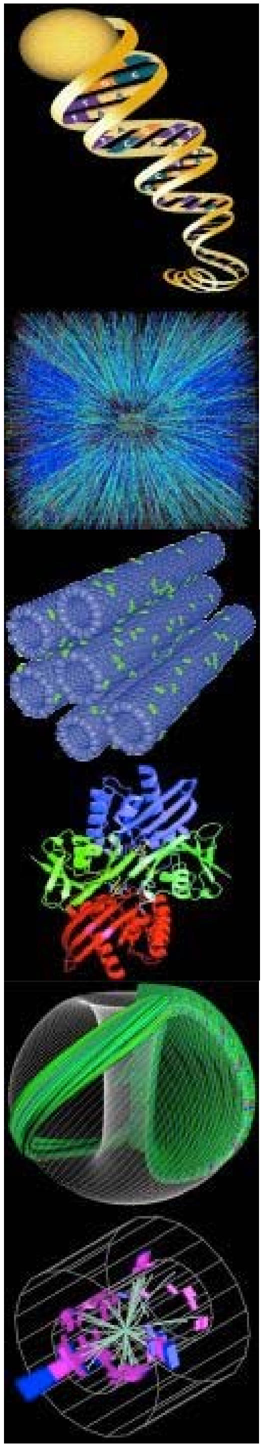


U.S. Department of Energy's

Office of Science

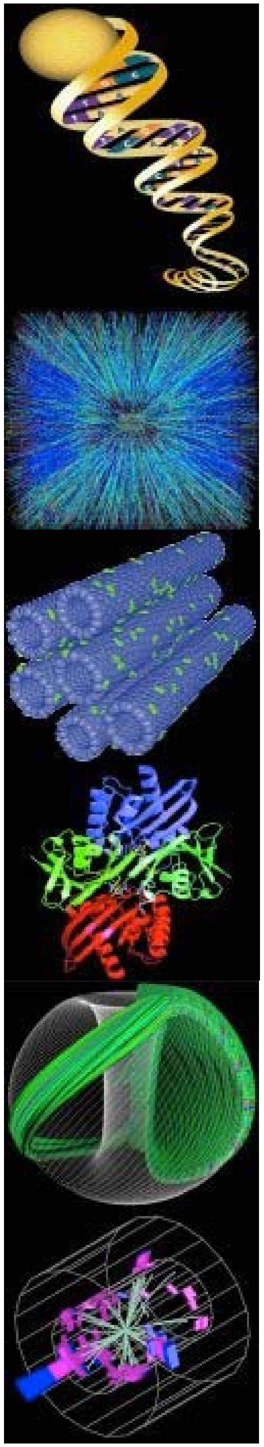
BRIEFING FOR THE SENATE ENERGY AND WATER DEVELOPMENT APPROPRIATIONS SUBCOMMITTEE STAFF

FY04 Budget Request For the Office of Science

Raymond L. Orbach

Director, Office of Science

March 6, 2003



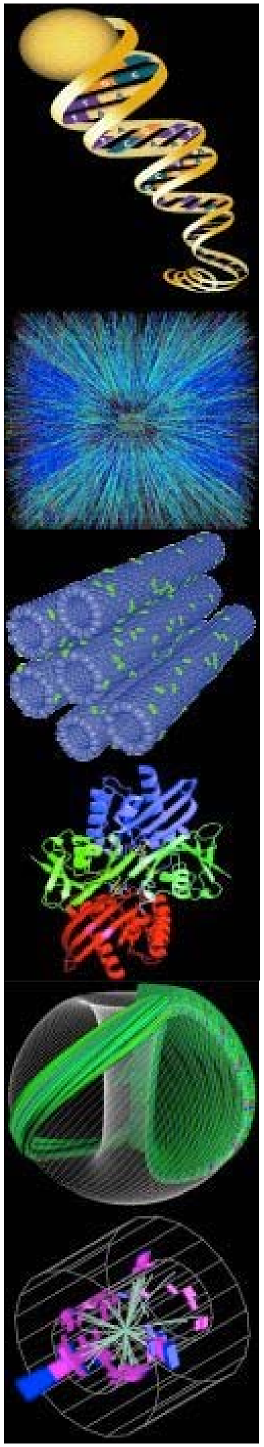
U.S. Department of Energy's
Office of Science

BRIEFING FOR THE HOUSE ENERGY AND WATER DEVELOPMENT APPROPRIATIONS SUBCOMMITTEE STAFF

FY04 Budget Request
For the Office of Science

Raymond L. Orbach
Director, Office of Science

March 7, 2003



Office of Science

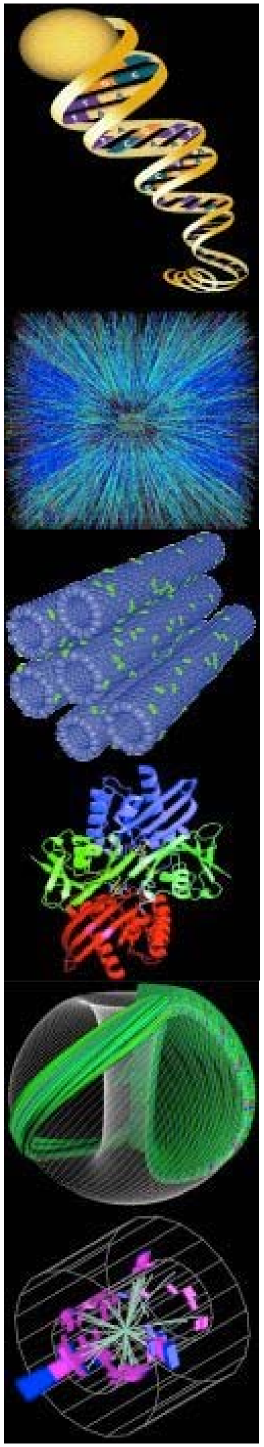
FY 2004 Budget Request by Program

SCIENCE (B/A in Thousands)	FY 2002 Appropriation	FY 2003 President's Request	FY 2004 President's Request
Advanced Scientific Computing Research……	150,205	166,557	173,490
Basic Energy Science…………………………..…..	979,560	1,019,163	1,008,575
Biological and Environmental Research…….....	554,125*	484,215	499,535
High Energy Physics…………………………….	697,383	724,990	737,978
Nuclear Physics…………………………………...	350,589	382,370	389,430
Fusion Energy Sciences…………...…………..	241,100	257,310	257,310
Science Laboratories Infrastructure...……....….	37,125	42,735	43,590
Science Program Direction…………...………..	149,467	137,332	150,813
Workforce Development………………………...	4,460	5,460	6,470
SBIR/STTR...…………………………….…….	99,668**	-	-
Safeguards and Security……………….......….	45,770	43,744	43,744
Total Science……………………………..…..…….	**3,309,452**	**3,263,876** ⇒	**3,310,935**
		+1.4%	

Construction Rampdown Allows a 4.5% Increase for Science

** Includes $68,822,000 of one time projects.*

***Includes $63,377,000 for SBIR/STTR from Office of Science programs and $36,291,000 from other programs.*



Office of Science

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Advanced Scientific Computing Research	150,205	166,557	167,443	173,490
Basic Energy Sciences	979,560	1,019,163	1,016,714	1,008,575
Biological and Environmental Research	554,125 a/	484,215	503,641 b/	499,535
High Energy Physics	697,383	724,990	717,921	737,978
Nuclear Physics	350,589	382,370	379,576	389,430
Fusion Energy Sciences	241,100	257,310	246,882	257,310
Science Laboratories Infrastructure	37,125	42,735	45,109	43,590
Science Program Direction	149,467	137,332	134,686	150,813
Workforce Development for Teachers and Scientists	4,460	5,460	5,392	6,470
SBIR/STTR	99,668 c/	-	-	-
Safeguards and Security	45,770	43,744	43,828	43,744
Total Science	3,309,452	3,263,876	3,261,192	3,310,935

