



Nanotechnology Research Program

Health, Safety and Environmental Aspects of Nanotechnology at EPA



2010 NSF Nanoscale Science and Engineering Grantees Conference

Nora Savage, PhD

US EPA,

Office of Research & Development

National Center for Environmental Research

Office of Research and Development

Technology and Engineering Division

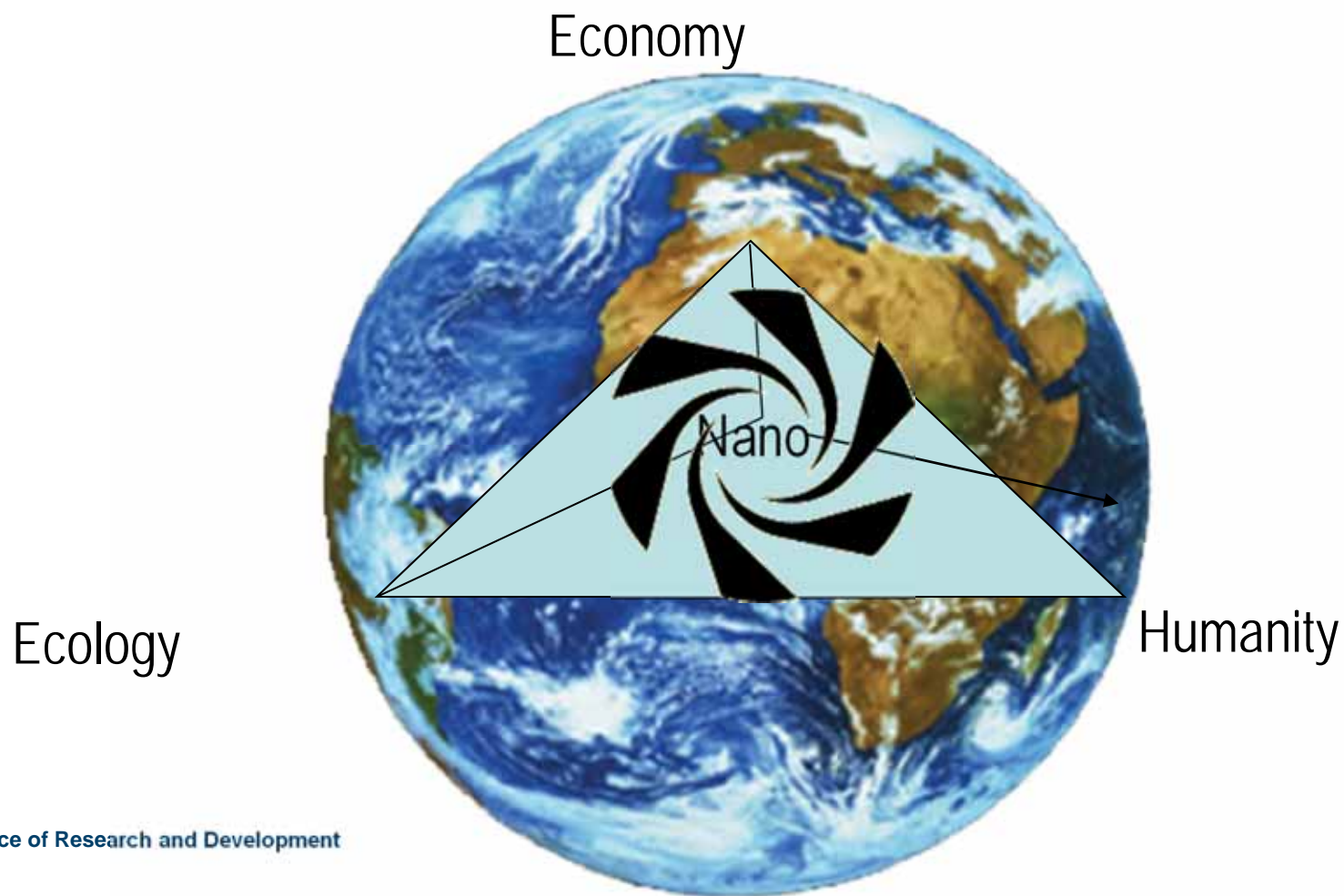


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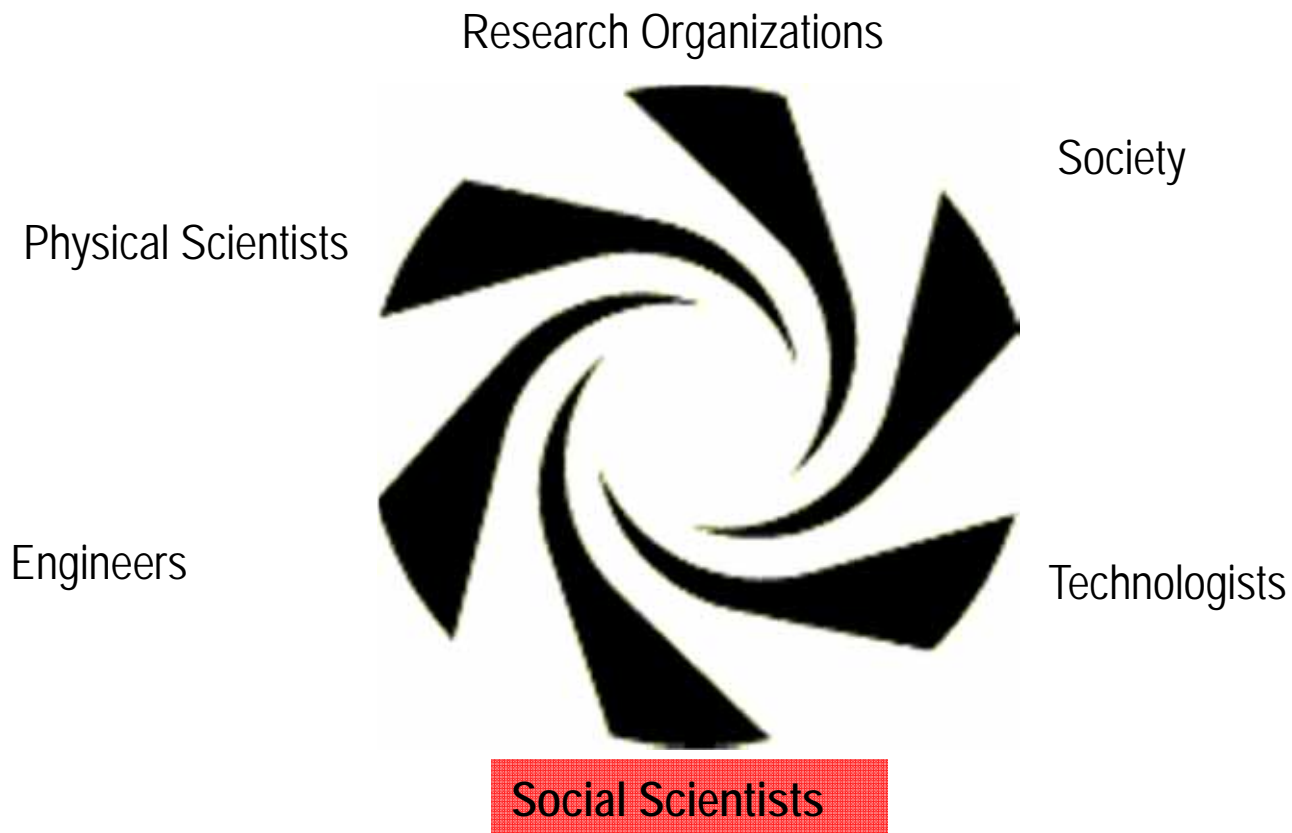
OUTLINE

- Sustainable Approach
- EPA & Nano
- EPA STAR Research
- Path Forward

Core - Sustainable Design



Core - Sustainable Design





EPA's Interest in Nanotechnology

Nanotechnology Research Program

- **Fulfill mission**

- Develop appropriate risk assessment & risk management approaches

- **Provide leadership**

- U.S. and global communities - environmental apps and impls

- **Support research**

- Enhance collaborations, increase knowledge base

- **Address statutory requirements**

- CAA, CWA, FIFRA, RCRA, SDWA, TSCA, etc.

