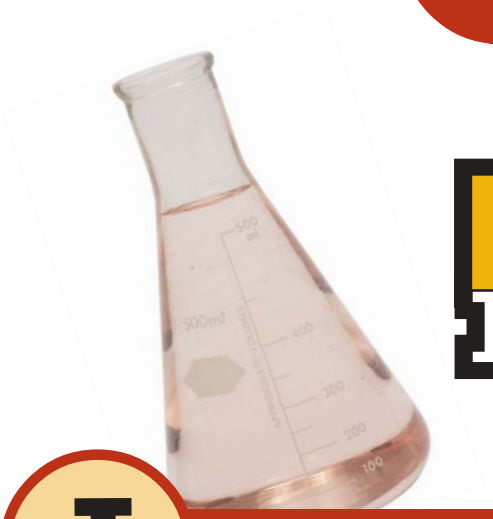
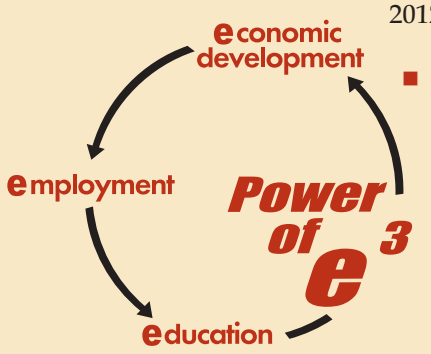


High Growth INDUSTRY PROFILE

Industry Snapshot

Growth Pattern

- The biotechnology industry is a vast field with much potential. Industry revenues more than quadrupled from $8 billion in 1992 to $33.6 billion in 2002. *(Ernst & Young)*
- The biotechnology industry employed 713,000 workers in 2002 and is anticipated to employ 814,900 workers in 2007. *(Economy.com)*
- Biotechnology-related Research and Development (R&D) expenditures amounted to $16.4 billion in 2001, about 10% of all U.S. industry R&D that year. *(U.S. Department of Commerce)*
- The scientific research, development, and technical services industry group is expected to be 1 of the top 10 fastest growing industry groups between 2002 and 2012, with a 70% increase in projected output growth. *(U.S. Bureau of Labor Statistics)*
- The life, physical, and social science occupations group is 1 of the top 5 occupational groups that has the highest projected percentage increase in employment between 2002 and 2012. Employment in the life sciences is expected to grow by 18%, led by a 19% increase in biological scientists. Biological technicians are also expected to increase by 19%. *(U.S. Bureau of Labor Statistics)*
- Employment in pharmaceutical and medicine manufacturing is projected to increase by 23% between 2002 and 2012. *(U.S. Bureau of Labor Statistics)*



- Jobs in biotechnology are diverse, creating excellent employment opportunities in many different areas. In addition to the many scientific jobs, there are many nonscientific jobs that usually do not require training in biology from writers and marketing specialists to genetic counselors. *(U.S. Bureau of Labor Statistics)*

Occupational Outlook

In emerging industries such as biotechnology, occupations are often difficult to classify. The tables below show the expected growth in occupations that are included in the biotechnology industry.

Biotech-Related Occupations	Number Employed 2002 (000's)	Number Employed 2012 (000's)	Numeric Change (000's)	Change %	2002 Median Annual Earnings	Postsecondary Education & Training
Medical scientists, except epidemiologists	58	73	16	26.9%	$56,980	Doctor's degree
Biomedical engineers	8	10	2	26.1%	$60,410	Bachelor's degree
Environmental scientists and specialists, including health	65	80	15	23.7%	$47,600	Masters degree
Biological scientists, all other	27	33	6	22.3%	$53,300	Bachelor's degree
Biological technicians	48	57	9	19.4%	$32,710	Associate degree
Medical and clinical laboratory technicians	147	176	29	19.4%	$29,040	Associate degree
Chemists	84	95	11	12.7%	$52,890	Bachelor's degree
Agricultural and food science technicians	20	22	2	9.3%	$28,580	Associate degree
Chemical technicians	69	72	3	4.7%	$37,430	Associate degree

Employment of Wage and Salary Workers in Pharmaceutical and Medicine Manufacturing by Occupation, 2002
(employment in thousands)

Occupation Title	Total Employment	% of Total
All occupations	293	100.0%
Chemists and materials scientists	15	37.5%
Packaging and filling machine operators and tenders	20	6.9%
Business operations specialists	14	4.7%
Secretaries and administrative assistants	10	3.5%
First-line supervisors/managers of production and operating workers	9	3.1%
Chemical equipment operators and tenders	9	3.1%
Computer specialists	9	3.1%
Medical scientists	9	3.0%
Inspectors, testers, sorters, samplers, and weighers	9	2.9%
Laborers and freight, stock, and material movers, handlers	8	2.7%

This is not a comprehensive list of occupations. Please refer to the U.S. Bureau of Labor Statistics employment projections Web page at www.bls.gov/emp/home.htm for more biotechnology occupational information.