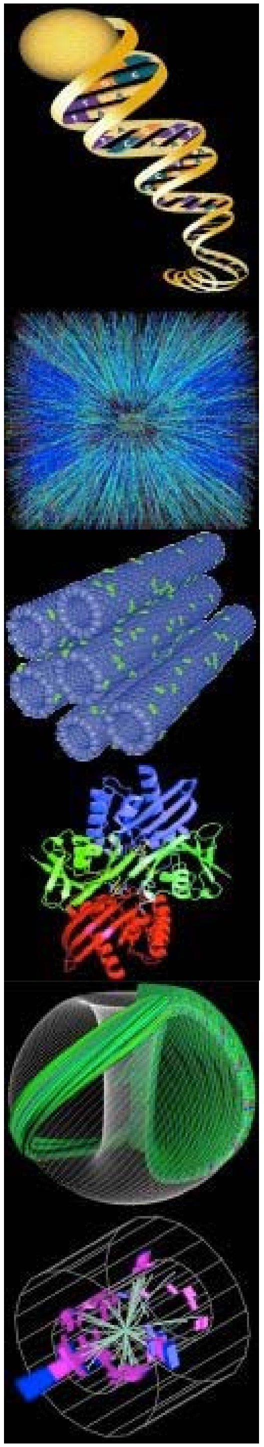
→ *1.5%*

Construction rampdown allows a 4.5% increase for Science.

a/ Includes $68,822,000 of one time projects.

b/ Includes $48,085,000 of one time projects.

c/ Includes $63,377,000 for SBIR/STTR from Office of Science programs and $36,291,000 from other programs.



"A serious commitment to National Security and Energy Security means a serious commitment to Science."

Spencer Abraham, *Secretary of Energy*

Energy

- ITER: *Clean fusion energy for the future.*
- Nanoscience: *Unique capabilities to advance energy technologies.*
- Climate Change: *Understanding the effects of energy production & use.*
- Research Underpinning the Hydrogen Economy: *Materials, Catalysis, Modeling, Electrochemistry, Genomes to Life, Fusion production, etc.*

Security

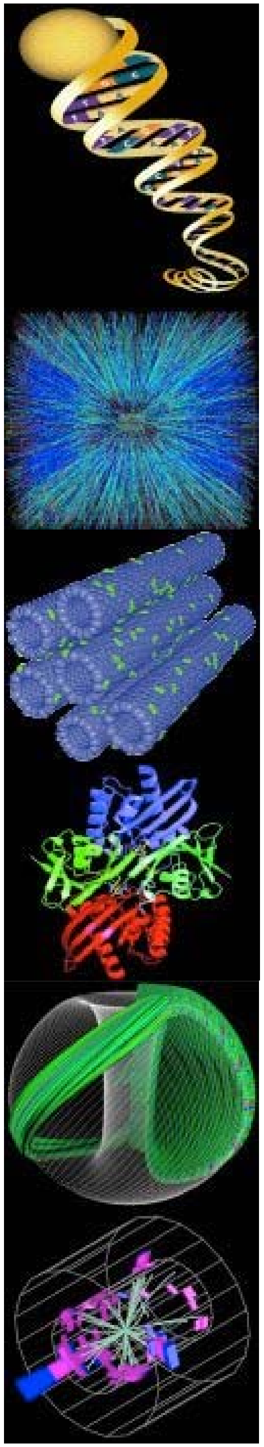
- Nanoscience: *Unique capabilities to advance technology.*
- Next Generation Computer Architecture: *Improved performance for Science.*

Environment

- Genomes to Life: *Harnessing Biotechnology to protect the environment.*
- Natural and Accelerated Bioremediation Research
- Basic Research for Environmental Management

Science

- Key Physics Questions: *Understanding the beginning of time, exploring the nature of energy and matter.*
- Scientific Computation: *Next Generation Computing Architecture.*
- Scientific Workforce Development: *Improving scientific literacy and training the next generation of DOE scientists.*
- Biomedical Applications of Energy Related Research

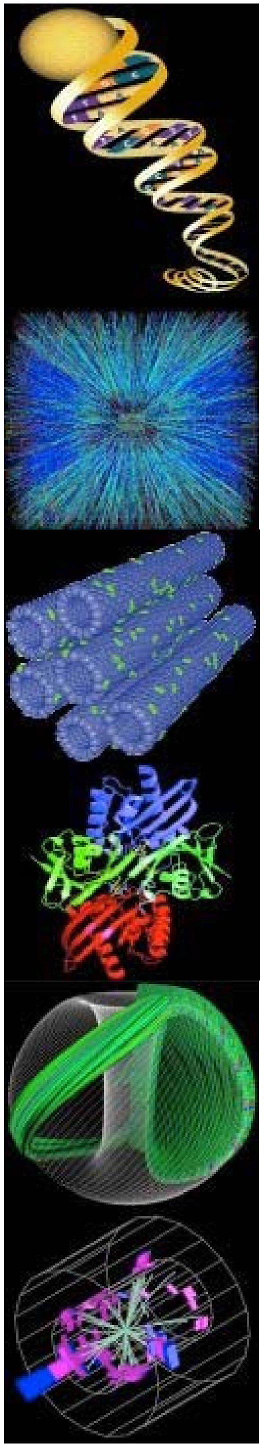


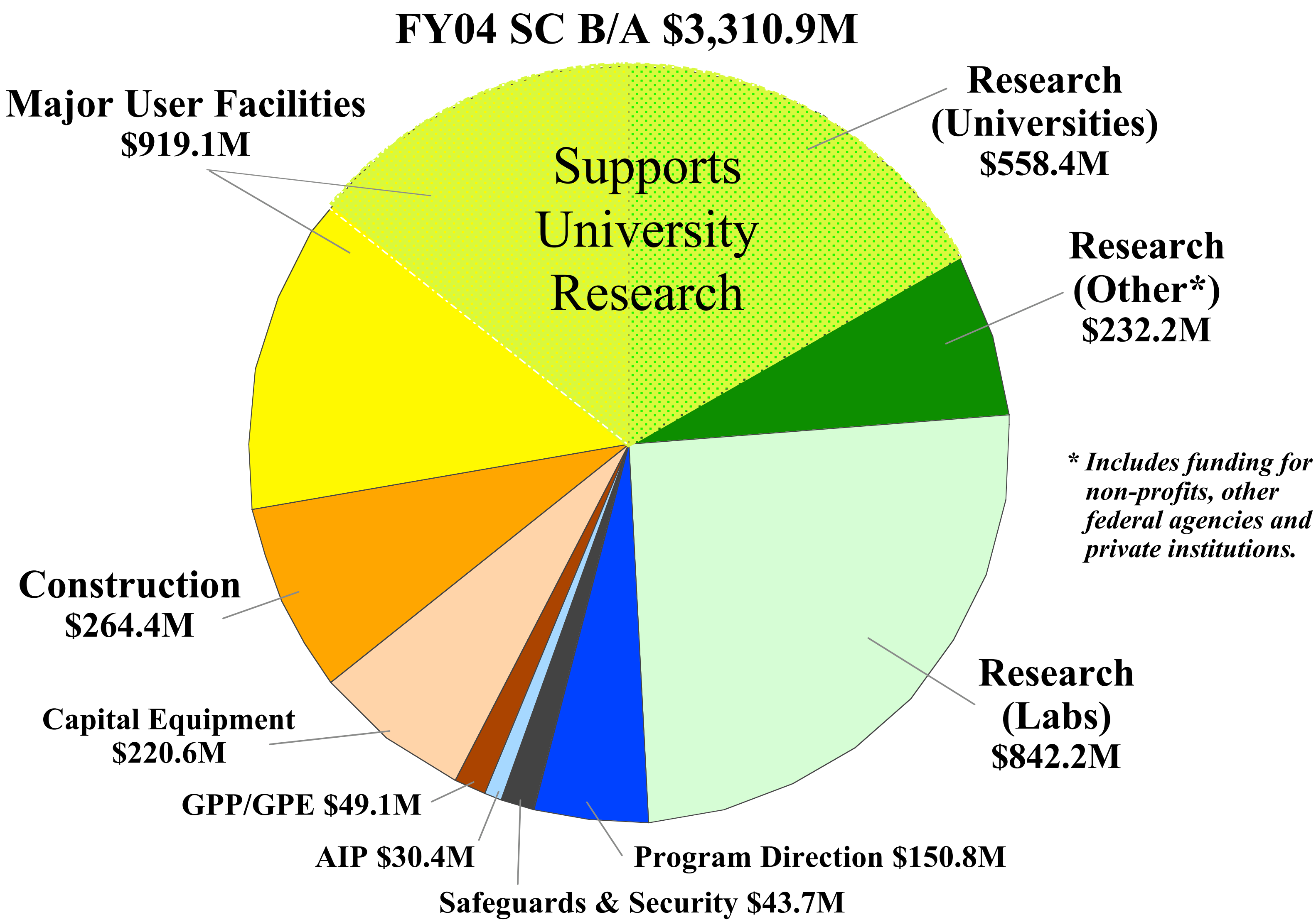
"Given the rising bar for competitiveness, the United States needs to be in the lead or among the leaders in every major field of research to sustain its innovation capabilities."

