

PA House Policy Committee Testimony
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Good morning Chairman Benninghoff, Chairman Sturla, and members of the Republican and Democratic House Policy Committees. My name is Dr. Stephen Tang; I serve as the President and CEO of the University City Science Center.

I want to welcome you and thank you for visiting the Science Center today. As a hub for innovation and entrepreneurship that supports the life sciences and emerging technologies here in Greater Philadelphia and across the Commonwealth, it is an honor for us to host this important hearing today.

I also have the honor of serving as co-chair (along with Governor Wolf) of the ~~Team~~ Pennsylvania Foundation, and serving as a member of the National Advisory Council on Innovation and Entrepreneurship, which reports to the U.S. Secretary of Commerce.

In addition, I serve as chair of the Committee of Seventy, an independent and nonpartisan better government advocate for Philadelphia and Pennsylvania.

Finally, I have the privilege of serving on the board of OraSure Technologies, Inc., which, as you may know, is based in Bethlehem. OraSure is a leader in the development, manufacture and distribution of oral fluid diagnostic and collection devices and other technologies designed to detect or diagnose critical medical conditions.

We appreciate your interest in Pennsylvania's vital life sciences industry. I use the word industry, but it may be more apt to refer to it as the life sciences community or ecosystem. As my colleague Chris Molineaux explained, the life sciences is an incredibly robust and diverse sector that sustains hundreds of thousands of families across the state.

Yet, the life sciences community in Pennsylvania is different than any other business sector because all of our companies serve one higher mission: to improve quality of life. No other sector can say that its core function is to create technologies that improve and save lives, and I think that's an important distinction to make: we are in the business of using science to make lives better.

But even with the strong community we have in Pennsylvania, I worry that the Commonwealth is starting to fall behind. The industry has changed following the Great Recession, and while other states have enacted policy changes to adapt to this new world, Pennsylvania has not followed in step. After the Great Recession, funding for early-stage life sciences companies dried up, venture capital firms and pharmaceutical companies became much more conservative with their investments, and there has been a dramatic drop off in support for technologies before they can reach a later stage. The work of the Ben Franklins and Life Science Greenhouses

is wonderful, but a wide gap remains before these companies can reach the point of maturity and see follow-on investments.

Multiple states, including all of the states that are widely regarded as leaders in life sciences such as Massachusetts and North Carolina, have created programs that match Federal funding or create other avenues to give early-stage life sciences companies the investment they need to succeed and grow, to get them to the point where private funders can get engaged. The Science Center and other innovation intermediaries across the state are doing what we can to plug the gap that has emerged, but we need the help of the Commonwealth. We have wonderful research institutions, but if we do not catch up to other states to create better support for early-stage companies, Pennsylvania is going to lose its competitive advantage, and companies are going to go elsewhere to form, scale and succeed.

The building we are meeting in today is a good example of the innovation ecosystem that we have in the Commonwealth, and why we need to broaden the public-private partnerships that put Pennsylvania where it is today. Not only is this building home to the Science Center's corporate offices, it's also home to more than 25 companies that are developing technologies that will transform people's lives. One floor below us, a company called Avid Radiopharmaceuticals is using a molecular imaging technology to identify the first stages of pathological change associated with Alzheimer's disease, potentially assisting in earlier diagnosis, better management and the development of new therapies. Born out of discoveries at the University of Pennsylvania, Avid entered the Science Center's incubator in 2005 with only one employee – the founder. They grew to 37 employees and moved into their own dedicated space in 2009. A year later, they were acquired by Eli Lilly in a deal worth up to \$800 million. This represents Lilly's first presence in Pennsylvania. Now a wholly owned subsidiary of Lilly, Avid has more than 100 employees and remains right here at the Science Center.

One floor above us is Invisible Sentinel. You'll hear from their co-founder Ben Pascal in a moment. Ben and his team have developed and now manufacture rapid diagnostic kits to detect food borne pathogens at the molecular level, keeping things like milk, juice and chicken safe while making sure beer and wine taste the way they should.

