connecticut, Illinois, Kansas, Louisiana, Massachusetts, Maryland, Minnesota, Missouri, New Jersey, New Mexico, Pennsylvania, Utah, and Wisconsin.

Interesting aspects of states' use of tobacco settlement funds for bioscience-related efforts include the following:

- **The participation of federal laboratories and non-profit research institutions in addition to universities.** Illinois is not only funding research at five universities, but is involving two of its DOE federal laboratories—Fermi and Argonne—as funding recipients.
- **Strong focus on tobacco-related research.** Several states have limited the research effort to control or use of tobacco (Massachusetts) or research focused on tobacco-related illnesses (Colorado, Connecticut, Maryland, and New Mexico).
- **Lack of emphasis on commercialization.** Only three states have explicitly targeted some of the funding for technology transfer and commercialization. Michigan has directed that 10 percent of the funding for the Life Sciences Corridor be used for commercialization. Ohio is also requiring that funds be used for commercializing research findings. Pennsylvania is using \$100 million from the state's tobacco settlement to establish Life Sciences Greenhouses in three regions of the state. Pennsylvania is also using a portion of the tobacco settlement funds to invest in several privately managed life sciences venture funds and for basic research.

Increased State Government Funding of Academic Bioscience Research Centers

Unlike other fields of endeavor, building strong state and regional bioscience economies demands having strong research universities which generate bioscience discoveries. This knowledge and

understanding, further stimulated by the availability of biomedical research funds from the tobacco settlement, has resulted in a substantial increase in interest and state funding for bioscience-related research centers in a number of states.

Initiatives are under way throughout the country to address research facilities, recruit research talent, and secure federal National Institutes of Health (NIH) and other research funding support. Billions of dollars are being expended in states and regions to build modern facilities and fully equipped labs with state-of-the-art instrumentation. With the federal government doubling funding support to NIH, those states and regions with sufficient facilities can attract the talent and funds necessary to further build their stature and reputation and form the basis for technology-based economic development.

The following are examples of the types of projects being funded:

- **California** has established a new Institute for Bioengineering, Biotechnology, and Quantitative Biomedical Research, one of three new Institutes for Science and Innovation. The Institute, funded at \$100 million and to be matched by \$200 million in private funds, will house 100 scientists in three new buildings.
- The State of **Delaware** has provided partial funding to establish the Delaware Biotechnology Institute (DBI), a new bioscience research center. DBI is a partnership of state government, Delaware's institutions of higher education, and local bioscience companies. To date, the Institute has secured \$85 million in funding.
- The State of **Georgia** has invested more than \$300 million to provide endowments for Eminent Scholars and to build state-of-the-art laboratories and core research facilities. Many of these facilities are biotechnology and life science related.
- **Michigan** has allocated \$59 million from its Life Sciences Corridor initiative to fund five laboratories equipped with specialized equipment.
- The 2001 **Illinois** legislature approved funding for a Post-Genomics Institute at the University of Illinois at Urbana-Champaign, a Biomedical Research Facility at the University of Illinois-Chicago, a Medical Resonance Imaging Center in Chicago, and a Biomedical Research Building at Northwestern University. These investments are part of the Governor's \$2 billion, five-year VentureTECH initiative.
- **New York** recently awarded funding for six Strategically Targeted Academic Research (STAR) Centers, four of which have a bioscience focus. Each Center will receive approximately \$15 million.
- The 2001 **Texas** legislature appropriated \$800 million for science, engineering, research and commercialization activities; \$385 million of that amount will be used for construction, laboratory expansion, and equipment acquisition for research and science facilities in the state's universities and colleges. Included in this package is funding for seven new or expanded health science research centers.
- In 2000, **Wisconsin** launched BioStar, a 10-year, \$317 million initiative to build a series of state-of-the-art research centers on the University of Wisconsin-Madison campus.

Increased Focus and Attention on Financing Needs of Biotechnology Firms

While private capital markets continue to address the venture capital needs of bioscience-related firms, a number of states and, increasingly, regions are stepping in to make early-stage financing more available. These initiatives seek to address what is perceived to be a capital gap in the private marketplace, i.e., a shortage of pre-seed to seed-stage venture capital (initial funding of less than \$2 million). Even in regions with strong venture capital markets, such as San Diego, the lack of pre-seed and seed capital is a problem.

Recognizing that building a critical mass of bioscience-related firms is unlikely without pre-seed and seed-stage funding, some states and regions have developed programs to address this need. States and regions have responded to this problem by creating programs that make direct investments in companies, investing in privately managed venture funds, and using tax incentives to encourage investment in venture capital. In some cases, universities and foundations are investing a portion of their endowments in seed and pre-seed funding for bioscience companies. The bottom line seems to be increased understanding that access to capital—at all stages of the life cycle of bioscience firms—is required to build a critical mass of firms.

Twenty-eight states indicated in the survey that they have one or more publicly supported seed or venture funds that can invest in bioscience-related companies. These funds usually invest in any technology company, although some states target specific industries. Five states have publicly supported seed and venture funds that invest exclusively in bioscience-related companies (see Table 3).

Table 3: Publicly Supported Bioscience Seed and Venture Funds

State	Fund
Existing Funds	
California	CalPERS Biotechnology Program
Massachusetts	BioVentures Investors LLC
North Carolina	NC Bioscience Fund
Ohio	EBTC BioInvestment Fund
Wisconsin	State of Wisconsin Investment Board
Funds Under Development	
Ohio	BioVentures Development Fund

In Massachusetts, the Massachusetts Biomedical Initiative recently created its fifth venture fund, ***Bioventures Investors LLC***. The fund is privately managed. In North Carolina, the legislature appropriated \$10 million to capitalize the ***NC Bioscience Investment Fund***. An additional \$15 million was raised in the private sector. The State of Ohio has provided initial support for the development of three funds.

California and Wisconsin are investing pension funds in the bioscience sector. The ***CalPERS Biotechnology Program*** calls for the California Public Employees' Retirement System to invest \$500 million in the biotechnology sector. The ***State of Wisconsin Investment Board***, the state's

pension fund, awarded an aggregate of \$50 million to two Wisconsin venture capital funds to be used for biotechnology-related investment in Wisconsin firms.

Regions are undertaking similar initiatives. St. Louis, for example, working with its universities, is in the process of creating several funds to serve not only the pre-seed and seed stages, but also later stages as well.

Increased State Interest in Addressing Facilities Needs of Bioscience Firms

The need for bioscience firms to secure operating and working capital and their need for financing facilities and leasehold improvements, including wet labs, are related but separate issues. Most bioscience firms initially lease space, rather than purchase it. And, for the most part, the bioscience industry has historically been geographically concentrated. Therefore, ensuring that the private marketplace offers the right amount and type of space suitable for the development and growth of these firms has been a major challenge for emerging bioscience regions.

Nine states indicated in the survey that they have used traditional economic development programs, including loan, loan guarantee, and other public financing programs, to fund facilities for bioscience companies. Maryland, for example, has used the state's Economic Development Opportunities Fund to help companies construct laboratory facilities and purchase and install equipment. Financing from the Maryland Industrial Development Finance Authority has played an important role in helping to meet the large investment capital needs of Maryland bioscience companies as they scale up to manufacturing. The activities of the nine states are summarized in Table 4.

Table 4: Facilities Financing for Bioscience Companies

State	Exclusively Bioscience	General ED Funds Available for Bioscience Facilities
Alabama		<ul style="list-style-type: none"> Alabama Site Development Program
Alaska		<ul style="list-style-type: none"> Alaska Growth Capital
Arkansas	<ul style="list-style-type: none"> Tax credit for constructing biotechnology facilities 	<ul style="list-style-type: none"> Arkansas Capital Corporation
Connecticut	<ul style="list-style-type: none"> Biotechnology Facilities Fund 	
Maryland		<ul style="list-style-type: none"> Economic Development Opportunities Fund Maryland Industrial Development Finance Authority
Massachusetts		<ul style="list-style-type: none"> Mass Development
New Jersey		<ul style="list-style-type: none"> NJEDA Technology Funding Program Tenant Outfit Allowance at Technology Centre of NJ
Pennsylvania		<ul style="list-style-type: none"> Various Economic Development Programs
Wisconsin		<ul style="list-style-type: none"> Technology Development Loan Program

Only two states, Arkansas and Connecticut, have created specialized programs to support the development of bioscience facilities. ***Connecticut's Biotechnology Facilities Fund*** provides financing to biotechnology firms for the development or expansion of wet laboratory and related

space. The fund has financed more than 225,000 square feet of laboratory space since its creation in 1998. Arkansas provides a tax credit for the cost of constructing biotechnology facilities.

Interestingly, as the bioscience industry becomes an increasingly important component of economic development efforts across all states and regions, more jurisdictions are developing ways to help address and fill the facilities financing gap.

Growth of Biotechnology Networking and Trade Associations Across All States

Counterparts of BIO are now found in most states, serving as educators, advocates, and clearing-houses for information on the growing bioscience base in their states and regions. While these organizations vary in membership, dues and sources of funding, staff support, and agenda, they have one common interest—assisting their biotechnology base to be competitive and grow in their states and regions.

These networking organizations have various names and geographical focuses. Some operate on a statewide basis; others are regionally focused. Many of these organizations are more than a year old, and it is most interesting that they continue to broaden their geographical coverage of the American landscape.

Thirty-five states identified at least one such networking organization; some states, such as Colorado, Florida, Georgia, Kentucky, Louisiana, Maine, Massachusetts, Michigan, Minnesota, Missouri, New Jersey, New York, Washington, and Wisconsin, noted more than one—in many instances both a statewide organization and a regional organization in one or more of their metropolitan areas. These organizations are critical in networking academic, industry, and public and non-profit groups and organizations, encouraging cross-fertilization of ideas and opportunities and leading, in many cases, to joint endeavors. They also help link business service providers and their knowledge of critical aspects of business formation and maturation with bioscience firms. Effective states and regions are those where networking and relationship building become normal ways of doing business.

Revamp of State Tax Policies and Structure to Better Address the Growth of the Bioscience Industry

States continue to use their tax structures strategically to encourage private investment in biotechnology firms, to ease the tax burdens on such firms, and/or to even the “playing field” of biotechnology firms with traditional industries. The majority of the states have research and development tax credits, usually tied to the federal research and development tax credit. States also are addressing the needs of emerging technology and biotechnology companies in the following ways:

- **Sales and use tax exemptions and/or deferral.** Various state programs provide additional sources of R&D capital by exempting or limiting the applicable sales and use taxes paid on purchases of R&D and manufacturing materials. As an alternative, the exemption could be restricted to purchases made from in-state vendors and/or sales taxes could be deferred only until the company’s biotechnology product has been approved by the FDA and is marketable.
- **Investment Tax Credits (ITCs).** ITCs include credit for manufacturing modernization and upgrade expenses; sales tax exemptions for computer and R&D equipment purchases; property tax exemptions on equipment; and other similar vehicles. ITCs often provide greater benefit to companies than depreciation deductions or the ability to expense the cost of the equipment.
- **Capital gains tax cuts.** Cutting the state tax rate for individual investors can provide them an incentive to support biotechnology companies. A rollover provision in several states allows the investor to defer tax if he or she sells the stock and invests in another qualifying company for at least one year.
- **Net Operating Loss (NOL) provisions.** A number of states, including California, Connecticut, New Jersey, and Texas, allow NOLs to be carried forward. California allows NOLs to be carried forward for eight years, New Jersey allows carryover for 15 years, and Connecticut and Texas allow carryover for 20 years.
- **Tax credit transferability.** Connecticut, Hawaii, and New Jersey allow biotechnology companies to transfer tax benefits to generate capital and assist technology investment in the state. Beginning in January 2000, Connecticut businesses with \$70 million or less in gross sales may exchange unused R&D tax credits with the state for a cash payment equal to 65 percent of the value of the credit. In Hawaii, a qualified high technology business may sell its unused NOL carryover to another taxpayer, if approved by the Department of Taxation. The New Jersey Emerging Technology and Biotechnology Financial Assistance Program allows biotechnology companies, with unused amounts of research and development tax credits otherwise allowable, but not applicable for the credit tax year, to surrender those tax benefits for use by other corporation business taxpayers in the state.
- **Incentives for specific industries.** Some states provide tax credits for such activities as job creation, training, or facility renovation in identified fields, including biotechnology. For example, the Arkansas Biotechnology Development and Training Act of 1997 provides income tax credits to biotechnology companies. The credits include a 30 percent tax credit on the cost of cooperative research with state universities; a 5 percent credit on the cost of construction, expansion, improvement, renovation, or purchase of a biotechnology facility; a 30 percent credit on the cost of training employees in biotechnology; and a 20 percent credit

on the amount that the cost of qualified research exceeds the cost of such research in the base year.

Increased Interest in Research Parks and Incubators Throughout the United States

As industrial parks manifested the increase in manufacturing in post-World War II America, so technology research parks, with or without incubator facilities, are emerging phenomenon across the nation. Research parks are being built near medical centers and teaching hospitals and generally are offering incubator space. A few also offer multi-tenant/accelerator space.

While 26 states reported research parks that can or do house bioscience companies, only nine states reported research parks focused exclusively on bioscience companies (although a number of initiatives to develop bioscience parks are in the planning stages). These nine states' research parks are summarized in Table 5. Some of the bioscience research parks identified have been publicly supported; others are private operations. Fifteen states reported bioscience incubators, and another 19 states reported technology incubators that include wet lab space for bioscience companies as well as space for other technology companies, often information technology companies. Bioscience incubators are summarized in Table 6.

Table 5: Bioscience Research Parks

State	Research Park
Colorado	• Colorado Bioscience Park Aurora (under development)
Connecticut	• 300 George Street • Hamden BioScience Campus
Maryland	• The Shady Grove Life Sciences Center
Massachusetts	• Massachusetts Biotechnology Research Park • BioSquare • University Park at MIT • One Kendall Square, Cambridge • Cambridge Center, Cambridge • Charlestown Navy Yard, Boston • Longwood Medical Area, Boston • Kendall Square Project (Cambridge Research Park)
New Jersey	• Technology Centre of New Jersey
New York	• Audubon Biomedical Science and Technology Park • The Broad Hollow Bioscience Park
Oklahoma	• Oklahoma Health Research Park
Tennessee	• Med Tech Research Park
Virginia	• Virginia Biotechnology Park • Virginia Biotechnology Park at Meadowville

Examples of publicly sponsored bioscience research parks and incubators include the following:

- The ***Office for the Advancement of Developing Industries (OADI) at the University of Alabama at Birmingham (UAB)***. OADI, an incubator facility with 20,000 square feet of

Table 6: Bioscience Incubators

State	Incubator
Alabama	• Office for the Advancement of Developing Industries
Arkansas	• Arkansas Bioventures
Colorado	• Bioscience Park Center
Florida	• Sid Martin Biotechnology Institute
Georgia	• The Center for Applied Genetics Technology (AGTEC) • EmTech Biotechnology Development, Inc. • CollabTech at Georgia State University
Maine	• Thomas M. Teague Biotechnology Park
Maryland	• The AlphaCenter, owned by Johns Hopkins University and the Hopkins Health System • Association for Entrepreneurial Science • Bard Laboratories, Baltimore City Community Colleges • The Medical Biotechnology Center, UMBI • The Technology Development Center in Montgomery County, operated by the Maryland High Technology Council • Technology Enterprise Center, UMBC • Commercial/Wet Lab Office Building
Massachusetts	• MBIdeas Innovation Centers
Michigan	• The Michigan Biotechnology Institute International/Biobusiness Incubator
Minnesota	• Biodale
Ohio	• BioEnterprise • BIO/START
Oregon	• Portland Biotechnology Center (PBC)
Tennessee	• The University of Tennessee Environmental Biotechnology Center
Texas	• TEKSA Innovations
Virginia	• City of Norfolk Biotechnology Incubator

laboratory space for bioscience companies, currently houses 26 tenants. It is located in the UAB Research Park at Oxmoor.

- ***Maryland's Shady Grove Life Sciences Center*** houses, in addition to corporate tenants, the University of Maryland Biotechnology Institute's Center for Applied Research in Biotechnology, a University of Maryland teaching facility, a Johns Hopkins University campus, and an incubator.
- ***A 160-acre Colorado Bioscience Park Aurora*** is under development at the former site of the Fitzsimons Army Medical Center. Located in the park is the Bioscience Park Center, a 60,000-square-foot facility designed to house start-up bioscience companies. The Center opened in 2000.
- ***Massachusetts Biotechnology Research Park***, created in 1985, currently includes about 1 million square feet of building space on 105 acres. It is home to more than a dozen

biotechnology companies and also includes several non-profit and academic institutions. It houses an MBIdeas Innovation Center that offers fully equipped wet lab space; use of existing permits; and business assistance, consulting, and mentoring to start-up biotechnology and biomedical companies.

While construction of biotechnology incubators is expensive, interest in such facilities is growing throughout the country, particularly as part of a medical or university complex and research park.

Emergence of Bioscience Commercialization and Business Development Initiatives

Discussions abound of approaches and techniques to move basic research into the marketplace, not only to undertake formal technology transfer, but also to form and build companies from the research enterprise. States and regions are experimenting with approaches to encourage and facilitate commercialization of research findings. Efforts to assist range from venture fairs to business planning assistance to formation of formal intermediary organizations focusing on improving the investment quality of start-up opportunities.

The majority of the states responding to the survey provide some type of commercialization and business development support to entrepreneurs and start-up companies. In most cases, this assistance is not limited to any particular type of technology company. Several states, including Florida, Kansas, and Oklahoma, have created dedicated centers that offer a full range of commercialization support services.

The ***Oklahoma Technology Commercialization Center***, for example, provides the following services: technology assessments and technical concept analysis; engineering, testing, and prototype development; market research and analysis; economic feasibility studies; strategic marketing and business plans development; and access to early stage risk capital.

A few states have developed programs specifically targeted to bioscience companies. ***MDBio***, a private non-profit corporation originally created by the State of Maryland, awards funding to bioscience companies for product development and manufacturing, assists bioscience firms with marketing and regulatory issues, and provides financing for management or strategic planning. The ***Carilion Biomedical Institute*** in Roanoke, Virginia, is an example of a new type of intermediary organization. The Institute, which is a partnership between Carilion Health Systems, the University of Virginia, and Virginia Tech, will include prototype development facilities to help commercialize university and other research and development.

Emergence of Workforce Development Programs for the Bioscience Industry

The biotechnology industry has not experienced the same problems of insufficient labor as has the information technology industry; its issues have more often been with finding experienced management, sales, marketing, and regulatory personnel. States and their trade associations report bioscience workforce initiatives across a range of the educational spectrum. The following are examples of these efforts:

- **Establishing biotechnology technician two-year associate's degree programs**, which has happened in Colorado, Connecticut, Delaware, Florida, Iowa, Maine, Maryland, Massachusetts, New Hampshire, Ohio, Oklahoma, Oregon, Virginia, and Wisconsin.
- **Changes in curricula at colleges and universities to better reflect the workforce needs of bioscience firms.** New master and doctoral level programs are being created in the bioscience

field. Examples include a joint Ph.D. program in biotechnology being offered by two universities in Maine and a new master's program focused on biotechnology in New York. In addition, new curricula are being added in biotechnology and related fields, such as bioinformatics and clinical trials management, at a number of colleges and universities throughout the country.

- **Outreach to bioscience companies to determine skill training and education needs.** Seminole Community College in Florida, for example, has proposed soliciting input for curricula change through a competency-based, Web survey system for biomedical firms in its region. The New York Biotechnology Association has received state funding to conduct an industry workforce survey.
- **New delivery approaches to reach the student.** These apply to both full-time students and adults who are part-time students and full-time workers. Connecticut's *BioBus* is a five-year, \$3 million partnership between members of CURE—Connecticut's BioScience Cluster—and Connecticut Innovations, Inc. The bus, modeled after CityLab, a biotechnology learning laboratory sponsored by the Boston University School of Medicine, is a permanent, mobile, learning lab traveling to schools, community events, and other locations throughout Connecticut. Primary audiences for the bus include middle school and high school students and educators. The Virginia Biotechnology Association, in partnership with Greater Richmond area community colleges and the state's Center for Innovative Technology, is sponsoring a five-day biotech summer camp pilot program for 50 middle school children in August 2001. This program will expand statewide in 2002.

Conclusion

In the New Millennium, interest in the biosciences is growing throughout the country. This report shows 41 states with initiatives under way to address this emerging industry—one that only a few years ago was perceived as of interest to only a handful of states. While states and regions have varying strengths and advantages, their initiatives that invest in the workforce, build a better business climate for technology, improve access to capital, and address other needs noted here benefit not only the biosciences, but information technologies and other industries as well.

While America's bioscience firms must be global in outlook, they are based locally in communities, regions, and states throughout the nation. And they are finding increased opportunities for collaboration—with higher education institutions, with public and non-profit sectors, and with private investment communities. Private decisions and private actions will determine which states and regions fully blossom, but the widespread range of initiatives documented in this report shows considerable interest by private and public leaders throughout the country in the future and the opportunities that the bioscience industry presents.

STATE PROFILES

The following profiles were developed using data from several sources. The State Science and Technology Institute surveyed science and technology contacts in all 50 states and Battelle sent surveys to state biotechnology associations. In addition, the project team collected data from Web sites. Data on research and development tax incentives were taken from an earlier SSTI study. Data on Medicaid Reimbursement Policies were taken from BIO's *2000 Survey of State Initiatives*.

This section of the report includes profiles for 41 states. Seven states—Mississippi, Montana, Nevada, North Dakota, South Dakota, West Virginia, and Wyoming—reported that their state governments have not initiated any activities focused exclusively on bioscience companies at this time. Data were not available for two states: Arizona and Nebraska.

The state-specific information contained in the profiles is by no means exhaustive. State policy and programs are changing rapidly, making it difficult to maintain up-to-date information. It is likely that there are additional technology-based economic development programs that are also used to assist bioscience companies. Readers are encouraged to comment on the profiles and to suggest changes as appropriate.

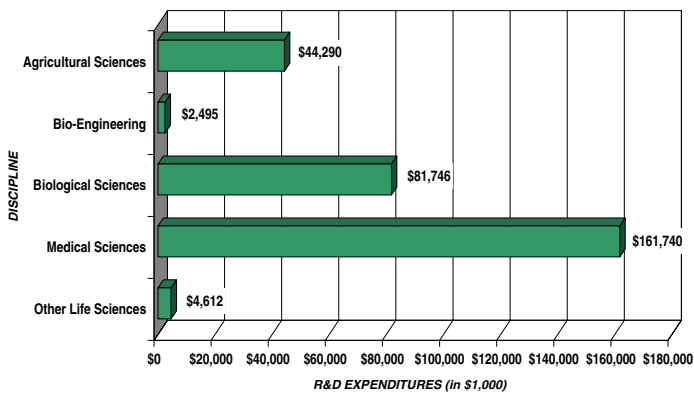
The table below contains the sources for the statistical data provided in each state profile. State ranks were calculated based on data for the 50 states and the District of Columbia.

Category	Data Sources and Notes
FY1999 University Life Sciences R&D Expenditures (in 1999 dollars)	National Science Foundation Webcaspar system. * "Life sciences" includes bioengineering, agricultural sciences, biological sciences, medical sciences, and other life sciences. ** Some of the growth in percent change from 1995 to 1999 may be due to the fact that NSF data in 1995 does not capture bioengineering as its own data, while 1999 data includes this information.
FY2000 NIH Support to Institutions (in 2000 dollars)	National Institutes of Health data.
Higher Education Awards in Biological Sciences, 2000	National Center for Education Statistics Integrated Postsecondary Education Data System, Year 2000 Graduates. (Life science instructional programs were determined by Battelle and include parts or all of the following classifications of instructional program major field: agricultural sciences, engineering, engineering technology, biological and biomedical sciences, physical sciences, science technology/technicians, health professions.)
Biological Scientists in the Workforce, 2000	Battelle definition based on 1998 U.S. Occupational Employment Statistics Data. Occupations with less than 30 workers are not disclosed. * N/A or blank data in this field simply means that an estimate was not currently available. It does not mean the number is zero.

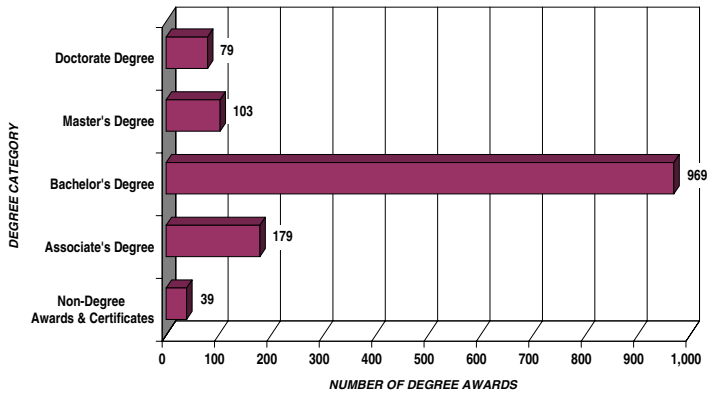
Alabama

	Alabama	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$294,883	\$15,728,292	17
Per Capita	\$67	\$58	
Percent Change FY1995–1999	21.3%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$202,514	\$14,679,343	21
Per Capita 2000 Expenditures	\$46	\$52	
Percent Change in Expenditures FY1996–2000	20.7%	37.0%	
Higher Education Awards in Biological Sciences, 2000	1,369	88,982	24
Biological Scientists in the Workforce, 2000	6,340	454,980	24

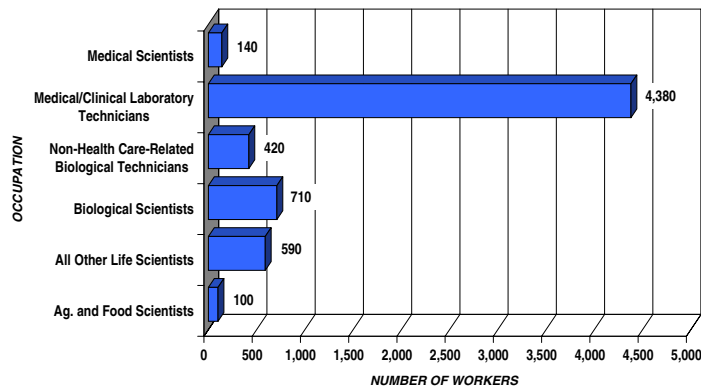
Total Bioscience R&D Expenditures at Academic Institutions in Alabama



Life/Biological Sciences Degrees from Alabama Higher Education



Biological Science Occupations in the Alabama Workforce



ALABAMA

The University of Alabama at Birmingham has established an incubator to encourage the start-up of technology based companies, including bioscience companies, and is in the process of developing a research park designed to create and attract a cluster of high technology firms.

SEED AND VENTURE FINANCING

Emerging Technology Partners (ETP) provides seed funding and professional management for inventors and entrepreneurs. Its Paradigm Ventures Partners L.P., which was launched in 1999 and currently has \$10 million under management, funds early stage technology companies. ETP was formed in 1997 as a private venture but its investors include the University of Alabama-Birmingham Research Foundation and several public economic development entities. ETP, which has formed seven companies since its founding in 1997, invests in life science, physical science, and information science companies.

FACILITIES FINANCING

Alabama has no programs that provide funding for facilities development exclusively for bioscience companies. However, the *Alabama Site Development Program* reimburses companies for site preparation costs. To qualify for this program, a company must be in a specified industrial classification or be a regional corporate headquarters facility. Commercial physical and biological research, noncommercial research organizations, and testing labs are eligible industry classifications. Reimbursement is based on a percentage of capital costs.

NETWORKING

The *Biotechnology Association of Alabama (BAA)*, a statewide industry organization formed in 1997 by biotechnology executives and community leaders, provides a unified effort and industry voice for the emerging biotechnology industry. The mission of BAA is to promote growth and understanding of the biotechnology industry through increased communication and public awareness of the benefits of biotechnology. BAA's mission includes not only helping Alabama benefit from the steady growth of the industry, but also from biotechnology products and services.

TAX POLICY

- **Tax abatements for research entities.** Cities, counties, and Alabama public industrial authorities may grant abatements of non-educational ad valorem taxes, state and non-educational local sales and use tax, and/or mortgage and recording taxes to companies that are primarily engaged in certain industries including commercial physical and biological research (SIC 8731), noncommercial research (SIC 8733), or testing laboratories (SIC 8734). The total amount of the capital investment is eligible for abatement. Major additions are eligible for the lesser of 30 percent of the original cost of the property, or \$2,000,000.
- **Income tax capital credit.** Businesses engaged primarily in research activity that falls under SIC codes 8731, 8733, and 8734 are eligible to apply for an income tax credit of five percent of the capital costs of a project to be applied to the income tax liability generated by the project income each year for 20 years. Depending on the size of the business, there are minimum requirements for capital costs, job creation, and average hourly wages that must be met before this credit can be claimed.

To be eligible for the following programs, a company must be classified by SIC codes 20–39, 50–51, 737, 0724, 8731, 8733, or 8734.

- ***State of Alabama Capital Investment Tax Credit Program.*** To qualify, a company with a new project must invest at least \$2,000,000 and hire 20 new employees earning at least \$8.00 per hour. Existing small business expansions (less than 100 existing employees) qualify if they invest at least \$1,000,000 and hire 15 new employees earning at least \$8.00 an hour. Qualified companies earn credit towards their state corporate income tax bill equal to 5 percent of the total capital investment for the project. The company receives the credit every year for 20 years, no carry forward or back.
- **Sales and property tax exemption.** To qualify a company must have a new project in the state, or expand an existing facility with a capital investment of 30 percent of the value of the original land, building and equipment or \$2,000,000. The lesser of the two applies. Qualified companies receive an 1) abatement of state, county, and local non-educational sales and use tax on materials used in constructing a facility and equipment and machinery purchased for use in the facility; 2) abatement of state, county, and local non-educational property tax on real and personal property employed in the project for up to 10 years; and 3) abatement of state, county and local non-educational mortgage and recording taxes.

REGULATORY POLICY

- Alabama has not enacted genetic privacy legislation.
- Alabama has not enacted “right to know” legislation.
- Alabama has not enacted legislation to impose price controls on prescription drugs.
- Medicaid Reimbursement Policy: Most prescription drugs are covered but some require prior approval. Many over the counter drugs are covered.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The University of Alabama at Birmingham (UAB) houses the *Office for the Advancement of Developing Industries (OADI)*, a technology incubator facility with wet lab facilities for biotechnology companies. It has 20,000 square feet of laboratory space within the 67,000 square foot building. Since the program was established in 1986, 38 companies have graduated. OADI currently houses 26 tenant companies. OADI is located in the *UAB Research Park at Oxmoor*, a 100-acre research park that is currently under development.

Cummings Research Park, Huntsville, was created in 1962. The park, which today includes 3,800 acres, is home to 212 companies and also houses University of Alabama and federal laboratory facilities. The park also contains a 40,000 square foot NASA affiliated incubator.

Southern Research Institute is a not-for-profit center for scientific research and is now affiliated with the University of Alabama at Birmingham. It has both public and private sector clients, some of which are biotechnology firms.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

OADI provides a wide range of professional services to tenants including help developing business plans, formulating marketing strategies, and discussion of intellectual property rights issues.

WORKFORCE DEVELOPMENT

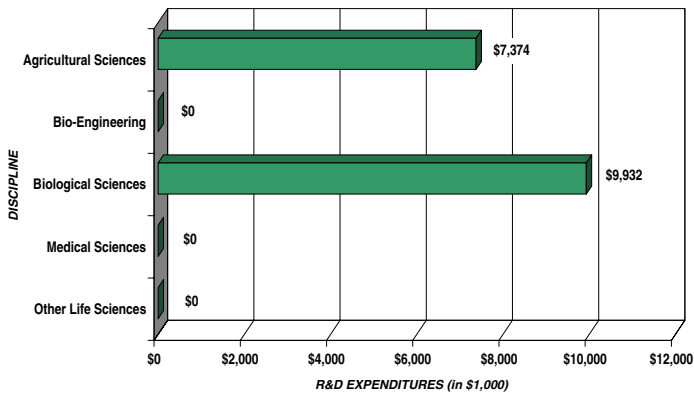
The *Alabama Industrial Development Training (AIDT)* program, established in 1971, is funded in the state education budget and is an institute under the Department of Postsecondary Education. Its mission is to recruit and train a skilled workforce to attract new industries to the state and expand existing industries. The program provides a full range of customized technical training programs that are free to employers and to trainees. Management and supervisory training programs, including TQM and ISO 9000, are also available. The services provided include placing advertisements for available positions, interviewing, developing and printing training manuals, on-the-job training, mobile training unit classrooms, and hiring of trainers. Each program is customized to the specific company and their needs. Industry and Education Alliances train employees from several businesses or industries in a community that have similar training needs. AIDT also has programs available on the K–12 level. This program has been used to assist biotechnology companies.

Alabama Works is a public-private partnership recently established by the Governor that is an intensive course of study designed to create direct paths to technical, high-skilled jobs for people with little or no work experience. Coursework is concentrated in four industry areas, including IT and Biotechnology, over a 2-year period. Applicants must have a high school diploma or GED. Scholarships are available.

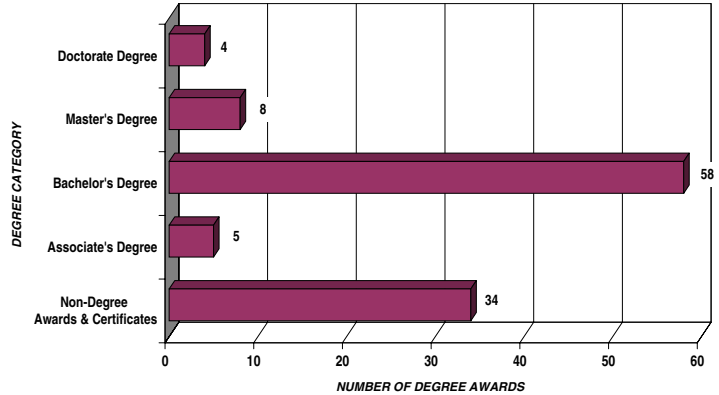
Alaska

	Alaska	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$17,306	\$15,728,292	50
Per Capita	\$28	\$58	
Percent Change FY1995–1999	-8.9%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$3,578	\$14,679,343	51
Per Capita 2000 Expenditures	\$6	\$52	
Percent Change in Expenditures FY1996–2000	23.7%	37.0%	
Higher Education Awards in Biological Sciences, 2000	109	88,982	51
Biological Scientists in the Workforce, 2000	1,910	454,980	42

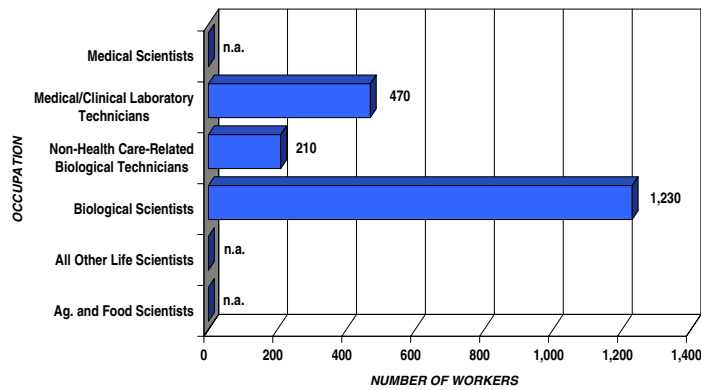
Total Bioscience R&D Expenditures at Academic Institutions in Alaska



Life/Biological Sciences Degrees from Alaska Higher Education



Biological Science Occupations in the Alaska Workforce



ALASKA

Alaska has no programs specifically targeted to developing the state's bioscience industry. The state's technology development organization, the *Alaska Science and Technology Foundation (ASTF)*, however, invests in projects that will improve Alaska's economy, increase the state's science and engineering capabilities, and improve the health of Alaskans.

Recent bioscience related projects funded by ASTF include

- A \$500,000 joint effort of University of Alaska Anchorage and Native Medical Lab to establish a genotyping lab in state, to undertake a project to identify Alaskans with Hepatitis C, and inform them of treatment options;
- A \$50,000 project on helicobacter pylori resistance and reinfection with local CDC and Native Medical Center;
- A \$70,000 evaluation of three telemedicine sites for psychiatric services at remote locations; and
- An investment of \$337,000 in partnership with a Canadian biotechnology firm, to develop a test kit for Paralytic Shellfish Poisoning.

SEED AND VENTURE FINANCING

ASTF provides grants for small and large business development and research projects. Applications for assistance can be submitted at any time.

Alaska Growth Capital, described below, can make direct equity investments in companies.

OTHER FINANCING AVAILABLE TO BIOSCIENCE COMPANIES

Alaska Growth Capital is a commercial lending institution that provides high-risk loans to companies. Financing can be used for lines of credit, permanent working capital, equipment, and leasehold improvements.

FACILITIES FINANCING

Alaska Growth Capital can provide financing for construction and leasehold improvements.

NETWORKING

Alaska does not have any organizations that promote networking within the bioscience community.

Alaska InvestNet, an organization that works to help entrepreneurs develop their business plans and to obtain financing, holds networking breakfasts, receptions, seminars, and workshops.

TAX POLICY

The State of Alaska has no state income, sales, or gross receipts taxes. There is a net corporate income tax. Some cities in Alaska have a local sales tax.

Alaska does have a series of education credits against the net corporate income tax for contributions accepted for direct instruction, research, and education support purposes.

REGULATORY POLICY

- Alaska has not enacted genetic privacy legislation.
- Alaska has not enacted “right to know” legislation.
- Alaska has not enacted legislation to place price controls on prescription drugs.

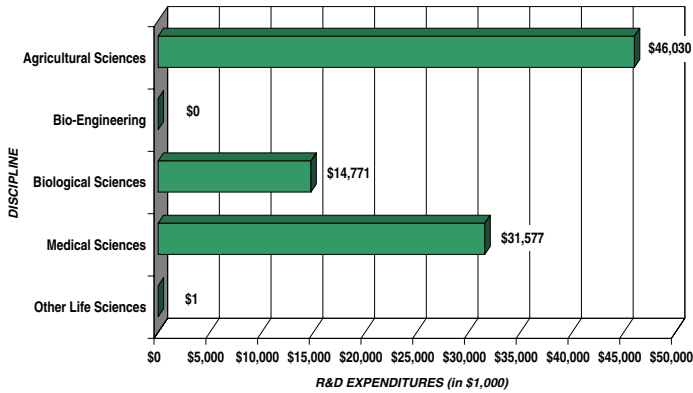
COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

Alaska Growth Capital provides managerial and financial consulting to clients and corporate strategic planning assistance to non-client companies.

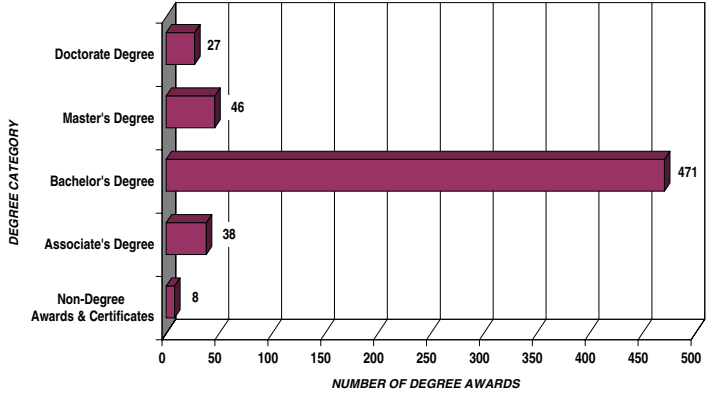
Arkansas

	Arkansas	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$92,379	\$15,728,292	35
Per Capita	\$36	\$58	
Percent Change FY1995–1999	21.7%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$38,807	\$14,679,343	40
Per Capita 2000 Expenditures	\$15	\$52	
Percent Change in Expenditures FY1996–2000	68.7%	37.0%	
Higher Education Awards in Biological Sciences, 2000	590	88,982	36
Biological Scientists in the Workforce, 2000	4,360	454,980	31

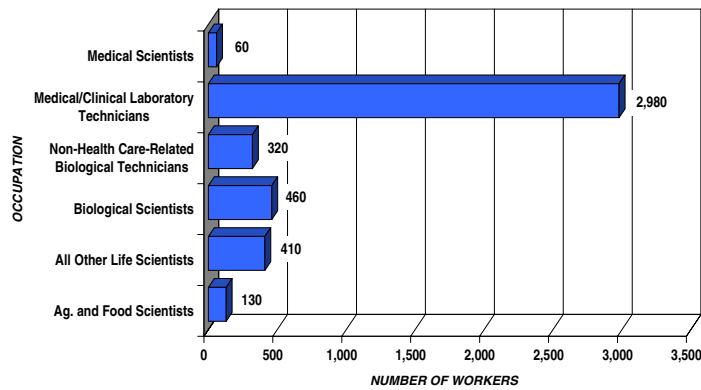
Total Bioscience R&D Expenditures at Academic Institutions in Arizona



Life/Biological Sciences Degrees from Arkansas Higher Education



Biological Science Occupations in the Arkansas Workforce



ARKANSAS

In 1997, the *Arkansas Science and Technology Authority (ASTA)* developed a state R&D plan that identified a number of focus areas, one of which was biotechnology. In 2000, the University of Arkansas for Medical Sciences (UAMS) developed the *Arkansas Biotechnology Strategy*, which lays out a number of proposals to grow Arkansas' base of bioscience companies. The Strategy proposed the following:

- Develop and strengthen UAMS' capability to identify core technologies, effectively obtain intellectual property protection, and expand the ability to license these technologies.
- Create an agricultural medicine industry in Arkansas.
- Create a biotechnology incubator.
- Stimulate development of angel investing, seed capital, and venture capital in Arkansas.
- Create a network of companies, organizations, agencies, and individuals in the state interested in and committed to developing the biotechnology potential of Arkansas.
- Create an education program that informs Arkansas regarding opportunities in biotechnology and trains Arkansans to work in the fields of biotechnology and medical research.
- Create an infrastructure of service providers to serve the biotechnology and medical technology industry.
- Attract out of state pharmaceutical and biotechnology related businesses to locate facilities in Arkansas.

The focal point of Arkansas' existing bioscience activities is the *Biomedical Biotechnology Center (BBC)*, which was established by UAMS in 1994. BBC's mission is to maximize industrial interaction with University of Arkansas faculty, facilitate technology transfer, and encourage and support the creation of biotechnology start-up companies. Since its founding, BBC has fostered the creation of

- the *Arkansas Biotechnology Association*;
- the *Arkansas Research Alliance*, which includes nine campuses of the University of Arkansas and Arkansas State University; and
- *Arkansas BioVentures*, a technology business incubator located on the campus of UAMS.

In 2001, Governor Huckabee proposed that a portion of Arkansas tobacco settlement money be used to create an *Arkansas Biosciences Institute*, which would foster research on tobacco-related illnesses and alternative therapies for Arkansans. The Institute, which will be a cooperative effort of the University of Arkansas, Arkansas State University and Arkansas Children's Hospital, will conduct agricultural and bioengineering research as well as research addressing tobacco related illnesses and cancer.

SEED AND VENTURE FINANCING

The *Arkansas Science & Technology Authority's (ASTA) Seed Capital Investment Program (SCIP)* can provide working capital to help support the initial capitalization or expansion of

technology-based companies located in Arkansas. The program can provide working capital up to one-fourth (25 percent) or \$500,000 of the company's total financing needs, whichever is less. Investments made by the SCIP fund can be repaid through a variety of instruments, including direct loans, participations, and royalties.

The *Arkansas Capital Corporation (ACC)* recently formed *Diamond State Ventures*, a venture capital fund to provide patient capital for growth and development of small businesses in Arkansas. Capitalized by investors from the banking community, private corporations, individuals, and state government, this Arkansas-based fund's initial capital base is \$10 million. Diamond State Ventures has applied to be licensed as a Small Business Investment Company, which would enable it to obtain leverage from the U.S. Small Business Administration. It is anticipated that Diamond State Ventures will provide financing in the form of loans ranging from \$250,000 to \$1.5 million.

OTHER FINANCING AVAILABLE TO BIOSCIENCE COMPANIES

ASTA's *Technology Development Program* provides assistance in development and commercialization of new technology-based products and processes. The program provides royalty financing for qualified projects possessing a well developed, comprehensive project plan. The maximum investment is \$50,000 with terms negotiated on an individual basis. These terms are a maximum five percent of net sales for a maximum term of 10 years.

ASTA's *Applied Research Grant Program* is a (50:50) cash-matching effort to support applied research in science and engineering. A match of two dollars from the state is available for every one dollar from an Arkansas business with 50 or fewer employees. The goal of the Applied Research Grant Program is to stimulate the transfer of science and technology in Arkansas by enhancing opportunities for research partnerships between Arkansas colleges and universities and private industries.

ASTA's Technology Transfer Grant Program provides limited financial support for the transfer and deployment of innovative technology. ASTA will fund up to \$3,750 of costs associated with transferring new or existing technology from a qualified applicant—such as a public or private enterprise, laboratory, college, or university—to an enterprise based in Arkansas. Up to \$5,000 of total project costs will be considered, with the first \$2,500 funded by the ASTA; the remaining \$2,500 is cost-shared equally (50:50) between ASTA and the enterprise. Each enterprise is eligible to receive assistance for two technology transfer projects per year. Projects are evaluated on a competitive basis.

FACILITIES FINANCING

The *ACC* provides long-term fixed rate loans to fund purchase of real estate, new construction, machinery and equipment, and working capital.

Arkansas provides a tax credit for the cost of constructing biotechnology facilities. It is described under Tax Policy.

NETWORKING

The *Arkansas Biotechnology Association (ABA)* is a non-profit, member organization established to promote the biotechnology industry within the state of Arkansas as well as to build relationships with academic institutions and companies in the food, chemical and agricultural

industries. The ABA is working to update the K–12 and college-level curriculum in order to prepare students for opportunities in biotechnology/life sciences industries.

Arkansas Research Alliance encourages collaboration among Arkansas scientists. Joint programs currently under development build on Arkansas strengths and opportunities, in fields such as agricultural medicine, bioengineering, aquaculture, bioremediation, and molecular genetics. The Arkansas Research Alliance presently includes the following institutions: the University of Arkansas System, Arkansas State University, National Center for Toxicological Research, the USDA’s Stuttgart National Aquaculture Research Center, many biotechnology-based Arkansas companies, and members of the Arkansas Biotechnology Association.

TAX POLICY

- The *Arkansas Biotechnology Development and Training Act* enacted in 1997 (amended in 1999) provides income tax credits to biotechnology companies in Arkansas. The credits include a 30 percent tax credit on the cost of cooperative research with state universities; a five percent credit of the cost of construction, expansion, improvement, renovation, or purchase of a biotechnology facility; a 30 percent credit of the cost for training employees in biotechnology and Higher Education Partnerships (credit for training shall not include salaries and wages of the employees being trained and cannot exceed \$10,000 per employee); and a 20 percent credit of the amount that the cost of qualified research exceeds the cost of such research in the base year. In 1999, another credit was added as an income tax credit of 30 percent of the cost of buildings, equipment, and higher education partnerships and licenses for Intellectual Property needed to produce “biofuels.” These credits should be used to offset the first \$50,000 of income tax liability that arise during the given credit year and 50 percent of the remainder of the income tax liability. Credits may be carried forward for up to nine years after the initial establishment of the credit. Also, taxpayers that receive these tax credits are not entitled to other state or local credits for the previous items, except for normal depreciation.
- The *Arkansas Enterprise Zone Program* is not geographically based, but rather SIC-based. Projects that fall into research, development, and a number of other classifications are eligible for sales/use tax refunds and income tax credits. Projects must involve construction or expansion of a new plant or facility, or the replacement of production or processing equipment or support infrastructure. R&D businesses need to hire at least one new permanent employee. The **income tax credit** equals 100 times the average hourly wage paid per net new permanent employee; this is doubled to a maximum of \$2,000 if the business is located in a county that had an unemployment rate in the preceding year greater than 10 percent or greater than three percent of the state’s average unemployment rate. The credit may be carried forward for the succeeding four years or until the credit is entirely used, whichever occurs first. For projects approved on or after March 25, 1997, the credit may be applied against income tax for the succeeding nine years. The **sales and use tax refund** may be used on materials purchased and used in the construction or improvement of a building(s), and on machinery and equipment to be utilized in connection with the building(s).

REGULATORY POLICY

- Arkansas has enacted genetic privacy legislation.
- Arkansas has not enacted “right to know” legislation.

- Arkansas has not enacted legislation placing price controls on prescription drugs.
- Medicaid Reimbursement Policy: No formulary, but prior authorization required on some drugs including non-steroidal anti-inflammatory drugs (NSAIDS), acute dosage anti-ulcer drugs, certain antihistamines, and impotency drugs.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

Arkansas BioVentures was initiated by the University of Arkansas for Medical Sciences (UAMS) in 1997 and is administered by the College of Medicine's Biomedical Biotechnology Center (BBC). The incubator was created to facilitate the startup of biotechnology-based business enterprises and to enhance the growth of job opportunities in Arkansas. BioVentures currently supports nine start-up companies, housed in transitional space, both on campus and in the community. Four additional companies are currently in the pipeline for admission. It is expected that two or three new companies will enter the incubator each year.

The University of Arkansas' *Genesis* Business Incubator, which originally received seed funding from ASTA, has been in operation since 1986. Genesis, which currently houses 12 companies, offers client companies professional management, marketing and financial advice, and access to the technical resources of the university.

Arkansas does not currently have any bioscience research parks although planning is underway to develop a park in the vicinity of the Arkansas coalition of Biotechnology Cities (Fayetteville, Stuttgart, Pine Bluff, and Little Rock).

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

The *Arkansas BioVentures Advisory Board* was formed in 1999 and constitutes a critical link connecting private sector business resources with the scientific resources located within UAMS. This Board is a group of multidiscipline representatives from across the state who are available to assist entrepreneurs with all the challenges of new business formation.