Types of Jobs Created

Skill Sets:

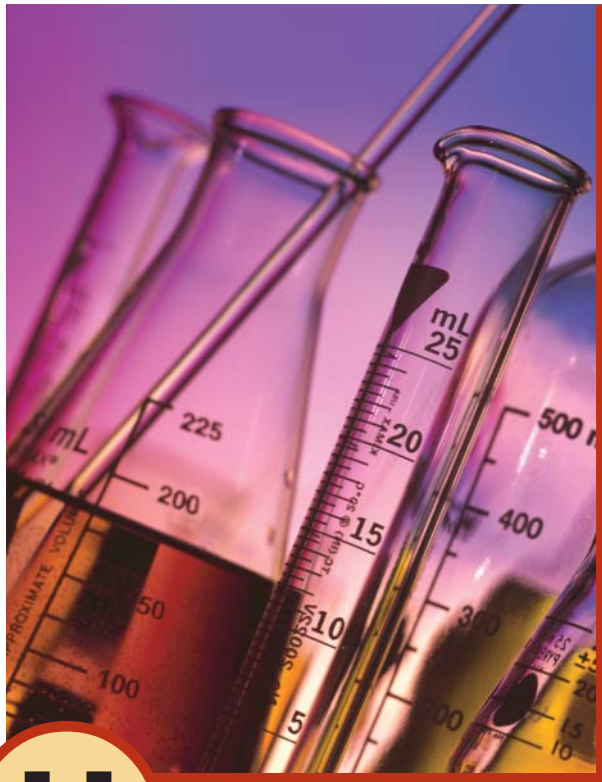
(Source: U.S. Department of Commerce, Survey of the Use of Biotechnology in U.S. Industry and U.S. Bureau of Labor Statistics, 2004-05 Career Guide to Industries)

- Increasingly, companies and research organizations are seeking workers with more formalized training who have the skills of both computer and life sciences.
- For science technician jobs in the pharmaceutical and medicine manufacturing industry, most companies prefer to hire graduates of technical institutes or junior colleges or those who have completed college courses in chemistry, biology, mathematics, or engineering. Some companies, however, require science technicians to hold a Bachelor's degree in a biological or chemical science.
- Because biotechnology is not one discipline, but the interaction of several disciplines, the best preparation for work in biotechnology is training in a traditional biological science, such as genetics, molecular biology, biochemistry, virology, or biochemical engineering. Individuals with a scientific background and several years of industrial experience may eventually advance to managerial positions.

Workforce Issues

The overarching workforce issues are recruitment, education, and training. The following workforce issues have been gathered directly from senior executives:

- While the biotechnology industry, like other knowledge-based industries, is in need of qualified workers at all levels, an additional challenge has been finding experienced workers with specialty skills that align in many cases with a highly regulated work environment, e.g., knowledge of GMP—Good Manufacturing Processes, quality control, and regulatory issues.
- The capacity of the community college system needs to be developed to support efforts that generate additional biotechnology and life science programs. In order for this to occur, industry employers need to develop a set of common definitions among industry sectors that will allow for the creation of a baseline curriculum that prepares new entrants for employment within the industry.
- Historically, the biotechnology industry has been in need of intellectual talent at the Masters degree and Ph.D levels. The growth of the industry has seen a shift in the types of workers needed to fill critical skill gaps. Biotechnology industry organizations are now conducting outreach efforts geared towards individuals that possess Bachelor of Science and Associate of Arts degrees. In addition, many firms are also searching for alternative labor pools, e.g., transitioning military.



What is the High Growth Job Training Initiative?

