

# THE NANOTECHNOLOGY INSTITUTE™

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***A Comprehensive Model for Nano-Based Development.***



UNIVERSITY OF  
PENNSYLVANIA



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# Nanotechnology

“Nanoscience is an opportunity to *energize the interdisciplinary connections between biology, chemistry, engineering, materials, mathematics, and physics* in education. It will give birth to new fields that are only envisioned at this moment...”

National Science and Technology Council, Committee on Technology. National Nanotechnology Initiative: *Leading to the Next Industrial Revolution*. Supplement to the President’s FY 2001 Budget. Washington, DC., February 2000, p. 14.

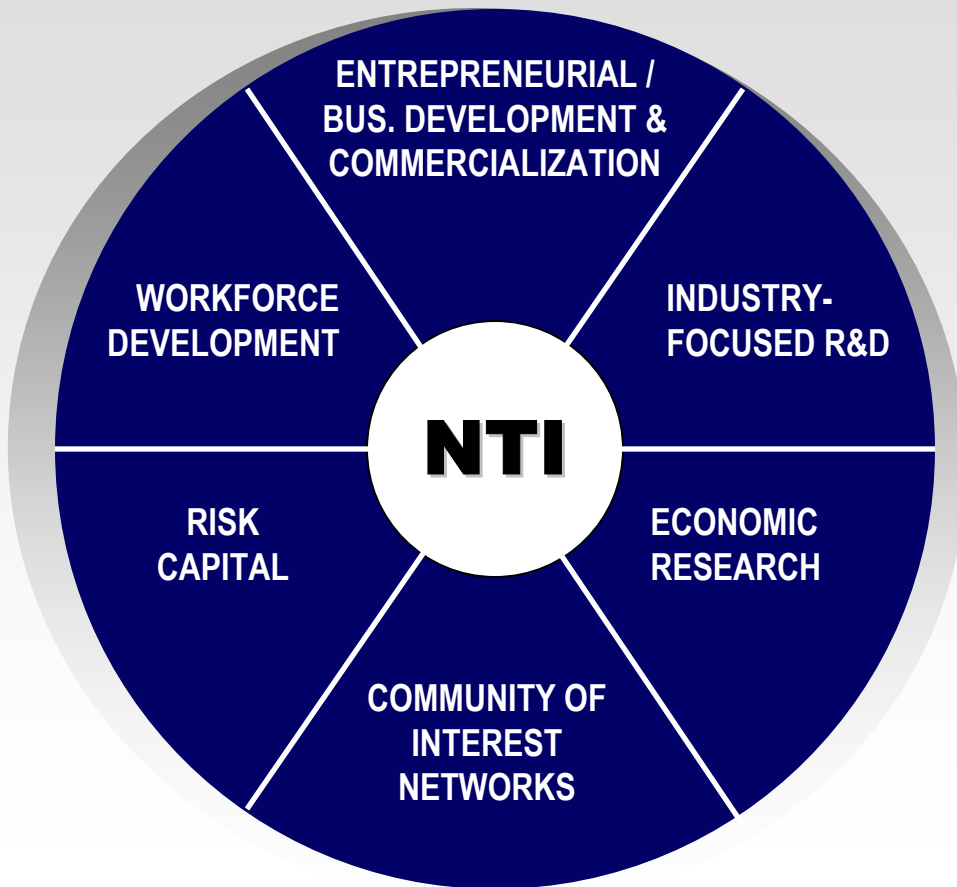
# Nanotechnology in Pennsylvania

- **Solid, ongoing investment in nano innovation:**
  - Penn State nanofabrication facility
    - \$23 M equipment base, class 10 clean room facility for academic and industrial use
  - Nanotechnology Institute (Drexel & Univ. of Penn)
    - Multi-institutional model recognized by NSF for driving research to commercialization of nanotechnology
- **Statewide approach to propelling PA to the next level of nanotechnology-driven growth:**
  - Strategy in development via DCED
    - May 2004 unveiling by Governor at “The Business of Nanotechnology” conference in Philadelphia
- **Pennsylvania is already ranked as a “Top 10” nanotechnology state (*Small Times*) and continues to grow in stature and activity**

# The Nanotechnology Institute

## Mission

To focus on the *transfer of discoveries and intellectual knowledge* in the area of nanotechnology *from universities to industry partners* and on the *rapid application and commercialization* of this technology to *stimulate economic growth*.

