



*Nanomaterials and Human Health &  
Instrumentation, Metrology, and Analytical Methods*

*November 17-18, 2009 – Holiday Inn Rosslyn at Key Bridge*

*1900 North Fort Myer Drive, Arlington, VA 703-807-2000*

*Metro: blue or orange line to Rosslyn Station*

*[www.nano.gov/html/meetings/humanhealth/](http://www.nano.gov/html/meetings/humanhealth/)*

# Agenda

## **Tuesday, November 17, 2009**

7:30      **Registration & Continental Breakfast** (*location: Promenade, 2<sup>nd</sup> floor*)

8:30 – 12:00      **Morning Session** (*location: Rosslyn Ballroom*)

**Introductions, Dianne Poster**, National Institute of Standards and Technology

**Welcome and Expectations for the Workshop**

**Clayton Teague**, Director, National Nanotechnology Coordination Office

**Sally Tinkle**, National Institute of Environmental Health Sciences

**Plenary Session, Chair, Steve Roberts**, University of Florida

*Three presentations to set the stage for the workshop, identifying the critical issues and providing common knowledge and language.*

**Eric Grulke**, University of Kentucky

**Characterization of engineered nanomaterials**

**David Grainger**, University of Utah

**Biological in vitro interactions of engineered nanomaterials**

**Break**

**Martin Philbert**, University of Michigan

***Biological in vivo interactions of engineered nanomaterials***

**Charge to Breakouts, Sally Tinkle, NIEHS**

12:00      **Lunch** (*on your own*)

1:30-4:15      **Concurrent Breakout Sessions**

*Participants will probe the state-of-the-science and identify gaps and emerging trends as they relate to the research needs identified in the Federal nanoEHS strategy.*

★ *Characterization—Club Room (1<sup>st</sup> floor)*

★ *In vitro—Shenandoah A&B (2<sup>nd</sup> floor)*

★ *In vivo—Rosslyn Ballroom*



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### ★ Session 1: Characterization

**Co-chairs: Amit Kulkarni, GE Global Research, and Scott McNeil, Nanotechnology**

#### **Characterization Laboratory**

- I1. Develop methods to detect nanomaterials in biological matrices, the environment and the workplace
- I2. Understand how chemical and physical modifications affect the properties of nanomaterials
- I3. Develop methods for standardizing assessment of particle size, size distribution, shape, structure, and surface area
- I4. Develop certified reference materials for chemical and physical characterization of nanomaterials
- I5. Develop methods to characterize a nanomaterial's spatio-chemical composition, purity, and heterogeneity
- H2. Develop methods to quantify and characterize exposure to nanomaterials and characterize nanomaterials in biological matrices

### ★ Session 2: *In vitro* – biological – associated instrumentation

**Co-Chairs: Carolyn Cairns, Consumers Union, and Andrew Maynard, Woodrow Wilson Center for International Scholars**

- I1. Develop methods to detect nanomaterials in biological matrices, the environment and the workplace
  - is this important to understanding hazard to human health
  - will we get the data we need to complete this research need (e.g., do we have the tools we need?)
- I2. Understand how chemical and physical modifications affect the properties of nanomaterials
- H1. Understand the absorption and transport of nanomaterials throughout the human body/cells
- H3. Identify or develop appropriate *in vitro* [and *in vivo*] assays/models to predict *in vivo* human response to nanomaterials exposure
- H5. Determine the mechanisms of interaction between nanomaterials and the body at the molecular, cellular, and tissue levels

### ★ Session 3: *In vivo* – biological – associated instrumentation

**Co-Chairs: Bill Kojola, AFL-CIO, and Richard Pleus, Intertox**

- I1. Develop methods to detect nanomaterials in biological matrices, the environment and the workplace
  - is this important to understanding hazard to human health
  - will we get the data we need to complete this research need (e.g., do we have the tools we need?)
- I2. Understand how chemical and physical modifications affect the properties of nanomaterials
- H1. Understand the absorption and transport of nanomaterials throughout the human body
- H2. Develop methods to quantify and characterize exposure to nanomaterials and characterize nanomaterials in biological matrices
- H3. Identify or develop appropriate [*in vitro* and] *in vivo* assays/models to predict *in vivo* human response to nanomaterials exposure
- H4. Understand the relationship between the properties of nanomaterials and uptake via the respiratory or digestive tracts or through the eyes or skin, and assess body burden
- H5. Determine the mechanisms of interaction between nanomaterials and the body at the molecular, cellular, and tissue levels



