



standardization  
and innovation

2006 ANSI ANNUAL CONFERENCE



## An Introduction to Nanotechnology

*Presented by*

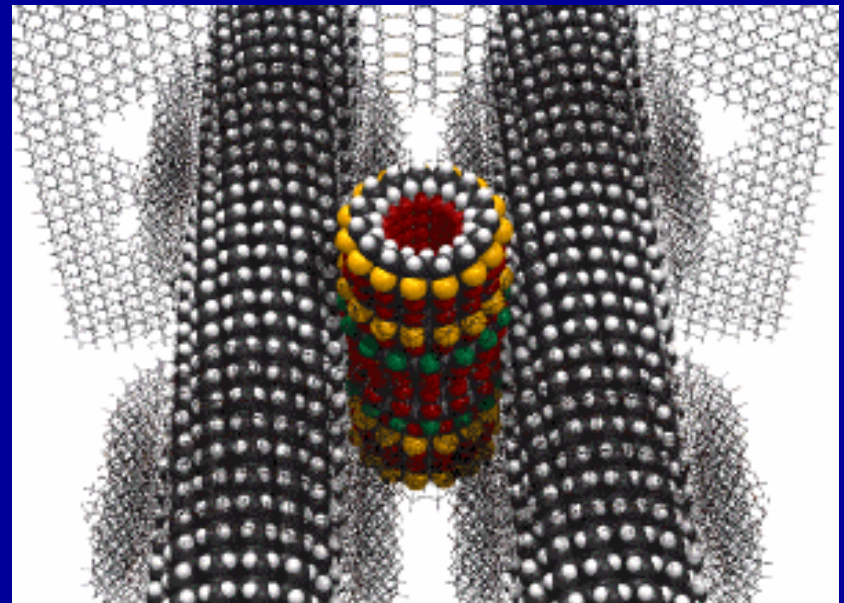
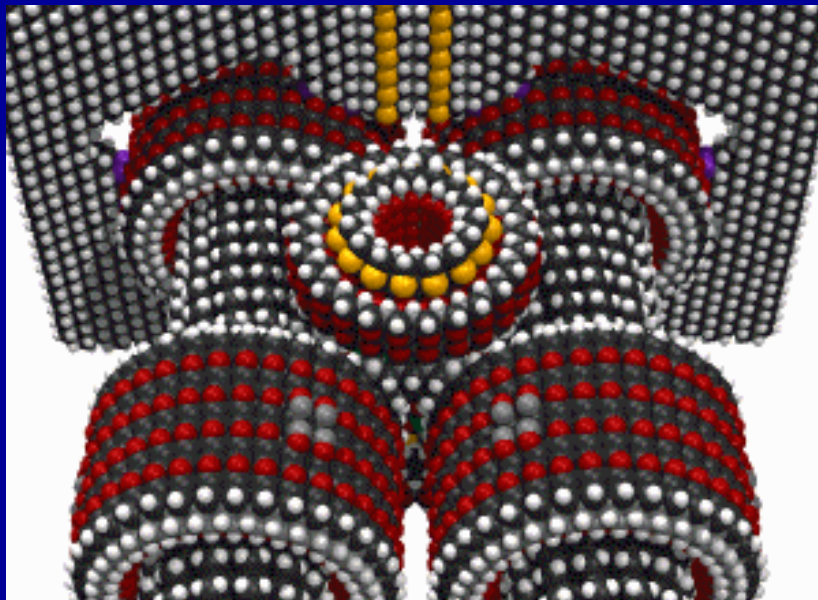
Clayton Teague, Ph.D.

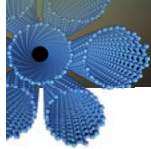
Director

National Nanotechnology Coordination Office

# Nanoscale Worm Drive Assembly

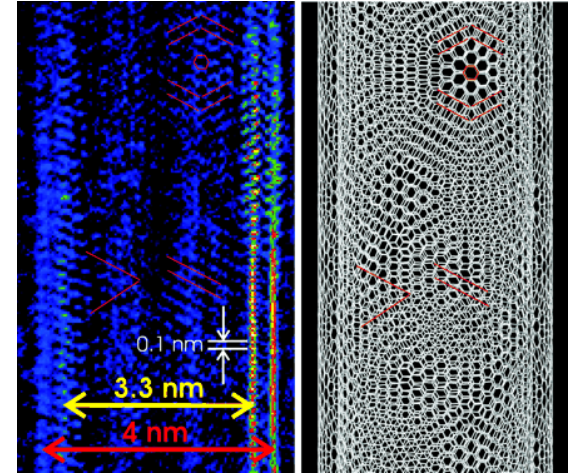
This worm drive assembly designed by K. Eric Drexler, Josh Hall, Ninad Sathaye and Mark Sims includes 11 components totaling 25,374 atoms. The animations below have been created from simulation results using NanoEngineer-1 Alpha 7, taking just over 370 hours to complete on a Dell laptop running Windows XP. It is the largest model ever simulated with NanoEngineer-1.



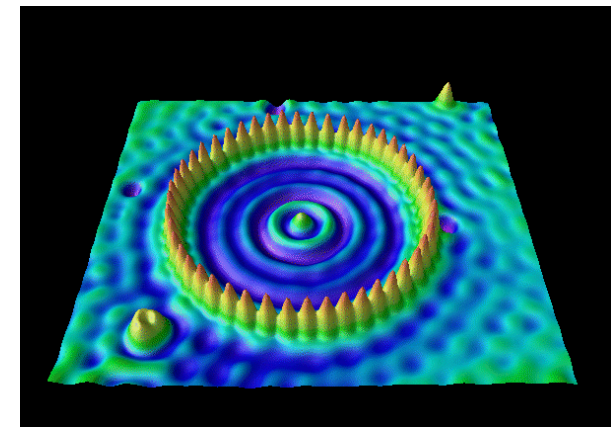


# What Is Nanotechnology?

- Research and technology development aimed to understand and control matter at dimensions of approximately 1 - 100 nanometer - the nanoscale
- Ability to understand, create, and use structures, devices and systems that have fundamentally new properties and functions because of their nanoscale structure
- Ability to image, measure, model, and manipulate matter on the nanoscale to exploit those properties and functions
- Ability to integrate those properties and functions into systems spanning from nano- to macro-scopic scales



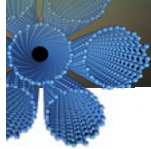
Nanoarea Electron Diffraction of DW Carbon Nanotube – Zuo, et.al



Corral of Fe Atoms – D. Eigler

# Widespread Application Areas for





# Importance of Standards Efforts for Innovation in Nanotechnology

- **Standards based on solid science and engineering are key platforms for innovation in nanotechnology**
  - Standards not so founded can constrain innovation and entrench inferior technologies
  - Consensus specifications serve as highly informative and instructional documents for advancing field
- **Nanotechnology is a genuinely multi-disciplinary and broad based field—cross-sectorial standards typical**
  - As example: nanowire-based biosensors + quantum-information processing + medical therapeutics
- **Global competition in nanotechnology is intense**
  - Imperative for best of Nation's technology be incorporated into internationally-developed specifications and standards
- **Process type standards likely will play important role**
  - Environmental, health, and safety standards key part of agenda for responsible development of nanotechnology