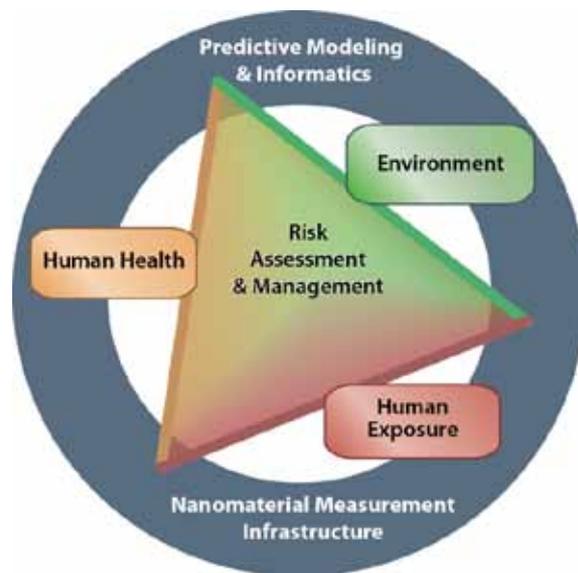




2011 NNI Environment, Health, and Safety Research Strategy



Sally S. Tinkle, Ph.D.
Deputy Director
National Nanotechnology Coordination Office
Coordinator for NNI EHS
stinkle@nnco.nano.gov



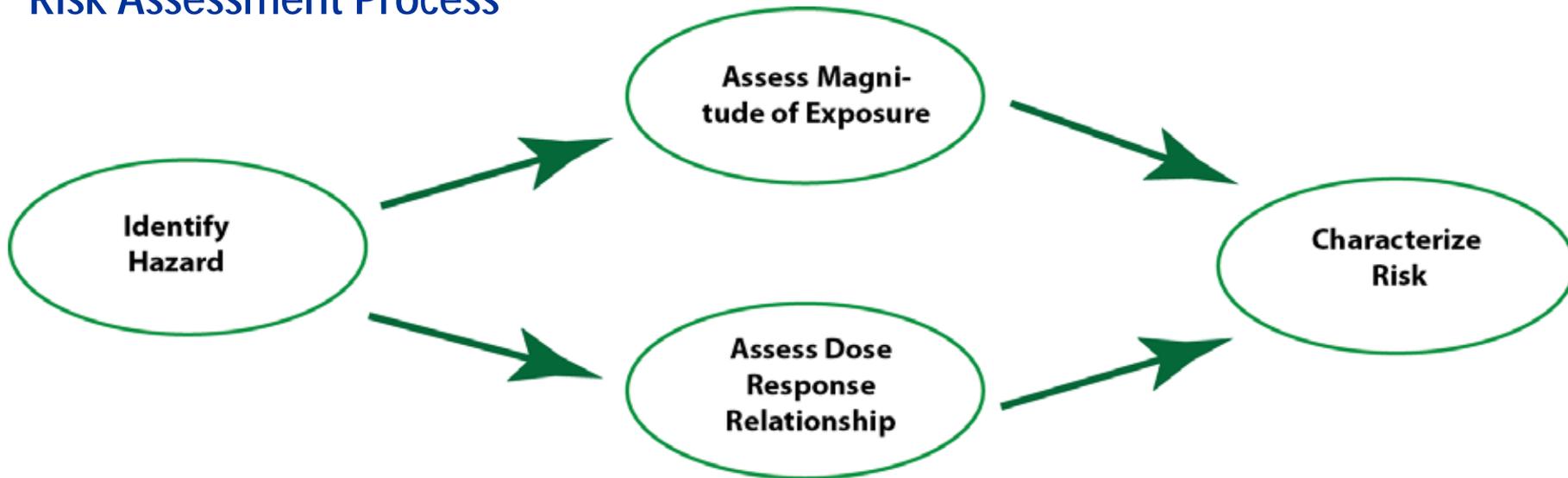
NNI Environmental, Health, and Safety Mission

- Protect public health and the environment
- Employ science-based risk analysis and risk management
- Foster technological advancements that benefit society



