



# Massachusetts

Programs & Initiatives Advancing the Biopharmaceutical Industry



## Key Programs & Initiatives

The opportunities generated by the biopharmaceutical sector as a leader in innovation and high quality job creation are not limited to just a few states, but have a substantial national footprint across states. States proactively pursue the development of the biopharmaceutical sector because it represents: a large-scale, geographically dispersed supply chain spanning R&D through to production and distribution; a key driver of the economy including the recent economic recovery; and a sector paying high wage rates in quality jobs. States are deploying a range of programs and initiatives to support and grow the biopharmaceutical industry, including: comprehensive state development strategies; investments in R&D and related infrastructure; programs to boost venture capital, entrepreneurship, and innovation development; advanced manufacturing; economic incentive initiatives; and programs working to advance STEM education and training. As a leading bioscience state, Massachusetts is not taking its future for granted. As a leading bioscience state, Massachusetts is not taking its future for granted and continues to prioritize its support for the biosciences through a number of key initiatives.

### Quick Guide: Massachusetts's Programs & Initiatives Advancing the Biopharmaceutical Industry



#### Comprehensive State Strategies to Support Biopharmaceutical Development:

- Massachusetts Life Sciences Initiative
- Massachusetts Life Sciences Center (MLSC)
- Massachusetts Biotechnology Council (MassBio)



#### R&D Investment:

- Massachusetts Neuroscience Consortium
- Cooperative Research Matching Grants
- Life Sciences International Collaborative Programs of MLSC



#### Biosciences Infrastructure Development:

- Research Facilities through the Capital Program
- Incubator and Accelerator Facilities through the Capital Program



#### Venture Capital, Entrepreneurship, and Other Innovation Related Programs and Initiatives:

- Small Business Matching Program
- MassCONNECT
- Innovation Exchange
- Pharma Days
- Mass Technology Transfer Center
- Life Science Accelerator Program



#### Advanced Manufacturing:

- UMass Lowell Massachusetts Biomufacturing Center Facilities
- UMass Medical School's MassBiologics
- Massachusetts Accelerator for Biomufacturing
- The Worcester Polytechnic Institute's Biomufacturing & Education Training Center



#### Economic Incentives:

- R&D Tax Incentives
- Life Sciences Targeted Tax Incentive Program



#### STEM Workforce & Education:

- STEM Grant Program
- Internship Challenge
- Global Entrepreneur in Residence Pilot Program

## Impacts

**Massachusetts Life Sciences Center** – has used its funds as a “magnet” to attract additional investment capital. Most of its programs require at least a 1:1 match. Across all of its investments, MLSC has averaged \$3.4 for every \$1 that has been invested.

**MLSC's Life Sciences Targeted Tax Incentive Program** – through 2014 has resulted in a net new hire commitment of more than 3,750 jobs.

**MLSC's Internship Challenge** – since 2009, MLSC has supported nearly 1,900 interns at more than 450 life science companies from across more than 160 colleges and universities.

## Massachusetts by the Numbers



## Comprehensive State Strategies to Support Biopharmaceutical Development

As a leading bioscience state, Massachusetts is not taking its future for granted. In 2008, the state enacted legislation establishing a 10-year, \$1 billion investment in the **Massachusetts Life Sciences Initiative**.

- The enacted legislation was the result of the culmination of a year's worth of efforts to draft an innovative new initiative to expand life sciences activities in the Commonwealth.
- This included a comprehensive plan to promote life sciences across all facets and stages of the sector, from as early as middle and high school classrooms, to workforce development, academic research and commercialization, to globally-competitive businesses that provide high-paying jobs for workers in the state.

The lead organization for advancing the development of the life science industry is the **Massachusetts Life Sciences Center (MLSC)**, a quasi-public agency created to enact the Massachusetts Life Sciences Initiative.

