

FINANCING SCIENCE



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Pittsburgh's Targeted Incubator

Taking Innovation to the Next Level

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THE PITTSBURGH LIFE SCIENCES GREENHOUSE was formed in 2000 as a focused incubator to provide capital investments and customized company formation. A focused incubator provides deep knowledge of global industry trends, national networks, and corporate collaborations to identify investment opportunities. The Pittsburgh Life Sciences Greenhouse, or PLSG, is solely focused on biosciences companies with promising innovations in the following concentrations: biotechnology tools, diagnostics, health care information technology, medical devices, and therapeutics.

As western Pennsylvania's only investment organization with a pure life sciences focus, PLSG serves as an investor conduit for life sciences companies. Additionally, PLSG promotes the region's biosciences innovations and achievements through media relations, industry events, and one-on-one relation-

ship building with investors across the United States and around the world. PLSG grew out of a 2001 initiative, led by then-Pennsylvania Gov. Tom Ridge and the Pennsylvania legislature, which took the bold policy step of investing its share of the state's portion of the \$206 billion tobacco settlement money into health-related programs.

As part of this effort, the state took a hard look at where Pennsylvania excelled and where it was falling behind in the biosciences. The state's strength in research wasn't translating into funding for start-up companies. Patent creation was on par with or outpaced many competitor regions, yet Pennsylvania's share of venture capital lagged behind dramatically.

Pennsylvania responded by creating three innovative programs to fuel growth in the life sciences industry: the Life Sciences Greenhouse Initiative for very early stage life sciences start-ups and regional

workforce plan development projects; the CURE grants program to help maturing start-ups access the next round of development capital; and the funding of venture capital groups in the state to help finance these start-ups as they begin to register sales and profits. In the pages that follow we will examine each of these programs as they relate to the emergence of the Pittsburgh Life Sciences Greenhouse as an innovation powerhouse in western Pennsylvania.

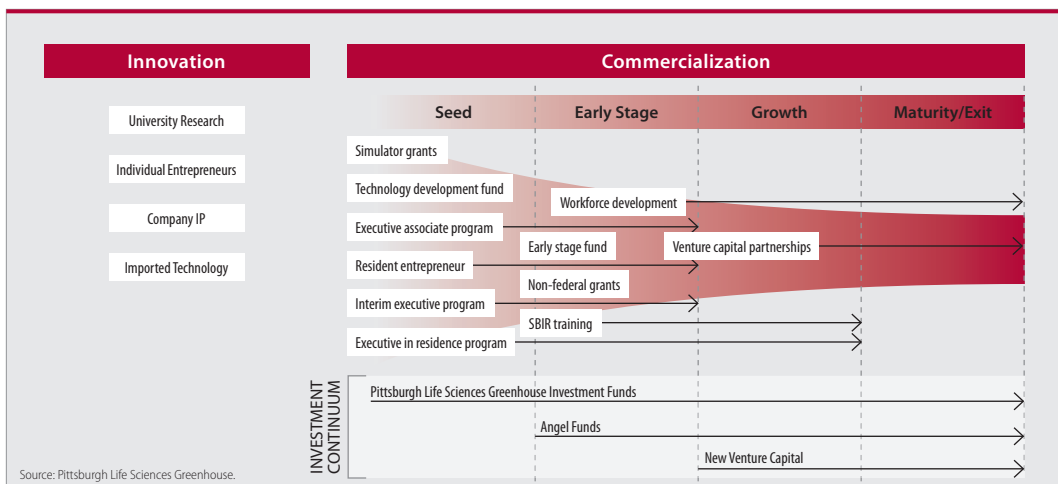
THE LIFE SCIENCES GREENHOUSE INITIATIVE

The Life Sciences Greenhouse Initiative was one of the programs created to successfully commercialize university technologies and was designed to be one of the very few state/university/industry-funded programs focused exclusively on the life sciences. The LSGI created three regional Life Sciences Greenhouses, with each Greenhouse given the mandate to leverage the unique strengths and opportunities in its region. To achieve their mandate, the Greenhouses were empowered from the very beginning with flexibility in creating programs to increase life sciences commercialization through accelerated technology transfer, company formation, and sustainable company growth.

Western Pennsylvania was ripe for accelerated company formation and commercialization of life sciences companies because of the University of Pittsburgh and Carnegie Mellon University, the region’s premier research institutions, which were consistently securing substantial federal research funds. Despite the impressive level of research support and activity, the level of commercialization lagged well behind regions that had established a sustainable life sciences industry.

The ability to commercialize opportunities generated by research at the universities was hampered by the fact that the region attracted only one-tenth of the venture capital expected based on the magnitude of federally funded research. An absence of local venture capital firms focused on the life sciences, and a regional lag in competing for Small Business Innovation Research grants and other non-VC commercialization funds, resulted in a new life sciences company formation rate of only two or three companies per year. The Pittsburgh Life Sciences Greenhouse set out to fix this problem.