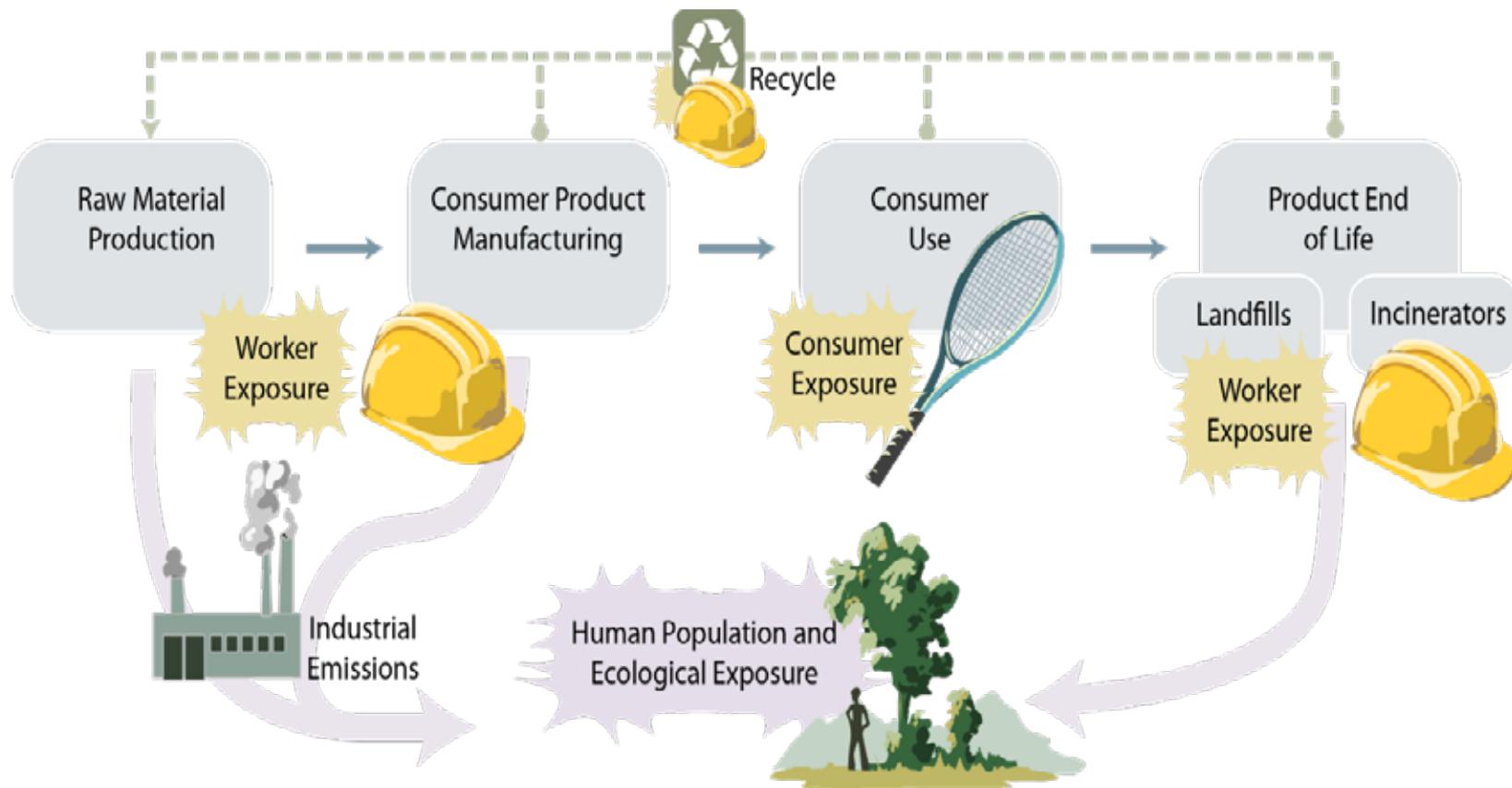
Framing the Research Strategy

Risk Assessment Process





Life Cycle Stages





Product Life Cycle Stages

