

# Nanotechnology: Definitions and Challenges

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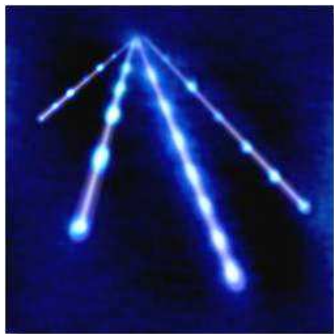
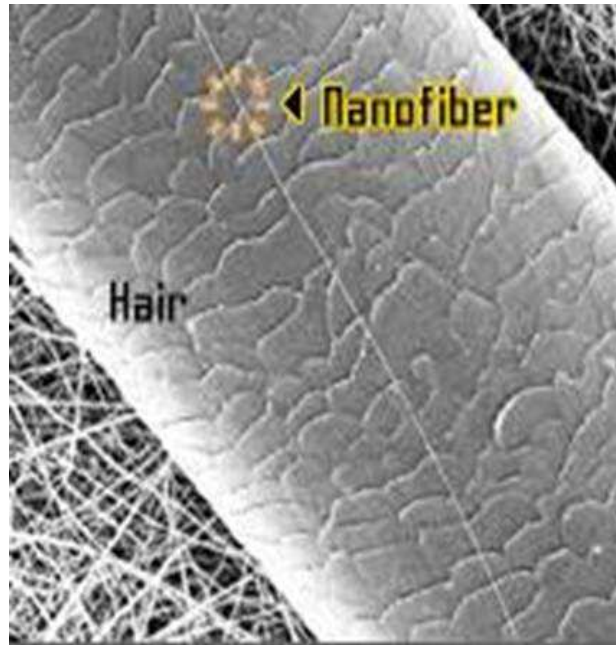
Center for the Environmental  
Implications of NanoTechnology

[www.ceint.duke.edu](http://www.ceint.duke.edu)

