



pennsylvania
DEPARTMENT OF COMMUNITY
& ECONOMIC DEVELOPMENT

Nanotechnology for Business 2008

Technology Investment

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Mission

The mission of the Technology Investment Office is to serve as a catalyst for growth and competitiveness for Pennsylvania companies and universities through technology-based economic development (TBED) initiatives including funding, partnerships and support services.

Our Goal

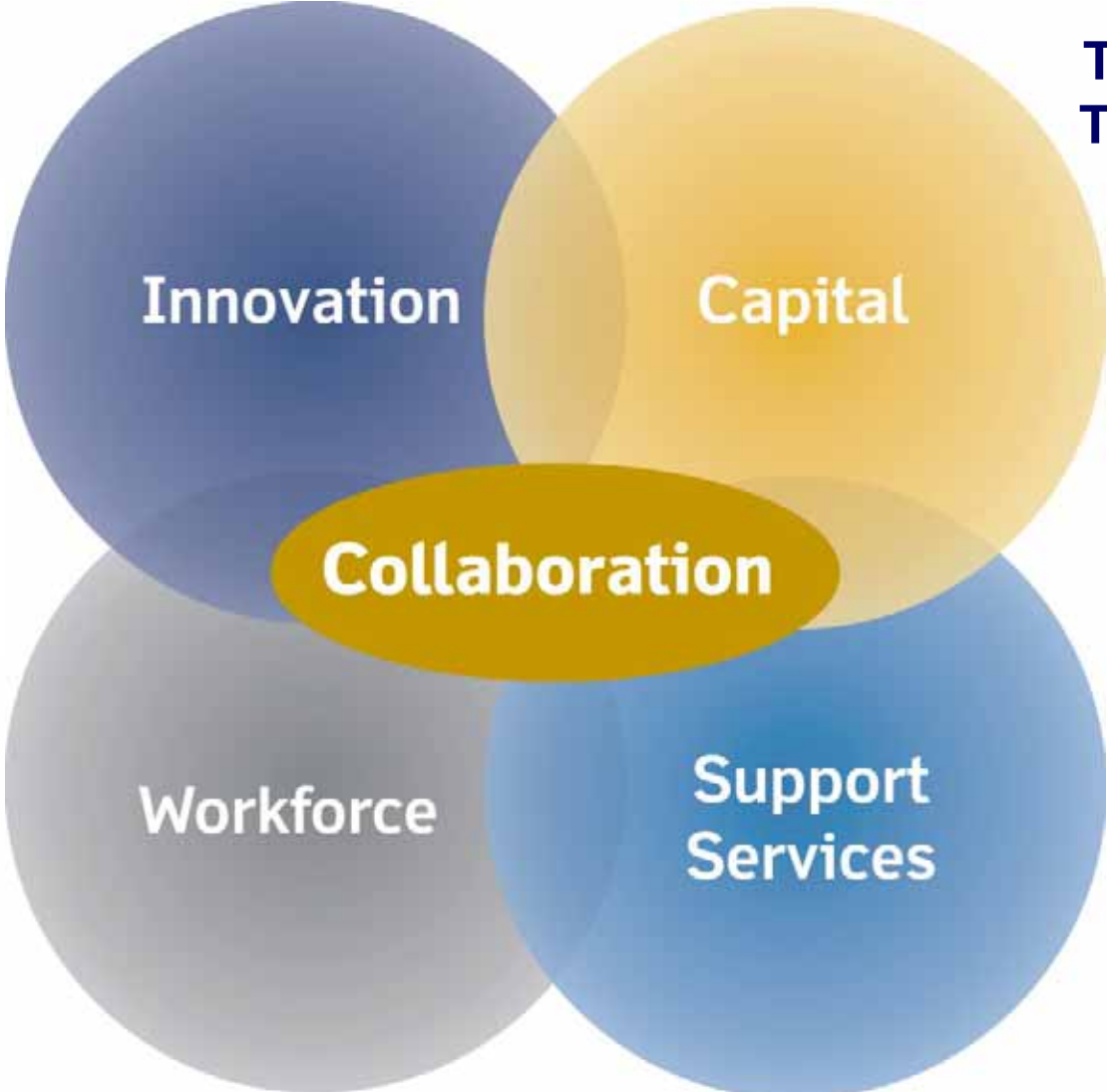
- The goal of the Technology Investment Office is to ensure that the variety of TBED organizations and initiatives located throughout the Commonwealth are working collaboratively to fully leverage the wealth of research, capital sources, and support services available to build a comprehensive infrastructure that supports company growth.