WORKFORCE DEVELOPMENT

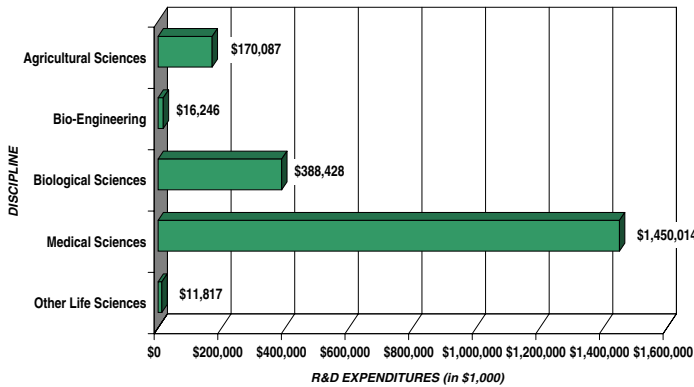
Significant resources are available at UAMS, related to biotechnology and medical technology, and at the University of Arkansas, related to biology and the agricultural sciences, and from the *Arkansas Biotechnology Association (ABA)*, related to educational program improvement initiatives at the K–16 levels. The Biomedical Biotechnology Center has developed educational programs that promote awareness of biotechnology and provide education for scientists, technicians, and business people in Arkansas. These programs have included working with the media, local government, the public school system, and the University of Arkansas Business and Law Schools. Specific areas of focus include

- Grades K–16 curricula for the public schools,
- A Web site virtual classroom <<http://biotech.uams.edu/educate/index.htm>>,
- Faculty and graduate student orientations,
- A technologist education program,
- A molecular biotechnology (four-year) degree program <<http://www.ualr.edu/~biology/programs/biotech/biotech.html>>, and
- A scientist and business education program.

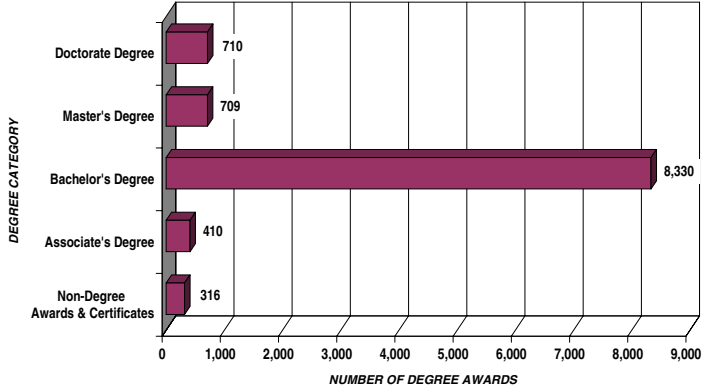
California

	California	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$2,036,592	\$15,728,292	1
Per Capita	\$61	\$58	
Percent Change FY1995–1999	25.5%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$2,248,309	\$14,679,343	1
Per Capita 2000 Expenditures	\$66	\$52	
Percent Change in Expenditures FY1996–2000	39.0%	37.0%	
Higher Education Awards in Biological Sciences, 2000	10,475	88,982	1
Biological Scientists in the Workforce, 2000	52,520	454,980	1

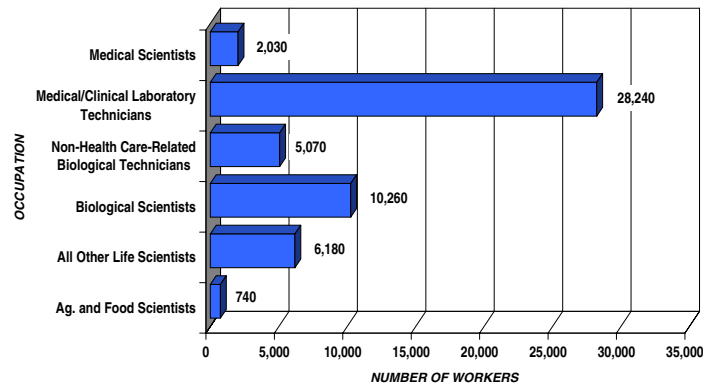
Total Bioscience R&D Expenditures at Academic Institutions in California



Life/Biological Sciences Degrees from California Higher Education



Biological Science Occupations in the California Workforce



CALIFORNIA

Governor Gray Davis has established the *Institute for Bioengineering, Biotechnology, and Quantitative Biomedical Research*, one of the three California Institutes for Science and Innovation, also known as Centers of Excellence. The Institute, which is a cooperative effort among three campuses of the University of California and private industry, will seek to harness the quantitative sciences to integrate our understanding of biological systems at all levels of complexity.

The Institute will build on strengths in the engineering and physical sciences at UC Berkeley, the mathematical sciences at UC Santa Cruz and the medical sciences at UC San Francisco, as well as on strong biology programs at the three campuses. The Institute will receive state funds totaling \$100 million across the three campuses. For every dollar received from the state, the Institute will provide at least \$2 of outside funding, mainly from private donors.

By 2004, the institute will involve more than 100 scientists to be housed in new buildings at Mission Bay in San Francisco, at UC Berkeley, and at UC Santa Cruz. Mission Bay is the new UCSF campus that will be part of a public or private biomedical research park.

In addition, the *California Public Employees' Retirement System (CalPERS)* created the *California Biotechnology Program*, a new investment vehicle to leverage innovative opportunities in the private equity marketplace. The fund, which was announced in late 2000, will invest in early stage biotechnology companies both inside and outside the state.

SEED AND VENTURE FINANCING

The *CalPERS California Biotechnology Program* (part of the CalPERS Alternative Investment Management Program) calls for the State's employee retirement fund to invest \$500 million (to augment the fund's existing \$100 million investment) in the biotechnology sector. To date, five investments have been approved for a total of \$285 million. CalPERS is the nation's largest public pension fund with assets totaling approximately \$170 billion.

OTHER FINANCING AVAILABLE TO BIOSCIENCE COMPANIES

The *Biotechnology Strategic Targets for Alliances in Research (BioStar) Program* provides matching funds for basic to proof of concept research in the field of biotechnology.

The *California Technology Investment Partnership (CalTIP)* program provides matching grants of up to \$250,000 to California companies that receive federal funding. Health care technology companies are eligible for funding under this program.

NETWORKING

The *California Healthcare Institute (CHI)* acts as a networking organization to advocate for policies and forums that promote biomedical science, biotechnology, pharmaceutical, and medical device innovation in California. CHI acts as a liaison for the industry between government and the public for educational as well as policy purposes. Additionally, they offer information on the industry for interested parties as a means of growing the industry and promoting more effective linkages between stakeholders and others.

The *Bay Area Bioscience Center* was established in 1990 by a consortium of universities, public officials, educators, and bioscience executives. Its purpose is to bring together Northern

California's bioscience community, promote its culture and important biology-based discoveries, and proactively identify and address members' needs. Through information meetings, conferences, social gatherings, publications, and email communiqués, the Center keeps members of the regional bioscience community up to date on relevant activities and public policy decisions throughout Northern California.

BIOCOM is San Diego's association for the life sciences community. It seeks to promote the growth of the bioscience industry in the region by representing the regional industry in matters of public policy, member services (informational), education, and business networking.

TAX POLICY

- **Manufacturers' investment credit.** Certain manufacturers operating in California are eligible for a six percent manufacturers' investment credit (MIC). The credit is generally unlimited. The credit can be claimed against the tax; unused credit can be carried forward for eight years (10 years for specified taxpayers).
- **Research and development tax credit.** The research tax credit allows companies to receive a credit of 15 percent for qualifying research expenses (research done in-house). Instead of the 15 percent, businesses may elect an alternative incremental research expense credit of varying percentages. Corporate taxpayers also are allowed a credit of 24 percent for basic research payments (payments to an outside company). Research must be conducted within California and must not include research for the purpose of improving a commercial product for style, taste, cosmetic, or seasonal design factors.
- **Net Operating Loss (NOL) carryover.** Biotechnology and biopharmaceutical companies are allowed preferential treatment on their NOLs. The entire amount of NOL (100 percent) may be carried over for up to eight years. The normal NOL carry forward is 55 percent for taxable and income years beginning on or after January 1, 2000 and before January 1, 2002; 60 percent for years beginning on or after January 1, 2002 and before January 1, 2004; and 65 percent for years beginning after January 1, 2004.

REGULATORY POLICY

- California has enacted genetic privacy legislation.
- California has enacted "right to know" legislation.
- California has enacted legislation placing price controls on prescription drugs.
- Medicaid Reimbursement Policy: California has a restricted formulary with supplemental rebates, prior authorization, and mandatory generic substitution for over 600 commonly prescribed drugs.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The *Technology Development Center* in West Sacramento offers wet and dry lab space of 1,500 total square feet in addition to small offices and warehouse space.

NASA Ames is converting *Moffit Field* to a technology park where a combination of biotech and high tech firms are anticipated.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

The Beckman Laser Institute has established a *Photonic Incubator* to utilize photonic (light) technologies (lasers, optics, detectors, etc.) in the development of new biomedical systems for the diagnosis and treatment of disease. This project utilizes the Institute's existing facilities, scientific and medical expertise, and extensive corporate contacts and also incorporates new facilities (11,280 gross square feet) to provide a unique and innovative resource for technology transfer in the area of medical photonics that will have a major impact on healthcare. The Photonics Incubator is not a traditional incubator in that it does not provide physical space for start-up companies.

California has three *Regional Technology Alliances*—the *Bay Area RTA (BARTA)*, the *San Diego RTA (SDRTA)*, and the *Los Angeles RTA (LARTA)*—that provide business development assistance to emerging technology companies. The RTAs also help companies obtain investment capital and administer the CalTIP program.

WORKFORCE DEVELOPMENT

The *Biotechnology Education Consortium* is an organization led by community colleges and universities within the state to promote better education of students in the biotechnology field. The Chancellor's Office of California's community colleges developed the Consortium with the charge to establish ties with industry for economic development purposes, and to fulfill the need for job market surveys to identify workforce needs of the state's biotechnology industry. To meet these needs, the consortium is developing core curriculum programs across the state colleges as well as creating internship and job placement programs. Regional affiliates in the state include the Bay Area Biotechnology Education Consortium (BABEC) and the Northern California Biotechnology Center (NCBC).

The *San Joaquin Biotechnology Center* links the 13 community colleges, biotechnology industry, high schools, and universities in a five-county area. The Center holds workshops for high schools and community colleges, and provides workforce training and internship opportunities. It also helps to link companies with relevant training programs.

The *Central Coast Biotechnology Center (CCBC)* aids biotechnology businesses in the Central Coast region by developing training for faculty, students, and employees in community colleges.

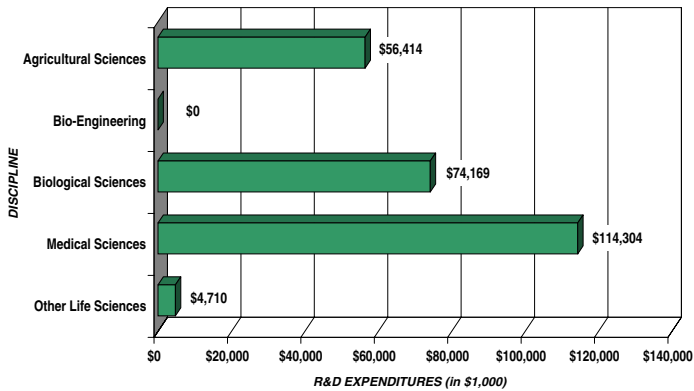
The *University of California System-wide Biotechnology Research and Education Program* receives \$1.5 million annually in state funds to foster and provide support for research in biotechnology, to promote training, and to inform government, industry, and the public about biotechnology developments. The program provides seed funding for innovative multidisciplinary, multi-investigator training projects. Projects can receive up to \$200,000 annually for up to three years.

The *Science Alliance of San Gabriel Valley* is an association of educators, scientists, and industry volunteers who form partnerships to enhance science education and facilitate school to career transitions.

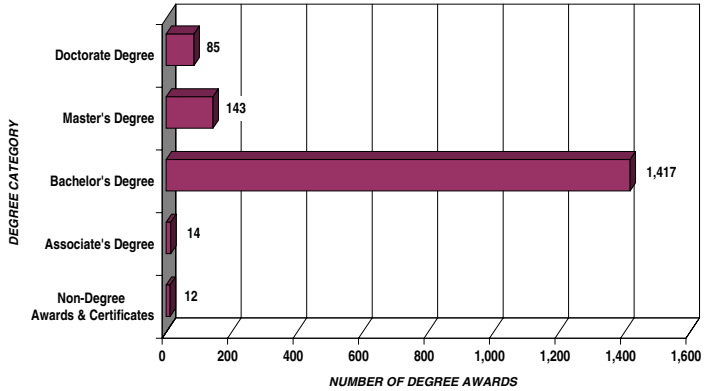
Colorado

	Colorado	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$249,597	\$15,728,292	20
Per Capita	\$62	\$58	
Percent Change FY1995–1999	26.9%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$243,926	\$14,679,343	16
Per Capita 2000 Expenditures	\$57	\$52	
Percent Change in Expenditures FY1996–2000	35.8%	37.0%	
Higher Education Awards in Biological Sciences, 2000	1,671	88,982	20
Biological Scientists in the Workforce, 2000	7,650	454,980	22

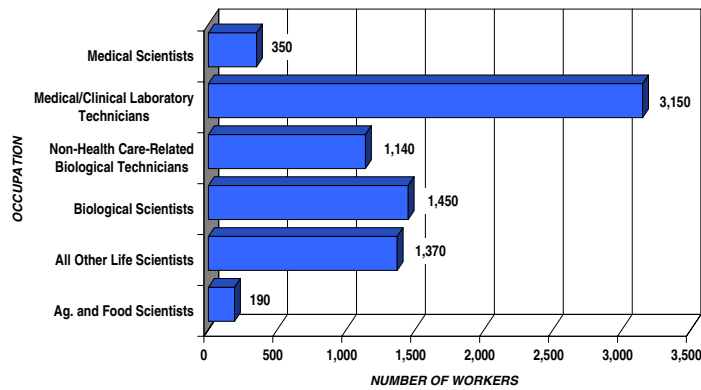
Total Bioscience R&D Expenditures at Academic Institutions in Colorado



Life/Biological Sciences Degrees from Colorado Higher Education



Biological Science Occupations in the Colorado Workforce



COLORADO

Colorado's biotechnology industry has emerged over the last 15 years. During this time, a number of bioscience start-up companies have been established and several larger bioscience companies have relocated to Colorado. In 2000, Governor Owen appointed a *Biotechnology Council* to recommend goals, policies, and actions for developing Colorado's biotechnology industry, to assist in developing, retaining, and recruiting biotechnology activities, and to provide a mechanism for communication between the biotechnology industry and the governor. The council includes representatives of Colorado's bioscience firms, institutions of higher education, public officials, and trade organizations. The Council completed and submitted a Report to the Governor outlining policy and program recommendations in March 2001. It is too early to say which of the recommendations will be implemented.

A major activity underway in Colorado that will impact the growth of the bioscience sector is the redevelopment of the Fitzsimons Army Medical Center, which closed in June 1999. This 500-acre site is being redeveloped under an agreement between the City of Aurora and the Regents of the University of Colorado to house life science research, education, and patient care. The project, which is expected to take 20 years to fully develop, is anchored by a 217-acre campus of the University of Colorado Life Science Center and the 160-acre Colorado Bioscience Park Aurora. The University Campus is expected to be completed by 2010, the research park is already under development; several buildings, including an incubator facility, have been completed.

NETWORKING

The *Colorado Biotechnology Association* facilitates the networking of companies in the biotechnology industry.

The *Biotechnology Council* also provides a mechanism for networking.

TAX POLICY

- **Research and development income tax credit for *Enterprise Zone*.** Taxpayers who make expenditures on research and experimental activities in an enterprise zone qualify for a three percent income tax credit. The credit is based on the increase of a company's research and experimental expenditures within an enterprise zone over the average of the previous two income tax years. If the taxpayer's tax liability is less than the research and experimental credit, the remaining amount may be carried forward to the subsequent tax years. There is no limit on the number of years this credit can be carried forward.
- **Investment tax credit.** Not specific to biotechnology companies and 10 percent of the federal investment credit.
- **Sales and use tax refund.** Effective January 1, 1999, taxpayers may claim a refund of all state sales and use tax paid by the qualified taxpayer, on the sale, storage, use, or consumption of tangible personal property to be used in Colorado directly and predominantly in research and development of biotechnology during that calendar year.
- **Rural Technology Enterprise Zone credit.** For income tax years beginning on or after January 1, 1999 and prior to January 1, 2005, any taxpayer that makes a qualified capital

investment in technology infrastructure in Rural Technology Enterprise Zones may claim an income tax credit of 10 percent of the total investment made during the year.

REGULATORY POLICY

- Colorado has enacted genetic privacy legislation.
- Colorado has not enacted “right to know” legislation.
- Colorado has not enacted legislation placing price controls on prescription drugs.
- Medicaid Reimbursement Policy: Colorado has a closed formulary listing over 20,000 products. Prior authorization is required for several biotechnology products including growth hormones and epogen.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The *Colorado Bioscience Park Aurora* is being developed as part of the Fitzsimons Redevelopment Project. The 160-acre park, which is affiliated with the University of Colorado, is expected to accommodate three million square feet of space and 4,000 employees when fully developed. The park can accommodate research-oriented biomedical, biotechnology and pharmaceutical operations in multi-tenant buildings and in single tenant build to suit facilities.

Located at the Bioscience Park is the *Bioscience Park Center*, a 60,000 square foot facility designed to house start-up bioscience companies. The Center provides support services as well as specialized equipment and facilities. The Center opened in 2000.

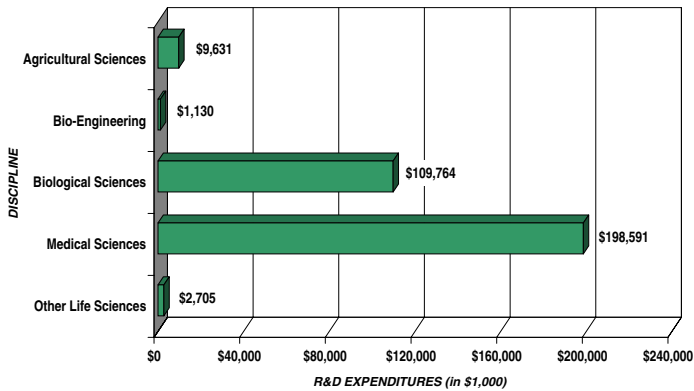
WORKFORCE DEVELOPMENT

The *Community College of Aurora* offers a biotechnology technician certificate designed to prepare students to work as technicians in the biomedical industry. Students can emphasize R&D or biotechnology manufacturing.

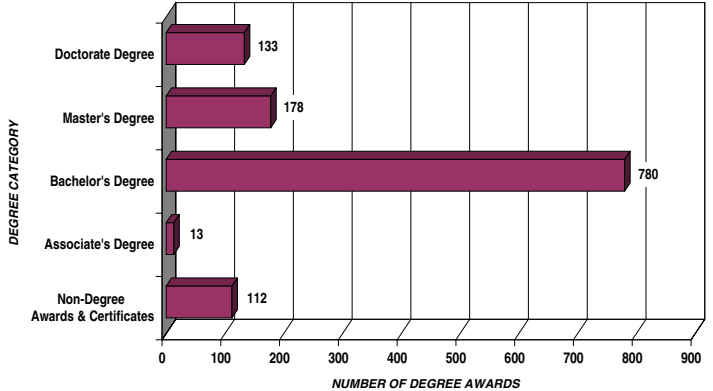
Connecticut

	Connecticut	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$321,821	\$15,728,292	16
Per Capita	\$98	\$58	
Percent Change FY1995–1999	10.8%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$322,157	\$14,679,343	13
Per Capita 2000 Expenditures	\$95	\$52	
Percent Change in Expenditures FY1996–2000	25.2%	37.0%	
Higher Education Awards in Biological Sciences, 2000	1,216	88,982	27
Biological Scientists in the Workforce, 2000	6,080	454,980	27

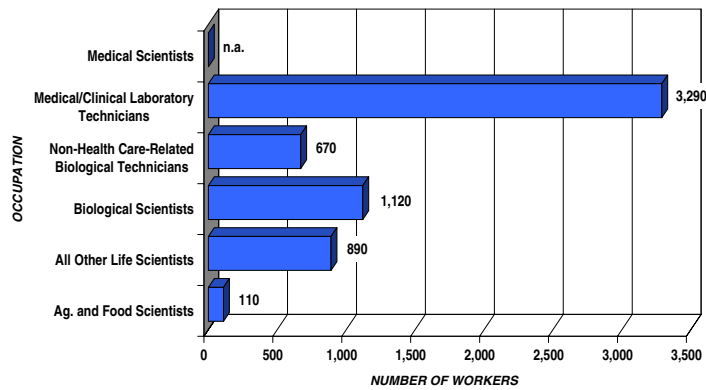
Total Bioscience R&D Expenditures at Academic Institutions in Connecticut



Life/Biological Sciences Degrees from Connecticut Higher Education



Biological Science Occupations in the Connecticut Workforce



CONNECTICUT

Several years ago, Connecticut adopted a *Competitiveness Strategy* that included a focus on specific industry clusters, and the “BioScience” cluster was the first of the clusters to be introduced by the state. In 1998, *Connecticut United for Research Excellence (CURE)*, a statewide coalition of bioscience companies, health-related organizations, and supporting agencies and businesses was named the organizational center for the cluster to help oversee the cluster’s formation. The State of Connecticut, through its Department of Economic and Community Development, provided \$300,000 in state seed money, which was matched by \$700,000 in contributions from the bioscience industry. CURE was charged with

- Building a critical mass of bioscience companies in the state;
- Incorporating best practices from, between, and among cluster members and related clusters;
- Developing an entrepreneurial and innovative workforce; and
- Publicizing and promoting the critical mass, related career opportunities, socioeconomic contributions, and potential of the bioscience industry.

A number of initiatives designed to support the growth of bioscience companies, including the creation of a \$40 million *Biotechnology Facilities Fund*, have been undertaken and additional initiatives are under consideration in the legislature. They include

- Continued funding for the state’s Biotechnology Facilities Fund;
- The creation of a special Office of Bioscience, with a dedicated ombudsman staff, within the Department of Economic and Community Development, to recruit and assist bioscience companies seeking to locate in Connecticut or already located here;
- Development of a marketing plan designed to increase awareness of the state as a high tech or biotech center, and of the opportunities that exist here for those wishing to start up bioscience businesses and/or find employment in these sectors; and
- Creation of scholarships and other programs designed to encourage students to pursue scientific careers in the state and provide for continuing education and training once they are employed by a bioscience company.

SEED AND VENTURE FINANCING

Connecticut Innovations (CI) is the state’s leading investor in high technology enterprises, having invested more than \$56 million in 51 Connecticut technology companies since 1995. Twenty-three percent of these investments have been in bioscience companies. CI, which was created by the state in 1989 to grow Connecticut’s technology economy, provides early stage financing in return for an equity position in the company. Investments can range from \$500,000 to as much as \$2 million in the initial round. Applicants must be located in Connecticut, have a management team in place, and have a business plan.

OTHER FINANCING AVAILABLE TO BIOSCIENCE COMPANIES

CI’s Yankee Ingenuity Technology Competition provides royalty-based, market-driven funding for applied high technology research and development projects that lead to marketable products or

processes. This initiative seeks to encourage collaboration between Connecticut colleges and universities and Connecticut business and industry for the development and commercialization of products or processes. The program funds up to \$300,000 per project, and provides up to \$3 million in awards annually. Yankee funding is available to any higher educational institution in Connecticut that agrees to share royalties from successful projects with Connecticut Innovations. Collaborating businesses are expected to make cash or in-kind contributions to the projects. More than 30 bioscience companies have benefited from the Yankee Ingenuity program since its inception in 1985.

FACILITIES FINANCING

The *Connecticut Biotechnology Facilities Fund* provides financing to biotechnology firms for the development or expansion of wet laboratory and related space. The fund, administered by Connecticut Innovations, has financed more than 225,000 square feet of laboratory space since its creation in 1998. Laboratory space in Connecticut has increased more than 60 percent to nearly 500,000 square feet between 1998 and 2000.

NETWORKING

CURE, the statewide coalition of bioscience companies and academic research universities described above, provides a forum for these organizations to exchange information on issues related to bioscience. CURE maintains a virtual bioscience information center at <<http://www.curennet.org>> that includes direct access to

- An inventory of the state permits likely required to start a bioscience business in Connecticut, permitting forms, and responsible state agency Web sites;
- Bioscience job openings through the Cluster member companies' job posting sites;
- Lab space, buildings, and land available for lease or sale through the Connecticut Economic Resource Center (CERC) Site Finder; and
- Quality of life information through CERC.

The *Connecticut Venture Group* sponsors an Annual University Business Plan Competition and Crossroads, a venture fair and technology-networking event, that showcases companies in a number of technology areas including biosciences and healthcare.

TAX POLICY

In 1999, the Connecticut Legislature passed a tax incentive bill including

- Extension of the net operating loss (NOL) carry forward from five years to 20 years (effective for income years beginning January 1, 2000), and
- Allowance for businesses with \$70 million or less in gross sales to exchange unused R&D tax credits with the state for a cash payment equal to 65 percent of the value of the credit (effective for income years beginning January 2000).

In 1998, legislation was passed that

- Increased R&D tax credits (non-incremental) to six percent on the first dollar forward for companies with \$100 million or less in annual revenues.

In 1996, the Legislature passed a tax incentive bill aimed specifically at the biotechnology industry. The legislation included

- Sales & use tax exemption on machinery, equipment, tools, materials, supplies, and fuel used in the biotechnology industry;
- Property tax exemption on new machinery and equipment used in the biotechnology industry; and
- A 15-year carryover of unused R&D Tax Credits.

REGULATORY POLICY

- Connecticut has not enacted genetic privacy legislation.
- Connecticut has not enacted “right to know” legislation.
- Legislation was introduced, but not passed, in the 2001 legislative session to impose price controls on prescription drugs.
- Medicaid Reimbursement Policy: Connecticut has an open formulary, no prior authorization required policy.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

Connecticut Innovations maintains two laboratory or office suites in New Haven for temporary use to accommodate start-up and early stage bioscience companies.

Science Park. Connecticut has invested \$14 million in “*Science Park*,” a cluster of rehabilitated buildings in New Haven, CT, which houses a number of biomedical laboratories. Lyme Properties, developers of Kendall Square, Cambridge, MA, has committed \$200 million to managing the rehabilitation and expansion of this project.

300 George Street. Renovation of 550,000 square feet by private developer Winstanley Enterprises for rental to biotechnology companies.

Hamden BioScience Campus. One million square feet under development.

Acorn Technology Park. Early stages of development.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

The *Technology Test Bed Program* was established through legislation in June 1999. Connecticut high technology companies are given an opportunity to validate the commercial viability of their products by utilizing state agencies as beta site “customers.” CI administers this program by providing the capital necessary to execute the beta test and/or helping companies coordinate test bed projects within the most suitable agency or agencies.

WORKFORCE DEVELOPMENT

Connecticut’s *BioBus* is a five-year, \$3 million partnership between members of CURE and CI. The BioBus is a permanent, mobile, learning laboratory traveling to schools, community events and other locations throughout Connecticut beginning in September of 2001. Primary audiences for the bus include middle- and high school students and educators.

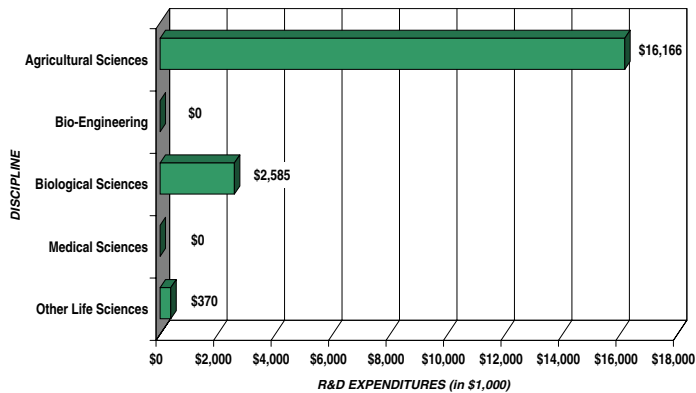
REGIONAL INITIATIVES

The Science Park described earlier is being developed and supported by a public private partnership that includes the City of New Haven, Yale University, and the State of Connecticut.

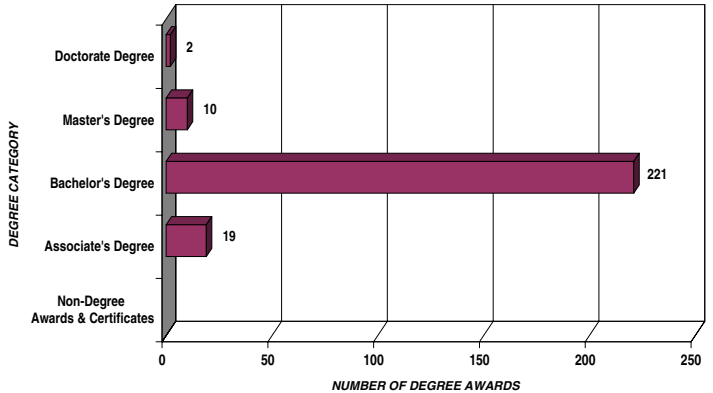
Delaware

	Delaware	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$19,121	\$15,728,292	48
Per Capita	\$25	\$58	
Percent Change FY1995–1999	40.0%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$14,878	\$14,679,343	44
Per Capita 2000 Expenditures	\$19	\$52	
Percent Change in Expenditures FY1996–2000	80.8%	37.0%	
Higher Education Awards in Biological Sciences, 2000	252	88,982	48
Biological Scientists in the Workforce, 2000	1,100	454,980	49

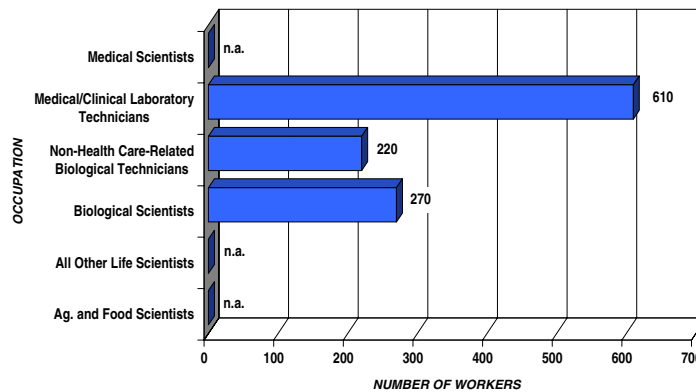
Total Bioscience R&D Expenditures at Academic Institutions in Delaware



Life/Biological Sciences Degrees from Delaware Higher Education



Biological Science Occupations in the Delaware Workforce



DELAWARE

Over the past decade, Delaware has enacted legislation, research initiatives, and funding programs to grow its technology business base. These efforts have included a focus on the bioscience industry. Earlier this year, newly elected Governor Ruth Ann Miner created the Strategic Economic Council and charged the Council with developing a Strategic Plan. The Council established a subcommittee on biotechnology to address the specific needs of this sector. The Council will report back to the Governor later this year.

The Delaware Economic Development Office (DEDO) also is developing a Strategic Plan that will include a focus on addressing the needs of the bioscience community. The plan is scheduled for completion in June 2002. For the past three years, DEDO's staff has included staff dedicated to working with the bioscience industry. The department is now expanding that emphasis with an additional staff member focused on the agricultural sector.

Major bioscience initiatives undertaken by the state include the establishment of the ***Delaware Biotechnology Institute (DBI)***, a research consortium and incubator for bioscience companies. DBI is a partnership among state government, Delaware's institutions of higher education (University of Delaware, Delaware State University, Delaware Technical and Community College), and local bioscience companies. The Institute conducts multidisciplinary research and promotes educational opportunities and economic development through biotechnology and life sciences. DBI, which was founded in 1999, is housed in a new 72,000 square foot research building that was dedicated in April 2001. The Institute is designed to house approximately 180 researchers focusing on the areas of agriculture, biomaterials, human health, and marine ecosystems. To date, the Institute has secured \$85 million in funding from state grants, industry partners, and Delaware's institutions of higher education.

Delaware has also actively worked to attract biotechnology and life sciences companies to locate in Delaware and worked with the Delaware Technical and Community College to develop programs to meet the workforce needs of the state's bioscience community.

SEED AND VENTURE FINANCING

Delaware has invested in four funds to further technology growth in the state and these funds have made investments in the bioscience area. The ***Delaware Innovation Fund*** provides pre-seed and seed funding through two investment vehicles: the ***Demonstration Fund*** and the ***Commercialization Fund***. The Demonstration Fund can provide limited one-time funding of \$10,000–\$25,000 to aid in establishing a patent, developing a business plan, or demonstrating proof of concept. The Commercialization Fund can provide \$25,000–\$250,000 to launch an early-stage company. Funding must be matched on a 1:1 basis.

Delaware has also invested in three venture capital funds. These three funds—***Anthem Capital, L.P.***; ***Triad Investors Corporation***; and ***Blue Rock Capital***—have the ability to fund a variety of seed stage, early stage, and later stage companies in both technology-related and non-technology fields. The investment focus of each fund varies. Investments can range from \$150,000 for seed stage companies up to \$2,000,000 or more for later stage companies.

NETWORKING

The *Delaware Biotechnology Institute* holds monthly seminars open to industry and academia on a wide variety of topics such as new scientific discoveries, starting a business and raising capital, and cross-disciplinary approaches and successes. These meetings have begun to foster more collaboration between the academic researchers and industry.

DEDO and the Institute recently initiated a monthly networking breakfast meeting for the bioscience community. The initial goal of this activity is to introduce the group members to each other to foster individual company growth through collaboration with local resources. Furthermore, this group's input will assist in the formation of state policy and additional initiatives to grow the base of the bioscience industry in Delaware. Lastly, it is hoped that this networking will encourage companies to partner with the Institute on applied research and development projects.

The *Subcommittee on Biotechnology* created by the Governor's Strategic Economic Council, consists of bioscience representatives from academia, industry, and government. In addition to providing input to the development of a strategic plan, the Subcommittee will meet regularly to discuss the ongoing needs of the bioscience community and the integration of the agriculture industry with the new technology of the future.

TAX POLICY

- **Tax credits for creation of employment and qualified investments in business facilities.** Business taxpayers that: 1) are engaged in a qualified activity; 2) hire five or more qualified employees; and 3) make an investment of at least \$200,000 (\$40,000 per qualified employee) in a qualified facility are entitled to tax credits against the corporation or personal income taxes, gross receipts tax, and public utility tax. To qualify for tax credits, investment and employment must occur within a "qualified activity" which includes, but is not limited to: scientific, agricultural, or industrial research, development or testing; non-custom computer software; telecommunications services; or computer processing, data preparation or processing services. Eligible businesses receive credits of \$400 for each qualified employee and \$400 for each \$100,000 invested. These credits may be taken during the tax year in which the qualified facility is placed in service and for any of the following nine years. The aggregate amount of credits claimed in any given year may not exceed fifty percent of the firm's tax liability. Credits may be carried forward. Businesses that are not subject to the corporation income tax (e.g., pass through entities such as Subchapter S Corporations) are entitled to use the credits against the personal income tax. Unless the program is extended, no new credits will be allowed for investments that occur on or after January 1, 2002.
- **Tax credit for creation of employment and qualified investments in targeted areas (Blue Collar Jobs Act).** Employers engaged in qualified activities, as above, are allowed an extra credit of \$250 (for a total of \$650) for additional full-time employees, and an extra credit of \$250 (for a total of \$650) for each \$100,000 investment in qualified facilities located in "targeted areas," as defined in §2020. This credit sunsets in 2007.
- **Research and development tax credit.** A taxpayer may take a credit for the taxable year equal to 1) 10 percent of the excess of the taxpayers' total Delaware qualified research and development expenses over the base amount or 2) Delaware's apportioned share of taxpayers' federal research and development tax credit calculated using the alternative incremental credit and a multiplier explained in the code. The credit cannot exceed 50 percent of the tax liability

for the year and it cannot be carried back, but may be carried forward for 15 years. The total amount of credits for all taxpayers shall not exceed \$5,000,000 in any fiscal year. This credit expires December 31, 2005.

REGULATORY POLICY

- Delaware has enacted genetic privacy legislation.
- Delaware has not enacted “right to know” legislation.
- Delaware has not enacted legislation to place price controls on prescription drugs.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The *Delaware Technology Park (DTP)* is a 40-acre research park located near the University of Delaware. The park houses numerous technology companies including companies focused in the areas of life sciences, advanced materials, and information technology. The park, which was established in 1993, has partnered with the University City Science Center in Philadelphia with some of its recent expansion. The new 72,000 square foot research facility of the Delaware Biotechnology Institute is located in the park. The \$15 million Institute research facility will house up to 180 researchers and includes 23 wet labs and 15 common lab work areas. It will also include a “learning lab” with hands-on labs and an interactive learning center focusing on student-based learning.

The German Fraunhofer Society recently announced the establishment of its *Molecular Biotechnology Center* at the Delaware Technology Park. This new biotech research and incubation center will occupy a portion of a 56,000 square foot facility currently under construction. Estimated occupancy is for April 2002, with the new entity already occupying other space in the park. The state provided \$1 million in initial funding for the center and plans to make similar investments for an additional three years.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

The State of Delaware has used its *Advanced Technology Centers (ATC)* program to invest over \$8.3 million in three centers with a focus on the life sciences. The Advanced Medical Devices ATC, the Applied Optics Center, and the Delaware Biotechnology Institute received ATC funding during the last five years. ATC funds are awarded on a competitive basis to partnering institutions that create ATCs in technology areas with long-term potential for the state.

DEDO, the *Delaware Technology Park*, and the *Delaware Biotechnology Institute* collectively counsel, develop, and network entrepreneurs and existing companies with the formation and expansion of their businesses.

The *Delaware Innovation Fund* offers business and strategic planning and business management consulting as well as technical and operational support to Delaware’s entrepreneurs with the goal of assisting in the expansion of Delaware’s technology sector.

WORKFORCE DEVELOPMENT

DBI is working with the University of Delaware, Delaware State University, and Delaware Technical and Community College to promote educational programs in life sciences that address government, academic, and private sector needs. Initiatives currently under development or consideration include

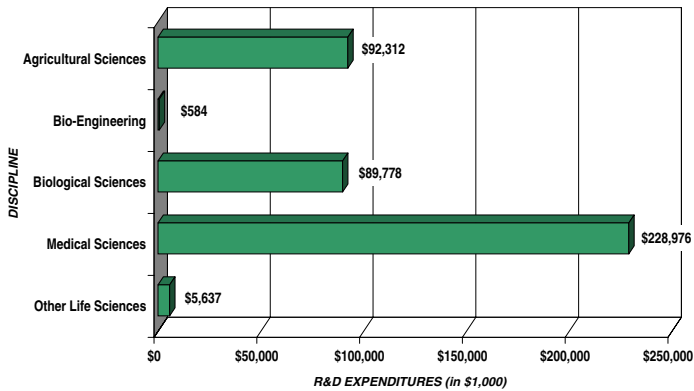
- Sponsorship of interdisciplinary Post Doctoral DBI Fellowships;
- Assistance to the College of Agriculture in building a plant science graduate program;
- Partnership with Delaware Technical and Community College on workforce education;
- Co-development of a joint biotech program with Delaware State University;
- Assistance in building an interdisciplinary, life science-based summer undergraduate, research scholars program;
- Organization of a Fall and Spring Seminar program with speakers from academia and the private sector; and
- Development of a pilot MBA program in biotechnology for business executives with the University of Delaware College of Business and Economics.

Additionally, graduate internship programs in biotechnology are being initiated across all colleges and universities. DBI is working with the University of Delaware to develop summer internships for undergraduates in biotechnology fields and with Delaware Technical and Community College to develop a pilot program with Wilmington's Red Clay School District to include a more advanced curriculum in life sciences and biotechnology courses as part of the college's school to work program.

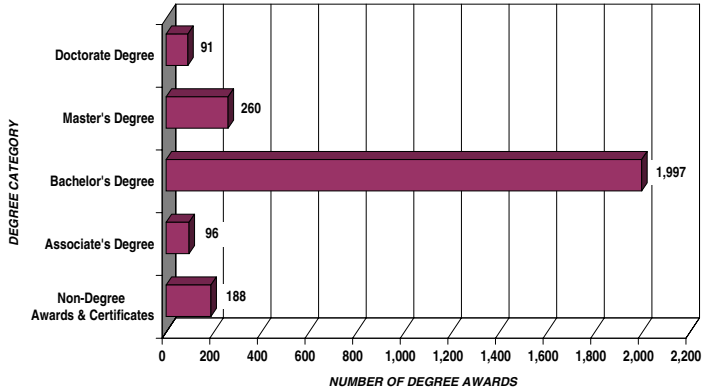
Florida

	Florida	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$417,287	\$15,728,292	13
Per Capita	\$28	\$58	
Percent Change FY1995–1999	21.8%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$226,095	\$14,679,343	19
Per Capita 2000 Expenditures	\$14	\$52	
Percent Change in Expenditures FY1996–2000	51.6%	37.0%	
Higher Education Awards in Biological Sciences, 2000	2,632	88,982	11
Biological Scientists in the Workforce, 2000	22,950	454,980	4

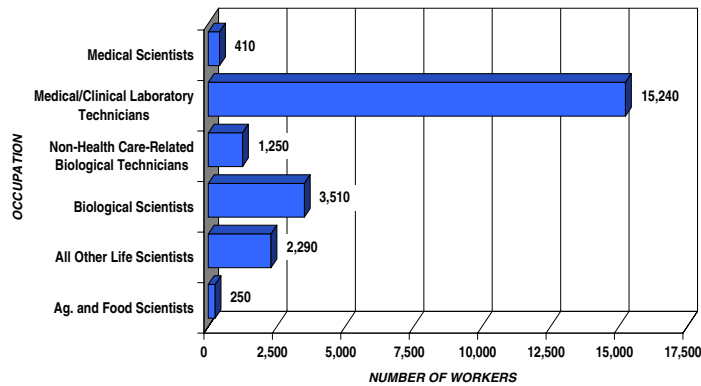
Total Bioscience R&D Expenditures at Academic Institutions in Florida



Life/Biological Sciences Degrees from Florida Higher Education



Biological Science Occupations in the Florida Workforce



FLORIDA

In 1998, *BioFlorida* developed a strategic plan for developing Florida's health and biomedical technology industry. Partly in response to recommendations in the plan, the state has targeted the biomedical industry sector as one that is important to the state's economy and plans to designate the sector as a high impact industry sector, making business incentives available to attract and retain biomedical companies.

In addition, the 2001 legislature is considering a number of bills that would implement actions recommended in the strategy. Legislation has been introduced to improve conflict of interest regulation as it applies to university technology transfer and to create an advisory board of business and technical experts to provide direction to commercialization of university science and starting new companies. The legislature is also considering bills to grant relief for sales taxes on purchases of equipment and research and development supplies for certain technology companies, and to improve technology transfer and access to investment capital.

SEED AND VENTURE CAPITAL

Florida's Certified Capital Company (CAPCO) program, which was established in 1999, has provided more than \$50 million in financing to biomedical companies. Investors in the CAPCO program are insurance companies, which obtain Florida tax credits equal to the amount of dollars CAPCO funds invest for them. The CAPCO program's three certified venture firms are Wilshire Partners, Advantage Capital Partners, and Stonehenge Capital. These funds were allocated \$150 million to be invested solely in Florida-based companies that are less than two years old and are involved in developing an early-stage technology.

NETWORKING

BioFlorida is a statewide networking organization that provides a forum for companies and others to exchange information and ideas. It also assists biotechnology companies in obtaining financial resources and acts as an advocate for the industry pertaining to legislative matters at the state and federal levels. As part of the forum for information exchange, BioFlorida is committed to developing information tools such as regional meetings, an annual conference, and an Internet Web site which will keep members apprised of industry developments.

The *High Tech Corridor's Medical Manufacturing Consortium* is a regional networking organization that provides a forum for biomedical manufacturing companies to exchange information and ideas.

TAX POLICY

- **Research and development costs; labor exemption.** There is a sales and use tax exemption on the labor component of research and development expenditures.
- **Apportionment of adjusted federal income; research and development activities.** An exemption is available to corporations that conduct research and development activities with and through a state or nonpublic university. The university must be a member of the State University System or a nonpublic university that is chartered in Florida and conducts graduate programs at the professional or doctoral level.

REGULATORY POLICY

- Florida has enacted genetic privacy legislation.
- Florida has not enacted “right to know” legislation.
- Florida has not enacted legislation that would impose price controls on prescription drugs.
- Medicaid Reimbursement Policy: Florida has an open formulary with prior authorization required on certain drugs including outpatient injectables, NSAIDS, and acute anti-ulcer drugs.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The *Sid Martin Biotechnology Development Institute*, which is affiliated with the University of Florida, offers incubator assistance to start-up biotechnology firms. Traditional incubator services are offered in laboratories and office suites from 387 square feet to 963 square feet. The Institute also provides radioisotope facilities (including beta and gamma counter), two autoclaves, three common use cold rooms, a walk-in incubator, a fermentation and bioprocessing pilot facility with a 20 liter and 80 liter tank, dedicated type II deionized water hookup in every lab, type I ultra-pure water hookups in central common instrument rooms, and a greenhouse and seedling/transgenic plant growth chamber

Progress Corporate Park is a research park located adjacent to the Biotechnology Development Institute where incubator graduates will be able to continue existing relationships and collaborations at the end of the initial incubation period of the business.

Additional research parks that can accommodate bioscience companies but are not exclusively targeted to bioscience companies include

- *University of Central Florida Research Park*, located in Orlando, Florida;
- *University of North Florida Research Park*, located in Jacksonville, Florida; and
- *Florida State University’s Innovation Park*, located in Tallahassee, Florida.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

Florida’s *Innovation Commercialization Centers (ICCs)* provide a full range of intensive business assistance services to emerging technology companies. Services include assistance in forming a new company, licensing technology, finding business partners, and raising capital. Several of the commercialization centers also provide incubator space for start-up companies. The ICCs can also assist by providing access to regionally based early-stage venture capital. The ICCs were established in 1994 with state and local matching funding. As of FY 2001, the state no longer provides funding to the ICCs. The three ICCs are

- *Enterprise North Florida Corporation*, Jacksonville and Gainesville;
- *Enterprise Development Corporation* of South Florida, Boca Raton; and
- *Central Florida Innovation Corporation*, Orlando.

WORKFORCE DEVELOPMENT

Workforce Florida, Inc.’s High Skills/High Wages Targeted Industry Sectors Program helps ensure that training programs are coordinated with the needs of the biomedical industry.

Florida's Community College System has adopted a sector consortia approach to develop new curricula in partnership with industry. The state community colleges have two-year biomedical programs that offer degrees in biomedical equipment engineering, medical laboratory technology, plastics engineering technology, and computer programming and applications.

A **health technology program** is under development at Okaloosa-Walton Community College in Ft. Walton Beach.

The **biotechnology program** at Santa Fe Community College in Gainesville is sustained through a formal partnership among SFCC, the University of Florida biotechnology program and biotechnology industry partners. The curriculum, faculty, and facilities were established with guidance from local employers to meet student needs.

The **Tech 4 Consortium** created by the Florida High Tech Corridor Council, links the Corridors' high tech industries with the Corridors' community colleges, local school districts and its two university partners (USF and UCF). The Tech 4 Consortium offers a new two-year Associate in Science degree in biomedical technology.

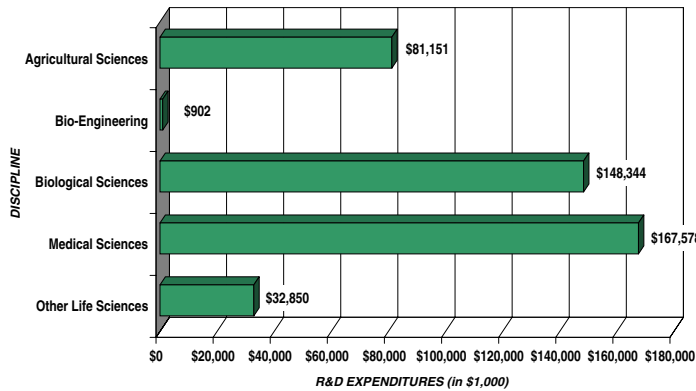
The **Florida High Tech Corridor** and Seminole Community College (SCC) have proposed the development of a competency-based, Web-based survey system that will serve to facilitate communication regarding training needs between High Tech Corridors' biomedical technology employers and area educators.

The 2001 Legislature is considering **economic development and emerging and strategic technologies (proposed) legislation** to meet the workforce needs of the state's high tech industry sector, including the biomedical industry sector. Among other things, the legislation would authorize a corporate income tax credit for employers who pay matriculation and other fees on behalf of current or prospective employees enrolling in approved information technology educational programs, including bioinformatics.

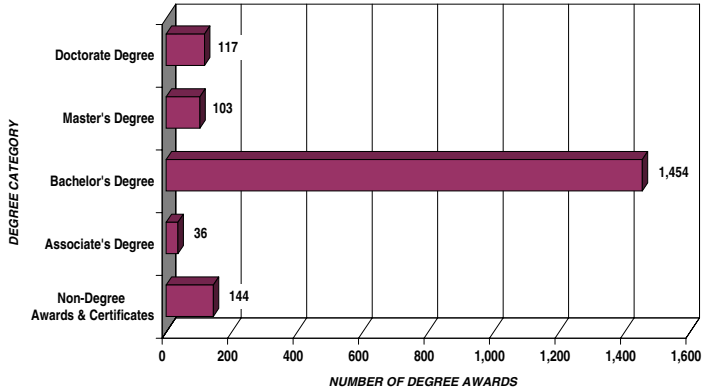
Georgia

	Georgia	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$430,825	\$15,728,292	11
Per Capita	\$55	\$58	
Percent Change FY1995–1999	18.1%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$234,863	\$14,679,343	17
Per Capita 2000 Expenditures	\$29	\$52	
Percent Change in Expenditures FY1996–2000	66.8%	37.0%	
Higher Education Awards in Biological Sciences, 2000	1,854	88,982	15
Biological Scientists in the Workforce, 2000	10,920	454,980	14

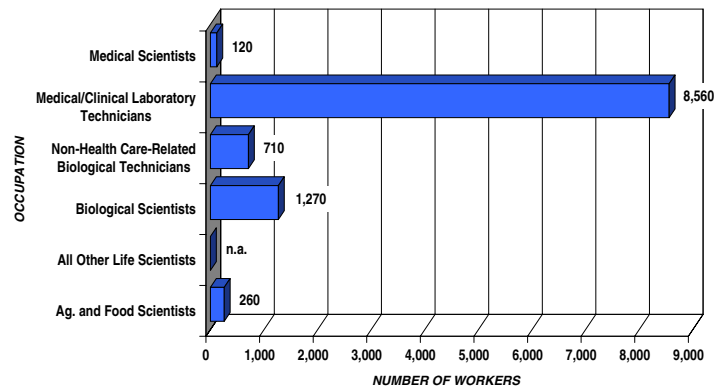
Total Bioscience R&D Expenditures at Academic Institutions in Georgia



Life/Biological Sciences Degrees from Georgia Higher Education



Biological Science Occupations in the Georgia Workforce



GEORGIA

In 1990, a consortium of Georgia's business leaders conceived and founded the **Georgia Research Alliance (GRA)** to turn university research into economic growth for the state. The Alliance brings together business, scientific, and government leaders to generate start-ups, attract industry, enhance jobs, and create wealth.

