



Overview and Summary of Recent Initiatives

Ohio has undertaken a number of strategic initiatives and provided new investments in programs that are impacting bioscience-based economic development. A major component of the state's technology-based economic development activities is the **Third Frontier Project**.

Governor Bob Taft unveiled The Third Frontier Project in February 2002. The \$1.6 billion Third Frontier Project is the state's largest commitment ever to accelerate the growth of Ohio's economy through globally competitive research and innovation. The majority of state funding comes from state capital funds, tobacco settlement proceeds, general revenue funds, and a recently passed bond fund initiative that will provide \$500 million that can be used for both noncapital and capital-related expenses of funded projects.

In targeted areas of technology, Ohio seeks to establish regional and statewide clusters of excellence. Bioscience was identified as one of five areas of focus for the Third Frontier Project.

As of late 2005, more than \$300 million in Third Frontier funds had been awarded, greater than 60 percent of which were targeted for bioscience-related initiatives, most notably 10 major bioscience-focused collaborations between academic research centers and private businesses. No new awards for 2006 have been made to date.

The Third Frontier Project, and its respective funding programs, is administered by the Third Frontier Commission, which was legislatively created in 2003. Funding sources include the Third Frontier Action Fund, the Biomedical Research and Technology Transfer (BRTT) Trust Fund, the Wright Capital Fund, and the Third Frontier Research and Development Fund. The Third Frontier Commission consists of the Director of the Ohio Department of Development, the Chancellor of the Ohio Board of Regents, the Governor's science and technology advisor, and six regional commissioners appointed by the Governor.

Building Bioscience R&D Capacity

Research programs

Wright Centers of Innovation are funded by grants to support large-scale world-class research and technology development platforms designed to accelerate the pace of Ohio commercialization. Wright Centers are collaborations among Ohio higher education institutions, nonprofit research organizations, and Ohio companies in the areas of advanced materials; bioscience; power and propulsion; information technology; and instruments, controls, and electronics. Consideration is being given to creating a new class of Wright Centers that will be funded at a level of \$50 million to \$60 million for a 5-year period,

with the majority of funding being for operating expenses. The current centers are funded at \$15 million to \$28 million for a 3-year period, and the majority of funding is for capital acquisitions.

The Biomedical Research and Commercialization Program (formerly BRTT Partnership) awards grants to support biomedical and biotechnology research leading to Ohio commercialization and long-term improvements to the health of Ohioans. Projects are to be collaborations among Ohio higher education institutions, nonprofit research organizations, and Ohio companies in the areas of human genetics and genomics, structural biology, biomedical engineering, computational biology, plant biology, and environmental biology. No 2006 awards have been made to date.

Faculty development programs

In FY 2000–2001, Governor Taft reinstated Ohio's **Eminent Scholar Program**, endowing Eminent Scholar faculty positions to foster national eminence of selected outstanding academic programs at Ohio colleges and universities. Today, the Eminent Scholar Program is used to support the Third Frontier Project by providing funding to develop endowed faculty positions to bolster the Wright Centers of Innovation.

Since the program was reinstated, 12 positions have been endowed, 48 since the program was created by the Ohio General Assembly in 1983. In 2004, a \$731,250 Ohio Eminent Scholars Program award in regenerative medicine was presented to Case Western Reserve University. Approximately \$1.5 million in funding is next available in FY 2007

Encouraging Academic/Industrial Interaction

The **Ohio MicroMD Laboratory** is a technologically integrated microfabrication facility for developing biomedical microelectromechanical system (bioMEMS) devices and therapeutic applications. The combination of multiple microfabrication process lines with a complete biochemical wet-lab facility provides capabilities for the research, development, testing, and characterization of new devices.

Occupying 20,000 square feet of Science Village on the **West Campus of The Ohio State University**, MicroMD has 6,000 square feet of Class 100 clean room, microfabrication-laboratory space and a 4,000-square-foot biohybrid laboratory. Specialized services and scheduling are available for R&D programs requiring protection of intellectual property and/or isolation in their processing. Specialized training and support are available, as well as direct support in fabrication of user-specified designs. With the depth of research programs on the campus of The Ohio State University, the MicroMD Laboratory also facilitates the development of a broad range of R&D activities. Ideally, a partnership is developed between MicroMD staff and facilities and users.

