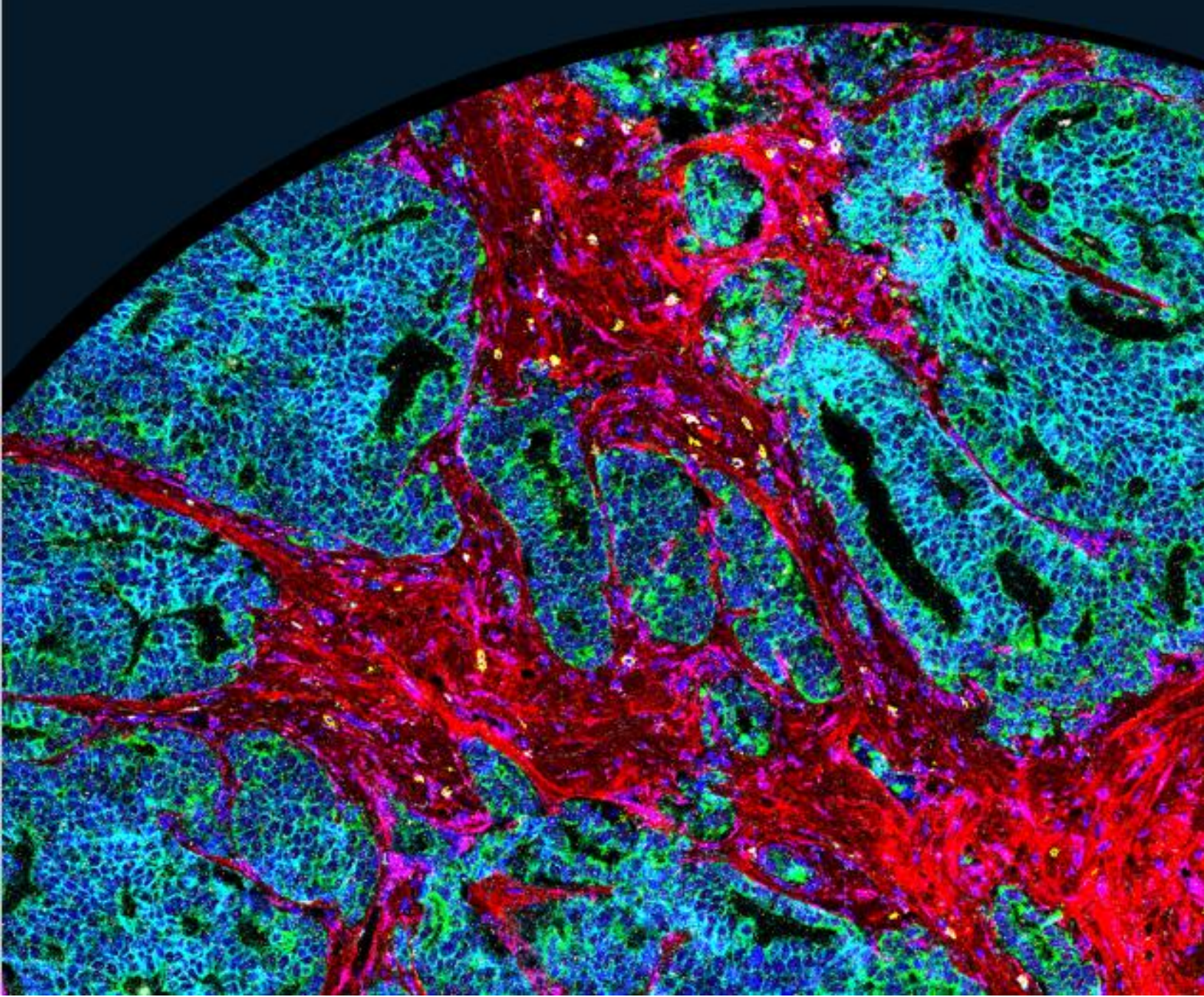
NEW YORK STATE OF OPPORTUNITY. | Empire State Development

Life Science Initiative

ANNUAL REPORT: 2022



The First Five Years: Progress & Impact

In the five years since legislative authorization of Empire State Development's Life Science Initiative in April 2017, New York has experienced an impressive increase in life science activity across the state. The Initiative was established to invigorate and grow the state's life science industry and initially focused on addressing historic gaps in the life science ecosystem that were impeding industry growth in New York. These gaps included:

- Limited ability to commercialize basic research
- Lack of managerial talent, resulting in academic Intellectual Property leaving New York
- Lack of early-stage venture capital investments
- Lack of commercial incentives and affordable space
- Disconnect between upstate and downstate

Much has changed during this period, as programs established and funded by New York State's Life Science Initiative, as well as by New York City, have made large inroads in filling these gaps. The combined investment in life sciences of more than $1.5 billion is supercharging growth of the ecosystem, with existing and new investments enabling multiple centers of innovation,[i] life science workspace, entrepreneurial talent, programs to accelerate commercialization, and a growing venture investment pool.