Raw Materials

Research, Design
and Development

Production

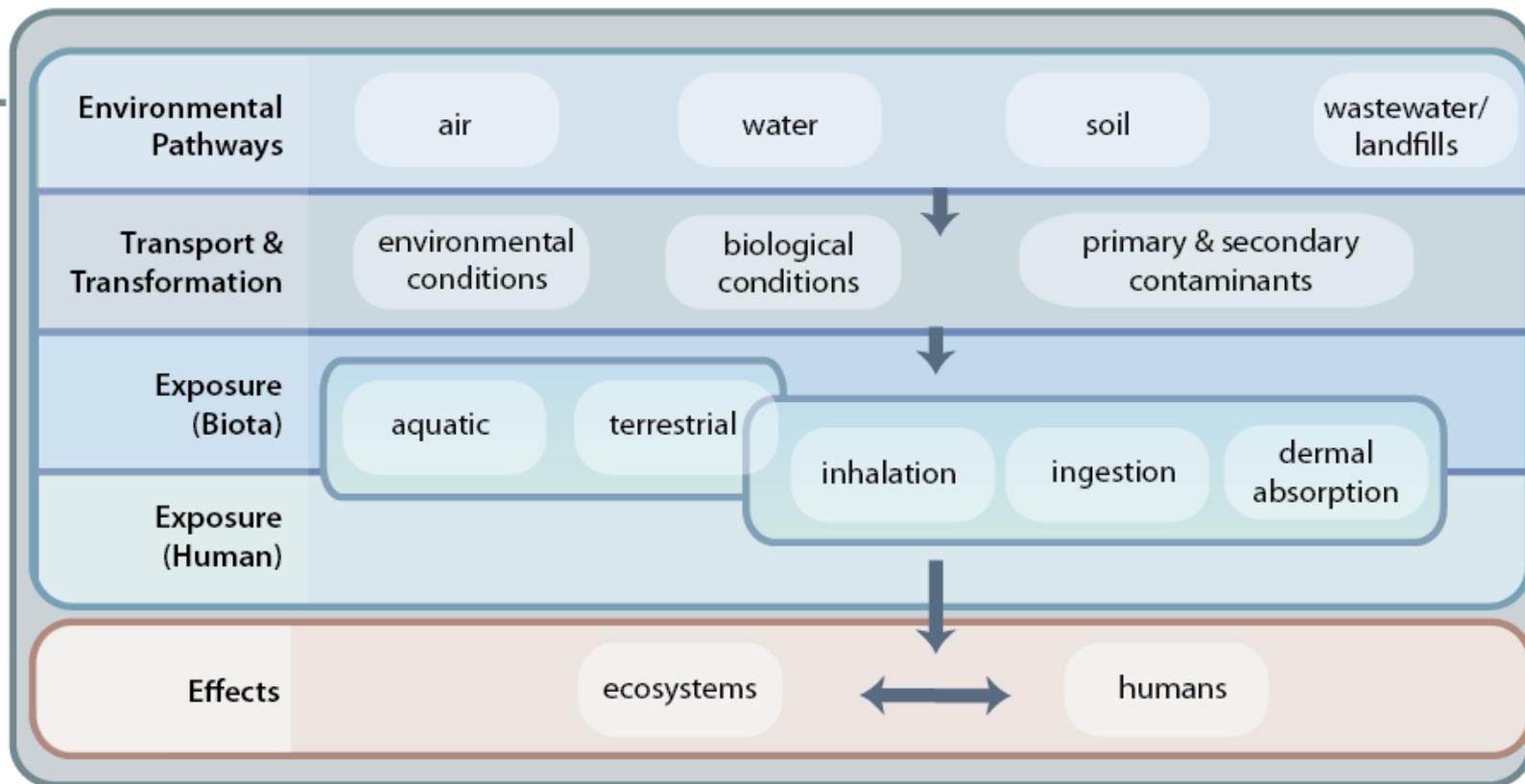
Commercialization
Consumer Use

Disposal or Recycling