Our Customers

- Pre-revenue, emerging and mature technology companies
- Universities engaged in R&D that can be commercialized
- Community organizations focusing on technology infrastructure, training and facilities
- Investment partners

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**The Four Pillars of
Technology-based
Economic
Development**

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Industry Clusters



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Overview of Programs and Funded Initiatives

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<p>Ben Franklin Technology Develop. Authority</p> <ul style="list-style-type: none"> •4 Ben Franklin Technology Partners (25 year anniversary) •Technology Development (i.e. Innovation Partnership; 63 projects) •Fund Investment (i.e. Mid-Atlantic Angel Group Fund; 22 projects) •University (i.e. Lehigh Center for Optics; 20 projects) •Keystone Innovation Zone Program (29 KIZs to date) 	<p>University Research and Commercialization</p> <ul style="list-style-type: none"> •KIZ, KIG, KISK and KIZ Tax Credit Program •Research & Development Tax Credit Program •Nanotechnology Institute (Ben Franklin Technology Partners SE/PA) •Pennsylvania Initiative for Nanotechnology (PIN) •Nanofabrication Materials Technology Partnership (BFTDA project)
<p>Telecommunications</p> <ul style="list-style-type: none"> •Business Attraction and Retention Program •Inventory of Telecom Services Database •Broadband Outreach and Aggregation Fund •Telecom projects through the BFTDA •Bona Fide Request Program •Pennsylvania Technology Investment Map •Wall Street West 	<p>Technology-Related Supports</p> <ul style="list-style-type: none"> •Center for e-Business and Advanced IT (BFTDA project) •Innovation Partnership (BFTDA project) •Pennsylvania Technical Assistance Program (BFTDA project) •Pittsburgh Supercomputing Center •Technology Collaborative (BFTDA project) •Center for Optical Technologies (BFTDA project) •Idea Foundry (BFTDA project)
<p>Venture Capital</p> <ul style="list-style-type: none"> •New PA Venture Guarantee •New PA Venture Capital Investment •Pennsylvania Angel Network (BFTDA project) 	<p>Manufacturing</p> <ul style="list-style-type: none"> •7 Industrial Resource Centers •Pennsylvania Infrastructure Technology Alliance •Agile Manufacturing •Office of Manufacturing Ombudsman
<p>Tobacco Settlement Programs</p> <ul style="list-style-type: none"> •3 Life Sciences Greenhouses •Health Endowment •Health Venture Investment Account •Commonwealth Universal Research Enhancement program -DOH 	<p>Workforce Development</p> <ul style="list-style-type: none"> •Nanofabrication Materials Technology Partnership (BFTDA) •Workforce Innovations for Regional Economic Development (WIRED) •Powdered Metals •Workforce Leadership Grants •Center for Optical Technologies •PA STEM Center Initiative

History of PA's Nanotech Investments

- PA through DCED and the BFTDA has been supporting university-based nanotechnology efforts since 1999
- Over \$65.8 million has been provided to leverage federal awards, build out facilities and jump start programs through FY 2006-07

DCED and BFTDA Funding	\$ 65.8M
Total Leverage Funding	\$404.0M
Total Funding: 1999-2007	\$469.8M

Leverage to DCED/BFTDA Funding—5.8 to 1

Cite: Semi-annual report data submissions

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The following Projects are funded BFTDA:

Lehigh PA Materials Research Science and Engineering Center – <i>Dr. Martin Harmer</i>	\$ 900,000
PSU Advanced Materials and Nanotechnology Research and Commercialization Program – <i>Dr. Carlo Pantano</i>	\$2,500,000
The Nanotechnology Institute (NTI) – <i>Dr. Anthony Green</i>	\$3,500,000
Lehigh Nanophotonics Technologies – <i>Dr. Thomas Koch</i>	\$ 500,000
PA NanoMaterials Commercialization Center – <i>Dr. Alan Brown</i>	\$1,000,000
PA NMT Partnership	\$1,400,000
PIN TOTAL FUNDING	\$9,800,000

PIN Funding Provides

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Each of the projects incorporate the following focal areas of PIN:

- *Consortia-driven, Educational and Workforce Development Programs*
- *Increasing Commercialization of Nanotechnology Applications and Processes Through Collaboration*
- *Increasing Technology Transfer & Enhancing University-Based Resources and Skills*

Focus areas for PIN partners

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- **Chemical, mechanical, electronic, and structural characterization of nano materials and interfaces.**
- **Nanoscale engineered materials for optical sensors, interconnects and optical processing. Production and mechanical testing of thin film MEMS (NEMS) devices.**
- **Develop technologies related to defense, homeland security and materially-related applications.**
- **Commercialize innovative solutions to meet the current and future needs of the marketplace, including organic and inorganic nanomaterials, coatings, sensors and films applications.**

PIN Statewide Strengths

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- **Strong statewide research base (*Major Research Institutions*)**
- **Significant industry sponsored research**
- **Central regions NSF National Nanotechnology User facility**
- **Strong Economic Development infrastructure in place to support technology transfer and commercialization**
- **Important cluster strengths in MEMS, Pharma/Biotech Advanced Materials and Chemicals**
- **Strong Nanotechnology education and training infrastructure**
- **Existing industry base providing a mechanism for the development of new products**

Results

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- 7th Pennsylvania rank for nanotechnology-focused R&D, access to capital, commercialization, and company support.
- 1,648 Publications/presentations/papers/journal articles/abstracts/faculty disclosures/lectures from faculty & visiting scientists associated with funded Nanotechnology Programs
- 150+ Faculty patents & licenses associated with funded programs
- 250+ Participating Faculty from over 15 Colleges, Universities
- 1,050+ Post Doctorates, Graduate Students, Undergraduate Students, Secondary Students, Educators, Industry Personnel and academicians impacted by these Nanotechnology Programs