Since 1992, the state of Georgia has invested more than \$300 million in GRA programs. These funds have been used to provide endowments and state-of-the-art laboratories for Eminent Scholars, to create core research facilities that can be used by both academic and industrial researchers, and to support commercialization programs. GRA investments are focused in several technology areas including biotechnology and life sciences. Eminent Scholar positions have been established in the areas of agricultural biotechnology, biomedical engineering, microbial physiology, molecular biology, molecular biotechnology, molecular immunogenetics, molecular immunology, neuropharmacology, structural biology, and human and animal vaccine development, among others.

GRA investments have led to the creation of many leading research centers and institutes in the state, including the following:

- **Institute for Molecular Medicine and Genetics** at the Medical College of Georgia
- **Center for Applied Genetics Technology** at the University of Georgia (focused on plant and animal genomics)
- **Emory Vaccine Research Center**, which houses a federally-funded Center for AIDS Research
- **Animal Health Research Center** at The University of Georgia
- **Center for Behavioral Neuroscience**, led by Emory University (NSF-designated Science & Technology Center)
- **Combinatorial Chemistry Center** at Georgia State University
- **Georgia Tech/Emory Center for the Engineering of Living Tissues** (NSF-designated Science & Technology Center)
- **Georgia Tech/Emory Department of Biomedical Engineering**
- **Institute for Bioengineering and Bioscience** at Georgia Institute of Technology
- **Viral Immunology Center** at Georgia State University
- **NIH Pilot Research Center in Structural Genomics**, led by The University of Georgia

The State of Georgia is in the process of developing a **Bioscience Strategic Framework** that will guide future investment decisions. Key players in this process include the Governor's Office; the Office of Planning and Budget; Georgia Research Alliance; the Georgia Department of Industry, Trade and Tourism; and the Board of Regents.

The Georgia Research Alliance is also incubating the **Georgia Cancer Coalition**, an initiative worth over \$1 billion to make Georgia a national leader in cancer prevention, treatment, and research. The Georgia Cancer Coalition includes a significant research and commercialization component, which will clearly interface with the bioscience strategy for the state.

OTHER FINANCING AVAILABLE TO BIOSCIENCE COMPANIES

The Georgia Research Alliance's *Technology Development Partnership (TDP)* funds university and industry partnerships aimed at commercializing technology. TDP invests in university-based research projects that are aimed at developing or improving products or processes useful for industry and that have already attracted investment or an investment commitment from one or more private industry sponsors. An industry sponsor must provide a minimum of 1:1 matching funds. TDP projects are funded for one year.

NETWORKING

The *Georgia Biomedical Partnership (GBP)* is a 501(c)(3) membership-driven organization with the mission to grow the life sciences industry in Georgia. GBP works with its members to provide a variety of services such as industry-specific educational programming, networking opportunities, and access to institutional research and resources through its member institutions.

The Georgia Department of Industry, Trade and Tourism; the Georgia Research Alliance; the Georgia Biomedical Partnership; and other interested parties have created a "*Bio Portal*" Web site that posts calendars of biotechnology events throughout the state as well as links to a wide variety of biotechnology resources.

The Georgia Biomedical Partnership and the state jointly sponsor the *CEO Round Table for CEOs of life sciences companies* to network and act as a center of influence.

The *Vaccine Dinner Club* facilitates interactions between members of the large and growing community of Georgia researchers from industry, universities, and the Centers for Disease Control who are interested in vaccine development and evaluation.

The *Consortium for Plant Biotechnology Research (CPBR)* fosters partnerships between companies and universities to produce higher value plants, new and improved plant products, a safer environment, and a more rapid transfer of technology from research laboratories to the marketplace.

The *Atlanta Biotech Network*, a student organization, facilitates professional, mutually beneficial relationships between area students and the greater Atlanta biotechnology business community.

Other organizations that provide networking and education include the *Georgia Regulatory Affairs Professionals Society* chapter, the *Georgia Institute of Technology Impact Speaker Series* (featuring presentations by CEOs of both high tech and biotechnology and life sciences companies) and the *University of Georgia Entrepreneurs Forum*.

TAX POLICY

- **Research & development tax credit.** A research expense tax credit is allowed for research conducted within Georgia for any business or headquarters of a business engaged in manufacturing, warehousing and distribution, processing, telecommunications, tourism, and research and development industries. The credit is 10 percent of the additional research expense over the "base amount," as long as the business for the same taxable year claims and is allowed a research credit under Section 41 of the Internal Revenue Code of 1986. A taxpayer must have taxable income in all years included in the base amount calculation and research dollars in Georgia for those years. The tax credit may be carried forward 10 years but may not exceed 50 percent of the business's net tax liability in any one year.

REGULATORY POLICY

- The Georgia legislature enacted genetic privacy legislation during the 2001 legislative session.
- Georgia has not enacted “right to know” legislation.
- Georgia has not enacted legislation to impose price controls on prescription drugs.
- Medicaid Reimbursement Policy: Georgia has an open formulary with prior authorization required on certain drugs including NSAIDS, acute anti-ulcer drugs, growth hormones, and hemophilia clotting factors.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The *Advanced Technology Development Center (ATDC)* is a state-supported business incubator for commercialization of technologies and economic development. ATDC and the Georgia Research Alliance have created several joint ventures with research universities in the state to provide technical and management assistance as well as physical space for advanced technology companies. In the biotechnology area, these include the following:

- The *Center for Applied Genetics Technology (AGTEC)* at The University of Georgia operates multiple plant and animal research and development facilities, providing expertise, offices, and laboratories for start-up companies involved in animal biotechnology, plant biotechnology, and genomic research. A new AGTEC building opened at The University of Georgia in 2001, which has a 20,000 square foot wing specifically designed to be leased by companies participating in AGTEC research. Laboratories and core facilities of two other new buildings will also provide space for first phase start-up companies that are closely aligned to the AGTEC mission.
- *EmTech Biotechnology Development, Inc.*, a joint venture between Emory University, Georgia Institute of Technology, ATDC, and GRA, is dedicated to growing bioscience companies in Georgia. In addition to wet lab facilities, EmTech provides business expertise to start-up companies. The 7,000 square-foot technology development center currently houses three companies.
- *CollabTech* at Georgia State University offers 7,000 square feet of space for companies focused on either biological or chemical applications. The center currently houses five start-up companies, three of which spun out of Georgia research universities within the last year and a half.

There are no bioscience research parks in Georgia at this time. However, the Georgia Medical Center Authority has plans to develop a life sciences park near the Medical College of Georgia in Augusta, GA.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

The Advanced Technology Development Center’s *Faculty Research Commercialization Program* provides funding to provide incentive to university researchers to commercialize discoveries and start companies.

The Advanced Technology Development Center, and the centers and incubators described above all provide commercialization and business development services.

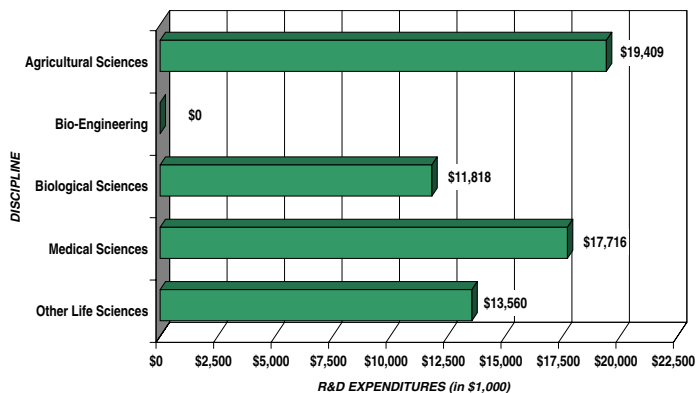
WORKFORCE DEVELOPMENT

Georgia's *Intellectual Capital Partnership Program (ICAPP)* trains workers for high-demand technology jobs whenever a low supply of qualified employees exists. ICAPP leverages the vast resources of Georgia's colleges and universities on behalf of economic development, providing customized, accelerated educational programs to meet the specific needs of employers.

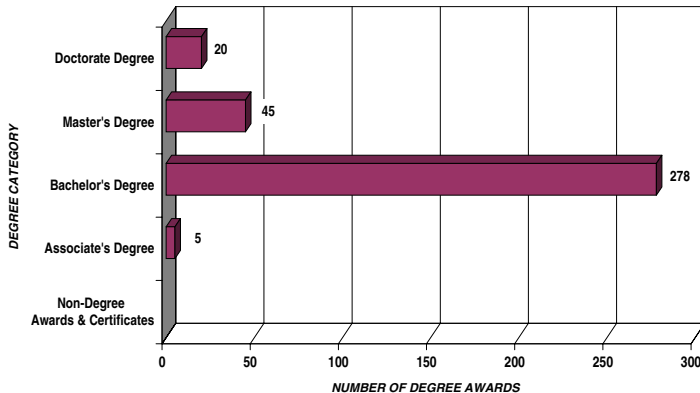
Hawaii

	Hawaii	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$62,503	\$15,728,292	38
Per Capita	\$53	\$58	
Percent Change FY1995–1999	79.5%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$35,282	\$14,679,343	41
Per Capita 2000 Expenditures	\$29	\$52	
Percent Change in Expenditures FY1996–2000	58.5%	37.0%	
Higher Education Awards in Biological Sciences, 2000	348	88,982	45
Biological Scientists in the Workforce, 2000	2,090	454,980	39

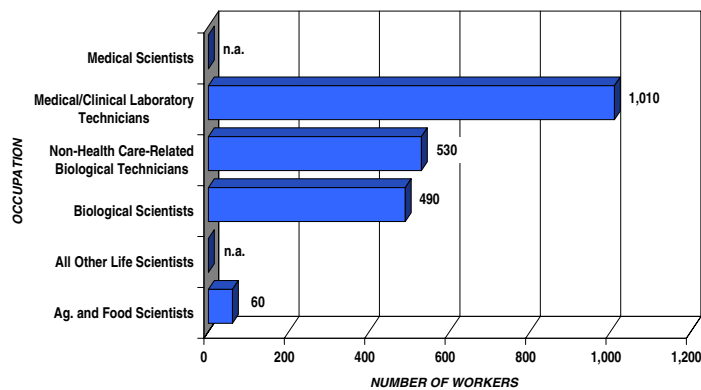
Total Bioscience R&D Expenditures at Academic Institutions in Hawaii



Life/Biological Sciences Degrees from Hawaii Higher Education



Biological Science Occupations in the Hawaii Workforce



HAWAII

The State of Hawaii is pursuing an economic development strategy that aims to build the state's technology base and diversify the state's economy. In 1999, Hawaii developed *Biotechnology in Hawaii: A Blueprint for Growth*, which recommends a number of strategies for growing Hawaii's biotechnology industry. They include expanding venture capital for the biotechnology sector; implementing a tax structure that provides incentives for high technology product development companies, such as biotechnology; improving the transfer of university developed technologies; and developing a bio-age curriculum. The state is in the process of implementing these recommendations.

SEED AND VENTURE CAPITAL

The *Hawaii Strategic Development Corporation (HSDC)* is a state agency that provides investment capital to businesses from public and private funds in exchange for an equity position in the entity. Biotechnology is one of multiple industries for which this funding may extend. Funding is accomplished through indirect investments from venture capital limited partnerships that are funded by HSDC. By funding in this manner, HSDC is able to leverage its public funds with those from the private sector and the federal government. HSDC has committed \$4.25 million of state funds to four limited partnerships, which provide equity and/or debt financing to companies ranging from seed stage to later stage in their business development. HSDC also provides business assistance services typical in an incubator setting and acts as a networking entity for local technology businesses.

NETWORKING

The *Hawaii Technology Trade Association's (HTTA)* mission is to grow the technology industry in Hawaii by fostering and facilitating a healthy business, funding, educational, and governmental environment for Hawaii's technology companies. HTTA has a *Biotechnology Council* that was created to address the specific needs of the biotechnology community within the state. Like other associations, its goals are to present the views of its members to government, academia, the larger business community, and the public.

TAX POLICY

- **High-technology business investment tax credit.** A high technology investment tax credit deductible from the taxpayer's net income tax liability is available for the taxable year in which the credit is properly claimed. The tax credit is 10 percent of the investment made in each qualified high technology business, up to a maximum allowed credit of \$500,000. The credit must be claimed against the net income tax liability for the taxable year. The credit may be carried forward until it is exhausted.
- **Tax credit for increasing research activities.** An income tax credit for increased research activities is allowable for the taxable year in which the credit is properly claimed. This tax credit equals the sum of 2.5 percent of the excess of the qualified research expenses for the taxable year over the base amount; and 2.5 percent of the basic research payments determined under section 41(e)(1)(A) of the Internal Revenue Code. The code also allows for an alternative incremental credit and reduced credit; each has its own equation spelled out in the code. If the tax credit for increased research activities exceeds the amount of income tax payment due,

the excess of the tax credit over payments due may be used as a credit against the taxpayer's income tax liability in subsequent years until exhausted or it may be refunded.

- **Carryover of net operating loss.** A qualified high technology business may sell its unused net operating loss carryover to another taxpayer, if approved by the Department of Taxation. The amount must be at least 75 percent of the amount of the surrendered tax benefit, but it cannot be more than \$500,000. The income from the sale must be reported as income, but it is not taxable income. Some prerequisites apply for the high technology business making the sale.
- **Royalties excluded from gross income.** Royalties (and other income from high technology business) derived from patents, copyrights, or trade secrets are excluded from gross income.
- **Tax exemption on stock options from qualified high technology business.** Notwithstanding any law to the contrary, all income received from stock options from a qualified high technology business by an employee, officer, director, or investor who qualified for the credit that would otherwise be taxed as ordinary income or as capital gains to those persons is exempt from taxation under this chapter.

REGULATORY POLICY

- Hawaii has enacted genetic privacy legislation.
- Hawaii has not enacted "right to know" legislation.
- Hawaii has not enacted legislation to place price controls on prescription drugs.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The *Manoa Innovation Center* is a high tech business incubator, linking emerging commercial high tech ventures to university-oriented research and development organizations. Centrally located next to the University of Hawaii's Manoa Campus on more than three acres, the 46,000-square-foot Center brings together a diversity of enterprises. The Manoa Innovation Center's purpose is to facilitate the transfer of technology and foster joint development projects between the University of Hawaii, private, non-profit research organizations and the Center's high tech occupants.

The *Natural Energy Laboratory of Hawaii Authority (NELHA)* is a unique ocean science and technology park that provides the resources, support, and facilities for many innovative ocean-related businesses. NELHA was developed with state support as a master-planned facility that offers a wide range of unique services. To support projects on the cutting-edge of technology and business, NELHA provides technical, operational, and educational support to all its tenants. New or existing businesses that have ideas of how to use NELHA's resources can submit project proposals to the NELHA Board of Directors. NELHA is continually seeking individuals or companies with interesting research or commercial ideas to locate and operate on-site. Tenants lease land, water, utilities, and support from NELHA and the state receives payment in the form of rent, a share in revenues, increased employment, capital improvement expenditures, and economic diversification.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

Marine Bioproducts Engineering Center (MarBEC), a partnership between the University of Hawaii at Manoa and the University of California at Berkeley, is headquartered at UH Manoa. It is

one of three engineering research centers funded by the National Science Foundation in 1998. MarBEC, through its ***Industry Sponsors Program***, has established relationships with firms in a range of industries, including chemicals, pharmaceuticals, advanced materials, food, feed, energy, environment, cosmetics, and aquaculture.

WORKFORCE DEVELOPMENT

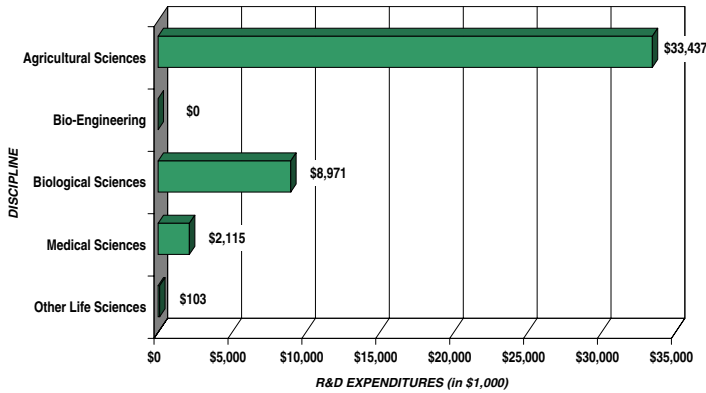
Act 178, SLH 1999, established a ***millennium workforce development training program*** to encourage partnerships between education and the technology industry in Hawaii, aimed at creating pre-employment, current employment, and on-the-job training for employees and prospective employees. The program led to the implementation of training curricula and internships in biotechnology, information technology, health care, and environmental sciences.

The ***Pacific Center for Advanced Technology Training***, a consortium of the University of Hawaii Community Colleges, was recently formed to develop and provide training in advanced technology applications including biotechnology.

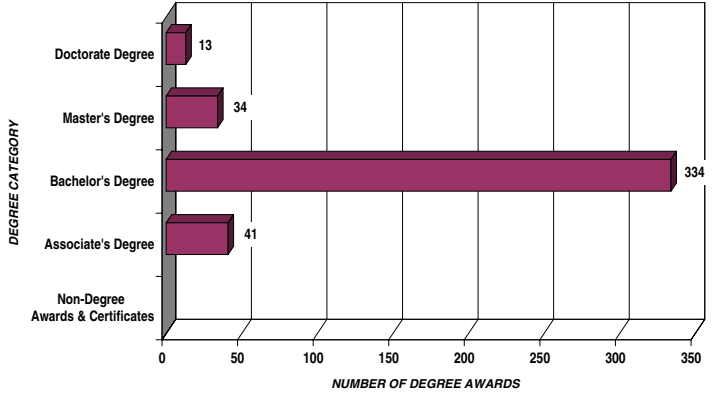
Idaho

	Idaho	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$44,626	\$15,728,292	42
Per Capita	\$36	\$58	
Percent Change FY1995–1999	-8.2%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$4,183	\$14,679,343	50
Per Capita 2000 Expenditures	\$3	\$52	
Percent Change in Expenditures FY1996–2000	189.4%	37.0%	
Higher Education Awards in Biological Sciences, 2000	422	88,982	41
Biological Scientists in the Workforce, 2000	2,420	454,980	38

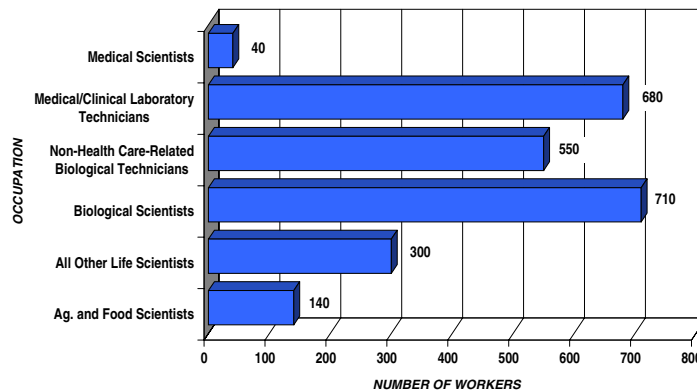
Total Bioscience R&D Expenditures at Academic Institutions in Idaho



Life/Biological Sciences Degrees from Idaho Higher Education



Biological Science Occupations in the Idaho Workforce



In November 1999, Governor Dirk Kempthorne signed an Executive Order creating the Idaho Science and Technology Advisory Council. The Governor asked the Council, which is composed of business entrepreneurs, engineers, technology experts, and representatives of the state's academic institutions and major technology companies, to develop a state strategic plan for science and technology. In December 2000, the Council submitted a strategic plan identifying specific investments and actions that should be taken to grow Idaho's technology economy. The strategic plan identified six strategies. They include

- Build, attract, and retain a highly skilled, technical workforce;
- Invest in research and development and promote university and industry collaboration;
- Facilitate commercialization of technology developed in Idaho;
- Build an entrepreneurial culture that supports and nurtures new firm formation; and
- Invest in the telecommunications and transportation needs of Idaho.

The strategy did not identify any actions specifically addressed to bioscience companies.

TAX POLICY

In 2000, the Governor and the legislature enacted a new tax package to support economic development throughout the state. This legislation established the following tax credits.

- **Research and development tax credit.** Beginning January 1, 2001 and continuing through December 31, 2005, companies engaged in research and development activities in the state are eligible for a nonrefundable tax credit. Companies may receive the sum of five percent of the excess of qualified research payments over the base amount and five percent of the basic research payments according to IRS code. The credit is transferable.
- **Incentive investment tax credit.** In 2001, companies investing in areas of the state experiencing high unemployment or low per capita personal income will be eligible for an incentive investment tax credit. The amount of the tax credit available may not exceed \$500,000 and is dependent on the unemployment rate or per capita personal income of the county in which the property is located.
- **Tax reductions.** Additional changes enacted during the 2000 legislative session include a reduction in the capital gains tax on the sale of real property from 80 to 60 percent and a reduction in the corporate income tax rate from 8 percent to 7.6 percent.

REGULATORY POLICY

- Idaho has not enacted genetic privacy legislation.
- Idaho has not enacted "right to know" legislation.
- Idaho has not enacted legislation to place price limits on prescription drugs.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

Idaho has a number of incubators, three of which offer facilities for bioscience companies.

The *University of Idaho Business Technology Incubator* is an \$1.8 million facility, with over 17,000 square feet of space, located adjacent to the University of Idaho campus in Moscow, Idaho. The Incubator provides space and an array of support services for young, growing companies. The incubator includes some wet lab space.

The *Idaho Innovation Center (IIC)* and the *Bonneville County Technology Center*, located in Idaho Falls near the Idaho National Engineering and Environmental Laboratory (INEEL) and Idaho State University, provide start-ups with shared office support, technical and business management assistance, and affordable space. The IIC is a collaboration of resources focused on increasing the potential for success and survivability of fledgling enterprises. The IIC provides services through its staff and the staff of the Idaho Small Business Development Center (ISBDC), the Service Corp of Retired Executives (SCORE), the Idaho Manufacturing Alliance, the University of Idaho (Agricultural Extension Service), and Idaho State University (Business and Engineering Colleges).

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

Idaho has no existing programs that support bioscience companies in their commercialization efforts. Idaho is currently participating in an *Entrepreneurship Academy* sponsored by the National Governors' Association. Through this effort, Idaho will seek to develop policies to strengthen entrepreneurship in the state. It is anticipated that new commercialization and business development initiatives will result from this effort.

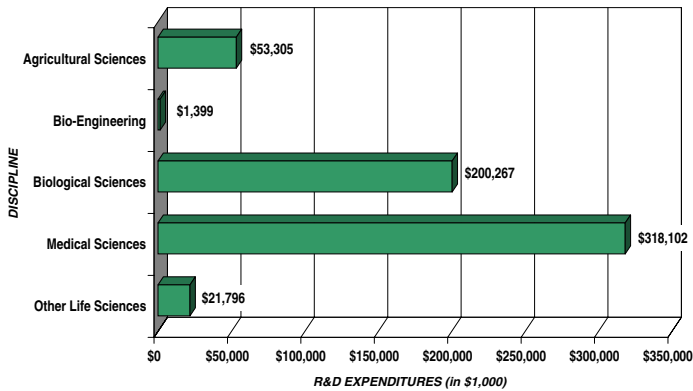
WORKFORCE DEVELOPMENT

Idaho has no specific program to train workers for bioscience careers. However, the state's *Workforce Development Training Fund* provides funds to help train new employees in specific job skills. Companies that qualify can receive training funds up to \$2,000 for each new job created. Training is conducted through Idaho's technical colleges, located throughout the state.

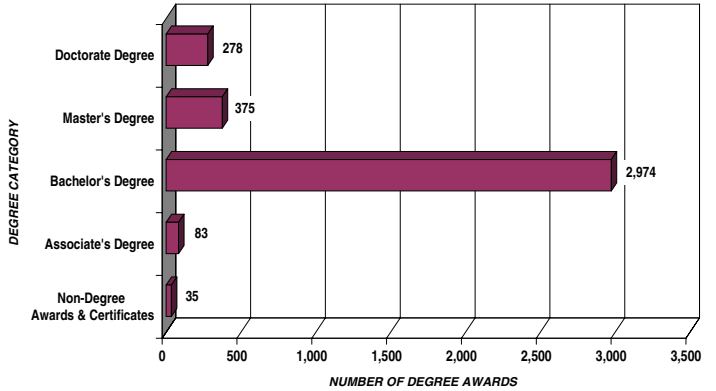
Illinois

	Illinois	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$594,869	\$15,728,292	7
Per Capita	\$49	\$58	
Percent Change FY1995–1999	26.9%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$473,149	\$14,679,343	9
Per Capita 2000 Expenditures	\$38	\$52	
Percent Change in Expenditures FY1996–2000	42.6%	37.0%	
Higher Education Awards in Biological Sciences, 2000	3,745	88,982	5
Biological Scientists in the Workforce, 2000	14,800	454,980	10

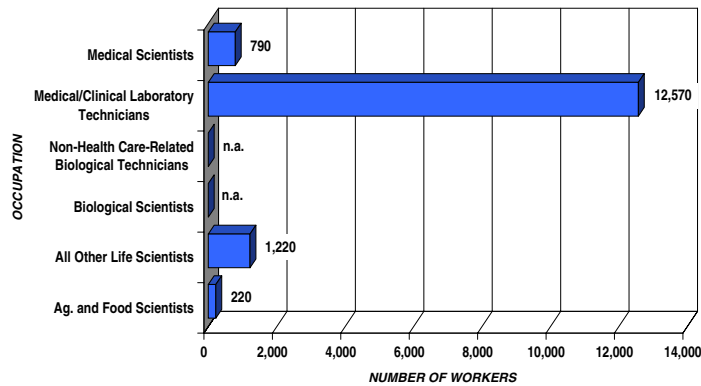
Total Bioscience R&D Expenditures at Academic Institutions in Illinois



Life/Biological Sciences Degrees from Illinois Higher Education



Biological Science Occupations in the Illinois Workforce



ILLINOIS

Governor George Ryan has developed *VentureTECH*, a five-year, \$1.9 billion comprehensive strategy for investing state resources in education and advanced research and development, health sciences and biotechnology, and cutting-edge information technology programs. The 2001 legislature approved funding for the following biotechnology and life sciences initiatives:

- Funding to establish a *Post-Genomics Institute* at the University of Illinois-Urbana Champaign. This facility will conduct cross-disciplinary, cutting edge research in the biological sciences including agriculture. The institute will focus on the development of new technologies and capitalize on the biology/engineering interface, growth in the field of biotechnology, and expansion into commercialization.
- Funding for a *Biomedical Research Facility* on the University of Illinois' Chicago campus.
- Funding for a new *Medical Resonance Imaging Center* in Chicago. This facility will seek to become the premier medical imaging research/clinical facility in the nation. Research conducted using this new imaging technology will focus on improving health care and developing commercially viable software and hardware, while training students for careers in electronic health care industries.
- Funding for a *Chemical Sciences Building* in Chicago. This research facility will focus in the areas of tumor growth, HIV, immunology, dental, orthopedics, and environmental impacts.
- Funding for a *Biomedical Research Building* at Northwestern University. This building will be part of a complex at Northwestern's Chicago campus that will focus on interaction with the biotechnology industry.

SEED AND VENTURE FINANCING

Illinois' Technology Development Bridge (TDB) program, a partnership of the Illinois Development Finance Authority (IDFA) and the Illinois Coalition, makes seed investments in start-up technology companies including biotechnology companies. As a self-funded agency, IDFA receives no general revenue funds from the State of Illinois. Funding for the TDB comes from IDFA's existing investment income base.

TDB is a \$15 million fund, of which \$6.5 million has been invested. The average investment is \$300,000. To date biotechnology companies have represented a minority of TDB investments, but an internal commitment has been made to increase biotech investments as the program moves forward.

OTHER FINANCING AVAILABLE TO BIOSCIENCE COMPANIES

The Department of Commerce and Community Affairs' *Technology Challenge Grant Program (TCGP)* provides grant funds to technology companies (including biotech) and research organizations (labs, universities) to help develop critical research and development projects. These projects should respond to significant needs in the state, and should foster the development of the Illinois economy through the advancement of the state's economic, scientific, and technological assets. The TCGP is also used to assist eligible applicants in the state to apply for, qualify for, and leverage federal funds awarded for advanced technology.

NETWORKING

The *Illinois Biotechnology Organization (IBIO)* was chartered in January 2000 to serve as a voice for biotechnology companies currently based in Illinois and those considering locating to Illinois. IBIO represents companies engaged in biopharmaceutical, biomedical, bioagricultural, and bioremedial endeavors. IBIO is charged with educating public policy leaders regarding the role that biotechnology can play in creating job opportunities and increased economic activity.

IBIO provides an active forum for the exchange of ideas and information to enhance business opportunities including partnering, strategic alliances, and joint ventures. IBIO also works to promote research and development within the state's educational institutions, to expand technology transfer and innovative partnerships, and to launch an aggressive effort to meet the infrastructure and capital needs of the biotechnology industry.

TAX POLICY

- **Research and development tax credit.** A business that increases research activities in the State is allowed a credit equal to 6.5 percent of the qualifying expenditures as defined under section 41 of the Internal Revenue Code for the taxable year. Credit that exceeds the tax liability for the taxable year may be carried forward for up to five years or until it has been fully used, whichever occurs first.

REGULATORY POLICY

- Illinois has enacted genetic privacy legislation.
- Illinois has not enacted "right to know" legislation.
- Illinois has not enacted legislation to place price controls on prescription drugs.
- Medicaid Reimbursement Policy: Illinois has a closed formulary with generic substitution. Prior authorization is required for any medication not listed in the formulary.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The State, UIC, and the Illinois Medical District Commission developed the *Chicago Technology Park Research Center* in 1987 as a small business incubator for biotechnology and information technology companies. The 57,000 square foot Research Center has 40 state-of-the-art biotechnology wet labs offering deionized water, fume hoods, autoclaves, and cold rooms. The incubator now houses more than 20 technology firms.

A former 20,000 square foot industrial building has been rehabilitated by the Illinois Medical District Commission as flexible, affordable wet lab and production space for SynQuest, Ltd. and Thermogen, Inc. who have graduated from the Chicago Technology Park Research Center incubator. The Commission and the City are working together to develop similar facilities within the Chicago Technology Park.

The *Chicago Technology Park*, located in downtown Chicago, is a 56-acre parcel located in the Illinois Medical District. The park is specifically designed to attract and support advanced medical, biological, chemical, engineering, computer, and other technological research and product development companies.

The *Northwestern University/Evanston Research Park*, located in Evanston, Illinois, seeks to accelerate technology transfer from the laboratory to the marketplace by means of a research

environment that combines the resources of a major university, a progressive community, and private industry. The Park has three major research thrusts: materials and manufacturing technology; biotechnology, including pharmaceutical research; and software development, particularly in the areas of artificial intelligence, robotics, and Internet applications.

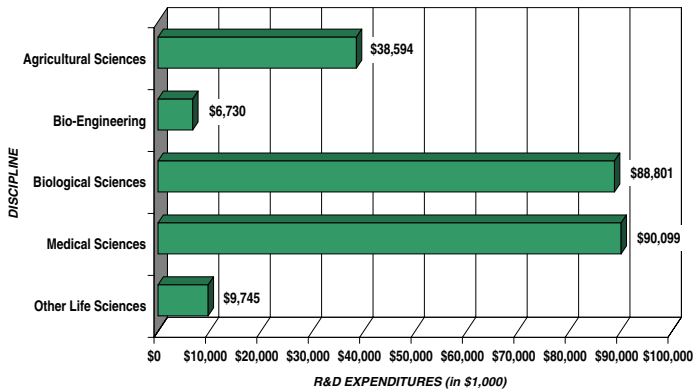
COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

The *Illinois Technology Enterprise Center (ITEC)* program provides operational support for regional centers to serve technology (including biotech) entrepreneurs, innovators, and small business owners and provide access to investments on behalf of young or growing companies in cooperation with private sector investments. ITEC services include assisting entrepreneurs to locate critical pre-seed and early stage financing; helping entrepreneurs, innovators, and start-up firms in high growth, high technology sectors in furthering their technical and/or managerial skills; and providing assistance with new product development and marketing. Currently, ITECs are operating in Evanston and Champaign-Urbana.

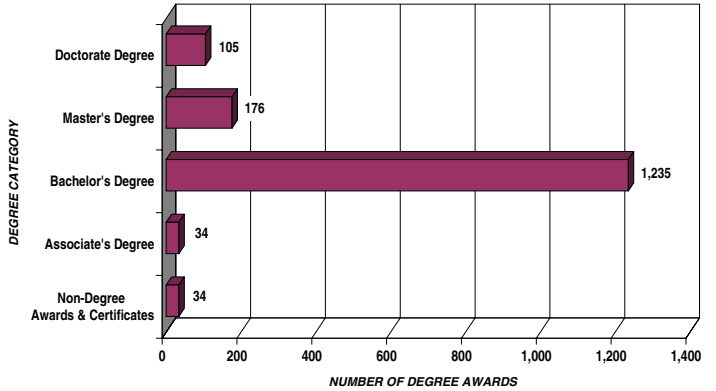
Indiana

	Indiana	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$233,969	\$15,728,292	24
Per Capita	\$39	\$58	
Percent Change FY1995–1999	13.9%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$141,214	\$14,679,343	25
Per Capita 2000 Expenditures	\$23	\$52	
Percent Change in Expenditures FY1996–2000	31.5%	37.0%	
Higher Education Awards in Biological Sciences, 2000	1,584	88,982	21
Biological Scientists in the Workforce, 2000	7,740	454,980	21

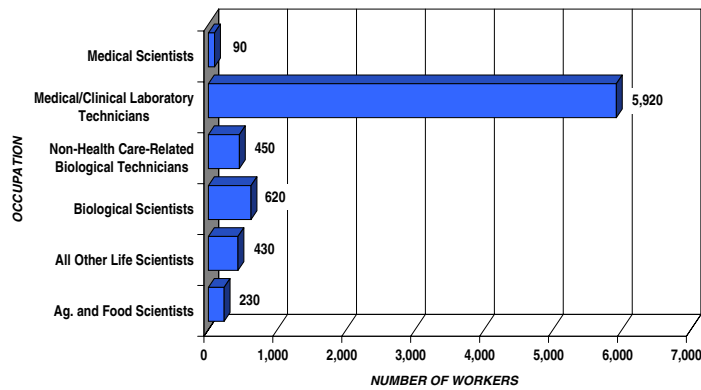
Total Bioscience R&D Expenditures at Academic Institutions in Indiana



Life/Biological Sciences Degrees from Indiana Higher Education



Biological Science Occupations in the Indiana Workforce



INDIANA

Indiana's major technology initiative is the *Indiana 21st Century Research and Technology Fund*. The fund was created in 1999 by the General Assembly to stimulate the process of diversifying the state's economy by developing and commercializing advanced technologies in Indiana. The enabling act created a Board, representing most of the academic and commercial sectors of the state, which establishes fund award and review policies, and approves awards. The recent session of the General Assembly reauthorized the program for two years and continued funding of \$25 million per year.

The fund makes awards in three broad categories: Science and Technology Commercialization, Centers of Excellence, and Entrepreneurial Activities. In addition, the fund provides cost-share on behalf of federal proposals submitted by Indiana-based entities. The fund emphasizes the creation of academic-sector-commercial-sector partnerships. In making awards, the fund expects significant leverage from the partners involved in the projects. Awards are made for periods of up to two years in amounts up to \$5 million, though the fund's Board has indicated that awards above \$2 million will be uncommon.

The fund makes awards based on peer review, involving a review panel comprised of science and technology researchers and economics experts from across the country. Thus, proposal quality is judged at a national level. The excellence of the science or technological objective is the primary determinant in making awards. Furthermore, clear commercialization intent is required.

NETWORKING

The *Indiana Health Industry Forum, Inc. (IHIF)* is a not-for-profit, private sector initiative, dedicated to enhancing the economic growth and development of the health industry in Indiana. IHIF reflects a private/public alliance of manufacturers and suppliers, educational institutions, health care providers, and service providers.

IHIF acts as a catalyst, convener, innovator, coordinator, and supporter of initiatives that advance the state's health-related enterprise. IHIF facilitates strategic partnerships, encourages business formation around medical technology, provides customized support to emerging health-related businesses, and fosters an enabling investment climate. Through its IHIFConnect[®] program, IHIF is able to match technical, business, regulatory expertise and funding sources to companies looking to start, expand, or relocate to Indiana. The Forum created a statewide "road map" in 1999 and is working with the various regions of the state to assist them in forming partnerships of industry, higher education, the non-profit and governmental sectors to build a strong region, anchored by the presence of Lilly in Indianapolis.

TAX POLICY

- **Research expense credits.** A taxpayer who incurs Indiana qualified research expense in a particular taxable year is entitled to a research expense tax credit for the taxable year. The rate is five percent; there are other variables in the equation depending upon whether or not the taxpayer has income apportioned to the state. Any credit in excess of the tax liability must first be used in the current tax year but may then be carried forward for no more than 10 years.

REGULATORY POLICY

- Indiana has not enacted genetic privacy legislation.
- Indiana has enacted “right to know” legislation.
- Indiana has not enacted legislation to place price controls on prescription drugs.
- Medicaid Reimbursement Policy: Indiana has an open formulary, no prior authorization required.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The *Purdue Research Park Business and Technology Center* offers an incubator facility with wet lab space for start-up business with 28,098 total square feet of space. The Research Park and Technology Center also offers an accelerator type facility for incubator tenants who have out-grown or moved past the incubation phase of their business. The Center helps with locating financing, preparing business plans, marketing, government R&D proposals, selling to the government, and general business counseling. The Technical Assistance Program provides technical and engineering expertise to solve problems. The Technical Information Service conducts information searches for Indiana companies and tracks technological advancements and industry trends.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

The *Indiana Business Modernization and Technology Corporation (BMT)* is a not-for-profit assistance agency that serves as a comprehensive full-service business resource for Indiana companies.

Indiana University’s Industrial Research Liaison Program (IRLP) assists small businesses in commercializing their products, services, and technology. IRLP’s *Helpnet* pairs business-experienced faculty with small, high potential companies needing advice in areas such as company operations, product development, technology, strategic planning, organizational structure, or business direction or expansion.

WORKFORCE DEVELOPMENT

Two efforts are underway in Northern Indiana. BMT is working in collaboration with the Indiana Department of Workforce Development and the Indiana Department of Education to establish a *Bioscience Academy*. The purpose of the Academy is to influence a future biotech workforce by providing secondary education faculty and students with industrial internships, provide relevant biotechnology experiences and training, and identify participants with Certificates of Achievement.

Bayer Corporation, South Bend, IN, has maintained a *Science Forum* designed to place biotechnology scientists in the classroom. The purpose of the Forum is to outreach to the education system around the Bayer research facility and entice youth to consider careers in biotechnology.

REGIONAL INITIATIVES

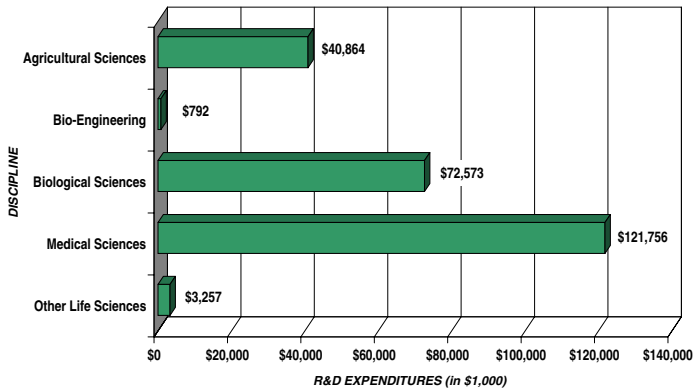
The *Central Indiana Corporate Partnership*, a new umbrella civic organization representing the largest businesses in the five-metropolitan wide MSA Central Indiana region, has adopted a strategy designed to develop its industry base in three areas: life sciences, advanced manufacturing, and information technology. The region is pursuing implementation of the strategy, which calls

for creating a pre-seed/seed fund for life science firms, and making use of the 21st Century Research and Technology Fund in ways to support and further improve the region's clusters.

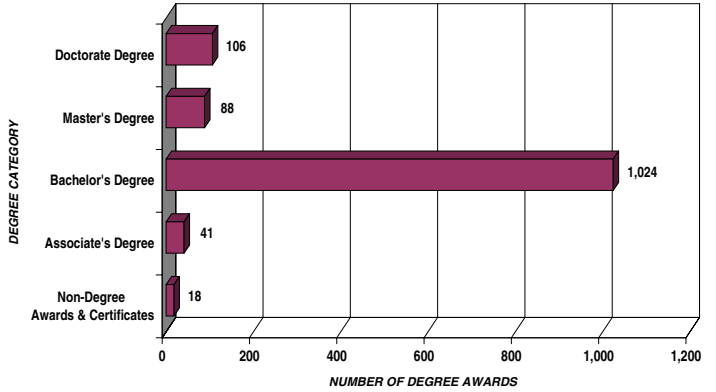
Kosciusko County (Warsaw), Indiana recently had a strategy completed entitled, *Sustaining Kosciusko County's Health and Biomedical Industry for the 21st Century*. Undertaken in conjunction with the Indiana Health Industry Forum (IHIF), this "road map" is the first of a series of regional industry road maps building upon the statewide strategy completed in 1999 for the IHIF. Kosciusko County, Indiana is the nation's leader in orthopedics manufacturing, with surgical appliances and supplies manufacturing 130 times more concentrated in Kosciusko County than across the U.S. The road map lays out four strategies for the County addressing image, workforce, and business climate issues. The strategy also proposes creating an Advanced Technology Biomedical Institute to address workforce and research applications needs of the biomedical cluster.

	Iowa	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$239,242	\$15,728,292	22
Per Capita	\$83	\$58	
Percent Change FY1995–1999	13.2%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$136,315	\$14,679,343	26
Per Capita 2000 Expenditures	\$47	\$52	
Percent Change in Expenditures FY1996–2000	35.3%	37.0%	
Higher Education Awards in Biological Sciences, 2000	1,277	88,982	25
Biological Scientists in the Workforce, 2000	4,220	454,980	32

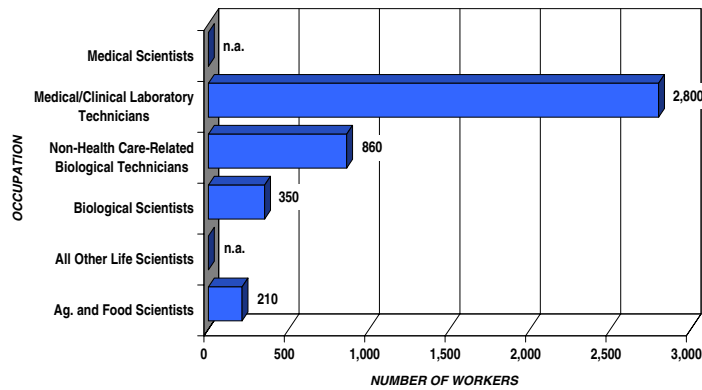
Total Bioscience R&D Expenditures at Academic Institutions in Iowa



Life/Biological Sciences Degrees from Iowa Higher Education



Biological Science Occupations in the Iowa Workforce



Following a comprehensive cluster analysis, Governor Vilsack launched a statewide technology initiative in 2001. The Governor appointed a Science and Technology Advisor and formed the ***Iowa New Economy Council***. The Council is organized into three Industry Leadership Groups: Life Sciences, Advanced Manufacturing, and Information Solutions. The mission of each group is to provide ongoing assessment of Iowa's competitive position and to coordinate industry-specific cluster initiatives.

The Governor also chairs the ***U.S. Governors Biotechnology Partnership***, a nonpartisan coalition that seeks to augment public understanding and acceptance of agricultural biotechnology. The partnership includes Governors Ed Schafer (R-ND), Tom Vilsack (D-IA), Tom Carper (D-DE), Dirk Kempthorne (R-ID), John Engler (R-MI), Mike Johanns (R-NE), Kenny Guinn (R-NV), George Ryan (R-IL), Frank O'Bannon (D-IN), and Gary Locke (D-WA).

SEED AND VENTURE CAPITAL

The ***tecTERRA Food Capital Fund*** is a private equity limited partnership initiated with a \$25 million loan from the State of Iowa, and now with total capital of \$48 million. The legislative charter of this fund is to make investments in companies engaged in value-added agriculture and biotechnology. Companies involved in agricultural biotechnology are a priority for fund investment.

OTHER FINANCING AVAILABLE TO BIOSCIENCE COMPANIES

Iowa's Advanced Research & Commercialization Program (ARC) invests in established Iowa businesses whose research projects have a near-term path to commercialization and which will advance Iowa's technological expertise, provide high-wage opportunities for knowledge workers, and which will involve value-added agriculture, advanced technology, or biotechnology.

Iowa's ***Value-Added Agricultural Products and Processes Financial Assistance Program*** supports innovation in food and fiber products. Many of its projects are based on commercialization of biotechnology-based products.

The ***Community Economic Betterment Account/Economic Development Set-Aside Program (CEBA)*** provides financial assistance to companies that create new employment opportunities and/or retain existing jobs and make new capital investment in Iowa. Funds, provided in the form of loans and forgivable loans, can be used for building construction or reconstruction, land or building acquisition, equipment purchases, operating and maintenance expenses, site development, and working capita. Approximately 25 percent of available funds have been used to fund projects in the value added agriculture and life science arenas.

FACILITIES FINANCING

ARC has invested in development of wet lab incubator facilities at both the University of Iowa and Iowa State University.

NETWORKING

The ***Iowa Biotechnology Association*** holds an annual statewide conference to promote issues and topics relevant to life sciences and provide networking opportunities between industry, academic,

and governmental organizations. Other special programs are organized as appropriate. The University of Iowa and Iowa State University hold specialized conferences in the life sciences.

The *Venture Network of Iowa* provides a forum for Iowa entrepreneurs to interact with investors and to forge long-term business relationships, including biotechnology and life science companies. The network was established in 1990 to accelerate the rate of Iowa business formation and growth and is facilitated by the Iowa Department of Economic Development Entrepreneurial Services Team in cooperation with private sector partners.

TAX POLICY

- ***Quality Jobs Enterprise Zone.*** A corporate tax credit equal to 1) 13 percent of the excess of qualified research expenses over the base amount, and 2) 13 percent of the basic research payments determined under section 41(e)(1)(A) of the Internal Revenue Code is available to the primary business or a supporting business for increasing research activities in this state within a zone. Any credit in excess of the tax liability for the tax year shall be refunded. In lieu of claiming a refund, the primary business or a supporting business may elect to have the overpayment shown on its final return credited to its tax liability for the following tax year.
- **Research activities credit *New Jobs and Income Act.*** An eligible business may claim a corporate tax credit for increasing research activities in this state during the period the eligible business is participating in the New Jobs and Income program. The credit equals the sum of 6.5 percent of the excess of qualified research expenses over the base amount and 6.5 percent of the basic research payments determined under section 41(e)(1)(A) of the Internal Revenue Code based on the state's apportioned share of the qualifying expenditures for increasing research activities.
- **Research activities credit income, sales, services, and franchise taxes, Division II, personal net income tax.** The taxes imposed under this division shall be reduced by a state tax credit for increasing research activities in this state. For individuals, the credit is the sum of 6.5 percent of the excess of qualified research expenses over the base amount, and 6.5 percent of the basic research payments determined under section 41(e)(1)(A) of the Internal Revenue Code, based upon the state's apportioned share of the qualifying expenditures for increasing research.
- **Tax credit for increasing research activities, Supplement 1999.** A credit equal to the sum of 1) 6.5 percent of the excess of qualified research expenses over the base amount and 2) 6.5 percent of the basic research payments determined under section 41(e)(1)(A) of the Internal Revenue Code based on the state's apportioned share of the qualifying expenditures for increasing research activities.
- **Sales tax exemption for R&D expense.** The gross receipts from the sale or rental of computers, machinery, and equipment, including replacement parts, and materials used to construct or self-construct computers, machinery, and equipment directly and primarily used in research and development of new products or processes of processing is exempt from tax.

REGULATORY POLICY

- Genetic privacy legislation has been proposed but has not been enacted in Iowa.
- "Right to know" legislation has not been enacted.

- Legislation to place controls on the price of prescription drugs has been proposed but has not been enacted.
- Medicaid Reimbursement Policy: Iowa does require Medicaid prior authorization; however, it has been opened up to allow pharmaceutical companies access to the process.
- ***Iowa's Life Science Enterprise Legislation*** allows waiver of certain of Iowa's restrictions on corporate ownership of farmland for industries involved in production of life science products derived from animals using biotechnological systems or techniques.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The State of Iowa has recently funded the development of additional wet lab space within business incubators at the research parks at both Iowa State University and the University of Iowa.

The ***Iowa State Innovation System*** is a technology incubator operated by the ISU Research Park Corporation. Its mission is 1) to identify technology-based concepts and businesses at early stages of development and 2) to provide an environment for their growth. In this effort, a wide range of physical and human resources are applied, tailored to the particular needs and goals of each enterprise.

Iowa State University's ***Center for Crops Utilization Research*** has wet lab space available for companies that can be leased on short- or long-term basis to work on projects in conjunction with the center.

The ***Technology Innovation Center***, The University of Iowa business incubator, fosters the development of new business ventures that make use of advanced technology. The Center offers services and facilities to start-up businesses and established companies eager to initiate new endeavors.

State-funded laboratories for industrial biotechnology include the ***Center for Biocatalysis and Bioprocessing*** and for pharmaceutical development, the ***Center for Advanced Drug Development***.