Risk Assessment Paradigm

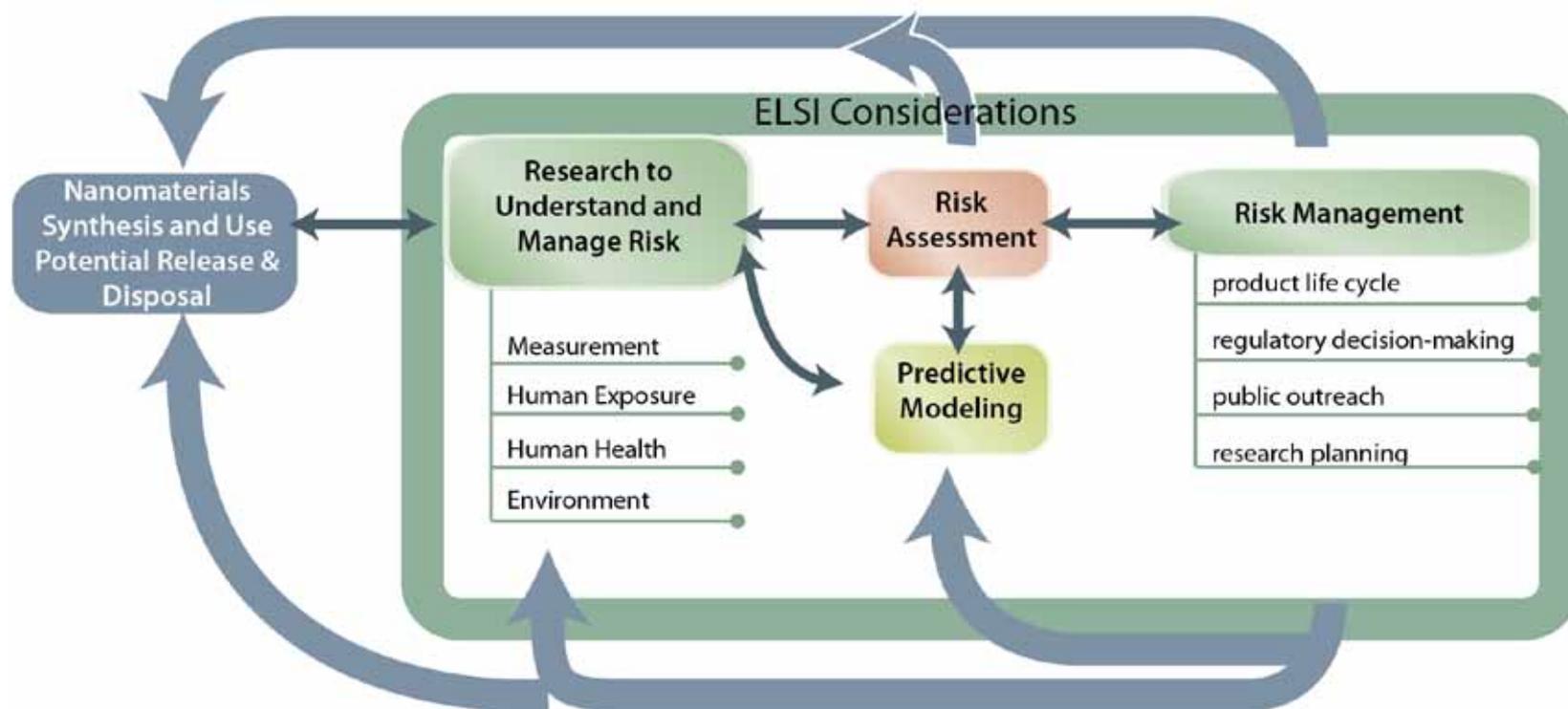
Exposure
Assessment
Transport/
Transform
Concentration
in Env.
External Dose