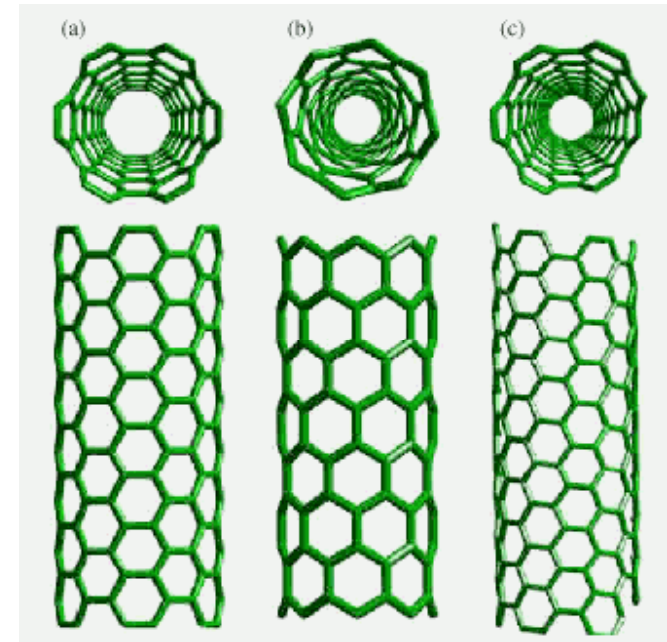
# Acknowledgements



# What is a nanoparticle?



small

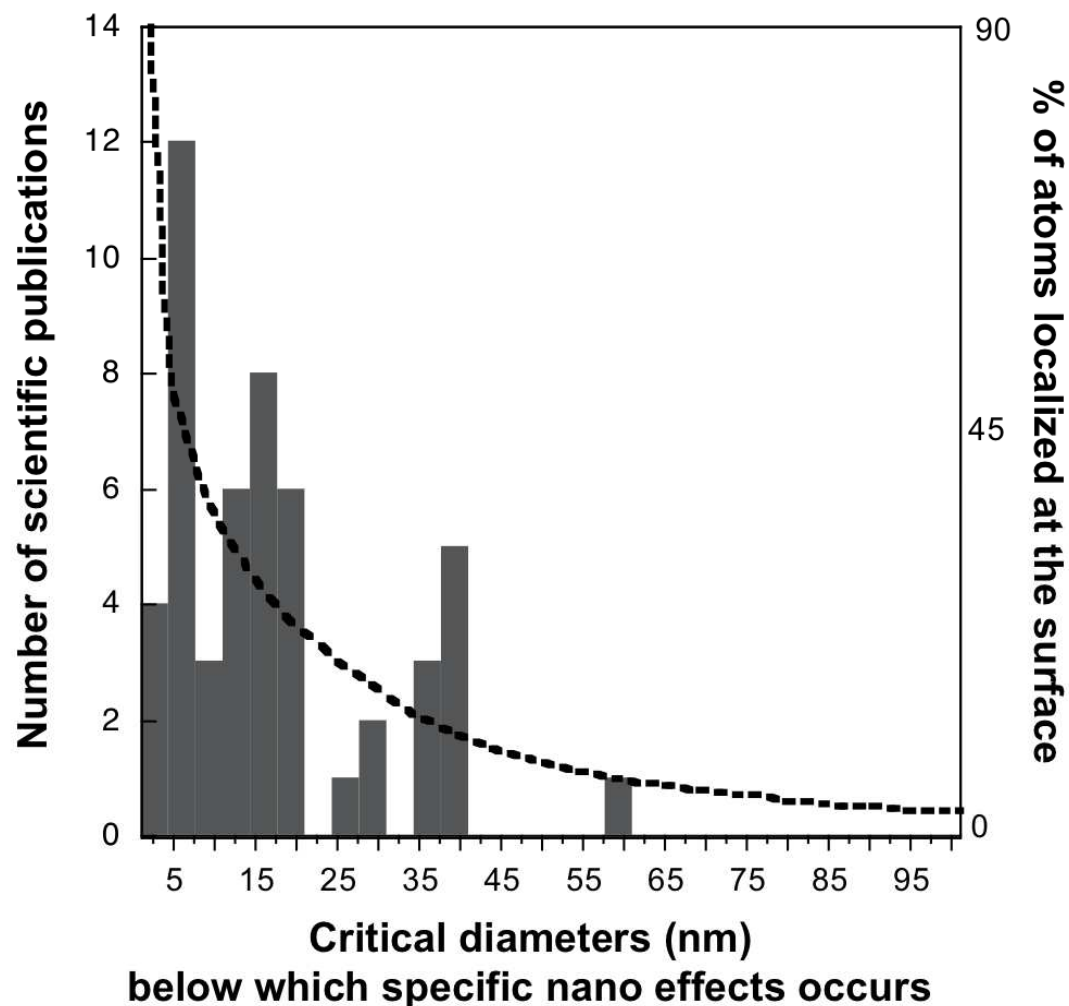


and have special qualities

# Quantum dots

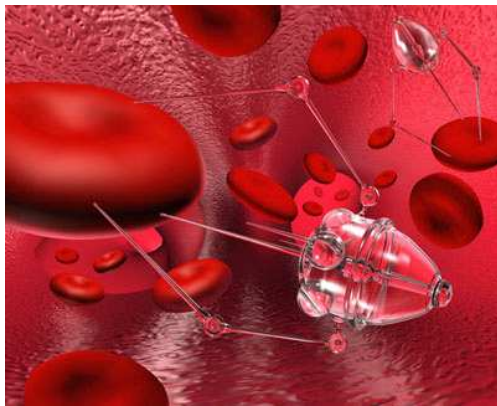


# All that is small is not nano

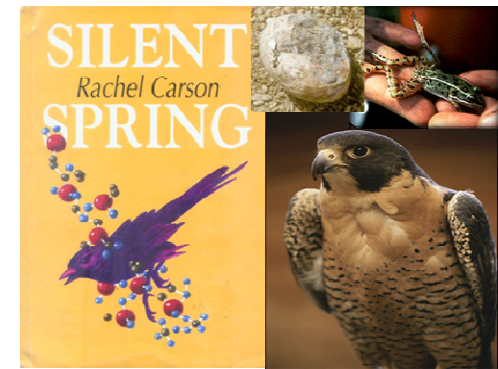