There are no research parks dedicated exclusively to biotechnology or life sciences. However, multi-purpose research parks at both of the state's research universities are host to a wide array of biotechnology companies.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

The ***Center for Advanced Technology Development*** at Iowa State University provides assistance to companies to commercialize new technologies in the form of product development engineering and process improvement. Through its ***Iowa Industrial Incentive Program***, the Center for Advanced Technology Development provides financial assistance to Iowa companies using research and technical expertise at the Iowa State University.

John Pappajohn Centers for Entrepreneurship assist individuals starting new businesses, with emphasis on those focusing on university-based technologies. The Centers provide assistance with the development of business plans, sources of financing, and market research. These Centers are located at Iowa State University, University of Iowa, University of Northern Iowa, and North Central Iowa Community College.

WORKFORCE DEVELOPMENT

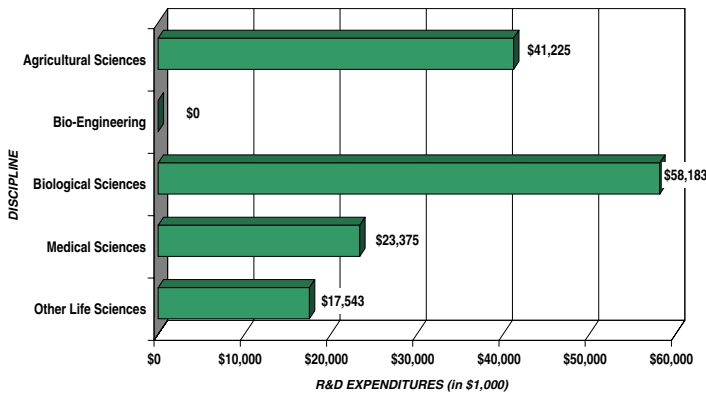
Indian Hills Community College at Ottumwa serves the technical needs of many industrial bio-processing companies in Iowa through its *Iowa BioDevelopment* Program.

The *Iowa Community College Network* develops curricula in various biotechnology fields for lab technicians.

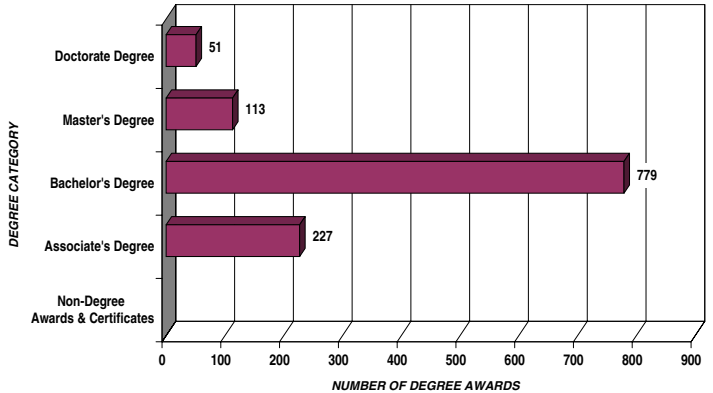
Kansas

	Kansas	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$140,326	\$15,728,292	30
Per Capita	\$53	\$58	
Percent Change FY1995–1999	19.9%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$53,196	\$14,679,343	35
Per Capita 2000 Expenditures	\$20	\$52	
Percent Change in Expenditures FY1996–2000	35.8%	37.0%	
Higher Education Awards in Biological Sciences, 2000	1,170	88,982	28
Biological Scientists in the Workforce, 2000	4,570	454,980	29

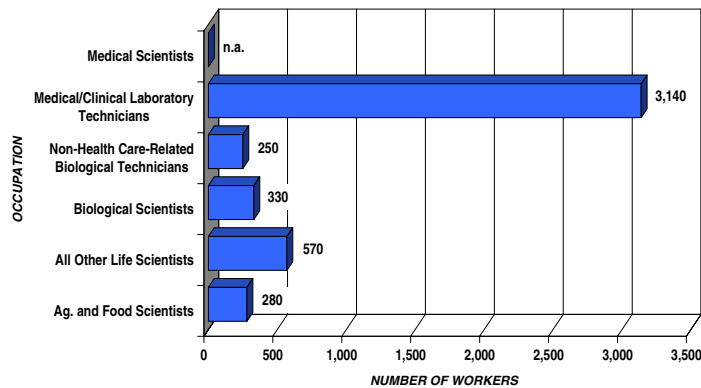
Total Bioscience R&D Expenditures at Academic Institutions in Kansas



Life/Biological Sciences Degrees from Kansas Higher Education



Biological Science Occupations in the Kansas Workforce



KANSAS

The *Kansas Technology Enterprise Corporation (KTEC)*, a quasi-public organization that seeks to promote the growth of technology-based industry in Kansas, has identified biotechnology as one of Kansas's strategic technology sectors. KTEC supports five Centers of Excellence, including the Higuchi Biosciences Center. The *Higuchi Biosciences Center* is a family of research centers at the University of Kansas. The member centers conduct interdisciplinary research in the following:

- Basic biomedical problems
- Bioanalytical chemistry
- Drug delivery systems
- Neurological sciences
- Immunology
- Combinatorial chemistry
- Gene delivery
- Related biotechnology

In 2000, KTEC commissioned a strategic technology cluster assessment that identified human biosciences and agricultural biotechnology as areas of focus for Kansas. Human biosciences include a broad range of scientific and clinical endeavors from health care delivery to pharmaceutical research and development to basic and applied biotechnology research to clinical drug trials to bioinstrumentation.

A major initiative is underway in Kansas City to develop *The Kansas City Area Life Sciences Institute, Inc.* This initiative is described under the Regional Initiatives section.

SEED AND VENTURE FINANCING

KTEC's Innovation and Commercialization Corporations (ICC) and affiliates provide business development and pre-seed financing to start-up, technology-based businesses. Each ICC is structured as a tax-exempt 501(c)(3) company whose for-profit management company also manages a for-profit seed capital fund. The ICCs manage the following seed funds, which may invest in biosciences companies but are not limited to bioscience companies:

- *Kaw Holding*, Lawrence, which is affiliated with the Kansas Innovation Corporation
- *Manhattan Holdings*, Manhattan, which is affiliated with the Mid-America Commercialization Corporation
- *Wichita Technology Ventures*, which is affiliated with the Wichita Technology Corporation
- *Milestone Ventures, LLC*, Pittsburgh, which is affiliated with the Alliance for Technology Commercialization
- *Prairie Investments for Technology Advancement, LLC*, Lenexa, which is affiliated with the Enterprise Center for Johnson County

- *Precede Fund LC*, Kansas City, which is affiliated with the University of Kansas Medical Center Research Institute
- *Enterprise Center* of Johnson county, Lenexa
- *Quest Ventures, LLC*, Hutchinson, which is affiliated with the Quest Business Center for Entrepreneurs
- *KTEC Holdings*

OTHER FINANCING AVAILABLE TO BIOSCIENCE COMPANIES

KTEC's *Applied Research Matching Fund (ARMF)* provides direct investments to companies for the purpose of conducting applied engineering or scientific research with the goal of developing a specific commercial product or technology. Eligible applicants are limited to for-profit business entities with either an existing or prospective Kansas business location. Awarded projects are those with a sound technical approach toward developing a commercial product with significant competitive features. Companies can apply for between \$5,000 and \$100,000 in ARMF assistance but they are required to make a 150 percent match. KTEC takes a royalty position on eventual product sales on commercially successful projects.

NETWORKING

The *Kansas City Life Sciences Institute* is a not-for-profit organization founded jointly by the Civic Council of Greater Kansas City and the Kansas City Area Development Council. The mission of the Institute, which is a partnership between the area's business, education, medical, and research communities, is to insure the successful implementation of the community's life sciences strategy.

TAX POLICY

- **Research and development credit.** The Kansas research and development credit allows a taxpayer who makes expenditures in research and development activities (allowable under the provisions of the federal internal revenue code of 1986) in Kansas to claim an income tax credit of 6.5 percent of the difference between the actual qualified research and development expenses for the year and the average of the actual expenditures made during the year and the two previous tax years. The credit allowed in any one tax year is limited to 25 percent of the credit plus any carry forward. Any remaining unused credit may be carried forward in 25 percent increments until the total amount of credit is used.
- **Manufacturing machinery and equipment sales tax exemption.** Computers and related peripheral equipment that are utilized by a manufacturing or processing business for engineering of the finished product or for research and development or product design shall be exempt from sales tax.
- **Exemption of property for economic development purposes.** The board of county commissioners of any county or the governing body of any city may exempt all or any portion of: buildings or added improvements and the land upon which the building is located and all of the tangible personal property used exclusively by the business for manufacturing, conducting research and development, or storing goods which are sold or traded in interstate commerce. An exemption may be granted if it is determined that this is needed to retain jobs in Kansas and is for a period of not more than 10 years. New employment must be created as a result of

the expansion. The property must be associated with a business that is new to a county and if the property was already in Kansas prior to the exemption, the city or county must make a determination that if not for the exemption Kansas would have lost jobs.

REGULATORY POLICY

- Kansas has not enacted genetic privacy legislation.
- Kansas has not enacted “right to know” legislation.
- Kansas has not enacted legislation to place price controls on prescription drugs.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

Kansas Innovation Center’s incubation program provides office space and shared secretarial and administrative services to resident companies. KIC is located at the University of Kansas and works collaboratively with the Higuchi Biosciences Center.

Oread West Corporate and Research Business Park is a 300-acre park located in Lawrence, Kansas. Although it is privately owned, the park, which was established in 1987, is affiliated with the University of Kansas. Park tenants include bioscience companies.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

KTEC’s Innovation and Commercialization Centers offer a full range of technical and business services, office space, and managerial support to start-up companies, including biotechnology companies. Services provided are: business plan development, including marketing and financial analysis; competitor analysis; market research; assistance in locating and accessing financing; sales and marketing strategy development; management consulting; technical assessments; prototype development; and patent and trademark assistance. In return for the assistance provided, the corporations assume a small (in the range of three to five percent) shareholder or equity position in the companies they assist and negotiates royalty payment on commercially successful products.

The ***Metropolitan Entrepreneurial Commercialization Alliance (MECA)*** is a coalition of business assistance organizations and incubators that is being formed to facilitate cooperation and collaboration among the various technology industry stakeholders in the Kansas City area. The organization will act as the commercialization arm of the Life Sciences Institute and KCCatalyst.

KCCatalyst, an initiative of the Kansas City Life Science Institute, is a bi-state not-for-profit entrepreneurial support organization dedicated to the creation and expansion of technology-based companies as well as the commercialization of new technologies in the bi-state region. KCCatalyst will support technology entrepreneurs and established companies in all technology industries by linking innovators with science and engineering expertise, business development services and sources of capital. In addition, the organization will promote the growth of the regional technology sector by identifying issues and problems and creating forums in which companies can discuss regional growth opportunities, common interests and cooperative efforts. KCCatalyst will also promote technology education and raise the visibility of the technology community, asserting its importance to the economic and social well-being of people in the bi-state region.

REGIONAL INITIATIVES

A major initiative is underway in Kansas City to make the region one of the top 10 regions for life sciences in the nation by 2010. The ***Kansas City Life Sciences Institute*** has been created to oversee implementation of a strategy developed by the Life Sciences Task Force, which was appointed

by the Civic Council of Greater Kansas City and the Kansas City Area Development Council. The institute is an umbrella organization formed to help allocate research and development money.

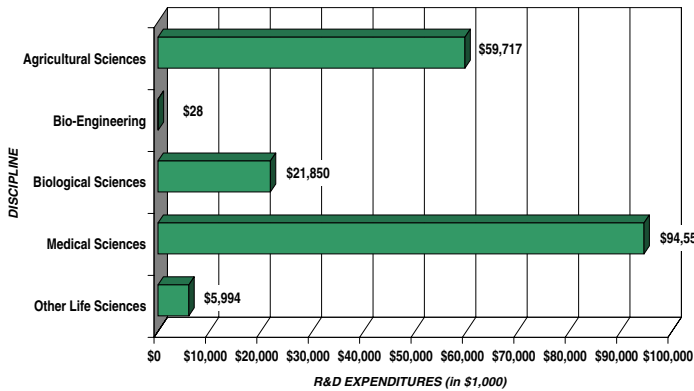
The institute will undertake initiatives in three main areas: research and development, education, and commercialization. Research and development efforts will focus on five areas of specialization: cancer, human development and aging, cardiovascular, infectious disease, and neurological diseases. Its partners include Kansas University Medical Center, Children's Mercy Hospital, Saint Luke's-Shawnee Mission Health System, the Stowers Institute for Medical Research, and the Midwest Research Institute.

Ultimately, the institute wants to raise \$500 million in annually financed research for the Kansas City area. The institute hopes initially to raise \$300 million to jump-start the initiative.

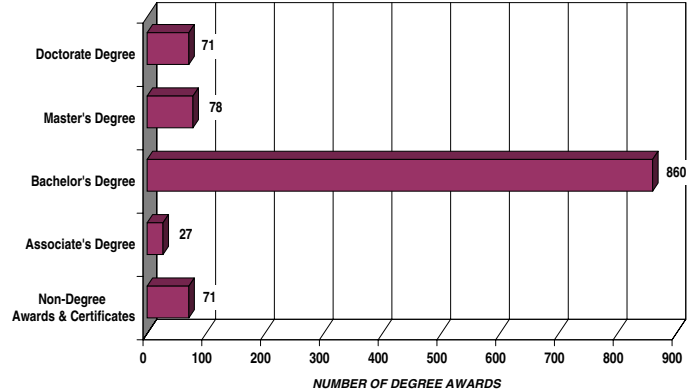
Kentucky

	Kentucky	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$182,140	\$15,728,292	27
Per Capita	\$46	\$58	
Percent Change FY1995–1999	62.5%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$83,488	\$14,679,343	29
Per Capita 2000 Expenditures	\$21	\$52	
Percent Change in Expenditures FY1996–2000	76.2%	37.0%	
Higher Education Awards in Biological Sciences, 2000	1,107	88,982	30
Biological Scientists in the Workforce, 2000	6,160	454,980	25

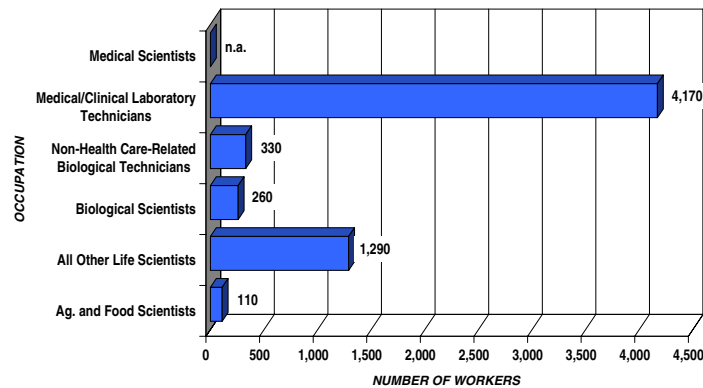
Total Bioscience R&D Expenditures at Academic Institutions in Kentucky



Life/Biological Sciences Degrees from Kentucky Higher Education



Biological Science Occupations in the Kentucky Workforce



KENTUCKY

The Commonwealth of Kentucky is in the process of developing a statewide science and technology economic development plan that includes substantial focus on the life sciences. The plan is being coordinated with the academic research strategies of Kentucky's universities and with the Kentucky Council on Postsecondary Education. The plan is scheduled for release in the summer of 2001.

Since 1998, Kentucky has invested \$220 million to support research endowments and to build research space in the life sciences. This figure does not include regular operating expenses. Private donors invested an additional \$55 million during this period as direct match for a portion of the public funding. Furthermore, under Governor Patton's leadership, the agricultural development board is actively exploring ways to apply tobacco settlement funds to biotechnology.

SEED AND VENTURE FINANCING

Kentucky has no publicly supported seed or venture funds focused exclusively on biotechnology and life sciences, but public/private seed capital venture funds being proposed under the Kentucky Innovation Act of 2000 will include biotechnology and life sciences as one area for possible investment.

OTHER FINANCING AVAILABLE TO BIOSCIENCE COMPANIES

Biotechnology and life sciences companies will be eligible to compete for funding from the following programs that were created by the *Kentucky Innovation Act*, which was passed by the legislature in 2000.

The *Kentucky Research and Development Voucher Fund* provides assistance to small- and medium-sized Kentucky-based companies that partner with Kentucky universities in their research and development activities. Awards, which are made to the universities, can be up to \$100,000 per year for up to two years, and require a 1:1 match from the company.

The *Kentucky Commercialization Fund* is designed to encourage the commercial exploitation of promising technologies developed within the state's universities. Seed funds of \$75,000 per year for up to three years, can be awarded to universities for technologies found to have commercial potential.

Both programs expect to make their first awards by December 2001.

NETWORKING

Kentucky Life Sciences Organization (KLSO) is an industry-supported non-profit organization that began to take shape late last year and was formally incorporated in early 2001. KLSO will work to support existing life sciences, biotechnology, and health care-related companies and educational institutions in the Commonwealth as well as to encourage life sciences entrepreneurship and to attract new talent and resources to Kentucky.

The *Greater Louisville Health Enterprise Network* is a non-profit professional association of member companies working together to grow the health related economy of the Louisville area. The group meets on a quarterly basis and hosts a number of workshops and presentations throughout the year. It is operated as a business network coordinated through Greater Louisville Inc.

TAX POLICY

Kentucky Jobs Development Act. Service and technology-related companies that invest in new and expanded non-manufacturing, non-retail projects that provide at least 75 percent of their services to users located outside of Kentucky, and that create new jobs for at least 25 full-time Kentucky residents may qualify for tax credits. Projects approved under the act may receive state income tax credits and job assessment fees for up to 50 percent of project startup costs and 50 percent of annual facility rental cost or rental value for up to 10 years. Maximum approved start-up costs are \$10,000 per new full-time job for Kentucky residents subject to Kentucky income taxes. The company receives a 100 percent credit against the state income tax arising from the project and may collect a job assessment fee of up to five percent of the gross wages of each employee whose job is created by the project and who is subject to Kentucky income taxes. Job assessment fee is limited to four percent if the local jurisdiction does not assess a local occupational license fee. Unused credits may be carried forward for the term of the agreement. The employee receives credits for the fee against state income taxes and local occupational taxes.

REGULATORY POLICY

- Kentucky has not enacted genetic privacy legislation.
- Kentucky has not enacted “right to know” legislation.
- Kentucky has not enacted legislation to place price controls on prescription drugs.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

In 1994, the University of Kentucky opened the ***Advanced Science and Technology Commercialization Center (ASTeCC)***, a high technology business incubator on its campus in Lexington. This 80,000 square foot facility houses both faculty-led groups doing research in life sciences and engineering as well as more than 10 start-up firms having the same focus.

The 2000 Kentucky legislature appropriated \$5 million to the ***Louisville Medical Center Development Corporation*** to develop a life sciences and information technologies business incubator. The corporation plans to develop 50,000 square feet of space to house the incubator, which will include 10 to 12 wet labs. In April 2001, the state approved another \$4 million public investment in the Louisville incubator, for a total public investment of \$9 million. Construction is due to begin in July, 2001, with completion scheduled for March, 2003.

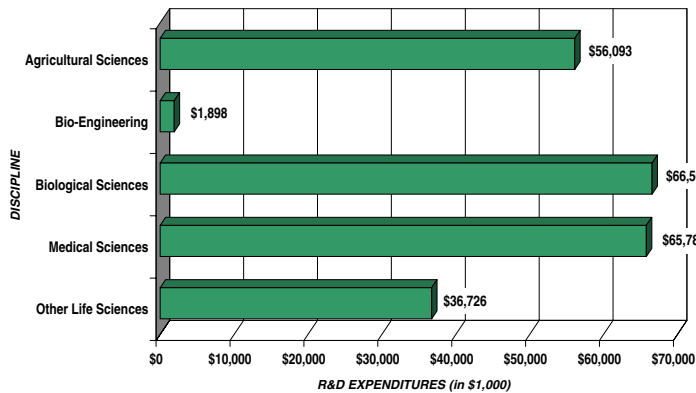
In addition, the city of Louisville recently acquired a 90,000 square foot commercial structure for \$2.15 million, and will lease it to the Louisville Medical Center Development Corporation as office and technology-development space.

In Lexington, the Coldspring Research Campus of the University of Kentucky has a strong life sciences emphasis. A business park near Bowling Green (i.e., near Western Kentucky University) and another one near the Cincinnati-Northern Kentucky Airport also welcome life science companies.

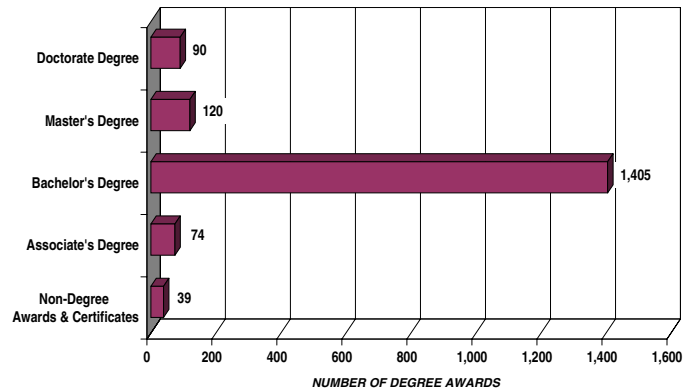
Louisiana

	Louisiana	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$227,068	\$15,728,292	25
Per Capita	\$52	\$58	
Percent Change FY1995–1999	-0.1%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$78,388	\$14,679,343	31
Per Capita 2000 Expenditures	\$18	\$52	
Percent Change in Expenditures FY1996–2000	23.4%	37.0%	
Higher Education Awards in Biological Sciences, 2000	1,728	88,982	17
Biological Scientists in the Workforce, 2000	6,930	454,980	23

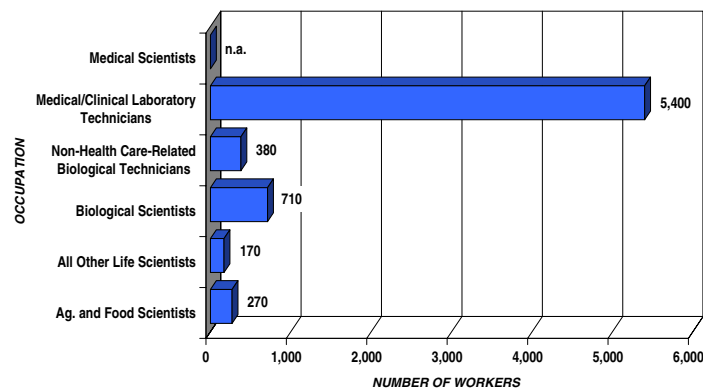
Total Bioscience R&D Expenditures at Academic Institutions in Louisiana



Life/Biological Sciences Degrees from Louisiana Higher Education



Biological Science Occupations in the Louisiana Workforce



LOUISIANA

The State of Louisiana adopted a strategic plan, *Vision 2020*, in 2000. The strategy has three goals, one of which is to build an economy driven by a diverse set of technology industries. The medical and biomedical industry is one of 10 industries that the state has targeted for investment. The Louisiana Department of Economic Development, which has been reorganized to implement the strategy, now includes a staff person responsible for developing and executing a program of work to successfully realize opportunities for retention, expansion, and recruitment of the Medical/Biomedical/Biotechnology/Health Care Cluster in Louisiana. This person is responsible for:

- Inventorying, developing, and maintaining a relationship with the current industry base;
- Identifying and addressing obstacles to growth of the cluster;
- Interacting with executives of current and prospective businesses to facilitate their decision to remain, to expand, or to locate in Louisiana;
- Working with the Communications and Policy and Research Coordinator to develop and implement a meaningful plan to market the medical, biomedical, biotechnology, and health care cluster to targeted markets both in-state and nationally;
- Developing benchmarks to establish a comparative analysis and measurement for determining success in growing the cluster in Louisiana;
- Developing a plan for measuring return on investment for cluster initiatives; and
- Determining the tools and/or resources necessary to achieve success, including university resources, proposed tax and legislative changes, program support (both financial and programmatic), and future workforce development requirements.

SEED AND VENTURE CAPITAL

The Certified Capital Companies program (CAPCO) is available to companies through the *NW Louisiana Biomedical Research Foundation* in Shreveport. This is a partnering effort with a Menlo Park, California operation. There is also an Angel Network operation to assist in finding seed capital.

OTHER FINANCING AVAILABLE TO BIOSCIENCE COMPANIES

The *Biomedical Research Foundation* works closely with prospective companies to determine their exact needs, and then works toward “adding value” to the package that is being put together to attract them to locate in Louisiana. Sometimes the incentive provided is real estate related, tax exemption related, alignment of the company and appropriate university researchers to continue appropriate product development initiatives, and/or market analysis for the company.

FACILITIES FINANCING

The State of Louisiana has assisted with building funds for the *Baton Rouge Technology Research Park* in Baton Rouge, the *National Biodynamics Laboratory* in New Orleans, *Pennington Biomedical Research Center*, *Gene Therapy Research Center* in New Orleans, and the high tech operations in all the state’s major research university operations.

NETWORKING

The mission of the *Louisiana Alliance for Biotechnology (LAB)* is to advance the interests and growth of biotechnology research and business development throughout Louisiana. The tools that are used to do this include a forum for researchers to actively and regularly communicate between themselves and with businessmen to increase the rate of technology transfer, to develop partnerships between academia and industry, and to become the clearinghouse of information related to this technical sector/industry at the state, federal and industry levels.

The mission of the *Baton Rouge Area Molecular Biological and Biotechnical Alliance* is to promote the Baton Rouge area in its growth toward a nationally and internationally recognized center of excellence in molecular biology and biotechnology. Regular meetings of university and private researchers, business representatives, and others needed to successfully meet the Alliance goals are held.

REGULATORY POLICY

- Louisiana has enacted genetic privacy legislation.
- Louisiana has not enacted “right to know” legislation.
- Louisiana has not enacted legislation to place price controls on prescription drugs.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The *Louisiana Business and Technology Center (LBTC)*, a 47,000 square foot business incubator on the Louisiana State University campus in Baton Rouge, has 27 tenants of which seven are biotech related. The LBTC provides business planning, management assistance, market research, capital acquisition, and general business support.

The University of New Orleans operates the *Innovation Center*, an incubator to assist medical and technology related start-up companies. The Center is located in the UNO Technology Enterprise Center, which also houses technology companies.

The *Center for Biomedical Technology Innovation (CBTI)* is dedicated to the support and development of advanced medical technology. Its special mission is to support development of technologies that promise not only an improvement in the quality of care, but also a reduction in the cost of care. The Biomedical Research Foundation created the Center with a \$7 million grant from the U.S. Department of Energy. To accomplish its mission, CBTI focuses on technologies allowing minimally invasive diagnosis and therapy, as well as technologies that apply information technology to health care issues. Specifically, CBTI is developing medical energy, imaging, and computer applications (including robotics) and is providing incubator and technology transfer opportunities.

InterTech is a triangular parcel of 2,400 acres in central Shreveport anchored by three major medical centers—LSU Medical Center in Shreveport to the south; Schumpert Medical Center to the east; and Willis Knighton Medical Center to the west. In addition to the three medical centers, the site encompasses a medical school, a nursing school, the Virginia K. Shehee Biomedical Research Institute, a Positron Emission Tomography Imaging Center, an emergency trauma center, a specialized orthopedic hospital and an incubator facility for new, technology-based businesses.

WORKFORCE DEVELOPMENT

The Louisiana Department of Economic Development has a *Workforce Development Program* that trains new employees of any approved company applicant, using grant dollars provided in the state budget. The Louisiana Department of Labor has *Workforce Development Act* funding to provide training funds for existing worker upgrades.

REGIONAL INITIATIVES

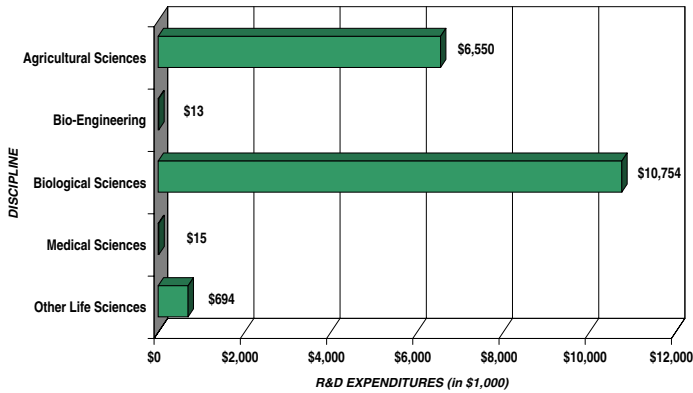
The *Biomedical Research Foundation of Northwest Louisiana* is an independent, not-for-profit, economic development and research organization incorporated in 1986 in the midst of a statewide economic recession due to the collapse of the oil industry. The Foundation was born of an economic development study that stressed the importance of diversifying the local economy so that Northwest Louisiana could successfully compete in the 21st century. The Caddo Parish Commission and the Greater Shreveport Chamber of Commerce provided seed money to establish the Foundation, and other support was generously provided by the Community Foundation of Shreveport-Bossier; the Samuel B. Hicks, Jr. Family Advised Fund; and members of the Shreveport-Bossier community. The Foundation is led by a non-paid, volunteer Board of Directors and managed by a president and professional staff.

In 1993, the citizens of Caddo Parish approved the levy of a special, five-year property tax to provide support to the Foundation for economic development and the establishment of a technology and research park—the InterTech Center. Since then, the Foundation has aggressively pursued economic development prospects and initiatives. In October 1997, Caddo Parish voters renewed the special property tax for 10 years. Money collected from the millage renewal—roughly \$13 million over a period of 10 years—will be used as seed money to attract much larger amounts of public and private funds to transform Shreveport into a destination for advanced technology companies, with a focus on medical and biotechnology companies.

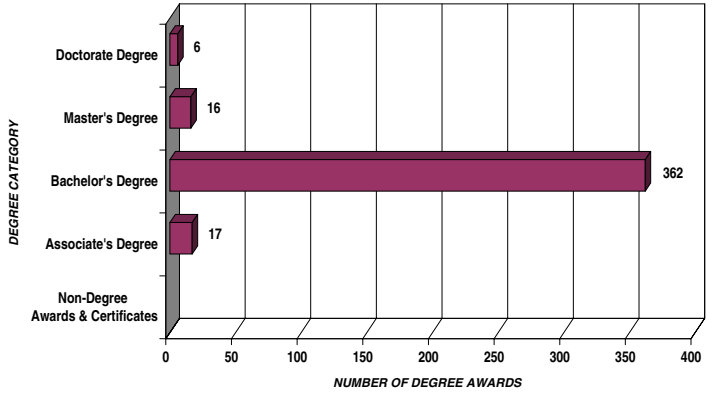
Maine

	Maine	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$18,026	\$15,728,292	49
Per Capita	\$14	\$58	
Percent Change FY1995–1999	-6.6%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$44,830	\$14,679,343	37
Per Capita 2000 Expenditures	\$35	\$52	
Percent Change in Expenditures FY1996–2000	71.7%	37.0%	
Higher Education Awards in Biological Sciences, 2000	401	88,982	43
Biological Scientists in the Workforce, 2000	2,080	454,980	40

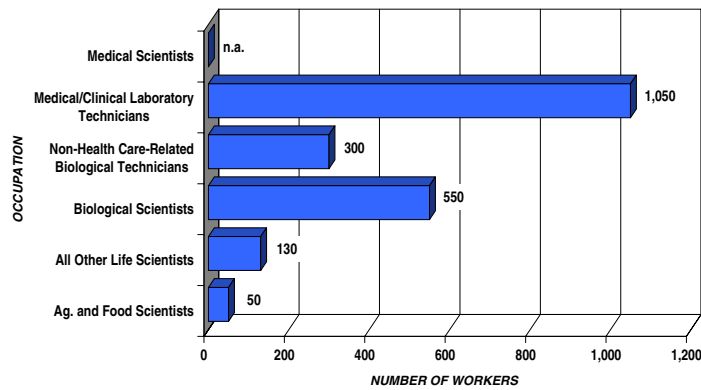
Total Bioscience R&D Expenditures at Academic Institutions in Maine



Life/Biological Sciences Degrees from Maine Higher Education



Biological Science Occupations in the Maine Workforce



Maine has not developed a strategic plan specifically focused on the biosciences; however, state-wide plans contain strategies for developing the state's biotechnology sector. Both the *Maine Science & Technology Action Plan 2001* published by the Maine Science and Technology Foundation (updated every two years) and the *State of Maine Economic Development Strategy*, January 2001, published by the Maine Department of Economic and Community Development (updated annually), include biotechnology as one of seven technology sectors targeted for development. The Maine Science and Technology Foundation is in the process of conducting industry cluster analyses for the targeted industries. The marine biotechnology report is already complete and the biotechnology report will be available around October 2001.

Initiatives that Maine has put in place to encourage the growth of the biotechnology industry include the following:

- The ***Maine Biomedical Research Program***, which invests in non-profit research laboratories, academic medical centers and medical schools that have been successful in attracting biomedical research funding from other sources. The fund, which is administered by the Maine Technology Institute, can support research projects, equipment and facilities. The legislature appropriated \$2 million for the program. In addition, the state has proposed a \$5 million bond issue for R&D equipment and infrastructure. If approved by the voters this fall, \$4 million of the bond proceeds will be used to support the Biomedical Research Fund.
- The ***Center for Innovation in Biotechnology***, an industry-driven, non-profit corporation established to catalyze the growth of Maine's biotechnology and biomedical sector by promoting the interaction of scientific excellence, commercial innovation, and business development. CIB encourages collaborative projects with commercial potential, organizes opportunities for networking among the entrepreneurial, venture capital, and biotechnology and biomedical communities, and facilitates access to product development services and funding. Additionally, the CIB provides a forum for discussion of topics relevant to the Maine biotechnology community.
- Creation of the ***University of Southern Maine Bioscience Research Institute (BRISM)***, with a mission of facilitating and increasing collaboration between university researchers and the Greater Portland biosciences community. The Institute has two major purposes: 1) to serve as the focal point for attracting external funding for R&D in the biosciences by fostering small group collaborations as well as individual research, and by assembling inter-institutional teams of researchers for large-scale projects, and 2) to facilitate the participation of University of Southern Maine (USM) and affiliated faculty in delivering the University of Maine collaborative Ph.D. program in Molecular Genetics and Cell Biology.
- A \$750,000 state appropriation to start-up the ***Thomas M. Teague Biotechnology Center of Maine*** in Fairfield Maine, as part of the statewide network of Applied Technology Centers. The Applied Technology Centers are state supported networks of self-managed, business incubators to support and foster technology-intensive companies in biotechnology, marine science, precision manufacturing, composite materials, environmental technologies, information technologies, and advanced technologies in forestry and agriculture.

SEED AND VENTURE CAPITAL

The *Maine Technology Institute (MTI)*, established by the Maine Legislature in 1999, is a non-profit organization created to encourage, promote, stimulate, and support research and development activity leading to commercialization of new products and services in the state's technology intensive sectors. MTI's *Seed Grants* of up to \$10,000 per project are offered on a competitive basis to support very early activities for product development, commercialization or business planning and development. Grants are awarded up to four times each year. To date, MTI has awarded \$37,300 in seed grants to biotechnology companies.

- *MTI Development Awards*. Investments of up to \$500,000 are made to support research and development of new products or services in the state's targeted technology sectors. This program, which began in September 2000, has invested more than \$2 million in the biotechnology sector. Development Awards are awarded two times per year.
- *MTI Cluster Enhancement Awards*. Awards of up to \$100,000 per project are made on a competitive basis to seed efforts that will stimulate and support the formation and growth of technology businesses. This program requires that a letter of intent be submitted to MTI prior to submission of a full proposal. The MTI Board of Directors considers full applications on a monthly basis at its regularly scheduled board meetings.

The *Small Enterprise Growth Fund*, operated by the Finance Authority of Maine, will make investments of up to \$500,000 on a matching basis with other cash resources invested in the business. The investment can be structured as either convertible debenture or direct purchase of preferred stock. The convertible debenture is designed to be flexible enough to provide "patient capital" to companies that have not yet generated sufficient cash flow to make regular debt payments. The preferred stock investment is designed to take an equity stake with no set repayment terms on the investment. The fund invests in targeted industries, which include marine science and biotechnology.

The state's *Seed Capital Tax Credit Program* is described under Tax Policy.

NETWORKING

The *Biotechnology Association of Maine* is a trade association that promotes the growth of the industry in the state, represents the industry to government, and influences public policy accordingly as well as promoting a forum for companies to exchange ideas and information. The association collects and prepares information relevant to the industry both at the state and federal levels and provides this information to members.

The *Center for Innovation in Biotechnology (CIB)* is also an industry networking organization with the mission of growing Maine's biotechnology and biomedical industries through the promotion of scientific research, commercial innovation, and business development. The CIB encourages collaborative projects with commercial potential, organizes opportunities for networking among the entrepreneurial, venture capital, and biotechnology and biomedical communities, and facilitates access to product development services and funding. CIB is funded through a direct appropriation from the legislature. CIB provides early research challenge grants.

The *Northeast International Biotechnology Corridor* is an organization established by the Conference of New England Governors and Premiers of Eastern Canada to coordinate and further the marketing and growth of the biotechnology industry in their region. The organization is incor-

porated and headquartered in Maine, working out of the Thomas M. Teague Biotechnology Center of Maine.

TAX POLICY

- **Research expense tax credit.** A taxpayer is allowed a credit of five percent of the excess, if any, of the qualified research expenses for the taxable year, over the base amount (established over the last three years); and 7.5 percent of the basic research payments determined under subsection (e)(1)(A) of Section 41 of the Internal Revenue Code. The amount of the credit cannot exceed the tax due. The credit is limited to 100 percent of a corporation's first \$25,000 of tax due, as determined before the allowance of any credits, plus 75 percent of the corporation's tax due, as determined in excess of \$25,000. Unused, unexpired credits generated by a member corporation may be carried over from year to year, for not more than 15 years.
- **Super credit substantially increased for research and development.** A taxpayer qualifying for a research expense tax credit under section 5219-K (above) is allowed an additional credit against the tax due equal to the excess, if any, of the qualified research expenses for the taxable year over the super credit base amount. For purposes of this section, "super credit base amount" means the average amount spent on qualified research expenses by the taxpayer in the three taxable years immediately preceding the effective date of this section, increased by 50 percent. The super credit allowed under this subsection applies only to the expenditures for research conducted in this State. The credit is limited to 50 percent of the taxpayer's tax due after the allowance of any other credits taken pursuant to this chapter. Any unused credit may carry over and apply to the tax due for any one or more of the next succeeding five taxable years the portion, as reduced from year to year, of any unused credit, but in no event may the credit applied in any single year exceed 50 percent of the taxpayer's tax due after the allowance of any other credits taken pursuant to this chapter. The credit provided by this section may not be used to reduce the taxpayer's tax liability under this part to less than the amount of tax due in the preceding taxable year after the allowance of any credits taken pursuant to this chapter.
- **High-technology investment tax credit.** A person engaged primarily (more than 50 percent of the time) in high technology activity that purchases and uses eligible equipment in that activity may claim a credit in the amount of that person's investment credit base of the eligible equipment; or a person engaged primarily in a high technology activity that leases and uses eligible equipment in that activity may claim a credit in the amount of the lease payments made on the eligible equipment in each tax year, except that if the eligible equipment is depreciable by that person for federal income tax purposes, the credit is based on that person's investment credit base (defined in the Internal Revenue Code) of the eligible equipment. The credit allowed under this section for any taxable year may not reduce the tax liability to less than zero. Any unused credit may be carried over and applied to the tax liability for any one or more of the next succeeding five taxable years the portion, as reduced from year to year.
- **Maine Seed Capital Tax Credit Program.** The Finance Authority of Maine is authorized to issue state income tax credits to investors for up to 30 percent of the cash equity that they provide to eligible Maine businesses. The Maine business must be a manufacturer, must provide a product or service that is sold or rendered, or is projected to be sold or rendered, predominantly outside of the State, or must bring capital into the State. The investment must be

expended on plant, equipment, research and development, or working capital for the business. Tax credits may also be issued to individuals who invest in private venture capital funds.

REGULATORY POLICY

- Maine has not enacted genetic privacy legislation.
- Maine has not enacted “right to know” legislation, but has voluntary labeling provisions.
- Maine has enacted legislation to place price controls on prescription drugs.
- Medicaid Reimbursement Policy: Maine has an open formulary, with limited prior authorization required for specific drugs.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

Thomas M. Teague Biotechnology Center of Maine in Fairfield Maine is part of the statewide network of Applied Technology Centers. The Applied Technology Centers are state supported networks of self-managed, business incubators to support and foster technology-intensive companies in biotechnology, marine science, precision manufacturing, composite materials, environmental technologies, information technologies, and advanced technologies, in forestry and agriculture.

Co-located within the Teague Biotechnology Center of Maine is the Jackson Laboratory-Fairfield. The Jackson lab will offer basic research training using a mouse model to research technicians, some of whom may be offered positions at The Jackson Laboratory-Bar Harbor. They will also operate a research lab.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

The *Center for Entrepreneurship and Small Business*, administered by USM’s School of Business, offers a variety of services to the entrepreneur and the small business community. The Premier FastTrac[®] New Ventures program helps entrepreneurs define their business concepts, evaluate their plans and launch their businesses; while the Premier FastTrac[®] Planning program helps businesses improve operations, management, budgeting and planning.

The Technology Law Center at the University of Maine School of Law was established by the legislature in 1999 to bring together faculty, students, practicing attorneys, the scientific community and Maine businesses to promote and assist technological innovation and economic growth. The center administers the Maine Patent Program, which provides patent assistance to entrepreneurs and manufacturers.

Market Development Centers help Maine businesses market products and services to federal and state agencies and other businesses through individual technical assistance, electronic scanning and distribution of contract announcements, a full government specifications library, monthly updates of procurement information, and other services.

WORKFORCE DEVELOPMENT

Kennebec Valley Technical College Bioscience Training Program, which operates in collaboration with the Jackson Laboratory, was developed in response to the growing demand for skilled technicians in the bioscience industry. The curriculum is designed to provide students with a sound theoretical base in the life sciences and to include the skills necessary for a variety of employment opportunities. National biotechnology skill standards are incorporated into the

coursework. Students who successfully complete the academic courses and demonstrate each skill standard will receive an Associate of Science degree.

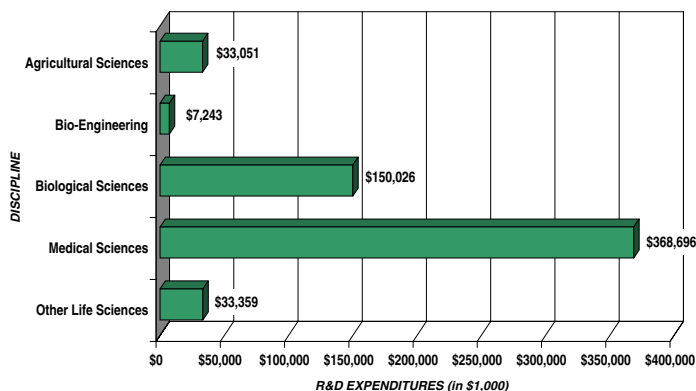
Maine Research Internships for Teachers and Students (MERITS) is a program that provides research opportunities for Maine students and teachers. Jointly administered by the Foundation for Blood Research and MSTF, MERITS has provided training experience for 210 students and 61 teachers from across the state. It expands students' learning experiences, encourages student interest in science, and forges collaboration between industry and schools.

Governor's Marine Studies Fellowships encourage the study of disciplines important to the conservation, management, and utilization of marine resource.

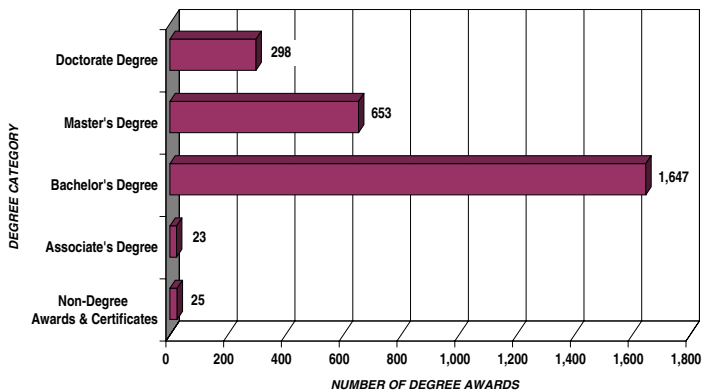
Maryland

	Maryland	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$592,375	\$15,728,292	8
Per Capita	\$115	\$58	
Percent Change FY1995–1999	11.3%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$868,641	\$14,679,343	5
Per Capita 2000 Expenditures	\$164	\$52	
Percent Change in Expenditures FY1996–2000	22.1%	37.0%	
Higher Education Awards in Biological Sciences, 2000	2,646	88,982	10
Biological Scientists in the Workforce, 2000	16,010	454,980	8

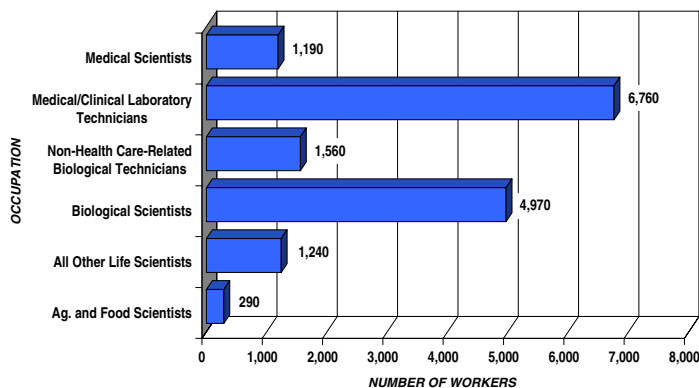
Total Bioscience R&D Expenditures at Academic Institutions in Maryland



Life/Biological Sciences Degrees from Maryland Higher Education



Biological Science Occupations in the Maryland Workforce



MARYLAND

Maryland has historically been one of the most active states in promoting the biotechnology industry. In 1991, Maryland adopted a biotechnology strategy and since that time has undertaken a comprehensive set of efforts that address the workforce, tax code, financing, R&D, commercialization, and industry facility issues that are important to young, growing biotechnology firms.

SEED AND VENTURE FINANCING

Maryland has no publicly supported venture fund dedicated exclusively to biotechnology or life science companies. The following investment programs, which are administered by the Maryland Department of Business and Economic Development (DBED), have, however, made significant investments in bioscience companies.

The **Challenge Investment Program (CIP)** makes small, high-risk investments in start-up firms. CIP funds can be used to help offset the costs of final testing and market development. In return for its investment, the state receives a royalty payment tied to the achievement of certain thresholds or revenues and capital structure.

The **Enterprise Investment Fund** makes direct equity investments in emerging high technology companies. EIF investments, which range from \$150,000 to \$500,000, can be used for start-up costs including recruiting and hiring staff, operating costs, and product marketing.

In addition, DBED recently committed that it will invest \$4 million in **Toucan Capital II**, a seed-stage venture fund based in Bethesda. While the Toucan fund is not focused exclusively on biotechnology, it intends to make approximately 50 percent of its investments in the biotechnology sector. Toucan Capital is in the process of finalizing its application to become a Small Business Investment Company with matching funds from the U. S. Small Business Administration.

OTHER FINANCING AVAILABLE TO BIOSCIENCE COMPANIES

MDBio, a private non-profit corporation which was originally created by the State of Maryland, makes awards to bioscience companies for product development and manufacturing. MDBio makes the following awards:

- GMP manufacturing incentive (maximum grant \$200,000)
- Product development accelerator (maximum \$100,000)
- Biomanufacturing upgrade (maximum \$100,000)
- Business Development (\$50,000)

MDBio can cover up to 50 percent of total project cost. In return for its investment, MDBio, which made its first investments in 1998, receives royalties or an equity position in the firm receiving the assistance. The State of Maryland will receive 25 percent of MDBio's profits in excess of \$250,000. It is anticipated that the state will begin to receive payments in 2003.

FACILITIES DEVELOPMENT

Maryland has no specific funds dedicated for biotechnology/life sciences facility development, however, the state has used two existing economic development programs, the **Economic Development Opportunities Fund**, better known as the Maryland Sunny Day Fund, and the **Maryland**

Industrial Development Finance Authority (MIDFA), to assist biotechnology and life science companies in obtaining financing for facility development. Sunny Day Funds have been used to help companies construct laboratory facilities and to purchase and install equipment. MIDFA financing has played an important role in helping to meet the large investment capital needs of Maryland biotechnology companies as they scale-up to manufacturing. MIDFA funds can be used for land acquisition, building construction and renovation, and to purchase machinery and equipment.

NETWORKING

The **Maryland Bioscience Alliance (BioAlliance)** is a statewide membership organization dedicated to serving the needs of the bioscience industry in Maryland. An organization of the Technology Council of Maryland, it provides a forum for senior managers from bioscience firms to meet and discuss topics of mutual interest. The Alliance addresses issues such as government regulations and workforce needs, proposes legislation, and seeks to build public understanding of the bioscience industry.

TAX POLICY

- **Tax abatement for locating/expanding in a qualified distressed area.** A tax credit may be claimed for a business involved in research and development or testing; biotechnology; computer programming, data processing, or other computer related services that establishes or expands a facility located in a qualified distressed county. The credit equals the lesser of 100 percent of the eligible project costs for the eligible economic development project, less the amount of the credit allowed with respect to the project for prior taxable years, or the state tax for the taxable year on the qualified business entity's income generated by or arising out of the project. If the eligible project costs for the eligible economic development project exceed the state tax on the qualified business entity's income generated by or arising out of the project for the taxable year in which the project is placed in service, the qualified business entity may apply any excess as a credit for succeeding taxable years until the earlier of the full amount of the excess is used; or the expiration of the 14th taxable year following the taxable year in which the project is placed in service.
- **Job creation tax credit.** For businesses that create at least 25 qualified positions and are engaged in research, development, or testing; biotechnology; computer programming, data processing, or other computer related services; a credit equal to the lesser of \$1,000 multiplied times the number of qualified employees employed by the qualified entity during the credit year; and 2.5 percent of the wages paid by the qualified business entity during the credit year to the qualified employees. For qualified employees working in a facility located in a revitalization area, the credit earned under this section equals the lesser of \$1,500 multiplied times the number of qualified employees employed by the qualified entity during the credit year; and five percent of the wages paid by the qualified business entity during the credit year to the qualified employees. If the credit in any taxable year exceeds the total tax otherwise due from the business for that taxable year, the qualified business entity may apply the excess as a credit for succeeding taxable years until the earlier of the full amount of the excess is used; or the expiration of the 5th taxable year from the credit year. The credit may not be carried back to a preceding taxable year.
- **R&D tax credit.** Established in 2000, income tax credits for qualified research and development expenses incurred by individuals or corporations are available. Total amount of credits

claimed in any year may not exceed \$6 million. The credit is three percent of the Maryland research and development expenses paid during the taxable year up to the base amount and 10 percent of the expenses paid during the taxable year that exceed the base amount. Any unused credit may be carried forward for the next 15 taxable years.