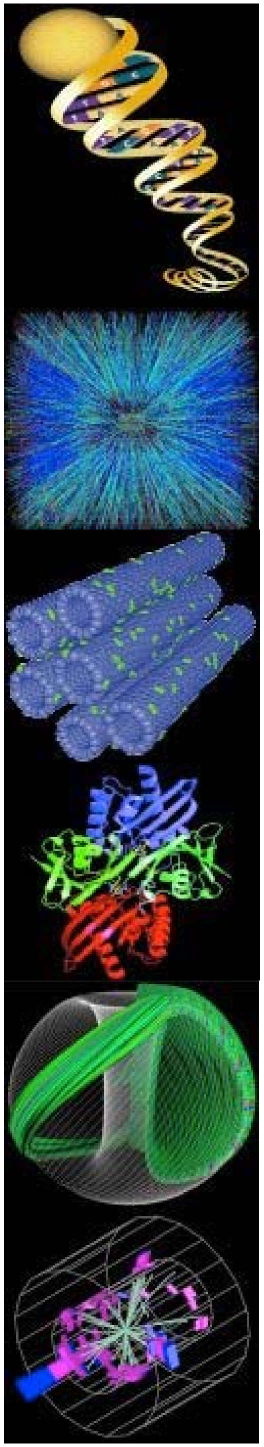
U.S. Competitiveness 2001: Strengths, Vulnerabilities and Long Term Priorities
Council on Competitiveness

- **The Office of Science is the primary source of support for the Physical Sciences.**
  - Provides over 40% of federal support to the physical sciences (e.g. 90% of High Energy & Nuclear Physics, 60% of Catalysis, 25% of Nanoscience, etc.)
  - Provides sole support to select sub-fields (e.g. nuclear medicine, heavy element chemistry, magnetic fusion, etc.)
  - Manages long term, high risk, multidisciplinary science programs to support DOE missions.
  - Directly supports the research of 15,000 PhDs, PostDocs and Graduate Students.
- **Constructs and operates large scientific facilities for the U.S. scientific community.**
  - Accelerators, light & neutron sources, fusion experiments etc.
    - Used by more than 18,000 researchers every year.
  - Infrastructure support for ten Science laboratories.

One-Third of Budget Supports University Research



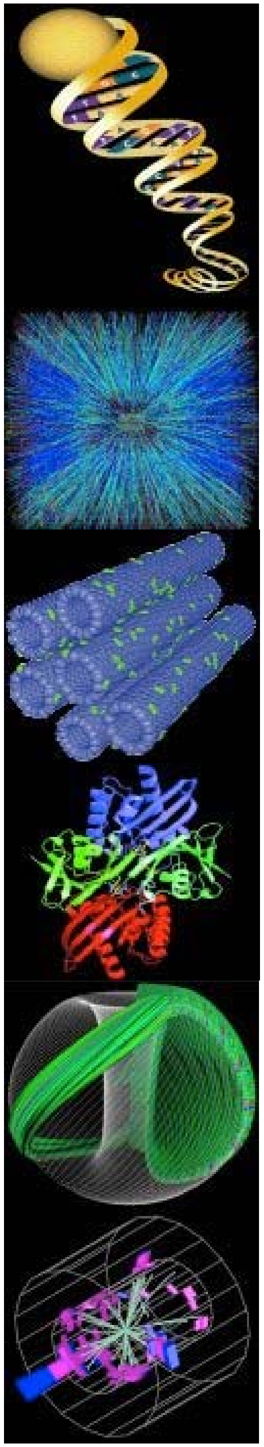




Office of Science FY04 Priorities

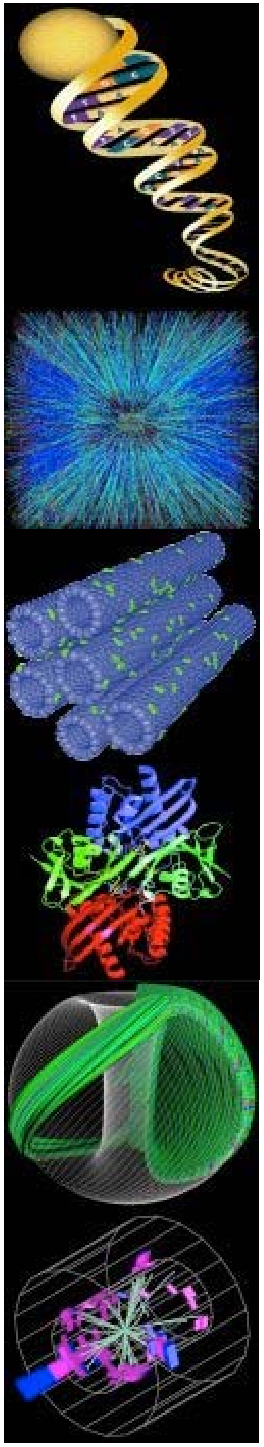
Construction Rampdown Allows a 4.5% Increase for Science

- **Research Priorities** ($[Total FY04], +[Increase over FY03 Request], [Increase over FY03 Appropriation]):
  - ITER Negotiations and Supporting R&D ($12M)
  - Next Generation Computing Architecture ($15M, +7M, +11M)
  - Nanoscale Science, Engineering, & Technology ($196M, +64M, +60M)
  - Genomes to Life ($67M, +24M, +27M)
  - Climate Change Research Initiative ($25M, +22M, +22M)
  - Scientific Discovery through Advanced Computing (SciDAC) ($62M, *no change*)
  - Workforce Development – Laboratory Science Teachers Professional Development ($6M, +1M, +1M)
  - Upgrade facilities to explore the fundamental nature of energy & matter ($447M, +22M, +29M)
- **Return on Investments: More Operating Time** (between 100% and 83% of maximum) **and New Instrumentation at User Facilities** ($1,258M, + 14M, +38M)