PLSG focuses on guiding researchers, entrepreneurs, and emerging companies through the difficult challenges faced in the early stages of company development. By helping them build sustainable business models and secure capital investments,



PENNSYLVANIA ROLE MODEL

Critical Mass and Key Benchmarks

- The world's 17th largest economy with \$510 billion in gross domestic product
- Six of 10 major U.S. markets within 500 miles of its capital
- Third-highest number of colleges and universities

the Greenhouse makes it possible for companies to deliver biomedical innovations to the marketplace more quickly and efficiently than they ever could alone. In addition to nurturing young companies, we fuel the expansion of life sciences companies in the growth and maturity stages by supporting new product and market developments and by introducing them to new investors.

People with deep life sciences commercialization experience are a core attraction of venture capital to the region. Investors want to know that people who have “been there, done that” are managing their investments. In that spirit, PLSG over the years has significantly adapted our existing Executive-in-Residence program, adding new elements on a regular basis. The success of this program is now a foundational component of the new PLSG Executive Program because of two key aspects—economic development know-how and industry-specific know-how. Our economic development skills help mentor companies through the formulaic steps necessary to start a company, preparing companies with the components they will need to obtain outside capital.

Having an executive as an account manager to foster access to economic development programs is clearly helpful and efficient. But equally important is having industry-specific knowledge to accelerate a company's impact within its business sector. Executives who have “been there, done that” are deeply knowledgeable in the industry's commercialization strategies and tactics. They bring their “Rolodexes” of industry relationships to the program to accel-

erate access to industry insiders and forge relationships with future partners and acquirers.

The Focus on Life Sciences

In 2007, the U.S. gross domestic product was \$13.8 trillion, spread over hundreds of industry specialties. U.S. health care accounted for \$2.3 trillion (16.6 percent) of GDP, and the manufactured products side of health care, called life sciences, was estimated to account for \$848 billion or 6.1 percent of GDP. Life sciences products are categorized into five verticals: pharmaceutical, diagnostics, medical devices, biotechnology, and health care information technology.

In short, our executives need to be experienced in 6.1 percent of the economy, whereas at traditional economic development organizations, with their broader charters, executives would need to be experienced in hundreds of verticals to achieve similar results. This is the value of focused incubators such as PLSG. As mistakes are the mother of experience, our executives ensure that companies do not encounter the same stumbling blocks that they experienced.

This model also has been validated independently by the franchise industry. Its value proposition, similar to that of our Executive Program, is that people choose franchising to start a new business because it often requires a smaller investment and less risk than the cost of establishing a new venture. People who develop these models are industry experts. Our Executive Program provides a similar benefit and as it continues to evolve it will help the local life sciences community grow even stronger in the future.

The next step is to find capital for these companies. With federal Small Business Innovation Research grants a company can secure vital capital at its earliest research and development stages. Our innovative SBIR Advance Program teaches a company how to pursue SBIR funds effectively so that it can rapidly achieve its technology commercialization milestones. Developed for researchers and entrepreneurs and launched in 2002, the Pittsburgh Life Sciences Greenhouse SBIR Advance Program

is the only western Pennsylvania resource dedicated to the specific needs of life sciences entrepreneurs.

SBIR Advance is designed to enhance researchers' existing understanding of the SBIR Phase I, Phase II, and Fast-Track proposal processes. Phase I focuses on funding a company's proof of concept and funding ranges from \$60,000 to \$200,000. These proposals generally take six to 12 months to complete. Phase II focuses on developing a working prototype product. Phase II grants generally are funded in a range of \$500,000 to \$1,000,000 and can take up to two years to complete. A Fast-Track proposal combines a Phase I and II request all at once. The advantage to the company is obvious but this proposal is less likely due to its more risky nature.

During a two-day group workshop and the following one-on-one consultations, our industry experts guide companies through the proposal process, with training and scientific and editorial review of federal grant applications. Participants who attend all required sessions receive these extensive consulting services free of charge. The benefits of the PLSG SBIR Advance Program include: expert instruction in the efficient development of SBIR

funding applications; a track record of improving applicant success rate; and constant, individualized support throughout the application development, submission, and post-award notification process.

Since inception, the PLSG SBIR Advance Program has assisted nearly 100 companies with their federal grant strategies. To date, these companies have received more than \$17 million in federal grant funding. Locally, companies such as ALung Technologies Inc., which received more than \$3 million, Separation Design Group (\$1.7 million), and COHERA Medical Inc. (\$1.8 million) funded 10 percent to 50 percent of their capital to date through these programs.