Moving Technology into the Marketplace

Supporting entrepreneurs and emerging companies

Ohio's Thomas Edison Program (TEP) has a history of more than 20 years. TEP is a network of nonprofit organizations funded to provide services to new and existing businesses. The overall objectives of the program are to retain and expand high-wage jobs and high-growth companies and to create and grow early-stage technology companies. TEP services are focused in the following four areas:

- Product innovation and commercialization
- Process innovation
- Business assistance
- Ohio research linkage to in-state applied innovation—fulfilling the technology needs of business by exploiting the products of research laboratories.

Bioscience support is provided through a number of the Edison Technology Incubators and Omeris, one of the Edison Technology Centers.

Omeris, founded in 1986 as the Edison BioTechnology Center, is a nonprofit organization designed to build and accelerate bioscience industry, research, and education in Ohio. It accomplishes these goals by both directly providing business services and by promoting the growth of the bioscience sector in the state. Ohio established and provides ongoing funding to Omeris, which is both the state's bioscience accelerator and its industry organization.

Originally located in Cleveland, the entity underwent a reorganization process in 2002; today, the statewide Omeris office is located in Columbus, with regional affiliates around the state. Each regional operation seeks to nurture and commercialize bioscience technologies through the formation of new companies and the attraction of companies from out of state. The regional offices include the following:

- BioEnterprise Corporation, a business formation and acceleration company committed to helping early-stage bioscience companies grow. Based in Cleveland, its founding and equal partners are the Cleveland Clinic, University Hospitals Health Systems, and Case Western Reserve University.
- BIO/START, a bioscience incubator in Cincinnati.
- The Edison Biotechnology Institute, a biomedical and genetics research institute of Ohio University in Athens. Its dual mission is basic discovery research and the transfer of new technology to the private sector for Ohio's economic benefit.
- The Central Ohio Regional Office of Omeris, a collaborative, early-stage technology commercialization catalyst that partners to create and/or grow bioscience-based businesses. With Columbus, Dayton, and Toledo as focus areas, it provides networking and business development services to emerging and established science companies.

Making Capital Available

Pre-seed and seed capital

The Technology Division within the Ohio Department of Development supports an **SBIR Office** to help Ohio's small research-oriented firms compete for federal agency R&D grants or contracts. In addition, the **Ohio Research Commercialization Grant Program** was recently established to help finance commercialization and pilot production of technologies by companies that have successfully competed for federal SBIR, STTR, and ATP awards. The program provides grants of up to \$350,000 to emerging technology firms.

The **Pre-seed Fund Initiative (formerly the Validation Fund and Seed Fund Initiative)** makes grants to pre-seed funds to increase the availability of professionally managed capital and associated services to accelerate the growth of early-stage Ohio technology companies. Awards include the following:

- \$1 million to the Cleveland Clinic Foundation BioValidation Fund (Cleveland) to invest in eight to 10 companies to support activities that further demonstrate the potential of technologies prior to the initiation of clinical trials.
- \$1 million to Draper Triangle Partners II, LLP (Cleveland and Pittsburgh) to invest in 25 early- and seed-stage technology companies.
- \$1 million to Ohio TechAngels Fund (Columbus). The fund is a contributed-capital and “sidecar” angel fund with 68 private equity investors from throughout Ohio investing in early-stage technology opportunities. Ohio TechAngels is central Ohio’s first angel fund and the largest in the upper Midwest. In addition to providing the capital for the \$2.5-million-plus fund, the angels provide statewide networking resources and mentoring for management.
- \$1 million to Queen City Angels First Fund II (Cincinnati) to invest in 10 to 12 high-growth technology companies. The fund makes investments in very early-stage companies and encourages others to co-invest.
- \$500,000 to JumpStart Evergreen Technology Validation Fund (Cleveland) for investing in 15 companies.
- \$500,000 to Cincinnati Children’s Hospital Medical Center TOMORROW Fund (Cincinnati) to invest in four to six spin-off opportunities.
- \$1.1 million to the Ohio Innovation Fund based in Cleveland.
- \$1.1 million to the First Fifty Validation Fund co-managed by Omeris, the Business Technology Center (BTC), and the Science and Technology Campus Corporation (Scitech).
- \$1.6 million to the Columbus Emerging Technology Fund.
- \$1.6 million to the Early Stage Partners Fund in Cleveland.