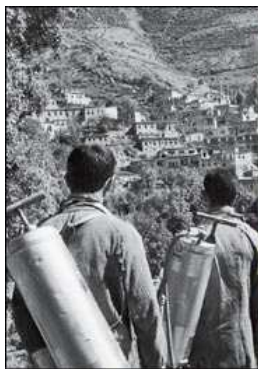
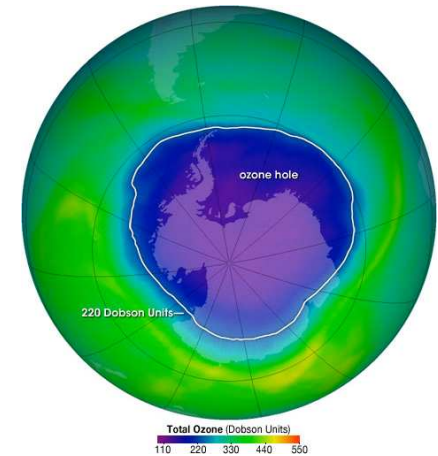


Auffan, M.; Rose, J.; Bottero, J.Y.; Lowry, G.V.; Jolivet, J.P.; Wiesner, M.R., "Towards a definition of inorganic nanoparticles from an environmental, health, and safety perspective," *Nature Nanotechnology* PUBLISHED ONLINE: 13 SEPTEMBER 2009