The President's High Growth Job Training Initiative, as implemented by the U.S. Department of Labor's Employment and Training Administration, is designed to provide national leadership for a demand-driven workforce system that ensures no worker is left behind. It is a strategic effort to prepare workers to take advantage of new and increasing job opportunities in high growth/high-demand and economically vital industries and sectors of the American economy. The initiative is designed to ensure that worker training and career development resources in the public workforce system are targeted to helping workers gain the skills and competencies they need to obtain jobs and build successful careers in these industries.

The foundation of this initiative is partnerships that include the public workforce system, business and industry, education and training providers, and economic development working together to develop solutions to the workforce challenges facing these industries and to develop maximum access for American workers to gain the competencies they need to get good jobs in these industries.

High Growth Job Training Initiative

In its efforts to meet the workforce demands of the 21st century economy, the U.S. Department of Labor's Employment and Training Administration (ETA) is conducting forums with various targeted high growth industries.

The Executive Forums are opportunities for senior industry executives to communicate the critical workforce issues facing their industry.

The Workforce Solutions Forums are opportunities for industry leaders, employers, educators, public and private workforce professionals, and economic development organizations to work together to identify a range of actual and potential solutions that if implemented could address their industry's workforce needs.

Biotechnology Industry Executive Forum

ETA conducted three Biotechnology Industry Executive Forums in an effort to engage industry leaders in discussions around the unique and critical workforce challenges facing the industry.

The first forum was held in Newark, Delaware, on May 16, 2003, at the Delaware Biotechnology Institute. ETA conducted its second Biotechnology Industry Executive Forum in San Diego, California, on November 11, 2003, at BIOCOM. Finally, ETA conducted its third Biotechnology Industry Executive Forum on March 23, 2004, at the Chicagoland Chamber of Commerce in Chicago, Illinois. The Forum was co-sponsored by IBIO, the Illinois-based biotechnology association.

A total of 53 CEOs and/or senior-level executives from biotechnology industry organizations participated in the Executive Forums.

Biotechnology Industry Workforce Solutions Forum

To follow up, the ETA and public workforce system representatives met with 30 senior human resources vice presidents and corporate staff on March 16, 2004, to discuss the critical workforce issues facing their industry.

(For a complete list of forum attendees, please contact the BRG.)

Background & Next Steps

ETA has addressed the workforce issues of the biotechnology industry from a national perspective by conducting three Executive Forums with the biotechnology industry to gather relevant information from key industry leaders.

These forums provided ETA and the public workforce system with the opportunity to gain further understanding of the overall critical workforce needs of the industry. After meeting with industry, education, and workforce system leaders at the Workforce Solutions Forum, ETA will develop and solidify strategic alliances with business, education, and workforce leaders who are focused on the workforce issues confronting the biotechnology industry and engage them in developing innovative approaches to address their needs.

ETA will partner with employers and education providers to develop and model skills training solutions nationally that can be replicated and sustained throughout the state and local public workforce system. These approaches will help ensure that workers have the right skills for the right jobs at the right time.

The ETA In Action

Forsyth Technical Community College "Textiles to Technology": Developing a Biotechnology Workforce for North Carolina's Western Piedmont

Challenge

North Carolina's Piedmont Triad Region has experienced a severe economic downturn due to the decline of its traditional furniture, tobacco, and textile industries, which once supported economic growth and job development in the region. Large numbers of dislocated workers in the area lack the skills they need in order to transition into careers in the region's emerging biotechnology industry.