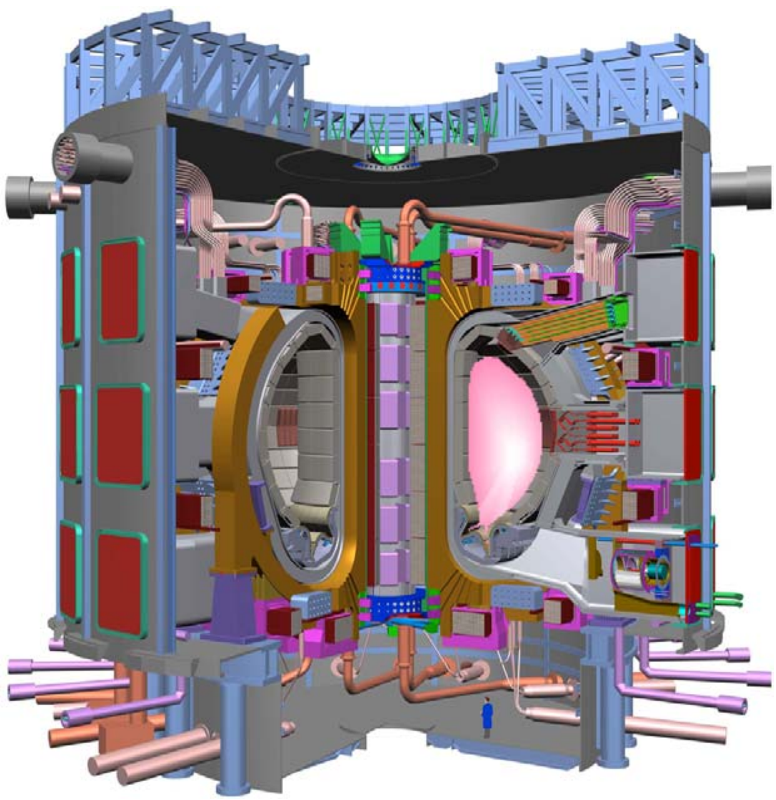
"So the United States will work with Great Britain and several European nations, as well as Canada, Japan, Russia, and China, to build a fusion test facility and create the largest and most advanced fusion experiment in the world. … It's an incredibly important project to be a part of."

President George W. Bush
Remarks on Energy Independence
February 6, 2003



"I am pleased to announce that the United States will join ITER, an ambitious research project to harness the promise of fusion energy."

President George W. Bush
January 30, 2003



US has major impacts on ITER design
500 – 700 MW thermal fusion power
400 sec – 1 hr pulse length

Science Benefits:

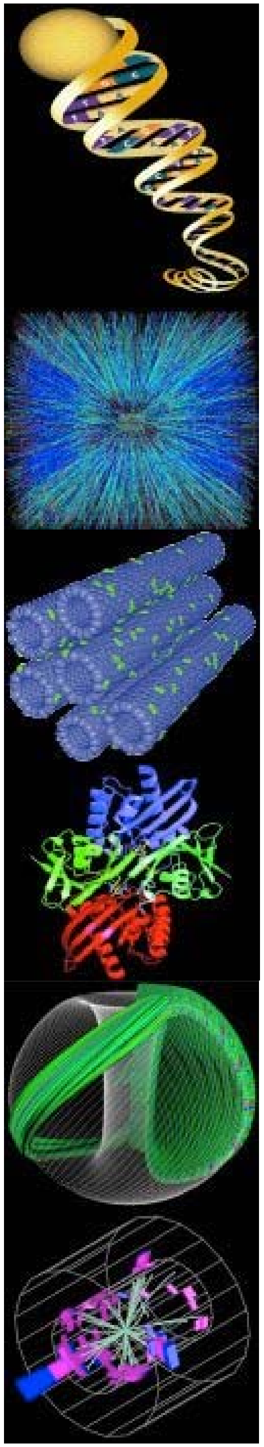
Extends fusion science to larger size, commercially relevant, burning (self-heated) plasmas.

Technology Benefits:

Commercial power plant and other relevant fusion technologies.
High duty-factor operation.

Objective:

"To demonstrate the scientific and technological feasibility of fusion energy for peaceful purposes."

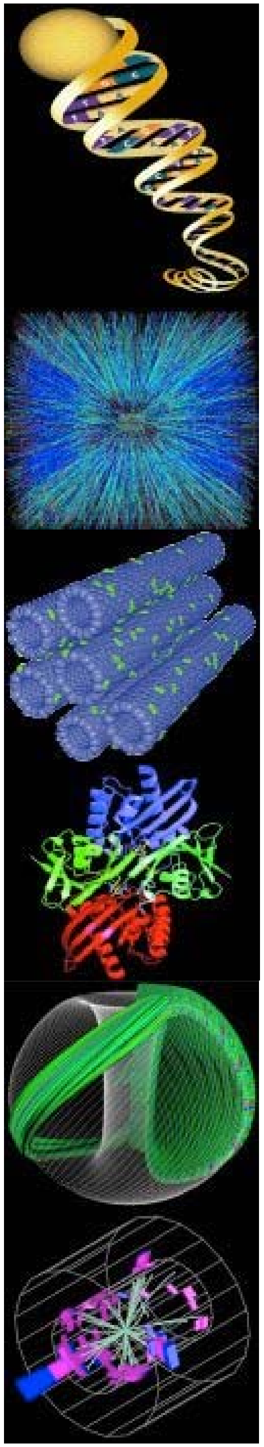


Next Generation Computer Architecture (NGA)

The goal of the NGA research activity is to identify and address major computer architecture bottlenecks to the performance and capability of critical DOE science applications.

In FY04 the NGA will:

- Work with the application community and the vendor community to significantly improve understanding of interactions between high-end system architecture and key application performance.
- Acquire an initial NGA testbed with emphasis on U.S. vendors.
  - Evaluation process will determine the appropriate testbed size to enable full evaluation of scalability, reliability and other key system issues.
- Initiate an academic, laboratory, and vendor research program on scalable technologies for future generations of operating systems and runtime environments.
  - Emphasis will be placed on supporting approaches that span a wide range of computer architectures to facilitate application portability and migration to innovative new systems.
- Develop a roadmap of hardware and software technology to facilitate application of new architectures for scientific research.

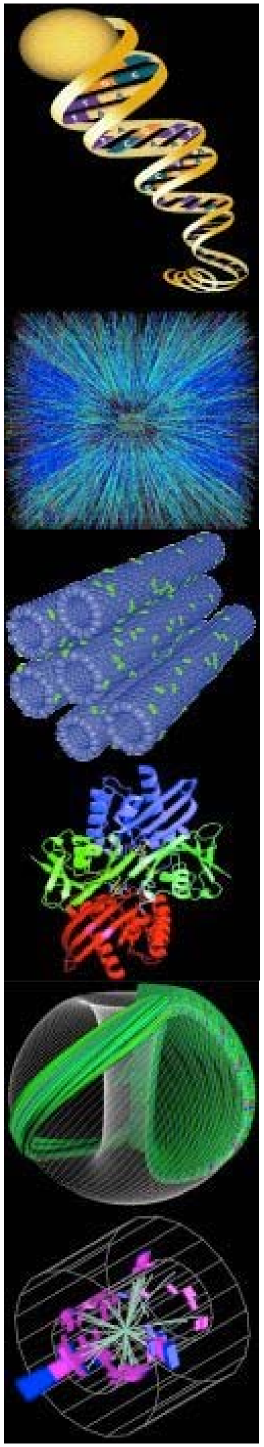


"Interestingly, nanotechnology may be one of the few cases where the biological aspects of a technology is being relatively underfunded by the federal government right now. The Department of Energy, the agency that is usually the focus of this meeting, is a major player in the nanotechnology field and our Bill will only underscore that further."