- The MLSC is governed by a seven member Board of Directors with three permanent members and four appointments from the Governor covering key stakeholders communities, including a physician from an academic medical center, an industry executive drawn from the leadership of the Massachusetts Biotechnology Council, a life science researcher with technology commercialization experience and a financier with significant experience in the life sciences sector.
- MLSC has also created a Scientific Advisory Board drawn from representatives from industry, universities, academic health centers and research institutes in Massachusetts.

Massachusetts also has one of the largest and most active biopharmaceutical/biotechnology industry associations in the nation, the **Massachusetts Biotechnology Council (MassBio)**, with 650 members drawn from biopharmaceutical and biotechnology companies, businesses related to the industry, and major teaching hospitals, academic institutions and research institutions. It offers a wide range of networking activities focused on promoting open innovation and entrepreneurial development, along with active policy and advocacy services at the state and federal level.

## R&D Investment Programs and Initiatives

Supporting basic research in the life sciences has been a long-standing commitment by the Massachusetts Life Sciences Center (MLSC), though it has taken different forms over the years. In the past, there was funding support targeted to attracting and retaining nationally prominent faculty to Massachusetts' colleges and universities as well as grants to new investigators in cutting-edge life sciences research to advance their careers. Today, this commitment to basic research takes a number of forms:

**MLSC's Massachusetts Neuroscience Consortium** involves a collaboration of MLSC with industry to pool funding in support of research at academic and research institutions to identify and validate novel targets for treating chronic and debilitating neurological diseases anchored in recognized human disease pathways.

- A total of \$1.5 million has been raised for the consortium.
- First round awardees were announced in 2013, involving three grants focused on Alzheimer's disease, two grants focused on neuropathic pain, and one grant each focused on Multiple Sclerosis and Parkinson's disease.
- A second round is underway and is focused on neurodegenerative and neuroinflammatory diseases (such as MS, Huntington's, ALS), neuropathic pain and treatment-resistant depression.

**MLSC's Cooperative Research Matching Grants** provides grant funding of up to \$500,000 over two years for industry-sponsored research collaborations with Massachusetts academic institutions to accelerate translational research.

- Industry sponsors must match the MLSC funds on at least a 1:1 basis.
- Since 2008, 12 grants were awarded totaling \$6.8 million.

### **Life Sciences International Collaborative Programs of MLSC.**

The efforts of MLSC in international partnerships began in 2012 with the creation of the International Partnership Assistance Portal to enable Massachusetts companies and international partners to find one another in a secure website.

- At the close of fiscal year 2014, the portal database had 227 company profiles (143 international and 74 Massachusetts) representing 25 countries and additional profiles of international and local life-sciences agencies and institutions.
- MLSC also supports collaborative R&D projects involving Massachusetts companies with international companies based in specific regions in the world. R&D grants of \$75,000 to \$400,000 are awarded by MLSC to the participating Massachusetts company, while the international company receives funding from its participating agency.

- In its first round, conducted in 2013/2014, awards to four teams were made totaling more than \$1 million and another round of \$2 million was initiated for 2014/2015.
- In 2014, MLSC expanded its focus on global collaborations by targeting \$1 million for its University Partnerships Program to provide R&D funding of \$50,000 to \$200,000 for projects involving Massachusetts companies and international partners drawn from industry, academic institutions, hospitals or research institutions in any non-U.S. geography.

## Programs and Initiatives to Build Bioscience Infrastructure

**MLSC's Research Facilities through the Capital Program** supports infrastructure investments for promoting life science research at academic and other research institutions. The Capital Program goes well beyond just research facilities. The intent is to advance the capabilities of Massachusetts' life science ecosystem across research and development, commercialization, manufacturing, and workforce and training through investments in physical infrastructure projects.