- **Encourage proactive approach**

- Predictive tools (comp tox), P2, green nano)



Nanotechnology Res

November 2008 • EPA/600/P-08/001
Free PDF Download
www.epa.gov/600/p08001

Core - Sustainable Design

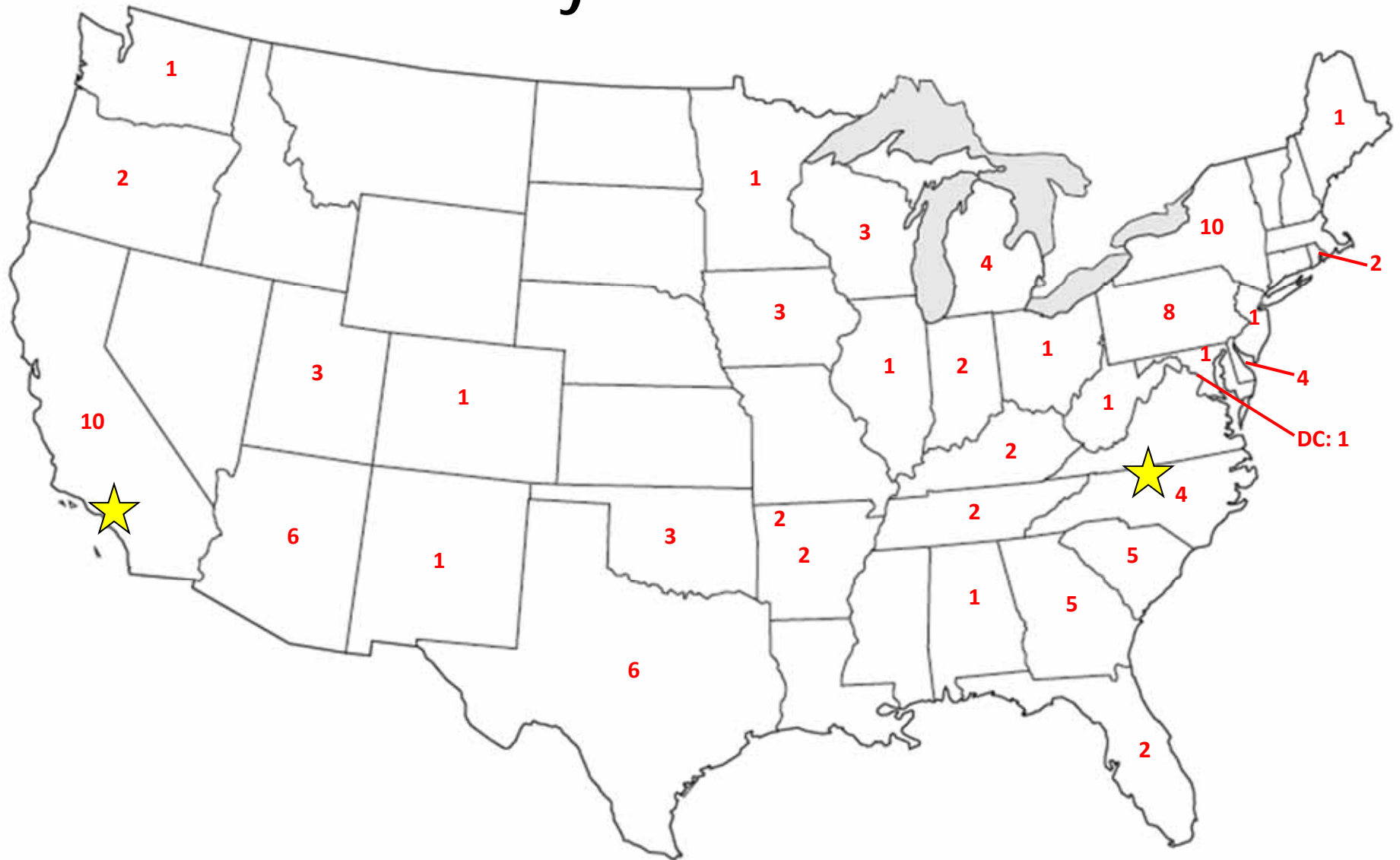


SHINING "STAR" Examples

Science To Achieve Results

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Grants by state 2002-2008





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Research at NCER

Applications – use nano to improve monitoring/detection and remediation techniques, pollution prevention

(Approx. \$12.2 M to date)

Implications – assess the interactions of enms (human & env), exposure, and possible risks that may arise

(Approx. \$17.8 million to date, excluding ultrafine)