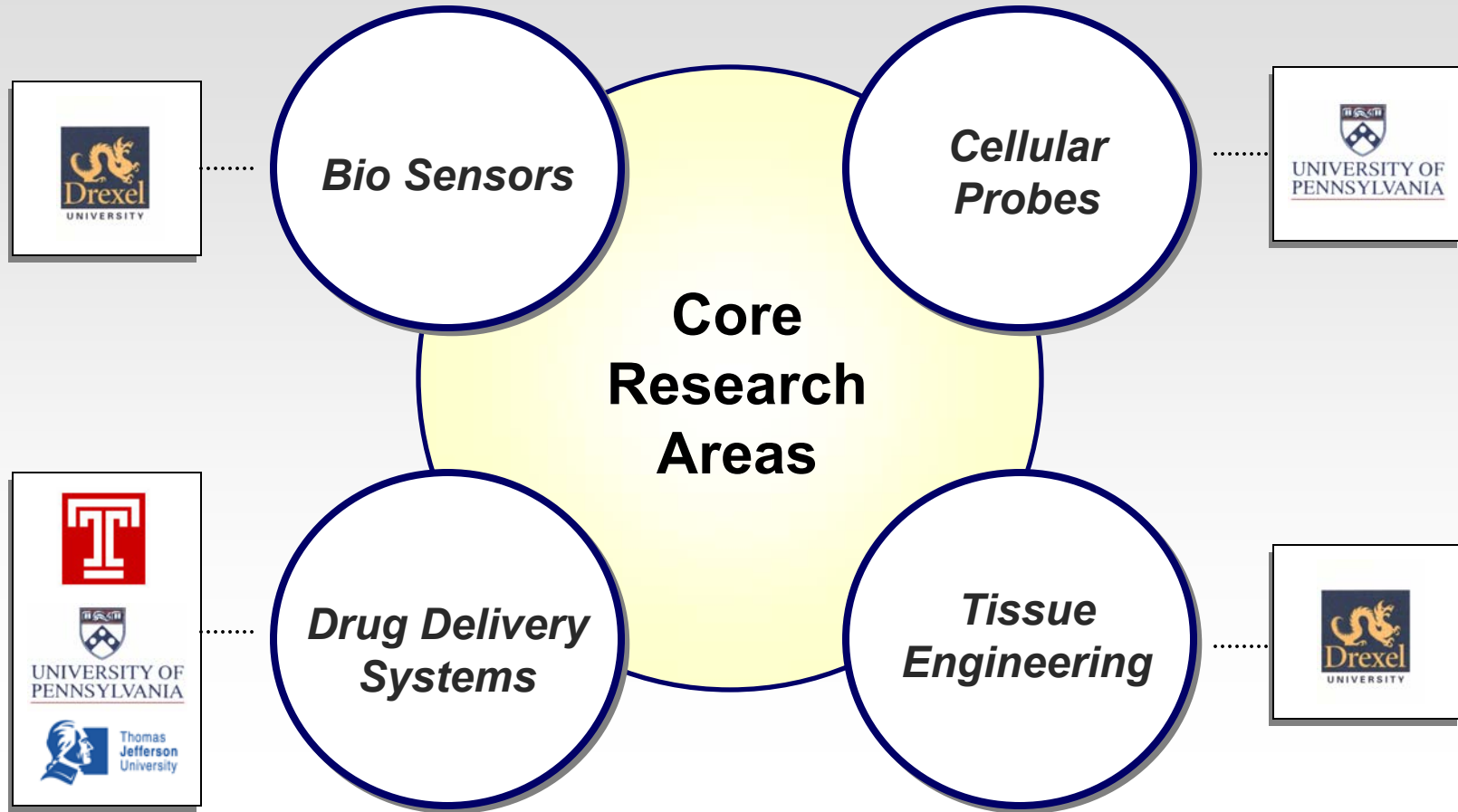


# Industry-focused R&D

- R&D focal areas reflect corporate input
- Infrastructure developed *reduces barriers to commercialization*:
  - Membership structure
  - NTI established as “Single Point of Contact”
  - Confidentiality Agreements
  - IP agreements
    - ✓ Expedited access to disclosures
  - Sponsored Research Agreements
- Company memberships obtained