- Legislation has been proposed in Maryland to allow transfer of net operating losses.

REGULATORY POLICY

- Maryland has enacted genetic privacy legislation.
- Maryland has not enacted “right to know” legislation.
- Maryland has not enacted legislation to place price controls on prescription drugs.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

Maryland is home to a network of incubators, several of which are focused on biotechnology and life sciences companies. In total, these incubators include more than 50,000 square feet of laboratory space. They include

- The *AlphaCenter*, a non-profit, private biotechnology focused incubator owned by Johns Hopkins University and the Hopkins Health System, which includes 18,000 square feet of wet lab space;
- *Association for Entrepreneurial Science*, privately operated 48,000 square feet including wet lab space;
- *Bard Laboratories*, Baltimore City Community College, 38,000 square foot lab and office space;
- The *Medical Biotechnology Center*, University of Maryland Biotechnology Institute, 1,700 to 2,000 square feet of lab space, focus on biomedical and pharmaceutical areas;
- The *Technology Development Center* in Montgomery County is operated by the Maryland High Technology Council, which includes 24 wet labs;
- *The Technology Enterprise Center*, University of Maryland/Baltimore County, includes wet lab space; and
- *A Commercial/Wet Lab Office Building*, 66,000 square foot building, includes wet lab, animal facilities, and office space.

The *Shady Grove Life Sciences Center* is a research park located on Maryland’s I-270 technology corridor. In addition to corporate tenants, the Center houses the University of Maryland Biotechnology Institute’s Center for Applied Research in Biotechnology, a University of Maryland facility in which eleven different universities and colleges offer graduate and undergraduate courses, a campus of Johns Hopkins University, and an incubator.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

MDBio assists Maryland bioscience companies with marketing and regulatory issues and provides financing for management or strategic planning.

The Maryland Technology Development Corporation’s (TEDCO) *University Technology Development Fund* helps universities conduct pre-commercial feasibility research on very early stage

technologies. The fund can provide 50 percent of the cost of feasibility demonstration projects up to \$50,000. Successful projects will be required to reimburse the fund up to three times its original investment.

TEDCO's *Federal Laboratory Partnership Program* subsidizes companies that wish to do pre-commercial development or testing at federal laboratories in the state.

WORKFORCE DEVELOPMENT

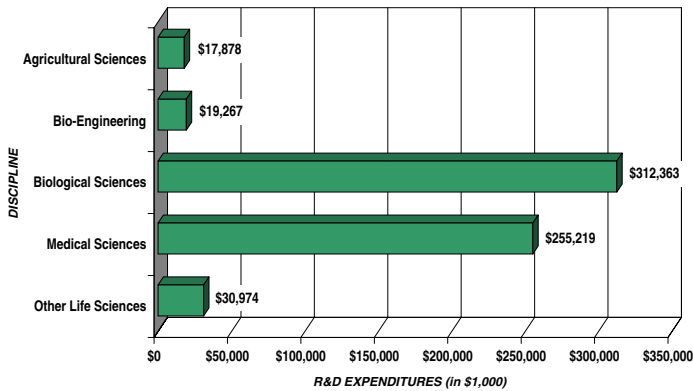
A number of Maryland institutions of higher education have programs that support development of a bioscience workforce. They include

- The *BioTechnical Institute of Maryland, Inc.*, which trains post high school graduates for entry level positions in biotechnology;
- *Montgomery County Community College*, which offers a biotechnology lab technician, A.A.S. degree program; and
- *University of Maryland at Baltimore*, which offers a B.S. in Biotechnology and Biomedical Studies.

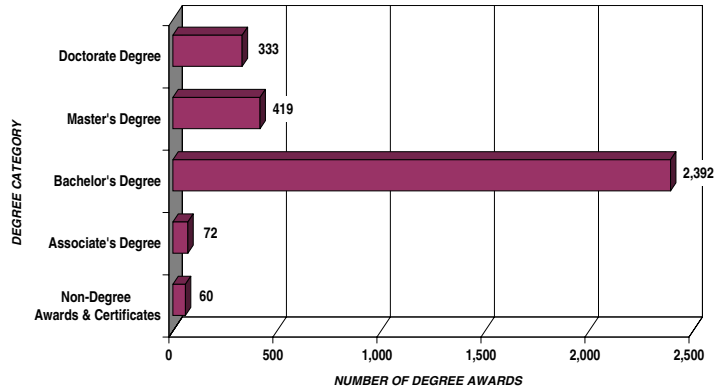
Massachusetts

	Massachusetts	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$635,701	\$15,728,292	6
Per Capita	\$103	\$58	
Percent Change FY1995–1999	26.5%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$1,534,352	\$14,679,343	2
Per Capita 2000 Expenditures	\$242	\$52	
Percent Change in Expenditures FY1996–2000	37.5%	37.0%	
Higher Education Awards in Biological Sciences, 2000	3,276	88,982	6
Biological Scientists in the Workforce, 2000	18,910	454,980	5

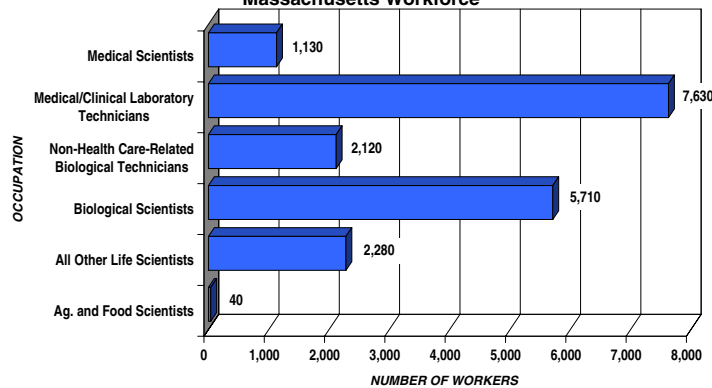
Total Bioscience R&D Expenditures at Academic Institutions in Massachusetts



Life/Biological Sciences Degrees from Massachusetts Higher Education



Biological Science Occupations in the Massachusetts Workforce



MASSACHUSETTS

According to an October 2000 report published by Ernst and Young, Massachusetts is home to the largest concentration of biotechnology companies anywhere in the world. Massachusetts estimates that in 1998 there were 456 bioscience companies in the state employing approximately 26,000 people. In addition, a significant portion of the Commonwealth's R&D organizations, educational institutions, and hospitals are actively involved in bioscience research and development. The Commonwealth of Massachusetts has supported a number of initiatives over the past 10 years to provide support to this important and growing sector of the state's economy.

Health care technology is one of four major clusters identified in *The Competitive Advantage of Massachusetts*, developed for the Weld-Cellucci administration in 1991, and represents one of the major cornerstones of *Choosing to Compete*, the state's strategic plan. The **Massachusetts Technology Collaborative (MTC)**, a public private economic development organization that was established by the state to foster the growth of the technology sector, supports projects in collaboration with technology industry clusters or regions seeking to develop technology industry clusters. Biotechnology and the biomedical industry was an early focus of MTC. MTC provided initial funding for the creation of MassMedic, a trade association for medical device manufacturers. MTC provides support services to biotech and life science companies seeking federal R&D support, including support from the SBIR/STTR and ATP programs

In addition to MTC, the **Massachusetts Biomedical Initiative (MBI)** works to support the growth and expansion of biotechnology and medical device companies by building on the academic research base in Central Massachusetts. MBI, which has been in operation since 1984, has an annual operating budget of about \$2 million. Past funding has come primarily from federal sources. MBI operates a number of programs that are described below.

SEED AND VENTURE FINANCING

Bioventure Investors LLC, a privately managed venture fund, is the fifth venture fund supported by MBI. Bioventure Investors plans to invest in the following areas:

- Biotechnology
- Health care
- Medical devices
- Bioinformatics and genomics
- Health-related services
- Drug discovery
- Other related technologies

Massachusetts Technology Development Corporation (MTDC) is a state-sponsored venture capital company that has been in operation since 1978. MTDC invests in Massachusetts-based companies with proprietary technology-based products. MTDC does not usually invest in biotechnology companies because the size of the fund is not large enough to meet the significant

capital needs of biotechnology companies. MTDC does invest in biomedical instrument and device companies.

FACILITIES FINANCING

The *Massachusetts Development Finance Agency (MassDevelopment)* has a number of asset-based financing vehicles, which can provide support to biotechnology companies.

NETWORKING

Massachusetts Biotechnology Council (MBC). MBC, a non-profit founded in 1985, provides services and support for Massachusetts' biotechnology industry. MBC works to advance policy and promote education while providing member programs and services. MBC represents more than 300 companies, academic institutions, and service organizations in biotechnology and health care.

MassMedic (Massachusetts Medical Device Industry Council). MassMedic is the state's trade association for medical device manufacturers. Its goal is to develop and implement programs and collaborative initiatives in areas of shared interest to member companies. MassMedic currently has more than 200 members.

Massachusetts has a rich infrastructure of university based networking programs, such as the MIT and WPI Enterprise Forums, that provide forums for start-up companies in biotech and other technology-based markets.

TAX POLICY

Massachusetts offers several tax credits to businesses engaged in R&D, including bioscience companies. The following credits are not transferable, but may be carried forward for up to three years.

- **Credit against corporate excise tax.** A manufacturing corporation, or a business corporation engaged primarily in research and development may claim a credit against the corporate excise tax of three percent of the cost or other basis for federal income tax purposes of qualifying tangible property acquired, constructed, reconstructed, or erected during the taxable year. Qualifying property also includes tangible personal property and other tangible property such as buildings and structural components of buildings acquired by purchase.
- **Credit against excise tax for leased personal property.** A manufacturing corporation, or a business corporation engaged primarily in research and development, may claim a credit against its excise due for tangible personal property leased. The amount is calculated as three percent of the lessor's adjusted basis in the property for federal income tax purposes at the beginning of the lease term, multiplied by a fraction, the numerator of which shall be the number of days of the taxable year during which the lessee corporation leases the tangible personal property and the denominator of which shall be the number of days in the useful life of such property.
- **The tax credit for a corporation renting or leasing tangible property** otherwise qualifying for the credit from a regional business development corporation or authority is three percent of the value of qualifying property leased and placed in qualified use during the taxable year.
- **R&D tax credit.** Massachusetts grants a tax credit for foreign and domestic corporations engaged in research and development in the state. Like the investment tax credit, it is available

to offset a corporation's excise tax liability; but the R&D credit is limited to a percentage of the qualified research expenses incurred in a given year.

REGULATORY POLICY

- Massachusetts has enacted medical records privacy legislation.
- “Right to know” legislation has been proposed but has not been enacted.
- Prescription drug price control legislation has been proposed but has not been enacted.
- Massachusetts has an open Medicaid formulary. However, pressure has been increasing to “prior authorize” new drugs, including biologics. Recently, the MBC helped to defeat a proposed rule that would have created a “biotech” class of drugs that would automatically require prior approval.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

MBIdeas Innovation Centers. MBI operates innovation centers at three locations in Worcester and one location in Boston. Each center offers fully equipped wet lab space, use of existing permits, and business assistance, consulting, and mentoring to start-up biotechnology and biomedical companies.

Massachusetts Biotechnology Research Park. Created in 1985, this research park currently includes about 1 million square feet of building space on 105 acres. It is home to more than a dozen biotechnology companies and also includes several non-profit and academic institutions. It is located adjacent to the University of Massachusetts Medical Center.

BioSquare. This is a private research park located in Boston, and affiliated with the Boston University School of Medicine and Boston Medical Center. BioSquare is located on 16 acres, and currently includes over 400,000 square feet of building space. The facility includes a 60,000 square foot Animal Science Center and Transgenic Facility, a cardiovascular imaging suite, a macromolecular X-ray crystallography facility, and a mass spectrometry resource core. BioSquare is home to one of the MBIdeas Innovation Centers.

The 106-acre ***Tufts Science Park*** is located on the campus of the Tufts University School of Veterinary Medicine. Tufts University and its subsidiary, Tufts Biotechnology Corporation (TBC), a private for-profit economic development company, own and manage the Park. The park provides space for research and development, pilot manufacturing and other activities related to the biotechnology, medical, and pharmaceutical industries, as well as the physical, environmental, and other sciences.

University Park at MIT. Created in 1983, University Park at MIT is now recognized as one of the premier office, high technology, and biomedical parks in New England and one of the first of its kind in the United States. Located on 27 acres next to MIT, University Park at MIT will contain 1.5 million square feet of first class office, research and development space, a 210-room hotel and executive conference center. Over 350,000 square feet of office and R&D space has already been completed and occupied.

Other major biotech park/centers include

- One Kendall Square, Cambridge;
- Cambridge Center, Cambridge;

- Charlestown Navy Yard, Boston;
- Longwood Medical Area, Boston; and
- Kendall Square Project (Cambridge Research Park), which will have 725,000 square feet of biotechnology space.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

The *MBIdeas Innovation Centers* provide commercialization and business development support to start-up bioscience companies.

MBI's Technology Commercialization Center provides academic institutions and entrepreneurs with technical expertise needed to commercialize new technologies. The Commercialization Center provides assistance on technology transfer, such as negotiating licenses, commercialization, and business consulting.

MassMEDIC and the Massachusetts Biotechnology Council operate *Venture Fairs* annually.

WORKFORCE DEVELOPMENT

The *Massachusetts Biotechnology Council* operates a Biotechnology Scholars Program that provides scholarships to Massachusetts' students who choose to study biomedical sciences.

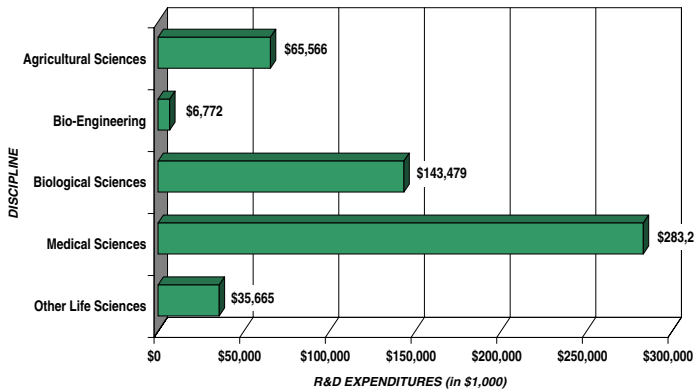
REGIONAL INITIATIVES

Central Massachusetts Biomedical Initiative. A consortium of research and medical institutions is undertaking this initiative. Its goal is to build a biomedical industry in Central Massachusetts by encouraging entrepreneurs and helping existing biomedical companies.

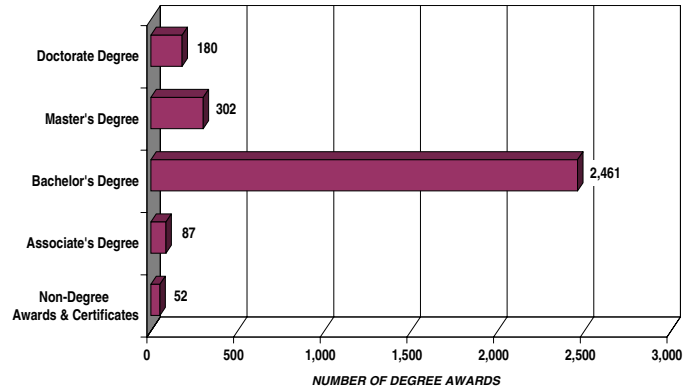
Michigan

	Michigan	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$534,706	\$15,728,292	9
Per Capita	\$54	\$58	
Percent Change FY1995–1999	12.0%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$389,888	\$14,679,343	11
Per Capita 2000 Expenditures	\$39	\$52	
Percent Change in Expenditures FY1996–2000	26.4%	37.0%	
Higher Education Awards in Biological Sciences, 2000	3,082	88,982	9
Biological Scientists in the Workforce, 2000	13,430	454,980	12

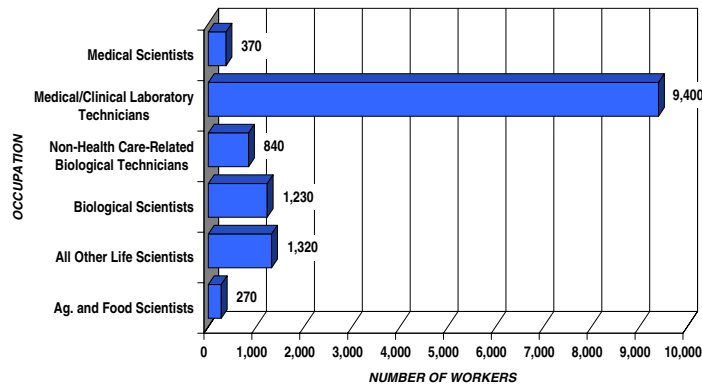
Total Bioscience R&D Expenditures at Academic Institutions in Michigan



Life/Biological Sciences Degrees from Michigan Higher Education



Biological Science Occupations in the Michigan Workforce



MICHIGAN

In 1999, Michigan launched its *Life Sciences Corridor*, a \$1 billion initiative over 20 years, designed to “develop Michigan as one of the world’s premier life sciences research and commercial centers.” The initiative is being funded at \$50 million annually from the state’s tobacco settlement. Of this \$50 million, 40 percent will be used to fund basic research at four Michigan research institutions (the Van Andel Research Institute, Michigan State University, the University of Michigan, and Wayne State University), 50 percent will be used to fund collaborative university and industry research projects aimed at developing commercial products and processes, and 10 percent will be used for commercialization activities aimed at bringing products to the market.

Thus far, the state has awarded \$100 million to fund 59 research projects. The projects were chosen through a competitive process, with priority being given to projects involving partnerships between institutions.

In addition to funding research projects, the Life Science Corridor Initiative is funding the Core Technology Alliance, a linked network of advanced laboratories. Each lab will be managed by one of the four Life Science Corridor research institutions, with the remaining institutions serving as satellite facilities. The labs will be open to private Michigan companies and other academics to study, design, and build new biotechnologies. Each of the labs will be equipped with specialized equipment that will be made available to private companies for a minimal charge. Approximately \$59 million has been allocated to fund the labs over the next five years.

Funding has been awarded for the following five laboratories:

- *Michigan Center for Genomic Technology* at Wayne State University
- *Michigan Proteomic Consortium*, located at the University of Michigan
- *Michigan Center for Structural Biology* at Michigan State University
- *Michigan Animal Model Consortium* at the Van Andel Research Institute
- *Michigan Center for Biological Information*, located at the University of Michigan

SEED AND VENTURE FINANCING

The Life Sciences Corridor has awarded \$1 million to the *Sloan Ventures Catalyst Fund* to establish a seed fund and \$2 million over three years to create the *Michigan State Universities Commercialization Initiative*.

NETWORKING

The *Michigan Biosciences Industry Association (MBIA)* is a not-for-profit, membership association. Its members are companies, universities, research institutes, and individuals that are involved in biotechnology within the state. The mission of the MBIA is to increase the understanding of the role and benefits of biotechnology and to support the growth of bio-based businesses in Michigan. To accomplish these goals, the MBIA arranges both networking and educational opportunities for its members and supports the development of requisite infrastructure to assist in the growth of bio-based businesses in Michigan.

The *Michigan Medical Device Association* is a statewide membership organization dedicated to serving the needs of its industry.

MEDC has organized a *Local Partners Advisory Group* and are going to create an industry roundtable to foster communication between industry members and universities.

TAX POLICY

- ***Michigan Economic Growth Authority (MEGA) Act 24 of 1995.*** A research and development business that proposes to create new jobs can enter into an agreement with the Michigan Economic Growth Authority. The business must agree to create 75 jobs if expanding in the state; 150 jobs if newly locating; and 25 jobs if locating in a neighborhood enterprise zone. Construction cannot have taken place prior to the agreement being written. MEGA cannot write more than 25 new agreements per year. The tax credit is limited to 20 years and is based on a number of items which must be included in the agreement: the number of qualified jobs to be created, the average wage level of the qualified new jobs compared to the average paid in the county in which the facility is located, total capital investment, cost differential to the business between expanding/locating in Michigan versus a site outside the state, potential impact of the expansion/location on the Michigan economy, and cost of the credit including government staff assistance and resources.
- ***High Tech Single Business Tax Credit, PA 144 of 2000.*** In addition to the original MEGA single business tax credits, in June 2000 the state expanded the tax credits for smaller high tech firms. To qualify as high tech the company must devote 25 percent or more of their total operating expenses to research and development. The firm must create five new jobs initially and 25 new jobs within five years. The wages for these jobs must be at least 400 percent of the minimum wage. The MEGA board can approve up to 50 projects per year. The MEGA incentive gives Single Business Tax credits for up to 20 years.
- ***Sales and use tax exemption.*** The Michigan sales and use tax act exempts tangible personal property when that property is used or consumed in industrial processing, which includes research and experimental activities.
- ***High Tech Tax Abatement, PA 247 of 2000.*** This incentive allows for the freezing of property taxes for up to 12 years to expand or build new facilities in Michigan. This tax abatement has been expanded to include high technology companies, formerly restricted to manufacturing firms.

REGULATORY POLICY

- Michigan has enacted genetic privacy legislation.
- Michigan has enacted “right to know” legislation.
- Michigan has not enacted legislation to place price controls on prescription drugs.
- Medicaid Reimbursement Policy: Michigan has a closed formulary and requires prior authorization for many drugs including several biotechnology drugs.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The *Michigan Biotechnology Institute International/Biobusiness Incubator of Michigan* offers space and commercialization assistance for biotechnology start-up companies within the state to locate and attempt to begin a business. It is the only biotechnology specific incubator in the state.

The Institute seeks to develop and commercialize biotechnologies through its research center and by developing partnerships with universities, federal labs, and industry. The research center consists of 120,000 square feet of space.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

MEDC's *Emerging Technology Challenge Fund*, funded at \$3 million over three years, provides up to \$150,000 to university applicants seeking to commercialize technology. Funds can be used for demonstrating proof of concept, supporting internship programs pairing students and graduates with start-ups and venture capital firms; underwriting of consultant and initial human resource development costs; grant writing assistance and support for identifying both public and private financial support; and seed investor identification. A minimum 1:1 dollar match is required for all applications.

The *Michigan Life Sciences Corridor* will provide funding for both applied university/industry research projects and commercialization.

MEDC assists Michigan life sciences companies with marketing and regulatory issues and provides financing for management or strategic planning.

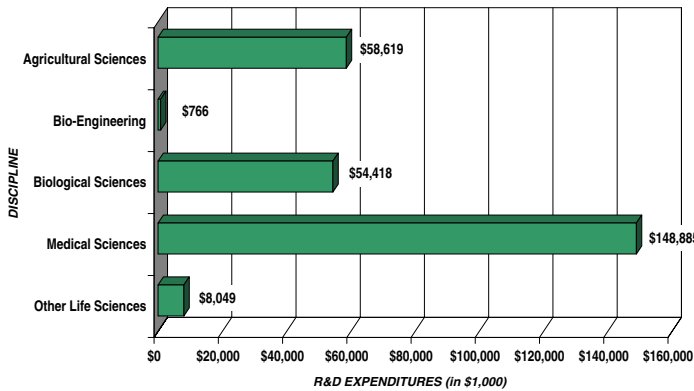
WORKFORCE DEVELOPMENT

Michigan has no initiatives specifically designed to train bioscience workers. The state's *Economic Development Job Training (EDJT)* program provides funding to companies for training or retraining of workers to meet marketplace needs, with the employer required to match 25 percent of the state grant for training of existing workers. Funds are awarded through a competitive process. The employer works with private or public education providers to design the training.

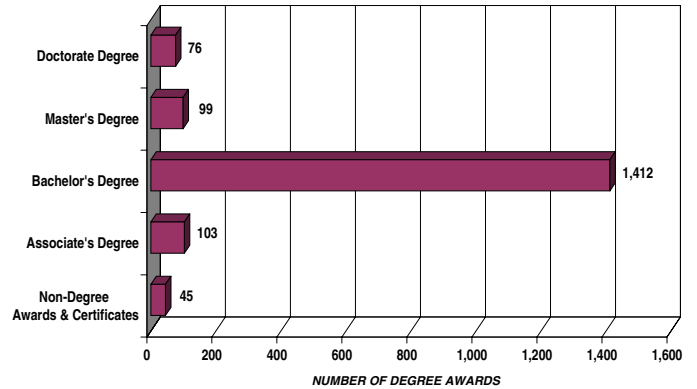
Minnesota

	Minnesota	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$270,737	\$15,728,292	19
Per Capita	\$57	\$58	
Percent Change FY1995–1999	3.3%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$281,517	\$14,679,343	14
Per Capita 2000 Expenditures	\$57	\$52	
Percent Change in Expenditures FY1996–2000	25.9%	37.0%	
Higher Education Awards in Biological Sciences, 2000	1,735	88,982	16
Biological Scientists in the Workforce, 2000	10,530	454,980	16

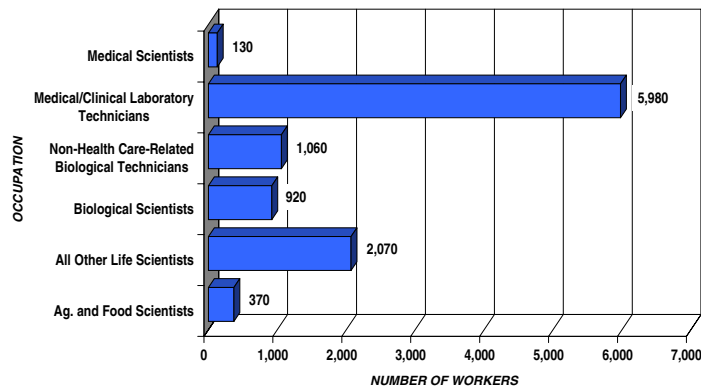
Total Bioscience R&D Expenditures at Academic Institutions in Minnesota



Life/Biological Sciences Degrees from Minnesota Higher Education



Biological Science Occupations in the Minnesota Workforce



MINNESOTA

The *Biomedical Innovation and Commercialization Initiative (BICI)* is a new for-profit corporation that was created to license and commercialize technology developed at the University of Minnesota and the Mayo Clinic. The state's investment will be matched by \$30 million from private industry.

BICI will provide proof of concept and early stage capital and help develop management talent for start-up companies. BICI will manage two funds: a proof of concept fund that will make investments in the range of \$100,000 to \$500,000 and an emerging markets fund that will make investments in the range of \$250,000 to \$3 million.

BICI funds have been appropriated in the recent Minnesota biennial budget process.

NETWORKING

MNBIO is an association for biotechnology networking opportunities within the state whose goal is to promote the steady growth of Minnesota's life sciences industry through partnerships of industry, financial resources, academia, and government. MNBIO also provides educational resources, seeks to heighten public awareness of the industry, and represents its industry members on matters of public policy.

The *Collaborative*[®] is a networking organization comprised of emerging companies, investors and advisors, which seeks to foster entrepreneurship and to help the growth of better, more profitable companies in Minnesota. The Collaborative offers specialty programs and publications that provide information on business solutions and contacts.

Medical Alley is a Minneapolis-based trade association representing more than 220 health care and biosciences related companies and organizations. Association members include medical device and product manufacturers; hospitals, clinics, and health care professionals; health plans, insurance organizations, and third-party payers; education and research facilities; public sector representatives; pharmaceutical companies; and service organizations. The association's mission is to serve as a collaborative forum that promotes an environment to enhance innovation in health-care.

Minnesota Technology Inc. (MTI) is a quasi-public organization that supports the growth of the state's technology base. MTI's *Industry Networks program* is a public/private partnership designed to foster innovation by encouraging collaborations among companies with common interests and goals. Through this program, MTI brings together companies with a common technology need and facilitates the development of goals and action plans. Once an action plan is developed, MTI provides staff resources to assist the participants in implementing the plan.

TAX POLICY

- **Credit for increasing research activities.** Corporations, other than Subchapter S Corporations, may claim a credit against the franchise tax equal to five percent of the first \$2 million of the excess of qualified research expenses over a base amount, and 2.5 percent on all excess research expenses over \$2 million. The credit for the taxable year shall not exceed the liability for tax. In the event there is unused credit, it can be carried over to each of the 15 succeeding taxable years.

REGULATORY POLICY

- Genetic privacy legislation has been proposed but not enacted in Minnesota.
- “Right to know” legislation has been proposed in Minnesota.
- Minnesota has not enacted legislation to control the cost of prescription drugs.
- Medicaid Reimbursement Policy: Minnesota has an open formulary, but requires prior authorization for certain products including some biotechnology products.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

Biodale is a suite of facilities located at the University of Minnesota-St. Paul campus that provides university departments and outside companies with access to sophisticated services and equipment, such as laser scanning microscopes. More than \$20 million in university, state, federal, and private funding was spent equipping Biodale.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

MTI assists the biotechnology and life sciences industry in the application, development, and commercialization of technology. MTI services include

- Working with companies to identify and implement new technologies that will improve products and processes;
- Providing custom market research services to Minnesota biotechnology/life sciences companies; and
- Providing assistance with the identification of technology and technology resources that are available from federal labs, academic institutions, and private sector resources.

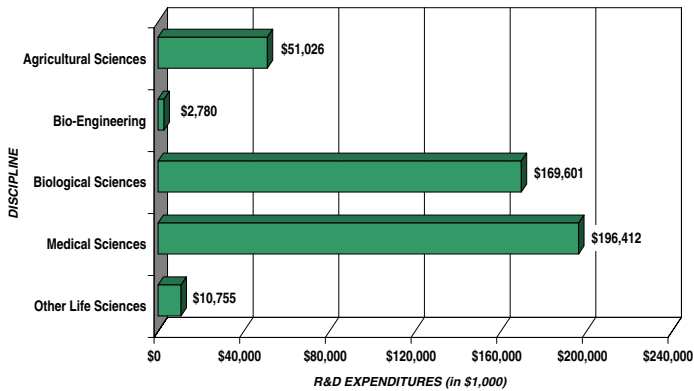
WORKFORCE DEVELOPMENT

The *Biotechnology Education and Training Initiative* at the University of Minnesota offers university-based short courses and workshops to industry professionals, scientists, teachers, and others interested in knowledge and research in biotechnology. It links continuing education courses and workshops, degree programs, teacher education and community outreach to serve the Minnesota biotechnology community.

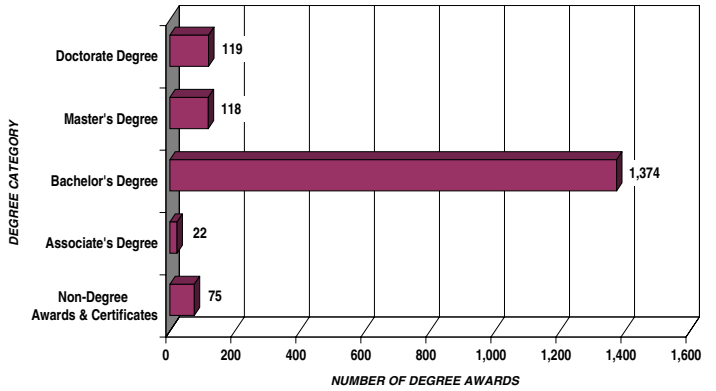
Missouri

	Missouri	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$430,574	\$15,728,292	12
Per Capita	\$79	\$58	
Percent Change FY1995–1999	519.2%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$366,950	\$14,679,343	12
Per Capita 2000 Expenditures	\$66	\$52	
Percent Change in Expenditures FY1996–2000	44.0%	37.0%	
Higher Education Awards in Biological Sciences, 2000	1,708	88,982	18
Biological Scientists in the Workforce, 2000	8,990	454,980	17

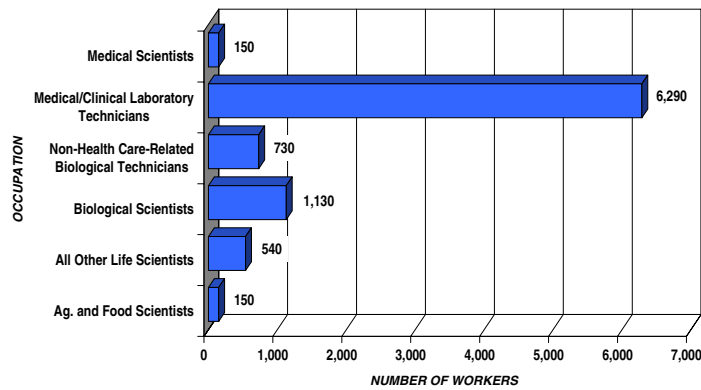
Total Bioscience R&D Expenditures at Academic Institutions in Missouri



Life/Biological Sciences Degrees from Missouri Higher Education



Biological Science Occupations in the Missouri Workforce



MISSOURI

Established in 1994, the *Missouri Technology Corporation (MTC)* is dedicated to creating a stronger Missouri economy by developing science and technology; promoting business modernization through transfer of science, technology, and quality improvement methods; and enhancing the productivity of Missouri business. Missouri has identified three economic sectors for development—life sciences, information technology, and transportation.

The MTC has assumed a leadership role in Missouri’s overall life sciences initiative. It provides strategic direction, encourages collaboration, identifies untapped research and development dollars, and promotes Missouri technology leadership. Seed and Venture Capital

The *Prolog Fund*, a public-private fund for early stage capital, is currently completing its capital accumulation phase and is preparing to make investments in biotech/life sciences companies. The creation of this \$40 million fund was authorized by the Missouri New Enterprise Creation Act, which also provided that tax credits be given to investors in the fund. Prolog will create two parallel funds. One is the “qualified” fund, in which investors will receive a one dollar Missouri income tax credit for every dollar invested. The income tax credit can be transferred or sold. For each dollar in the qualified fund, investors also must put up one dollar for a “non-qualified” fund. The legislation provides that any investments made by the qualified fund must be in Missouri companies. The non-qualified fund doesn’t have the same restriction.

OTHER FINANCING AVAILABLE TO BIOSCIENCE COMPANIES

Through the *Centers for Advanced Technology (CATS) Program*, the state of Missouri helps industries pay for research contracted through a state university. Each dollar spent by the state on a project must be matched by at least one dollar from the client industry. Funded projects are expected to result in either reduced production costs, increased sales, or additional investment in the company.

NETWORKING

The *Missouri Biotechnology Industry Organization (MO-BIO)* is a statewide membership organization that provides a legislative focus, educational initiatives, and networking opportunities for the biotechnology/life sciences industry in Missouri.

The *Governor’s Life Sciences Roundtable* is a statewide forum to provide communication and support for life sciences initiatives.

TAX POLICY

- **Tax credit for relocating a business to a distressed community.** A tax credit for relocating a business to a distressed community may be granted to a business with fewer than 100 employees (75 percent of which are at the distressed community location). The business must be engaged in manufacturing, biomedical, medical devices, scientific research, animal research, computer software design or development, computer programming, telecommunications, or a professional service. A 40 percent credit against income taxes on specific equipment is available if approved by the Department of Economic Development, which issued a certificate of eligibility. Employees of companies that have received the above tax credits also are eligible to receive a tax credit against individual income tax, equal to 1.5 percent of their gross salary

earned for each of the three years that the business receives the tax credit. The total maximum of tax credits under this program is limited to no more than \$10 million dollars for each year. The total maximum credit for companies already located in distressed communities is \$750,000.

- **Tax credit for qualified research expenses.** A taxpayer may be allowed a tax credit against the tax otherwise due up to 6.5 percent of the excess of the taxpayer's qualified research expenses over the average of the taxpayer's qualified research expenses within this state for the preceding three taxable years. No credit is given if the company spends 200 percent more for R&D in the coming year versus the annual average of the preceding three years. Unused credit balances may be carried forward for up to five years.
- **CAPCO, Certified Capital Companies Sections.** Insurance companies that make an investment in a CAPCO are eligible for a tax credit equal to 100 percent of their investment. The investor must take the credit at 10 percent over a 10-year period. The tax credits may be used to offset state premium tax liability or they may be sold and transferred to another taxpayer having premium tax liability. The maximum amount of certified capital in one or more CAPCOs for which earned and vested tax credits will be allowed in any year to any one investor or its affiliates is limited to \$10 million. A CAPCO may invest in an eligible business which must derive its revenue primarily from manufacturing, processing, or assembling of products; conducting research and development; or, service businesses which can demonstrate that more than 33 percent of revenue would be from outside the state of Missouri.
- **New enterprise creation tax credit.** A business involved in production, research and development, or providing services in interstate commerce is eligible for a credit equal to 100 percent of its investment in a qualified fund. The credit may then be used to offset state income tax, corporate franchise tax, or financial institution tax liability. Tax credits may be claimed for the tax year in which the qualified contribution is made or in any of the following 10 years. Credits may be sold and transferred to another taxpayer having the same tax liability. Credits are limited to \$20 million for use by the qualified fund, with no more than \$5 million of tax credits being issued in any one year. The Missouri Seed Capital Investment Board will establish a qualified fund. Seed capital investments made through this program may be used for research; development and precommercialization activities to prove a concept for a new product, process, or service; preproduction product development; service development; or initial marketing of a product.

REGULATORY POLICY

- Missouri has enacted genetic privacy legislation.
- Missouri has not enacted "right to know" legislation.
- Missouri has not enacted legislation to place price controls on prescription drugs.
- Medicaid Reimbursement Policy: Missouri has an open formulary with prior authorization required for specific drugs.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The *Center for Emerging Technologies* is a high technology incubator primarily serving biotech and medical related start-up companies. The main building is 92,000 square feet and contains wet/dry labs and DNA labs among other biotechnology related necessities. It is a public-private

partnership financially supported by the University of Missouri-St. Louis and the state Department of Economic Development. In addition, the City of St. Louis is an owner of one of the incubator buildings.

The *St. Charles County Synergy Center* is a business incubator facility with wet lab space available for high tech life sciences start-up companies. The Center, operated by and for the St. Charles County area, offers clients a full range of business support services, including administrative assistance and teleconferencing capabilities.

The *Nidus Center for Scientific Enterprise*, although not publicly funded, is a non-profit, 40,000 square foot plant and life sciences incubator in St. Louis. The Center is part of an investment from Monsanto Company among others.

Although Missouri has no research parks targeted exclusively to bioscience companies, the following research parks offer accommodations for bioscience companies:

- *Missouri Research Park*, St. Charles, MO
- The *University of Missouri Technology Park* at Fort Leonard Wood, Fort Leonard Wood, MO
- *University of Missouri Research Park*, Columbia, MO

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

The four *Missouri Innovation Centers* provide a wide range of management and technical assistance during the early stages of development for new technology-based business ventures. Services include market research and strategies; technology assessment; business planning; financial packaging; research and development; business management; patent and licensing consulting; preliminary patent searches; and prototype development. They also provide physical space with necessary support in their business incubators. The four centers are

- *Center for Emerging Technologies* in St. Louis;
- *Missouri Enterprise Business Assistance Center*, Rolla, Springfield;
- *Missouri Innovation Center* in Columbia; and
- *Center for Business Innovation* in Kansas City.

WORKFORCE DEVELOPMENT

The *St. Louis Workforce Development Initiative* seeks to encourage students to choose science and math study programs in preparation for careers in the life sciences; and provides schools and teachers with information about skill needs in the life sciences industry and the types of courses students need to become employable in life sciences.

REGIONAL INITIATIVES

The *St. Louis Regional Chamber and Growth Association (RCGA)* has developed and is implementing a plan to position St. Louis as the international center for plant sciences and a major international center in life sciences. Initiatives that are already underway include

- *Danforth Plant Science Center*, a free-standing non-profit R&D center composed of a partnership of six leading research institutions;

- The *NIDUS Center for Scientific Enterprise*, a plant sciences incubator which will house 15 to 20 plant and life sciences-related firms;
- *Center for Emerging Technologies*, a business development and incubator facility located adjacent to the Washington University Medical School; and
- *Technology Gateway Alliance*, an alliance of technology professionals coming together in an effort to stimulate the development of the technology economy in the St. Louis region.

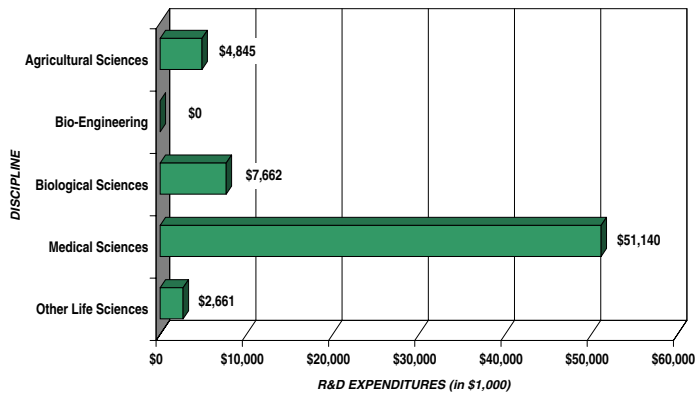
Kansas City has also initiated an effort to build the region's life sciences industry. The *Kansas City Life Sciences Institute* is a not-for-profit corporation that has been established to implement a strategy to foster collaboration and resource sharing between the area's private sector, academia and government. This effort is designed to capitalize on the newly created \$200 million Stowers Institute for Medical Research. Built on 10 acres, this state of the art complex includes 600,000 square feet of labs, animal care facilities, and administrative offices.

The *University of Missouri-Columbia* is building a new life sciences center. The facility, which will include 124,000 square feet of space, will house 50 new research laboratories, controlled growth facilities, teaching and computer labs, and a 250-seat auditorium. The university received a \$15 million federal grant and a \$30 million appropriation from the state to construct the center. A private fund-raising effort has set a \$10 million goal for equipment and programs for the Life Sciences Center. Construction is scheduled to begin in 2001.

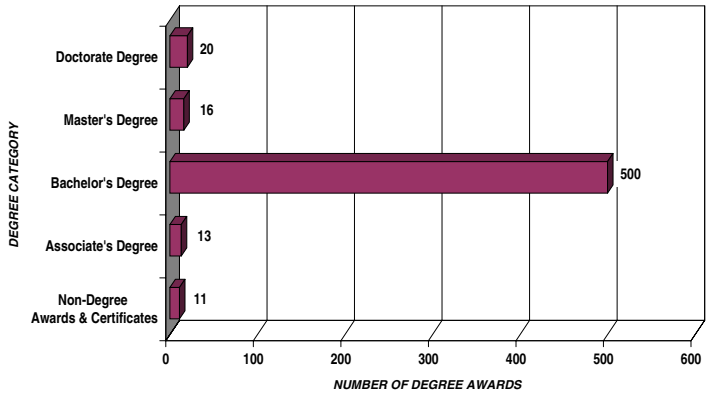
New Hampshire

	New Hampshire	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$66,308	\$15,728,292	37
Per Capita	\$55	\$58	
Percent Change FY1995–1999	25.2%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$57,217	\$14,679,343	34
Per Capita 2000 Expenditures	\$46	\$52	
Percent Change in Expenditures FY1996–2000	26.4%	37.0%	
Higher Education Awards in Biological Sciences, 2000	560	88,982	37
Biological Scientists in the Workforce, 2000	1,130	454,980	48

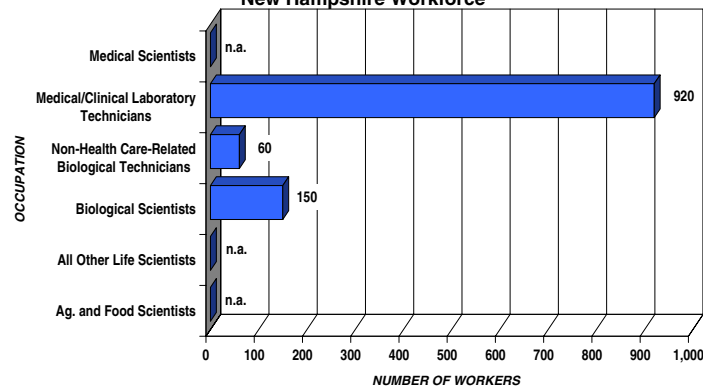
Total Bioscience R&D Expenditures at Academic Institutions in New Hampshire



Life/Biological Sciences Degrees from New Hampshire Higher Education



Biological Science Occupations in the New Hampshire Workforce



NEW HAMPSHIRE

In April 2001, New Hampshire released *New Hampshire in the New Economy*, a comprehensive economic development plan for the state. While the plan calls for investment in innovation and research and development, it does not include any specific recommendations with regard to the state's bioscience industry.

OTHER FINANCING AVAILABLE FOR BIOSCIENCE COMPANIES

The New Hampshire Industrial Research Center's (NHIRC) ***Technical Assistance Grant (TAG) Program***, provides funding to enable New Hampshire companies to receive subsidized technical assistance from the University of New Hampshire or Dartmouth University. Funding is provided for basic and applied R&D projects leading to new or improved products or processes in a number of technology areas, including biotechnology.

By demonstrating that the proposed project will increase or preserve the number of jobs in New Hampshire, companies become eligible for state funds to match company funds on a dollar for dollar basis, generally not to exceed \$25,000. Projects with extraordinary job creation potential may receive higher funding. Proposals with greater company match are viewed more favorably. A five percent fee on the total project is charged to help cover administrative expenses.

NETWORKING

The ***New Hampshire Biotechnology Council's*** mission is to develop the biotechnology industry within the state by providing information and assistance to biotechnology companies looking to relocate in the state of New Hampshire, increasing the education level within and outside of the industry by supporting the creation of new initiatives for basic knowledge as well as job training activities for companies, to represent the industry on behalf of the companies to government and the local public, and to serve as a local clearinghouse resource for Council members. The Council defines the biotechnology industry to include the life science, biosciences, and medical sciences.

TAX POLICY

New Hampshire has no general sales or use tax, no general personal income tax, and no property tax on machinery or equipment.

REGULATORY POLICY

- New Hampshire has enacted genetic privacy legislation.
- New Hampshire has not enacted "right to know" legislation.
- New Hampshire has not enacted legislation to place price controls on prescription drugs.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

NHIRC helps companies by providing market research assistance and helping inventors to develop, patent, copyright, and commercialize their ideas and innovations through the ***NHIRC Inventors Assistance Program (IAP)***.

WORKFORCE DEVELOPMENT

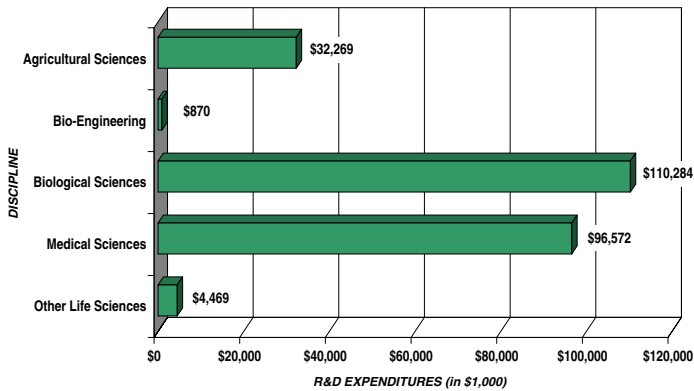
The ***New Hampshire Technical College at Stratham*** has created an entry-level biotechnology education and training program to support the biomedical and biotechnology industry. With the

help of a grant from the federal *Advanced Technology Program* and matching funds from the state, a fully equipped bench top biotechnology research, development, and manufacturing lab was built at the New Hampshire Technical College-Stratham/Pease Center to help provide a source of experiential learning for workers seeking biotechnology careers. This program has been developed with the Bioscience Industry Skill Standards in mind so that graduates have the necessary skills and knowledge to allow them to immediately compete in the workforce upon graduation.

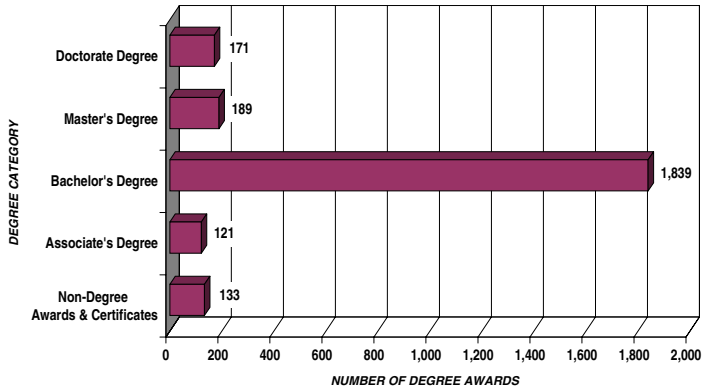
New Jersey

	New Jersey	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$244,464	\$15,728,292	21
Per Capita	\$30	\$58	
Percent Change FY1995–1999	10.8%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$185,575	\$14,679,343	24
Per Capita 2000 Expenditures	\$22	\$52	
Percent Change in Expenditures FY1996–2000	54.8%	37.0%	
Higher Education Awards in Biological Sciences, 2000	2,453	88,982	12
Biological Scientists in the Workforce, 2000	16,460	454,980	7

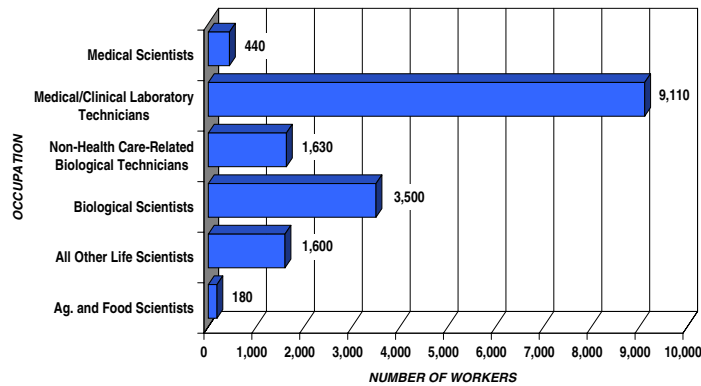
Total Bioscience R&D Expenditures at Academic Institutions in New Jersey



Life/Biological Sciences Degrees from New Jersey Higher Education



Biological Science Occupations in the New Jersey Workforce



NEW JERSEY

Medical biotechnology, agricultural biotechnology, environmental technology, and food technology have been among the key thrusts of the New Jersey's Commission on Science and Technology since its creation in 1985. In 1998, the High Tech Job Retention Act was passed. It included an investment tax credit, a transferable research and development tax credit, and extended from seven to fifteen years the time small companies may carry forward their net operation losses and research and development tax credits.