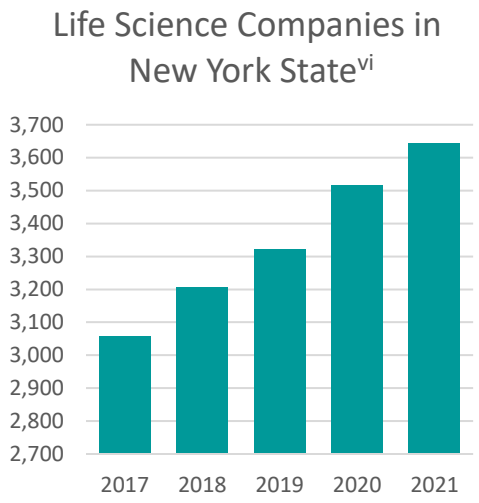
ESD has played a substantial role in the overall growth of the life science ecosystem and in elevating the State's profile as a leading life science investment destination. The results show that the state's commitment to growing the life science sector is paying off. New York State's Life Science Initiative has directly contributed to building the sector in several ways:

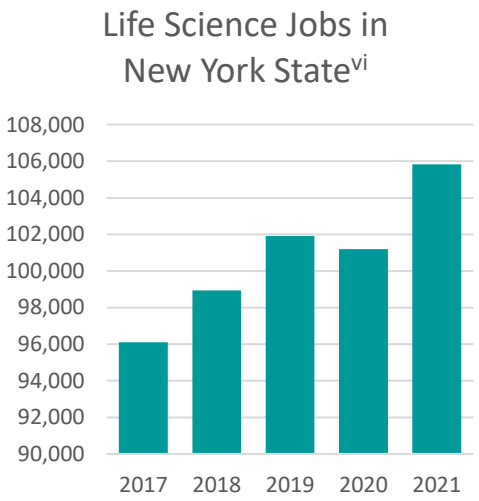
- Generated $1.5 billion of leveraged investment[ii] in the state.
- Incentivized 17 new life science companies to locate in the state.
- Created more than 540 direct jobs in New York through Life Science Initiative programs.

And the overall activity of New York's life science sector tells a compelling story:

- $2.3 billion in private investments in New York State life science companies between October 1, 2019, and September 30, 2020,[iii] an approximate 10-fold increase since 2017
    - As a result, New York ranked 3rd behind only California ($11 billion) and Massachusetts ($6.2 billion) in life science venture capital funding in 2017 and 2020, up from 9th in 2015 and 15th in 2011.[iii]

- This increase in private investment also increased the ratio of venture funding to every NIH dollar received, a standard measure of life science economic activity, from $.13 in 2016 to $.73 in 2020. New York is 3rd only to California ($2.20) and Massachusetts ($1.88).[iv]
- A record $3.28 billion of NIH funding in FY 2022, a 38% increase since 2017.[v]
- 19.2% growth in the number of companies from 2017 to 2021.[vi]
    - Approximately 587 new life science companies established since 2017; totaling 3,644 companies in New York in 2021.[vi]
- 10.1% growth in life science jobs between 2017 and 2021.[vi]
    - Approximately 9,727 new life science jobs added since 2017, with total life science employment of 105,837 in 2021.[vi]
    - 14.8% greater rate of job growth than in the state's private sector overall, and 10.1% greater than the national private sector job growth rate. [vi]
- More than 3.1 million sq. ft. of laboratory space for life science companies in New York City.[vii]
- A large pipeline of future talent. Between 2016 and 2020, the NYC Metro area produced more than 1,700 life science PhD graduates. This is more than any other metro produced; New York City-based institutions account for 44% of these PhDs.[viii]





Rapid Industry Innovation Making Way for Long-Term Growth

During its first five years, the Life Science Initiative has focused on strengthening the support and resources needed to feed the life science chain,[ix] remove barriers, and ensure the continuity of the cycle. The state's efforts to build the ecosystem, working with other public and private partners, has contributed to a wave of rapid industry innovation, with the development of new technologies and diversity in the life science industry, including food technology, cell and gene therapy, AI, digital, and climate technology. This diversity provides more opportunities for long-term growth by capitalizing on a broader range of innovations.

The accomplishments of the Life Science Initiative have primed the state's life science ecosystem to continue an upward trajectory, strengthening it and defining New York as a place where innovative companies can thrive. There is still more to do to continue this momentum and enlarge New York's life science footprint. The next phase of the Life Science Initiative will continue to support emerging life science communities while capturing new opportunities from novel capabilities and breakthrough technologies, such as cell and gene therapies, application of machine learning to clinical decision making, real-time digital pathology, and nano and organoid technologies.

Life Science Initiative Operations and Accomplishments – 2022

The following pages report on the operations and accomplishments of New York State's Life Science Initiative during 2022.[x] The report highlights the remarkable impact of the projects that have been initiated, provides detail on the commitments to date of the $520 million in planned investment, and lists other relevant information with respect to the operations and accomplishments of the Initiative.[xi]

New York State Life Science Initiative Resources

Strategic initiatives to grow New York State's life science economy	**$320M** Programs, Grants and Project Funding	→	**$171M** Committed as of September 2022
Refundable tax credits for R&D expenditures, available for new life science companies[xii]	**$100M** Research and Development Tax Credits	→	**$9.28M** Issued as of September 2022
Tax credits for job creation initiatives[xiii]	**$100M** Excelsior Jobs Program Tax Credits	→	**$4.4M** Issued as of September 2022
Matching co-investments and external funds	**$100M** Expected Investment at start of Initiative	→	**$1.49B+** Leveraged Investment as of September 2022

Strategic Approach

ESD's strategic approach is to implement programs that fill historic gaps in New York's life science ecosystem.