Workforce Development Program

A prepared workforce will help regional companies keep pace with market demand. To accomplish this goal, PLSG offers direct assistance to our region's growing businesses and leads initiatives to prepare the western Pennsylvania workforce for emerging career opportunities in the life sciences industry. PLSG's Workforce Development Program is cus-

BASIC TENETS TO STATE-DRIVEN, INNOVATION-LED ECONOMIC DEVELOPMENT

- Identify comparative advantages in science, technology, and innovation that sustain and drive your state economy such as life sciences, information technology, manufacturing, or agriculture
- Find sources of capital needed to invest in research, business incubation, and people
- Connect the capital and the ideas by:
 - Aligning research interests with opportunities for commercialization that will spark investor interest
 - Harvesting sources of innovation broadly among universities, entrepreneurs and dormant intellectual property housed in private industry
 - Importing innovation from outside the region
- Connect people with the capital and ideas by:
 - Attracting the best researchers to develop regional centers of excellence
 - Hiring industry-specific business talent to provide key commercialization skills and access to venture capital investment and mergers-and-acquisitions experience
- Provide the physical space necessary for innovation and commercialization to thrive by:
 - Creating the best research space to draw the best talent
 - Developing cost-effective incubation space and services

tomized to life sciences workforce challenges—whether recruiting new employees or expanding the skills of existing talent.

The Greenhouse connects life sciences companies to educational partners and funding sources for cost-effective workforce development. Our workforce development program includes administering a first-of-its-kind \$2.4 million federal grant from the U.S. Department of Labor to train western Pennsylvania workers for the life sciences industry. PLSG is working in partnership with Community College of Allegheny County, Lyceum Group LLC, and the Pittsburgh Technology Council. To date, the workforce program has trained more than 6,000 workers, far exceeding its original goal of 400.

As part of our efforts to foster economic opportunities in the life sciences, PLSG also is facilitating the implementation of a full-scale Mobile Laboratory Program to serve the region's Science, Technology, Engineering, and Mathematics, or STEM, educational and workforce development needs. Mobile laboratories are self-contained, traveling laboratories that allow for student participation in laboratory-focused biosciences investigations on board. Mobile laboratories already are successfully serving tens of thousands of students in places such as Arizona, Connecticut, Georgia, Iowa, Massachusetts, Maryland, North Carolina, Texas, Virginia, South Dakota, and portions of Pennsylvania outside western Pennsylvania.

The Incubator

The PLSG Incubator offers cost-effective space to qualified seed and early-stage life science companies, including those relocating to western Pennsylvania. The PLSG Incubator offers far more than preassembled cubicles: Incubator companies have access to amenities that free them from the more tedious tasks of growing a company, and these firms will be instantly placed in the midst of a supportive early stage business community. Offering companies world-class meeting rooms for investor presen-

tations, the Incubator provides computer, communications and Internet infrastructure that present an image of stability and professionalism to investors. Access to the Executive-in-Residence pool offers support and immediate advice to the sometimes-secluded entrepreneur.

Young start-up companies also benefit from the close proximity of neighboring life sciences startups and the experts of PLSG, which has two Incubator facilities equaling 20,000 square feet of available space for growing companies. The main Incubator, PLSG East, is adjacent to PLSG's administrative offices. It is a 13,000-square-foot facility consisting of 40 percent modern wet lab space and 60 percent office space. The second facility, PLSG West, is 7,000 square feet of mostly laboratory space.

The benefits of the PLSG Incubator include wired offices for data and voice communications, basic utilities, and flexible lease terms. All Incubator tenants have access to small and large conference rooms, office furniture, office equipment, and a kitchen, balcony, and ample tenant and visitor parking. Industry-specific neighbors or building tenants include ThermoFisher, the University of Pittsburgh, the McGowan Institute for Regenerative Medicine, Novitas Capital, and UPMC Health System.

The PLSG Incubator has a prime Pittsburgh location within the Pittsburgh Technology Center, which conveniently places it between Oakland's university cluster and Downtown Pittsburgh's legal and financial center. It also puts us in the Greater Oakland Keystone Innovation Zone, which offers financial incentives to life sciences companies. The Greater Oakland Keystone Innovation Zone is a partnership of collaborating organizations, including: Allegheny Conference on Community Development and Affiliates, Allegheny County Department of Economic Development, Carnegie Mellon University, Idea Foundry, Innovation Works, MPC Corporation, Pittsburgh Life Sciences Greenhouse, Pittsburgh Gateways Corporation, Pittsburgh Technology Council, The Technology Collaborative, University of Pittsburgh, University of Pitts-

burgh Medical Center, and Urban Redevelopment Authority of Pittsburgh.

