



Overview and Summary of Recent Initiatives

In 1997, the State of Connecticut adopted a philosophy of industry clustering to support the growth of emerging segments of the economy. Legislation in 1998 launched Connecticut's Industry Cluster Initiative under the Department of Economic and Community Development (DECD). In addition, the Governor's Council on Economic Competitiveness and Technology, composed of CEOs from a cross-section of industries, legislative leaders, heads of key educational institutions, labor representatives, officials of industry associations, and several state commissioners, was established. The council meets quarterly to monitor cluster progress and find ways to enhance and support it, an initiative now known as **The Next Generation Competitiveness Strategy**.

The BioScience Cluster was the first to be formally launched. Overseen by **Connecticut United for Research Excellence (CURE)**, the cluster was established with \$300,000 in state seed money and \$700,000 from industry contributions. The state, through DECD, has supported the BioScience Cluster with direct financial support for the past 9 years.

Connecticut Innovations (CI), created by the state in 1989, is the state's leading investor in high technology. CI provides funding through several initiatives, including early-stage financing to companies focused on research and development in bioscience, information technology, photonics, and energy and environmental systems; seed-stage financing to bioscience companies; and bioscience facilities funding. Funded originally by state bonding, since 1995, CI has financed its equity investments solely through its own investment returns.

In 2002, the **Connecticut Office of BioScience** was created in response to recommendations from leaders of the state's BioScience Cluster. It operates within DECD and offers business facilitation and recruitment activities. It is designed to ensure that the state's programs, services, and general business environment continue to be bioscience friendly.

In 2005, Connecticut Governor M. Jodi Rell included a request of \$20 million over 2 years for **stem cell research** in her 2006 budget request. The state Senate agreed with the proposal, but extended the commitment to \$10 million per year for 10 years. The \$100 million proposal endorses and funds embryonic and adult stem cell research. Some state tobacco settlement money will also go to stem cell research. A new advisory board and peer review council have been created to administer the grants. The initiative is staffed by CI.

Building Bioscience R&D Capacity

Research programs

Public Act 05-149, passed in 2005, supports the advancement of human embryonic and adult **stem cell research** in Connecticut. Connecticut is one of three states to permit and publicly fund this research. The law bans the cloning of human beings and prohibits direct and indirect payment for donations of embryos, embryonic stem cells, unfertilized eggs, or human sperm for stem cell research. It appropriates \$20 million through 2007 and provides an additional \$10 million annually through 2015.

The Connecticut Stem Cell Research Advisory Committee is charged with developing the grant application process; developing a donated funds program to encourage alternative funding sources; advancing embryonic and adult stem cell research in the state via business development; monitoring on-going research; and reporting annually to the General Assembly, with the first report due by the end of June 2007. The program's proposed timeline called for the proposal process to begin February 1, 2006, with funding to institutions by June 30, 2006. The **Stem Cell Research Peer Review Committee** evaluates the ethical and scientific merit of each proposal and recommends funding to the Stem Cell Research Advisory Committee. The Stem Cell Research Advisory Committee then consults with the Commissioner of Public Health and makes funding decisions.

Encouraging Academic/Industrial Interaction

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 annually. In the past, all technology projects, including bioscience projects, were eligible for the funding. In 2004, renewable energy projects were the sole focus of the competition; but, the competition is expected to reopen to other technologies, including biotechnology, in the future.

Making Capital Available

Pre-seed and seed capital

The **Connecticut Venture Group** is organizing the angels in Connecticut and plans to provide them training and create a database of entrepreneurs to match with angels.

Since 1995, CI has invested more than \$100 million in 60 Connecticut companies through its **Eli Whitney Fund**. The Eli Whitney Fund is aimed at strengthening the state's high-technology environment by providing entrepreneurs with the capital and strategic guidance they need to start and build successful businesses. The fund focuses primarily on bioscience, information technology, photonics (applied optics), and energy and environmental systems. Investments, which typically range from \$500,000 to \$2 million on the initial round, are made in early-stage Connecticut companies that meet established criteria.

The **Connecticut BioSeed Fund** is CI's \$5 million fund designed to address a gap in financing resources for very early-stage biotechnology enterprises in Connecticut. Initial investments range up to \$500,000.

Providing Space for Bioscience Companies

Incubators

CI maintains laboratory and office suites in **Science Park at Yale** for temporary use to accommodate start-up and early-stage bioscience companies. In 2003, 10,600 square feet of newly constructed, transitional wet-lab space was made available. This space consists of two separate suites and provides a turnkey laboratory solution for emerging biotech companies.

