

# The Next Paradigm Shift in Manufacturing: Innovation From the Nanoscale on Up

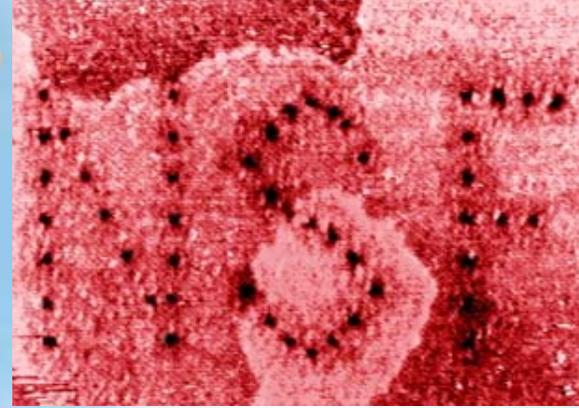
“The big winners in the increasingly fierce global scramble for supremacy will not be those who simply make commodities faster and cheaper than the competition. They will be those who develop talent, techniques and tools so advanced that there is no competition.”

“Sustaining the Nations Innovation Infrastructure: Report on Information technology Manufacturing and Competitiveness,” PCAST, January, 2004.

Warren R. DeVries, Division Director  
Design and Manufacturing Innovation  
for the  
Engineering Advisory Committee  
May 3-4, 2006



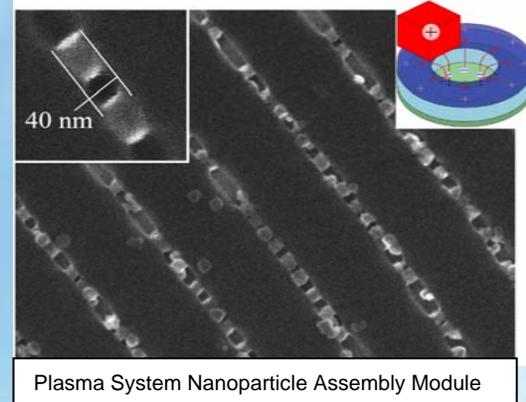
# A Transformative and a *bona fide* Nanomanufacturing Sector Needs:



- To enable the design and assembly of predictable integrated systems and sub-systems that incorporate nanoscale elements and exploit their functionality at the macroscale.
- Quantity and quality-engineered nanomaterials.
- Processing and manipulation on the atomic and molecular scale.
- To improve productivity and facilitate the transfer of nanoscience discoveries in the laboratory to practical industrial applications.
- To create a new sector, design a new enterprise, where the key resource will be people.



# Why NSF Engineering?



Plasma System Nanoparticle Assembly Module

- NSF Role
  - NSF is a recognized leader in fundamental nanotechnology research, and leveraging our multidisciplinary culture of research at the frontier.
  - This cross-directorate research will focus on fundamental nanophenomena: quantum control, convergence of science and engineering at the nanoscale, and multiscale and multiphenomena theory and modeling.
- Partnerships
  - Nanomanufacturing is an interagency priority for the National Nanoscale Initiative
  - NSTC Interagency Working Group on Manufacturing Research and Development.
  - States are partners in NNI precisely because of this opportunity.

