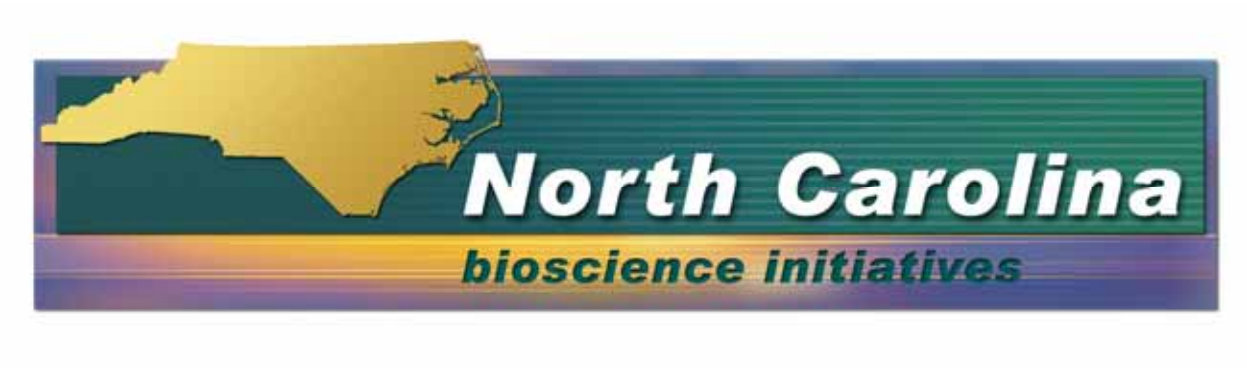

Overview and Summary of Recent Initiatives

State government and regional business partnerships are cultivating bioscience clusters in both the Research Triangle (Raleigh/Durham/Chapel Hill) and the Piedmont-Triad (Winston-Salem/Greensboro/ High Point regions). The **North Carolina Biotechnology Center,** a state-sponsored intermediary created in 1984 by the **North Carolina Board of Science and Technology,** is pursuing the **New Jobs Across North Carolina** bioscience strategy it developed in 2004 to expand bioscience growth statewide. Headquartered in the Research Triangle, the Biotechnology Center has regional satellites in Asheville, Winston-Salem, Greenville, and Wilmington, with another office planned for Charlotte.

Since the last BIO report, **Golden LEAF Foundation,** a nonprofit foundation that administers a major portion of the state's tobacco settlement trust funds to assist communities in economic transition, rolled out several aspects of its $60 million **Biomanufacturing and Pharmaceutical Training Consortium**, a network of facilities and programs at North Carolina (NC) State University in Raleigh, NC Central University in Durham, and the NC Community College System. Golden LEAF also made a major placement of endowment funds in a bioscience venture fund.

The University of North Carolina (UNC) system also announced a major new bioscience park to be developed with financial support from the former owners of a closed textile mill in Kannapolis, north of Charlotte.

Building Bioscience R&D Capacity

Recent state investments in facilities

Bioscience research buildings included in the $3.1 billion higher education bond approved in 2000 include the recently opened 100,000-square-foot, four-story, $35 million **College of Veterinary Research Building** at NC State's Centennial Biomedical Campus.

The state has also approved separate bond funding for

- The **Bioinformatics Research Center** at the Charlotte Research Institute at the UNC Charlotte (UNCC), a 70,000-square-foot, $35 million project;
- A new research and clinical facility for the UNC Chapel Hill **Cancer Center,** budgeted at $180 million; and

- The **Cardiovascular Disease Institute,** a $60 million facility at East Carolina University in Greenville.

Research programs

The Biotechnology Center offers two tiers of grants for bioscience research at North Carolina universities:

- Institutional development grants of up to $250,000 for equipment that will serve at least six investigators
- Multidisciplinary research grants of up to $250,000 for up to two years for projects involving three or more scientists from different disciplines, with an emphasis on industrially relevant research.

Faculty development programs

The UNC system has a trust fund for eminent-faculty recruitment under which the state may optionally grant up to one-third of privately raised endowments at either the $500,000 or $1 million level. The Biotechnology Center will also provide up to $150,000 to an institution to assist in faculty recruitment in the biosciences.