Silver Socks

ugAg/g sock content for 6
commercial nano-Ag socks



Pure Ag nps observed

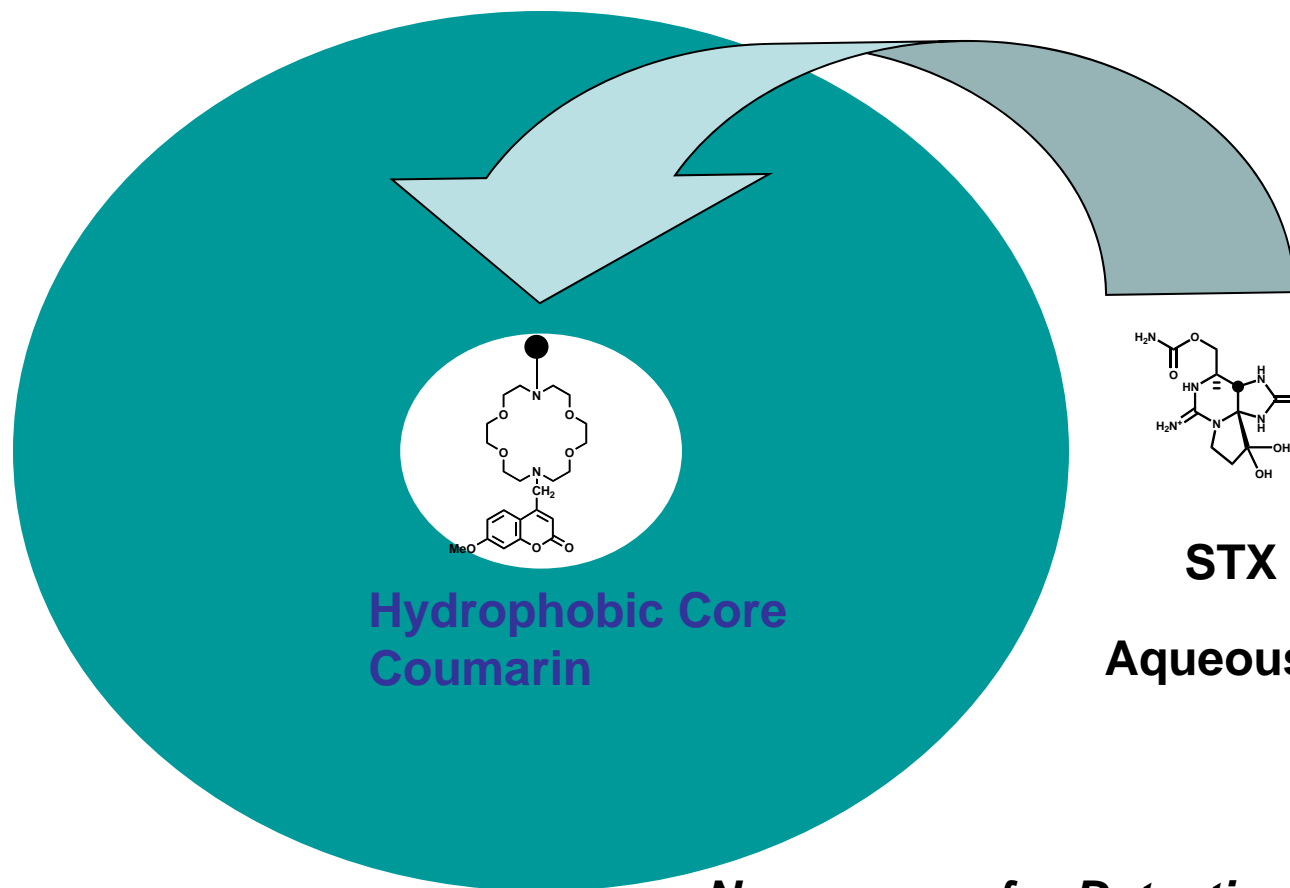
***Biological Fate & EM Detection of
Nanoparticles During Wastewater
Treatment***

Paul Westerhoff, ASU

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Coumarin Sensor Anchored in Dendrimer

Permeable Walls
of Dendrimer



Nanosensor for Detection of Saxitoxin
Robert Gawley, University of Arkansas

CEINs

- 2007 Solicitation through NSF
 - 2 Awards – UCLA and Duke
- \$1M/year from EPA, ~\$7M/year from NSF for initial 5 year period
- International Partners
- Enabling holistic approach – introduction of novel compounds/materials



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2008 Solicitation

Environmental Effects of Nanomaterials

- Joint with United Kingdom
- Investigating Environmental Effects of Manufactured Nanomaterials
 - fate/transport & exposure
- ~ \$4 million (US, UK), \$2 million each, 4 years
- Consortia teams
- Closed August 2009
- 13 proposals received