Ohio’s Technology Investment Tax Credit Program offers a variety of benefits to Ohio taxpayers who invest in small firms oriented toward R&D and technology that have been pre-approved for investment. Through the program, Ohio investors may offset the risk of investment by reducing their state taxes by 25 percent of an investment up to \$250,000. The credit may be applied to personal income tax, public utility excise tax, or the tax on dealers in intangibles. Twenty million dollars is available for the credits, and the credit process for bioscience investments is managed through Omeris.

Venture capital

The **Ohio Venture Capital Fund Program** increases the amount of professionally managed early- and seed-stage capital available to Ohio companies by increasing the number of Ohio-based early- and seed-stage venture capital funds. To accomplish this, the statute authorized the creation of a “fund-of-funds,” referred to as the “Program Fund.” To capitalize the Program Fund, a fund manager, referred to as a Program Administrator, is raising up to \$100 million in the form of loans from banks and insurance companies. To assist the Program Administrator in these fund-raising efforts, the statute authorizes the

issuance of state tax credits to secure the principal and interest payments on the loans. The Program Administrator, Buckeye Venture Partners, is investing Program Fund monies in early- and seed-stage venture capital funds that commit to invest at least 50 percent of the investment in Ohio-based companies.

Providing Space for Bioscience Companies

Incubators

The **Edison Program** within the Technology Division of the Ohio Department of Development has been providing operating support for technology incubators since 1986. Today, 10 Edison incubators located throughout the state receive, on average, approximately \$200,000 in annual operating support. Of the 10 technology incubators, three provide assistance to bioscience companies through access to wet-lab space and a variety of business services. All three are regional affiliates of Omeris.

The **TechColumbus/BTC**, located in Scitech, currently occupies 68,000 square feet and offers clients space for offices, workrooms, light manufacturing, and wet labs. Room sizes vary from 230 to 2,327 square feet.

BioEnterprise, the Cleveland regional affiliate of Omeris, maintains and manages office and wet-lab space for emerging bioscience companies within University Circle in close proximity to Case Western Reserve University, the Cleveland Clinic, and University Hospitals of Cleveland. Offered in flexible arrangements to accommodate the evolving needs of a growing bioscience company, space is available for early- and mid-stage medical device, biopharmaceutical, health care service, and other healthcare-related companies.

BIO/START, located in Cincinnati, provides 31,500 square feet of incubator space featuring wet labs; dry labs; culture labs; photodocumentation and X-ray labs; a cold room; a device design lab; and a shared equipment room with ultra and high-speed centrifuges, spectrophotometer, and analytic balances. In addition, BIO/START has a GMP manufacturing module.

Under development

The **Akron Industrial Incubator**, another of the 10 Edison incubators, offers 129,000 square feet of space for manufacturing, assembly, and distribution; as of July 2006, it will offer an additional 60,000 square feet of upscale office, wet-lab and conferencing facilities to accommodate technology companies, including bioscience companies. The Akron program will be able to take a technology company through stages from idea generation to market introduction, all within the confines of the facility.

The **MidTown Technology Center** is geared toward start-ups, incubator graduates, and established technology firms. It was designed to meet the technical requirements of growing technology companies in the fields of the life sciences, information technology, biopharmaceutics, and medical devices. The MidTown Technology Center will be constructed in two phases: renovating the former Ohio Knitting Mills building to create 84,000 square feet of laboratory and loft-style office space with a keycard-secured 71-space indoor parking garage and maximizing the total 7.5-acre site by offering the opportunity to create up to 400,000 square feet of space.

Bioscience research parks

Scitech, a research park affiliated with The Ohio State University and located on the University's West Campus, occupies a 53-acre campus with 380,000 square feet of office, laboratory, manufacturing, and warehouse space. In addition to the technology incubator and accelerator space offered within the park, Scitech has developed Science Village, a modular, flexible concept for larger companies. Phase I features 40,000 square feet of office and laboratory space. Additional phases will increase the buildout to more than 150,000 square feet. The area of bioMEMS was a significant focus of the Phase I buildout (see above discussion of the Ohio MicroMD Laboratory).

The **TechSolve Business Park** is a 143-acre site located in Cincinnati. TechSolve, one of the Edison Technology Centers created by the state, owns the Business Park. Its facility includes 65,000 square feet containing laboratories, training facilities, and meeting space.