Encouraging Academic/Industrial Interaction

The Biotechnology Center and the **Kenan Institute for Engineering, Technology & Science** at NC State jointly offer **Collaborative Funding Grants** of up to $50,000 a year for three years, to match university and industry contributions to joint research projects.

The North Carolina Small Business and Technology Development Center offers a **Strategic Applied Research** program that provides grants up to $20,000 for universities participating in applied research matched by in-state companies. Biosciences projects are eligible.

Moving Technology into the Marketplace

Supporting bioscience entrepreneurs and emerging companies

The **Council for Entrepreneurial Development,** a non-profit organization that seeks to accelerate the entrepreneurial culture of North Carolina and Research Triangle Park (RTP), has active programs to mentor entrepreneurs and prepare them for the process of raising formal venture capital.

Making Capital Available

Pre-seed and seed capital

The **North Carolina Board of Science and Technology** has a $3 million fund that matches SBIR and STTR Phase I awards to a maximum of $50,000. Biosciences are eligible. The program also covers stipends up to $3,000 for the costs of preparing SBIR and STTR proposals.

The Biotechnology Center makes loans to companies of up to $150,000 for product development, $25,000 for proof-of-concept research, and $15,000 for nonscientific commercialization work such as business planning.

Investors in qualified businesses, including those registered with the state as R&D firms with revenues less than $5 million, licensees of the UNC system, and recipients of SBIR awards, are eligible to claim credits up to 25 percent against personal income tax. The annual credit pool is $7 million.

Venture capital

North Carolina has generally supported capital formation through various intermediaries. Most recently, the Golden Leaf Foundation placed $30 million of its endowment fund in **HBM Bio-Capital,** a privately managed fund that is a collaboration of a major financial firm and local advisors.

Providing Space for Bioscience Companies

Incubators

There are bioscience incubators in several regions of the state:

- **First Flight Venture Center** is a 14,000-square-foot incubator in RTP.
- Becton-Dickinson's (B-D's) **RTP BioVenture Center** sets aside space in the company's Research Triangle building for start-up firms working in technologies of corporate interest to B-D.
- **NC State Technology Incubator** offers 10 wet lab suites in one of the laboratory buildings in the Partners II building at Centennial campus.
- **Eastern Carolina Technology Center** at Eastern Carolina University in Greenville has a 17,000-square-foot wet lab unit.

Facilities financing

North Carolina created a **Life Science Industry Revenue Bonding Authority** to assist in facilities financing, but has not yet financed it.

Bioscience research parks

RTP has been developed since the 1950s with the goal of attracting R&D laboratories and has a long-standing focus in the biosciences, including agricultural biotechnology. The park now encompasses 15 million square feet of space over 7,000 acres. It is the headquarters for the Biotechnology Center.

The **Centennial campus** of NC State University in Raleigh includes 1,334 acres on two sites being developed as a dual-use campus/research park. The main Centennial campus includes university resources in genomics and bio-informatics, and the new Centennial Biomedical Campus is developing tenancies around the College of Veterinary Medicine. The Centennial Biomedical Campus will have 1.6 million square feet when complete.

Piedmont-Triad Research Park in Winston-Salem levers the Bowman Gray School of Medicine at Wake Forest University and is being developed by Idealliance, the regional technology council and

commercialization support group. It houses 14 bioscience companies in four buildings. When complete, the park will cover 200 acres and have 5.7 million square feet of space.

Initiatives similar to the Centennial campus are authorized and at varying stages of development at UNCC, North Carolina A&T, UNC Greensboro, and UNC Chapel Hill/Carolina North. The extent of bioscience use at these parks is not yet clear, although all have expressed bioscience as a target.

Since the last BIO report, the UNC system and billionaire philanthropist David Murdock announced that the former Cannon Mills textile plant in Kannapolis would be redeveloped into a research campus eventually totaling 1 million square feet. The first building, 330,000 square feet, will include core bioscience laboratories for NC State, contract bio-manufacturing, multitenant wet-lab space, and a research institute sponsored by Dole Foods. The park will be paired with a venture capital fund financed by Murdock.

