



VIA E-MAIL TO BIOECONOMY@OSTP.GOV

December 6, 2011

Office of Science and Technology Policy
Executive Office of the President
725 17th Street, Room 5228
Washington, DC 20502

Response to Request for Information: Building A 21st Century Bioeconomy

Ladies and Gentlemen:

The University City Science Center, located in Philadelphia, Pennsylvania, hereby submits this letter in response to the Request for Information on Building a 21st Century Bioeconomy, issued by the Office of Science and Technology Policy. As a member of the US Department of Commerce's Innovation Advisory Board, I am pleased to share with you the Science Center's recommendations for harnessing biological research innovations to meet national challenges in health, food, energy, and the environment while creating high-wage, high-skill jobs.

We believe that research parks, business incubators, and other technology-based economic development organizations, such as the Science Center, can serve as innovation intermediaries or linchpins to connect – without any bias or favoritism – the creators of emerging technologies, located at research institutions, with the investors and funders of the development of these technologies, located at venture capital firms and industrial companies, in order to maximize the value of early-stage technology generated by researchers and accelerate technology commercialization.

In this response, we will focus on (a) suggestions for making specific changes to Federal Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs that would help accelerate commercialization of federally-funded bioeconomy-related research, including the presentation of a proposed model for bringing together academic and commercial resources at an earlier stage in order to advance SBIR/STTR-funded research more rapidly; and (b) suggestions for building new, high-impact public-private partnerships to facilitate the commercialization of life sciences research, including a discussion of the Science

Center's QED Proof-of-Concept Program – the nation's first multi-institutional proof-of-concept program in the life sciences.

Background on the University City Science Center

Established in 1963, the Science Center is the oldest and largest urban research park in the United States. Our mission is to support business incubation, technology commercialization, and technology-based economic development. Our 31 shareholders include many of the distinguished colleges, universities and research institutions located throughout Pennsylvania, New Jersey and Delaware. (Attached as Appendix A is a list of the Science Center's shareholders.) Our Board of Directors includes both academic and non-academic officials from many of these institutions, as well as representation from science and technology companies, investment and venture capital firms, and economic development organizations.

Situated in West Philadelphia, adjacent to the University of Pennsylvania and Drexel University, the Science Center campus includes 2.0 million square feet of laboratory, office and medical facilities. The Science Center accelerates technology commercialization and the market availability of life-enhancing scientific breakthroughs by bringing together innovations, scientists, entrepreneurs, funding, laboratory facilities and business services. We provide an unparalleled regional resource center designed to inspire a community of knowledge, spark the spirit of enterprise, and help expand and strengthen the region's technology sector; and we offer a steady stream of networking, professional and product development, and entrepreneurial support programs designed to leverage the rich resources available on our campus and throughout the region.

The work of the approximately 100 incubator and established companies that currently call the Science Center home ranges from information technology, nanotechnology and green technology to cognitive science, biotechnology, bioinformatics, diagnostics, healthcare and medical devices. According to a study by the Economy League of Greater Philadelphia,¹ of the more than 350 organizations that have been incubated on the Science Center campus since our inception in 1963, 93 remain in the region. Currently, these companies directly employ more than 15,000 people at an average salary of \$89,000, and they, along with our incubator residents, contribute more than \$9 billion to the regional economy annually.

Graduates of the Science Center's incubation programs include Centocor (acquired by Johnson & Johnson, and now known as Janssen Biotech), BioRexis (acquired by Pfizer), and Avid Radiopharmaceuticals, which has pioneered a medical imaging method to detect beta amyloid plaques for the diagnosis of Alzheimer's disease. Avid entered the Science Center's incubator in 2005, graduated in 2009, and was acquired by Eli Lilly in 2010 for \$300 million in cash up front,

¹ [The University City Science Center: An Engine of Economic Growth for Greater Philadelphia](#) (2009), prepared by the Economy League of Greater Philadelphia. Available online at www.sciencecenter.org.

plus an additional \$500 million in future payments based upon the achievement of defined milestones.

Partnering with research institutions, entrepreneurs, funders, industry leaders, governmental agencies at all levels, and economic development organizations across Pennsylvania and beyond, the Science Center continues to help move technology out of the lab and into the marketplace, where it can benefit the region and the world.

Copies of the Science Center's 2011 Annual Review and our recently published economic impact study, "The University City Science Center: An Engine of Economic Growth for Greater Philadelphia," are available for download at www.sciencecenter.org.