And right on this floor, a few doors away, BioBots is creating 3D bioprinters and biopinks that researchers around the world are using to print bones, organs and tumors out of biological material -- literally printing living organisms on their own desktops for research in their labs!

The business of making life better through science is certainly exciting and fascinating, but this business is not an easy one, and it entails a great deal of time and investment. Every pill that your mother or father takes to ease joint pain, and every device that your doctor uses to check on your son or daughter's health, is the product of many years – and millions of dollars - of research, development, testing and investment.

That's why the Commonwealth's support for our work is so important. At every step of the way, public-private partnership is vital to ensure success. Research funding at our world-class

research institutions, through programs like the Pennsylvania Department of Health's CURE funding program, is the first step. The Science Center and others then help move these ground-breaking ideas out of the lab and into the marketplace.

As the technologies are commercialized, valuable state programs like the Ben Franklin Technology Partners supply early-stage funding to help these young companies continue on the pathway to success. RoseAnn Rosenthal and her team at BFTP of Southeastern Pennsylvania, and their counterparts around the state, have set the gold standard for how public-private partnerships can work to bring early-stage technologies to market.

Similarly, the seed-stage investment provided by the PA Life Science Greenhouses has also raised the bar for public-private partnerships. Barbara Schilberg and her team at BioAdvance here in the southeast, and the other Greenhouses across the state, have been an incredible support for the industry. After the early investment and guidance from Ben Franklin and BioAdvance, larger investments from the private sector follow, allowing these companies to scale up and get their products to market as quickly and efficiently as possible.

We also must recognize the Innovate in PA initiative, established in 2013, which created a fund that is being used to support innovation and economic growth technology-based projects across the state.

And, in addition, Pennsylvania is well-positioned in the life sciences thanks to our research institutions and the support they receive from the Commonwealth. Pitt, CMU, Penn State, Geisinger, Lehigh, Temple, Drexel, Penn, and many others make Pennsylvania the envy of other states. In 2015, Pennsylvania ranked fourth in the nation in total research funding from the National Institutes for Health, and seventh in NIH funding per capita.

Turning brilliant research and development into thriving companies is the key to building a successful life sciences industry, and that is where the Science Center comes in.

Founded as a non-profit enterprise in 1963, the Science Center has been incubating businesses since long before the term business incubation was coined. We are the nation's first and largest urban research park, and one of the only multi-institutional research parks in the country. Our 31 shareholders represent the top academic and research institutions across much of Pennsylvania, New Jersey and Delaware.

We currently have a suite of programs to commercialize academic technologies:

Our QED proof of concept was founded in 2009 as the nation's first multi-institutional proof-of-concept program for the life sciences, partnering with 15 institutions across the Commonwealth. QED provides business development support for researchers developing early-

¹ *The Value of Bioscience Innovation in Growing Jobs and Improving Quality of Life*, TEconomy Partners and Biotechnology Innovation Organization (BIO), 2016

stage technologies, helping them to retire the business risk in these early-stage projects and increase their attractiveness to follow-on investment by established life science companies and private investors.

Our Phase 1 Ventures program works with “long-horizon” intellectual property to help newly formed companies build R&D, management, and strategic capabilities. The program leverages the Science Center’s connections to corporate and product-development professionals to get the companies on the path to success.

And our Digital Health Accelerator helps health IT companies with products at the prototype stage move forward to reach their first sales and venture capital investment.

Through the years, 442 companies have received incubation services from the Science Center. Our biggest success is Centocor, now known as Janssen Biotech. Centocor developed Remicade, which treats rheumatoid arthritis and other conditions. Now owned by Johnson and Johnson, Remicade is J&J’s biggest-selling drug.

Today, the 155 firms incubated here at the Science Center that are located in Greater Philadelphia directly employ 12,000 people. And these are high-paying jobs with an average salary of \$103,000 – nearly double the region’s median annual wage of \$52,000.

There's a ripple effect as well. Each direct job in the region generates more than two additional jobs. That's a total of 40,000 direct and indirect jobs – or one out of every 100 jobs in the region. And these 40,000 jobs drive \$13 billion in economic activity in the region each year – more than 2% of the region’s total economic output.

