

Knowledge Infrastructure and Framework for Nano Safety

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Perspectives on informatics approaches for the emerging science of nanotechnology

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Perspectives on informatics approaches for the emerging science of nanotechnology

- Efforts of the National Cancer Informatics Program Nanotechnology Working Group (NCIP NanoWG)
- US-EU Communities of Research interactive exercise: NanoEHS Scrimmage 2.0
- The CEINT NanoInformatics Knowledge Commons (CEINT NIKC)

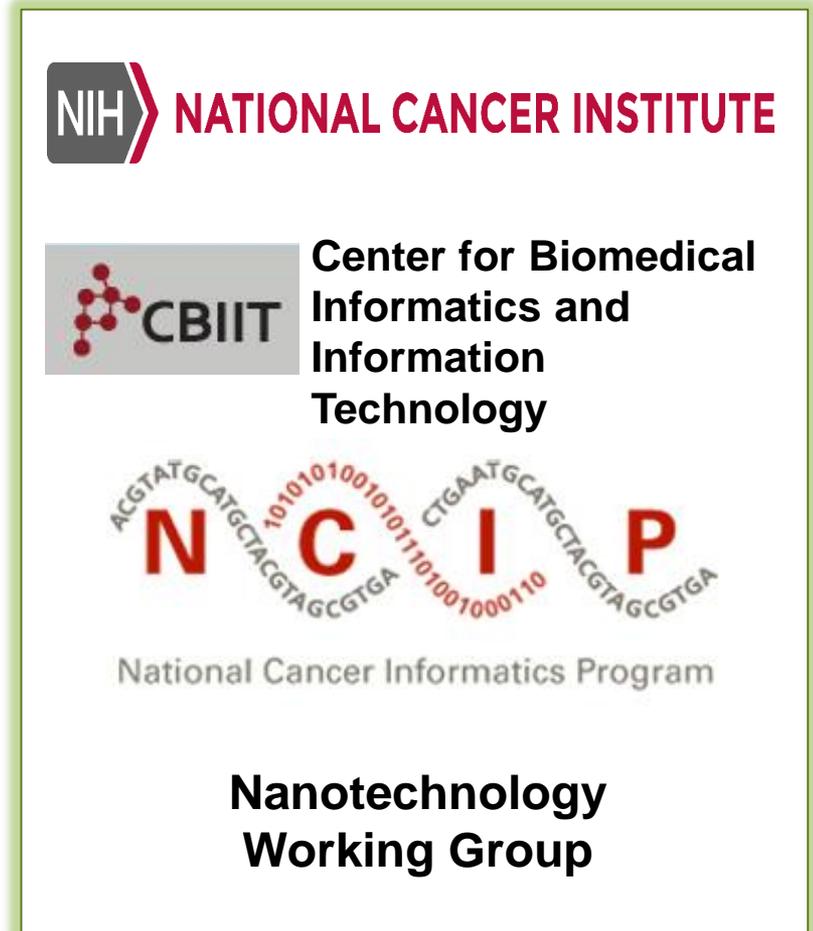
NCIP Nanotechnology Working Group

Initiated in 2008 as an open, informal working group, with the objectives of:

- Assessing and defining needs of the cancer nanotechnology research community
- Defining standards for cancer nanotechnology research community in a variety of areas
- Defining and prioritize informatics applications in nanotechnology that fulfill priority needs