I. RECOMMENDATIONS FOR CHANGES IN SBIR AND STTR PROGRAMS

SBIR/STTR is a valuable source of funding for supporting high-risk research and development being conducted by small businesses, where the goal is to invest in new product development. In the life sciences, three agencies are important sources of SBIR/STTR funding: the National Institutes of Health, the National Science Foundation, and the Department of Defense.

While historically, existing small businesses may have utilized SBIR/STTR funding to explore new product concepts for their pipelines, in a climate where private investment is scarce and investors are placing more emphasis on rapidly and efficiently developing marketable products, small businesses are less inclined to dilute their focus. Consequently, there is increasing potential for SBIR/STTR funding to be used as a source of start-up or seed capital by new companies rather than as a source of follow-up product financing by existing small businesses. However, SBIR/STTR funds are ill-suited for new venture creation because of eligibility limitations, operating policies, and goals and metrics of performance. We believe that there are opportunities for SBIR/STTR programs to be utilized more effectively for product development by newly-launched small businesses, particularly those that are focused on developing technologies licensed from federally-funded institutions.

Limitations of SBIR/STTR for New Venture Formation

SBIR and STTR programs can be a critical source of funding for bridging the gap between basic research funding and private sector investment financing. However, SBIR/STTR funding pools are becoming increasingly competitive, and even when successfully obtained, SBIR/STTR funding is often not sufficient to maximize the likelihood of new startups becoming scalable small businesses.

In 2010, through a series of working groups, the Science Center's Scientific Advisory Committee (SAC), composed of representatives of major federally-funded research institutions

in the Greater Philadelphia region, private-sector companies, and other stakeholders, collectively considered the issue of forming new start-up companies using SBIR/STTR funding. While affirming the importance of the mechanism, these groups identified several challenges:

- The need for a commercial entity: To attract funding and expertise, there is often a need for a commercial entity. Many (although not all) high-potential scientific projects are simply too early-stage to justify the creation of a dedicated corporate entity – and there are few mechanisms by which to determine their appropriateness for a start-up company in advance.
- The need for additional funding: SBIR/STTR funds (typically \$150,000 in Phase 1) are usually not sufficient to create a new, functioning commercial entity. This need is compounded by the inefficiencies that arise from duplicating infrastructure and administration for each separate entity.
- The need for additional expertise: Many projects are staffed primarily or solely by inventors. In the case of institutional inventors, there is a need for non-institutional staff to operate or manage the commercial for-profit program in order to avoid conflict of interest. In all cases, there is a need to build management and advisory structures, a difficult task for pre-capitalized start-ups.

The SAC working groups concluded that while many technologies are appropriate for individual start-ups, there is also a need for a consolidated mechanism that would enable technology managers to “road-test” early-stage technologies and to aggregate resources and expertise prior to launching new companies.

Proposed New Concept: Phase 1 Ventures

Following recommendations from the SAC and further investigation, including a large amount of external benchmarking using interviews with more than 20 opinion leaders within and outside the region, and drawing on primary research and experience in the field, the Science Center has developed the concept of Phase 1 Ventures (PIV).

PIV involves a partnership between a for-profit (SBIR/STTR-eligible) entity and one or more non-profit entities that are sources of technologies. Other strategic partners include economic development organizations, investors and entrepreneurs, and corporate entities. The partnership approach enables the following critical ingredients to be connected:

- Technologies, typically developed using federal basic research funding
- A corporate entity enabling independent product development

- Commercial guidance
- Market input and capital
- Third-party management of academic, new company, and market interaction

P1V provides an independent, turnkey option that enables high-potential federal laboratory or university technologies to be road-tested, using Phase 1 SBIR/STTR or other seed-stage funding, for their suitability as foundations of new small businesses.

The P1V model offers all of the following:

- Assistance in the development of competitive SBIR/STTR funding applications for selected technologies.
- Projects that receive Phase 1 funding will be co-housed within a dedicated partnership – operated by an intermediary economic development organization such as the Science Center – which will include managers, staff, facilities, and resources to be provided to each project as needed to complete the Phase 1 work.
- Upon successful receipt of Phase 2 funding, new small business entities will have sufficient capital to attract dedicated resources and ultimately “graduate” from the accelerator.
- P1V will realize value and create a framework for sustainability through equity in the resulting small businesses that are launched through its process.