1 IP Development

- **Historic GAP**
  - Limited ability to commercialize basic research
- **INVESTMENTS**
  - **Biodefense Commercialization Fund:** Accelerate development and commercialization of infectious disease solution
  - **EDI:** Translate academic IP into commercially viable therapeutics in Upstate NY
  - **NYFIRST:** Incentivize translational research with commercial potential in NY medical schools
  - **NeuroCuresNY:** Create more efficiency in evaluating novel neurological therapeutics
  - **MMRI:** Improve knowledge about cardiac disease

2 Entrepreneurial Talent & Workforce Development

- **Historic GAP**
  - Lack of managerial talent and academic IP leaving New York
- **INVESTMENTS**
  - **IndieBio New York:** Train and develop the next generation of life science leaders in NY to advance their startups
  - **Entrepreneurial Development Grant:** Formal graduate level concentrations and certificates to create life science entrepreneurs
  - **JLABS @ NYC:** Expansion of resident companies and alumni create jobs
  - **NYFIRST**: Recruit entrepreneurial researchers

3 Venture Development

- **Historic GAP**
  - Lack of early-stage venture capital investments
- **INVESTMENTS**
  - **IndieBio New York:** Invest in companies participating in the bioaccelerator; facilitate additional investments
  - Connected New York City Partnership with IndieBioNY to add $50m side-car investment
  - **JLABS @ NYC:** Assists resident companies in obtaining investment funding
  - **Biodefense Commercialization Fund:** Target Seed, Series A or B funded companies to encourage investor interest in early-stage companies

4 Commercial Growth

- **Historic GAP**
  - Lack of commercial incentives and affordable space
- **INVESTMENTS**
  - **JLABS @ NYC:** Incubate and grow companies in NY
  - **R&D Tax Credits and Excelsior Tax Credits:** Encourage growth and retention of startups
  - **IndieBio New York:** 25,000 ft^2 workspace in NYC for cohorts and as networking space
  - **Biodefense Commercialization Fund:** Financial incentives and expertise to accelerate progress toward commercialization

5 Connecting the Ecosystem

- **Historic GAP**
  - Disconnect between Upstate and Downstate
- **INVESTMENTS**
  - **IndieBio New York:** Virtual networking and meeting place for life science community during pandemic; reverted to physical location post-pandemic
  - **NYS Life Sci Website:** A one-stop-shop resource for all stake holders
  - **JLABS @ NYC:** Serves as hub and meeting place for NYC life science startups
  - **Entrepreneurial Development Grant:** Resources for life science entrepreneurs to connect with mentors and others across the state

Select Life Science Projects, 2022

Since its April 2017 legislative authorization, the Life Science Initiative has focused on strengthening New York's life science ecosystem and elevating the State's profile as a leading life science investment destination. In this five-year period, the Initiative has made active grant commitments totaling $170 million in state funding, which combined with matching co-investments and external investments, will leverage a total of more than $1.5 billion invested in LSI programs. Signature programs are briefly described here.

Creating a Home for Innovative Startups:
IndieBio New York -- New York's Bioaccelerator

Since the start of the Life Science Initiative, ESD has recognized the need to catalyze and accelerate growth of innovative companies to spur job creation, investment, and economic growth in New York State. In 2019, ESD supported SOSV, a life science venture capital investor, to bring its accelerator program, IndieBio, to New York, with the goal of creating a pipeline of vetted life science technology to attract venture capital investments and fuel the formation of new companies across New York.

IndieBio New York has met this expectation. Since the start of its first cohort in May of 2020, IndieBio New York has:

- Graduated a total of 36 startup companies
- Resulted in 12 of the 36 startups, including five international companies, locating their businesses in New York
- Facilitated more than $59 million in external funding for these companies, including $47 million in venture investments and more than $12 million in public funds as of September 22, 2022
- Been responsible for the creation of 61 new direct jobs in New York
- Assisted eight companies in making progress on licensing agreements and/or patents[xiv]
- Established a $65 million sidecar fund that provides additional funding for select IndieBio graduate startups planning to operate in New York.

Twice a year, IndieBio New York selects approximately 10 startups from hundreds of applicants for an intensive, four-month, in-person training program that provides financial support, laboratory space, mentoring, and essential survival skills to thrive in the life science industry. Each cohort consists of companies from various sectors of the life science industry, not just

therapeutics and diagnostics, but also emerging fields such as food technology, synthetic biology, cell and gene therapy, and climate technology. Attraction of these companies in the forefront of innovation is what keeps New York's life science ecosystem unique, diverse, and adaptable to the constantly changing life science environment. Each startup receives an investment of $275,000, rent-free lab space, and access to a global network of mentors and investors. SOSV also offers the possibility of an additional $250,000 in funds from the Genesis Consortium to qualified startups. The IndieBio team works with resident companies to ensure they are on track to reach critical milestones to advance their technologies and attract future investments. IndieBio continues to assist companies after graduation from the program with access to financial and experience-based support for long-term growth.

Since its launch, IndieBio New York has graduated four cohorts and started its fifth cohort of companies in the fall of 2022, selecting from an applicant pool of more than 600 companies. And, before the end of 2022, SOSV will be moving into its permanent space: 25,000 ft^2 of prime laboratory space at 7 Penn Plaza in New York City. This 10-year lease will create additional jobs and strengthen relationships with companies and research institutions throughout the State, while continuing to diversify New York's life science ecosystem.

IndieBio New York *-- $25 million committed for SOSV to operate IndieBio New York for five-year period.*

$59M
Total funding facilitated for resident companies

36
Companies graduated through 4 Cohorts

12
Companies locating in NYS as a result of IndieBio

An Incubator for Innovation: JLABS @ NYC

JLABS is a global life science network for innovation, providing startups with access to capital-efficient lab space and resources, including expertise, community, industry connections and entrepreneurial programs. With capital funding of $17 million from ESD in 2017, JLABS @ NYC, a collaboration between Johnson & Johnson Innovation and the New York Genome Center, opened in 2018 to provide space and a community for emerging companies transforming scientific discoveries into breakthrough healthcare products.