# Four R&D Teams

## Core Research Areas/ Team Leadership



# Interdisciplinary, Multi-Institutional Research

- 4 Research Teams
- 9 Regional Institutions
- >250 publications
- >400 presentations
- Accelerated pace of discovery
  - 7x typical disclosure rate/research \$
- >\$60M in federal funding leveraged through NTI

# Entrepreneurial/Business Development & Commercialization

- **Database of 97 regional SMEs with nano interest**
- **BFTP/SEP SBIR Alliance**
- **BFTP/SEP Early Stage Investment**
- **FY03 BFTP/SEP Technology Commercialization Network: Focus on identifying SME nano opportunities**

# Risk Capital

- **Visibility with & input from Venture capitalists**
- **Growing VC interest in Nanotechnology**
- **Focus on NTI at 2001 Mid-Atlantic Venture Fair**
- **Participation at other VC events**
- **Capital track at 2004 Conference**

# Education & Workforce

Anticipate, fulfill need for trained workforce

- **NSF Partnership for Innovation, Dep't. Education, Commonwealth of PA, & BFTP/SEP funding; private and local match**
- **Nano-biotechnician Associate Degree program**
- **Ahead of typical workforce development curve**
- **Seven Community Colleges (multi-state)**
- **Distance learning, tele-experimentation**
- **5 new courses developed with corporate input**
- **High School Outreach**
  - Student Focus Groups
  - Teaching Fellows
    - Nanotechnology Workshops
    - Instructional Modules
  - Nanotechnology Fair (capstone event)

# Economic Research

Position NTI as the source of regional nanotechnology information & analysis.

- **NEXUS Regional Asset Mapping Study Completed**
  - Distributed at PA 2002 Nano Congress
- **BFTP Nano Database**
  - Academic capabilities
  - Company profiles/contacts
- **Strategic Planning**
  - ANGLE Technology, LLC
  - Regional Strategic Planning process completed-report prepared
  - State Nanotechnology Strategy in process

# Community of Interest

- Early marketing & branding
- NanoForums (multi-state)
- NTI Web Site [www.nanotechinstitute.org](http://www.nanotechinstitute.org)
  - Information: NTI, research, corporate activities, resources, and news
  - Interactive discussion capability for teams, companies
  - Database of regional nano resources
  - On-line event registration
- “Business of Nanotechnology”- 2004 PA Nanotechnology Conference [www.pananoconference.org](http://www.pananoconference.org)
- Regional Roadmap lead
- SMART region/federal visibility
- Collaborative MOUs
  - NRL
  - NanoBioNet (Germany)
  - Pending: UDE, IMI Quebec, NIST

# Summary

- NTI value-added demonstrated to region
- Partner institutions, state & regional interest & investments in nano
- Future of NTI...a solid foundation to build upon...can be the organizing principle for growth
- Mid Atlantic Nanotechnology Alliance (MANA) formed

## 2000...

- ✓ Nanotechnology Institute
- ✓ Center for Molecular Nanofabrication & Devices (Penn State)

## 2003...

- ✓ New Jersey Nanotechnology Consortium
- ✓ Center for NanoMachined Surfaces (UofD)
- ✓ A.J. Drexel Nanotechnology Institute (Drexel)
- ✓ Center for Science and Engineering of Nanoscale Systems (UPenn)
- ✓ Center for Advanced Materials & Nanotechnology (Lehigh)
- ✓ BioNano Robotics (Rutgers)