Introduction

As the mounting concern regarding the potential impact of nanotechnology on the environment and human health, there is a global drive to ensure that the development of beneficial nanotechnologies is accomplished in a responsible manner so as to avoid adverse environmental and human health impacts. Therefore, better understanding and mapping of the pharmacology and toxicology of nanomaterials are urgently required in order to provide the needed knowledgebase/guiding principles for the development of safe-by-design nanomaterials and nanomedicines. Accomplishing the above requires further investigation and development in the recently emerged field of nanoinformatics for acquisition, processing, visualization, management (collection, validation, storage and sharing), and interoperability of large amounts of data, information, and knowledge involved with nanotechnology processes and materials. This workshop aims to provide a forum for nanoinformatics community to exchange ideas and discuss the latest research developments across broad aspects of nanomedicine and environmental health impact assessment of nanomaterials.

Topics of the Workshop include (but are not limited to):

- Data management and database development for nanomaterials
- Ontology and meta-data design for nanomaterial data
- Nanomaterial data standards and interoperability/sharing protocols
- Nanomaterial characterization (i.e., physicochemical/structural properties)
- Text/Literature mining for nanomaterial data collection and integration
- Analysis/Quantification for nano-images (e.g., TEM images of nanomaterials, images generated from in-vivo high-throughput screening of nano-bioactivity)
- Assessment of the value of information in nanomaterial data
- Data mining/Machine learning for nanomaterial data, particularly the development of (quantitative) structure-activity relationships for nanomaterials
- Simulation for nanomaterial fate & transport, nano-bio interactions
- Computing applications for nanomedicine (e.g., drug delivery systems (nano-excipient), diagnosis and prevention, and safe disposal of nanomedicine as household goods)
- Visualization of nanomaterial data
- Environmental and health risk assessment, life-cycle analysis, and regulatory decision making for nanomaterials
- Assessment of ethical and social issues of nanotechnology
- Infrastructure (frameworks/software/tools/resources) for nanoinformatics