Under development

Cleveland Biotechnology Park, Inc. (BioPark now rolled into BioEnterprise) received \$1 million from the State of Ohio in FY 2001 to develop a bioscience research park. BioPark is a collaborative venture of the Cleveland Clinic Foundation (with its Lerner Research Institute), Case Western Reserve University, and University Hospitals Health Systems (with University Hospitals of Cleveland and its Research Institute). It is envisioned that BioPark will help these three institutions and others in northeastern Ohio identify research results in biomedical science and technology that can be commercialized.

Addressing Talent Needs

Specialized postsecondary programs

The **Third Frontier Internship Program** helps develop critical partnerships between Ohio's students and businesses. Created in 2003, the 3-year, \$15 million initiative, utilizing Governor's discretionary funds from the federal Workforce Investment Act, is expected to create approximately 1,500 annual internships for Ohio students. With required private matching funds, students are able to earn up to \$12,000 over 2 years, leveraging the state's annual investment of \$3,000 per student. The awards assist businesses, students, and educators working or studying in the five core technology areas identified by the Third Frontier Project, including the biosciences. The program is being administered by the Ohio Department of Development.

Pending Proposals

- **Federal Matching Grants.** Proposed is a program to support bids for major federal funding opportunities of at least \$10 million for research and development activities relevant to Third Frontier Project priorities. Federal awards must be for the establishment of a designated federal center or facility—not a singular research project. Nonrenewable matching funds up to 10 percent of the value of the federal funds awarded will be provided, up to a limit of \$2 million per award.
- **Entrepreneurial Assistance Projects.** Proposed is a program to enhance support for the start up and growth of new technology-based companies. Funding for 3-year initiatives will be provided up to \$15 million. Applicants must demonstrate that they have developed a comprehensive regional plan to dramatically improve the delivery of entrepreneurial assistance. A minimum cash contribution of \$1 will be required for every \$2 of state funding. It is expected that the majority of

the funding from this program will support pre-seed capital formation, the attraction and retention of experienced entrepreneurial management, and the provision of well-defined business expertise to client companies. As a component of any project, applicants may request pre-seed funding in an amount not to exceed \$2 million per project year.

- **Targeted Industry Company Attraction Program.** Proposed is a program to support the identification of company attraction opportunities within targeted industry sectors relevant to the Third Frontier Project. Initial areas of interest are the biosciences; advanced polymers; and instruments, controls, and electronics. Competitive funding for 2-year initiatives will be provided to use the state's assets to develop the Ohio value proposition for specific industry sectors and companies, identify and qualify potential targets for attraction to Ohio, and interface with the Ohio Department of Development and local economic development organizations to facilitate closing deals. A portion of the available funding will be incentive based.
- **Targeted Industry Grants.** Proposed is a program to provide direct funding to eligible companies that are targets for attraction to Ohio. Initial areas of interest are the biosciences; advanced polymers; fuel cells; and instruments, controls, and electronics. To be eligible for funding, companies would be required to have identified linkages to cluster components including universities and other businesses.

Contacts

Will Indest
 Ohio Department of Development
 Technology Division
 77 South High Street, 25th Floor
 Columbus, OH 43215-1001
 (614) 466-3887
windest@odod.state.oh.us