The University of Connecticut has established a **Small Business Incubation Program** to assist and accelerate the successful establishment and development of entrepreneurial companies. Currently, incubators exist at the University of Connecticut's Storrs Bioscience Complex and Farmington (Health Center) and Avery Point campuses.

Facilities financing

CI also manages the **BioScience Facilities Fund**. Through this fund, CI provides funding to qualified biotechnology companies for the construction of wet-lab and related space. The financing can take a variety of forms, and terms are consistent with the level of risk associated with the transaction and the specialized needs of the companies. Companies already in Connecticut, or those wishing to move to the state, may apply for this funding. Since it was launched, the fund has invested and/or committed more than \$33 million to finance more than 300,000 square feet of laboratory and related space for 12 biotechnology companies.

Bioscience research parks

Connecticut has invested \$14 million in the **Science Park at Yale**, a cluster of rehabilitated buildings in New Haven near Yale University, which houses a number of biomedical laboratories. The park encompasses several million square feet of former industrial space that eventually could be renovated. Currently, space is being leased in a 250,000-square-foot building that has been renovated.

Addressing Talent Needs

K-12 outreach programs

Connecticut's BioBus represents a 5-year, \$3.6 million partnership among 27 members of CURE and CI. The BioBus is a permanent, mobile learning laboratory with the latest in bioscience equipment and state-of-the-art computers that travels to schools, community events, and other locations throughout Connecticut. Since its inception in 2001, Connecticut's BioBus has provided more than 16,000 students throughout Connecticut with laboratory experience in the life sciences.

In 2004, under the umbrella of BioBus, two additional programmatic elements were launched:

- **Connecticut's BioBus Honors Program at Yale University** introduces high school students interested in science to research applications of bioscience as they tour a range of Yale research laboratories. In the 1-day program, students participate in research activities including analysis of magnetic resonance images, the physiology of taste and the role of genetics in taste, the role of radiology in medicine, neurological research, immunology research, and other current topics in bioscience research.

- **Connecticut's BioConnection Program** is a pilot laboratory-equipment loan program delivering real-world research techniques, advanced investigational exercises, and bioscience career information to middle- and high-school science classrooms. The BioConnection Program is free of charge to schools and is structured to enrich the scientific curriculum at middle and high schools with advanced investigational exercises using research tools and techniques beyond the scope of most classrooms. During the pilot year through December 2004, the BioConnection Program was introduced to at least six schools within the five urban school districts in Connecticut. At the conclusion of the pilot year, CURE sought contributions from its members to support the BioConnection Program on an ongoing basis. The pilot period was funded by an earmark grant under the fund for the Improvement of Education from the U.S. Department of Education.

CURE also hosts a Web site entitled **BioRap®**. This educational resource provides middle-school students and teachers with information and featured stories connecting bioscience topics to everyday life.

More recently, through the Connecticut Office for Workforce Competitiveness, the state in its workforce development efforts for incumbent workers has advanced a career ladders program for allied health care. As part of its technology-related career development efforts for advancing science, technology, engineering, and math skills, the state is piloting a statewide K-12 biotech/health care track to enable these students to pursue postsecondary education seamlessly in technology fields and emerge with the skills required to work effectively in the state's Knowledge Economy. A key component is providing experiences for high school students interested in pursuing a career in health care.