Weekly working meetings

Co-chairs: Stacey Harper and Christine Ogilvie Hendren



• Join the mailing list NANO-STANDARDS-L@LIST.NIH.GOV at <https://list.nih.gov/>

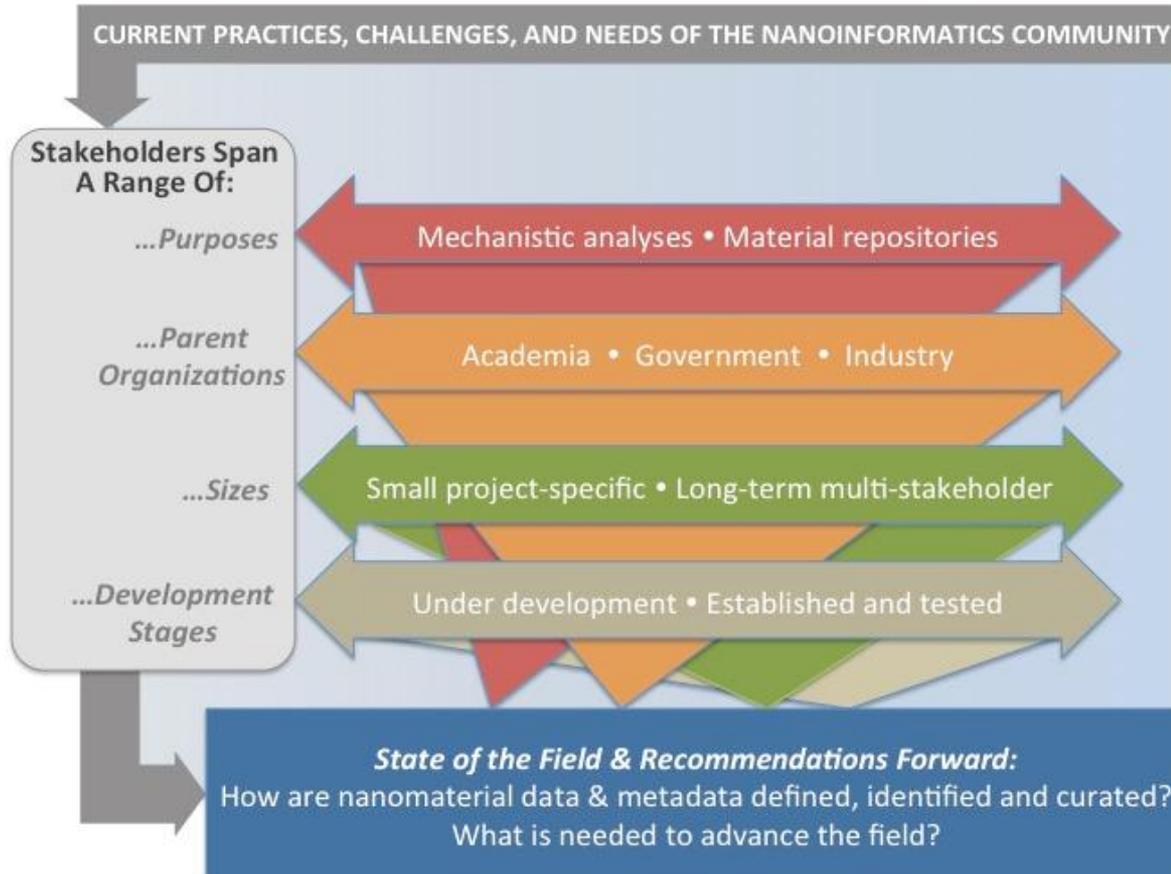
• E-mail Mervi.Heiskanen@nih.gov

NCIP NanoWG Goals

- Enable nanoinformatics applications
 - Develop data exchange standards (ISA-TAB-Nano)
 - Develop ontologies (Nano Particle Ontology)
 - Build a community of practice around nano-data reuse and integration (Nanomaterial Data Curation Initiative)
 - Advancing nanomaterial data integration and reuse: Pilot projects (EPM/ZP Workshop)
- To support ultimate goals of informatics in nanomedicine
 - Predictive models for nanomaterial activity
 - Rational design of nanomaterials
- To bridge with other non-medical nano data communities
 - Environmental / ecological implications of nanotechnology
 - Responsible development of materials for sustainable nanotechnology

Building a community of practice around nanomaterial data integration and reuse: *The Nanomaterial Data Curation Initiative (NDCI)*

- Capture a snapshot of current curation practices and concerns
- Develop recommendations for moving toward increasingly harmonized curation practices



1. Framing Paper
2. Curation workflows
3. Data completeness and quality
4. Curator responsibilities
5. Data Integration
6. Metadata

US-EU COR NanoEHS Scrimmage 2.0: A competitive game to address pragmatic nanomaterial questions

Purpose: Exchange of expert opinions across scientific disciplines and practices organized as six Communities of Research (CoR's)

Design: Shared problem scenario where resolution requires the CoR's to interact in small groups (12 teams) and report out their results to authorities (fire companies, first responders) and through them, the public.