Since opening in 2018, JLABS @ NYC has been delivering in many ways, including:

- Graduated a total of 37 life science companies
- 25 of the 37 graduate companies remained in New York after exiting JLABS @ NYC
    - 3 out-of-state companies relocated to New York
    - 22 New York-originating companies remained in New York
- A total of 346 new direct jobs have been created in New York and 198 have been retained through JLABS @ NYC residents
- A total of 148 patents were filed by resident companies
- In 2021 and the first half of 2022, 49 sources of external funds were secured by the companies, totaling approximately $194.3 million.
- Since the start of JLABS @ NYC, 203 sources of external funds were secured by the companies, totaling approximately $1.2 billion
- JLABS @ NYC currently hosts 28 companies at the facility

JLABS @ NYC accommodates 35 - 40 life science companies. JLABS @ NYC initially opened with 26 residents, including the four awardees of the JLABS @ NYC QuickFire Challenge, a crowdsourcing platform seeking innovators working on cross-sector solutions to prevent, intercept or cure diseases. JLABS @ NYC also houses companies selected for BLUE KNIGHT™, a joint initiative between JLABS and the Biomedical Advanced Research and Development Authority (BARDA), which supports companies developing solutions for public health threats and emerging diseases.

In addition to providing modular lab units, office space, shared core laboratory equipment and business facilities, JLABS @ NYC links entrepreneurs with resources for funding opportunities, educational events and access to scientific, industry and capital funding experts from across the industry. Having diverse companies sharing space at JLABS @ NYC allows resident companies to connect with each other and form critical industry networks early on.

JLABS @ NYC *-- $17 million awarded to The New York Genome Center for renovations, machinery and equipment to prepare space for JLABS @ NYC.*

Accelerating Innovation to Improve Resiliency:
Biodefense Commercialization Fund

New York was gravely affected by COVID-19, which upended the lives of New Yorkers, with nearly six million confirmed cases and more than 74,000 fatalities.[xv] The economic impact on the state was devastating, with New York's GDP steeply declining by 36.3% in the second quarter of 2020.[xvi] The decline was more pronounced in private sector industries, at 38.1%.[xvi] The pandemic and resulting economic shutdown led to soaring unemployment rates in New York, which peaked at 16.2% in April 2020.[xvii]

COVID-19 was a wake-up call to the profound impact of serious infectious diseases and a reminder of the need to increase our resilience against future infectious threats. To ensure New York is better prepared for a future disease outbreak, the New York State $40 million Biodefense Commercialization Fund was created to provide financial resources supporting commercial advancement of promising solutions for serious infectious diseases. The Fund is intended to increase the state's resilience to infectious disease threats and encourage a broader range of life science companies to relocate to New York, thus expanding the state's life science ecosystem with enhanced opportunities for employment and a diverse environment for innovative companies.

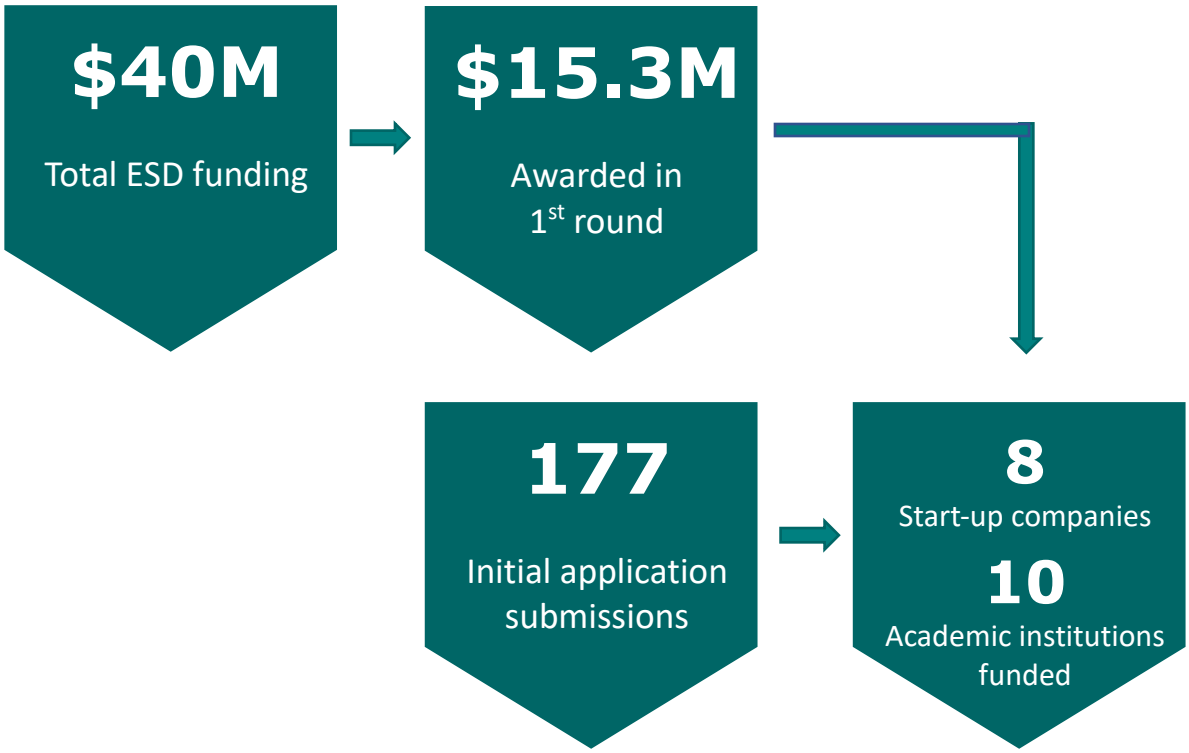
The tremendous interest shown in the Fund was evidenced by the submission of 177 applications after the opening of applications in September 2021. Initial applicants included 105 startup companies, including several submissions from companies in other states and countries, and 72 academic institutions. Initial applications were reviewed by an Expert Review Panel, and 50 applicants were chosen to provide supplemental information. After additional review by the Expert Review Panel and input from the Fund's Executive Committee, ESD selected 18 final grant recipients (eight startups and 10 academic institutions), for a total award amount of $15.3 million.[xv]