- Half of the resources committed through the \$1 billion, 10 year Massachusetts Life Sciences Initiative are dedicated to the Capital Program.
- To date, the MLSC has awarded or committed more than \$372 million to support capital projects, creating more than 1.4 million square feet of life science facilities across the state.
  - Examples of significant investments include: \$90 million towards the \$400 million, 512,000 sq. ft. expansion of the UMass Medical School; and, \$95 million of the \$160 million for the UMass Amherst Life Science Laboratories, a major new inter-disciplinary research lab of over 300,000 sq. ft. housing life sciences research centers and individual faculty labs.
  - Other examples include funding support for research and development facilities at Harvard (\$5 million), Boston Children's Hospital (\$4 million), Tufts Biosafety Lab (\$9.5 million), Massachusetts Green High-Performance Computing Center (\$4.5 million), Woods Hole Marine Biological Lab (\$10 million), Dana Farber Molecular Cancer Imaging Center (\$10 million) and UMass Boston/Dana Farber Center for Personalized Cancer Therapy (\$10 million).

**MLSC's Incubator and Accelerator Facilities through the Capital Program** supports infrastructure investments for promoting life science research, education, commercialization, and manufacturing primarily to academic institutions, research institutions, and consortiums involving academic partners. Examples of incubator and accelerator facilities supported by grants from MLSC include:

- Lab Central in Cambridge
- North Shore Biotech InnoVenture Center
- UMass Boston Venture Development Center
- UMass Lowell M2D2
- Berkshire Innovation Center in the City of Pittsfield.

In addition, there are many other incubators offering wet lab space for emerging bioscience ventures in Massachusetts.

## Venture Capital, Entrepreneurship, and Other Innovation Related Programs and Initiatives

### Innovation Development

MLSC's **Small Business Matching Program** provides grants to companies that have received Phase II SBIR or STTR grants, of up to \$500,000 per company, to help these commercialization-ready technologies reach production. Through 2014, eight companies have been awarded grants totaling \$4 million.

### Entrepreneurial Development

**MassBIO's MassCONNECT** links new entrepreneurs and founders with seasoned bioscience professionals to provide industry expertise, evaluation, and guidance to help in commercializing new bioscience technologies. These seasoned bioscience professionals span pre-clinical development, regulatory/clinical development, business development, and serial entrepreneurs.

**MassBIO's Innovation Exchange** offers a secure web-based system to connect those looking for technology or in-licensing opportunities with those with technologies to license.

**MassBIO's Pharma Days** offers an opportunity for building partnerships between established and emerging biopharmaceutical companies, including private one-on-one meetings, presentations by established biopharmaceutical companies to discuss partnering opportunities they are seeking, and general networking.

**Mass Technology Transfer Center**, a state supported initiative housed at the University of Massachusetts System, seeks to facilitate technology transfer and collaborations of universities and industry, as well as support new start-up companies. It holds regular showcase conferences targeting the life sciences, among its efforts. It also provides an intensive entrepreneurial coaching service available to university researchers, technology transfer officers, and emerging entrepreneurs to help them develop their strategic plans and present before investors.

## Venture Financing

**MLSC's Life Science Accelerator Program** provides loans to early-stage life science companies engaged in R&D, commercialization, and manufacturing in Massachusetts.

- It focuses on providing working capital, and is capped at \$1 million per company.
- To date, 30 early-stage life science companies have received \$20.8 million in Accelerator loans since 2008. Of these, eight companies have paid back their loans fully with interest after generating more than \$180 million in equity or acquisition proceeds.

## Advanced Manufacturing Programs and Initiatives

Massachusetts has created a network of shared-use manufacturing facilities, typically associated with academic and research institutions. Many of these shared-use manufacturing facilities have received support through the Capital Program of the Massachusetts Life Sciences.

**UMass Lowell Massachusetts Biomanufacturing Center Facilities** houses a fully equipped facility to assist companies in analytical development and characterization, process development, process technology development, and pilot manufacturing.

- It is part of a comprehensive research and education program at UMass Lowell, including a PhD, masters, and graduate certificate programs involving bioprocessing.
- The Center also holds annual summit meetings on bioprocessing, and generally is focused on addressing industry-wide concerns in Massachusetts for a resource to help advance validated, cGMP-compliant manufacturing processes. It has received support from the MLSC Capital Program.