# Special qualities mean new technologies and products



# How do we make sure that new products are not dangerous?



# Center for the Environmental Implications of NanoTechnology (CEINT)

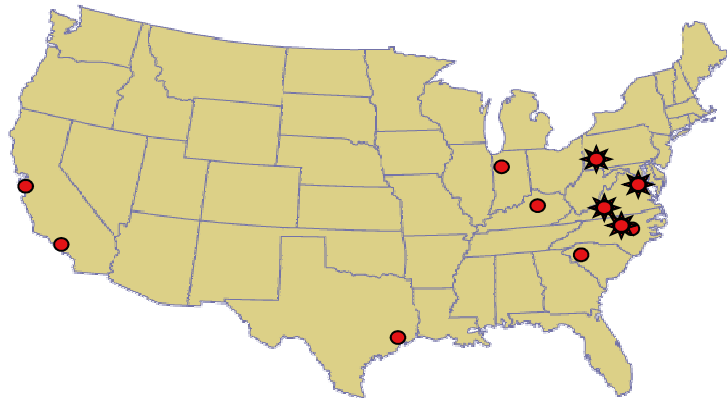


**4 Core Institutions: Duke (headquarters), CMU, Howard, Virginia Tech**

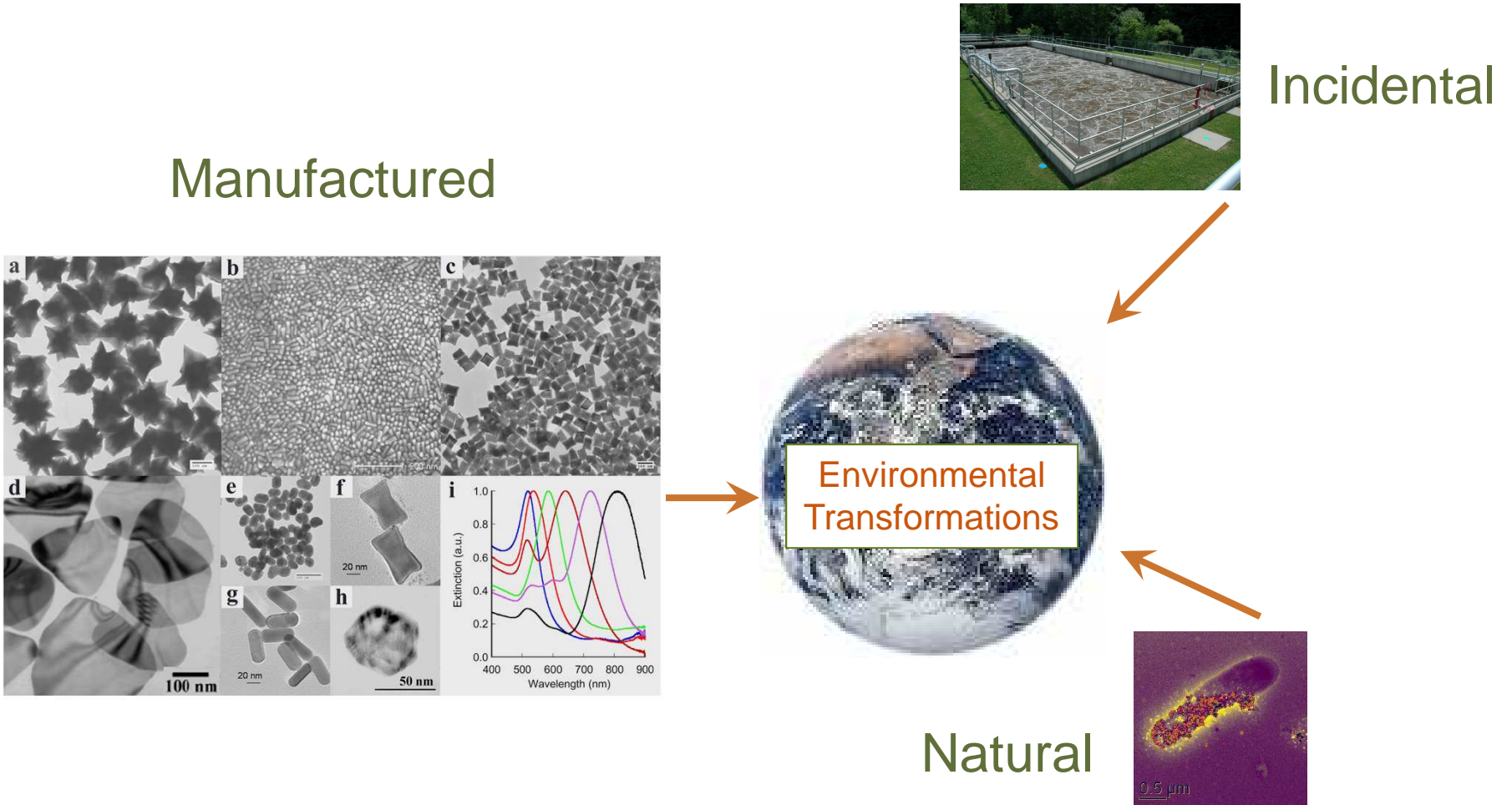
**+ U Kentucky, Stanford**

**Collaborators from 5 US government entities**

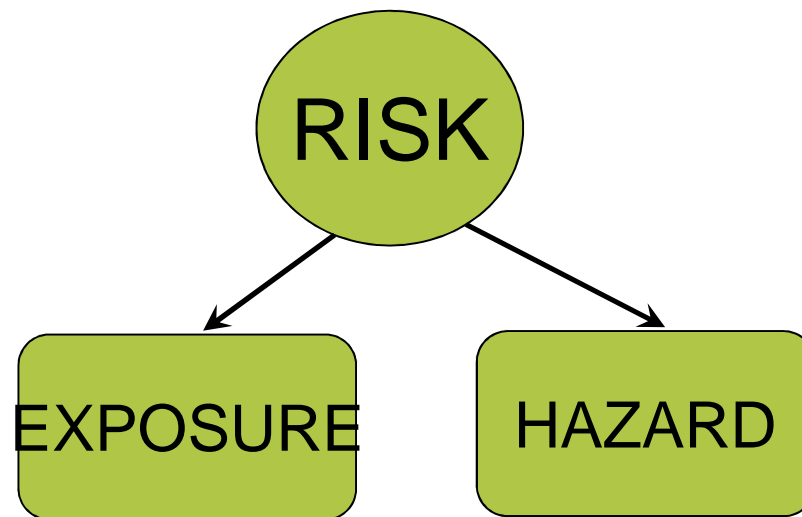
**ICEINT= CEINT + over 17 International partners on 3 continents coordinated by French consortium with CNRS and CEA funding**



# CONSIDER ALL SOURCES: MANUFACTURED, NATURAL AND INCIDENTAL NANOPARTICLES



If nanomaterials pose a risk what are the options for managing risk?



# Several efforts developing protocols for nanomaterial handling and standards



**Charles O. Holliday, Jr.  
Chairman of the Board  
DuPont**

**Industry Perspective:  
Where we are and how did we get here?**