Hazard ID
Internal Dose
& Response





Risk Management Research Framework

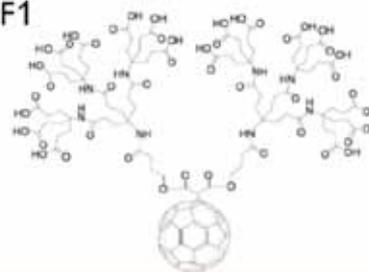




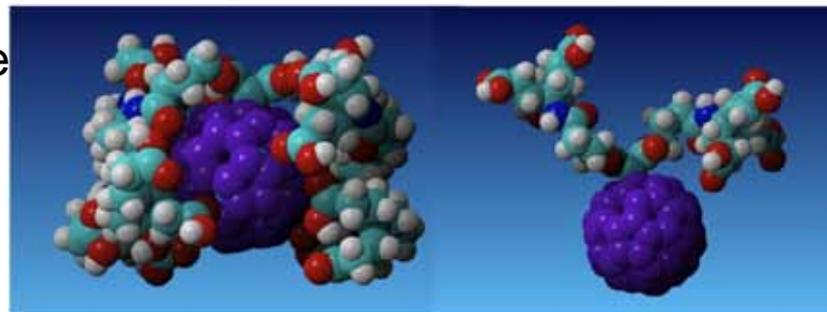
Informatics and Modeling for NanoEHS Research

- Aid development, analysis, organization, archiving, sharing, and use of data that is acquired in nanoEHS research projects in the core research.
- Effectively manage reliable, high-quality data to support advanced modeling and simulation.
- Sections:
 - Data acquisition, analysis, sharing
 - Structural models
 - Predictive models and simulations
 - Collaborative informatics infrastructure
 - New research need

DF1



DF1-mini





Targeting and Accelerating Research

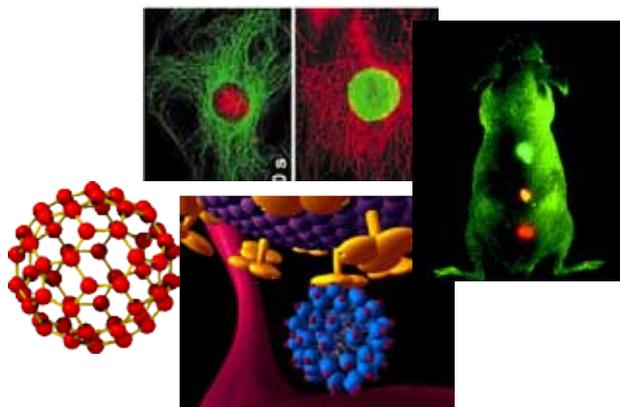
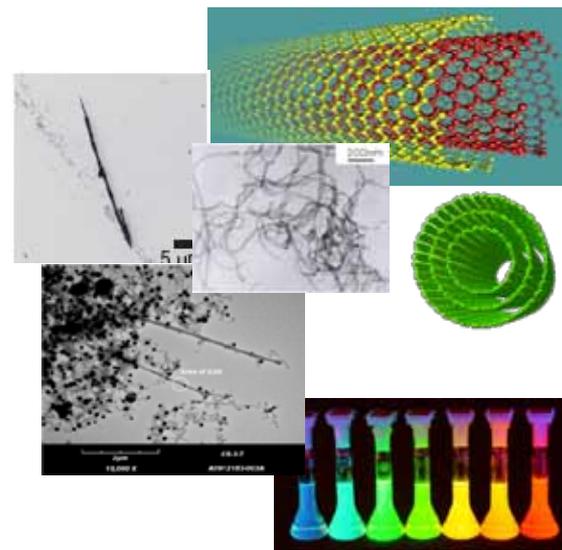
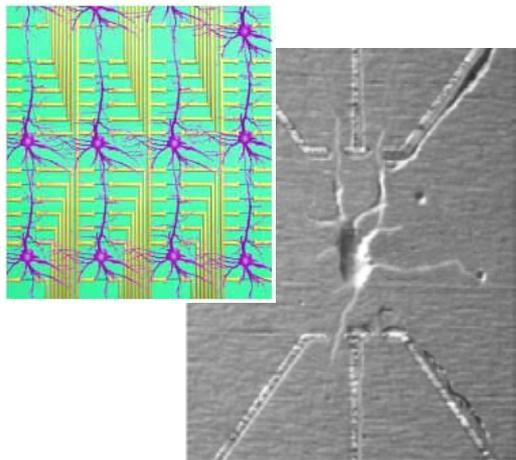
- Prioritize which nanomaterials to research
- Establish standard measurements, terminology, and nomenclature
- Maximize data quality
- Stratify knowledge for risk assessment
- Partner to achieve the NNI EHS research goals
- Engage internationally





