

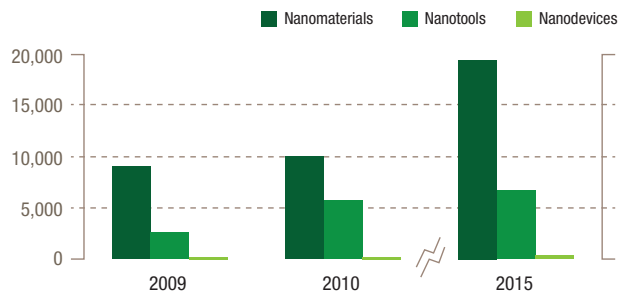
# Illinois' Nanotechnology Opportunity

Nanotechnology is the process of engineering at the molecular scale to create new properties that have the potential to impact every sector of our economy, from health and medicine to energy. Illinois already boasts one of the nation's largest nanotechnology clusters, which can be harnessed through increased support and coordination to catalyze new business formation and economic growth for decades to come.

## A Rapidly Expanding Market

By 2015, the market for nanotechnology products will be worth over \$26 billion, growing at an annual compound growth rate of 11.1% for the period 2009–2015. The rapid expansion of the nanotechnology market, and the added advantage that nanomaterials and nanotools give American companies, has made investment in nanotechnology R&D a key component of the federal strategy for economic growth and American competitiveness.

Global Nanotechnology Market, 2009–2015, \$ millions

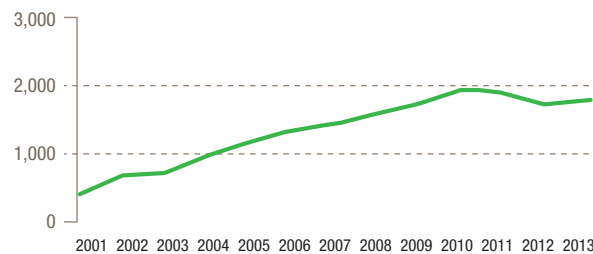


Source: BCC Research

## Billions in Federal Funding

Federal funding for nanotechnology through the National Nanotechnology Initiative (NNI) began in 2001, and between 2001–2013 the NNI has channeled \$18 billion for nanotechnology R&D. In 2013 funding for the NNI is expected to be approximately \$1.8 billion.

National Nanotechnology Initiative (NNI) Funding, 2001–2013, \$ millions

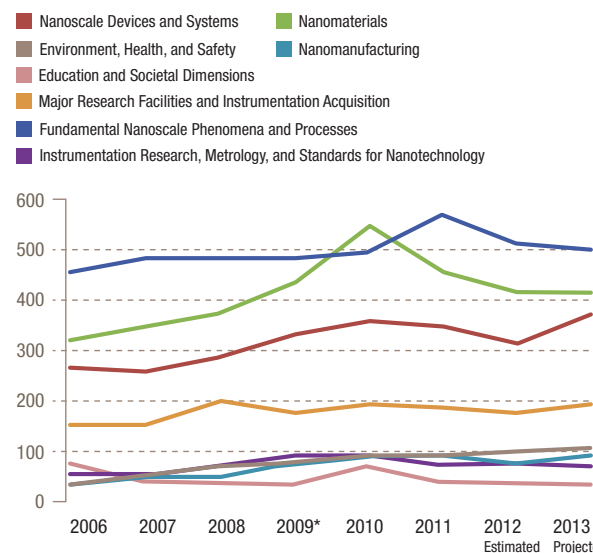


Source: Congressional Research Service

## Funding per NNI Program Component Area (PCA)

The maturation of nanoscience has led to increased funding for applied nanotechnology research in Program Component Areas (PCA) such as nanodevices and nanomanufacturing. Applied research funding is now \$500 million, slightly more than the \$498 million invested in basic research. With 80 companies and dozens of research institutes involved in nanotechnology R&D, Illinois is ideally positioned to capture this funding and spur economic growth through technology commercialization and advanced manufacturing.

Annual investment by PCA, 2006–2013, \$ millions



\*Not including ARRA funding  
Source: National Nanotechnology Initiative

## Illinois' Nanoindustry Profile

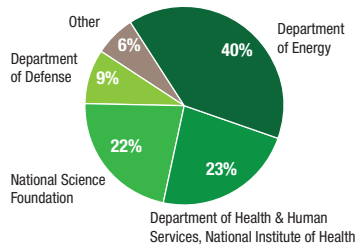
- 10x Microstructures
- 10x Technology, LLC
- Abbott Laboratories
- Advanced Diamond Technologies, Inc.
- Advanced Life Sciences
- Agilent Technologies
- Alpha Precision, Inc.
- Amcol International
- APP Pharmaceuticals
- Applied Thin Films, Inc.
- Arryx, Inc.
- Astellas
- AuraSense, LLC
- AuraSense Therapeutics
- Baxter
- BioSante Pharmaceuticals
- Boeing
- BP Chemicals
- Cabot Microelectronics
- Caterpillar, Inc.
- ChemSensing, Inc.
- CogNiTek
- Hitachi High Technologies America, Inc.
- Honeywell Sensing and Control
- Horizon Pharma, Inc.
- Integrated Genomics
- Kanematsu USA
- Knowles
- Lonza
- Lundbeck, Inc.
- Medical Murray
- Micro Measurement Laboratories, Inc.
- Motorola Applied Research Center
- Motorola, Inc.
- Nanocor, Inc.
- Nanodisc
- Nanolnk, Inc.
- NanolIntegris, Inc.
- Nanophase Technologies Corporation
- Nanosphere, Inc.
- NanoSonix
- Nanotope, Inc.
- Ohmx Corporation
- Optobionics
- Polyera
- Precision Biomarker Resources
- QuesTek Innovations, LLC
- RTI International
- SmaTec International
- SpeedFam Co., Ltd
- Taylor Hobson
- Technotrans
- Therapeutic Proteins, Inc.
- Turtle Wax, Inc.
- Wilson Sporting Goods Co.
- WITec