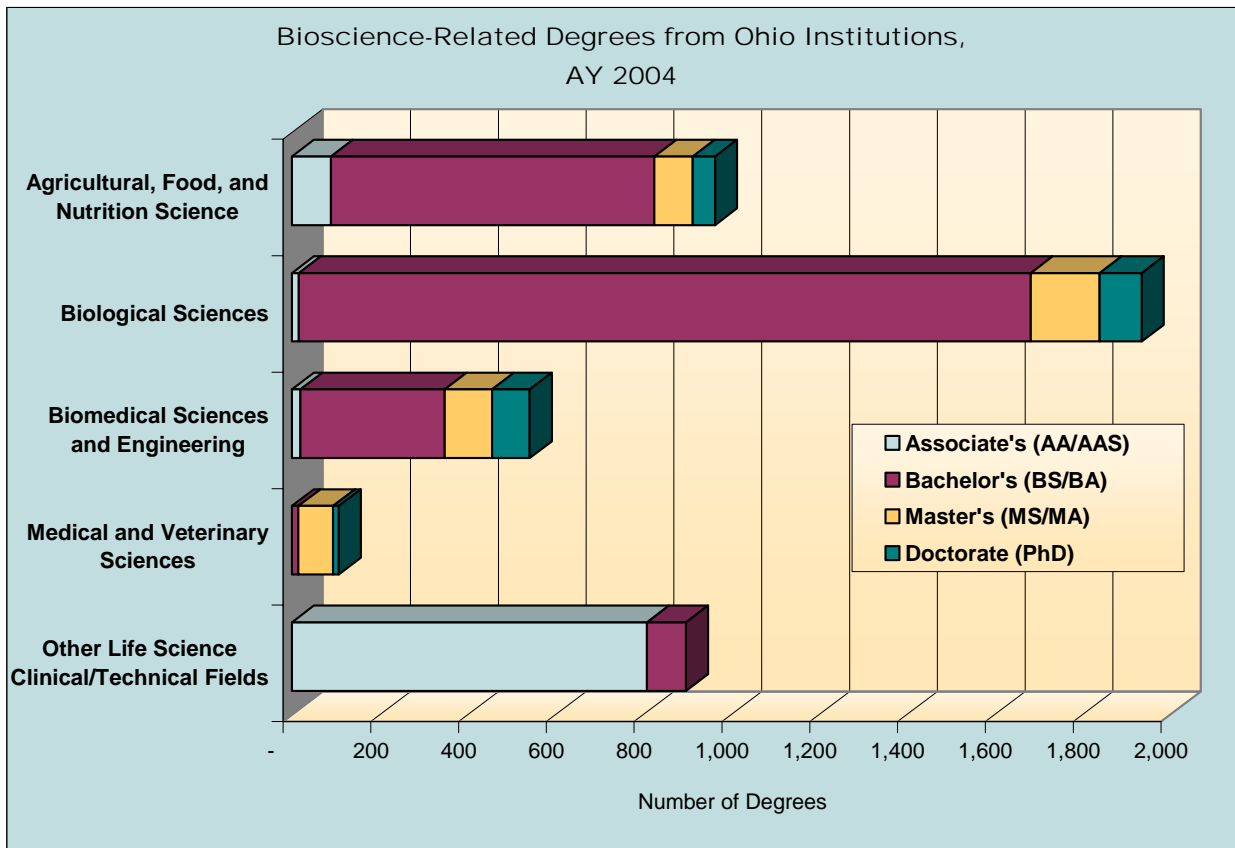
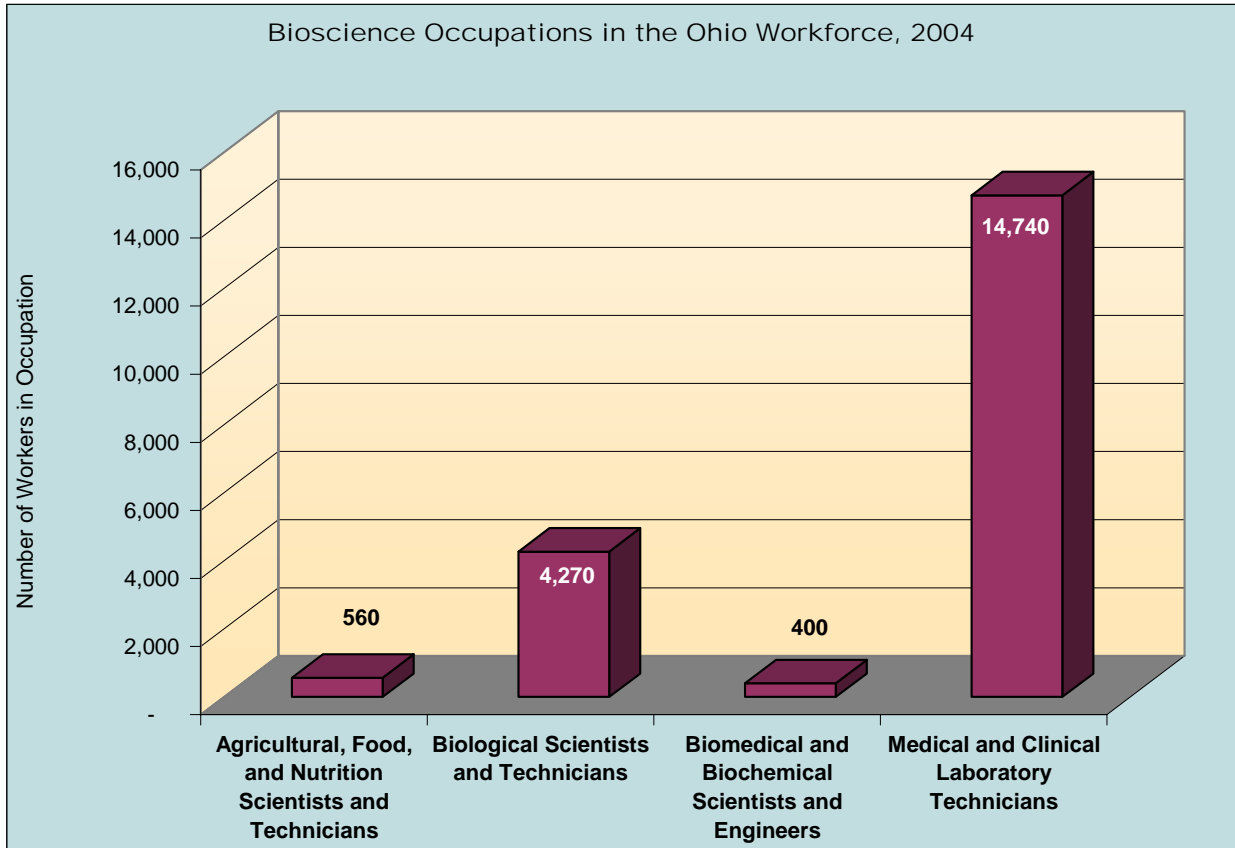
Omeris is both the state's bioscience accelerator and its industry organization. As such, it helps to build and accelerate bioscience industry, research, and education in Ohio both directly by providing business services and by promoting the growth of the bioscience sector in the state. See more information, above.