The P1V model presents a number of attractive features compared with traditional *ad hoc* venture formation:

- P1V provides an independent and collaborative pre-review process at the “point-of-invention” for screening and selecting projects that are suitable for SBIR/STTR funding and for eventual transition into fundable new companies.
- P1V exploits economies of scale by sharing fixed costs among multiple projects during their time in the shared P1V partnership.
- Advisory support in determining strategy and in managing R&D will lead to more successful Phase 2 SBIR/STTR grant applications and eventual private investment.

- Management and the accumulation of resources can be achieved in a strategic multi-step process (e.g. starting with interim management that can oversee multiple projects), avoiding the over-burdening of fragile new companies too early.
- By establishing a network of advisors and partners, P1V will facilitate connection of new companies with networks and private sector investors.

II. RECOMMENDATIONS FOR PUBLIC-PRIVATE PARTNERSHIPS

We believe that the highest impact opportunities for public-private partnerships relating to the bioeconomy are public-private partnerships that enhance or assist with the translation and commercialization of undeveloped, or underdeveloped, early-stage research at academic laboratories, federal laboratories, and private-sector companies.

In the context of technology commercialization, the “valley of death” refers to the barrier between early-stage technology and follow-on development in the private sector. Particularly in recent years, private capital for R&D has moved steadily “downstream,” as investors and corporations favor later-stage, lower-risk technologies. This leaves many early-stage technologies, the supply of which has actually increased (as manifested by the number of scientific papers, invention disclosures, and patent applications), stranded in the laboratory. The question is: as the pipeline of biomedical products “dries up,” how will the development of new products be sustained? This issue is currently receiving greater attention, as public policymakers and economic development organizations consider new ways to generate more value from the billions of dollars that are allocated to universities each year in research grants, and to unlock the value inherent in early-stage technologies at “big pharma” companies that are not being pursued due to reduced R&D operations or (in their view) insufficient potential return on investment.

Science Center’s QED Proof-of-Concept Program

In 2009 the Science Center launched the nation’s first multi-institutional proof-of-concept program to fund early-stage academic research projects in the life sciences and to promote the commercialization of the technologies resulting from those projects. Our program – named “QED,” after the Latin phrase “*quod erat demonstrandum*” or “proven as demonstrated” – provides funding and business advice for academic researchers throughout the Greater Philadelphia region who are developing early-stage life science technologies with high commercial potential. QED helps promising researchers translate their publicly-funded basic research into privately-funded technology commercialization and product development opportunities. As angel investors, venture capitalists, and established companies increasingly shift their investments to later-stage initiatives, QED fills a critical gap in the innovation and funding pipeline.

The Science Center created QED in response to a 2007 study conducted by the CEO Council for Growth, an affiliate of the Greater Philadelphia Chamber of Commerce, which recommended the establishment of a proof-of-concept research fund to bridge the gap between research grants and seed funding.² The goals of the program are to engage the region's academic institutions, research scientists, entrepreneurs, investors, and industry in early-stage commercialization, and ultimately to increase the pace and value of technology transfer in the region.

QED leverages the Science Center's relationships with universities, healthcare institutions, public and private companies, and government agencies, driving technology transfer and new business formation, advancing entrepreneurship, and encouraging innovation, competitiveness, and knowledge-base retention and expansion. The program's key operating principles for technology commercialization are (a) to focus existing regional resources on substantially reducing early-stage business risk, and (b) to evaluate and position early-stage technologies for follow-on investment by established life science companies and private investors, thereby reducing the proliferation of sub-scale, undercapitalized ventures already in the market. Ultimately, the success of the program will be judged according to the metrics of technology transfer, including new venture formation, license execution, and outside investment.

QED provides key resources, including business guidance, bridge funding, and access to industry and investor representatives, to competitively selected projects. Currently, a total of 19 research institutions throughout the tri-state region participate in the program. Funding decisions are made by a regional selection team composed of representatives from pharmaceutical, medical device and medical diagnostics companies, private equity and venture capital firms, and economic development organizations. Each project selected for funding receives up to \$200,000 over 12 months, with half of the funding provided by the Science Center and the other half by the scientist's host institution.

To date, QED has received and evaluated more than 227 proposals; proof-of-concept plans have been developed, with the assistance of business advisors, for 40 life science technologies at 15 institutions; 12 projects at eight institutions have received or been offered funding; and five of the funded projects have resulted in the licensing or optioning of technologies to the private sector, either through start-up or established companies. These early successes demonstrate the program's potential for meaningful impact on the region's innovation ecosystem through the collective engagement of academic, private sector, and entrepreneurial stakeholders, as well as a pipeline of new technologies that could significantly contribute to human health.

