

# National Nanotechnology Initiative: A Strategic Vision for Responsible Development

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## **Strategic Themes**

- NNI Guidance Documents
- Integration of EHS across the NNI
- Nanotechnology Policy Directions



control of matter at nanoscale for:

National Economic Benefit

National Security

Improved Quality of Life

DHS

**SEPA** EPA

USPTO

USGS

Science for a changing world

DOL

DOEd

ITC

CPSC

NRC

DOS

DOTr

DO

ITIC

DOJ

DOC/BIS



#### **NNI: Guided by Strategic Documents**

#### NATIONAL NANOTECHNOLOGY INITIATIVE

STRATEGIC PLAN

National Science and Technology Council Committee on Technology Subcommittee on Nanoscale Science, Engineering, and Technology

#### February 2011



National Nanotechnology Initiative ENVIRONMENTAL, HEALTH, AND SAFETY

RESEARCH STRATEGY

National Science and Technology Council Committee on Technology Subcommittee on Nanoscale Science, Engineering, and Technology

#### October 2011



### NNI Vision and Goals: Strategic Plan to Organize the Innovation Pipeline

**Vision of the NNI** .... a revolution in technology and industry that benefits society.

#### Goals

- Advance world-class nanotechnology research and development
- Foster the *transfer of new technologies* into products for commercial and public benefit
- Develop and sustain educational resources, a skilled workforce, and the supporting infrastructure and tools to advance nanotechnology
- Support responsible development of nanotechnology



# EHS Challenge: Translate Goal 4 into a Strategy to Decrease Risk and Support Product Development

# **EHS** Mission:

- Protect public health and the environment through sciencebased risk analysis and risk management and
- Foster technological advancements that benefit society



#### **Risk Management Research Framework**



# **Targeting and Accelerating Research**

#### **Critical Elements:**

- Prioritize nanomaterials for research
- Establish standard measurements, terminology, nomenclature, and assay methods
- Develop informatics and predictive modeling tools
- Stratify knowledge for risk assessment
- Partner to achieve the NNI EHS research goals, including globally





#### Partnering Globally to Achieve the NNI EHS Research Goals



Communities of Research for Nanotechnology EHS



NNI Booth at Japan Nanotech 2012



Russian scientists met with Deputy Director Sally Tinkle at the National Nanotechnology Coordination Office as part of the Open World Program.



NNI-OECD International Metrics Symposium

### NNI Signature Initiatives: Focusing the Scientific and Technological Spotlight

- Address R&D gaps within *critical national challenges*
- Leverage skills, resources, and capabilities among multiple NNI agencies to *maximize scientific and technological progress*
- Prepare a field for *industrial commercialization*





#### **Sustainable Nanomanufacturing**

**Collaborating Agencies:** NIST, NSF, DOE, DOD, EPA, IC/DNI, NIH, NIOSH/OSHA, USDA/FS

**Goal:** Use nanotechnology to improve design of scalable and sustainable nanomaterials, components, devices, and processes and to develop nanomanufacturing measurement technologies



DeVolder et al., Advanced Materials



#### Nanotechnology for Sensors & Sensors for Nanotechnology

Improving and Protecting Health, Safety, and the Environment

**Collaborating Agencies:** CPSC, DOD/DTRA, EPA, FDA, NASA, NIH, NIOSH, NIST, NSF, USDA/NIFA

**Goal:** To coordinate and stimulate creation of the knowledge, tools, and methods to develop nanotechnology-enabled sensors and sensors to track the fate of engineered nanomaterials in the body and the environment.





#### Nanotechnology Knowledge Infrastructure

Enabling National Leadership in Sustainable Nanomaterial Design

**Collaborating Agencies:** CPSC, DOD, DOE, EPA, FDA, NASA, NIH, NIOSH, NIST, NSF, OSHA

**Goal:** To develop the infrastructure to support the transformation of data to knowledge in support of nanotechnology and build the tools and communities of scientists and technologists who will use the tools





### **Identifying Synergies and Opportunities**



Potential areas for collaboration

- Understanding physical and chemical properties along the length and time scale
- Data and databases of mutual interest
- Procedural and technical issues in developing open innovation communities
  - e.g., IP and standards, data curation and federation, minimum information requirements
- Shared protocols and best practices

#### Advanced Manufacturing Partnership: Creating High-Quality Manufacturing Jobs of the Future in the US

#### • Developed by industry & university leaders

• **Goal:** invest \$1 billion to catalyze a national network of up to 15 manufacturing innovation institutes around the country that would serve as regional hubs of manufacturing excellence



#### First Award Announced August 16, 2012 National Additive Manufacturing Innovation Institute, Youngstown, Ohio

- Initial \$30 million in federal funding, matched by \$40 million from the winning consortium, which includes 40 companies, 9 universities, 5 community colleges, and 11 non-profit organizations from the Ohio-Pennsylvania-West Virginia 'Tech Belt.'
- Additive manufacturing (3D printing) is a new way of making products and components from a digital model



### Emerging Technologies Interagency Policy Coordination Committee (ETIPC)



 Broad principles: guide development and implementation of policies for oversight across the US government

Science and Technology Priorities Memo for FY14 Budget recognizes the importance of <u>nanotechnology</u>, <u>nanoEHS</u>, <u>and</u> <u>NSIs</u>

Scientific Integrity: I vederal regulation and oversight of a based on the best available scientific evidence. Adequate and developed, and new knowledge should be taken into

March 11,2011

Our regulation: system must printed public health, velfare, selfer, and eur evolution while promoting economic growth, incornation, competitiveness, and job creation. Is most he hand on the heat available econom." Periodenic Disana, Economic Doder 15565, January II, 2011.

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June 9, 2011

risk; nanomaterials should not as a class be presumed either benign or harmful



#### **NNI Information Resources**