# Solving Grand Challenges Through Nanotechnology

## Improved Energy and Clean Water

The 2013 budget requests \$443 million for Department of Energy (DOE) investment in nanotechnology. This makes the DOE the largest recipient of NNI funding out of twenty-five participating agencies. Up to 39% of funding for basic research and almost 40% of funding for the nanomaterials PCA will be administered by the DOE.

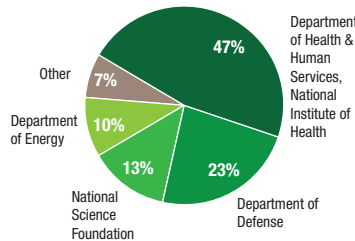
Nanomaterials research funding by agency, 2013 (projected)



## Personalized Medicine

Health and Human Services (HHS)/National Institutes of Health (NIH) qualify for \$409 million in NNI funding for 2013. Over 46% of funding for applied research in nanodevices and systems will be assigned to NIH.

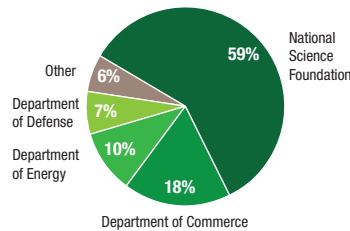
Nanodevices funding by agency, 2013 (projected)



## Advanced Manufacturing Innovation

Nanomanufacturing is a top federal priority, and it will be funded through the Sustainable Nanomanufacturing Nanotechnology Signature Program (NSI), a collaborative multi-agency effort. Over 59% of funding for nanomanufacturing for 2013 is assigned to the National Science Foundation (NSF)

Nanomanufacturing funding by agency, 2013 (projected)



Source: National Nanotechnology Initiative

# Illinois' Nanoscience and Nanotechnology Facilities

## Northwestern:

- International Institute for Nanotechnology**
- NSF Nanoscale Science and Engineering Center (NSEC) for Integrated Nanopatterning and Detection Technologies
  - Center for Transportation Nanotechnology
  - Center for Bioengineering and Nanoscience in Advanced Medicine (IBNAM)
  - NSF Research Science and Engineering Center

## University of Illinois Champaign-Urbana:

- Center for Nanoscale Science and Technology**
- Beckman Institute for Advanced Science and Technology
  - Biotechnology Laboratory
  - Coordinated Science Laboratory (CSL)
  - Frederick Seitz Materials Research Laboratory
  - Institute for Genomic Biology (IGB)
  - Micro and Nanotechnology Laboratory (MNTL)
  - National Center for Supercomputing Applications (NCSA)
  - School of Chemical Sciences

## NSF Nanoscale Chemical-Electrical-Mechanical Manufacturing Systems (Nano-CEMMS)

## Center for Agricultural, Biomedical, and Pharmaceutical Nanotechnology (CABPN)

## University of Chicago:

- NSF Research Science & Engineering Center (MRSEC)

## Consortium for Nanoscience Research (CNR)

## University of Illinois Chicago:

- Microfabrication Applications Laboratory (MAL)

## Northern Illinois University:

- Institute for Nanoscience, Engineering & Technology (INSET)

## Argonne National Laboratory:

- Center for Nanoscale Materials

## Southern Illinois University:

- Materials Technology Center

The 2013 budget projects approximately \$190 million for Major Research Facilities and Instrumentation Acquisition, with over 60% funds assigned to the DOE. A world class system of nanoscience research facilities positions Illinois as a top competitor for funding that will help retain cutting edge research in Illinois and provide new commercialization opportunities and a competitive advantage to local spin off companies.

## Allocation of funding for facilities and instrumentation by agency, 2013 (projected)

Department of Energy	\$118.5 million	62%
National Science Foundation	\$28.5 million	15%
Department of Commerce	\$16.4 million	9%
Department of Defense	\$15 million	8%
Department of Health & Human Services, National Institute of Health	\$11.4 million	6%

# Policies That Will Drive Economic Growth Through Nanotechnology

## Nanotechnology Collaborative

An organization led by leaders of nanotechnology research, development and commercialization could steer the state's efforts to make nanotechnology an economic driver in Illinois.

## Proof of Concept Center

Proof of concept centers can be mechanisms which fill the funding gap of seed-stage investing. They can accelerate the commercialization of innovations out of the university and into the marketplace.

## Shared Facilities Program

A nanotech commercialization grant program could be put in place to ease the financial burden on existing nanotechnology facilities in providing support staff and covering over-head costs, thus making the user facilities more accessible to those who are in the business of creating jobs.

## Application Assistance Programs

Illinois currently captures just over 2% of SBIR and STTR funding. Emerging companies require specialized assistance to capture more federal funding for early stage companies.

## Workforce Development Program

Companies will go where they can find an adequate workforce. To stay ahead of the curve, Illinois must have a skilled workforce in place for nanotechnology. This could be accomplished through two-plus-two high school and community college programs, or community college programs.

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