



CSGF and SSGF Fellows' Poster Session Opening Remarks

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Defense Programs Works on Problems That Matter



Overseeing the Stockpile

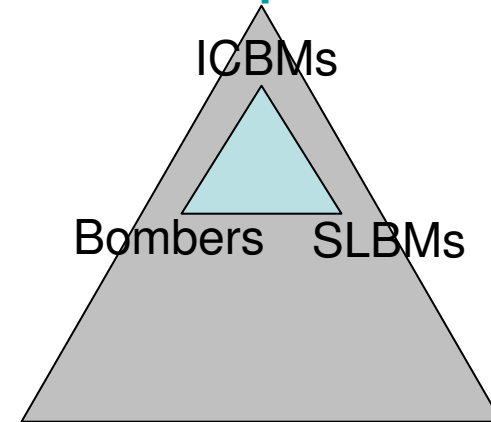


**Fundamental R&D
Supporting National Security**



**Manufacturing:
“cradle-to-grave”
understanding
of materials**

Nuclear and Non-Nuclear Strike Capabilities



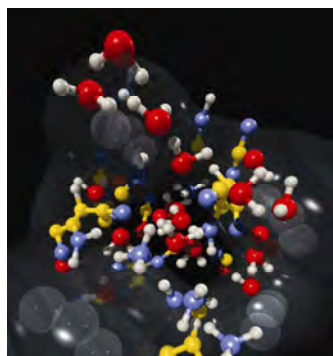
Active and Passive Defenses **Responsive Infrastructure**
Changing Deterrence Theory



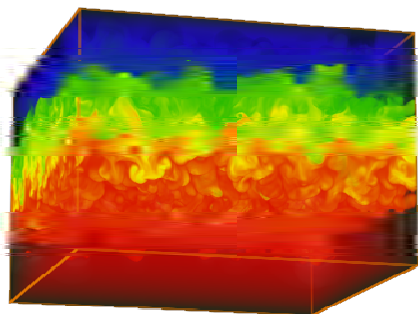
Secure Transportation



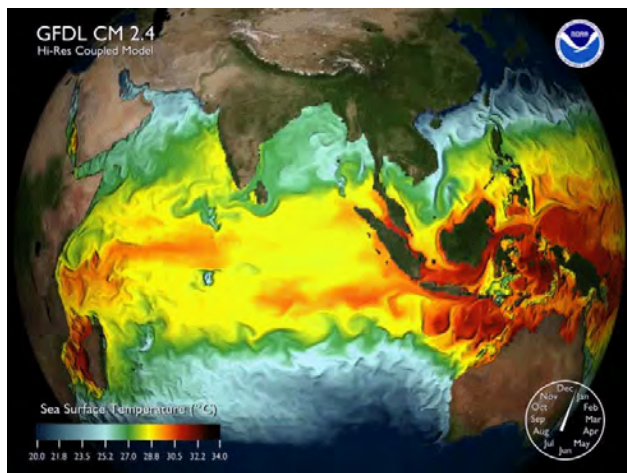
Simulation has become an Essential Tool in Making Important Decisions



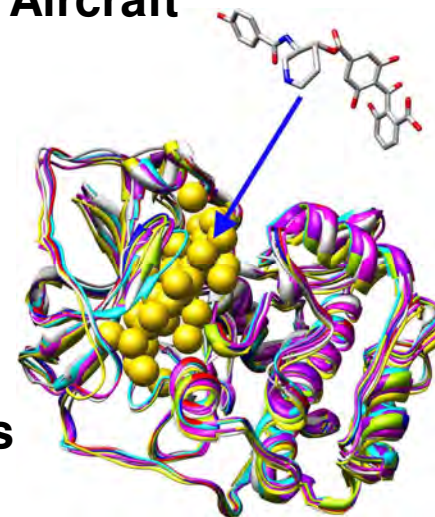
Materials Behavior



Military Aircraft



Climate Modeling



New Drugs

We need predictive tools that can be relied upon when full scale experiments can't be performed