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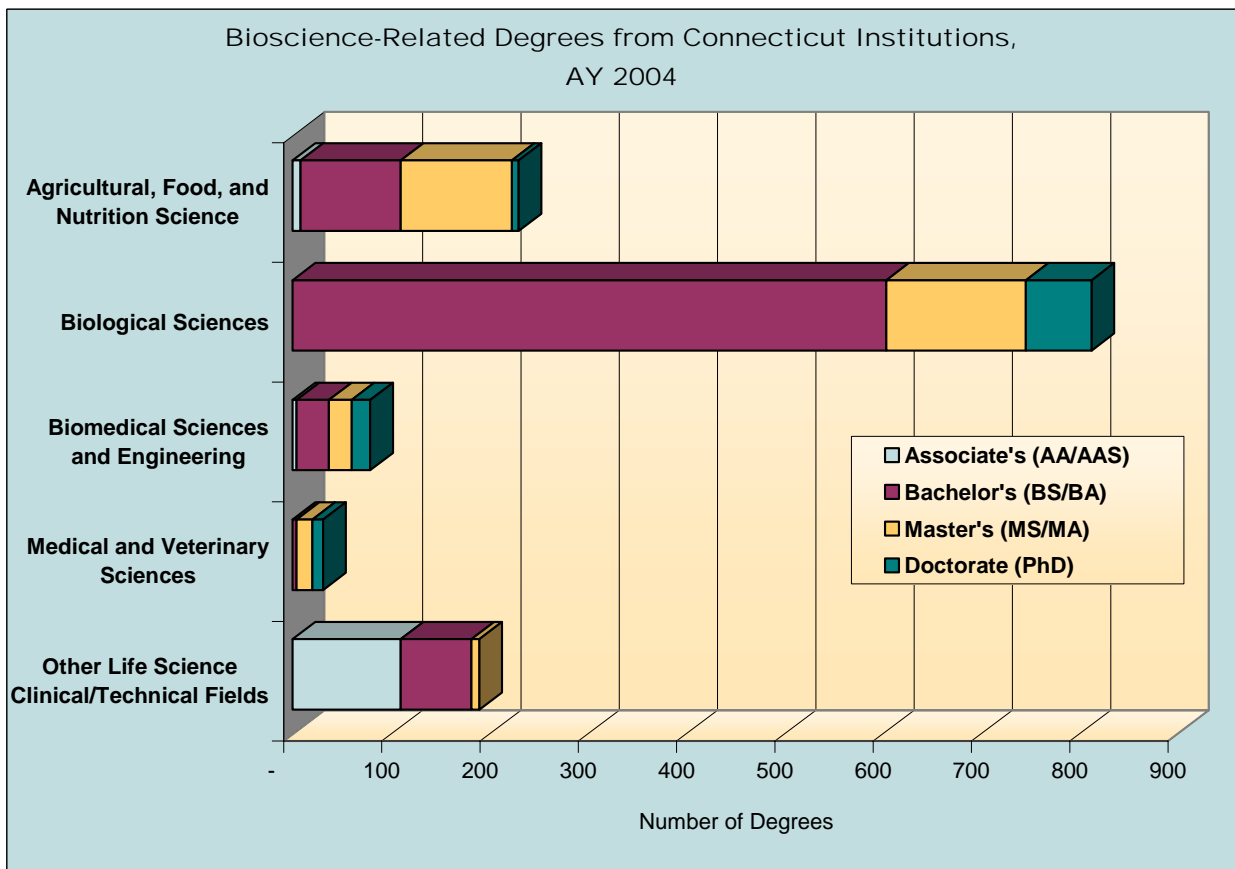
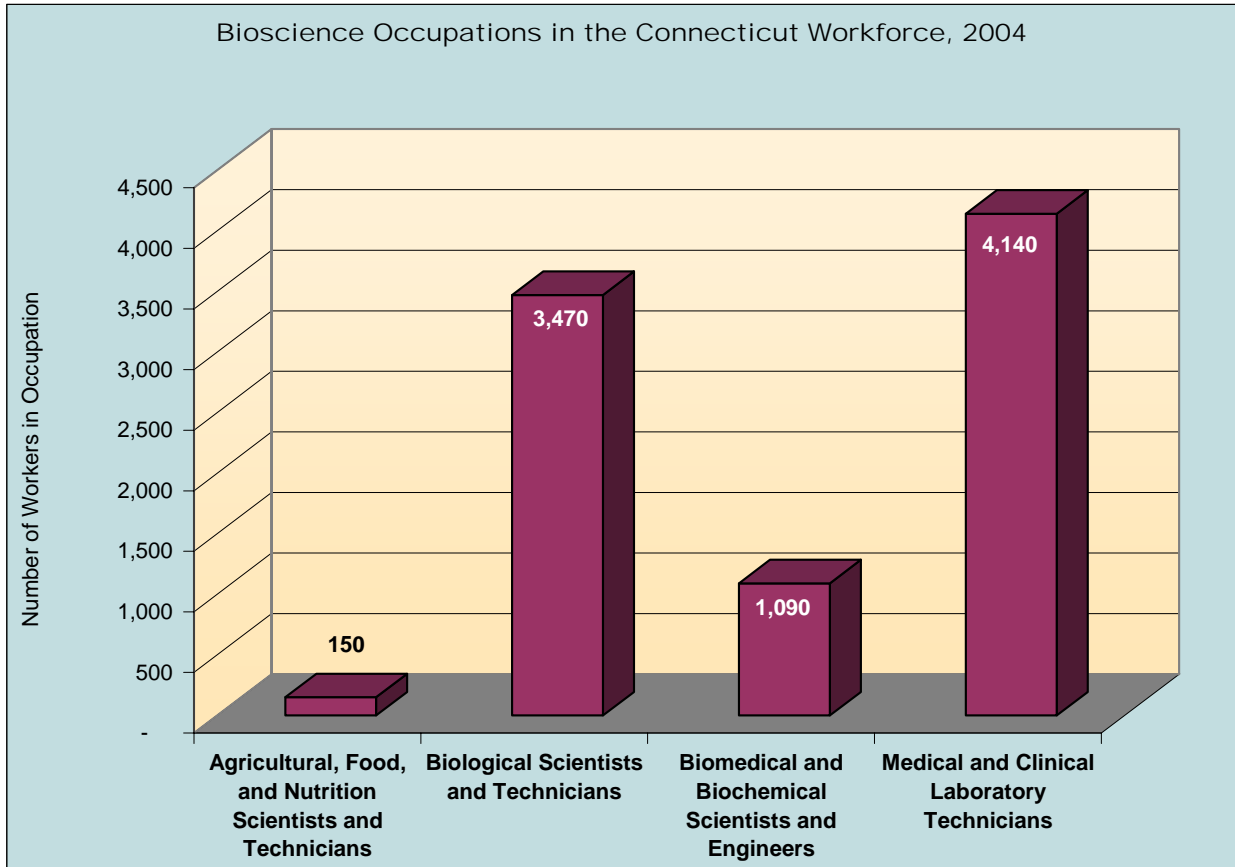
In 1990, CURE was formed as a not-for-profit member coalition to promote the processes and benefits of biomedical research. Today, CURE has grown to more than 110 members and has expanded its mission to create an environment of collaboration and competition in which its members can thrive.