Representative Sherwood Boehlert (R-NY)

Speech to the Universities Research Associates

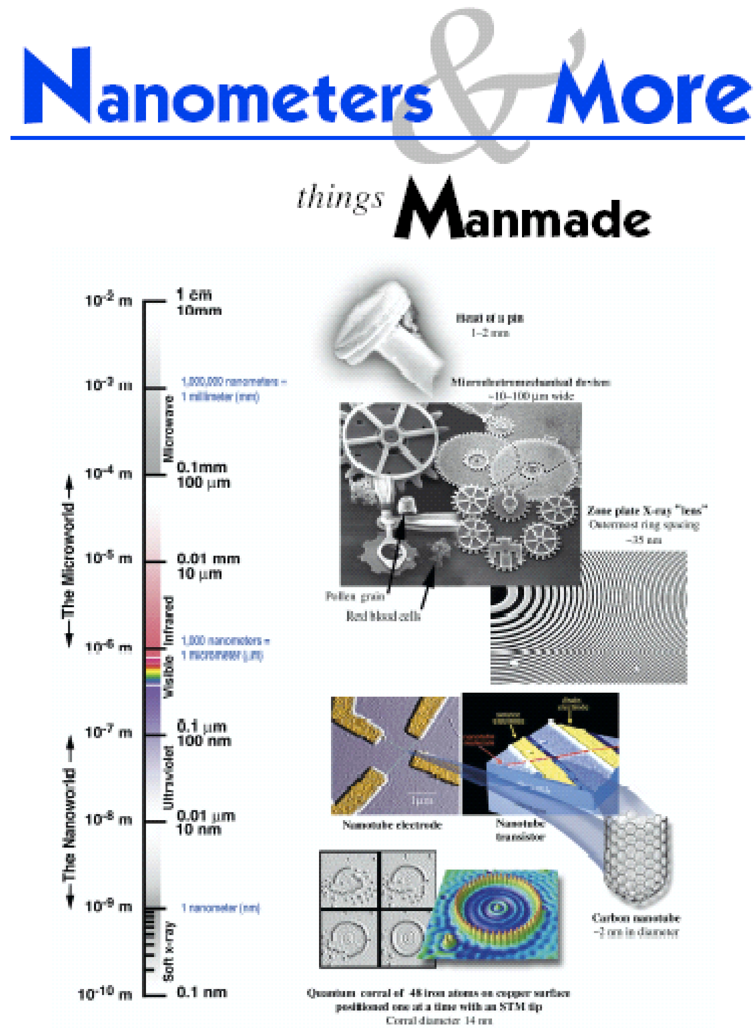
January 30, 2003



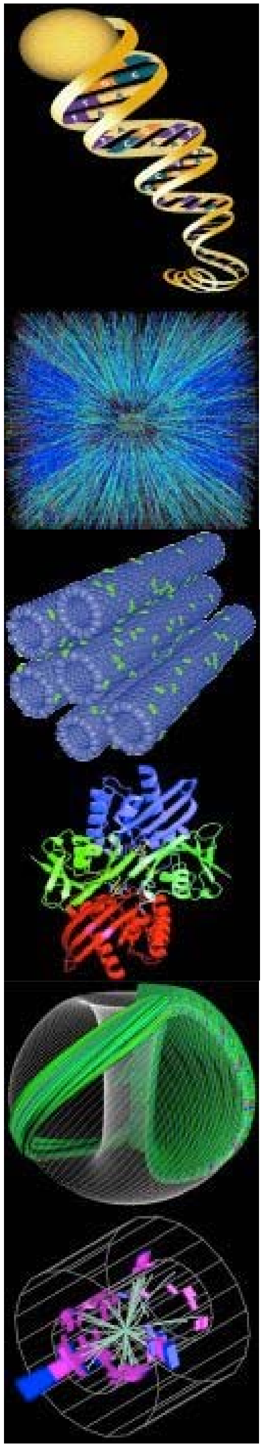
Nanoscale Science Research Centers (NSRCs)

Facilities for fabrication, assembly, and characterization of objects at the nanoscale

- NSRCs are highly collaborative, multidisciplinary research centers and user facilities for the fabrication and study of materials at the nanoscale.
- Project Engineering and Design funding ($3M) is provided for an NSRC at BNL
  - *Equipment and capabilities of the NSRC are being determined based on input from the scientific user community.*
- Construction funding is provided for:
  - *The Center for Nanophase Materials Sciences (CNMS) at ORNL ($20M).*
  - *The Molecular Foundry at LBNL ($35M)*
  - *The Center for Integrated NanoTechnologies at SNL/LANL ($30M)*
- A Major Item of Equipment (MIE) is funded for:
  - *The Center for Nanoscale Materials at ANL ($10M) – The State of Illinois is providing funding for this NSRC estimated to cost $36M.*

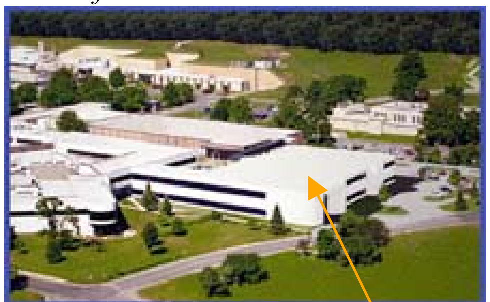


Nanoscale Science Research Centers
Unique Resources, Unique Capabilities



Brookhaven National Lab

Center for Functional Nanomaterials

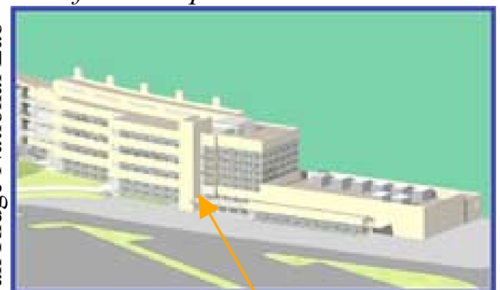


Unique Resource
- National Synchrotron Light Source
- Theory and Computation Center

Scientific Focus
- Nanoscale strongly correlated oxides
- Charge transfer on the nanoscale
- Nanometer-thick organic films
- Nanoscale magnetism
- Nanostructured Catalysts
- Nanomaterials applications

Oak Ridge National Lab

Center for Nanophase Material Sciences



Unique Resource
- Spallation Neutron Source
- High Flux Isotope Reactor

Scientific Focus
- Neutron scattering to probe materials at the nanoscale, at interfaces, and in complex nanophase materials
- Synthesis and nanofabrication
- Nanomaterials Theory Institute
- Hybrid soft/hard materials
- Organic/inorganic nano-interfaces

Lawrence Berkeley National Lab

The Molecular Foundry

Unique Resource
- Advanced Light Source
- NERSC Computing Center

Scientific Focus
- E-beam nanowriter
- Nanofabrication (lithography & stamping)
- Inorganic nanostructures (crystals & tubes)
- Imaging, manipulation, theory & modeling
- Bio-nanostructures (Organic, polymers)

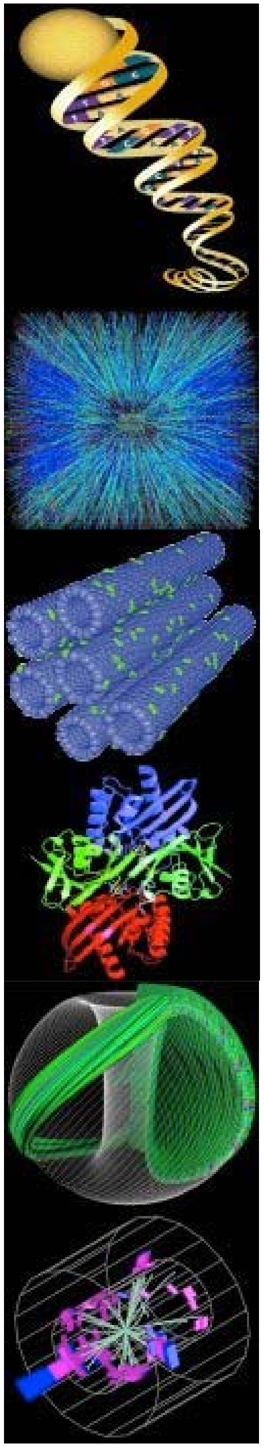
Argonne National Laboratory

Center for Nanoscale Materials

Unique Resource
- Advanced Photon Source
- Electron Microscopy Center

Scientific Focus
- Advanced magnetic materials
- Nanocrystalline diamond
- Complex oxides
- Nanophotonics
- Bio-inorganic hybrids
- X-ray nanoprobe characterization
- Simulations of self-organization