Our Mission Presents Many Technical Challenges



- **Certifying stockpile systems without nuclear testing**
 - Increased reliance on scientific understanding and simulation
 - Modeling manufacturing, design, performance, environment
- **Aging stockpile**
 - Need cradle-to-grave understanding of material behavior
 - Process aware models: manufacturing, aging, environmental
- **Maintaining the expertise to support counter proliferation**
- **Maintaining the expertise to support nuclear counterterrorism**

Simulation science will lead to a more reliable stockpile



We Rely on the Expertise in Our People to Carry Out Our Mission – YOU are the next generation



- **Computational Science Graduate Fellowships (CSGF)**
 - Jointly sponsored by NNSA and Office of Science
 - Able to utilize the large DOE/NNSA investments in High Performance Computing
 - Spectacular work being done in many fields of science
 - One of the major sources for the scientific and technical leadership of the future
- **Stewardship Science Graduate Fellowships (SSGF)**
 - Stresses novel experimental and theoretical work
 - Emphasis is on three scientific areas:
 - *Low Energy Nuclear Physics*
 - *Materials under Extreme Conditions*
 - *High Energy Density Physics*
 - We hope that we will attract many of you to contribute to solving important problems for the nation



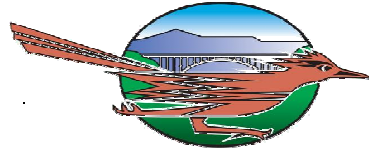
Huge Scientific Opportunities Becoming Available



- **Both NNSA and the Office of Science are investing in major new scientific capabilities**
- **We hope the nation's science and engineering leaders of the future (**YOU**) will address major problems of the country including:**
 - ***National Security***
 - ***Fundamental Science***
 - ***Energy Production and Availability***
 - ***Medicine and Biology***
 - ***...***



Cutting-edge Computational Science for Solutions to National Security Issues



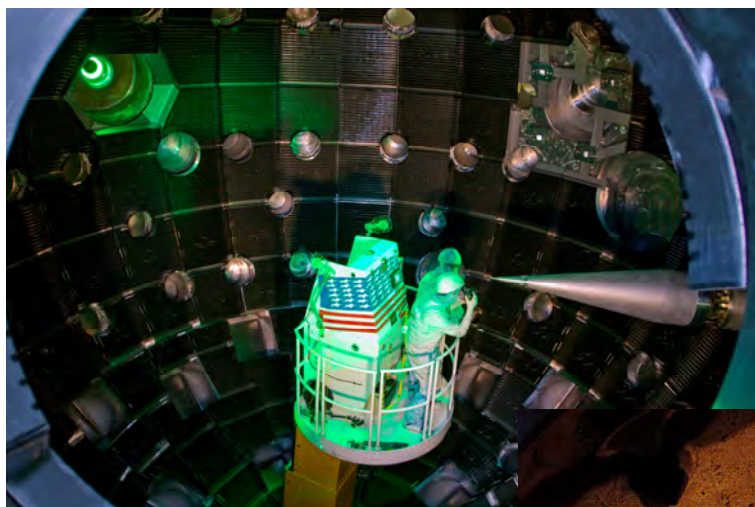
**Roadrunner: first to break
the petaflop barrier
current #1 on TOP500**



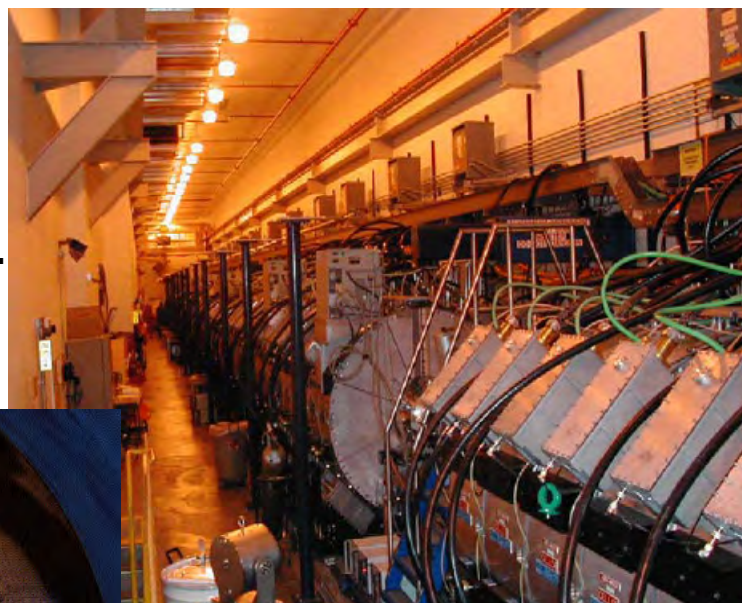
**BlueGene/L: 478 teraflop
top of TOP500 2004 – 2007
(current #5)**