**UMass Medical School's MassBiologics**, affiliated with UMass Medical School, has a more than 100 year history in improving public health through the production of vaccines, plasma derivatives, and monoclonal antibodies. It is the only non-profit, FDA-licensed manufacturer of vaccines in the United States.

- MassBiologics currently manufactures Tetanus and Diphtheria Toxoids, Adsorbed (Td) vaccine and distributes products nationwide.
- In recent years, it has been actively working with industry and on its own research to identify new antibody targets for clinical development for which it can develop human monoclonal antibodies, particularly for infectious diseases and increasingly neurological diseases.
- It recently received funding from MLSC Capital Program for a cGMP Vector Manufacturing Center.

**Massachusetts Accelerator for Biomanufacturing**, affiliated with the UMass Medical School and UMass Dartmouth, is located in Fall River at the new SouthCoast Life Science & Technology Park.

- It provides cGMP biomanufacturing capability to confirm bio manufacturing processes and research findings.
- It has capacity to serve companies with traditional biologic therapeutic products, new types of products using stem cells and tissue engineering, as well as biomaterials, biofuels, and green chemistry products.

**The Worcester Polytechnic Institute's Biomanufacturing & Education Training Center** offers a fully functional biomanufacturing pilot plant that offers both contract services for small-scale non-GMP manufacturing and training programs. It was partially funded by MLSC.

## Economic Incentives

**R&D Tax Credits.** Massachusetts offers a non-refundable R&D tax credit in two categories:

- A 10 percent credit against qualified research expenses
- A 15 percent credit on research costs related to donations and contributions made to research organizations such as universities and hospitals.

**MLSC's Life Sciences Targeted Tax Incentive Program** supports those life science companies that commit to creating new long-term life science jobs in Massachusetts within the next year and retain those jobs for a five-year period.

- To qualify, companies must receive certification from the MLSC based on demonstrating the merits of their expansion plan. The program is also carefully monitored with annual reporting requirements and clear policies and procedures for decertifying and recapturing of tax credits.
- **Outcomes:** Through 2014, it has resulted in a net new hire commitment of more than 3,750 jobs. More than \$115 million in tax credits has been awarded to over 75 companies through five annual rounds of the program.

## STEM Workforce and Education Programs and Initiatives

**MLSC's STEM Grant Program** seeks to increase student interest and achievement in STEM fields by increasing access to such programs. It funds the purchase of equipment and supplies for high schools and middle schools, and provides grant support to non-profit organizations offering STEM-related programs reaching out to a diverse student population.

- Through 2014, the STEM efforts have awarded more than \$12 million to over 100 different high schools, middle schools, and non-profit organizations.

**MLSC's Internship Challenge** facilitates the placement of students and recent graduates interested in careers in the life sciences in paid internships to expand the talent pipeline and create meaningful connections between students and companies. Internships can be part-time or full-time and can run throughout the year.

- MLSC provides a web-based system to facilitate the connection of potential interns and companies. Each company participating commits to providing a dedicated mentor and hands-on learning experience.
- MLSC funds up to two interns per year at those participating small life science companies with under 100 employees, reimbursing up to \$15 per hour and a total funding of \$7,200 per intern.
- Larger life sciences companies can access the internship web-based system to recruit interns.

- **Outcomes:** Since 2009, MLSC has supported nearly 1,900 interns at more than 450 life science companies from across more than 160 colleges and universities. Survey results suggest high levels of satisfaction by both students and companies, along with 8 out of 10 students having an increased interest of working in a Massachusetts life sciences company and 6 out of 10 companies using the program to help in identifying future employees.

**Global Entrepreneur in Residence Pilot Program** is a novel pilot program recently authorized by the Massachusetts Legislative to enable foreign graduate students in STEM fields to gain H-1B visa applications outside of existing caps by partnering with universities to act as the sponsor for these students who will work part-time with the university in their field of study and part-time on a new early-stage venture the foreign graduate student is helping to lead. The program is being administered by the Massachusetts Technology Collaborative, the state's quasi-public technology development organization, and the two university sites for the effort are at the venture centers of UMass Boston and UMass Lowell.