Major commission programs, which benefit bioscience companies, include the ***R&D Excellence Awards program***, offering competitive multiyear grants to New Jersey academic institutions, often in partnership with industry, and a ***Technology Transfer and Commercialization Program*** (see below), offering repayable grants to New Jersey-based technology companies with short-term commercialization research programs. Approximately 50 percent of the R&D Excellence awards are in the life sciences.

In prior year, the Commission seeded and then spun off several life-sciences centers of excellence, including

- The ***Center for Advanced Biotechnology and Medicine***—a collaboration of University of Medicine and Dentistry of New Jersey (UMDNJ) and Rutgers University;
- The ***Biotechnology Center for Agriculture and the Environment***—at Rutgers University/Cook College; and
- The ***Center for Advanced Food Technology***—also at Rutgers University/Cook College.

Other key life-science facilities created through capital funding controlled by the Commission include

- The ***Clinical Research Center*** at the UMDNJ-Robert Wood Johnson Medical School;
- The ***Cell Fermentation Facility*** at the Rutgers Waksman Institute of Microbiology; and
- The ***Lewis Thomas Molecular Biology Laboratory*** at Princeton University.

SEED AND VENTURE FINANCING

New Jersey has not publicly supported seed or venture funds dedicated exclusively to bioscience companies. The following funds invest in early-stage technology companies, including bioscience companies.

Early Stage Enterprises is an SBIC focusing on early-stage opportunities in the New Jersey region. Its capital structure includes \$4.3 million from the Commission on Science and Technology, \$10.5 million in private investment from leading business corporations and utilities, and \$29.5 million in leverage from the federal SBIC program.

New Jersey Technology Council Venture Fund is a recently formed fund, which focuses on early stage technology companies in New Jersey. The state contributed \$10 million toward this \$30 million fund, which will be leveraged from the federal SBIC program.

The New Jersey Economic Development Authority offers loans of \$25,000 to \$3 million through its ***Seed Capital Program***.

OTHER FINANCING AVAILABLE TO BIOSCIENCE COMPANIES

The *New Jersey Commission on Science and Technology* offers repayable grants of \$50,000 to \$250,000 for commercialization research through its *Springboard Fund*. Biotechnology and life-science companies are regularly supported through this mechanism.

Under the *Business Employment Incentive Program (BEIP)*, qualified businesses can receive grants of up to 80 percent of New Jersey personal income tax withholdings from new jobs created when the company expands or relocates to New Jersey. To qualify, a company must create a minimum of 25 jobs in urban areas or 75 jobs in non-urban areas. Pharmaceutical, information technology, and bioscience companies have been assisted by this program.

FACILITIES FINANCING

The New Jersey Economic Development Authority offers a *Technology Funding Program* that co-participates with commercial banks on term loans of \$100,000 to \$5 million for working capital or fixed-asset financing needs.

The NJEDA also offers a *tenant fit-out allowance* of \$100/square foot at the *Technology Centre of New Jersey* (see description under research parks).

NETWORKING

The *Biotechnology Council of New Jersey* was chartered in January 1994 to serve as a voice and to create a positive climate for the state's biotechnology companies. The Council represents companies engaged in biopharmaceutical, biomedical, bioagricultural, and bioremedial endeavors before legislators, the media, and the general public.

The *Health Care Institute of New Jersey* acts as a unified voice for the state's research-based pharmaceutical and medical technology industry. The Institute, which includes 19 pharmaceutical and medical technology leaders headquartered in New Jersey, works with New Jersey citizens, state government, private business, trade and non-profit organizations, as well as the media, to communicate its messages and serve as a central information resource.

The *New Jersey Technology Council's Life Sciences Industry Network* provides New Jersey-based life sciences companies with access to expertise in marketing, regulatory affairs, legislative issues, and financing and information systems, and serves as a platform for cross technology and other strategic collaborations and for recognition of life sciences technology leaders.

TAX POLICY

- **Corporation business tax benefit certificate transfer program.** Under the *New Jersey Emerging Technology and Biotechnology Financial Assistance Program*, a corporation business tax benefit certificate transfer program is available to allow new or expanding emerging technology and biotechnology companies with unused amounts of research and development tax credits otherwise allowable, which cannot be applied for the credit's tax year, to surrender those tax benefits for use by other corporation business taxpayers in this state, provided that the taxpayer receiving the surrendered tax benefits is not affiliated with a corporation that is surrendering its tax benefits under the program.
- **Taxpayer credit for certain research activities.** A taxpayer shall be allowed a credit of 10 percent of the excess of the qualified research expenses for the fiscal or calendar accounting year over the base amount; and 10 percent of the basic research payments determined in

accordance with section 41 of the federal Internal Revenue Code provided the research is conducted in New Jersey. The amount of the credits applied under this section shall not exceed 50 percent of the tax liability otherwise due and shall not reduce the tax liability to an amount less than the statutory minimum. The amount of tax year credit otherwise allowable under this section which cannot be applied for the tax year due to the limitations of this subsection may be carried over to the 15 accounting years following a credit's tax year.

- **High technology business investment tax credit.** Ten percent of the qualified investment made in each of three tax years (\$500,000 per year cap) is available for businesses engaged in advanced computing, advanced materials, biotechnology, electronic device technology, environmental technology, or medical device technology, with less than 225 employees. Unused credit may be carried forward for 15 years.
- **Carryover of net operating loss.** Companies with qualified research expenses, which experience a net operating loss for a particular tax year, may carry it over to each of the 15 tax years following the year of the loss. The qualified research conducted in the state must be in the fields of advanced computing, advanced materials, biotechnology, electronic device technology, environmental technology, or medical technology.
- **Sales tax exemption on tangible personal property for use in R&D.** Receipts from sales of tangible personal property (except energy) purchased for use or consumption directly in research and development in the experimental or laboratory sense are exempt from the tax imposed under the Sales and Use Tax Act. Goods used for ordinary testing or inspection are not included.

REGULATORY POLICY

- New Jersey has enacted genetic privacy legislation.
- New Jersey has not enacted “right to know” legislation.
- New Jersey has not enacted legislation to place price controls on prescription drugs.
- Medicaid Reimbursement Policy: New Jersey has an open formulary with limited prior authorization required for a few specific products including anti-obesity drugs.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The following incubators provide facilities for bioscience companies:

- The *Rutgers Business Innovation Center* in New Brunswick
- The *NJIT Enterprise Development Centers I and III (planned)* in Newark
- The *Burlington County College High Technology Incubators I and II (planned)* in Mt. Laurel
- *Stevens Technology Ventures Business Incubator II (planned)* in Hoboken

The *Technology Centre of NJ* is a life science oriented research park in North Brunswick that was developed by the New Jersey Economic Development Authority (NJEDA). It includes both single-tenant and multitenant space, most of it wet lab capable. Tenants include divisions of several life-science companies.

University Heights Science Park is an urban research park in Newark. The park is anchored by a biomaterials center, three university-affiliated business incubators, and the International Center for Public Health (ICPH). ICPH is a high-rise research facility to be shared by UMDNJ and the Public Health Research Institute (PHRI). NJEDA financed \$60 million of the cost of the ICPH in order to attract PHRI to locate in the park.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

The Commission is supporting enhancements in the technology transfer and intellectual property offices of the state's major research universities.

The ***Entrepreneurial Training Institute*** is a program sponsored by the New Jersey Development Authority for Small Businesses, Minorities' and Women's Enterprises (NJDA). The Institute consists of an eight-session workshop during which students develop a business plan for their own businesses, which is subsequently submitted to a panel of banking, accounting, law, marketing, and economic development professionals for a thorough review.

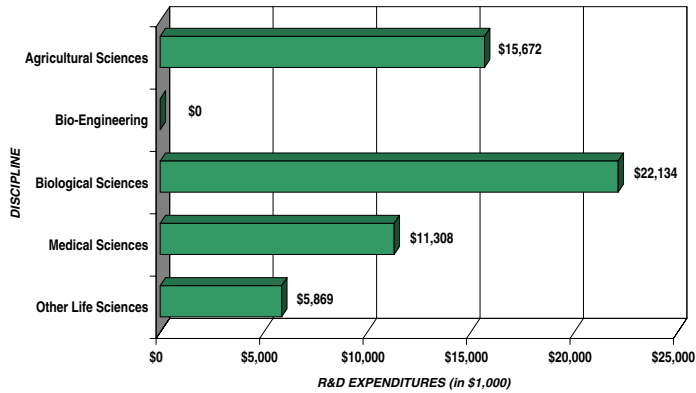
WORKFORCE DEVELOPMENT

The Commission on Higher Education has \$15 million in each of 2000 and 2001 for ***Technology Workforce Program*** grants through the universities, colleges, and community colleges. Life science awards to date have focused on tissue engineering, bioengineering, bioinformatics, and surgical technology.

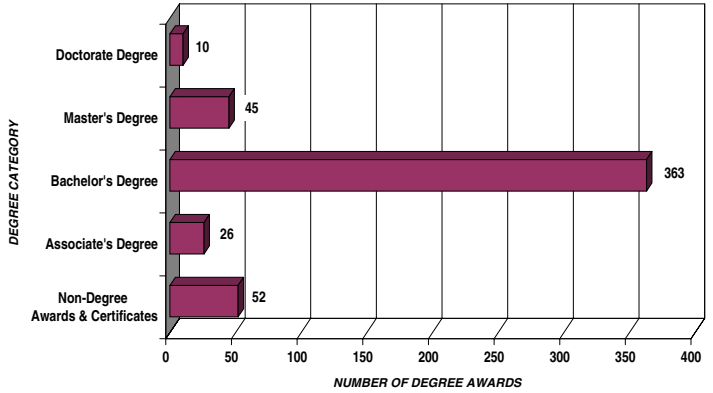
New Mexico

	New Mexico	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$54,983	\$15,728,292	40
Per Capita	\$32	\$58	
Percent Change FY1995–1999	-8.8%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$65,123	\$14,679,343	32
Per Capita 2000 Expenditures	\$36	\$52	
Percent Change in Expenditures FY1996–2000	69.5%	37.0%	
Higher Education Awards in Biological Sciences, 2000	496	88,982	39
Biological Scientists in the Workforce, 2000	2,590	454,980	37

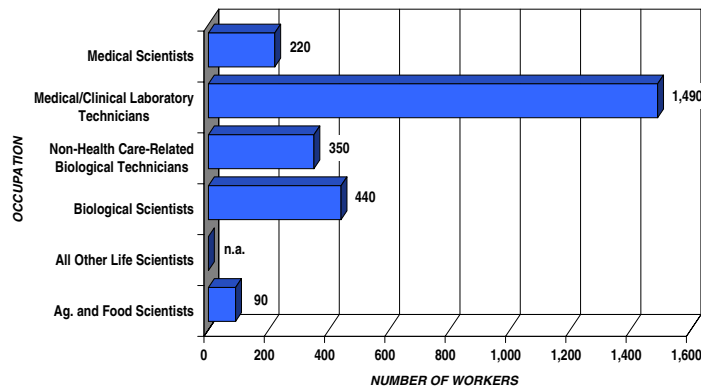
Total Bioscience R&D Expenditures at Academic Institutions in New Mexico



Life/Biological Sciences Degrees from New Mexico Higher Education



Biological Science Occupations in the New Mexico Workforce



NEW MEXICO

New Mexico's economic development strategy includes a focus on developing a biotechnology/biomedical cluster in the state. The Department of Economic Development includes two staff people who focus on the development of this industry cluster. One staff member is responsible for assisting entrepreneurs, start-up, and expanding companies in the high technology sectors identified in the state's strategic plan, which includes the biotechnology and biomedical industry. The second staff member, a Trade Specialist for the European Community, focuses on trade missions and assisting export ready New Mexico biotechnology and biomedical firms.

NETWORKING

The *New Mexico Biotechnology and Biomedical Association* is a networking organization that brings together industry professionals in order to exchange ideas and information with the hope that these forums will lead to positive business relationships for New Mexico and El Paso, Texas biotechnology industries and lead to the growth of the industry within this region. The Association seeks to understand key issues affecting the industry and develop initiatives to respond to these issues. It also represents the industry on matters relating to public policy and with image regarding the general public. It provides education on commercialization of ideas, capital acquisition, marketing, development, and manufacturing issues as they relate to the life sciences industry as well as providing specific company information on companies within the New Mexico and El Paso, Texas region.

TAX POLICY

- **Research and development tax reduction.** This program is for research and development services produced by a business with a New Mexico office but sold for initial use to an out-of-state buyer. Additionally, out-of-state delivery is not charged gross receipts tax. For a company engaged in R & D the tax saving is five percent of state gross receipts, plus any local additional tax of up to 2.1875 percent.
- **Technology jobs additional credit.** This credit has two components: a gross receipts incentive (available monthly) and an income tax incentive (available annually). Any taxpayer doing qualified R&D at a facility in New Mexico (other than one operated for the U.S. Government) may claim a credit equal to four percent of qualified expenditures. Qualified expenditures include rent, facility operation and maintenance (except for facilities owned by the taxpayer before the effective date, owned by a local government as an industrial revenue bond project, or for which the taxpayer received another credit), equipment, software, payroll, and technical manuals and materials. The credit may be applied against state taxes (gross receipts, compensating and withholding). Basic credit amounts not claimed against these taxes may be claimed against income taxes. The credit amount doubles if the qualified facility is in a rural area.
- **Investment tax credit.** A credit applied to the purchase of qualified equipment used in a manufacturing operation in New Mexico.

REGULATORY POLICY

- New Mexico has passed genetic privacy legislation.
- New Mexico has not passed "right to know" legislation.

- New Mexico has not passed legislation to place price controls on prescription drugs.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

The *New Mexico Technology Assets Program* is an all-volunteer coalition of business, university, and government professionals dedicated to helping New Mexico's high technology businesses and entrepreneurs succeed. TAP services include the following:

- Market research
- Strategic planning
- Technology evaluation
- Business case assessment
- Business plan development
- Business formation and expansion issues
- Other regulatory, licensing, and registration issues

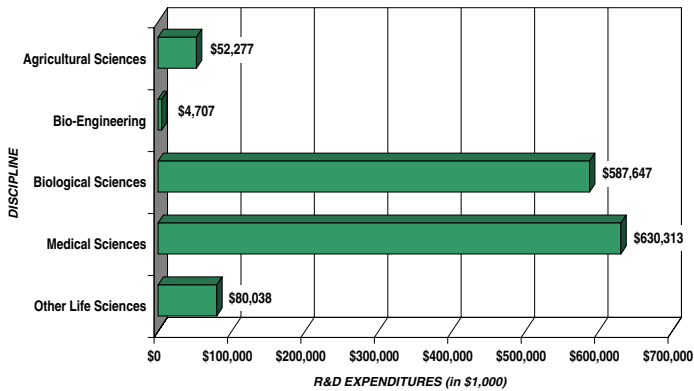
WORKFORCE DEVELOPMENT

New Mexico has no workforce programs designed specifically to meet the needs of bioscience companies. The state's *Industrial Development Training Program*, however, provides funds for training projects to prepare New Mexico residents for employment in new or expanding industry.

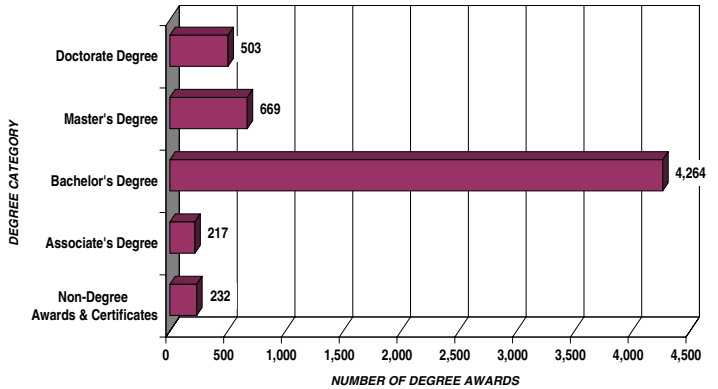
New York

	New York	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$1,354,982	\$15,728,292	2
Per Capita	\$74	\$58	
Percent Change FY1995–1999	10.3%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$1,422,860	\$14,679,343	3
Per Capita 2000 Expenditures	\$75	\$52	
Percent Change in Expenditures FY1996–2000	31.6%	37.0%	
Higher Education Awards in Biological Sciences, 2000	5,885	88,982	2
Biological Scientists in the Workforce, 2000	34,400	454,980	2

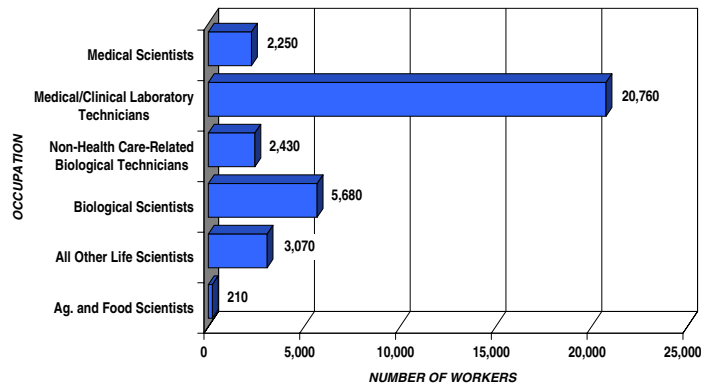
Total Bioscience R&D Expenditures at Academic Institutions in New York



Life/Biological Sciences Degrees from New York Higher Education



Biological Science Occupations in the New York Workforce



NEW YORK

New York State has a wide array of initiatives underway to encourage the growth and development of the state's bioscience industry. In 1999, *Jobs 2000 (J2K)* was enacted, which created the *New York State Office of Science, Technology, and Academic Research (NYSTAR)* and appropriated \$500 million to support capital projects in academic research institutions, basic and applied research and development, and technology transfer activities. J2K also established the New York Venture Capital Investment Program, a \$250 investment fund capitalized by the state's retirement system. A substantial portion of the funds New York has appropriated for technology development is being used to develop bioscience facilities and to fund bioscience research and commercialization.

Funds were recently awarded for six Strategically Targeted Academic Research (STAR) Centers, four of which have a bioscience focus. Each of the following Centers will receive approximately \$15 million.

- ***The Center for Biomolecular Diagnostics and Therapeutics at the State University of New York (SUNY) at Stony Brook.*** This center will focus on research and technology development in the areas of functional genomic instrumentation, gene discovery, drug design and delivery, and smart micro- and nano-based biomaterials and biosensors.
- ***The Center of Disease Modeling and Therapy Discovery at SUNY Buffalo.*** The consortium will serve as the locus for gene expression, protein scale-up and purification, combinatorial chemistry, structural biology, and pharmacogenomics.
- ***The New York Structural Biology Center at City University of New York.*** The Center will provide state of the art equipment in nuclear magnetic resonance spectroscopy and cryo-electron microscopy.
- ***The High Resolution Imaging of Functional Neural Circuits in Behavior and Pathology Center at Columbia University.*** The Center will develop new technologies to improve the diagnosis and treatment of neurodegenerative and psychiatric disorders.

A new initiative called *Gen*NY*sis*, has been proposed by the NY Senate. *Gen*NY*sis* would provide \$500 million in targeted tax credits and direct state grants to match private, academic, and industry investments to create and attract new bioscience companies. It would provide funding for

- State grants to match private, academic, and industry investment in basic research, including funding for research, laboratory construction and the purchase of state-of-the-art research equipment;
- Technology transfer and development;
- A "Life Sciences Business Development Program" to encourage the growth of biotech industry in New York State through workforce training and creation of life science bio-business parks;
- Targeted tax relief, including creation of special tax benefit "life science development zones," more than doubling the existing Research and Development Tax Credits to 20 percent and providing increased wage and tax credits for biotech industry employers; and

- Empire State Development and NYSTAR to help new businesses overcome regulatory hurdles and provide additional startup assistance.

Lastly, Governor Pataki has proposed creating *Centers of Excellence* that will link university researchers with business and industrial leaders. The Governor's plan utilizes \$283 million in State funds during the next five years to leverage more than \$700 million in combined federal, university, and private funds to spur high tech and biotech job growth through the "Centers of Excellence" and other initiatives.

One of the four Centers of Excellence that have thus far been announced focuses on the biosciences. The **Center of Excellence in Bioinformatics at Buffalo** will, through the University of Buffalo's Center for Computational Research, create academic and industrial partnerships with Roswell Park, the Hauptman Woodward Medical Research Institute, Praxair, Advanced Refractory Technologies (ART), Ethicon, Veridian, and Life Technologies, among others.

SEED AND VENTURE FINANCING

The *Biotechnology Industry Growth Fund*, is a \$10 million fund established by the state to provide capital to start-up bioscience companies. Empire State Development, New York State's economic development agency, manages the fund.

Small Business Technology Investment Fund (SBTIF) provides venture capital funding for New York's emerging high tech and biotechnology firms. The fund is limited to businesses that locate and remain in the state of New York. Most investments involve startups that have a prototype but need assistance with commercialization. Typical investments range from \$50,000 to \$500,000 and include biotechnology, optics, software development, and materials science.

In addition, the *NYS Common Retirement System* has a large alternative asset pool and is buying into venture capital, and in New York City the Economic Development Corporation has bought into a venture capital fund, *Prospect St. NYC Discovery*, and financed a quasi-public seed fund, *Emerging Industries Fund*.

NETWORKING

The *New York Biotechnology Association (NYBA)* is a not-for-profit trade association dedicated to the development and growth of New York State based biotechnology related industries and institutions, and to strengthening the competitiveness of New York State as a location for biotechnology/biomedical research, education and industry. NYBA offers networking opportunities and represents the industry in matters of public policy at the legislative level. Additionally, the association serves as an information resource for the biotechnology industry and the general public and acts to promote the industry through educational events.

The *Health Care Industry Association of Western New York* is a regional trade association serving bioscience companies in the Rochester and Buffalo region.

Academic Medicine Development Corporation is a New York City focused but statewide consortium of medical centers and academic research institutions. Through AMDEC, its 36-member institutions work collaboratively to develop large scale basic science and clinical research projects, expand New York's research infrastructure, and recruit talented researchers to New York's scientific institutions.

Biomedical Research Alliance of New York (BRANY) is an alliance of academic medical centers in the New York City region designed to conduct high-quality clinical research trials for the pharmaceutical and biotechnology industries in a rapid, efficient, and ethical manner.

TAX POLICY

- **R&D exemption.** New York individuals and corporations engaged primarily in research and development activities may elect to use the special R&D investment tax credit in lieu of the state's regular investment tax credit. The R&D investment tax credit is equal to nine percent of investments for corporate income taxpayers and seven percent for personal income taxpayers. Unused credits can be carried forward for up to 15 years. Businesses that have been New York taxpayers for four years or less may elect to receive a refund of the unused credit balance.
- ***Qualified Emerging Technology Company (QETC) employment credit and QETC capital tax credit.*** Tax credits are available for qualified emerging technology companies that increase employment in New York State. New York also offers investors in qualified emerging technology companies credits toward their income tax obligations.
- **Sales tax exemptions for production, research, and development.** New York State offers sales tax exemptions for purchases of production machinery and equipment, research and development property, and fuels/utilities used in manufacturing and R&D. A state/local exemption from sales and compensating use tax is provided for sale.

REGULATORY POLICY

- New York has enacted genetic privacy legislation.
- New York has enacted "right to know" legislation.
- New York has not enacted legislation to impose price controls on prescription drugs.
- Medicaid Reimbursement: New York has an open formulary with no prior authorization.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The Audubon Biomedical Science and Technology Park at Columbia University's Health Sciences Campus offers biotechnology business research park space of 100,000 square feet with additional incubation facilities for start-up companies.

The ***Long Island High Technology Incubator*** facility, located at SUNY-Stony Brook, offers wet lab space for start-up biotechnology companies among others. It is connected to a privately operated bioprocessing facility.

The ***University at Buffalo Foundation Incubator*** offers wet lab space for the Buffalo/Niagara region of New York State with 40,000 square feet of space. It is located at the University of Buffalo, a SUNY school.

The ***SUNY Albany-East Campus Incubator***, located in the former Sterling Winthrop Laboratory, offers both office and lab space.

The ***North Shore-Long Island Jewish Health System*** announced major expansion plans last year that include a bioscience incubator as part of an \$18 million Research Institute. The new incubator, for which the State provided \$3.2 million, will occupy the first floor of a four-story addition to the existing research complex.

The ***Broad Hollow Bioscience Park*** opened in September 2000 on the campus of SUNY Farmingdale. OSI Pharmaceuticals, a rapidly growing biotechnology company, agreed to become the biopark's first anchor tenant.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

Cornell University's Center for Biotechnology and the ***Center for Biotechnology at SUNY-Stony Brook*** provide access to university researchers and facilities for bioscience companies. Both Centers are funded through the state's Centers of Advanced Technology (CAT) program. The ***Innovative Technology Development program***, administered by the Center at Stony Brook, funds innovative commercially promising, faculty research, alone or in partnership with industry. The program funds projects designed to add value to technologies that will facilitate licensing, strategic partnerships, and/or new company formation.

NYSTAR's Technology Transfer Incentive Program funds projects to support the efforts of colleges and universities to commercialize high technology innovations.

New York's ***Regional Technology Development Centers*** provide entrepreneurial and business assistance, financing and venture capital information, and federal research grant information and assistance to employers across the state.

WORKFORCE DEVELOPMENT

The ***New York Biotechnology Association*** has received grant funding for programs aimed at meeting the workforce needs of biotechnology firms. Initial activities will include a biotech job fair and an industry workforce survey.

The ***Rochester Institute of Technology*** has received funding to survey the needs of the bioscience industry and to create a training-internship program. RIT has also proposed a bachelor's degree in bioinformatics which, if approved, will be offered in fall 2002.

Hunter College, City University of New York, offers a biotech training program in its Master's program, which includes internships in biotechnology companies.

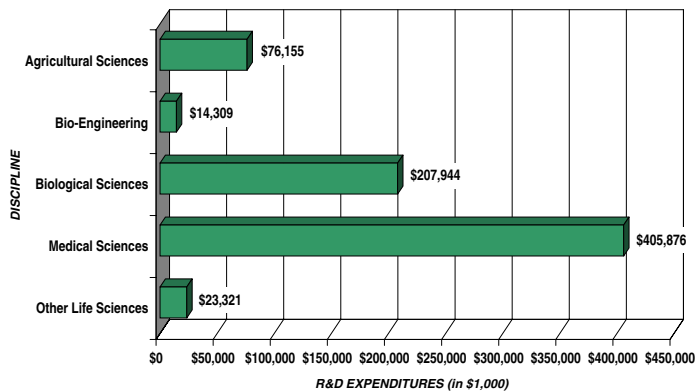
SUNY Albany's School of Public Health, the Albany College of Pharmacy and Omnicare Clinical Research have formed the ***Pharmaceutical Development Consortium***, which is developing a course that will teach students and professionals how to conduct a clinical drug trial.

The ***Empire State Technology Employment Incentive Program*** provides funding for employers in targeted industries, including biotechnology, to offer prospective employees cash incentives worth \$3,400 annually for up to four years. This \$1.7 million program is designed to encourage graduates of the State's engineering, computer science, and applied science programs to accept employment in New York.

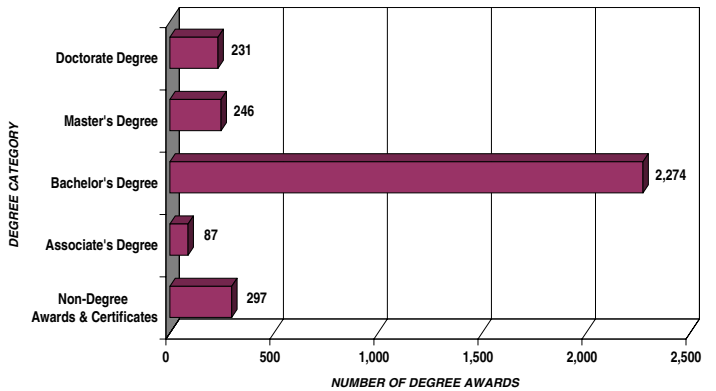
North Carolina

	North Carolina	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$727,605	\$15,728,292	5
Per Capita	\$95	\$58	
Percent Change FY1995–1999	33.6%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$581,097	\$14,679,343	7
Per Capita 2000 Expenditures	\$72	\$52	
Percent Change in Expenditures FY1996–2000	30.3%	37.0%	
Higher Education Awards in Biological Sciences, 2000	3,135	88,982	7
Biological Scientists in the Workforce, 2000	13,790	454,980	11

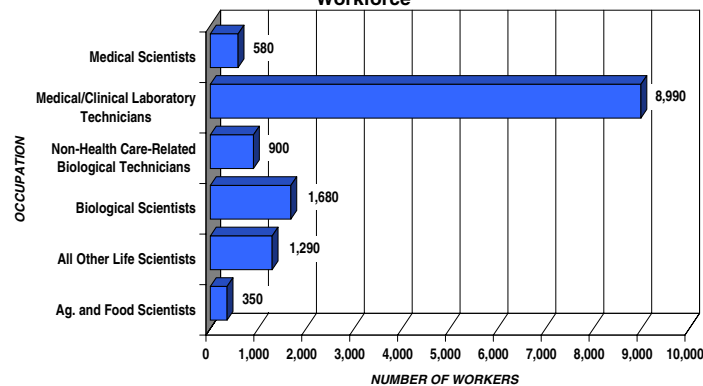
Total Bioscience R&D Expenditures at Academic Institutions in North Carolina



Life/Biological Sciences Degrees from North Carolina Higher Education



Biological Science Occupations in the North Carolina Workforce



NORTH CAROLINA

North Carolina has a long history of providing support to and facilitating the development of the state's bioscience community. The centerpiece of North Carolina's efforts is the ***North Carolina Biotechnology Center (NCBC)***. NCBC is a private non-profit organization that was established by the General Assembly in 1981. NCBC's mission is to "provide long-term economic benefit to North Carolina through support of biotechnology research, development, and commercialization statewide."

The Center helps arrange collaborations with local universities, provides access to venture capitalists and government officials, and provides training for biotechnology employees. The Center encourages industry-university collaborations, technology transfer, business development, venture capital formation, networking, and workforce training.

Recent Center initiatives include the creation of a North Carolina Genomics and Bioinformatics Consortium, formation of a national Institute of Forest Biotechnology, and creation of a \$28 million North Carolina Bioscience Investment Fund for capitalizing start-up companies.

SEED AND VENTURE FINANCING

The ***North Carolina Bioscience Investment Fund***, created by the ***North Carolina Biotechnology Center*** and managed by Eno River Capital, Durham, N.C., provides seed capital to bioscience companies. The fund was capitalized with \$10 million in appropriations from the North Carolina General Assembly. The fund has reached \$25 million with the help of outside investors. To date, the fund has made four investments.

The ***Innovation Research Fund (IRF)*** is the North Carolina Technological Development Authority's (TDA) revolving venture capital program. The IRF provides flexible financing to emerging technology-oriented businesses in North Carolina. Since its formation in 1984, the IRF has provided venture capital to over 82 companies, ranging from agriculture and biotechnology to computer software.

OTHER FINANCING AVAILABLE TO BIOSCIENCE COMPANIES

The ***Collaborative Funding Assistance Grants Program***, sponsored jointly by NCBC and the Kenan Institute for Engineering, Technology and Science, encourages long-term partnerships between North Carolina universities and companies by helping fund company-directed research at the universities.

The ***North Carolina Biotechnology Center*** also provides loans to early stage biotechnology companies for research and development, and for business development activities.

FACILITIES FINANCING

The ***North Carolina Technological Development Authority (NCTDA)***, a state-sponsored, non-profit corporation, sponsors technology incubators and is leasing and improving an incubator facility for life science companies in Research Triangle Park, North Carolina.

NETWORKING

The ***North Carolina Biosciences Organization (NCBIO)*** is a statewide association of biotechnology companies.

The *Council for Entrepreneurial Development (CED)* is a regional, non-profit organization that sponsors networking opportunities for biotechnology and other entrepreneurs and companies. CED cosponsors with the North Carolina Biotechnology Center an annual *Biotech Day* and monthly *Biotechnology Roundtable* series for entrepreneurs.

The *North Carolina Biotechnology Center* sponsors grants programs to fund meetings on the science, business, and educational issues of biotechnology.

TAX POLICY

- **Credit for investing in machinery and equipment.** If a taxpayer that has purchased or leased eligible machinery and equipment places it in service in this state during the taxable year, the taxpayer is allowed a credit equal to seven percent of the excess of the eligible investment amount over the applicable threshold. The credit may not be taken for the taxable year in which the equipment is placed in service but shall be taken in equal installments over the seven years following the taxable year in which the equipment is placed in service. If the machinery and equipment with respect to which the credit was claimed are disposed of, taken out of service, or moved out of State, the credit expires and the taxpayer may not take any remaining installment of the credit. The taxpayer may, however, take the portion of an installment that accrued in a previous year and was carried forward to the extent permitted under G.S. 105-129.5.
- **Credit for research and development.** A taxpayer that claims for the taxable year a federal income tax credit under section 41 of the Internal Revenue Code for increasing research activities is allowed a credit equal to five percent of the state's apportioned share of the taxpayer's expenditures for increasing research activities.
- The *William S. Lee Quality Jobs and Expansion Act of 1996* provides various tax credits to encourage economic development. In addition to the two tax credits described above, the Act provides tax credits for job creation, worker training, investment in machinery and equipment, purchase of central administrative offices, and for economic activity in certain economic development zones.

REGULATORY POLICY

- Article 35 of Chapter 58 regulates collection, use, and sharing of personal and medical information by insurance companies.
- North Carolina has enacted "right to know" legislation.
- North Carolina has not enacted legislation to impose price controls on prescription drugs.
- Medicaid Reimbursement Policy: North Carolina has an open formulary, no prior authorization required.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The *First Flight Venture Center (FFVC)* was established specifically to serve the initial laboratory and office location needs of Research Triangle Park area research-based entrepreneurs. The FFVC incubator is a 28,500 square foot facility with approximately 16,000 square feet of leasable office and laboratory space. Offices and laboratories range in size from 115 to 345 square feet. The Center can accommodate up to 25 early-stage companies engaged in a diversity of research and product development efforts.

The ***Entrepreneurial Development Center @ NC State (EDC)*** was established through a joint initiative between TDA and North Carolina State University. The Center is a technology business incubator located on Centennial Campus. The Center provides flexible office and laboratory space for emerging technology companies. EDC includes 8,300 square feet of wet laboratory space in a laboratory research building on Centennial Campus. The facility has state-of-the-art mechanical, electrical, plumbing and laboratory services and can accommodate biotechnology research groups.

Research Triangle Park includes, but is not limited to, biotechnology companies.

University Research Park in Charlotte includes, but is not limited to, biotechnology companies.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

NCBC's ***Business and Technology Development Program*** helps entrepreneurs with technology assessment, business plans, networking, referrals, lab space procurement, and financing.

The ***North Carolina Small Business and Technology Development Authority***, sponsored by the University of North Carolina System in cooperation with the U.S. Small Business Administration, provides management counseling and educational services to North Carolina businesses.

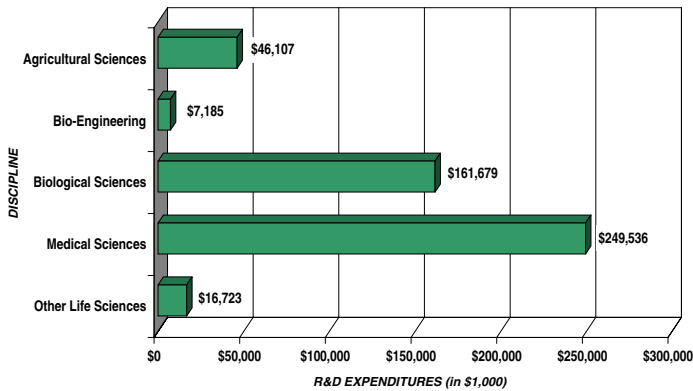
WORKFORCE DEVELOPMENT

NCBC's ***Education and Training Program*** trains middle school, high school, and community colleges how to teach about biotechnology more effectively; provides grants to schools and colleges to improve biotechnology education and training; sponsors university faculty sabbaticals at biomanufacturing plants; and is partnering with the state's Community College System to develop courses for training bioprocess technicians for jobs in biomanufacturing plants.

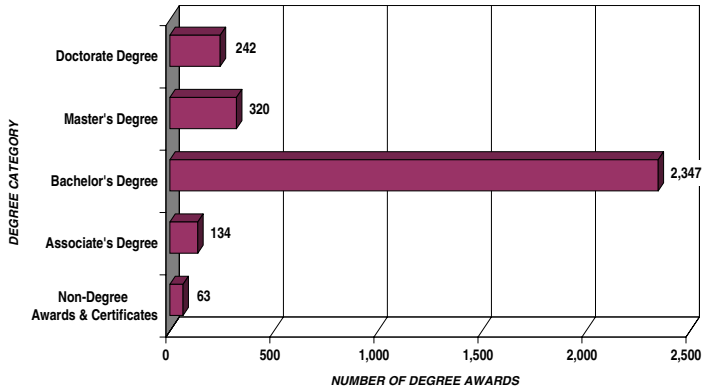
Ohio

	Ohio	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$481,230	\$15,728,292	10
Per Capita	\$43	\$58	
Percent Change FY1995–1999	31.2%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$444,004	\$14,679,343	10
Per Capita 2000 Expenditures	\$39	\$52	
Percent Change in Expenditures FY1996–2000	47.0%	37.0%	
Higher Education Awards in Biological Sciences, 2000	3,106	88,982	8
Biological Scientists in the Workforce, 2000	15,620	454,980	9

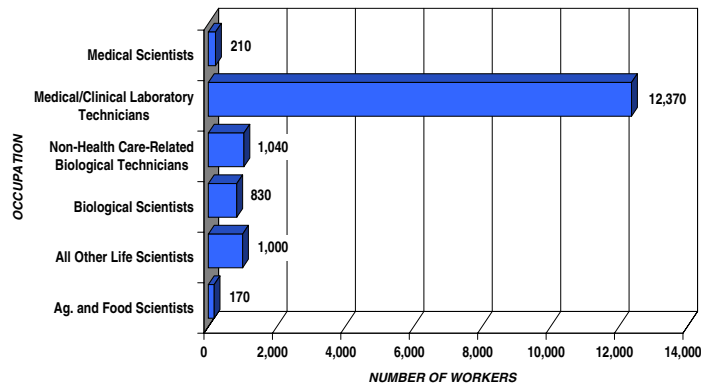
Total Bioscience R&D Expenditures at Academic Institutions in Ohio



Life/Biological Sciences Degrees from Ohio Higher Education



Biological Science Occupations in the Ohio Workforce



Ohio established the ***Edison BioTechnology Center (EBTC)*** in 1987 to promote the growth of the biotechnology sector in the state. EBTC works closely with medical research institutions, biomedical and biotechnology companies, and community development organizations within the state to commercialize research, foster company formation and growth, and promote Ohio resources to regional and national audiences. EBTC activities include

- Developing events and programs that inform the bioscience industry in Ohio regarding various issues;
- Creating seed funds for biotech investment;
- Supporting biotechnology incubators;
- Serving as an agent for the Ohio Department of Development ***Technology Investment Tax Credit***;
- Providing assistance to researchers and businesses trying to obtain SBIR funding;
- Providing referrals to Ohio's network of service providers by maintaining a database of service providers and biomedical industry experts;
- Providing linkages to technical experts at fifteen of Ohio's biomedical research institutions;
- Providing specialized staff assistance in business development, regulatory affairs, intellectual property, small business financing and marketing; and
- Identifying licensing opportunities and targeted access to technologies available for licensing at EBTC member institutions.

In addition, the state of Ohio has undertaken a number of strategic initiatives recently that will impact biotechnology-based economic development. First, the state of Ohio has allocated a portion of the state's tobacco settlement revenues to a new ***Biomedical Research and Technology Transfer Fund***. This fund will provide direct support to research and commercialization activities in the biomedical sciences and assist Ohio's biomedical research institutions to secure a larger portion of federal research support. Projected total over 12 years is over \$400 million. Proposals submitted in the first two cycles will be eligible for support in the range of \$5-\$15 million.

Finally, the ***Technology Action Fund (TAF)*** was created in 1998 by the state. It provides monetary support for projects that contribute to technology-based economic development in Ohio. In its first two years, the TAF had a budget of \$3 million. The fund's initial purpose was to increase the amount of federal research dollars leveraged in the state. For 2000 and 2001, the TAF was increased to \$15 million each year and the focus changed to support entrepreneurial activity in technology sectors in Ohio, including biotechnology. Over those two years, projects such as biotechnology commercialization initiatives, biotechnology seed funds, biotechnology infrastructure, and specific grants to biotechnology companies have been awarded.

SEED AND VENTURE FINANCING

The ***EBTC BioInvestment Fund*** is a financial resource utilized to support business growth activities in the biomedical, biotechnology and health care information sectors in the State of

Ohio, through the formation and growth of Ohio companies. The fund seeks a return by investing in technology-based companies with significant market potential for which EBTC's involvement is critical to qualifying the company for conventional investment or to maintaining an Ohio presence.

BioVentures Development Fund, which is being sponsored by BIO/START, a biomedical incubator in Cincinnati, is in the early planning stages. The fund has received a \$350,000 grant from the Ohio TAF, plus an additional \$350,000 in matching funds from Procter & Gamble Co., the University of Cincinnati, and Arch Development Corp. of Chicago. The grant monies will be used to pay the start-up costs of BioVentures. Short-term goals include finding a co-manager for the fund and getting commitments for \$10 million in private investments. In all, the fund wants to have \$15 million in private investment which could be matched on a 2:1 basis by the U.S. Small Business Administration's Small Business Investment Company (SBIC) Program.

Columbus Emerging Technology Fund is being created by the Columbus Technology Leadership Council with funding provided by the State of Ohio through the TAF program. It is anticipated that the fund will focus its investments in information technology and biotechnology.

The Ohio Innovation Fund with \$12.5 million in funds was established in Cleveland in 1997 as a source of early and mid stage financing.

Early Stage Partners Fund, based in Cleveland, is targeting to raise \$50 million to provide pre-seed and seed funds for technology based start-ups. Initial support for establishing the fund and seed money for the fund was provided by two TAF grants from the state, one for \$322,000, and the second for \$1.6 million.

OTHER FINANCING AVAILABLE TO BIOSCIENCE COMPANIES

Edison BioTechnology Center Flex Fund (EBTC) Program provides funding for market research, business planning, patent expenses, prototype design, and limited laboratory or clinical projects. FlexFund awards currently are a maximum of \$20,000. The maximum will increase to \$50,000 in the next fiscal year. Companies are expected to remain in Ohio for five years following receipt of the award.

NETWORKING

The ***Edison BioTechnology Center*** performs this function. EBTC has regional offices in Cleveland, Columbus, and Cincinnati, and will soon open a fourth in Athens.

TAX POLICY

- ***Technology Investment Tax Credit Program.*** Through Ohio's Technology Investment Tax Credit program, Ohio investors or groups of up to 20 Ohio investors may reduce their state taxes by up to 25 percent of the amount they invest in qualified, technology-based Ohio companies. The maximum credit of \$37,500 per investment may be applied to personal income tax, corporation franchise tax, public utility excise tax or the tax on dealers in intangibles. The state's total exposure or potential loss of revenue from the tax credits is limited to \$10 million.
- **Sales tax exemption.** Equipment purchased for use in research and development is exempt from the state sales tax.

REGULATORY POLICY

- Ohio has not enacted genetic privacy legislation.

- Ohio has not enacted “right to know” legislation.
- Ohio has not enacted legislation to place price controls on prescription drugs.
- Medicaid Policy: Ohio has a closed formulary, with prior authorization required for certain drugs including growth hormones.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

BioEnterprise, the first phase in the development of a Cleveland Technology District, is designed to give new biotech and biomedical companies lab and office space in close proximity to Cleveland area research institutions. The first phase of the project entails 25,000 square feet of space on two floors of Case Western Reserve University’s University West Building. The University West Building is also home to Enterprise Development, Inc., the Edison BioTechnology Center and the Edison Technology Incubator. Lab space in the facility is outfitted with benches, fume hoods, sinks, deionized water, and emergency eyewash and showers. The entire building will soon expand its incubator capacity by 40,000 square feet and become the headquarters facility for Cleveland’s new BioPark.

BIO/START is a biomedical business incubator located in Cincinnati. It provides specialized wet lab space and shared technical equipment for entrepreneurs and start-up companies at below market rates. Operational support services are also available on a fee-for-service basis. BIO/START offers business counseling, and entrepreneurial education. After raising \$2.7 million to build out Phase I of the facility, BIO/START opened its doors to its first tenants in October 1996. A build-out of additional space is currently underway.

The **Business Technology Center (BTC)**, a technology-based business incubator located in Columbus, successfully conducted a capital campaign within the Central Ohio community to expand its facility to more than double its existing space. In addition to the office, common, and conference space in the expanded facility, the incubator will have 16 new wet labs to help launch emerging bioscience firms. This bio-specific build-out is being conducted in partnership with EBTC, which is located within the BTC.

Science and Technology Campus Corporation (SciTech) is a research park affiliated with The Ohio State University. The park is currently finishing its build-out of Science Village Phase I, which will be a multi-tenant facility focused on OSU’s BioMEMS work. The facility will house the emerging firm, iMEDD, as well as a multi-user laboratory for BioMems research, accessible to both industry and academia. The BioMEMS laboratory will provide unique services to the bioscience community.

A **Cleveland Biotechnology Park (BioPark)** is under development by Cleveland’s three major research institutions, the Cleveland Clinic, University Hospitals, and Case Western Reserve University. Ohio’s capital projects budget for 2000-2002 includes \$8.5 million as seed money to help launch the biotech park and Ohio’s Technology Action Fund awarded \$1 million for the planning of the park. The money will be used toward an estimated \$90 million biomedical center, a campus-like setting where fledgling companies could be nurtured and established companies would have room to grow.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

OSU has created a *Technology Commercialization Corporation (TCC)* that will seek to create companies based on technology developed from OSU's research programs. While not limited to biosciences, the TCC is expected to provide unique services to the bioscience community.

All three incubator programs listed above, as well as EBTC, provide commercialization and business development support to emerging bioscience companies.

WORKFORCE DEVELOPMENT

Ohio's community colleges have, or are developing, curricula to meet workforce needs of biotech and medical device companies.

Case Western Reserve University has collaborative programs between its Weatherhead School of Management and science and engineering schools to mentor students in both business and technical aspects to promote entrepreneurship.

REGIONAL INITIATIVES

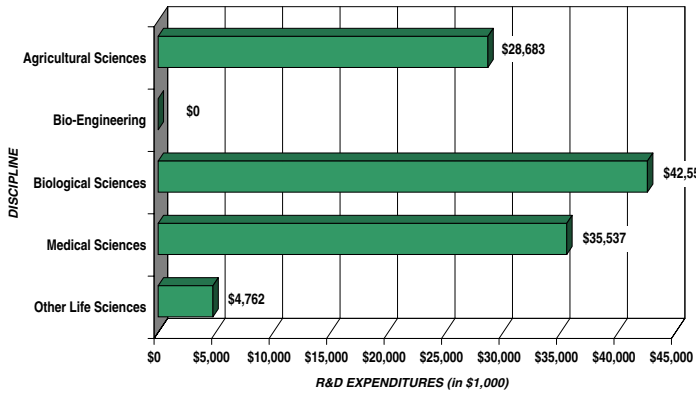
Individual regions are driving most of the biotechnology initiatives discussed above with support from the statewide technology-based economic development intermediary organization, EBTC. This is due in large part to the organizational structure of EBTC, which focuses on a decentralized approach with three regional offices.

- Cleveland, Columbus, and Cincinnati have each developed biotechnology strategies. Cleveland commissioned "Creating a Biomedical Economy" in August 1999. Cincinnati conducted a "Life Sciences Task Force Benchmarking Study" in September 1999. Columbus commissioned "A Central Ohio Bioscience Strategy for the 21st Century" in April 2001. Athens initiated a southeast regional biotechnology strategic development project in May 2001.

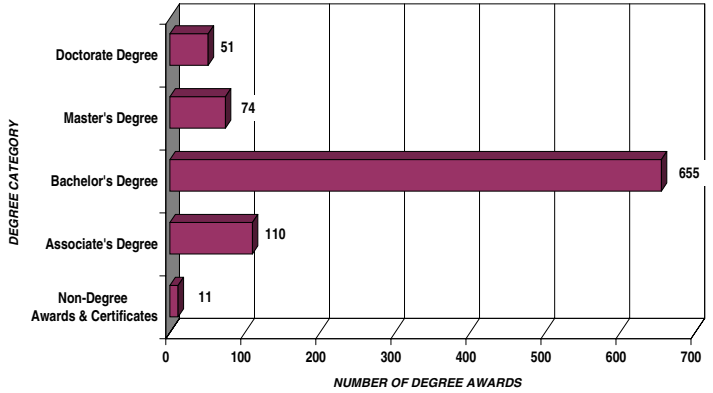
Oklahoma

	Oklahoma	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$111,541	\$15,728,292	34
Per Capita	\$33	\$58	
Percent Change FY1995–1999	8.3%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$44,429	\$14,679,343	38
Per Capita 2000 Expenditures	\$13	\$52	
Percent Change in Expenditures FY1996–2000	29.5%	37.0%	
Higher Education Awards in Biological Sciences, 2000	901	88,982	32
Biological Scientists in the Workforce, 2000	4,100	454,980	34

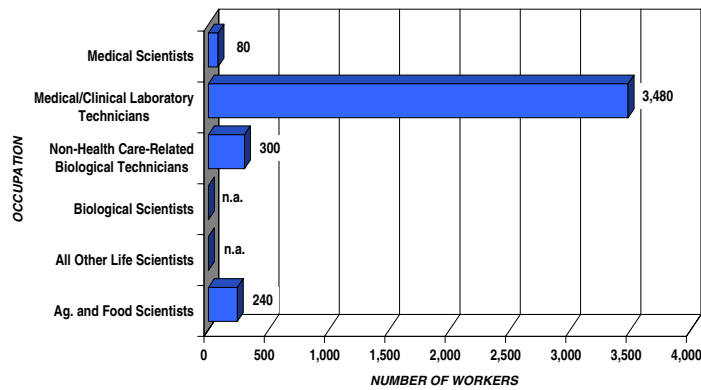
Total Bioscience R&D Expenditures at Academic Institutions in Oklahoma



Life/Biological Sciences Degrees from Oklahoma Higher Education



Biological Science Occupations in the Oklahoma Workforce



OKLAHOMA

The *Oklahoma Center for the Advancement of Science and Technology (OCAST)* was created by the Oklahoma legislature in order to build the infrastructure and equipment needed to conduct nationally competitive research and development within the state. OCAST has implemented programs and initiatives that range from funding basic research to supporting commercialization and facilitating the creation of new companies. 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.

