Overview of the FY 2003 Budget Request for the Office of Science

Advanced Scientific Computing Advisory Committee

May 2, 2002

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**Director**
Office of Science

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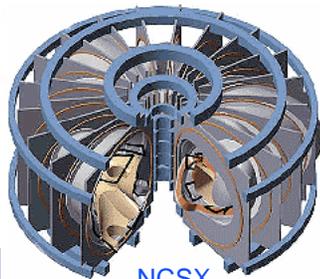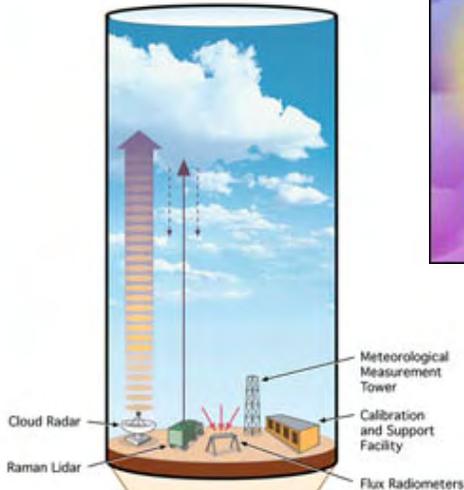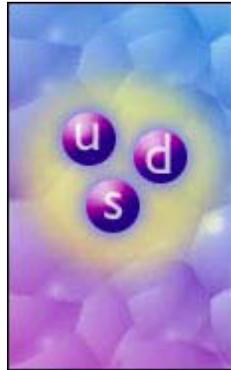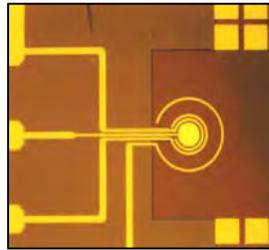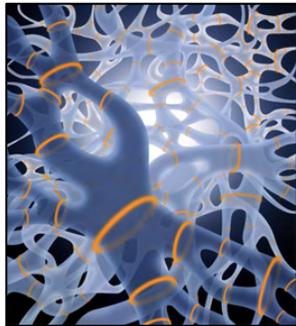
The DOE FY 2003 Budget
(in millions of dollars)

Organization	FY 2002 Appropriation	FY 2003 Request	Difference
National Nuclear Security Administration	7,605	8,039	+ 433 (6%)
Environment	7,228	7,397	+ 169 (2%)
Science	3,288	3, 293	+ 5 (0%)
Energy	2,457	2,2379	- 78 (-3%)
Other	757	809	+ 52 (7%)
Total	21,335	21,917	+ 582 (3%)

SC FY2003 Budget Request by Program

Bar chart titled "SC FY2003 Budget Request by Program" with y-axis "($ in millions)" ranging from 0 to 1200. Legend: Black = One Time Projects, Yellow = FY 2002 Est., Blue = FY 2003 Est.

| Program	FY 2002 Est.	FY 2003 Est.	One Time Projects
Basic Energy Sciences	999.6	1,019.6	
Biological & Environmental Research	504.2	504.2	570.3 (69.8)
Fusion Energy Sciences	247.5	257.3	
Advanced Scientific Computing Research	157.4	169.6	
High Energy Physics	713.2	725.0	
Nuclear Physics	359.0	382.4	
Science Facilities Infrastructure	37.1	42.7	
Safeguards & Security	43.1	43.7	
Program Direction	152.5	139.5	
Energy Research Analyses	1.0	1.0	

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Emphasis of the FY 2003 Budget

The roll-off from SNS construction and the one-time FY2002 projects provide a 5% increase for Science.

- **Science Thrust Areas:**
  - Nanoscale Science, Engineering, and Technology ($133M, +$48M)
  - Genomes to Life ($45M, +$20M)
  - Climate Change Research Initiative ($3M, +$3M)
  - Scientific Discovery Through Advanced Computing (SciDac) ($62M, +$5M)
- **More Operating Time and New Instrumentation at User Facilities ($1,246M, +$40M)**
- **Improved Infrastructure ($43M, +6M)**
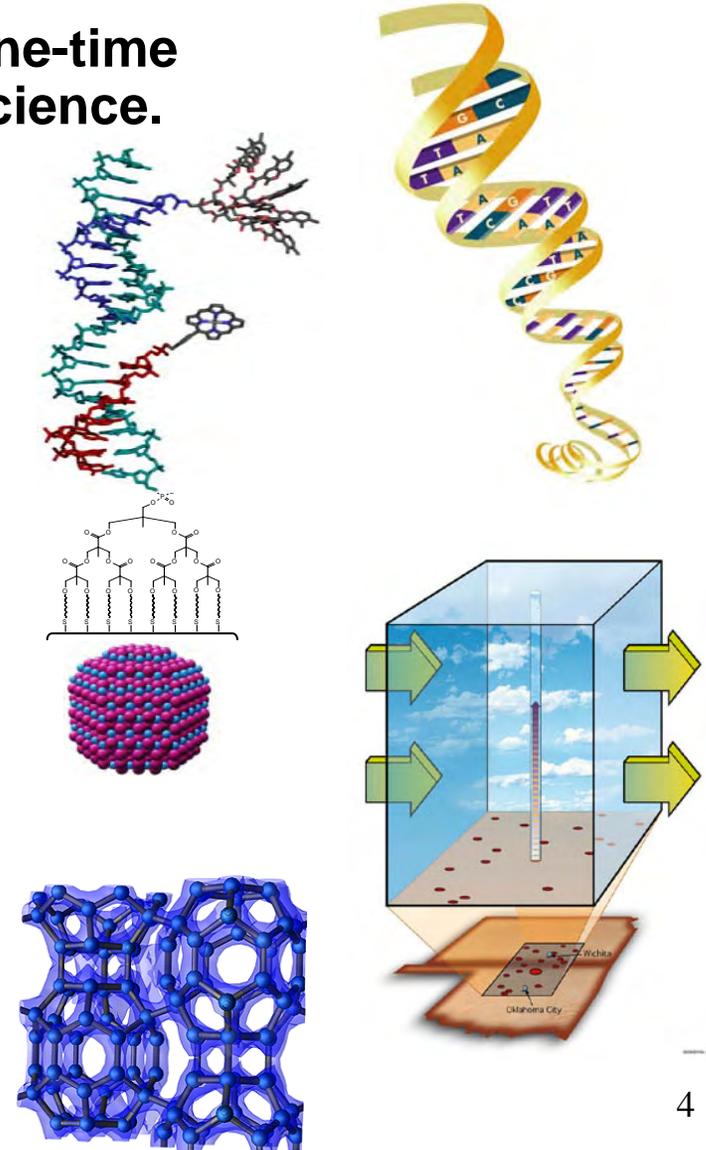
Advanced Scientific Computing Research