² Accelerating Technology Transfer in Greater Philadelphia: Identifying Opportunities to Connect Universities with Industry for Regional Economic Growth (2007), prepared by the CEO Council for Growth. Available online at www.selectgreaterphiladelphia.com

Attached to this application are a list of the participating institutions in the program (Appendix B), a list of the companies and investment firms represented on the QED selection team (Appendix C), and a list of the nine projects funded to date, indicating the five projects whose technologies have already been licensed or optioned (Appendix D). One of the licensed technologies represents the first example of technology from The Children's Hospital of Philadelphia, the nation's oldest hospital for children, being commercialized via start-up company formation.

In addition to the direct benefits of commercial guidance (and, potentially, funding) received by successful applicants, there is also a benefit derived by the business advisors and student fellows through the collaborative and entrepreneurial learning experience. Not only are we working to develop a network of science and technology entrepreneurs – we are also creating an environment that encourages meaningful interaction between academic and commercial interests, resulting in (a) the provision of earlier commercial guidance to research technologies, (b) the creation of avenues for experienced entrepreneurs to identify new opportunities, and (c) the opportunity for students to gain real life, valuable experience in entrepreneurship.

More immediate indicators of success include:

- Evaluation and feedback to non-funded projects, better positioning them for funding from other programs
- Re-direction of limited resources from projects that prove to be unsuitable for commercial development
- Assembly of a comprehensive regional inventory of life science technologies with potential commercial value, creating a pipeline of commercially-evaluated technologies that are capable of bridging the “valley of death”

Longer-term indicators of success will include:

- Increased number of direct and indirect jobs, and per-capita wealth
- Development of new life science products which will improve the quality and efficiency of healthcare

The ultimate success of the QED program will be determined by the transfer of successful R&D proof-of-concept projects to the private sector. Meanwhile, program participants will continue to “learn by doing,” to improve process productivity with each cycle, and to establish the basis for program continuation and scale-up.

QED as a Model for Public-Private Partnerships

We believe that our QED program can serve as an innovative and promising model for public-private partnerships nationwide:

- **QED serves a tri-state “regional innovation cluster.”** The Greater Philadelphia region is one of the top metropolitan areas in the nation for research and development in the life sciences. QED is a collaborative program that extends across the region, transcending state and local boundaries. The program catalyzes the transfer and commercialization of early-stage life science technologies emanating from universities, hospitals and research institutions throughout 11 counties in Pennsylvania, New Jersey and Delaware. As a hub of innovation, entrepreneurship and technology commercialization in the region – without any mandated allegiance to a particular state or locality, and without any limitations or restrictions imposed by government (or any other third party) on where we can operate or whom we can assist – the Science Center is a neutral intermediary organization that can bring the region’s institutions and other assets together in order to produce tangible results that benefit all.
- **QED is multi-institutional.** QED began in April 2009 with 10 participating research institutions; the number of participants has since expanded to 19. Cooperation and competition among the institutions serve to increase the regional technology pool and leverage regional resources more effectively, ultimately maximizing the program’s impact. Also, the broad range of institutional participants aligns well with the Science Center’s role as a facilitator of the region’s dominant “innovation ecosystem” in the life sciences. Although other organizations elsewhere in the country – notably MIT and the University of California at San Diego – offer similar business advisory and funding resources, their reach is limited to projects at the host institution. QED’s multi-institutional scope features a diversity of institutional sizes and characteristics within a versatile program model that minimizes administrative overhead. We believe that this model can be readily adapted to other regions in the US.
- **QED leverages existing multi-disciplinary resources.** QED builds upon the Science Center's extensive relationships with research centers, tech transfer offices, entrepreneurs, investors, public and private companies, and economic development organizations in order to address the multiple aspects of commercialization for all projects that enter the program. In particular, third-party scientific and commercial guidance is a critical component of QED. This guidance takes the form of business advice from experienced investors, entrepreneurs and industry representatives; technical and clinical review of technology by outside scientific reviewers; and market-based screening and selection teams that evaluate the projects with a focus on both the potential for follow-on investment and the anticipated market demand for the end-stage product.