The grantees' projects are focused on the development of a wide range of promising solutions for serious infectious disease, including next-generation antiviral drugs, platforms to address drug development and delivery obstacles, and rapid, easy-to-use diagnostic tests. An important component of the program is that each grantee is matched with one or more industry experts who serve as mentors to help ensure grantees make appropriate and timely progress. Mentors not only provide guidance to advance projects to commercialization but also connect grantees with key industry stakeholders to succeed in the life science industry.

The Fund grants up to $4 million to startup companies developing innovations that tackle infectious disease threats and up to $500,000 to academic institutions to fast-track advanced intellectual property. Projects closer to commercialization are given priority. All companies receiving grants are required to remain in New York State for three years beyond completion of the grant, and awardees receiving $2 million or more are required to provide a 100% match.

The second call for applications opened on September 6, 2022, with award decisions to be announced early in 2023. Information about the application, eligibility requirements, and program guidelines are available on ESD's website at: https://esd.ny.gov/biodefensefund. ESD will continue to award grants through a competitive grant solicitation until funds under this program are fully committed.

Biodefense Commercialization Fund *-- $40 million committed, of which $15.3 million has been awarded to 18 grantees for a three-year period.*



Enhancing Translational Research Strength: New York Fund for Innovation in Research and Scientific Talent (NYFIRST)

Translational research is key to the development of patented innovations and new companies – each are needed for growth of the ecosystem. The $15 million New York Fund for Innovation in Research and Scientific Talent (NYFIRST) was established to build the state's translational research strength by encouraging the recruitment or retention of exceptional translational life science researchers at medical schools in New York State. NYFIRST is intended to further

strengthen the intellectual backbone needed to produce commercially viable discoveries, attract investment capital, and create startups.

The NYFIRST grants that have been awarded since 2018 are delivering in several ways, including:

- Approximately $59 million in public and private funding raised by the grantees, as of September 2022
- 113 direct jobs have been created
    - 50 of these jobs were new direct hires from outside New York State
- Five patent applications filed by NYFIRST recruits
- More than 100 scientific articles published
- One spin off company established

Recruiting exceptional scientists focused on translational research expands the expertise residing within New York institutions, increases patentable discoveries, attracts additional venture funding, and strengthens New York's life science ecosystem. These developments increase the likelihood that life science companies will choose New York for their place of business.

NYFIRST is a $15 million competitive grant program that awards medical schools grants of up to $1 million per qualified application. Funds awarded by NYFIRST support such capital expenditures as major equipment purchases and laboratory construction, as well as working capital to support researchers hired by the recruited investigator and for the purchase of costly supplies. Each grantee is required to invest $2 of matching funds for every $1 of NYFIRST assistance. To date, nine awards have been offered, with a total commitment of $8.7 million. Applications are accepted at specified times until all grant funds are committed.

Applications for round four of the NYFIRST program are being accepted until January 15, 2023. Information about the application, eligibility requirements, and program guidelines are available on the ESD website at: https://esd.ny.gov/ny-first-program.

New York Fund for Innovation in Research and Scientific Talent (NYFIRST) *-- $15 million total in the Fund, of which $8.7 million has been committed to selected New York medical schools for a four-year period.*

Converting Basic Research into Commercial Opportunity: Empire Discovery Institute

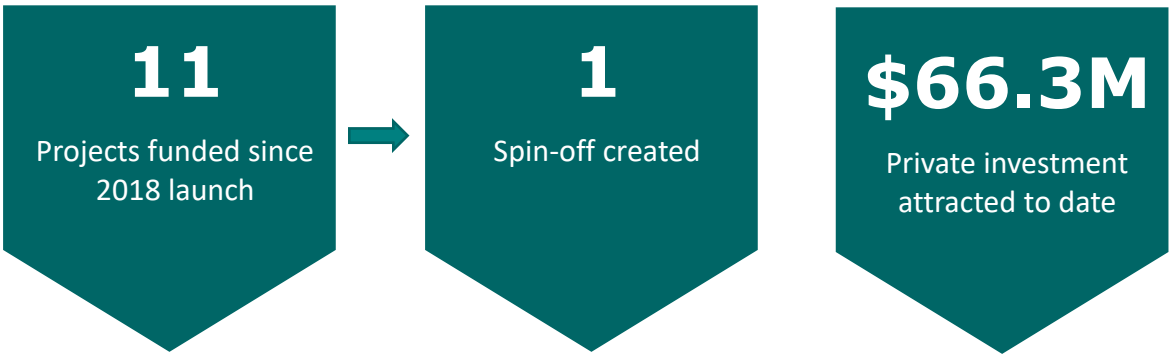
Empire Discovery Institute (EDI) was founded to help address the challenges typically faced by life science researchers in academia, namely the lack of external funding to facilitate translational R&D efforts and the lack of pharmaceutical industry expertise to advance products to commercialization. Their mission is to identify medically important pathways related to human disease that will serve as the basis for the discovery and development of novel, highly differentiated new therapeutics.