Addressing Talent Needs

Specialized postsecondary programs

Golden Leaf has financed the nation's largest biotech/biomanufacturing training programs, a **Biomanufacturing and Pharmaceutical Training Consortium** comprising the following two major facilities, and curricula delivered through a $7.1 million **BioNetwork** funded at the North Carolina Community College System:

- **Biomanufacturing Training and Education Center (BTEC),** a 91,000-square-foot, $35 million commercial-scale biomanufacturing and packaging facility being built at NC State's Centennial Campus. The BTEC will provide hands-on experience in a commercial environment and will train as many as 3,000 students a year through both on-site programs and distance learning.

- **Biomanufacturing Research Institute and Training Enterprise,** a $19 million facility at NC Central University in Durham, which will offer laboratory experiences in underlying science and analytical instrumentation to students from multiple universities.

Operational funding for the consortium totaled $12 million in 2005 and will increase this year to $15 million.

K-12 outreach programs

The Biotechnology Center offers summer workshops for K-12 educators, taught at colleges around the state, and the BTEC will offer four-week in-residence courses for high school students.

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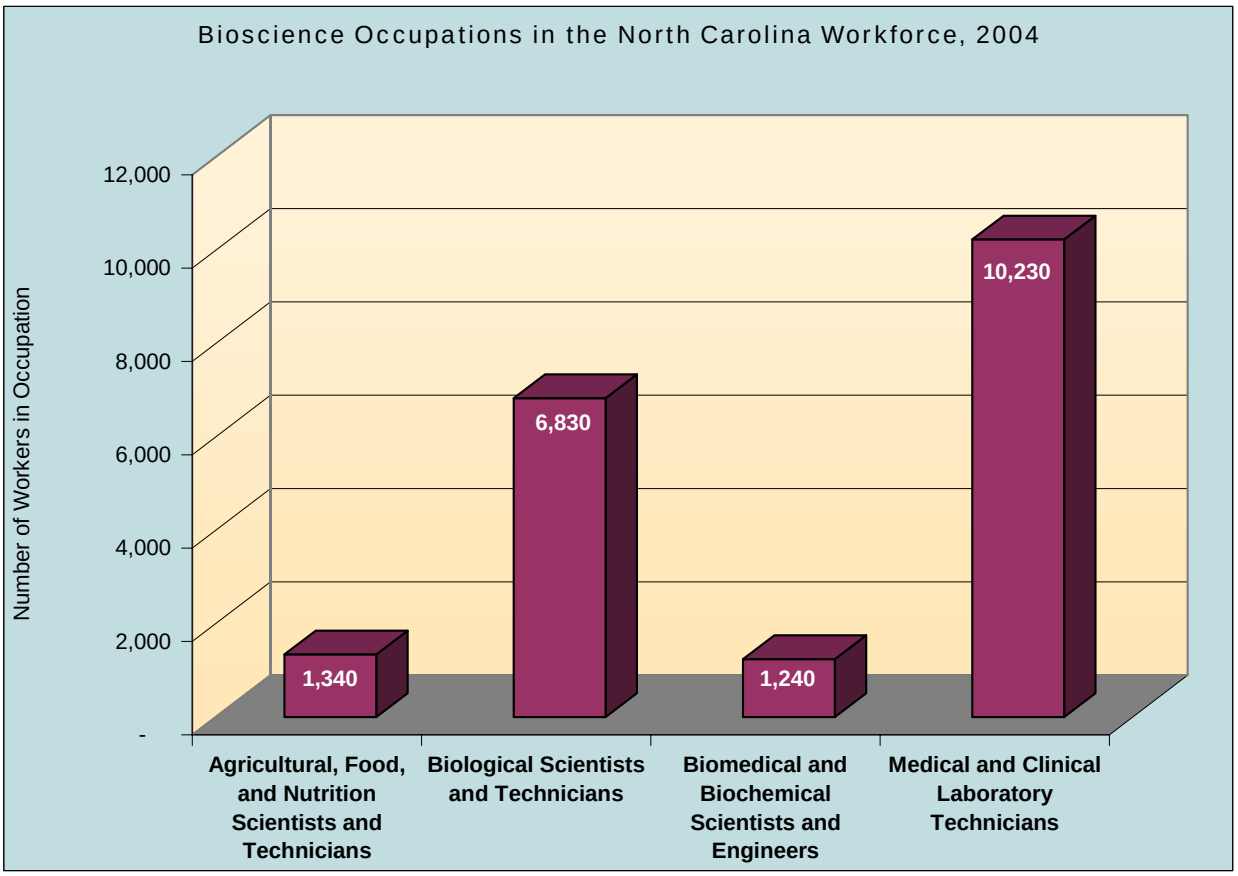
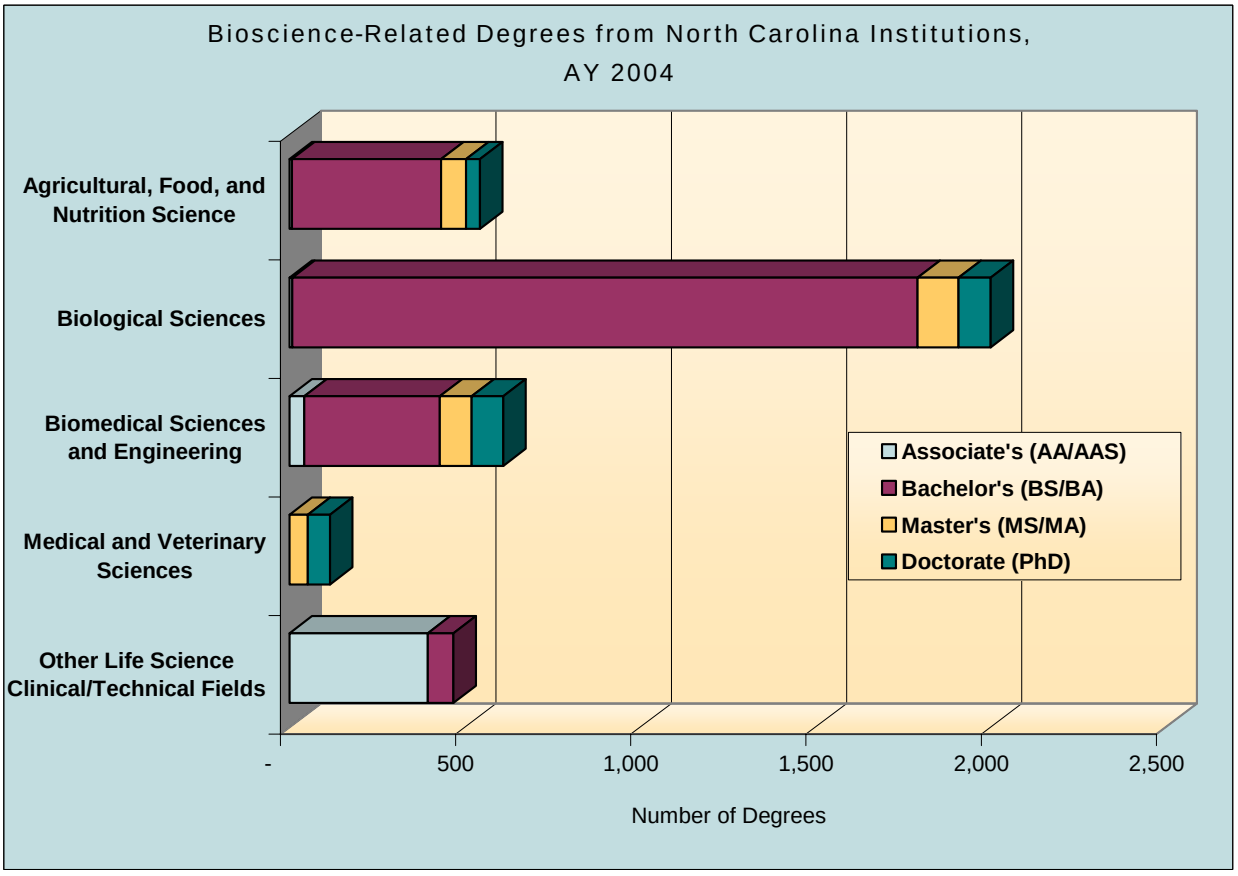
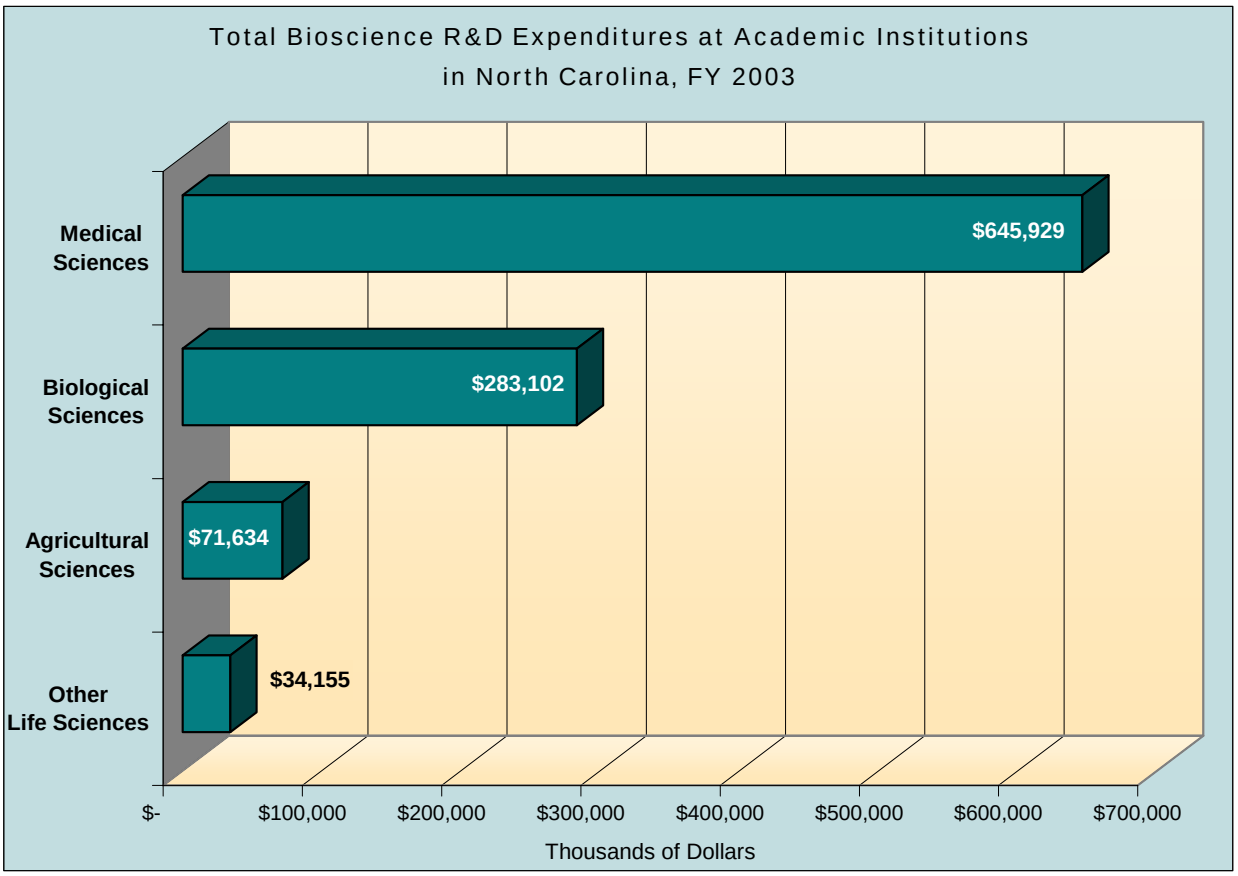
Industry Subsector	North Carolina	United States
Agricultural Feedstock & Chemicals		
Establishments 2004	59	2,111
2001-2004 Establishment % Change	-0.4%	0.4%
Employment 2004	5,184	104,893
2001-2004 Employment % Change	15.2%	-6.9%
Share of U.S. Employment	4.9%	100.0%
Location Quotient	1.72	n.a.
Average Annual Wage 2004	$68,327	$63,383
Direct-Effect Employment Multiplier	6.47	10.91
Total Employment Impact	33,562	1,212,094
Drugs & Pharmaceuticals		
Establishments 2004	70	2,589
2001-2004 Establishment % Change	-12.5%	-0.6%
Employment 2004	20,646	313,207
2001-2004 Employment % Change	9.9%	2.7%
Share of U.S. Employment	6.6%	100.0%
Location Quotient	2.29	n.a.
Average Annual Wage 2004	$72,998	$79,303
Direct-Effect Employment Multiplier	6.46	9.51
