

HP C Nano

Workshop 2006

- Door to Exploration -

Introduction to HPCNano06 in SC06

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Nanotechnology Scenarios

- An exciting research field
- Strongly requires multidisciplinary knowledge
- Needs creative ideas, theoretical models, experimental studies, and numerical simulations

Nanotechnology Scenarios

- Characteristics of Numerical simulations
 - Multi-scale, multi-dimensional
 - Massive dataset
 - Intensive computation
 - Interactive couplings between different applications

Nanotechnology Scenarios

■ Demands

- Large-scale high-end computational resources
 - High performance data storage
 - High performance computing systems
 - High performance networking
- High-end computational schemes
 - Parallel algorithms
 - Workflow and linkages between software components
 - Software applications
 - Pre-Process control
 - Process monitoring and control process
 - Post-process

Nanotechnology Scenarios

- Domain of HPC for nanotechnology or computational nanotechnology
 - Large scale computing in multi-scale modeling and simulation of nano-scale materials
 - Parallel algorithms, functional task decomposition
 - Domain decompositions, and computational methods in nano-materials processing, characteristics, and statistical analysis
 - Nano-material fabrication, synthesis, and processing simulations

Nanotechnology Scenarios

- (continued)
 - Microscopy nano-structured materials databases
 - Large-scale molecular methods and simulations in nano-science and technology
 - Nano-science -related data and image processing
 - HPC-based modeling and simulation for Nano electromechanical systems

Nanotechnology Scenarios

- Domain of HPC for nanotechnology or computational nanotechnology
 - High performance computing in Fourier transform infrared nano-surface
 - Modeling and parallel simulation of organic nanostructure materials and biomaterial processing
 - HPC-based multi-scale spectroscopy data and image processing
 - High performance data processing in microwave spectroscopy on quantum dots

Nanotechnology Scenarios

- (continued)
 - High performance computing in atomic-scale friction
 - Large scale computing systems for nano-science (computational and network systems)
 - Grid computing in nano science and technology
 - High performance computing in bionanotechnology
 - ...

Workshop Goal

- A great opportunity to present, share, and discuss various aspects of HPC-related computational methods and problem solving techniques for nano-science and technology research.

Appreciation to PC committee

- **Program Committee**

M. P. Anantram, NASA Ames Research Center, USA

Hamid R. Arabnia, Univ. of Georgia, USA

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Jerry Jenkin, CFD Research Corporation, USA

Julien Langou, The University of Tennessee, USA

Watson Layne, Virginia Tech., USA

Workshop Organization

- **Program Committee (continued)**

Meyya Meyyappan, NASA Ames, USA

Hisashi Nakamura, RIST, Japan

Aiichiro Nakano, USC, USA

Jun Ni, The University of Iowa, USA

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Matthew Wolf, Georgia Tech., USA

Laurence T. Yang, St. Francis Xavier University, Canada

Shaoping Xiao, The University of Iowa, USA

Yao Zheng, Zhejiang University, China