EDI's primary goal is to enhance the Life Sciences ecosystem in Western New York and the Finger Lakes region through the creation of high value spin-out biotechnology companies, jobs and pharmaceutical licensing transactions based on research conducted by EDI's founding institutions at the University at Buffalo, the University of Rochester, and Roswell Park Comprehensive Cancer Center. As a not-for-profit 501(c)(3) drug development accelerator, EDI seeks to advance programs to commercialization and re-invest revenues generated from such endeavors back into future programs, to create an evergreen and sustainable enterprise beyond the terms of the grant from ESD.

Their goal of attracting investment dollars is already being realized. EDI has partnered with Deerfield Management Company to launch Empire Deerfield Discovery & Development LLC (ED3) to support projects in high-need therapeutic areas. Deerfield is expected to invest up to $65 million over the next five years to accelerate selected projects towards clinical validation and commercialization. EDI also has partnered with Novo Nordisk to form LeapRx, a collaborative research initiative to accelerate drug discovery in cardio-metabolic diseases and rare blood disorders. Novo Nordisk has committed $1.25 million, with a potential of up to $10 million, over a five-year period.

The Medicines Discovery Award Program (MDAP) established by EDI advances promising early-stage drug discovery and provides resources for project development with the goal of exiting the program as a licensing transaction to a pharmaceutical partner or as an EDI-created startup company. Five projects were approved for support from the 2019-2020 call for applications, and three additional projects were approved in 2021. Each project supported by EDI receives a minimum of $250,000 in funding and may be eligible to receive up to $7.5 million in funding over a five-year period based on progress of the research towards commercialization. The funds are derived from the $35.4 million grant made to EDI from ESD in 2018 and from EDI-secured external investments and in-kind contributions. To date, EDI's work has resulted in the creation of 14 new direct jobs and one spin-off company, Emprime Therapeutics; more are expected to follow with EDI's continued support.

Empire Discovery Institute (EDI) -- *$35.4 million committed for EDI operating expenses for a five-year period.*



Developing Entrepreneurial Talent: Life Science Entrepreneur Development Grant Program

New York has been a leader in life science discoveries but has lagged in capturing venture capital investments to move these discoveries toward commercialization while remaining in the state. The lack of entrepreneurial talent has often been cited as the reason for this. To help remedy this problem, in 2020 ESD created the Life Science Entrepreneur Development Grant program to close the talent gap that has hindered life science commercialization in the state.

The Life Science Entrepreneur Development Program is designed to build a critical mass of entrepreneurial talent equipped to manage innovation-driven startups through training in joint business school-life science graduate program curricula. As the first graduate business programs in life science entrepreneurship in the State, the programs will strengthen the pipeline of managerial talent in New York and help retain home-grown talent and research. Approximately 250 life science entrepreneurs are expected to graduate each year once this program is fully implemented.

ESD is providing funding of up to $500,000 to five business schools based in different regions of New York State, each of which is working with a medical school or life science graduate program, for development and implementation of a graduate curriculum that will equip students with the skills and expertise needed to successfully guide innovative life science startups to commercial viability. The schools selected for funding for curriculum development and implementation represent a range of life science capabilities and offer a variety of graduate business education programs -- in person, remote and/or online learning -- that accommodate the needs of students at all stages of their lives. The five schools developing these programs include:

- Cornell University, SC Johnson College of Business (Regions: Southern Tier & New York)
- Rensselaer Polytechnic Institute, Lally School of Management (Capital)
- Rochester Institute of Technology, Saunders College of Business (Finger Lakes)
- Stony Brook University, College of Business (Long Island)
- University at Buffalo, School of Management (Western New York)

Four of the schools have already launched their programs with a total of 60 students enrolled as of September 2022. The number of enrolled students is projected to grow as the schools fully launch and ramp up their programs. The schools are also establishing industry partnerships to ensure students are connecting with experienced life science company founders and investors through conferences, internships, and other opportunities. Some of the industry partners include Pfizer, General Electric, Cooper Vision, and industry associations such as MedTech, and many more. The Life Science Entrepreneur Development Grant program will match New York's environment of strong anchor research institutions with better opportunities to grow life science companies. Combined with many other initiatives sponsored by the Life Science Initiative, the Entrepreneur Development Grant Program is catalyzing a synergistic effect that will accelerate innovation and growth of New York's life science ecosystem.

Entrepreneur Development Grant Program *-- $2.5 million committed, $500,000 awarded to each of five selected New York business schools for a five-year period.*

Tackling Brain Disability by Enabling More Efficient, Less Costly Clinical Trials: NeuroCuresNY

Millions of Americans struggle daily with neurological disabilities from conditions such as stroke, Alzheimer's disease, and brain/spinal cord injury. Despite continuous increases in the cost of caring for these disabilities, clinical trials for therapies to treat the disabilities associated with neurological disorders occur infrequently because of the overwhelming cost for researchers to

conduct such trials and the unclear findings that typically result. Recognizing the crucial need to develop novel solutions for such disabilities, ESD supported the establishment of NeuroCuresNY to identify a strategy to efficiently evaluate more potentially therapeutic modalities.

ESD has granted $5 million to NeuroCuresNY, a multi-institutional collaborative formed by Burke Neurological Institute, the University of Rochester and the National Center for Adaptive Neurotechnologies, to create a standard clinical trial protocol that uniquely combines therapeutics with state-of-the-art robotic training technology. The protocol is designed to accelerate the discovery of effective treatments for patients with neurological disabilities by reducing infrastructure costs for trials and enabling them to run more efficiently. One central goal of NeuroCuresNY is to provide this service to pharmaceutical and other companies that wish to test new treatments for neurological disabilities. To ensure that NeuroCuresNY demonstrates its value to pharmaceutical companies, it will initially conduct a pilot program testing phase 2 therapeutics in patients with chronic impairment due to stroke. This 24-month demonstration trial will quantify reduction of motor impairment in stroke patients by combining robot-assisted training with a drug or device that improves neuroplasticity.