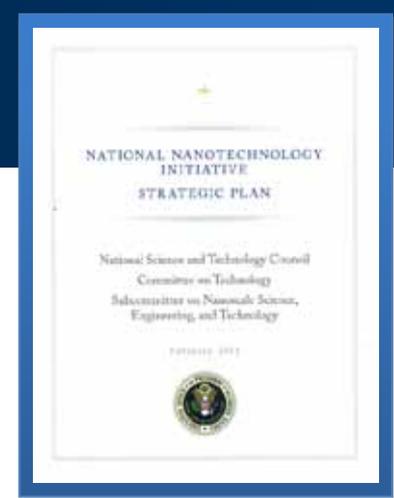
Prioritizing Nanomaterials for Research

- Potential for hazard
- Likelihood of exposure
- High reactivity
- Biological novelty
- Identified in a health or environmental event





2011 NNI Strategic Plan



Vision

• A future in which the ability to understand and control matter on the nanoscale leads to 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

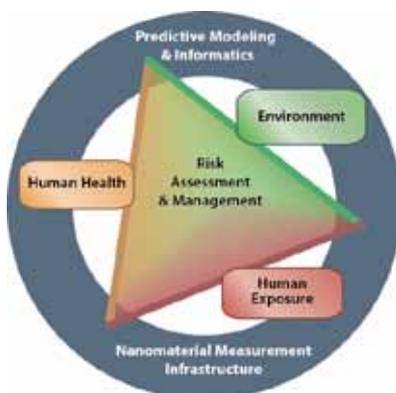


Alignment between Goals and Objectives of the NNI Strategic Plan and the NNI EHS Research Strategy

<p>NNI Strategic Plan Objective 4.1.1.1:</p>	<p>NNI EHS Research Strategy Goals:</p>	<p>Explanation of the Relationship:</p>
<p>Incorporate safety evaluation of nanomaterials into the product life cycle, foster responsible development, and, where appropriate, sustainability across the nanotechnology innovation pipeline, by developing and applying measurement tools (defined as protocols, standards, models, data, and instruments) to assess the physico-chemical properties of engineered nanoscale materials (ENMs) and their biological effects in the environment and on human health and quantify exposure across the nanotechnology product life cycle.</p>	<ul style="list-style-type: none"> ■ Develop measurement tools for determination of physico-chemical properties of engineered nanoscale materials in relevant media and in products ■ Develop measurement tools for determination of biological response, and to enable assessment of hazards and exposure for humans and the environment from engineered nanomaterials and nanotechnology-based products throughout all stages of their life cycles ■ Understand the relationship of physico-chemical properties of engineered nanoscale materials to <i>in vivo</i> physico-chemical properties and biological response. ■ Identify, characterize, and quantify exposures of workers, the general public and consumers to nanomaterials. ■ Understand the environmental fate, exposure, and ecological effects of engineered nanomaterials. 	<p><i>The NNI Strategic Plan objective 4.1.1.1 maps directly to the goals and research needs articulated in the NNI EHS research strategy. The Nanomaterial Measurement Infrastructure (NMI) goals direct development of measurement tools to determine the physico-chemical properties of ENMs in relevant media and in NEP and for the biological response across the ENM and NEP life cycles. The NMI research needs specify the types of assays and measurement tools necessary to achieve the NMI goals, and the resulting tools are applied in the human exposure assessment, human health, and environment categories to make the quantitative measurements of exposure and biological effect. Quantitative measures of exposure are also consistent with the human exposure assessment goal to identify, characterize, and quantify exposures of workers, the general public, and consumers to nanomaterials.</i></p>



2011 NNI Environment, Health, and Safety Research Strategy



**Draft document available on your flashdrive
and at: <http://strategy.nano.gov/>**

**More information on the NNI:
nano.gov**