Entrepreneurship often begins with an individual and an innovative idea, but it takes a team effort to create a marketable product and a sustainable business. The Pittsburgh Life Sciences Greenhouse gives western Pennsylvania's entrepreneurs a reach into the global biotechnology industry. PLSG leads collaborations that support our regional industry's growth and benefit the individual company. These efforts include access to capital investment networks. The Greenhouse develops and maintains venture capital partnerships to make funding more accessible for our region's life sciences companies. Firms such as Pittsburgh's Adams Capital Management, Birchmere Capital, Draper Triangle Ventures, and Novitas Capital, Boston's Techno Ventures Management, Philadelphia's Quaker BioVentures, and Silicon Valley's Longitude Venture Partners LP all have invested in the region.

Other collaborations with global industry life sciences companies are offered via trade missions. PLSG leads and facilitates foreign trade missions in Europe and Asia to identify strategic and cost-effective business development opportunities. Similarly, the Greenhouse hosts regional networking events, working with regional industry groups to create opportunities for peer-to-peer collaboration. And PLSG develops industry-specific promotions. Through international conferences and media relations, we promote western Pennsylvania's life science innovations and achievements.

Finally, PLSG prepares start-up life sciences companies to spread their business wings in the region and the state. Life sciences companies require highly specialized facilities to adequately house research and development activities, production, and daily operations. Through its contacts with the region's foremost site selection services, PLSG aids companies in the search for light industrial, manufacturing, or headquarters space.

Both expanding local companies and those looking to relocate to the Pittsburgh region can take full

advantage of our site selection services. By arming our site selection partners with our knowledge of a company's unique business needs, we can ensure that their next location will be the perfect fit for any regional life sciences company.

THE ROLE OF CURE GRANTS

In addition to the Life Sciences Greenhouse Initiative, the state also initiated the Commonwealth Universal Research Enhancement Program, called the CURE Grant Program for short, to support and encourage Life Sciences-related research, recruitment of scientists, and development of laboratories. This program was enacted by the State of Pennsylvania in 2001 to direct the Pennsylvania Department of Health to establish a health research program. Under this program research grants are awarded for clinical, health services, and biomedical research. All funds must be used in a way that is consistent with the research priorities as established by the Department of Health. Approximately \$68 million per year has been distributed to universities, colleges, and companies working in collaboration to support these goals.

The majority of the funds are allocated to the universities directly by a formula in proportion to their National Institutes of Health grant funding levels. The remainder of the funding is distributed

PENNSYLVANIA INCUBATION

Fast Facts

- Federal programs are integrated toward universities
- State funding is provided directly to universities
- State funding is provided directly to private capital
- State programs foster and link economic development entities, corporations, universities, and private capital
- Economic development entities link innovation sources with commercialization sources

by a careful and thorough external peer review process (non-formula funding) to projects chosen in research areas selected by a state commission under the Secretary of Health. Projects submitted in response to this RFP are then reviewed by an impartial external review mechanism.

All the money in both the formula and non-formula components is in the form of grants. Follow-up reports and presentation of results for the non-formula funding are required. The program is now in its eighth year and has been very successful in achieving its goals and encouraging collaborative research efforts in the Life Sciences focused area. Examples of funding include Carnegie Mellon University, which received a \$710,806 grant to quantify the evaluation of Elder Care Environments, and the Allegheny-Singer Research Institute, which received a \$237,838 award to study the impact of cigarette smoking and tobacco use on wound healing.

THE ROLE OF STATE-BASED VENTURE CAPITAL FUNDING AND CO-FUNDING

The third component of the state's program entails co-funding three venture capital funds to invest a significant proportion of their funds in Pennsylvania-based life sciences companies. The program is a \$60 million fund designed to provide loans to venture capital companies looking to make investments in companies located in historically underserved areas of Pennsylvania. The program also requires a match by the venture capital firm of three dollars of investment into Pennsylvania-based companies for every one dollar the state provides, creating to date \$240 million in investment capital that has been tapped by, among others, Birchmere Capital, Novitas, and New Spring Capital—the first recipients of these funds.

Three local start-up companies, Renal Solutions Inc., Cellumen Inc., and Red Path, started with early Pittsburgh Life Sciences Greenhouse involvement and advanced their funding to tens of millions of dollars. Most recently, Renal Solutions was sold to Fresenius Medical Care AG & Co. for \$190 million—completing the state's vision of providing support through a company's entire financial life cycle. It is important to note that Renal Solutions remains in the Pittsburgh region.

Of course, a six-year-old incubator program for life sciences startups such as PLSG will probably need another six years before it knows how many of its young companies will survive and thrive in the competitive life sciences industries. Developing a successful life sciences company from the lab to Wall Street is no easy task, taking well over a decade in most cases. So far, however, PLSG has worked with 280 start-up companies. Currently, 118 companies are active and the PLSG has invested in 56 companies, helping western Pennsylvania's young life science companies to take a shot at the successful commercialization of their products and services. It's a model other regions of the country with prominent universities boasting comparative advantages in key science, technology and innovation arenas should actively consider.

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