Theme: Two nano-pesticide products, one silver-based and one copper-based, spilled on city streets and near a waterway.

Outcomes likely to be explored:

- Interactions between experts and public authorities;
- Adequacy of publicly available information for the unexpected, unplanned exposure;
- Identifying short-term spill containment and long-term site remediation considerations;
- Distinguishing among pristine nanoparticle, formulated nano-pesticide and environmentally transformed nanoparticle categories in a defined location; and
- Awareness that regulations and standard for spills differ from those of chemical registration.

US-EU COR NanoEHS Scrimmage 2.0: The scenario and the charge

We are in Washington D.C. for this conference. Two events have just happened, with spills of two different nano-enabled pesticide products. We have four hours to prepare for a briefing, during which time each COR-based team will rotate through all other CORs in structured time-blocks to draw on their respective expertise.

Scenario A:

One product (nanoAg-enabled) has been released in the Chesapeake Bay through an accidental spill of a large shipment of nanoform pesticides. In 4 hours the press and members of the public will arrive for a public briefing, where they will expect to be presented with an action plan for supporting decisions about key concerns, and to ask the nanoEHS community targeted questions about their concerns.

Scenario B:

The other product (nanoCu-enabled) has been released onto an urban street / loading area. In 4 hours a confidential briefing will be held before representatives of the pesticide company, regulators, and city officials (for this, assume any role relevant from a US or EU perspective). At this briefing they will expect to be presented with an action plan for supporting decisions about key concerns, and to ask the nanoEHS community targeted questions about their concerns.

Data in the CEINT

NanoInformatics Knowledge Commons (NIKC)

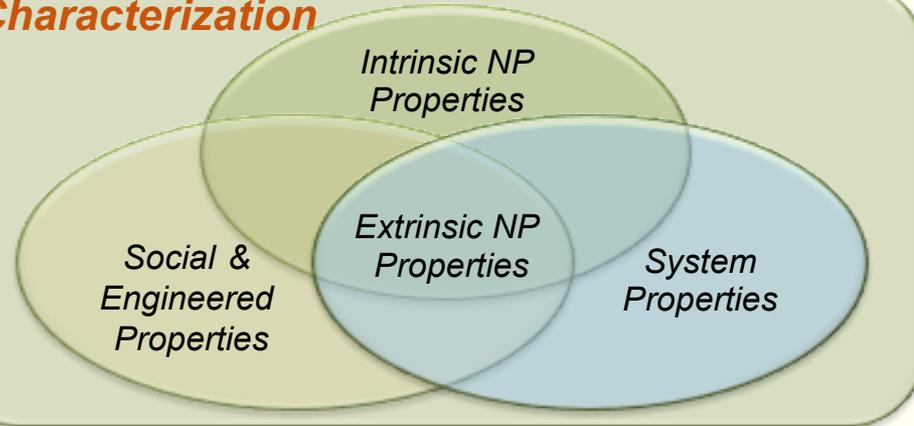
Meta-Data

Bibliometrics

Analytical Protocols
(e.g. equipment, methods, temporal and spatial data)

Experimental Protocols
(e.g. methods, temporal and spatial data)

Characterization



Functional Assays

Dissolution Rates

Surface Affinity

In-vitro Bioassays

Intermediary, semi-empirical parameters that bridge the gap between nanomaterial properties and potential outcomes

Exposure Endpoints

Persistence

Transformations

Mobility

Hazard Endpoints

Biomagnification

Bioactivity Endpoints

Ecological Endpoints
e.g. nutrient cycling

A black and white photograph of a rocky river with a central oval overlay containing the text "Questions?". The river flows over numerous dark, jagged rocks, creating white, turbulent water. The background shows a steep, rocky bank. The central oval is dark with a thin orange border and a green glow effect.

Questions?