SEED AND VENTURE FINANCING

Oklahoma's Technology Business Finance Program is funded by OCAST and administered by the Oklahoma Technology Development Corporation. This program provides pre-seed financing and early-stage risk capital to Oklahoma based start-up technology companies. Life sciences, medical devices and instruments, and agricultural sciences are among the industries eligible to receive financing from the program. All funds provided under the program must be matched on a 1:1 basis from other sources and at least one dollar of every three dollars of matching funds must be provided in cash; the remaining match can include in-kind contributions. Successful projects require a repayment of at a minimum 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. Life sciences accounts for approximately 40 percent of the projects funded.

OTHER FINANCING AVAILABLE TO BIOSCIENCE COMPANIES

The *Oklahoma Health Research (OHR) Program* awards seed funds for research projects related to human health. The OHR program funds projects for one to three years at a maximum of \$45,000 per year with no matching funds required. Eligible applicants include Oklahoma universities and colleges, non-profit research organizations, and private enterprises located in Oklahoma.

The *Oklahoma Applied Research Support (OARS)* program was initiated to accelerate the development of technology (including biotechnology) with potential for producing a commercially successful product, process or service, which will benefit Oklahoma's economy. OCAST, through the OARS program, provides incentive funding to applied research projects under terms which increase industrial R&D investment and reward collaborative efforts.

Under this program, reimbursement contracts are competitively awarded to Oklahoma businesses, universities, and non-profit research organizations for one- to three-year R&D projects. A minimum of one dollar matching support is required for each state dollar awarded; no indirect costs are allowed. Continued funding is contingent on satisfactory annual performance evaluations and availability of funds.

TAX POLICY

- **Income tax credit for computer/data processing/R&D jobs.** A state income tax credit is available for up to five years, for a net increase in the number of full-time equivalent employees engaged in computer services, data processing, or research and development. The credit,

based on employees whose annual wages were at least \$35,000, is \$500 per employee for up to 50 employees. The total credits claimed may not exceed \$25,000 annually and is not available to participants in the Quality Jobs Program.

- **Sales and use tax refunds.** Oklahoma offers sales tax refunds for qualified companies in the form of an interest bearing account set up by the Tax Commission to hold sales taxes paid on possible sales tax exempt items. Interest accrues at the rate of a three-month Treasury bill. Sales taxes paid for machinery and equipment by certain service businesses (computer services, R&D, and aircraft repair) are refundable. Oklahoma offers a sales tax refund on purchase of computers, data processing equipment, related peripherals, telegraph, or telecommunications services and equipment which applies to businesses engaged in research and development, among other things.
- **Ad valorem tax exemptions.** New and expanding qualifying manufacturers, research, and development companies, certain computer services and data processing companies with significant out-of-state sales, and aircraft repair and distribution companies may be eligible for ad valorem exemptions for up to five years. Eligible exempt property may include land, buildings, improvements, machinery, fixtures and equipment, used directly and exclusively in the primary activity or process of the qualified company located on the manufacturing site.
- **Qualified venture capital company tax credit.** Oklahoma has freely transferable tax credits for investors in qualified venture capital companies. A qualified venture capital company must have been organized prior to July 1, 1992 and its principal place of business must be in Oklahoma. Seventy-five percent of capital must be invested in Oklahoma business ventures. The credit is 20 percent of investment in the venture capital company, and may be carried forward three years or transferred to another taxpayer.

REGULATORY POLICY

- Oklahoma has not enacted genetic privacy legislation.
- Oklahoma has not enacted “right to know” legislation.
- Oklahoma has not enacted legislation to place price controls on prescription drugs.
- Medicaid Reimbursement Policy: Oklahoma has an open formulary with prior authorization required for specific products including growth hormones.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

OCAST provides funding annually to the Oklahoma Technology Commercialization Center (OTCC) to support on-site technical assistance for the *Oklahoma Biomedical Accelerator* at the Oklahoma Health Research Park in Oklahoma City.

The *Oklahoma Health Research Park* is a 23.5 acre biomedical research park that was developed by the Oklahoma City Urban Renewal Authority, and the Medical Technology Research Authority. It is located in close proximity to the University of Oklahoma Health Sciences Center, the University of Oklahoma School of Medicine, the Oklahoma Medical Research Foundation and Oklahoma State University.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

The *Oklahoma Technology Commercialization Center*, which is operated by the Oklahoma Technology Development Corporation for OCAST, works with Oklahoma companies, inventors,

researchers, and entrepreneurs to turn technology innovations into business opportunities. OTCC provides the following services:

- Technology assessments and technical concept analysis
- Engineering, testing, and prototype development
- Market research and analysis
- Economic feasibility studies
- Development of strategic marketing plans
- Development of strategic business plans
- Access to early stage risk capital

WORKFORCE DEVELOPMENT

OCAST's Applied Research Support Program (OARS) supports student and faculty internships in Oklahoma R&D facilities in order 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*** will support one- to two-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 one year.

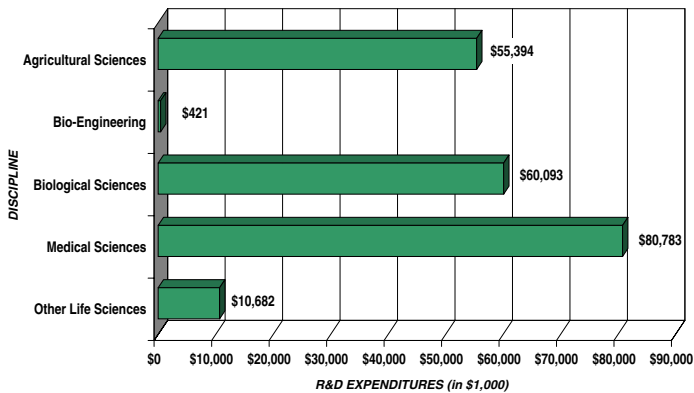
The biotechnology program at Oklahoma City Community College offers a two-year, 65-credit associate degree program (A.A.S.) or a 44-credit Certificate of Mastery. Both programs are designed to prepare the student to directly enter the job market after program completion.

The University of Central Oklahoma offers a biotechnology degree.

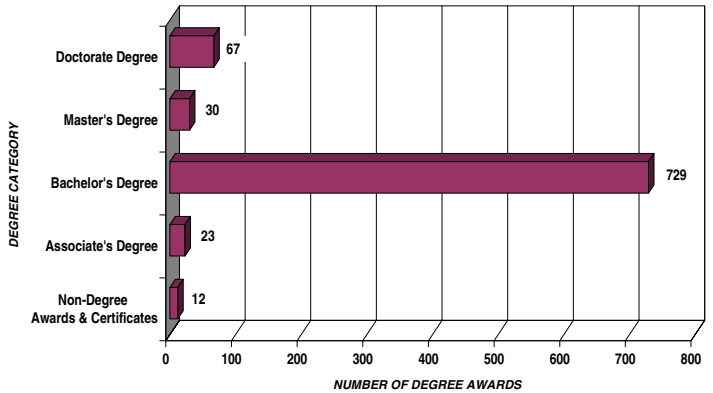
Oregon

	Oregon	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$207,373	\$15,728,292	26
Per Capita	\$63	\$58	
Percent Change FY1995–1999	18.2%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$186,074	\$14,679,343	23
Per Capita 2000 Expenditures	\$54	\$52	
Percent Change in Expenditures FY1996–2000	63.5%	37.0%	
Higher Education Awards in Biological Sciences, 2000	861	88,982	33
Biological Scientists in the Workforce, 2000	6,140	454,980	26

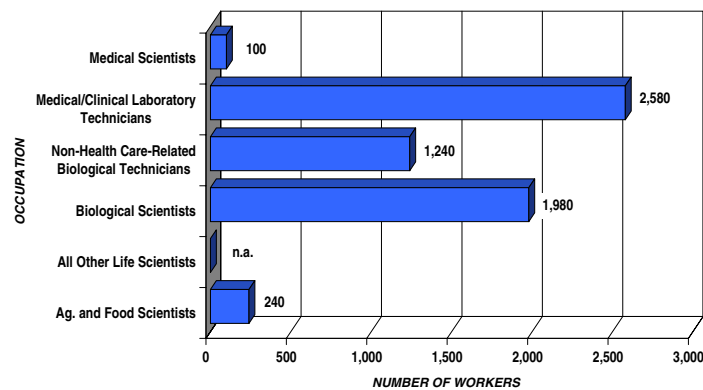
Total Bioscience R&D Expenditures at Academic Institutions in Oregon



Life/Biological Sciences Degrees from Oregon Higher Education



Biological Science Occupations in the Oregon Workforce



OREGON

The State of Oregon has not developed a strategy to develop the state's bioscience industry. However, an ad hoc group known as the *Oregon Bioscience and Medical Technology Alliance* developed a bioscience strategic plan in 1999. The Alliance is made up of representatives from the Oregon University System, Oregon Health Sciences University, the City of Portland Development Commission, a representative from the Oregon Economic and Community Development Department, and private sector representatives. The Alliance submitted a proposal in 2001 to the legislature to provide funding from the State's tobacco settlement funds for hybrid university and industry research initiatives.

SEED AND VENTURE FINANCING

The *Oregon Research and Technology Development Account (ORTDA)* provides seed funding for a wide array of "technology" companies including bioscience companies. Initial funding of the account came from Oregon Lottery funds. The majority of the seed funding is dedicated to companies that have licensed technologies from Oregon universities.

NETWORKING

The *Oregon Bioscience Association (OBA)* is the organization charged with promoting the growth and quality of biotechnology in the State of Oregon. OBA represents the industry on all levels, particularly in matters of public policy. OBA offer networking opportunities and seminars for members to exchange information, ideas, and contact information. Additionally, the association performs a biannual survey of companies within the state providing information on each of Oregon's biotechnology and bioscience companies. Data on companies, revenues, financing, and employees are published and used to track the industry.

TAX POLICY

- **Qualified research activities credit.** Taxpayers may receive a five percent credit against corporate excise taxes for increases in qualified research expenses and basic research payments in the following fields: advanced computing, advanced materials, biotechnology, electronic device technology, environmental technology, or straw utilization. The maximum credit under this section is \$500,000. Any tax credit that is otherwise allowable under this section and that is not used by the taxpayer in that year may be carried forward and offset against the taxpayer's tax liability for the next succeeding tax year for five years. This credit cannot be claimed in conjunction with the alternative credit described below
- **Qualified research activities, alternative credit.** A credit against corporate excise taxes is allowed for qualified research which consists of research in the fields of advanced computing, advanced materials, biotechnology, electronic device technology, environmental technology or straw utilization, all as defined under ORS 317.152, but only to the extent that such research is conducted in Oregon. The credit is equal to five percent of the amount by which the qualified research expenses exceed 10 percent of Oregon sales. The credit under this section shall not exceed \$10,000 times the number of percentage points by which the qualifying research expenses exceed 10 percent of Oregon sales. The maximum credit under this section is \$500,000. This credit cannot be claimed in conjunction with the credit described above. Any tax credit that is otherwise allowable under this section and that is not used by the

taxpayer in that year may be carried forward and offset against the taxpayer's tax liability for the next succeeding tax year for five years.

- **Strategic Investment Program.** Businesses involved in aerospace, biotechnology, high technology, software, and a number of other industries are eligible for a property tax exemption on Real Market Value over \$100 million at its assessed value. The exemption is for up to 15 years or until Real Market Value of the property falls below the exemption cap. The local rates also must be taken into account in arriving at the cap. Fees to the local government apply. The company cannot claim both an Enterprise Zone and a Strategic Investment Exemption.

REGULATORY POLICY

- Oregon has enacted genetic privacy legislation.
- "Right to know" legislation has been proposed but has not been enacted.
- Oregon has not enacted legislation to place price controls on prescription drugs.
- Medicaid Reimbursement Policy: Oregon has an open formulary with prior authorization required for specific drugs including growth hormones.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The **Portland Biotechnology Center (PBC)**, formerly known as the Oregon Biotechnology Innovation Center (OBIC), provides 13,000 square feet of office and wet laboratory space to Portland bioscience companies. PBC was established with public funding in 1995. The facility is not a true incubator in the sense that subsidies are not provided to the tenants. The facility is located in close proximity to the Oregon Health Sciences University and Portland State University. Labs may be rented in their entirety or, in some cases, by the bench. Lab rent includes access to the Center's cold room, tissue culture room, autoclave, and other shared capital equipment. PBC also houses support companies that can provide tenants with financial and business plan assistance as well as access to venture capital information.

There are no dedicated Biotech/Life Sciences parks, but research parks include the **Riverfront Research Park** in Eugene and the **Benton Enterprise Center** and **Sunset Research Park** in Corvallis.

WORKFORCE DEVELOPMENT

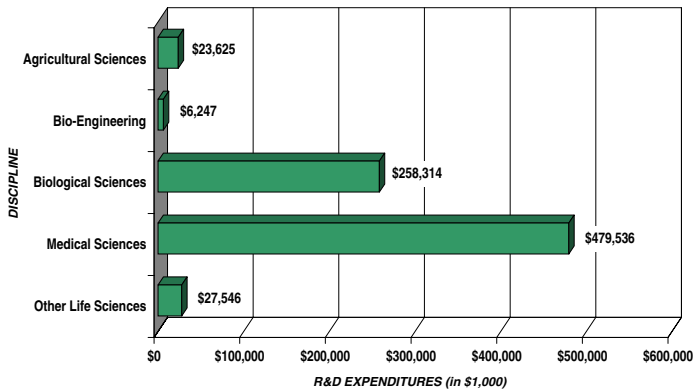
The **Oregon Biotechnology Foundation's (OBF)** mission is to "develop educational programs about biotechnology for primary and secondary schools, higher education, and the general public." The OBF has established a teaching center at Portland State University that provides educational classes to high school science teachers in advanced biology techniques. Other programs are offered for students and teachers alike including classes, seminars, a two-week summer initiative for teachers, and the equipment loan program for teachers who have participated in the summer initiative.

Additionally, a biotechnology technician training program was established in 1996 at the Rock Creek Campus of the Portland Community College to train students in laboratory techniques, tissue culture, molecular biology, and reagent preparation.

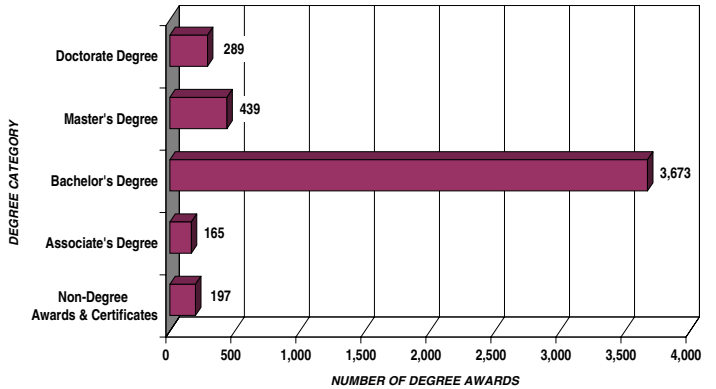
Pennsylvania

	Pennsylvania	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$795,268	\$15,728,292	4
Per Capita	\$66	\$58	
Percent Change FY1995–1999	18.9%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$947,254	\$14,679,343	4
Per Capita 2000 Expenditures	\$77	\$52	
Percent Change in Expenditures FY1996–2000	40.0%	37.0%	
Higher Education Awards in Biological Sciences, 2000	4,763	88,982	4
Biological Scientists in the Workforce, 2000	17,330	454,980	6

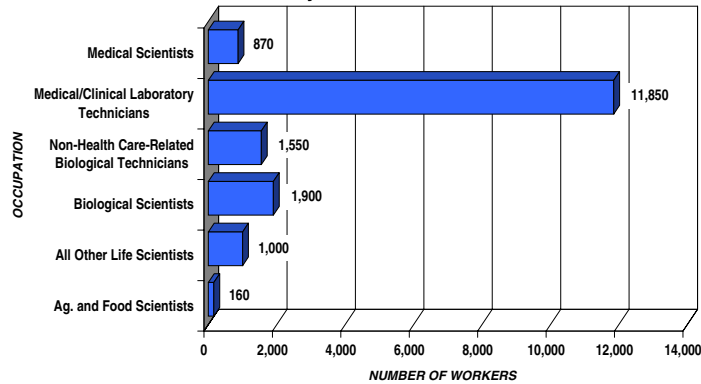
Total Bioscience R&D Expenditures at Academic Institutions in Pennsylvania



Life/Biological Sciences Degrees from Pennsylvania Higher Education



Biological Science Occupations in the Pennsylvania Workforce



PENNSYLVANIA

Using its tobacco settlement dollars, Pennsylvania plans by the beginning of 2002 to launch three major bioscience initiatives: a \$120 million venture fund that will invest in Pennsylvania life sciences companies, three life sciences *Greenhouses* that will accelerate the commercialization of research conducted at the Commonwealth's universities, and the investment of more than \$1 billion in commercially relevant health care research. The Greenhouses, which will be regionally-based, are expected to be operational by the end of 2001. Each Greenhouse will receive \$100 million in state funding.

SEED AND VENTURE FINANCING

Pennsylvania Early Stage Partners is a family of venture funds that makes investments in seed, start-up, and early stage technology-based companies. Pennsylvania Early Stage's \$50 million first fund, which was launched in January 1998, was a collaborative effort of the Commonwealth of Pennsylvania, the Pennsylvania Public School Employees' Retirement System (PSERS), and Safeguard Scientifics, Inc. PA Early Stage II began operation in February 2000 with \$101.5 million under management. Founding investors PSERS and Safeguard Scientifics, along with two other strategic limited partners, provided the capital for Fund II. The fund continues to focus on seed, start-up, and early stage technology-based companies with significant growth prospects, including bioscience companies.

OTHER SOURCES OF FINANCING AVAILABLE FOR BIOSCIENCE COMPANIES

Ben Franklin Technology Partners (BFTP), Pennsylvania's technology-based economic development program, provides small amounts of pre-seed capital for start-up and young technology companies. Ben Franklin Technology Partners operates on a regional level through four centers located in Pittsburgh, State College, the Lehigh Valley, and Philadelphia. The centers directly invest in companies, help clients access sources of private capital, and seek to increase the availability of private venture capital. BFTP can fund both technology-based start-up companies and established companies and manufacturers seeking to develop and introduce new products or processes. Funds can be used for research and development, proof of concept and prototype development, product development and commercialization, and process improvements. The specific amount and type of Ben Franklin company investments vary in the different regions. BFTP of Southeastern Pennsylvania, for example, provides southeastern PA biotech companies with access to funding up to \$500,000. Companies may utilize these funds for research, testing, equipment rental, and patents, among other things.

FACILITIES FINANCING

Pennsylvania uses its Capital Budget funds to make investments in university and industrial park assets relevant to the life sciences. Additionally, the Commonwealth uses its economic development incentive programs to finance biotechnology companies and incubators.

NETWORKING

The mission of the *Pennsylvania Biotechnology Association (PABIOTECH)* is to advance the life sciences in Pennsylvania by creating commercial opportunities and public policy strategies that lead to greater understanding, growth, and community support of biotechnology.

PABIOTECH is a member-supported association that includes small biotechnology companies, large pharmaceutical corporations, universities, venture capital firms, and service providers who share its goal of making Pennsylvania a center for the development of biotechnology.

The *Pittsburgh Technology Council* serves as a point of connection for companies from four primary clusters of the technology industry found in southwestern Pennsylvania. The Council includes technology leaders from the region's information technology, biomedical technology, advanced manufacturing/materials, and environmental technology industries. Services provided by the Council include entrepreneurial assistance, industry research, peer networking, cost-saving plans, lobbying/political action, identity building and advocacy for technology industries, and recruiting and human resources assistance.

The *Eastern Technology Council*, located in Wayne, PA, provides members with contacts, capital, and information with a broad variety of events, publications, and innovative services.

TAX POLICY

- **R&D tax credit.** A credit, to be used against a taxpayer's personal income tax, corporate net income tax, or capital stock/franchise tax, is available to those businesses who incur expenses for qualified research and development activities performed within the state. The credit equals 10 percent of the increase in qualified research expenses for the current taxable year over a base period. The credit cannot exceed 50 percent of the tax liability in a tax year. Unused credit may be carried forward for no more than 15 years, but cannot be carried back, transferred, or refunded. There is a \$15 million annual cap on the credits issued.
- **Capital stock and foreign franchise tax exemption.** Manufacturing, processing, or research and development corporations may claim an exemption for capital stock invested in such activities. Pollution control assets are included for these corporations. This exemption is reflected in computing the percentage of the capital stock value actually subject to tax and applies to both single-factor and three-factor apportionment.
- **Sales and use tax exemption.** Tangible personal property and services used directly in research and development of a new or improved product or service are exempt from tax.

REGULATORY POLICY

- Pennsylvania has not enacted genetic privacy legislation.
- Pennsylvania has not enacted "right to know" legislation.
- Pennsylvania has not enacted legislation to impose price controls on prescription drugs.
- Medicaid Reimbursement Policy: Pennsylvania has an open formulary with prior authorization required for specific products.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

University City Science Center, which was established in 1963, is a 17-acre research park in the University City section of Philadelphia. A consortium of 30 academic and scientific institutions owns the Science Center, which provides office and laboratory space for technology and research-based companies.

In 1998, the Science Center, with support from the state of Pennsylvania, created the ***Port of Technology***, a regional incubator for information technology and life sciences companies. The Port of Technology is located in proximity to the University of Pennsylvania, Drexel University, and the University of the Sciences. The Port offers life sciences companies a wide range of services, including six world-class labs and access to a full range of core research services including electron microscopy, flow cytometry, NMR, confocal microscopy, peptide synthesis and analysis, and protein structural cores. The Port of Technology Building is the first smart building in Philadelphia.

The ***Ben Franklin Innovation Center*** is a collaboration between The Thomas Jefferson University, The Hepatitis B Foundation, and The Ben Franklin Technology Partners of Southeastern Pennsylvania. The Center is co-located with the Jefferson Center for Biomedical Research on the campus of Delaware Valley College. The Innovation Center nurtures agri- and biotechnology development in the region. The Center's faculty, scientists, and staff and the extensive research facilities are available to commercial enterprises.

The ***Penn State Nanofabrication Facility*** offers “state-of-the-art” processing equipment for exploring biotechnology applications of micro- and nano-fabrication. As one of five such facilities funded by the National Science Foundation, it facilitates industrial research in the life sciences.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

Each of the Ben Franklin Technology Partners Centers assist companies with commercialization and link companies to sources of management and technical expertise. Ben Franklin Technology Partners of Southeastern Pennsylvania supports its funded biotechnology and medical device companies through ***BioSuccess Teams***, which help them find the resources they need. BFTP also forges relationships between its portfolio companies and venture funds. Additionally, Ben Franklin has established a formal mentoring program between executives of advanced biotech companies and early-stage companies.

WORKFORCE DEVELOPMENT

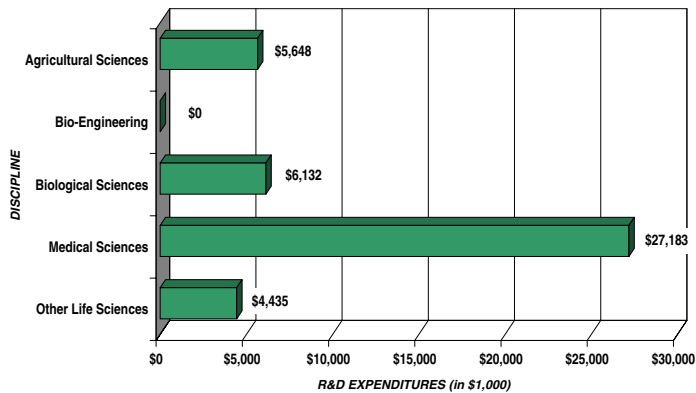
Ben Franklin Technology Partners of Southeastern Pennsylvania supports a **program to train biotechnicians**, developed by The Wistar Institute and the Community College of Philadelphia (CCP), which includes a two-year biotech training curriculum that combines specified CCP math, science, and general studies courses with 680 hours of paid employer-based training at The Wistar Institute.

The ***Governor's Action Team*** is the principal point of contact for companies doing business in or considering locations in Pennsylvania.

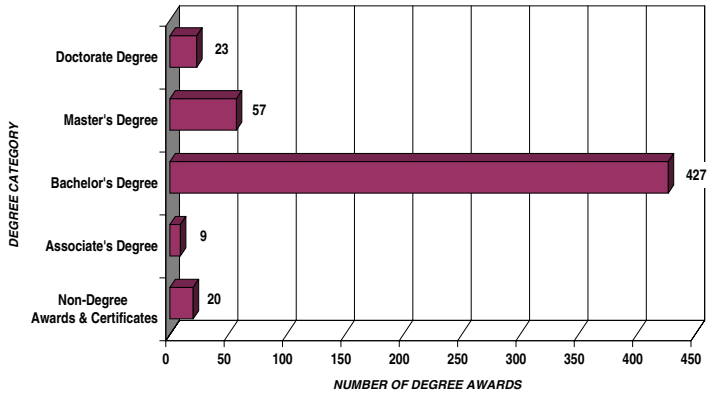
Rhode Island

	Rhode Island	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$43,398	\$15,728,292	43
Per Capita	\$44	\$58	
Percent Change FY1995–1999	32.3%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$79,350	\$14,679,343	30
Per Capita 2000 Expenditures	\$76	\$52	
Percent Change in Expenditures FY1996–2000	66.9%	37.0%	
Higher Education Awards in Biological Sciences, 2000	536	88,982	38
Biological Scientists in the Workforce, 2000	1,910	454,980	43

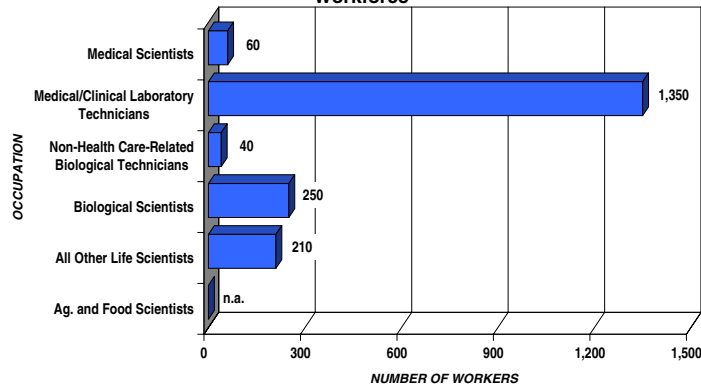
Total Bioscience R&D Expenditures at Academic Institutions in Rhode Island



Life/Biological Sciences Degrees from Rhode Island Higher Education



Biological Science Occupations in the Rhode Island Workforce



RHODE ISLAND

In 1997, Governor Lincoln Almond and the Rhode Island General Assembly established the *Samuel Slater Technology Fund* in order to foster innovation and entrepreneurial vision among potential new economy industry groups. The Slater Technology Fund was one of several recommendations issued by the Rhode Island Economic Policy Council, along with a series of tax incentives and other economic development programs.

Among the Slater Fund's first initiatives was the creation of the *Slater Center for Biomedical Technology (Slater Biomed)*, a center of excellence dedicated to commercializing technology developed in Rhode Island's universities and health care institutions. The Center seeks to encourage the creation of new biotechnology companies by providing seed funding and business development support. The Center does not support basic biomedical research, but actively seeks relationships with scientists and young companies interested in commercializing promising biomedical technologies in Rhode Island. Slater Biomed also serves as a resource for more mature biotechnology firms interested in relocating or expanding in Rhode Island.

SEED AND VENTURE FINANCING

The *Samuel Slater Technology Fund* provides \$3 million annually in seed funding and business development to Rhode Island startup companies. The fund also supports five centers for technology commercialization that seek to foster industry-university collaborations and to develop industry clusters including the biotechnology industry. Two of the five centers, the *Slater Center for Biomedical Technology* and the *Slater Center for Environmental Biotechnology*, focus on biotechnology. The Centers offer seed grants and loans from \$50,000 to \$100,000.

TAX POLICY

- **Research and Development expenses credit tax credits/deductions regulation.** Rhode Island offers taxpayers a credit toward their personal or corporate income tax obligations equal to 22.5 percent of expenditures up to \$111,111 and 16.9 percent of expenditures over \$111,111 of the excess of qualifying research expenses over base period expenses. The credit is calculated from those expenses in a taxpayer's federal excess expenses that occurred within Rhode Island. Any unused portion of the credit may be carried over for a maximum of seven years.
- **R&D property credit tax credits/deductions regulation.** A tax credit is available equal to ten percent of the cost or other basis of valuing realty or tangible personal property acquired, constructed, reconstructed, or erected for research and development purposes. Any unused portion of the credit may be carried over for a maximum of seven years.
- **Elective deduction for new R&D facilities.** The state offers businesses the option of taking a one year write-off of new research and development facilities in lieu of federal depreciation or investment tax credit. The deduction is allowed on qualifying tangible property passing several criteria and must be taken on the net income of only that corporation or business. Unused portions of the deduction may be carried forward for up to three years. The R&D deduction must be applied after any net operating loss deduction has been applied for that year. Each year for which federal depreciation is claimed on the same property, the amount of federal depreciation taken must be added back to income.

- **Sales tax exemption for research and development equipment.** There is a tax exemption from the sale and from the storage, use, or other consumption of equipment used for research and development purposes by a firm. A qualified firm is one for which use of research and development equipment is an integral part of its operation. Equipment is the scientific equipment, computers, software, and related items necessary for operation.

REGULATORY POLICY

- Rhode Island has not enacted genetic privacy legislation.
- Rhode Island has not enacted “right to know” legislation.
- Rhode Island has not enacted legislation to place price controls on prescription drugs.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

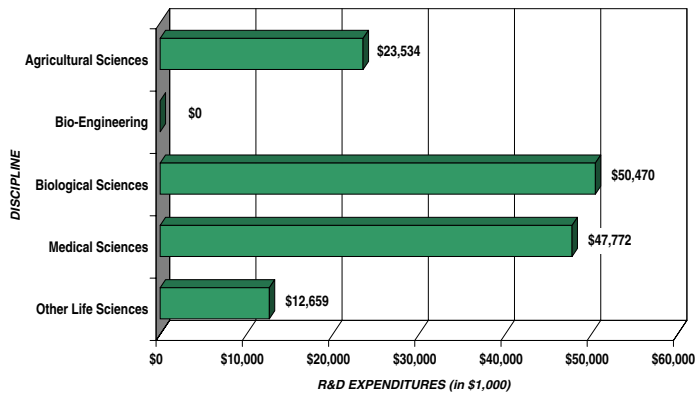
The *Slater Center for Biomedical Technology* provides commercialization and business support services to biomedical companies.

The *Slater Center for Environmental Biotechnology* provides mentoring and networking assistance to emerging biotechnology companies.

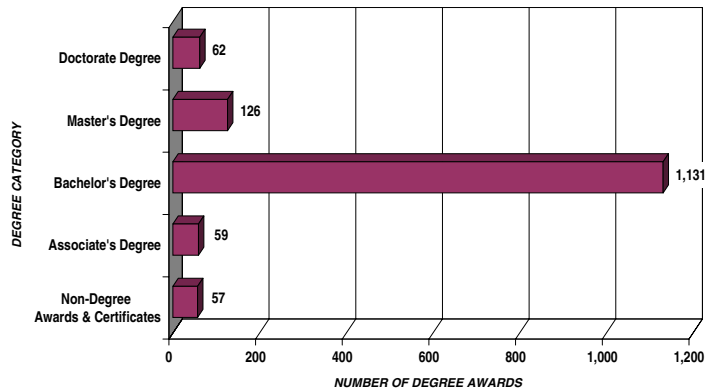
South Carolina

	South Carolina	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$134,435	\$15,728,292	33
Per Capita	\$35	\$58	
Percent Change FY1995–1999	7.3%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$62,888	\$14,679,343	33
Per Capita 2000 Expenditures	\$16	\$52	
Percent Change in Expenditures FY1996–2000	62.1%	37.0%	
Higher Education Awards in Biological Sciences, 2000	1,435	88,982	23
Biological Scientists in the Workforce, 2000	5,530	454,980	28

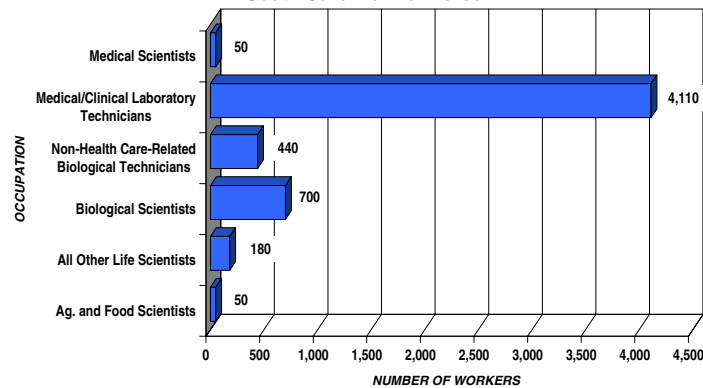
Total Bioscience R&D Expenditures at Academic Institutions in South Carolina



Life/Biological Sciences Degrees from South Carolina Higher Education



Biological Science Occupations in the South Carolina Workforce



SOUTH CAROLINA

In 1999, Governor Jim Hodges signed an Executive Order calling upon the South Carolina Technology Alliance to develop and create a comprehensive plan addressing policy, legislation, and funding initiatives that will lead South Carolina into the 21st Century. The Alliance issued a report, *South Carolina Technology Initiative 2000*, that outlined short- and long-term strategies. The short-term strategies focus on increasing the technological skills of the workforce. The long-term strategies include promoting the growth of technology-related businesses, stimulating research and development, and expanding the infrastructure required to support increasingly complex and sophisticated technology-based operations. The strategy did not identify specific areas of technology that should be targeted.

In April 2001, the Governor appointed a *South Carolina Technology Transition Team*, which is composed of business leaders, technology entrepreneurs, venture capitalists, and leaders of South Carolina's research universities to develop a comprehensive plan for attracting high technology firms to South Carolina and growing local technology-based start-up companies.

NETWORKING

The *South Carolina Biotechnology Association* is a non-profit trade association representing companies and academic institutions involved in biotechnology research and product development.

The *South Carolina Investor Network (SCIN)* is a voluntary network whose members include experienced venture capital and private equity investors, angel investors, business lawyers, accountants, investment bankers and business brokers, other business advisors and service providers. SCIN was established in 1999 with the goal of facilitating the creation and growth of high-impact companies in South Carolina. SCIN regularly brings together professionals from around the state to network and consider current issues in financing and structuring business investments; in managing the start-up, growth, and liquidity of business ventures; and in expanding the state's entrepreneurial resources.

TAX POLICY

- **Job tax credit.** South Carolina taxpayers operating research and development facilities are allowed an annual job tax credit toward their income tax and insurance premium tax obligations if they create a monthly average of 10 jobs in a single year. The credits are limited to 50 percent of the taxpayer's income tax or insurance premium tax liability and are capped at \$5,500. The credit is available for five years and there is a 15-year carry forward.
- **Corporate income tax credit for corporate headquarters.** A taxpayer establishing, expanding, or adding to its corporate headquarters in South Carolina may be eligible for a corporate income tax or license tax credit from the state. Qualifying projects will involve real property costs of at least \$50,000 and the creation of at least 40 new permanent, full-time headquarters staff or R&D related jobs. The credit is equal to 20 percent of the qualifying real property costs or the cost of the first five years of leased facilities. An additional 20 percent credit is available for tangible personal property acquired for the same project provided job creation and minimum wage criteria are met. Unused credits can be carried forward for either 10 or 15 years so long as the corporation continues to meet the qualifying criteria.

- **Maximum tax on sale or use of machinery for research and development.** The maximum tax levied on the sale or use of machinery or equipment used for research and development and located in facilities dedicated exclusively to R&D is \$300. Machinery for research and development is that used directly and exclusively in research and development in the experimental or laboratory sense for new products, new uses for existing products, or for improving existing products.
- **General exemption from property tax code section.** Facilities of new enterprises engaged in research and development and all additions to such facilities that total \$50,000 or more are exempt from county ad valorem taxes for a period of five years. To qualify, the facility must be devoted directly and exclusively to research and development.
- **Withholding tax credit for research and development job creation.** Taxpayers that operate research and development facilities in this State may be eligible for credit against withholding taxes. In order to qualify, taxpayers need to enter into an agreement with the South Carolina Coordinating Council for Economic Development and agree to create a set number of jobs in this State and invest a certain level of capital in South Carolina. The amount of credit against withholding tax that may be allowed is based on the wages paid to the employees at the facility and the county in which the facility is located. The credit is available for fifteen years.

The following changes will be effective beginning 6/30/2001:

- **A new corporate income tax credit or license fee credit will be allowed for research and development activities.** The new credit is equal to 5 percent of the qualified expenditures for research and development made in South Carolina. Qualified expenditures for research and development has the same meaning as provided in Internal Revenue Code Section 174. The credit is limited to 50 percent of the taxpayer's tax liability remaining after all other South Carolina credits have been applied and there is a 10-year carry forward of the credit. For a taxpayer to qualify for the credit, the taxpayer must claim a federal income tax credit pursuant to IRC Section 174 for increasing research activities in the taxable year.
- **The property tax exemption for research and development facilities is expanded to allow an exemption for machinery and equipment installed in an existing manufacturing facility.** Also, the facility will not have to be devoted directly and exclusively to research and development. It is sufficient if the facility is devoted directly and primarily to research and development.
- Code Section 12-36-2110(D) is repealed and a new item is added to Code Section 12-36-2120 to create **a full exemption from sales and use tax for machines used directly and primarily in research and development** as defined by the statute.

REGULATORY POLICY

- South Carolina has not enacted genetic privacy legislation.
- South Carolina has not enacted "right to know" legislation.
- South Carolina has not enacted legislation to place price controls on prescription drugs.
- Medicaid Reimbursement Policy: South Carolina has an open formulary with prior authorization required for specific types of drugs.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The *South Carolina Incubator Facility* in Greenwood South Carolina has facilities for bioscience firms.

The *South Carolina Research Authority* established a research park system in the 1980s to enhance economic development in South Carolina through science and technology. The system includes four research parks: Clemson Research Park, Carolina Research Park, Francis Marion University Research Park, and Charleston Research Park. None of these parks, however, are exclusively targeted for bioscience companies.

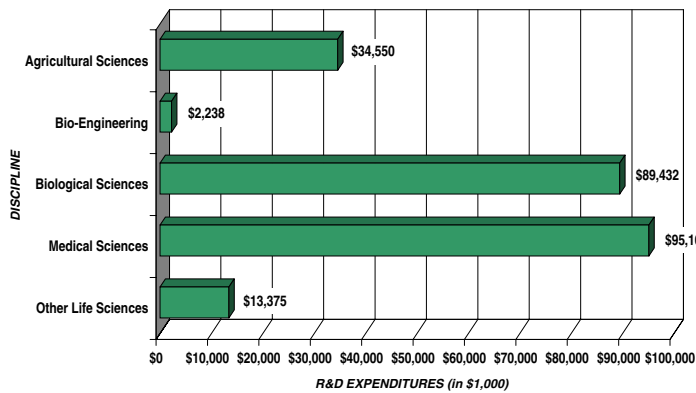
REGIONAL INITIATIVES

In South Carolina, Greenville, Greenwood, Aiken, and Charleston all have initial efforts underway to develop the bioscience sector of their region's economy.

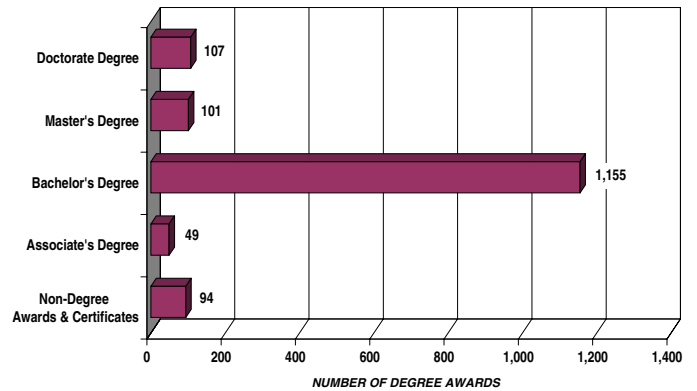
Tennessee

	Tennessee	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$234,697	\$15,728,292	23
Per Capita	\$43	\$58	
Percent Change FY1995–1999	15.3%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$229,409	\$14,679,343	18
Per Capita 2000 Expenditures	\$40	\$52	
Percent Change in Expenditures FY1996–2000	32.8%	37.0%	
Higher Education Awards in Biological Sciences, 2000	1,506	88,982	22
Biological Scientists in the Workforce, 2000	8,350	454,980	20

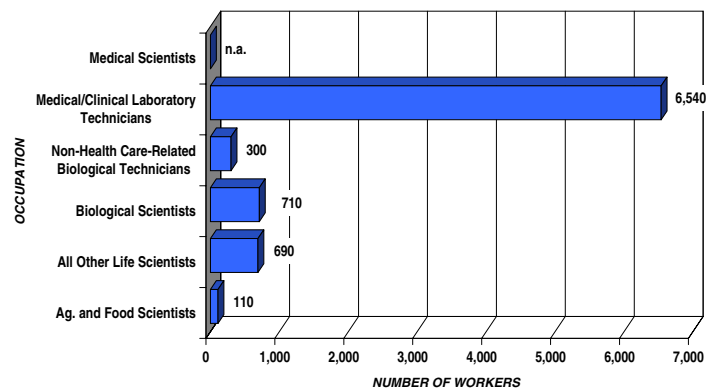
Total Bioscience R&D Expenditures at Academic Institutions in Tennessee



Life/Biological Sciences Degrees from Tennessee Higher Education



Biological Science Occupations in the Tennessee Workforce



TENNESSEE

Within the last two years, the state of Tennessee has embarked on several initiatives focused on technology development. In 1998, the Governor and General Assembly created the *Tennessee Technology Development Corporation (TTDC)*, with the mission of strengthening the state's economy through the development of science and technology and by supporting Tennessee businesses through the transfer of science, technology, and quality improvement methods to private and public enterprises. In 1999, with support from the *Department of Economic and Community Development (ECD)*, the *Tennessee Biotechnology Association (TBA)* was created.

This year, the Governor appointed a task force composed of people with expertise in the biosciences to develop policy recommendations on the most critical issues facing the state's biotechnology and life sciences industry. Both TBA and EDC are providing support to the task force.

SEED AND VENTURE FINANCING

The *TennesSeed Fund I*, has been created through a general partnership between the Tennessee Technology Development Corporation and Technology 2020 Finance Corporation. Technology 2020 is a regional economic development organization. This \$40 million plus fund was created to invest in start-up companies in communications, materials processing, information-Internet technology, and biotechnology industries. The fund has raised \$12 million in private investment commitments and received preliminary approval to be licensed as an SBIC by the U.S. Small Business Administration. Typical investments are expected to range from \$500,000–\$3 million.

NETWORKING

The *TBA*, a statewide association of biotechnology professionals, represents the industry on all public policy issues related to biotechnology. It also acts as an information clearinghouse and supports state education, research, technology transfer, and health care programs. In addition, the association aids in the attraction of biotechnology companies from other regions to the state as a means of economic development.

TAX POLICY

Tennessee does not provide any tax credits for research and development.

REGULATORY POLICY

- Tennessee has not enacted genetic privacy legislation.
- Tennessee has not enacted “right to know” legislation.
- Tennessee has not enacted legislation to place price controls on prescription drugs.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The *University of Tennessee Environmental Biotechnology Center*, located in the Oakridge/Knoxville region, offers facilities for early-stage environmental companies, including wet lab space for private biotechnology companies.

A *Med Tech Research Park* is in place centered around East Tennessee State University's College of Medicine. The Park offers biotechnology companies facilities suitable to their special needs. It also offers space for research and provides access to university resources and expertise.

The University of Tennessee, the newly formed Memphis Biotech Foundation, and Baptist Memorial Health Care Corporation have reached a series of preliminary agreements on a major gift of land and facilities and the establishment of a new biotechnology research park on the Medical Center campus of Baptist Memorial Health Care. The Memphis Biotech Foundation, the University of Tennessee Health Science Center, and Baptist will become partners in the proposed ***UT-Baptist Research Park***, a project that will extend Baptist's traditional mission in the Medical Center. The Biotech Foundation's plans call for a new campus integrating research, teaching and biomedical development. The proximity of the Research Park to University of Tennessee Health Sciences Center (UTHSC) will create collaborative opportunities for UTHSC and its academic and research activities. The UT-Baptist Research Park will include an incubation program to develop new businesses in biotechnology and biomedicine and foster the creation of new jobs.

WORKFORCE DEVELOPMENT

The ***Memphis Area High Tech Council*** is undertaking an initiative to focus on improving the local academic curricula to be more reactive to the biotechnology, medical, and life sciences industry.

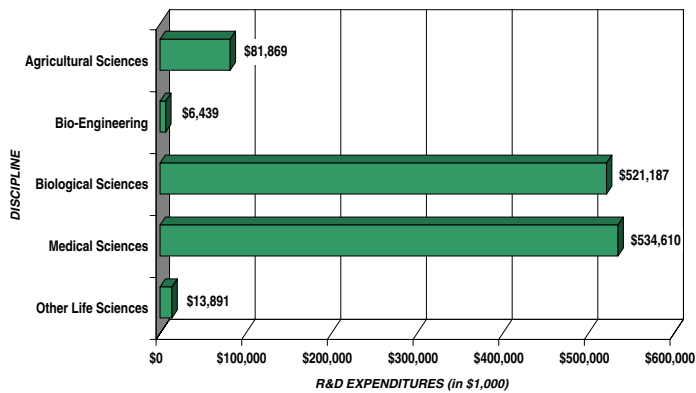
REGIONAL INITIATIVES

Memphis, through the ***Memphis Area High Technology Council*** and the newly formed ***Memphis Biotech Foundation***, is working to establish the Memphis region as an internationally recognized center for the development and commercialization of biomedical technology. The foundation's launch follows a yearlong effort by Memphis 2005, the City of Memphis, Shelby County Government, the Memphis Area Chamber of Commerce, the Community Foundation, the Regional Governor's Alliance for Excellence, and the Memphis Region Biomedical Initiative task force.

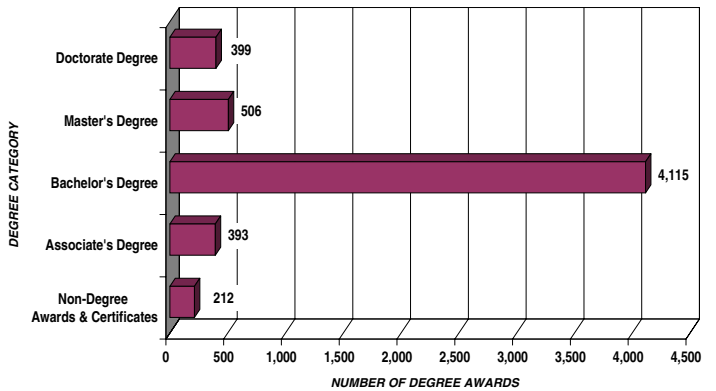
Texas

	Texas	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$1,157,996	\$15,728,292	3
Per Capita	\$58	\$58	
Percent Change FY1995–1999	18.1%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$765,113	\$14,679,343	6
Per Capita 2000 Expenditures	\$37	\$52	
Percent Change in Expenditures FY1996–2000	40.7%	37.0%	
Higher Education Awards in Biological Sciences, 2000	5,625	88,982	3
Biological Scientists in the Workforce, 2000	29,570	454,980	3

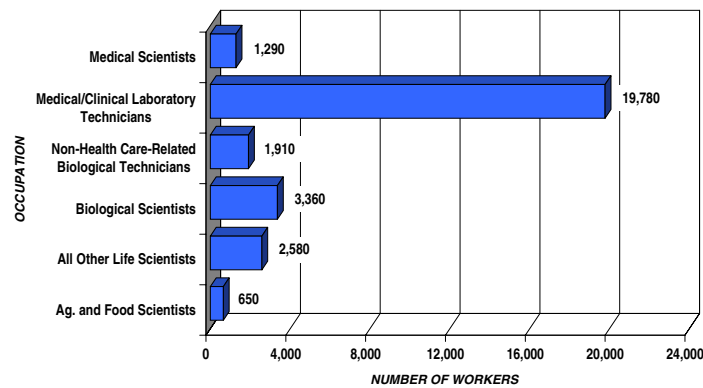
Total Bioscience R&D Expenditures at Academic Institutions in Texas



Life/Biological Sciences Degrees from Texas Higher Education



Biological Science Occupations in the Texas Workforce



Governor Perry proposed, and the 2001 Texas legislature funded, a significant number of new technology-related initiatives, many of which will support investments in the biosciences. In total, the legislature appropriated more than \$800 million for science, engineering, research, and commercialization activities. The initiatives funded included the following:

- \$385 million for construction, laboratory expansion, and equipment acquisition for a state-wide network of research, science, and engineering facilities in the state's universities and colleges. Included is funding for seven new or expanded health science research centers.
- \$25 million for a *Product Development Fund* and \$20 million for a Small Business Incubator Fund. The legislation dictates that both funds should give preference to biotechnology or biomedical projects.
- Creation of a new *San Antonio Life Science Institute* in the University of Texas system.
- Creation of the *Texas Tech Diabetes Research Center* at the El Paso campus.
- \$27 million to support research at four state health science centers.
- \$20 million to establish the *Southeast Texas Biotech Park* in Houston.
- Creation of a telemedicine pilot program aimed at enhancing health care services along the Texas border.

OTHER FINANCING AVAILABLE TO BIOSCIENCE COMPANIES

The Texas Department of Economic Development's *Capital Access Fund* is a partnership between the State and lending institutions to assist near bankable businesses in accessing the capital they need. To qualify, a business must have fewer than 500 total employees and 51 percent of them must be Texas residents.