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- 4:30 – 5:00 **Invited Presentation** (*location: Rosslyn Ballroom*)  
**Introduction, Travis Earles**, Office of Science and Technology Policy  
**Tom Kalil**, Deputy Director of Policy, Office of Science and Technology Policy  
*The White House Perspective on Nanotechnology Health and Safety*
- 5:00 **Reception** (*Light Hors d'Oeuvres and Cash Bar, outside Rosslyn Ballroom*)

### **Wednesday, November 18, 2009**

- 7:30 **Registration & Continental Breakfast** (*location: Promenade, 2<sup>nd</sup> floor*)
- 8:30 – 10:30 **Morning Session** (*location: Rosslyn Ballroom*)  
**Welcome & Logistics for the Day, Dianne Poster**, NIST  
**Report out from Session Rapporteurs, Chair, Heather Evans**, NNCO  
**Case Studies, Chair, Carolyn Cairns**, Consumers Union  
*Vignettes about real-world experiences help to inform the discussions in the breakout sessions*
- Chuck Geraci**, NIOSH  
[Exposure Measurements](#)
- Don Baer**, Pacific Northwest National Laboratory  
[Characterization Obstacles](#)
- Alison Elder**, University of Rochester  
[International Alliance for NanoEHS Harmonization](#)
- Charge to breakouts, Sally Tinkle**, NIEHS
- Break**
- 10:30-12:15 **Concurrent Breakout Sessions**
- Framework Strategy Analysis Discussion**  
*Sessions build upon the previous day to identify solutions for gaps and barriers, establish a timeline for the research needs, and develop milestones*
- ★ **Session 4: Characterization**  
**Co-Chairs: David Castner**, University of Washington, and **Vicki Grassian**, University of Iowa
- ★ **Session 5: In vitro – biological – associated instrumentation**  
**Co-Chairs: Charles Gause**, Luna Innovations, and **Nancy Monteiro-Riviere**, North Carolina State University
- ★ **Session 6: In vivo – biological – associated instrumentation**  
**Co-Chairs: Steve Roberts**, University of Florida, and **Joel Pounds**, PNNL



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12:30 **Working Lunch** (*location: Rosslyn Ballroom, lunch will be provided*)

**Introductions, Amit Kulkarni**, GE Global Research

*Nanoinformatics: Data-Enabled Predictive Modeling for nanoEHS*

**Martin Fritts**, NCL

**Justin Teeguarden**, PNNL

1:45-3:00 **Closing Session** (*location: Rosslyn Ballroom*)

**Public Comment, Facilitator, Bill Kojola**, AFL-CIO

*To sign up to make a public comment or send in written comments, email*

*[humanhealth@nnco.nano.gov](mailto:humanhealth@nnco.nano.gov) or mail to NNCO, 4201 Wilson Blvd Stafford II Suite 405, Arlington, VA, 22230*

**Report Out & Summary, Chair, David Castner**, University of Washington

*Summary of the thoughts from the three breakout sessions, and audience comments on research needs and framework strategy*

*Congressional Remarks on Nanotechnology Health and Safety*

**Invited Presentation**

**Introduction, Charles Gause**, Luna Innovations

**Next Steps & Final Thoughts**

**Sally Tinkle**, NIEHS, and **Dianne Poster**, NIST

*Looking to the future*

### **Invited Experts**

**Don Baer**, Pacific Northwest National Laboratory

**Alison Elder**, University of Rochester

**Martin Fritts**, Nanotechnology Characterization Laboratory

**Charles Geraci**, National Institute of Occupational Safety and Health

**David Grainger**, University of Utah

**Vicki Grassian**, University of Iowa

**Eric Grulke**, University of Kentucky

**Tom Kalil**, White House Office of Science & Technology Policy

**Andrew Maynard**, Woodrow Wilson Center for International Scholars

**Scott McNeil**, Nanotechnology Characterization Laboratory

**Nancy Monteiro-Riviere**, North Carolina State University

**Günter Oberdörster**, University of Rochester

**Michele Ostraat**, RTI International

**Martin Philbert**, University of Michigan

**Richard Pleus**, Intertox

**Joel Pounds**, Pacific Northwest National Laboratory

**Justin Teeguarden**, Pacific Northwest National Laboratory

**Kim Williams**, Colorado School of Mines

### **Workshop Planning Team**

**Carolyn Cairns**, Consumers Union

**David Castner**, University of Washington

**Charles Gause**, Luna Innovations

**Bill Kojola**, American Federation of Labor and Congress of Industrial Organizations

**Amit Kulkarni**, GE Global Research

**Dianne Poster**, National Institute of Standards and Technology

**Steve Roberts**, University of Florida

**Sally Tinkle**, National Institute of Environmental Health Sciences