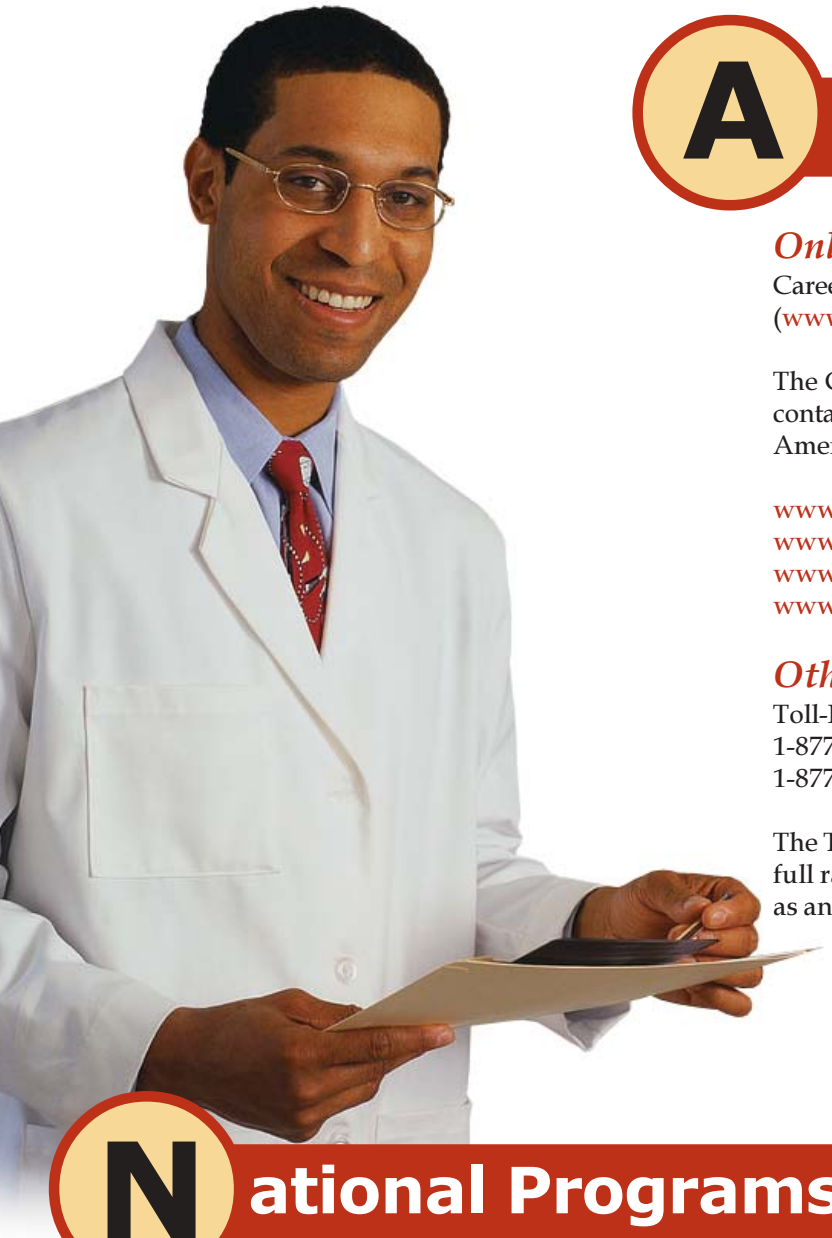
Addressing the Challenge

Forsyth Technical Community College (Forsyth Tech) will use its recent $754,146 grant from the ETA and $150,828 in leveraged contributions from business and education partners to implement a biotechnology associate degree training program for the region's dislocated workers. Forsyth Tech will retrain workers who have been dislocated from declining industries so that they are qualified for employment in the emerging biotechnology field. The Forsyth Tech curriculum will focus on training laboratory technicians in biotechnology and related pharmaceutical occupations.

Sustainable Impact

Forsyth Tech's pilot biotechnology training curriculum was developed in partnership with area biotechnology and pharmaceutical firms and has the backing of companies in these sectors. This demand-driven focus on training and skills development, in combination with leveraged support from key education, industry association, and community partners, will ensure that Forsyth Tech's program succeeds in the Piedmont Triad Region and serves as a replicable model for other communities experiencing similar economic and industry transitions.

For the most up-to-date information on ETA investments in workforce solutions for the biotechnology industry, go to www.doleta.gov.



Additional Resources

Online Tools

CareerOneStop
(www.CareerOneStop.org)

The CareerOneStop is a resource for businesses and job seekers. It contains links to America's Job Bank, America's Service Locator, and America's Career InfoNet.

www.careervoyages.gov
www.doleta.gov
www.doleta.gov/atels_bat
www.onetcenter.org

Other Tools

Toll-Free Help Line
1-877-US2-JOBS (1-877-872-5627)
1-877-889-5627 (TTY)

The Toll-Free Help Line provides up-to-date information about the full range of workforce services for workers and businesses as well as answers to employment and training questions.

National Programs

Apprenticeship

The apprenticeship system is working closely with the High Growth Job Training Initiative to assist the biotechnology industry in identifying and defining its technical workforce needs. Many of the industry's workforce needs and skills are embedded in sectors of the manufacturing and health care industries that are currently using registered apprenticeship.

Contact the BRG

For more information on the activities and services of the ETA's Business Relations Group (BRG), please contact:

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