Legislation was enacted in 2001 reinstating the *Product Development Fund* and the *Small Business Incubator Fund*. Texas voters approved these programs in 1989 but when the Department of Commerce was abolished in 1997, the enabling statute was eliminated. Legislation was passed reinstating the funds and directing them to give special preference to biotechnology or biomedical projects with the greatest likelihood of commercial success. The bill permits the state to use a variety of funding mechanisms including loans, guarantees, licenses/royalties, dividends, and equity investments. Both initiatives will be supported by a single board and will be administered through the State Comptroller's office.

NETWORKING

The *Texas Health Care & Bioscience Institute's (THBI)* main thrust is to represent the healthcare and Bioscience/Biotechnology industries in matters of public policies and offer networking and member services through forums and events. These events offer members the opportunity to discuss issues relevant to the industry from a policy standpoint, as well as the potential for future business opportunities. They communicate the value of healthcare and biotechnology to public officials and the public in general, as they are a clearinghouse for information on these industries within the state.

THBI has developed a *Life Sciences Roadmap* and is working with various regions of the state to develop viable life science research parks and incubators.

TAX POLICY

- **Credits and business loss carryovers for certain research and development activities.** A credit of four percent of qualified expenses can be taken before January 1, 2002; it changes to five percent after January 1, 2002. Qualified expenditures are the excess of qualified research expenditures in Texas over the base year, plus basis research payments in Texas, incurred after January 1, 2000. The credit may not exceed 25 percent of franchise tax due prior to January 1, 2002; it may not exceed 50 percent after January 1, 2002. This credit may be carried forward for 20 years, but may not be combined with the job creation credit.
- **Job creation tax credit.** The credit is 25 percent of wages paid for new qualifying jobs created in the following strategic investment areas: central administrative offices, distribution, data processing, manufacturing, research and development, or warehousing. The credit must be claimed in equal installments over five years and cannot exceed 50 percent of franchise tax due before credits. At least 10 new full-time jobs must be created and must pay 110 percent of the county average weekly wage and include health insurance. This credit can be carried forward for five years. It cannot be combined with the R&D credit.
- **Capital investment credit.** The capital investment credit is equal to 7.5 percent of a qualified investment made in depreciable tangible personal property in the strategic areas of central administrative offices, distribution, data processing, manufacturing, research and development, or warehousing. This credit may not exceed 50 percent of franchise tax due before credits. A minimum investment of \$500,000 is required and jobs must pay 110 percent of the county average weekly wage and include health insurance. This credit may be carried forward for five years.

REGULATORY POLICY

- Texas has not enacted genetic privacy legislation.
- Texas has enacted “right to know” legislation.
- Texas has enacted legislation to place price controls on prescription drugs.
- Medicaid Reimbursement Policy: Texas has an open formulary with prior authorization required for certain drugs including growth hormones.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

TESKA Innovations Corporation is a technology incubator that focuses on companies in the biosciences. They also promote the commercialization and technology transfer from academic and government research laboratories in the State of Texas.

Research parks that include facilities for bioscience companies include

- *Southeast Texas Biotech Park*, Houston, TX;
- *Texas Research Park*, San Antonio;
- *The Woodlands Research Forest*, The Woodlands; and
- *Harrington Regional Medical Center*, Amarillo.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

The Texas legislature has passed legislation allowing institutions of higher education to establish *Centers for Technology Development and Transfer*, which will seek to facilitate the transfer of university-developed technology to the marketplace. The Centers will assist Texas institutions of higher education in the discovery, protection, and commercialization of technology.

WORKFORCE DEVELOPMENT

The *Smart Jobs Fund* provides grants to employers to train their employees. The employer determines which employees they will train, what type of training will be performed, and who will administer the training. During fiscal year 2000, Smart Jobs grants totaling more than \$22 million were distributed to 245 businesses across the state of Texas.

REGIONAL INITIATIVES

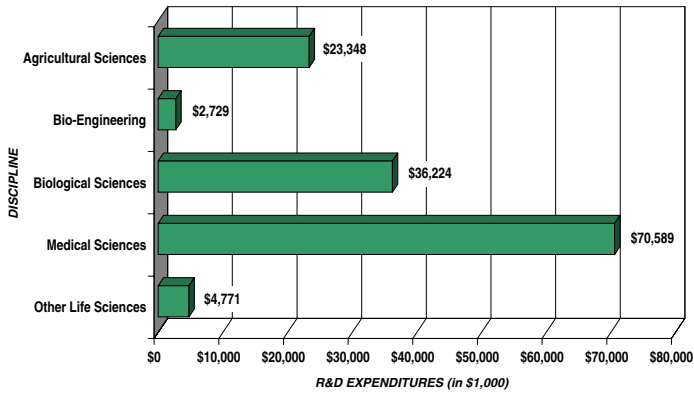
Efforts are underway in a number of regions of Texas to develop the bioscience industry. They include the following endeavors:

- *Southeast Texas Biotech Park* in Houston, a public/private initiative aimed at developing a biocluster in the Southeast Texas Region. This initiative has substantial support from the academic research institutions located in the region. It is funded by both public and private dollars. The 2001 legislature appropriated \$20 million for the project. The funding will go to support a 64-acre, two million square foot, 15-building project over a period of 17 years.
- The *Dallas Plan* is a public private collaborative effort to develop the bioscience industry in the Dallas area.
- *Strategy 2000* is a public/private effort to diversify the economy of the Fort Worth region by promoting partnership, networks and alliances in the region's existing medical industries as well as creating opportunities for new industries to develop.
- *San Antonio Technology Accelerator Initiative (SATAI)*, an industry, university, and public partnership focused on promoting technology-based enterprises in San Antonio in four industry clusters: bioscience, information technology, telecommunications, and aviation.

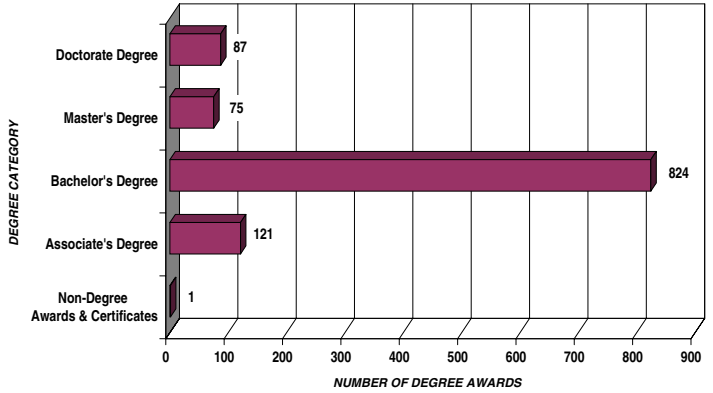
Utah

	Utah	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$137,661	\$15,728,292	32
Per Capita	\$65	\$58	
Percent Change FY1995–1999	31.5%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$114,320	\$14,679,343	27
Per Capita 2000 Expenditures	\$51	\$52	
Percent Change in Expenditures FY1996–2000	53.8%	37.0%	
Higher Education Awards in Biological Sciences, 2000	1,108	88,982	29
Biological Scientists in the Workforce, 2000	4,170	454,980	33

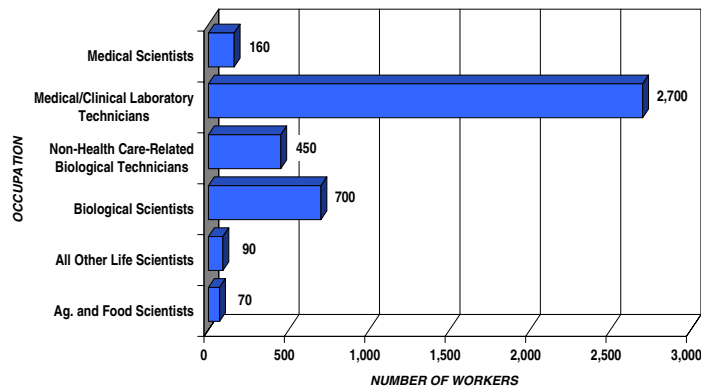
Total Bioscience R&D Expenditures at Academic Institutions in Utah



Life/Biological Sciences Degrees from Utah Higher Education



Biological Science Occupations in the Utah Workforce



The State of Utah is in the initial stages of developing a strategy to grow the state's bioscience industry. The Utah Department of Economic Development's Division of Business Development is actively encouraging companies specializing in genomics, proteomics, high throughput drug screening and drug delivery to locate in Utah. In addition, Utah's Centers of Excellence Program encourages technology licensing and the start-up of new bioscience companies.

SEED AND VENTURE FINANCING

The Utah Technology Finance Corporation (UTFC) was created by the Utah Legislature in 1983 to promote economic development and job creation throughout the state. UTFC made investments in start-up technology companies. While originally established as an independent, non-profit corporation, UTFC was recently privatized.

NETWORKING

The *Utah Life Science Association* seeks to develop and promote life science industries by bringing members together in partnership to foster education at all levels; facilitate innovation, excellence and international competitiveness in its members' products and services; gain consensus for action; and be proactive in matters relating to policy formation, legislation, and regulations that impact the life sciences industry.

TAX POLICY

- **Credits for machinery, equipment, or both primarily used for conducting qualified research or basic research.** A six percent nonrefundable income tax credit is available for the purchase of machinery, equipment, or both. The credit must be claimed for the taxable year for which the taxpayer qualifies for the credit. Unused credit may be carried forward for the next 14 taxable years, but may not be carried back.
- **Credits for research activities conducted in the state.** A taxpayer qualifies for a nonrefundable six percent income tax credit for increasing research activities in the state beyond the base amount. The credit or a portion of the credit should be claimed for the taxable year immediately following the taxable year for which the taxpayer qualifies for the credit; the credit or a portion of the credit may be carried forward. The alternative incremental credit in the Internal Revenue Code is not included in this section.

REGULATORY POLICY

- Genetic privacy legislation has been proposed but not enacted in Utah.
- "Right to know" legislation has not been enacted.
- Utah has not enacted legislation to impose price controls on prescription drugs.
- Medicaid Reimbursement Policy: Utah has an open formulary with prior authorization required for certain drugs including growth hormones.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The *Utah State University Research and Technology Park*, located in Logan, houses private and public sector tenants who are primarily engaged in research and technology-oriented activities.

Tenant collaboration with Utah State University for research and technology development is specifically encouraged and supported. The 38-acre park began operation in 1986. Currently, the park has 12 buildings with a combined total of 264,260 square feet of space. Two additional construction projects are in the planning and design phase. The park also houses a business incubator.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

The *Utah State University Biotechnology Center*, which includes a new Bioprocess Facility, promotes research and education, operates core resource service laboratories, and supports technology development and transfer. The Bioprocess Facility provides equipment, instrumentation, and personnel to help academic and industrial clients find solutions to research and development problems.

The *Utah Centers of Excellence Program (COEP)* is a state-sponsored program that funds late-stage research in order to develop new products and form new companies. COEP funds centers in the fields of agriculture and natural resources, information technology, biomedical and biotechnology, aerospace, and advanced materials and processes. During 2000–2001, COEP supported centers in Biomedical Optics (\$150,000); Vascular Biotherapeutics (\$100,000); Rapid Microbe Detections (\$120,000); Electronic Medical Education (\$120,000); Nuclear, Medical & Environmental Technologies (\$100,000); Bioremediation (\$68,000); Cell Signaling (\$170,000); and Profitable Uses of Agriculture (\$100,000). COEP also provides management and technical support for start-up companies.

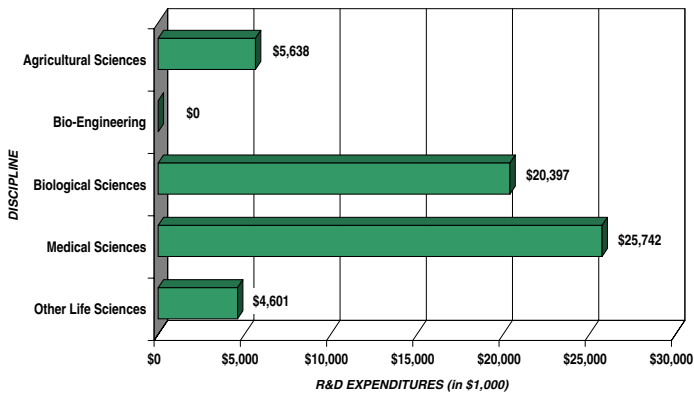
WORKFORCE DEVELOPMENT

Custom Fit Program provides matching funds to train workforce in new high tech skills at the request of the employer.

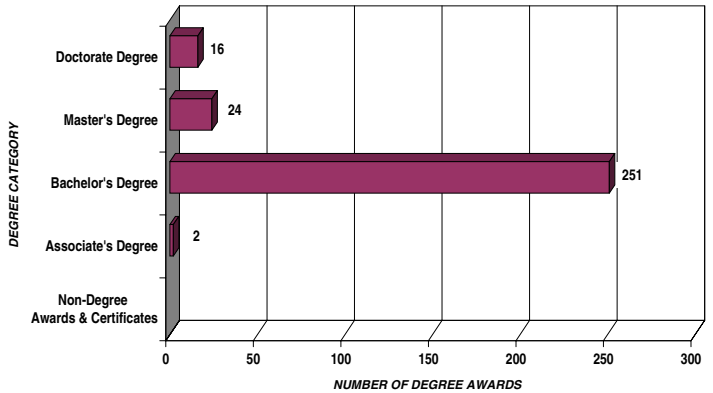
Vermont

	Vermont	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$56,378	\$15,728,292	39
Per Capita	\$95	\$58	
Percent Change FY1995–1999	9.6%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$49,648	\$14,679,343	36
Per Capita 2000 Expenditures	\$82	\$52	
Percent Change in Expenditures FY1996–2000	68.3%	37.0%	
Higher Education Awards in Biological Sciences, 2000	293	88,982	46
Biological Scientists in the Workforce, 2000	940	454,980	50

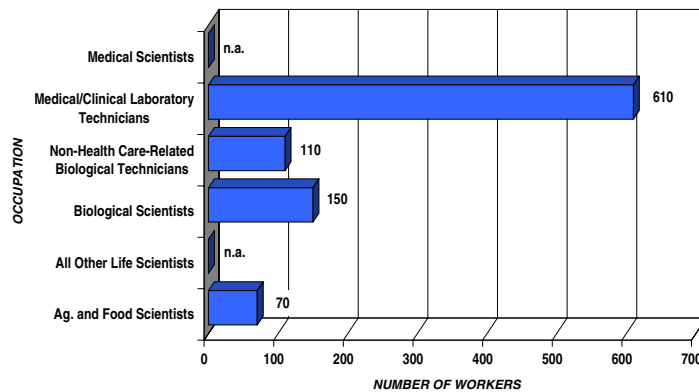
Total Bioscience R&D Expenditures at Academic Institutions in Vermont



Life/Biological Sciences Degrees from Vermont Higher Education



Biological Science Occupations in the Vermont Workforce



VERMONT

Biotechnology is one of five sectors identified for development in Vermont's state plan for science and technology. Vermont has used the state's *Experimental Program to Stimulate Competitive Research (EPSCoR)* program to develop Centers of Excellence related to each of these industry sectors. In the biotechnology area, Vermont EPSCoR supports activities in molecular biology and genetics associated with measurement technologies for biological processes. A variety of mechanisms including seed funding for university and industry collaborations, post doctoral mentoring, and multi-user research equipment acquisition are being used to enhance Vermont's competitiveness in biotechnology.

In 1996, the *Applied Biotechnology Center of Vermont (ABCV)* was incorporated as a not-for-profit private corporation. ABCV was established to provide support to start-up biotechnology companies and to facilitate the creation of new companies based on technologies developed at the University of Vermont (UVM) College of Medicine and other Vermont academic research institutions.

SEED AND VENTURE FINANCING

The *Vermont Venture Capital Fund* is managed by North Atlantic Venture Capital Corporation. Stimulated by state legislation, the fund is a private enterprise that seeks to invest from \$100,000 to \$750,000 in high-quality opportunities that have outgrown seed capital resources and are either not ready for or have exceeded the limits of commercial bank lending resources. Investments are made based on estimated return on investment.

NETWORKING

Vermont does not have any networking organizations focused exclusively on bioscience companies. The *Annual Vermont Innovation Forum* brings together innovators, technology developers, and investors and the *Vermont Venture Network* holds monthly meetings that provide an opportunity for networking within Vermont's entrepreneurial community.

TAX POLICY

Economic advancement research and development tax credit allows a person, upon obtaining the approval of the Vermont Economic Progress Council, to receive a credit against his or her income tax liability in the amount of ten percent of qualified research and development expenditures undertaken within the state of Vermont in the tax year for which the credit is claimed. Qualified R&D expenditures are those included in the IRS code.

REGULATORY POLICY

- Vermont has enacted genetic privacy legislation.
- Vermont has enacted "right to know" legislation.
- Vermont has not enacted legislation to place price controls on prescription drugs.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

ABCV has begun to provide business services to bioscience start-up companies. Vermont's professional community is currently providing these services on a volunteer basis. *ABCV* is also working with companies to assist them in obtaining start-up capital.

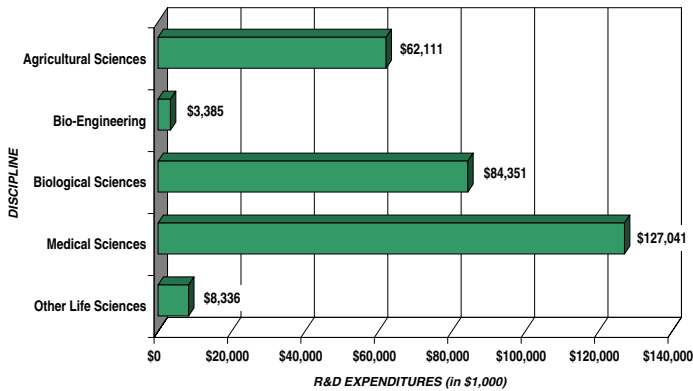
WORKFORCE DEVELOPMENT

Vermont has not developed any bioscience specific training programs. The *Vermont Training Program*, however, promotes business expansion and encourages the creation and retention of jobs in Vermont by providing training for new and existing businesses. Individually designed programs may include on-the-job, classroom, skill upgrade, or other specialized training that is mutually agreed upon between the state and employer.

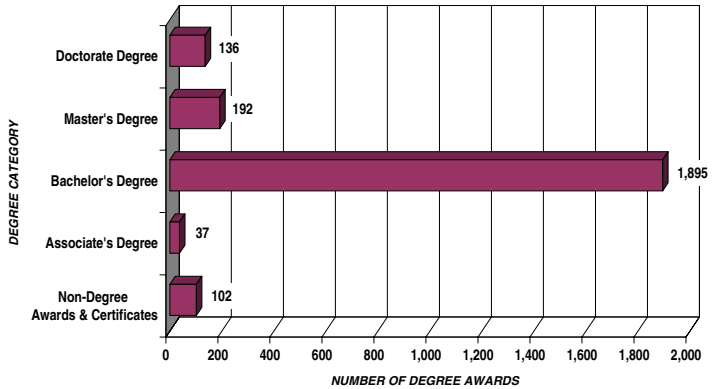
Virginia

	Virginia	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$285,224	\$15,728,292	18
Per Capita	\$41	\$58	
Percent Change FY1995–1999	11.7%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$212,926	\$14,679,343	20
Per Capita 2000 Expenditures	\$30	\$52	
Percent Change in Expenditures FY1996–2000	20.4%	37.0%	
Higher Education Awards in Biological Sciences, 2000	2,362	88,982	13
Biological Scientists in the Workforce, 2000	10,650	454,980	15

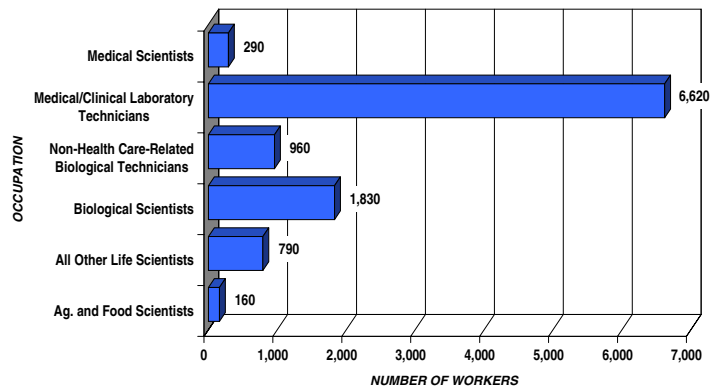
Total Bioscience R&D Expenditures at Academic Institutions in Virginia



Life/Biological Sciences Degrees from Virginia Higher Education



Biological Science Occupations in the Virginia Workforce



VIRGINIA

The Commonwealth of Virginia supports a number of organizations that provide assistance to new and growing bioscience companies. These include the following groups:

- ***Virginia's Center for Innovative Technology (CIT)***, a state-supported private, non-profit organization, which provides Virginia-based technology companies with access to technology expertise resident at Virginia's seven research universities, fosters a collaborative environment among the private and public sectors, and seeks to build technology infrastructure to ensure the growth and stability of the industry. Industry clusters targeted by CIT include biotechnology and biomedical industries.
- The ***Virginia Department of Business Assistance (DBA)***, state government's principal point of communication with Virginia businesses, provides the biotechnology industry with access to capital, small business counseling, workforce training, and pro-active business problem solving.
- The ***Virginia Economic Development Partnership (VEDP)***, the business development arm of the Commonwealth, targets the growth and development of the biotechnology industry. VEDP helps companies in relocating to and growing in the state.
- The ***Virginia Biotechnology Research Park Authority*** is an independent authority created in 1993 for the specific purposes of creating new jobs and investment in biotechnology for Virginia and advancing scientific research in the life sciences. The Authority created the Virginia Biotechnology Research Park, which is described below.

OTHER FINANCING AVAILABLE TO BIOSCIENCE COMPANIES

Technology Awards. CIT operates a financial awards program that focuses on supporting the expansion of technology infrastructure and promoting collaborative research and development efforts that will result in the creation of new, innovative technology as well as bring federal and private investment dollars to the Commonwealth. Awards fall into two basic categories: Technology Development and Technology Infrastructure, and can range from \$3,000 for short-term, immediate consulting help to \$90,000 for one to two year development projects. All awards are granted through a formal proposal process, but the requirements and objectives vary between award programs.

FACILITIES FINANCING

The Virginia Department of Business Assistance (DBA) manages the ***Virginia Small Business Incubator Grant Program***, which provides grants to local governments and nonprofit economic development organizations to construct or renovate buildings to provide incubator space for start-up companies. The program can also provide support for initial incubator operations. This program has been used to support the development of biotechnology-focused incubators.

The 2000 Virginia General Assembly appropriated \$13 million to establish the ***Commonwealth Technology Research Fund***. The fund, which requires a 1:1 match from the state's universities, is designed to leverage federal and private sector research investment in Virginia universities. The fund will be used to build and upgrade research capacity in key departments of Virginia universities, including bioscience departments.

NETWORKING

The *Virginia Biotechnology Association*, formed in 1992, promotes the biotechnology industry in Virginia; represents the industry's interests before federal, state, and local legislators and regulators; coordinates information among the many agencies and organizations interested in biotechnology; and provides a forum for networking. The association has created regional chapters in each major population area of the state in partnership with Virginia's Regional Technology Councils. The chapters hold special events, such as breakfasts, receptions, networking meetings, lectures, and plant tours.

CIT's BioInfoTech Luncheon Series seeks to connect Virginia's biotech researchers with the Information Technology industry to discuss how information technology resources can be brought to bear on problems in the life sciences.

TAX POLICY

- **Research & development sales and use tax exemption.** Virginia exempts the tangible personal property purchased for use or consumption directly and exclusively in basic research or research and development in the experimental or laboratory sense from sales and use tax. The exemption applies to a wide range of experimental or laboratory research activities: advancing existing knowledge or technology; developing new uses for existing products, technology, or processes; or improving existing products, technology, or processes. Research activities that are not exempted include management studies, environmental analyses, feasibility studies, consumer product testing, and social science or historical research.
- **Major business facility job income tax credit.** Qualified bioscience companies locating or expanding in Virginia receive a \$1,000 corporate income tax credit for each new full-time job created over a threshold number of jobs.
- **Property tax treatment for manufacturers.** A manufacturer's inventory, office furniture, fixtures, equipment used in non-production activities, and corporate aircraft are classified as intangible personal property in Virginia and thus are not taxed, even if the company's entire manufacturing operations are conducted outside Virginia.

REGULATORY POLICY

- Virginia has enacted genetic privacy legislation with regard to general personal medical record information.
- Virginia has not enacted "right to know" legislation.
- Virginia has not enacted legislation to place price controls on prescription drugs.
- Medicaid Reimbursement Policy: Virginia has an open formulary with prior authorization required for certain products including growth hormones.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

The *Virginia Biotechnology Park*, located adjacent to Virginia Commonwealth University's Medical College of Virginia campus in Richmond, is a 34-acre development that houses more than 34 private companies, institutes, and state laboratories in six buildings. The park also houses a business incubator facility and programs to support new biotechnology start-ups. A new \$55 million lab is underway for the Virginia Division of Consolidated Laboratory Services and a \$14 million headquarters for the United Network for Organ Sharing will be completed in the summer of 2002.

The ***Virginia Biotechnology Research Park at Meadowville***, a 325-acre site that is part of Chesterfield County's Meadowville Technology Park, will be dedicated to serving the needs of life science companies in Central Virginia. Affiliated with the Virginia Biotechnology Research Park described above, this is the second of a network of bioscience parks being developed in the Greater Richmond area by the Virginia Biotechnology Research Park Authority in conjunction with other entities.

The city of Norfolk has constructed the ***Norfolk BioTech Incubator***, a 22,000 square foot biotechnology incubator. The facility is adjacent to the Eastern Virginia Medical School's research institutes, which include the Jones Institute for Reproductive Medicine, Strelitz Diabetes Institute, and the Center for Pediatric Research.

The University of Virginia's ***Fontaine Research Park*** is a 54-acre research park which, when completely developed, will include nearly 400,000 square feet of development. The park, already 80 percent built, is home to the Virginia Neurological Institute, Multimedia Medical Systems, the Health Services Foundation, Varian Medical Systems, and a joint venture between the HEALTH-SOUTH Corporation and the University's Health System that includes a 50-bed Rehabilitation Hospital and the Musculoskeletal Medical Office Building.

The ***University of Virginia Research Park at North Fork*** is a 562-acre mixed-use park that will include facilities for laboratory research, medical, and pharmaceutical companies but will also include residential, retail, and other uses. Current tenants include MicroAire Surgical Instruments and Pharmaceutical Research Associates. An incubator is being developed in the park that will include 41,000 square feet of wet and dry laboratory and office space. The facility is scheduled to be completed in September 2001.

The ***Virginia Tech Corporate Research Center (CRC)***, 120 acres located adjacent to the Virginia Tech campus, contains 16 single and multi-tenant buildings. CRC houses seven biotechnology companies and the Virginia Bioinformatics Institute.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

CIT has a network of technical assistance programs to help build and grow technology-based companies. Assistance covers most aspects of the technology lifecycle from concept to prototype to market. CIT has established a number of ***Technology Development Centers*** including a Center for Bioprocess/Product Development and a Center for Drug Delivery Design and Clinical Applications. The CIT staff includes an Industry Director for Biotechnology and Medical Applications.

The ***Virginia Biosciences Development Center*** is a non-profit business accelerator that has been created to assist early- and pre-formation stage life science companies in Central Virginia. The Center connects companies with a network of professional service providers and the resources of the Virginia Biotechnology Center. This network has pledged more than \$183.5 million in pro bono services to assist early stage bioscience companies.

Carilion Biomedical Institute is a partnership between Carilion Health Systems, Virginia Tech, and the University of Virginia. The Institute's vision is to be a world-class biomedical science, engineering, and technology organization devoted to the research, development, and commercial application of health related technologies. When operational, it is anticipated that the Institute will take university research beyond initial concept to prototype testing and preparation for commercialization.

WORKFORCE DEVELOPMENT

The *Biotechnology Summer Intern Program*, sponsored by Virginia's Center for Innovative Technology, places students at life sciences companies. Companies get access to the best students before they graduate, and students learn about the companies and the types of positions they can expect after graduation.

The *Virginia Community College System* has identified biotechnology as a key area for curriculum development and has established an approved Associate's degree at Piedmont Valley Community College.

Virginia Biotechnology Association Student Chapters are forming at the major universities based upon a model created by James Madison University in Harrisonburg, Virginia. Students learn about career pathways in biotechnology and are assisted with bioscience internships across the state, through programs sponsored by the Center for Innovative Technology.

"Biotech Bonanza" Summer Camp 2001. The Virginia Biotechnology Association, in partnership with Greater Richmond area community colleges and CIT, is sponsoring a five-day biotech summer camp pilot program for 50 middle school children in August, 2001. This program will expand statewide in 2002.

CIT has established a *statewide biotechnology training resource* to collect and coordinate information on all the biotech training programs in the state, at all levels from high school to post graduate.

REGIONAL INITIATIVES

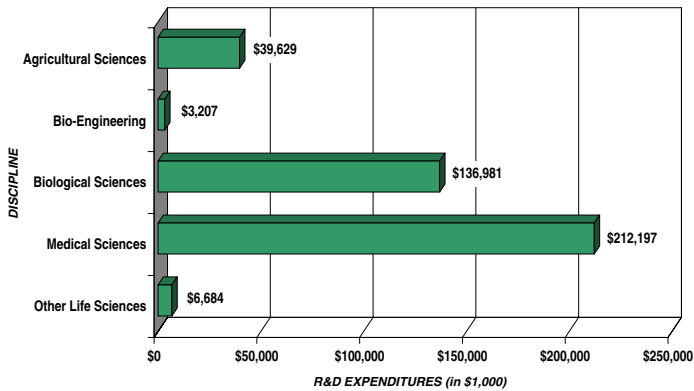
A number of communities in Virginia are investing in projects to facilitate the growth of bioscience companies. Prince William County, the City of Roanoke, and the City of Norfolk all have activities underway. These include the following projects:

- Prince William County is developing *Innovation @ Prince William*, a 124-acre business district. The site houses a campus of George Mason University, the primary focus of which is biotechnology, with emphases in bioinformatics, biotechnology, and forensic biosciences. The development is proposed to include a hotel convention center, several high tech and biotechnology business parks, residential areas, and classroom buildings.
- The City of Roanoke is developing *Riverside Centre for Research and Technology*, a 74-acre business park, to attract high technology health care related industries. Carilion Biomedical Institute described above, will locate in the Centre. Planning and development are underway and the first sites are expected to be available in 2002.
- The *City of Norfolk's BioTech Incubator* was described previously.

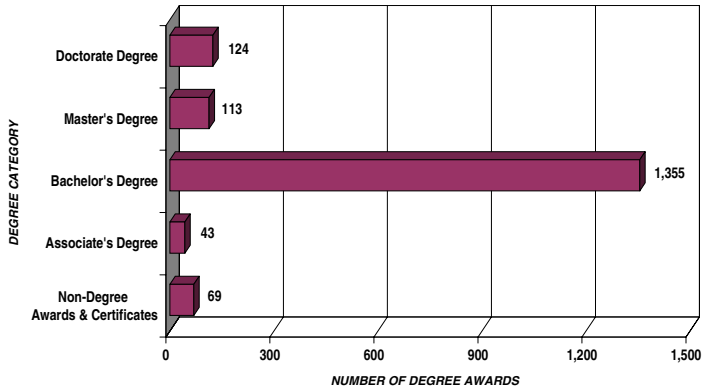
Washington

	Washington	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$398,698	\$15,728,292	14
Per Capita	\$69	\$58	
Percent Change FY1995–1999	15.5%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$530,436	\$14,679,343	8
Per Capita 2000 Expenditures	\$90	\$52	
Percent Change in Expenditures FY1996–2000	40.9%	37.0%	
Higher Education Awards in Biological Sciences, 2000	1,704	88,982	19
Biological Scientists in the Workforce, 2000	11,980	454,980	13

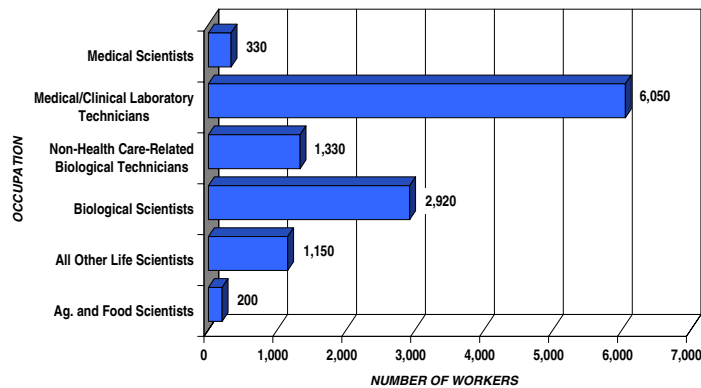
Total Bioscience R&D Expenditures at Academic Institutions in Washington



Life/Biological Sciences Degrees from Washington Higher Education



Biological Science Occupations in the Washington Workforce



WASHINGTON

While there is no explicit state government biotechnology strategy, the *Washington Biotechnology and Biomedical Association (WBBA)* is working with the Governor's office to formulate and encourage implementation of a technology strategy to further enhance the growth of innovative companies and research in Washington State. Two additional organizations that support Washington's efforts to promote the development of technology-based companies are the *Washington Technology Center (WTC)* and the *Spokane Intercollegiate Research and Technology Institute (SIRTI)*.

- The *Washington Technology Center*, created by the Washington legislature in 1983, works with Washington state companies and academic researchers to fund and facilitate market-driven, high technology focused, industry-university R&D partnerships in four areas, one of which is biotechnology and biomedical devices. WTC's biotech partnerships focus on industry applications in medical and biomedical devices, environmental bioremediation, and veterinary sciences.
- The *Spokane Intercollegiate Research and Technology Institute* creates partnerships to develop technologies and commercialize new products by combining and leveraging resources of business, higher education institutions, private investors, and state and federal governments.

The *Advanced Technology Initiative (ATI)* is a partnership between the legislature, private business, and the state's research universities. It creates new programs specifically targeted toward creating new industries and transforming existing industries in the areas of greatest opportunity for the state of Washington. The ATI is a bridge between cutting edge research and education and new economic activity. ATI invests in a number of technology areas including biotechnology. The initiative has attracted some of the field's best talent and tens of millions of dollars in private and federal research funding to the state. New jobs and new companies (capitalized at over \$50 million) have been created directly as a result of this initiative.

OTHER FINANCING AVAILABLE TO BIOSCIENCE COMPANIES

WTC's Focused Technology Initiatives (FTI) program provides technology assistance to Washington state companies from system proof of concept and prototype design to experimental analysis and technical feasibility evaluation of an emerging product. This program focuses on biotechnology and biomedical devices as one of four important areas of emerging technology.

WTC awards over \$1 million through its *Research and Technology Development (RTD) Program* annually to Washington state university researchers teamed with a Washington state company partner. Biotechnology and biomedical devices is one of the four priority areas of the RTD Program. Since 1996 WTC has awarded over \$4 million to almost 50 companies in biotechnology and biomedical areas.

SIRTI awards *Innovation Grants* for funding the development of new ideas and prototypes and has awarded \$1.1 million to nine different biotechnology and biomedical projects.

NETWORKING

Washington Biotechnology and Biomedical Association (WBBA), a not-for-profit association of Washington state biotechnology and biomedical companies, research firms, and related organizations.

Biotechnology Association of the Spokane Region (BASR) is an affiliate of WBBA dedicated to promoting the biotechnology & biomedical industry in Eastern Washington.

TAX POLICY

- **High Technology Business and Occupation Tax.** An annual credit of up to \$2 million toward the Business and Occupation Tax obligation is allowed for businesses that perform research and development in five areas: advanced computing, advanced materials, biotechnology, electronic device technology, or environmental technology. The credit cannot exceed the amount of tax due for the year and it must be taken for the same year in which the research and development expenditures took place.
- **High technology sales and use tax deferral or exemption.** Exemption of retail sales and use taxes is allowed for capital expenditures related to R&D or for pilot scale manufacturing facilities, in any one of the five categories, as long as the company continues to use the facility. Businesses are eligible for a sales and use tax deferral or exemption, if they start new research and development or pilot scale manufacturing operations, or expand a current operation. The deferral is not available for repair or replacement of high technology equipment.
- **Job creation tax credit.** A credit for each qualified employment position is available for companies with manufacturing or research and development activities that are conducted in an eligible area at a specific facility. The applicant's average full-time qualified employment positions at the specific facility must be at least 15 percent greater in the year for which the credit is being sought than the applicant's average full-time qualified employment positions at the same facility in the immediately preceding year. The credit is (a) \$4,000 for each qualified employment position with wages and benefits greater than \$40,000 annually that is directly created in an eligible business and (b) \$2,000 for each qualified employment position with wages and benefits less than or equal to \$40,000 annually that is directly created in an eligible business.
- **Sales and use tax exemption for constructing manufacturing/research facilities.** A tax deferral is available for an investment in a rural county (100 persons or less per square mile), in a qualified building (new construction, expansion, or renovation), or in qualified machinery and equipment used for the purpose of increasing capacity for manufacturing and research and development activities.
- **Sales and use tax exemption for purchase, repair and replacement of equipment for manufacturing/research operations (no structures).** Sales to manufacturers and processors for hire of machinery and equipment used directly in the manufacturing or R&D operation (and the necessary labor and services to repair or install the machinery and equipment) are exempt from sales tax.

REGULATORY POLICY

- Genetic privacy legislation has been proposed but not enacted in Washington.
- "Right to know" legislation has been proposed but not enacted in Washington.

- Legislation to place price controls on prescription drugs has been proposed but not enacted in Washington.
- Medicaid Reimbursement Policy: Washington has an open formulary, however, it has a strictly monitored prior authorization program for branded drugs including growth hormones. Budget language last year approved an experimental program to enact a therapeutic substitution program for two classes of drugs. The state Senate has proposed expanding this program to eight classes of drugs.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

SIRTI provides incubator capabilities to companies in the biotechnology and biomedical areas. SIRTI is specially equipped to promote testing and demonstration of new technologies, and accelerate product development in biodevelopment, as well as microelectronics, software engineering and multimedia. SIRTI's Bio Technologies Center offers office and production space to qualified organizations.

The **Applied Process Engineering Lab (APEL)** is an Eastern Washington technology business startup center with engineering and manufacturing scale space, as well as wet labs, bio labs, and electronic laboratories. APEL accepts companies that are ready to commercialize on a small scale or to market their products so they can avoid large capital expenses until their market is developed. Prototypes or pilot plants can be tested and initial manufacturing conducted using APEL's utilities, services, and permits. APEL has air and water discharge permits, a waste storage permit, and an RCRA R&D permit. APEL sponsors include the City of Richland, Washington State University, and the U.S. Department of Energy, among others.

WTC's headquarters in Fluke Hall on the University of Washington campus provides lab space for several biotechnology companies.

Research parks that can accommodate bioscience companies include

- **Washington State University Research and Technology Park**, Pullman, Washington;
- **Monte Villa Farms**, Bothell, Washington; and
- **SODO Biotechnology Facilities**, Seattle, Washington.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

WTC's **Entrepreneur's Access (EA)** program provides custom-tailored technology assistance to Washington state entrepreneurs, small companies, and start-up enterprises with 15 or fewer employees. WTC also helps entrepreneurs access university capabilities and facilities. The EA program focuses on biotechnology and biomedical devices, as well as three other technology areas.

SIRTI's commercialization specialists provide bench to market management services.

WORKFORCE DEVELOPMENT

WTC Summer Business Intern Program provides MBA students an opportunity to work with participating biotechnology companies who have been involved with a WTC funded project. WTC will match the company commitment up to \$4,000.

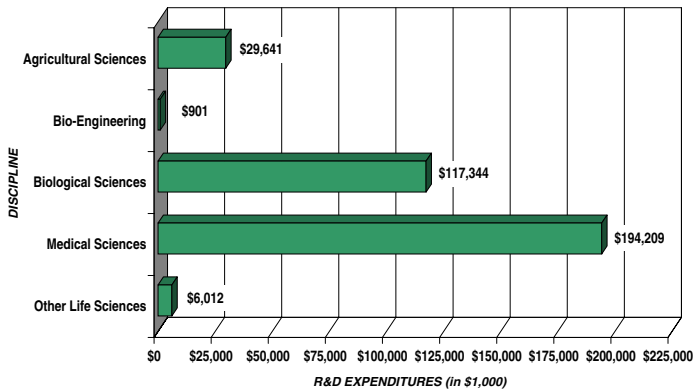
The Washington State Board for Community and Technical colleges (SBCTC) sponsored a project through Shoreline Community College to develop skill standards for the biotechnology

and biomedical industry. WBBA took an active role along with leaders in industry, labor, and education in developing assessments and curriculum in Washington State based on skill standards to be implemented in schools and colleges throughout the region.

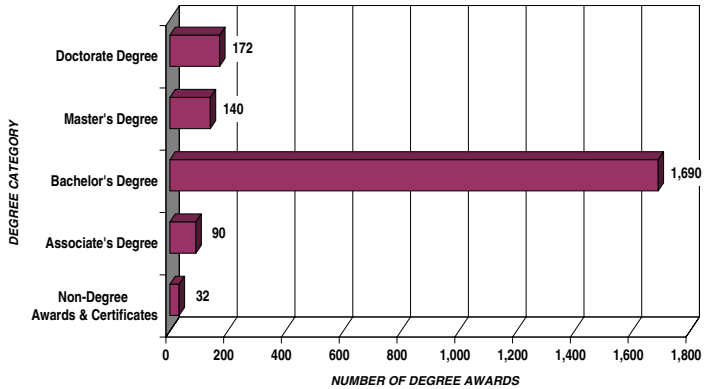
Wisconsin

	Wisconsin	U.S.	Rank
FY1999 University Life Sciences R&D Expenditures* (in 1999 Dollars)			
Total (thousands)	\$348,107	\$15,728,292	15
Per Capita	\$66	\$58	
Percent Change FY1995–1999	11.7%	18.3%	
FY2000 NIH Support to Institutions (in 2000 Dollars)			
Total (thousands)	\$253,205	\$14,679,343	15
Per Capita 2000 Expenditures	\$47	\$52	
Percent Change in Expenditures FY1996–2000	34.2%	37.0%	
Higher Education Awards in Biological Sciences, 2000	2,124	88,982	14
Biological Scientists in the Workforce, 2000	8,990	454,980	18

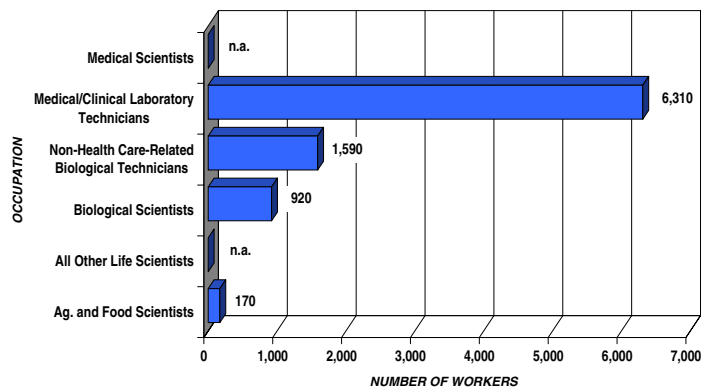
Total Bioscience R&D Expenditures at Academic Institutions in Wisconsin



Life/Biological Sciences Degrees from Wisconsin Higher Education



Biological Science Occupations in the Wisconsin Workforce



WISCONSIN

In January 2000, Governor Thompson announced a \$317 million 10-year *BioStar Initiative* to build a series of state-of-the-art research centers on the UW-Madison campus. Of this total amount, state government would provide approximately \$158.5 million. Proposed capital projects include an addition to the Biotechnology Center, construction of a new Microbial Sciences Building, and construction of a new Interdisciplinary Biology Building. This initiative is continuing to move forward under Governor McCallum.

In addition, the FY01-02 biennial budget requests funding for *Techstar*, an initiative involving a coalition of five universities in Southeastern Wisconsin, including the Medical College of Wisconsin, UW-Milwaukee, Marquette University, Milwaukee School of Engineering, and UW-Kenosha campus. The goal of Techstar is to increase technology transfer into commercial enterprise emanating from these organizations. The proposed funding is \$1.5 million for the biennium. The legislature has not yet approved funding for Techstar.

Lastly, legislation was passed creating a new Wisconsin Technology Council in 2000 as a 501(c)(3) technology economic development corporation with a statewide mandate for technology entrepreneurship and business development. The Council has identified workforce development and financing as key focus areas for policy initiatives and action. The Council is comprised of nearly 40 technology business and educational leaders, as well as representatives from key intermediaries such as law firms and venture capital firms. The Council has begun work on a statewide technology development policy.

SEED AND VENTURE FINANCING

In 2000, the *State of Wisconsin Investment Board (SWIB)*, the state's multi-billion dollar pension fund, awarded an aggregate of \$50 million to two Wisconsin venture capital funds (Mason Wells and Venture Investors Management) to be used for biotechnology-related high technology investment in Wisconsin firms. These two venture capital firms are otherwise privately funded and managed by professional venture capitalists.

In addition, the *Certified Capital Company (Capco) program* created a pool of \$50 million contributed by insurance companies in return for tax credits. The Department of Commerce has allocated this pool evenly among three certified capital companies who are charged with making investments in small Wisconsin growth businesses. These companies are reviewing the business plans of biotechnology firms for investment purposes, and at least one of these Capco's has invested in biotechnology firms.

OTHER FINANCING AVAILABLE TO BIOSCIENCE COMPANIES

The Wisconsin Development Fund operated by the WI Department of Commerce includes the *Technology Development Fund* program for financing R&D projects with good commercial potential. The fund will finance up to 75 percent of direct R&D project costs in the form of low-interest forgivable loans. The *Technology Development Loan Program* provides financing for working capital equipment purchase for commercialization efforts and market entry and expansion.

FACILITIES FINANCING

The *Technology Development Loan Program* can provide funding for facilities.

NETWORKING

The *Wisconsin Biotechnology Association* is the statewide membership trade organization for the biotechnology industry, and provides networking opportunities and an annual conference.

The *WIN Foundation*, based in Madison, provides monthly lunch programs for high technology firms, which many biotech firms attend. The WIN Foundation also organizes the fall Wisconsin Venture Fair, which typically features a number of biotech firms seeking capital.

The *Wisconsin Venture Network*, based in Milwaukee, sponsors the spring Wisconsin Venture Conference, the other venture-capital matchmaking event that generally features biotech firms.

The *University of Wisconsin Biotechnology Center* provides research, education, information services to Wisconsin's biotechnology community.

TAX POLICY

Governor Scott McCallum proposed a \$35 million tax credit for high tech companies in his FY01–02 budget request. The credits, to be available to businesses that expand or locate in seven targeted technology zones throughout the state, are the first phase of a program that is proposed to grow to include 20 zones and \$100 million in credits. Each zone would have a maximum credit eligibility of \$5 million. The Wisconsin Department of Commerce will certify business eligibility for the credit.

- **Research credit.** A corporation is entitled to a credit of five percent of the amount obtained by subtracting from the corporation's qualified research expenses, as defined in section 41 of the Internal Revenue Code, research not conducted in the state. If a portion of qualified research expenses is incurred partly within and partly outside this state and the amount incurred in this state cannot be accurately determined, a portion of the qualified expenses shall be reasonably allocated to this state. If a credit computed under this subsection is not entirely offset against Wisconsin income or franchise taxes otherwise due, the unused balance may be carried forward and credited against Wisconsin income or franchise taxes otherwise due for the following 15 taxable years.
- **Research facilities credit.** For taxable year 1986 and subsequent years, any corporation may credit against taxes otherwise due under this chapter an amount equal to five percent of the amount paid or incurred by that corporation during the taxable year to construct and equip new facilities or expand existing facilities used in this state for qualified research, as defined in section 41 of the internal revenue code. Eligible amounts include only amounts paid or incurred for tangible, depreciable property but do not include amounts paid or incurred for replacement property.

REGULATORY POLICY

- Wisconsin has not enacted genetic privacy legislation.
- Wisconsin has passed "right to know" legislation but only pertaining to BGH.
- Wisconsin has not enacted legislation to place price controls on prescription drugs.

- **Medicaid Reimbursement Policy:** Wisconsin has an open formulary with prior authorization required for specific products including several biotechnology products.

SPECIALIZED BIOTECHNOLOGY INCUBATORS AND RESEARCH PARKS

University of Wisconsin-Madison Research Park houses many biotechnology firms, as does the *MG&E Innovation Center*, a business incubator located in UW-Madison Research Park.

The *Fitchburg Research Park* (a southern suburb of Madison) also houses a number of biotech firms.

The *Milwaukee County Research Park* has an incubator that houses a number of biotechnology tenants.

COMMERCIALIZATION AND BUSINESS DEVELOPMENT SUPPORT

The *University Industry Relations* program and the *UW Enterprise Center* jointly hired a professional to assist university researchers spin-out technologies and start new businesses. This person provides help with business plans, management assistance, market research, and raising capital. The Enterprise Center staff also assist high tech entrepreneurs with business plans and financing strategies.

WISBIC, the Wisconsin Small Business Innovation Consortium, is a multi-organization group that promotes the federal SBIR/STTR program, helps companies compete more successfully for this federal funding, and addresses commercialization strategies for these firms.

The new *Office of Science and Technology* at the *Wisconsin Department of Commerce* provides qualified referrals to equity financing sources, helps organize venture fairs and conferences, and organizes venture missions to attract out-of-state capital to rapid-growth firms.

As previously noted, the *WIN Foundation* offers programs, many related to financing and the business strategies of successful tech firms, and organizes the annual Wisconsin Venture Fair.

WORKFORCE DEVELOPMENT

The *Madison Area Technical College (MATC)* offers a nationally recognized Biotechnology *Laboratory Technician Program*. Courses in the program provide students with extensive laboratory experience in such areas as documentation, instrumentation, chromatography, microbiology, fermentation, protein purification methods, and recombinant DNA methodologies. MATC is also the *Bio-Link North Central Regional Center for Biotechnology Education*. Bio-Link, a project of the National Science Foundation, enhances and expands biotechnology education programs by providing cutting edge professional development for instructors, by improving curriculum, by making use of technologies and by creating a system that promotes the sharing of information.

