

PANEL 4

Novel “Responsive” Hybrid Nanomaterials and Applications



2013 NSF Nanoscale Science and Engineering, Grantees Conference

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Novel “Responsive” Hybrid Nanomaterials and Applications

■ **Moderators:**

- **Philip Demokritou**, Harvard University
- **Andrey Dobrynin**, NSF
- **Hongda Chen**, USDA

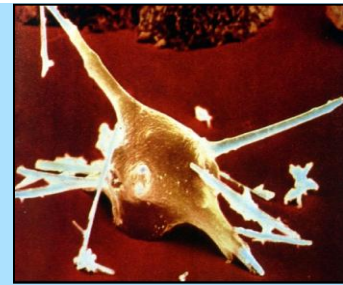
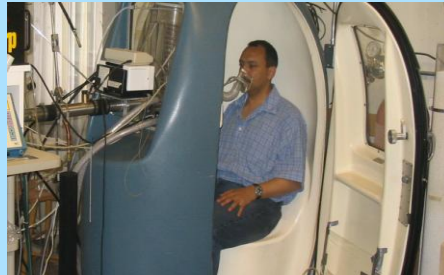
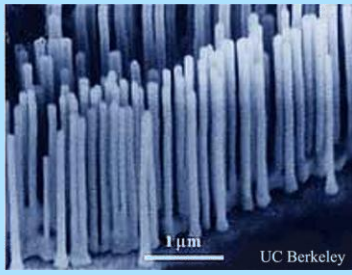
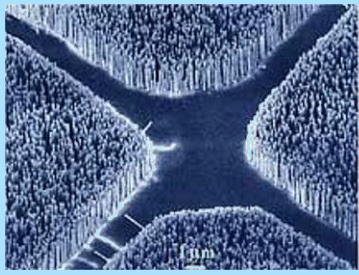
■ **Panelists:**

- **Bruce Hinds**, University of Kentucky
- **Chad Vecitis**, Harvard University
- **Robert Hamers**, University of Wisconsin

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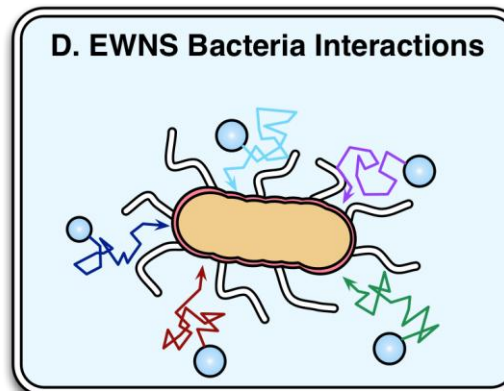
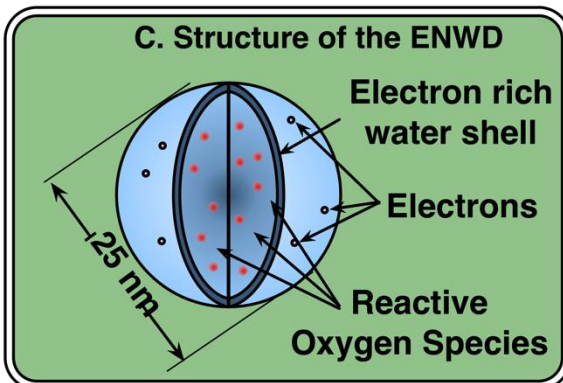
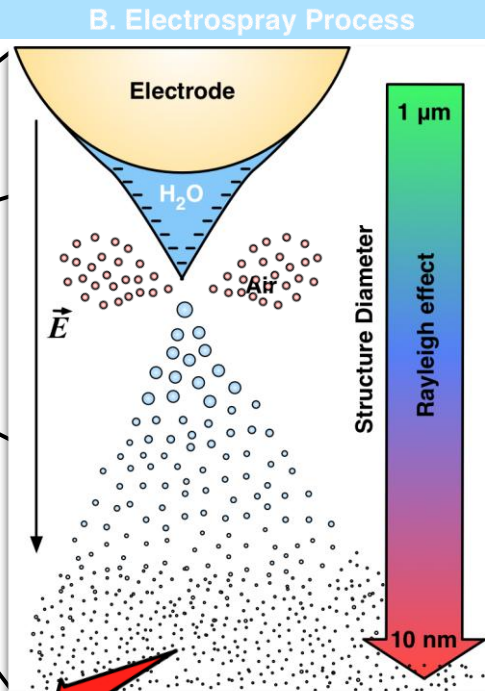
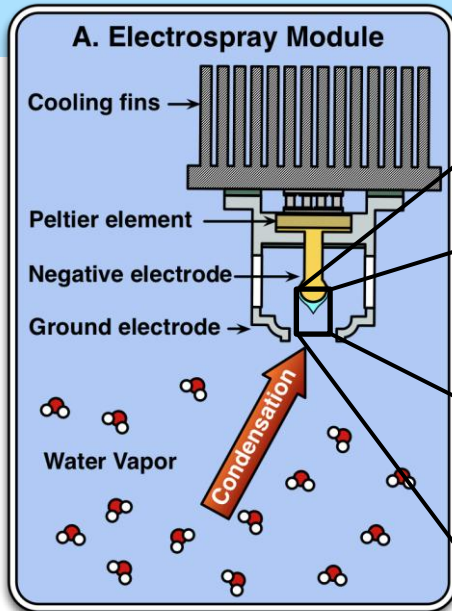
- What are the “horizon” ENMs and applications expected to enter market in near future?
- **Names:** Stimuli- responsive, active, hybrid, complex ENMs
- NT is a changing landscape
- Structural and physico-chemical complexity?
- What do we know in terms of nano-bio interactions? Nano-EHS implications?



NT market is a changing landscape:
Today's ENMs may not resemble those
of the future.

Concept: Engineered Water NanoStructures (EWNS)

...Making water nanostructures out of “thin air”



NOVEL Properties:

- Size: 25 nm in diameter
- EWNS contain on average 10 electrons on their surface.
- Core payload: OH• and O₂• Radicals,
- Lifetime in room air: More than 4 hours!
- Biological properties?

Antimicrobial Applications

- Air and surface pathogen disinfection?
- Fresh produce disinfection
- Medicinal applications-wound healing management

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“Active, Hybrid, and Horizon Nanomaterials”

Robert Hamers, University of Wisconsin

Research Interests:

- Surfaces and interfaces of nanomaterials
- Renewable energy and environmental science NT applications.



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“Carbon nanotube membranes as a platform for protein channel mimetic pumps”

Bruce Hinds, University of Kentucky

□ Research Interests:

□ Active membrane systems

□ Programmable drug delivery, biochemical separations, energy cells, water purification apps



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Environmental Applications of (Re)active Carbon Nanotube-based Membranes

Chad Vecitis, Harvard University

- Research Interests:
 - NT Water treatment applications



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