Cutting-edge Experimental Science for Solutions to National Security Issues



NIF



DARHT



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HEAF

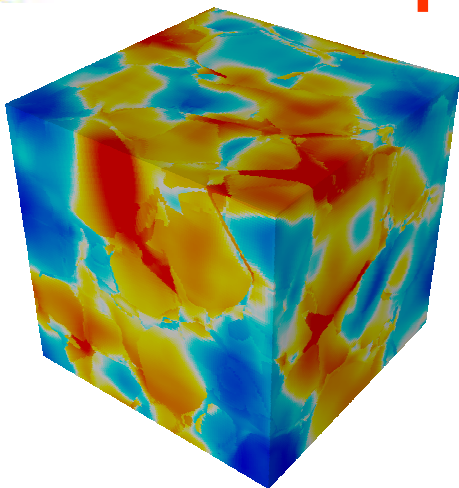


LANSCE



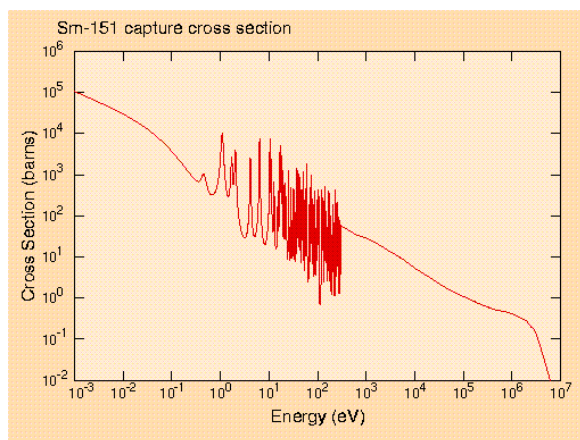


Opportunities to work on complex problems that matter

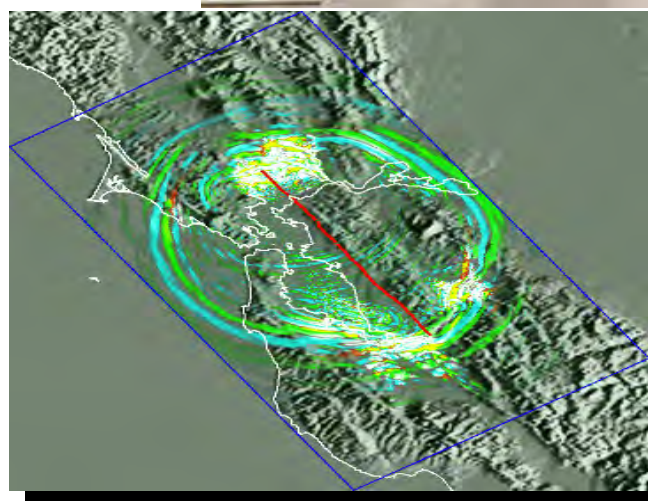


Material Science

Nuclear material detection



Nuclear Forensics



Seismic Modeling



The Future depends on YOU



- **We have made great strides in science and technology supporting our nation's security.**
- **Whatever world you envision, the future is in your hands:**
 - **Improved international security**
 - **A safe, secure, reliable stockpile**
 - **Nonproliferation of nuclear weapons**
 - **A smaller stockpile**
 - **A nuclear weapon free world**
 - **Reduced dependence on foreign fossil energy**
 - **Advances in fundamental science and technology**
 - **Advances in medicine and new drug therapies**