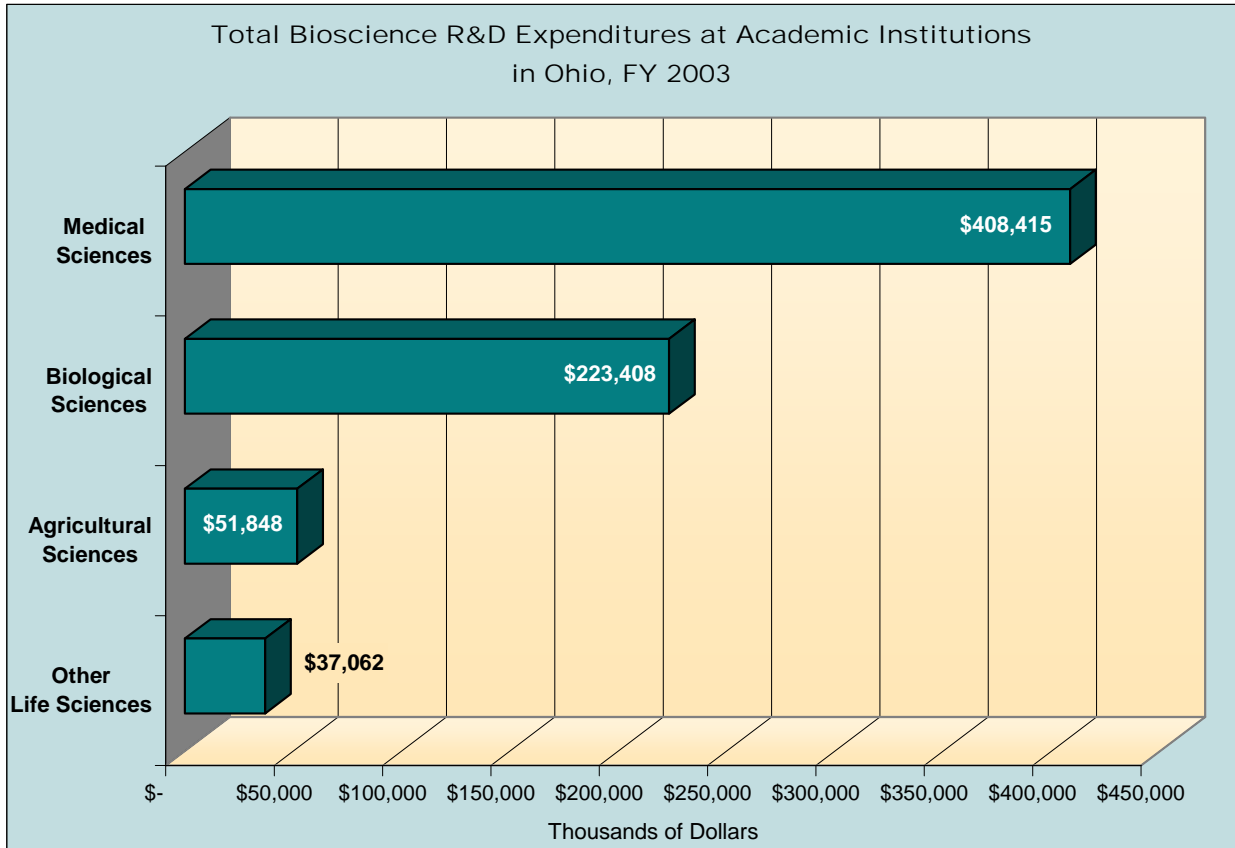
Dr. Tony Dennis, President
 Omeris Inc.
 1275 Kinnear Road
 Columbus, OH 43212
 (614) 675-3686
tdennis@omeris.org