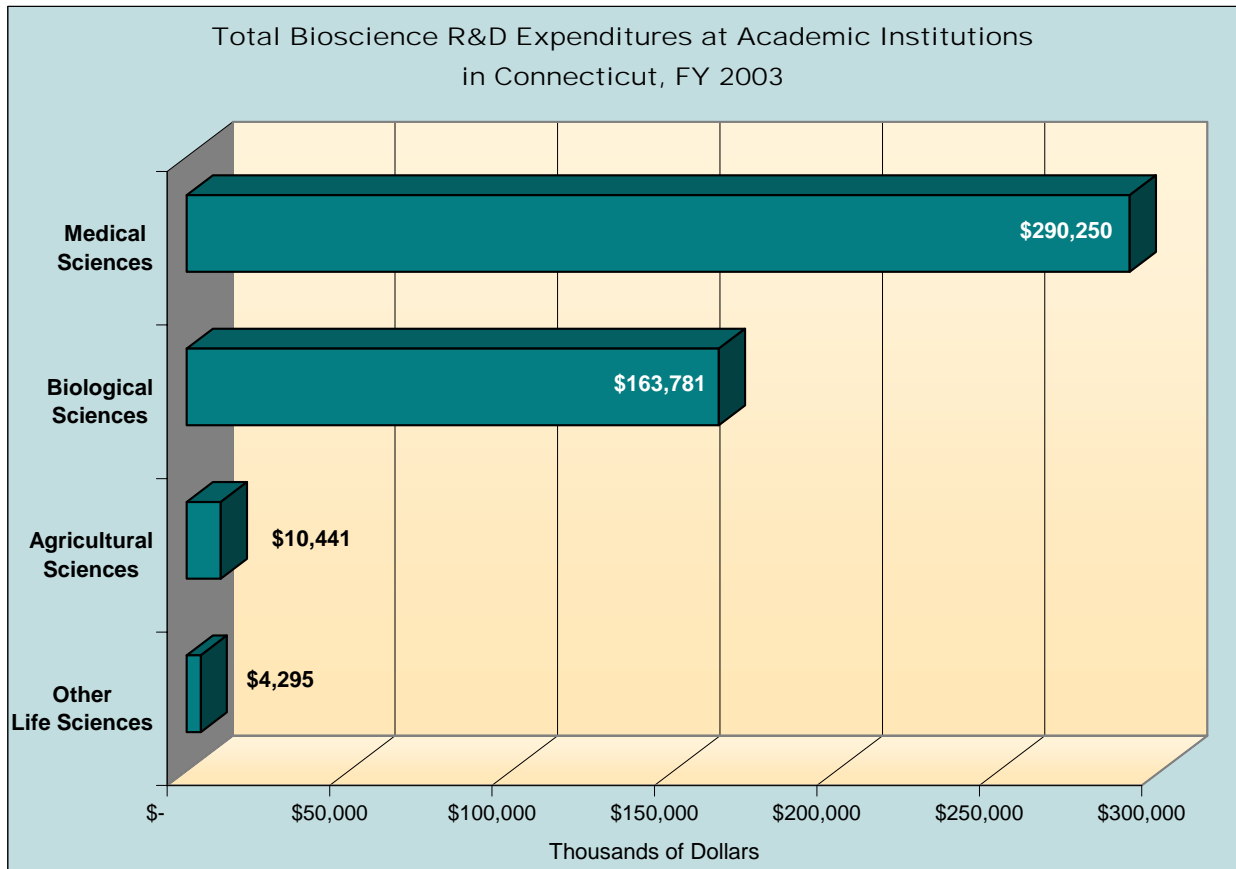
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Industry Subsector	Connecticut	United States
Agricultural Feedstock & Chemicals		
Establishments 2004	18	2,111
2001-2004 Establishment % Change	-1.4%	0.4%
Employment 2004	510	104,893
2001-2004 Employment % Change	-58.6%	-6.9%
Share of U.S. Employment	0.5%	100.0%
Location Quotient	0.38	n.a.
Average Annual Wage 2004	\$82,342	\$63,383
Direct-Effect Employment Multiplier	5.33	10.91
Total Employment Impact	2,720	1,212,094
Drugs & Pharmaceuticals		
Establishments 2004	32	2,589
2001-2004 Establishment % Change	10.3%	-0.6%
Employment 2004	9,758	313,207
2001-2004 Employment % Change	-9.7%	2.7%
Share of U.S. Employment	3.1%	100.0%
Location Quotient	2.43	n.a.
Average Annual Wage 2004	\$105,327	\$79,303
Direct-Effect Employment Multiplier	5.92	9.51
Total Employment Impact	57,806	2,731,321
Medical Devices & Equipment		
Establishments 2004	242	15,190
2001-2004 Establishment % Change	7.1%	0.2%
Employment 2004	8,776	411,460
2001-2004 Employment % Change	-4.3%	-3.6%
Share of U.S. Employment	2.1%	100.0%
Location Quotient	1.67	n.a.
Average Annual Wage 2004	\$54,365	\$56,449
Direct-Effect Employment Multiplier	2.91	4.56
Total Employment Impact	25,552	1,817,705
Research, Testing, & Medical Laboratories		
Establishments 2004	327	20,565
2001-2004 Establishment % Change	9.5%	19.4%
Employment 2004	6,961	413,550
2001-2004 Employment % Change	-0.4%	8.2%
Share of U.S. Employment	1.7%	100.0%
Location Quotient	1.31	n.a.
Average Annual Wage 2004	\$78,571	\$65,414
Direct-Effect Employment Multiplier	2.17	3.15
Total Employment Impact	15,134	1,272,936
TOTAL PRIVATE SECTOR		
Establishments 2004	105,317	8,156,137
2001-2004 Establishment % Change	0.6%	4.8%
Employment 2004	1,398,623	109,249,195
2001-2004 Employment % Change	-2.2%	-0.7%
Share of U.S. Employment	1.3%	100.0%
Location Quotient	n.a.	n.a.
Average Annual Wage 2004	\$51,614	\$39,003

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

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





	Connecticut	United States	Rank
University R&D Expenditures, FY 2003			
Total (\$ thousands)	\$594,541	\$40,104,621	22
Life Science R&D (\$ thousands)	\$469,290	\$24,062,088	16
Percent of Total R&D	78.9%	60.0%	
Life Sciences Per Capita	\$134.72	\$82.74	
Change in Life Sciences FY 1999–2003	45.8%	52.7%	
NIH Support to Institutions, FY 2004			
Total (\$ thousands)	\$444,847	\$22,556,459	15
Per Capita Expenditures	\$127.71	\$77.56	
Change in Expenditures FY 2000–2004	38.1%	53.2%	
Higher Education Degrees in Bioscience Fields, AY 2004	1,343	111,329	32
Bioscience Occupations in the Workforce, 2004	8,850	616,140	21