Multiply these numbers across the Commonwealth and you’ll see that the life sciences sector is an economic powerhouse to be reckoned with.²

One of our incubator graduates, Adaptimmune, highlights the future of the life sciences industry in Pennsylvania. Adaptimmune’s technology focuses on innovative T-cell therapies to treat cancer.

One reason Adaptimmune chose Philadelphia was because of the work of Dr. Carl June at the University of Pennsylvania. Dr. June is creating breakthroughs in the world of immunotherapy, developing new ways to genetically engineer the body’s own immune cells to be able to find, attack and eliminate cancer. We are just beginning to see the potential for these revolutionary technologies.

And Dr. June is not alone. Last year, Vice President Biden launched his “moonshot to cure cancer” here in Philadelphia for a reason: researchers at The Children’s Hospital of Philadelphia,

² *University City Science Center: An Economic Catalyst for Greater Philadelphia*, The Economy League of Greater Philadelphia and Econsult Solutions, 2016

Thomas Jefferson, Temple, Fox Chase, Wistar and elsewhere are quickly making Philadelphia an internationally recognized center for excellence in immunotherapy research. We will need continued support from the Commonwealth to make sure that this world-renowned research leads to world-renowned companies that will drive our state's economy for years to come.

Programs like the R&D Tax Credit and the Keystone Innovation Zone Tax Credit Program are incredibly vital to help startup companies launch and scale, and we appreciate the legislature's support for these programs. The Science Center manages the University City KIZ, which has awarded \$8 million to 48 startup companies over the last decade. Innovative companies across the Commonwealth qualified and received a total of \$17 million in 2014 and \$18 million in 2015. But, in the fiscal year 2016-17 budget, support for this highly effective program was cut down to \$15 million. I strongly encourage the House to consider restoring funding to the valuable Keystone Innovation Zones to ensure that every promising life sciences startup that qualifies can take advantage of this program.

More generally, while Pennsylvania is well-positioned to maintain its role as a national leader in the life sciences, we need the strong support of the Commonwealth to ensure that we succeed.

Other states have recognized the big return on investment they see in supporting early-stage life science companies and are stepping up to make major investments. The Federal government provides Small Business Innovation Research, or SBIR, and Small Business Technology Transfer, or STTR, grants to early-stage businesses working on cutting-edge technologies. A growing number of states are recognizing that providing matching funding to these Federal awards gives companies the ability to commercialize at a more rapid pace, which increases the likelihood that companies will succeed and become home-grown economic drivers. Many of our biggest competitors like Maryland, Massachusetts, Virginia and North Carolina, in addition to other states hoping to outpace us, are providing this matching support.

Pennsylvania needs to keep pace or else we will see technologies developed at CMU, Lehigh or Penn State go elsewhere as researchers seek a more supportive climate. I urge the House to consider working with our public, non-profit and private sector partners to develop new ways to keep investing in this high-growth industry.

The Commonwealth is at a crucial inflection point. We cannot let other states pass us by as we squander the strength in the life sciences industry we've built over generations. Instead we must continue to invest in this valuable Pennsylvania-grown industry that creates jobs – and saves lives.

I'll leave you today with a story of what can happen when an early-stage life sciences company receives proper support. Spark Therapeutics is a resident company at the Science Center, located in the building next door. Spark is a spin out from The Children's Hospital of Philadelphia, built on gene therapy technology that is showing promising results for treating a rare childhood blindness and potential for other applications like hematologic disorders and neurodegenerative disorders. When Spark moved in to our building less than two years ago

they had 20 employees. Today they have 144 employees. Last week they released very encouraging data from their Phase 3 trial, and with an FDA application in the works, their leading drug candidate could become the first ever U.S. gene therapy for a genetic disease. They are on a trajectory to grow to several hundred employees over the next few years.

We need more success stories like Spark Therapeutics, and with your help, we will see more home grown life sciences companies like Spark succeeding, improving lives and employing thousands of Pennsylvanians.

Chairman Benninghoff, Chairman Sturla, and members of the Republican and Democratic House Policy Committees, I appreciate the opportunity to testify today and thank you for all that you do on behalf of Pennsylvania.