- **QED is collaborative.** QED, by its nature, is a program that not only encourages, but demands, multidisciplinary collaboration between and among its participating institutions, principal investigators, business advisors, scientific reviewers, screening and selection team members, and prospective follow-on funders, thereby maximizing the prospects for high-quality, early-stage research with substantial end-stage market potential. It is this comprehensive approach that sets QED apart. Our intention is to organize and deploy the wealth of scientific, technological, and entrepreneurial talent and resources within our region – which transcend institutional, city, county, and state boundaries – towards a common goal of more efficient and effective life science commercialization.
- **QED strengthens an existing regional research capability.** A May 2009 report by the Milken Institute ranks the Greater Philadelphia life sciences “cluster” second among the 11 top life sciences clusters in the United States.³ The Greater Philadelphia region’s institutions of higher education excel at attracting research dollars; according to one study, the region attracted \$1.5 billion in academic R&D funding in 2005, 62 percent of which was devoted to life sciences, followed by engineering and physical sciences.⁴ That investment is paying off: the region averages 520 invention disclosures a year, surpassed only by Boston.⁵ However, our region’s universities and other research institutions are not achieving their full potential when it comes to economic development through entrepreneurship. QED is using technology transfer to spur economic development by successfully linking early-stage research with later-stage technology development and commercialization.
- **QED leverages funding from multiple public and private sources.** Currently in the fourth cycle of its pilot phase, QED has received funding from the US Department of Commerce’s Economic Development Administration (EDA), the Commonwealth of Pennsylvania’s Ben Franklin Technology Development Authority, the William Penn Foundation, and the Science Center’s real estate development partner, Wexford Science + Technology. This funding is being leveraged by funding from the Science Center and the participating institutions. A total of \$2.4 million has been committed by the Science Center and the participating institutions during the QED pilot phase, to cover costs incurred by award recipients in connection with funded projects. The Science Center continues to seek additional funding from Federal agencies and other government

³ The Greater Philadelphia Life Sciences Cluster 2009: An Economic and Comparative Assessment (2009), published by the Milken Institute. Available online at www.milkeninstitute.org

⁴ Accelerating Technology Transfer in Greater Philadelphia . . . (2007). See Note 2.

⁵ Ibid.

sources, as well as additional funding from private sources in order to increase (and leverage) the economic impact of any public dollars invested.

- **QED is designed to be self-sustaining.** The Science Center is committed to continuing to move the QED program forward. Participating research institutions have each committed \$100,000 of matching funds to any project submitted from their institution that is selected for funding. The Science Center and the participating research institutions have negotiated a share in licensing revenues and company equity that arise from successful QED projects. However, it is anticipated that long-term sustainability will require the formation of an endowment. Public policy changes should be instituted that would ease the current burden of financing this program until an endowment is substantially funded. Ultimately, we anticipate that demonstration of the program's success will encourage support from corporate partners. This process could be accelerated by providing tax incentives for private investment.

For all of the foregoing reasons, we believe that new, innovative public-private partnerships like our QED Proof-of-Concept Program represent a new paradigm for technology development, in which neutral "innovation intermediaries" like the Science Center can serve as facilitators. These intermediaries can uniquely promote greater collaboration and dialogue among the various stakeholders in the technology transfer process, which are essential to accelerating the commercialization of life science breakthroughs out of the lab and into the marketplace. They can also help to align often-mismatched incentives and cultural differences between academia and industry, creating an environment that supports the successful flow of R&D from basic research, through proof-of-concept projects, to product development and technology commercialization.

Importantly, the opportunity exists to scale up, expand and/or translate the QED program to other parts of the nation; to other sectors of the technology economy, such as energy and cleantech; to large companies with specific needs no longer supported by their own R&D capabilities; and to federal laboratories with under-commercialized research output. Organizations – such as the Science Center – that have a proven track record in technology commercialization can be utilized as reference points, in order to develop a national model for efforts to accelerate commercialization.

Conclusion

This letter describes two models for expediting the commercialization of early-stage technologies. These models leverage existing resources, address sustainability, and, importantly, are scalable and transferable. Federal agencies should encourage organizations that are working on similar initiatives to work together in a meaningful collaborative process that will allow funding to be more effectively deployed, thereby increasing the likelihood of successful outcomes. These outcomes will include the creation and growth of high-tech companies, high-

paying jobs, and high-demand medicines, medical devices and other technologies that, in turn, will fuel economic development in the United States and beyond. Regional innovation clusters and similar regional strengths can be emphasized, and appropriate incentives to collaborate and communicate can be provided, in order to foster an environment that facilitates the productive exchange of ideas and technologies.

Please feel free to contact me if you have any questions or comments on this letter or the attachments, or if you would like any additional information. In addition, I would be happy to meet with you at your convenience to discuss our ideas and programs in more detail, and I invite you to visit us here at the Science Center in Philadelphia to tour our facilities and learn more about who we are and what we do to support technology commercialization and economic development in the Greater Philadelphia region.