To date, NeuroCuresNY has conducted much of the legwork needed to launch the demonstration by setting best practices in patient recruitment, protocol development, and organizational structures. NeuroCuresNY is in the process of identifying a sponsored partner with an appropriate neurological therapy eligible for phase 2 development to incorporate into the trial.

The demonstration is not expected to create jobs during the initial two-year period of the trial, but NeuroCuresNY offers the potential for numerous economic development benefits over the long term. These benefits include generating new jobs in network management, study execution, clinical care, data management, and product development; expanding the State's life science industry by creating an anchor entity for neurological clinical development; stimulating geographical movement and retention of companies focused on neurological drug development to New York; attracting medical tourists in clinical trials; and attracting venture capital investment as a result of the increased neurological drug intellectual property.

NeuroCuresNY *-- $5 million committed over a five-year period for NeuroCuresNY to conduct a pilot demonstration trial.*

Expanding Expertise: Masonic Medical Research Institute

An internationally recognized biomedical research institute focused on unraveling the mechanisms underpinning the causes of cardiac disease, Masonic Medical Research Institute (MMRI) is further enhancing this expertise with the expansion of lab space and addition of expert faculty to create an interdisciplinary, translational research facility. Thanks to a $6 million capital grant from ESD, MMRI has commenced the second phase of an expansion project to renovate and modernize 5,500 square feet of space.

Since start of facility modernization, MMRI has:

- Initiated 13 new research projects
- Filed two patent applications
- Added 13 new direct hires to the project location

Once the expansion project is completed, the number of hires is expected to more than double; the space will accommodate up to five additional research faculty. With each new faculty member recruiting four to eight additional scientists to their laboratories, an additional 20 to 40 new jobs will result. ESD's investment is ensuring continuation of MMRI's groundbreaking cardiac research and also will enable expansion to research in such other therapeutic areas as diabetes and obesity, autoimmunity, cancer and neurocognitive research.

Masonic Medical Research Institute *-- $6 million committed for completion of MMRI research facility construction and modernization.*

Moving Forward

New York State is well positioned to accelerate its strategy to become one of the largest life science clusters in the nation. Our tremendous progress was achieved during the end of one phase of life science development and the beginning of another larger growth spurt. This new cycle features life science technologies reaching the clinic with greater therapeutic and commercial potential than at any other time in history. Breakthrough technologies such as cell and gene therapies; the application of machine learning to clinical decision making; real-time digital pathology; nano and organoid technologies; and robotics applications; individually represent billions of dollars in potential economic value to the State.

These technologies hold the potential, for the first time, to decentralize biopharma and other life science manufacturing centers. With New York State and ESD investing in these new capabilities and technologies, NYS communities have the chance to retain some of the economic value they export offshore. This means that life science investment will spur economic development more broadly across the value chain, from discovery to development and even commercial manufacturing.

Capturing these opportunities will require more targeted incentives such as grants, contracts and tax credits, that we have used in the last five years. But even more important than grants and tax credits is a statewide strategy, and approach that allows NYS to be on the forefront of innovation, and to make early investments, even when some emerging fields are unfamiliar or even controversial. The Life Science Initiative will continue to work with academic, industry, and non-profit stakeholders to accelerate innovative discoveries, grow companies, spur economic growth, job creation, talent retention and private investment in New York State. This approach will continue to strengthen New York's life science ecosystem and position the State as the leading place to conduct life science business.

Summary of Life Science Initiative Operations

October 2021 – September 2022

Dedicated Life Science Initiative Funding				
Funding Source	**Appropriated**	**Committed**	**Disbursed**	**Remaining**
Grants, Project Funding and Program Costs	$320,000,000	$170,800,000	$59,403,313	$260,596,687

Other State Life Science Incentives				
Incentive	**Total Available**	**Status**	**Credits Allocated**	**Description**
Excelsior Jobs Program	$100,000,000	Life science industry allocation implemented in April of 2017. Currently accepting rolling application submissions.	From inception to September 2022, there are six active projects that have received awards, totaling $4,420,000 in credits. These companies are anticipated to create 203 net new jobs.	Information about the program, regulations, eligibility and how to apply can be found at: https://esd.ny.gov/excelsior-jobs-program
Life Sciences R&D Tax Credit Program	$100,000,000 (capped at $10,000,000 per year)	Applications accepted on a rolling basis as long as funds are available.	From inception to September 2022, tax credits totaling $11,035,391 have been issued to 50 applicants with total qualified expenses of $100,634,040.	Information about the program, regulations, eligibility and how to apply and an application can be found at: https://esd.ny.gov/life-sciences-tax-credit-program
Total	**$200,000,000**			