Center for Integrated Nanotechnologies
at Sandia National Laboratories and
Los Alamos National Laboratory

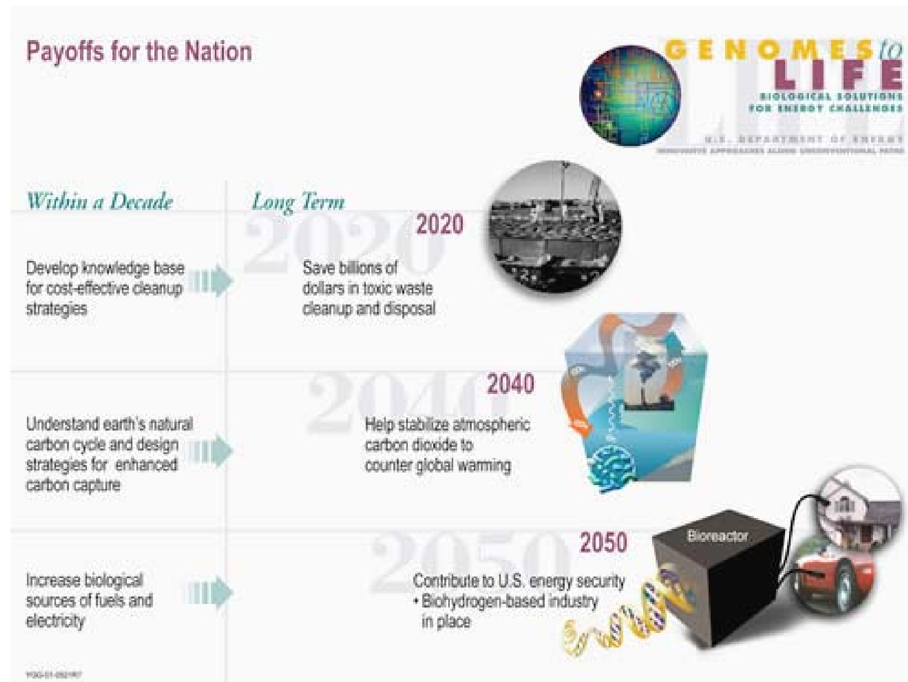


Genomes to Life

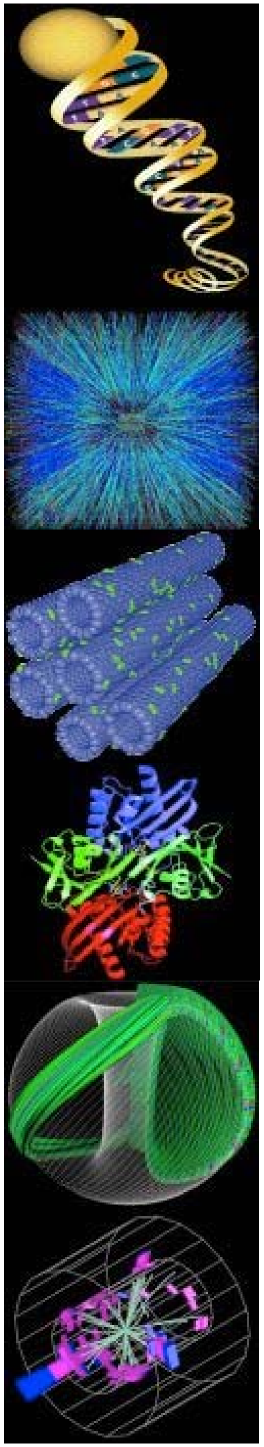
Building on advances in sequencing, molecular science and computing to understand and harness microbes to address DOE's energy, environmental and national security missions.

In FY04:

- Continue joint research that combines capabilities of advanced biological and computational sciences programs.
- Determine the composite DNA sequence & functional capability of microbes in a complex community to address DOE mission needs.



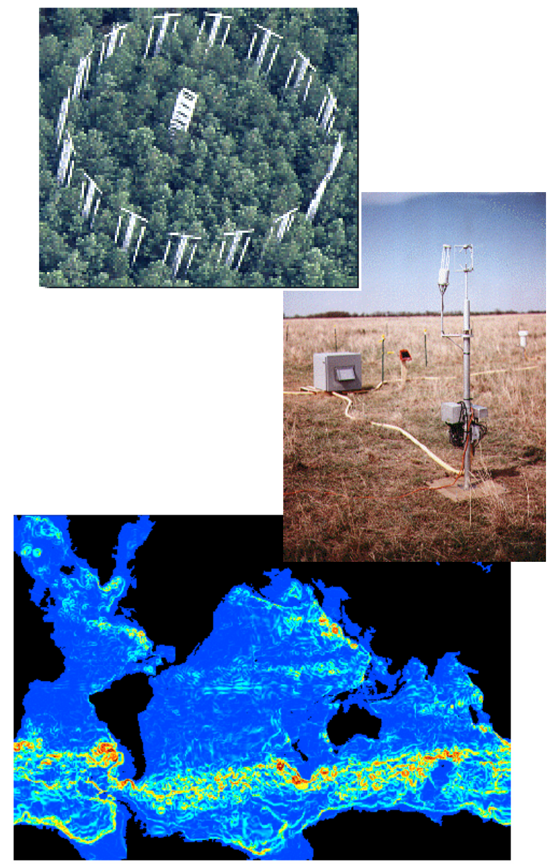
- Continue the complex task of characterizing all of the multi-protein molecular machines and their associated regulatory networks in microbes of importance to DOE's energy and environmental missions.
- $24M increase will focus on characterization of molecular machines, development of broad capabilities for large scale protein production and diverse molecular imaging approaches, and on DNA sequencing of individual microbes and microbial communities.

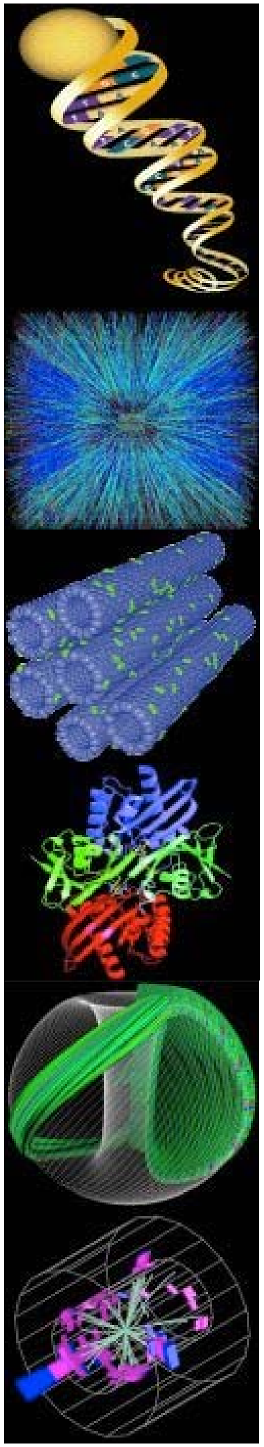


Climate Change Science Program

The Climate Change Science Program (CCSP) activities in BER include the Climate Change Research Initiative (CCRI) and the U.S. Global Climate Research Program (USGCRP). In FY 04, CCSP will:

- Expand performance testing of climate models and their submodels. Focus research to produce new, improved climate simulations with different forcing scenarios.
- Expand field measurements of atmospheric effects on the earth's radiation balance.
- Improve terrestrial carbon cycle models and expand research on carbon cycling to identify and quantify the North American carbon sink.
- Initiate research to understand how to scale ecological responses to environmental change from the proteome of selected species and communities up to a whole ecosystem.
- Focus research to develop and improve methods and models for conducting integrated assessments of climate change consequences.