Industry Subsector	Ohio	United States
Agricultural Feedstock & Chemicals		
Establishments 2004	73	2,111
2001-2004 Establishment % Change	-5.2%	0.4%
Employment 2004	6,493	104,893
2001-2004 Employment % Change	-7.0%	-6.9%
Share of U.S. Employment	6.2%	100.0%
Location Quotient	1.49	n.a.
Average Annual Wage 2004	\$73,551	\$63,383
Direct-Effect Employment Multiplier	8.05	10.91
Total Employment Impact	52,238	1,212,094
Drugs & Pharmaceuticals		
Establishments 2004	50	2,589
2001-2004 Establishment % Change	-7.4%	-0.6%
Employment 2004	4,745	313,207
2001-2004 Employment % Change	8.3%	2.7%
Share of U.S. Employment	1.5%	100.0%
Location Quotient	0.37	n.a.
Average Annual Wage 2004	\$64,548	\$79,303
Direct-Effect Employment Multiplier	5.34	9.51
Total Employment Impact	25,326	2,731,321
Medical Devices & Equipment		
Establishments 2004	498	15,190
2001-2004 Establishment % Change	-4.0%	0.2%
Employment 2004	12,325	411,460
2001-2004 Employment % Change	-9.7%	-3.6%
Share of U.S. Employment	3.0%	100.0%
Location Quotient	0.72	n.a.
Average Annual Wage 2004	\$41,555	\$56,449
Direct-Effect Employment Multiplier	2.84	4.56
Total Employment Impact	34,967	1,817,705
Research, Testing, & Medical Laboratories		
Establishments 2004	663	20,565
2001-2004 Establishment % Change	25.0%	19.4%
Employment 2004	8,434	413,550
2001-2004 Employment % Change	25.8%	8.2%
Share of U.S. Employment	2.0%	100.0%
Location Quotient	0.49	n.a.
Average Annual Wage 2004	\$45,668	\$65,414
Direct-Effect Employment Multiplier	2.21	3.15
Total Employment Impact	18,655	1,272,936
TOTAL PRIVATE SECTOR		
Establishments 2004	272,752	8,156,137
2001-2004 Establishment % Change	0.0%	4.8%
Employment 2004	4,533,865	109,249,195
2001-2004 Employment % Change	-3.3%	-0.7%
Share of U.S. Employment	4.2%	100.0%
Location Quotient	n.a.	n.a.
Average Annual Wage 2004	\$35,929	\$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.





	Ohio	United States	Rank
University R&D Expenditures, FY 2003			
Total (\$ thousands)	\$1,268,784	\$40,104,621	10
Life Science R&D (\$ thousands)	\$736,232	\$24,062,088	10
Percent of Total R&D	58.0%	60.0%	
Life Sciences Per Capita	\$64.38	\$82.74	
Change in Life Sciences FY 1999–2003	53.0%	52.7%	
NIH Support to Institutions, FY 2004			
Total (\$ thousands)	\$691,538	\$22,556,459	9
Per Capita Expenditures	\$60.47	\$77.56	
Change in Expenditures FY 2000–2004	49.1%	53.2%	
Higher Education Degrees in Bioscience Fields, AY 2004			
	4,447	111,329	7
Bioscience Occupations in the Workforce, 2004			
	19,970	616,140	9