Active Life Science Project Commitments			
Project	**Total Project Cost**	**Life Science Initiative Funding Commitment**	**Disbursed**
NYS Biodefense Commercialization Fund	$ 40,000,000	$ 40,000,000	$ 1,083,333
IndieBio New York*	$ 35,100,000	$ 25,000,000	$ 11,250,000
Empire Discovery Institute (EDI)**	$ 47,400,000	$ 35,400,000	$ 14,100,000
University of Rochester (EDI Planning Grant)	$ 1,650,000	$ 1,650,000	$ 1,650,000
NYFIRST	$ 45,000,000	$ 15,000,000	$ 994,530
JLABS @ NYC	$ 17,000,000	$ 17,000,000	$ 17,000,000
NeuroCuresNY Working Capital	$ 9,581,732	$ 5,000,000	$ 1,500,000
Burke Neurological Institute (NeuroCuresNY Planning Grant)	$ 795,000	$ 500,000	$ 500,000
Life Science Entrepreneur Development Grant Stage I	$ 350,000	$ 350,000	$ 199,228
Life Science Entrepreneur Development Grant Stage II	$ 7,500,000	$ 2,500,000	$ 0
Masonic Medical Research Institute	$ 15,000,000	$ 6,000,000	$ 3,000,000
IDC/Merck-Wadsworth Partnership***	$ 59,883,000	$ 22,400,000	$ 8,126,221
Total	**$ 279,259,732**	**$ 170,800,000**	**$ 59,403,313**

* In addition to providing a minimum of $275,000 to each company in a cohort, IndieBio has raised a $65 million fund to be used for the benefit of companies that have graduated from IndieBio and have plans to operate in New York. Investment from a $10 million fund raised by the Genesis Consortium also will be offered to all qualified startups graduating the IndieBio programs in New York and San Francisco.

** EDI garnered an additional investment of $65 million from Deerfield Management for a five-year collaborative research investment agreement and $1.25 million from Novo Nordisk, with the potential of up to $10 million, for a five-year research partnership.

*** The first phase of this project to create a sustainable reporting, tracking and surveillance network for use in New York State hospitals to fight the spread of infectious diseases successfully piloted a software solution at several hospitals in the NYU Langone and Northwell Health hospital systems that connects these hospitals to the Wadsworth Lab. For various reasons, it was decided, as of September 2021, that a longer-term project to expand use of this software to hospitals across the state would not be pursued.

Endnotes

[i] New York City Economic Development Corporation, Life Sciences in the NYC Metro: Exploring one of the fastest growing innovation sectors inside the nation's largest metropolitan economy (June 2022), 7.

[ii] Total leveraged investments include NYFIRST's anticipated matching investments from six future awardees, totaling $12 million.

[iii] Partnership Fund of New York City, New York's Life Sciences Industry Enters High-Growth Phase for Investment & Job Creation (April 2021), 3.

[iv] Partnership Fund of New York City, New York's Life Sciences Industry Enters High-Growth Phase for Investment & Job Creation (April 2021), 5.

[v] National Institutes of Health, "NIH Awards by Location & Organization," (FY 2022 runs October 1, 2021 through September 30, 2022).

[vi] Lightcast, Quarterly Census of Employment and Wage (QCEW), Non-QCEW employees, Self-Employed, and Extend Proprietors data.

[vii] New York City Economic Development Corporation, Life Sciences in the NYC Metro: Exploring one of the fastest growing innovation sectors inside the nation's largest metropolitan economy (June 2022), 17.

[viii] New York City Economic Development Corporation, Life Sciences in the NYC Metro: Exploring one of the fastest growing innovation sectors inside the nation's largest metropolitan economy (June 2022), 14.

[ix] Expansion of the life science industry is dependent on an endless cycle in which each stakeholder plays a critical role. Brilliant minds produce research discoveries, which in turn attract public and private grants, companies and investors. Promising technologies often are licensed to companies or spur new startups, which draws in venture capital investments and creates new employment opportunities. This helps fund the development and commercialization of new technologies. Monetization of technology leads to reinvestment of funds to advance research and development of innovative ideas. When all pieces are in place, this endless cycle expands and strengthens the life science ecosystem.

[x] This annual report has been prepared in accordance with the statutory requirements of Section 16-aa (5) of the New York State Urban Development Corporation Act (Chapter 174 of the Laws of 1968, as amended). Of note, for some categories of information, such as economic impacts and federal funding awards, limited data were available for the reporting period due to a lag in available data and the early stages of many initiatives. Additional information on these topics will be provided in subsequent annual reports.

[xi] The report does not detail all life science activities under way in the state, nor does it articulate every asset, incentive or benefit available to a life science company operating in New York State.

[xii] Information about the program, regulations, eligibility, how to apply and an application can be found at: https://esd.ny.gov/life-science-tax-credit-program

[xiii] Information about the program, regulations, eligibility and how to apply can be found at: https://esd.ny.gov/excelsior-jobs-program

[xiv] Another salutary consequence of the strategy employed by the Life Science Initiative is that its programs are touching companies at numerous places throughout the life cycle chain. For example, two graduates of IndieBio

New York recently received grants from the Biodefense Commercialization Fund. Two separate Biodefense Commercialization Fund grantees are now residing at JLABS @ New York. More synergies are expected as the state's life science programs become fully operational and as funded companies commercialize their technologies.

[xv] COVID-19 Fatalities Tracker. https://coronavirus.health.ny.gov/fatalities-0

[xvi] Office of the New York State Comptroller, New York's Economy and Finances in the COVID-19 Era (October 14, 2020).

[xvii] Office of the New York State Comptroller, New York's Economy and Finances in the COVID-19 Era (June 3, 2021).

Cover Art: Image mass cytometry analysis of human breast cancer tissue: Marker visualization of four tissue/cell protein markers, one immune cell maker (CD8 T cell) and DNA staining in formalin-fixed paraffin-embedded (FFPE) breast cancer tissue detected by image mass cytometry (IMC) and a region of interest (ROI) visualized by a visualization software, MCD viewer. Thanks to Joanna Stanson, Roswell Park Comprehensive Cancer Center, who provided the image.