Total Employment Impact	133,454	2,731,321
Medical Devices & Equipment		
Establishments 2004	379	15,190
2001-2004 Establishment % Change	1.5%	0.2%
Employment 2004	8,309	411,460
2001-2004 Employment % Change	3.3%	-3.6%
Share of U.S. Employment	2.0%	100.0%
Location Quotient	0.70	n.a.
Average Annual Wage 2004	$43,562	$56,449
Direct-Effect Employment Multiplier	2.97	4.56
Total Employment Impact	24,697	1,817,705
Research, Testing, & Medical Laboratories		
Establishments 2004	538	20,565
2001-2004 Establishment % Change	14.3%	19.4%
Employment 2004	13,845	413,550
2001-2004 Employment % Change	35.7%	8.2%
Share of U.S. Employment	3.3%	100.0%
Location Quotient	1.16	n.a.
Average Annual Wage 2004	$60,743	$65,414
Direct-Effect Employment Multiplier	2.33	3.15
Total Employment Impact	32,328	1,272,936
TOTAL PRIVATE SECTOR		
Establishments 2004	220,964	8,156,137
2001-2004 Establishment % Change	2.4%	4.8%
Employment 2004	3,139,889	109,249,195
2001-2004 Employment % Change	-1.6%	-0.7%
Share of U.S. Employment	2.9%	100.0%
Location Quotient	n.a.	n.a.
Average Annual Wage 2004	$34,632	$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.