NERSC IBM SP RS/6000—"Seaborg"

modeling turbulent combustion
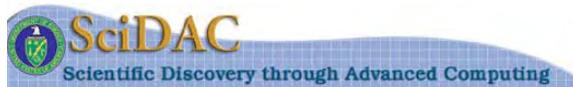
ESnet

Mathematical, Information, and Computational Sciences ($167M, +$13M)

- **Supports operation of supercomputer and network facilities available to researchers 24-7-365:**
  - National Energy Research Scientific Computing Center (NERSC),
  - Advanced Computing Research Testbeds, and
  - Energy Sciences Network (ESnet).
- **Scientific Computing Research Investments:**
  - Applied Mathematics,
  - Computer Science,
  - Advanced Computing Software Tools, and
  - Scientific Application Partnerships.

- **High Performance Networking, Middleware and Collaboratory Research Investments:**
  - Networking,
  - Collaboratory Tools, and
  - National Collaboratory Pilot Projects.
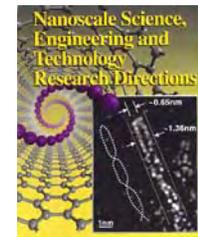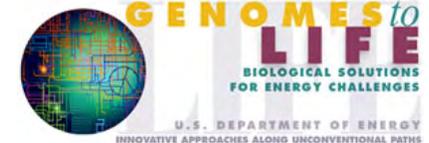
Laboratory Technology Research ($3M, +$0M)

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Scientific Discovery Through Advanced Computing (SciDAC) ($62M, +$5M)

- SciDAC brings the power of tera-scale computing and information technologies to scientific areas across the SC portfolio -- breakthroughs through simulation.

- SciDAC is building community simulation models through collaborations among application scientists, mathematicians and computer scientists -- research tools for plasma physics, climate prediction, combustion, etc.

- State-of-the-art electronic collaboration tools will facilitate the access of these tools to the broader scientific community to bring simulation to a level of parity with theory & observation in the scientific enterprise.
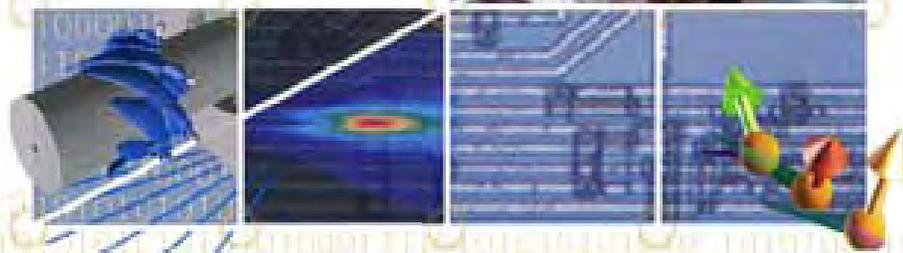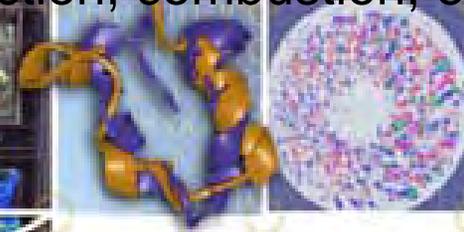
Topical Computing (TC)

- FY03 increases will reconfigure some resources at existing facilities around TC concept.
- These facilities will support applications communities with specialized requirements.

terascale computing

Hardware Infrastructure — Software Infrastructure — Collaboratories and DataGrids

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"The purpose of computing is insight, not numbers."
Richard W. Hamming,
Numerical Methods for Scientists and Engineers, 1973.

ASCR is critical to SC programs.

- New science: simulation is now driving scientific insight in many areas of science.

- Topical computing, for:
  - optimization of systems for applications
  - community-oriented computing
  - specifically QCD: a scientific opportunity to combine specialized hardware and software to verify the predictions of the Standard Model for experiments underway at the B-Factory and the Tevitron and planned at the LHC.