Climate Change Science Program (CCSP)

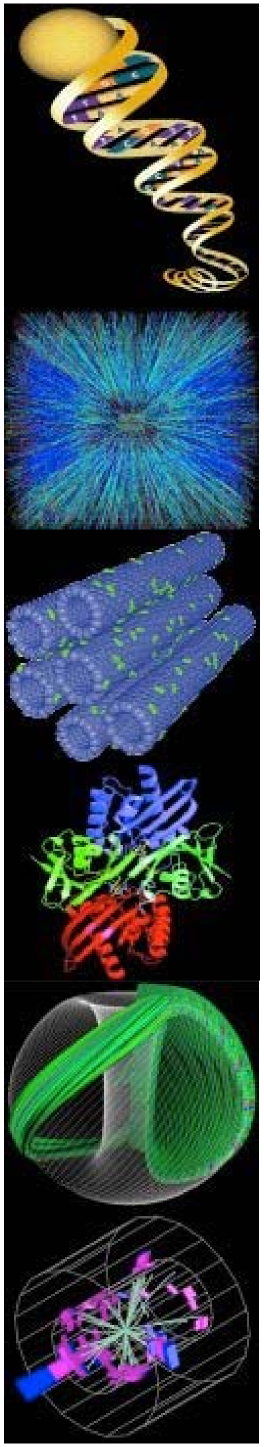
John H. Marburger III
Director, Office of Science and Technology Policy

CCSP Mission:

Provide science-based information on climate and global change to inform public debate, policymaking, and management of natural resources

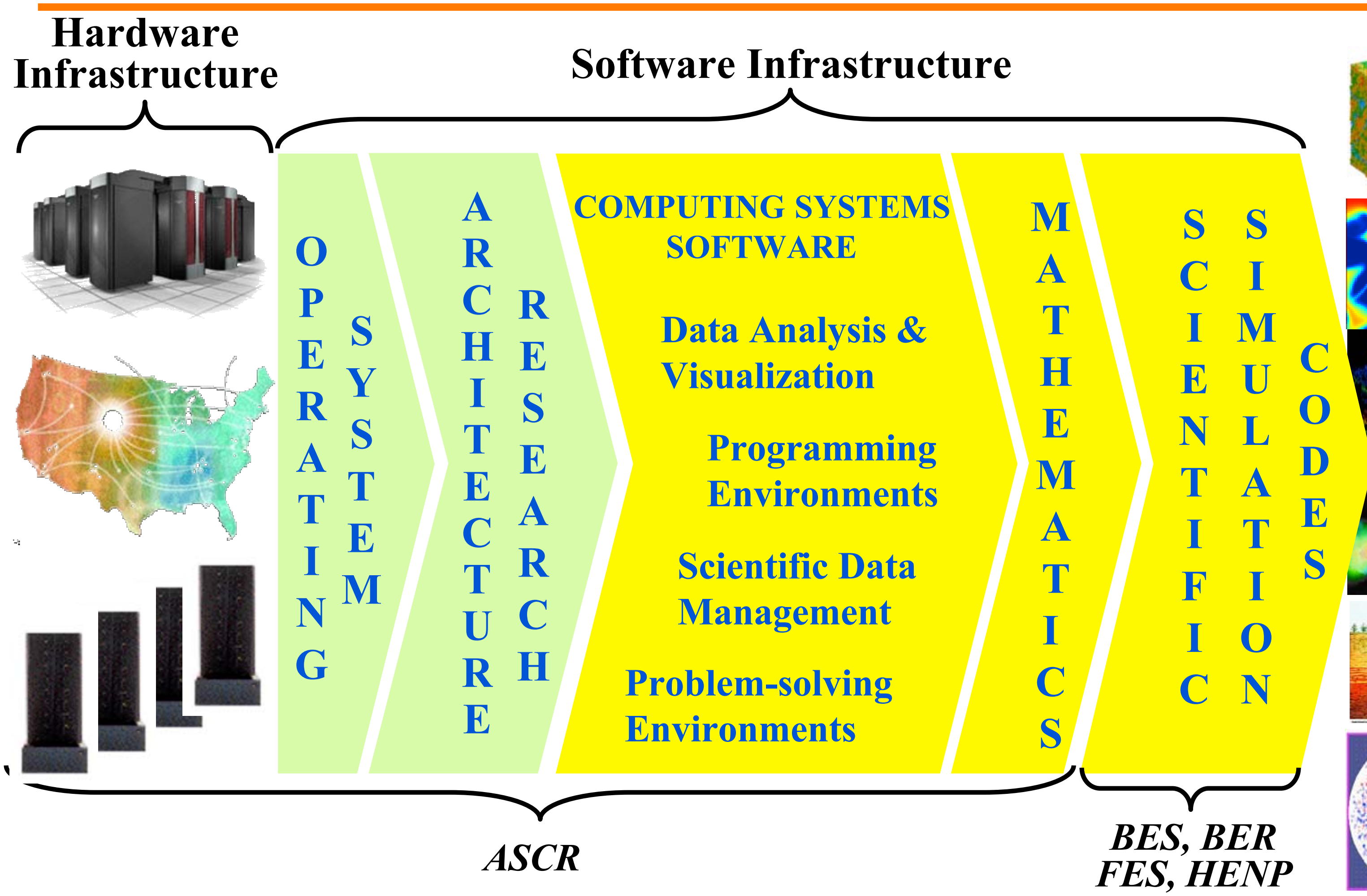
SC Climate Change Research includes process research & modeling efforts to:

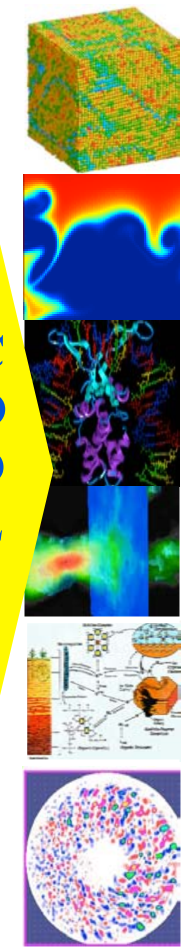
- **Improve understanding of factors affecting the Earth's radiant-energy balance;**
- **Predict accurately any global and regional climate change induced by increasing atmospheric concentrations of aerosols and greenhouse gases;**
- **Quantify sources and sinks of energy-related greenhouse gases, especially carbon dioxide; and**
- **Improve the scientific basis for assessing both the potential consequences of climatic changes, including the potential ecological, social, and economic implications of human-induced climatic changes caused by increases in greenhouse gases in the atmosphere and the benefits and costs of alternative response options.**



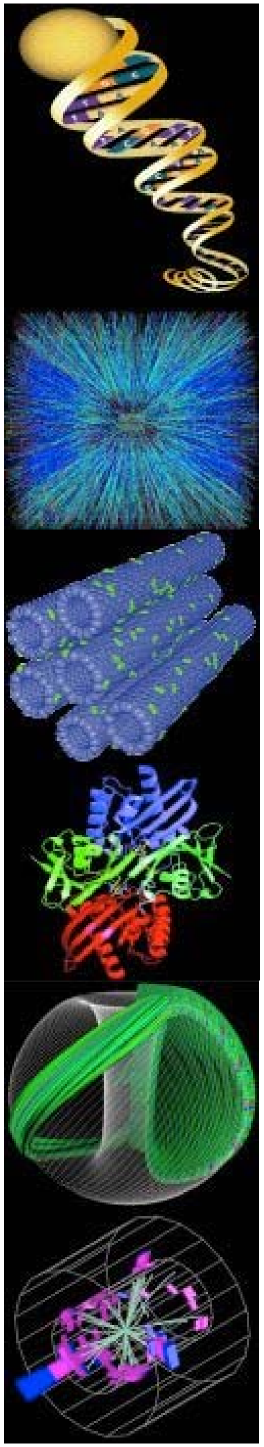
Scientific Discovery Through Advanced Computation (SciDAC)

Brings the power of terascale computing to science





State-of-the-art electronic collaboration tools will facilitate access to these tools to bring simulation to a level of parity with theory and experiment in the scientific enterprise.