Bioscience Occupations in the North Carolina Workforce, 2004
Number of Workers in Occupation
12,000
10,000
8,000
6,000
4,000
2,000
-
1,340
6,830
1,240
10,230
Agricultural, Food, and Nutrition Scientists and Technicians
Biological Scientists and Technicians
Biomedical and Biochemical Scientists and Engineers
Medical and Clinical Laboratory Technicians


Bioscience-Related Degrees from North Carolina Institutions, AY 2004
Agricultural, Food, and Nutrition Science
Biological Sciences
Biomedical Sciences and Engineering
Medical and Veterinary Sciences
Other Life Science Clinical/Technical Fields
Associate's (AA/AAS)
Bachelor's (BS/BA)
Master's (MS/MA)
Doctorate (PhD)
-
500
1,000
1,500
2,000
2,500
Number of Degrees



	North Carolina	United States	Rank
University R&D Expenditures, FY 2003			
Total ($ thousands)	$1,397,371	$40,104,621	8
Life Science R&D ($ thousands)	$1,049,850	$24,062,088	5
Percent of Total R&D	75.1%	60.0%	
Life Sciences Per Capita	$124.87	$82.74	
Change in Life Sciences FY 1999–2003	44.3%	52.7%	
NIH Support to Institutions, FY 2004			
Total ($ thousands)	$985,447	$22,556,459	7
Per Capita Expenditures	$117.21	$77.56	
Change in Expenditures FY 2000–2004	69.6%	53.2%	
Higher Education Degrees in Bioscience Fields, AY 2004	3,739	111,329	9
Bioscience Occupations in the Workforce, 2004	19,640	616,140	10