Community of Research: Nanotechnology Databases and Ontologies

VISION

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• CoR launched in May 2012 as part of the joint EU-US initiative on bridging nanoEHS research efforts

• Goal: enable nanotechnology research through informatics
Nanomaterials data diversity is challenging

Size distribution data

Tissue biodistribution

Anti-tumor activity

In vitro drug release

Surface morphology data

Drug loading data

Sampling

Preparation

Chemical composition of nanoparticle formulation

Nanotechnology information needs

- Systematically describe nanomaterials (identification, structure, morphology, composition, ...)
- Nanomaterial phys-chem properties
- Interaction with NM immediate environment
- Understand nanomaterial impact on human health
- Environmental behavior
- Search for existing data on nanoparticle synthesis and properties
- Exchange nanomaterial chemical, physical, and biological data (comparability)
- Design nanomaterials with custom properties for specific applications
Nanotechnology data resources are distributed through various hubs and terminologies, such as PubMed, NBI, caNanoLab, NANOhub, and Nano-registry. These resources are interconnected, facilitating the exchange of information between basic research, clinical applications, environmental, occupational, and health (E, O, S, & H) studies, and industry & manufacturing sectors.
Vision

Needed

- Interconnected, freely communicating and agreed information systems covering
  - nanoscale material descriptions
  - NM properties (intrinsic & context-dependent) and their effects,
  - including environmental and health-related

Goal

- enable the sharing, searching, and analysis of NM characterization data
  across a wide range of active and archived experimental sources
- to give advice on how to structure these data to enable their widest possible use

This will

- allow integration of pertinent risk assessment data among labs
- provide situational awareness of data coverage across nanomaterial categories
- enable predictive computational models for bridging physical properties
  and biological outcomes with exposure, dispersal and fate
Initially the CoR will focus on three areas:

- Identification of the **data elements** necessary to establish common data-sharing model(s) for this domain

- Specification of **requirements for sharing data** between research groups and repositories in human- and machine-interpretable forms

- **Definition of concepts** necessary to support the above activities and representation of those concepts in an **ontological framework**

**Vision statement:**
http://us-eu.org/communities-of-research/search-communities-of-research/databases-ontologies/
Previous activities

- Consolidated vision statement: scope, objectives
- 2 teleconferences July & August 2012
- Started compilation of available resources (databases, ontology)
Now:

- Nathan Baker (Pacific Northwest Laboratory)
- Iseult Lynch (University College Dublin)
- Breakout Discussion
Main issues to be discussed

- Available resources and data
  - Complete inventory of resources
- Initial data sharing priorities / data needs
  - coordination with other CoRs (2-3-4)
  - Materials (description/properties)
  - Nano-bio interface
  - Health-related (hazard – exposure)
  - Environment
  - Fate....
Main issues to be discussed

- Initial ontology concept priorities
- Workplan priorities
- Agreed future actions