Thank you for your consideration.

Sincerely,

A handwritten signature in black ink, appearing to read "Stephen S. Tang". The signature is fluid and cursive, with the first and last names being more prominent.

Stephen S. Tang, Ph.D., M.B.A.
President & CEO

APPENDIX A

List of Shareholders of University City Science Center

The American College, Bryn Mawr, PA
Bryn Mawr College, Bryn Mawr, PA
Burlington County College, Pemberton, NJ
The Children's Hospital of Philadelphia, Philadelphia, PA
Delaware State University, Dover, DE
Drexel University, Philadelphia, PA
East Stroudsburg University, East Stroudsburg, PA
Haverford College, Haverford, PA
Lafayette College, Easton, PA
Lehigh University, Bethlehem, PA
Lincoln University, Chester County, PA
Mercy Health System, Conshohocken, PA
NUS America (National University of Singapore), Philadelphia, PA
The Penjerdel Council, Philadelphia, PA
Pennsylvania Hospital, Philadelphia, PA
Philadelphia College of Osteopathic Medicine, Philadelphia, PA
Philadelphia University, Philadelphia, PA
The Presbyterian Foundation for Philadelphia, Philadelphia, PA
Rowan University, Glassboro, NJ
Rutgers, The State University of New Jersey, New Brunswick, NJ
Salus University (former Pennsylvania College of Optometry), Elkins Park, PA
Swarthmore College, Swarthmore, PA
Temple University, Philadelphia, PA
Temple University School of Podiatric Medicine, Philadelphia, PA
Thomas Jefferson University, Philadelphia, PA
University of the Arts, Philadelphia, PA
University of the Sciences in Philadelphia, Philadelphia, PA
University of Delaware, Newark, DE
University of Pennsylvania, Philadelphia, PA
Villanova University, Villanova, PA
Widener University, Chester, PA

APPENDIX B

List of QED Participating Research Institutions

The Children's Hospital of Philadelphia, Philadelphia, PA

Delaware State University, Dover, DE

Drexel University, Philadelphia, PA

Fox Chase Cancer Center, Philadelphia, PA

Harrisburg University of Science and Technology, Harrisburg, PA

Lankenau Institute of Medical Research, Wynnewood, PA

Lehigh University, Bethlehem, PA

Monell Chemical Senses Center, Philadelphia, PA

Philadelphia College of Osteopathic Medicine, Philadelphia, PA

Philadelphia University, Philadelphia, PA

Rutgers University, New Brunswick, NJ

Temple University, Philadelphia, PA

Thomas Jefferson University, Philadelphia, PA

University of Delaware, Newark, DE

University of Medicine and Dentistry of New Jersey, Newark, NJ

University of Pennsylvania, Philadelphia, PA

University of the Sciences, Philadelphia, PA

Widener University, Chester, PA

The Wistar Institute, Philadelphia, PA

APPENDIX C

List of Organizations Represented on QED Selection Team

Angiotech Pharmaceuticals

AstraZeneca

Becton Dickinson

Ben Franklin Technology Partners of Southeastern Pennsylvania

Blue Highway

Bristol-Myers Squibb

BioAdvance

Bracco

Delaware Crossing Investors Group

Exponent

FemmePharma

Integra Life Sciences

Johnson and Johnson

MentorTech Ventures

Merck

MidAtlantic Angel Group

NewSpring Capital

Novartis

Osage University Partners

Quaker Partners

Safeguard Scientifics

Seguro Surgical

Sigma Aldrich

SR One (GSK)

APPENDIX D

Projects Selected for QED Funding

<i>Project</i>	<i>Institution</i>	<i>Technology</i>
Near infrared wound monitor #	Drexel Univ.	Diagnostic device
Breast cancer detector #	Drexel Univ.	Diagnostic device
Sol-gel drug delivery platform	Univ. of Penn.	Combination therapy
Magnetic nanoparticle drug delivery system ~	Children's Hospital	Combination therapy
Heart valve replacement system	Univ. of Penn.	Implantable device
U1 adaptor for gene silencing #	Rutgers Univ.	Therapeutic/research
Differentiation therapy for leukemia~	Temple Univ.	Therapeutic
miRNA cluster to treat HCV	Children's Hospital	Therapeutic
Nanopore system for detection of miRNAs	Univ. of Penn.	Diagnostic device

Technology licensed

~ Technology optioned