3 awards (CPSC)

Office of Research and Development



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2009 Solicitation

Increasing Scientific Data on the Fate, Transport and Behavior of Engineered Nanomaterials in Selected Environmental and Biological Matrices

- Collaboration with EC
- ~ Additional consideration" on US side (EC partnership)
- Opened November 2, 2009, Closed February 2, 2010
- ~100 Proposals received
- 14 awards EPA, NSF, USDA



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Nanomaterial Research Strategy (NRS)

EPA Research Needs

EPA initial focus on the following high priority areas.

- Environmental fate, transport, transformation
- Exposure
- Monitoring and detection methods
- Effects assessment methods

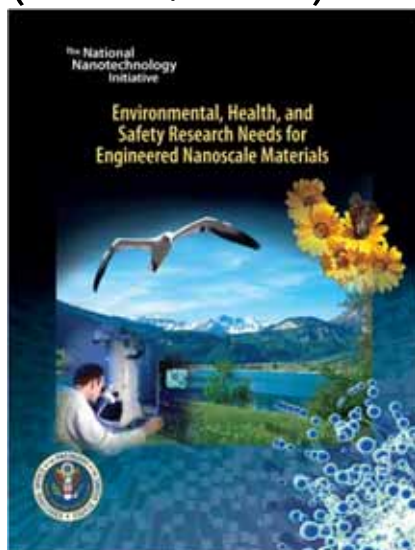




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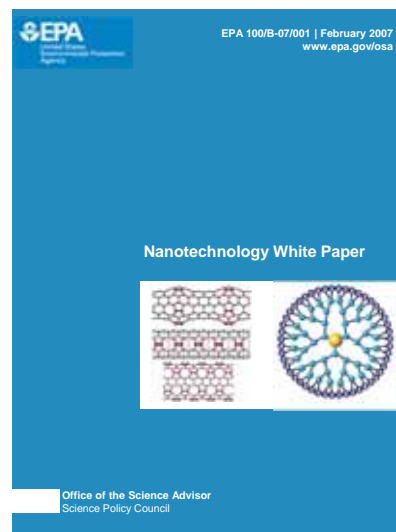
ORD Nanomaterial Research Strategy

Nanotechnology Environmental and Health Implications (NEHI) Interagency Working Group of NSET, (NSTC, 2006)



http://www.nano.gov/NNI_EHS_research_needs.pdf

EPA White Paper on Nanotechnology (EPA, 2007)



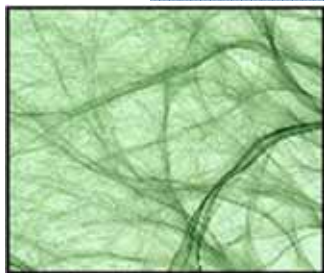
<http://www.epa.gov/OSA/pdfs/nanotech/epa-nanotechnology-whitepaper-0207.pdf>



Nanotechnology Research Program

NCER's Nano Web Page

Nanotechnology Home



Nanotechnology

Factsheet

Solicitations

Newsroom

Research Projects

**Publications &
Proceedings**

Nanotechnology has both applications and implications for the environment. EPA is supporting research in this technology while evaluating its regulatory responsibility to protect the environment and human health. This site highlights EPA's research in nanotechnology and provides useful information on related research at EPA and in other organizations.

<http://www.epa.gov/ncer/nano>

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EPA's Nano Web Page



Types of Nanomaterials

Exposure

Ecological Effects

Health Effects

Green Manufacturing

Risk Assessments

Pollution Management

Fate and Transport

Research Centers Research Grants

Life Cycle Research



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Direction & Goals - STAR

- Continued focus on understanding fate/transport
- Understanding behavior of enms
 - Interactions w/ other compounds & materials
 - Interactions within biological and environmental media
 - Transport between environmental media

Move from “compound x compound” approach →

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Moving Towards.....



Holistic assessment and management of environment

Collaborations (ALL sciences)

Result in

Improved public health and environmental protection

Application of beneficial technologies for QoLI

Understanding of complex mixtures – real exposures

=> emerging materials



Nanotechnology Research Program

2011 Gordon Research Conference



Environmental Nanotechnology GRC

May 29 – June 3

Waterville Valley Resort, NH



Nanotechnology Research Program

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