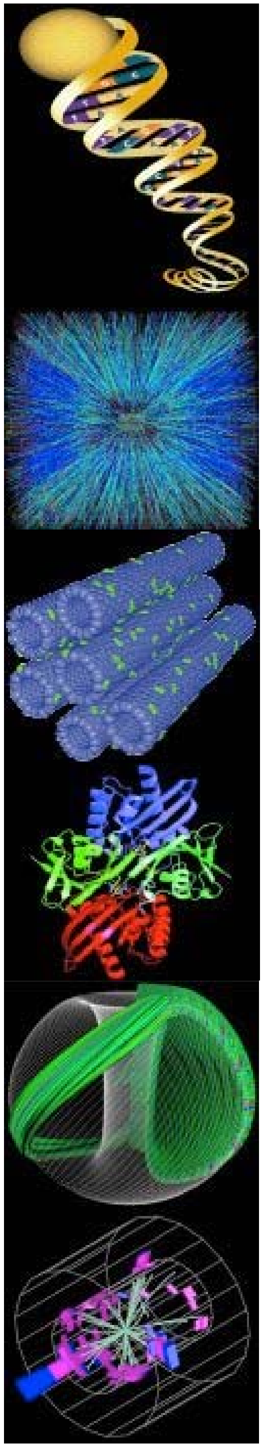
Laboratory Science Teacher Professional Development - Goals

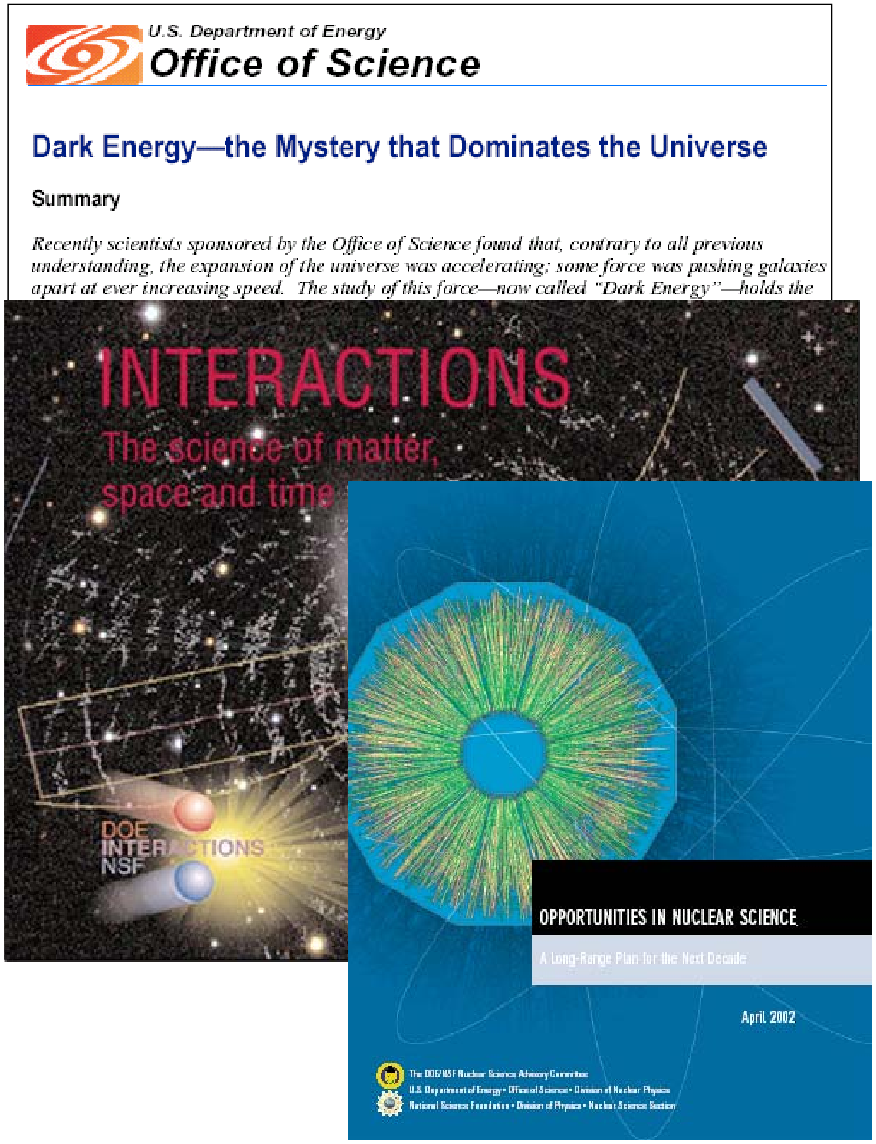
Laboratory Science Teacher Professional Development: For K-14 Teachers/faculty to become leaders in their profession and as members of the extended scientific and technical community.

- DOE labs are ideal institutions for teachers to make connections between the science and technology principles they teach.
- Encourage and motivate middle school and high school students to excel in science and math.
- Increase the number and diversity of undergraduates to expand the nation's supply of well-trained scientists and engineers.
- Supports fields of specific need to the National Labs.
- In FY 2004, a pilot for the LSTPD will be started at ANL

> **"The most direct route to improving math and science achievement for all students is through better math and science teaching."**
>
> "Before It's Too Late: A Report to the Nation from The National Commission on Mathematics and Science Teaching for the 21st Century"
>
> September 27, 2000

An Exciting Time for Physics: *Key Questions*





What is the dark matter?

What is the nature of the dark energy?

How did the universe begin?

Did Einstein have the last word on gravity?

What are the masses of the neutrinos, and how have they shaped the evolution of the **universe?**

How do cosmic accelerators work & what are they accelerating?

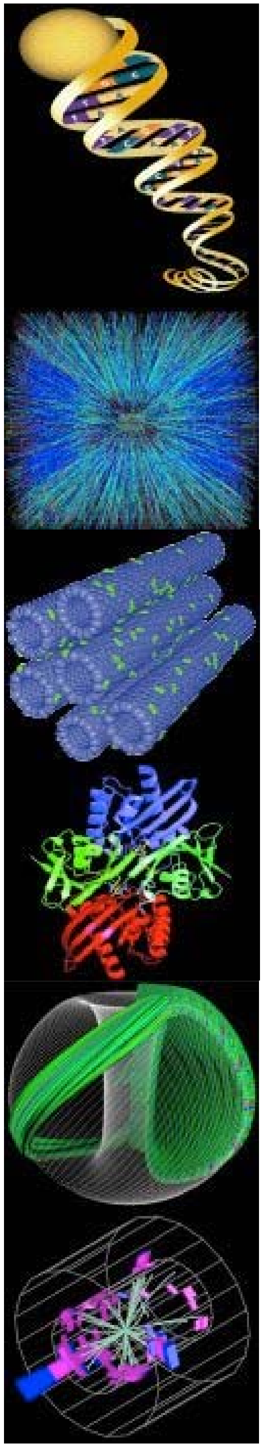
Are protons unstable?

Are there new states of matter at exceedingly high density & temperature?

Are there additional spacetime dimensions?

How were the elements from iron to uranium made?

Is a new theory of matter and light needed at the highest energies?



Office of Science Vision: FY04 - FY08

Scientific Discovery Through 21st Century Computation

- Develop computer architectures that will dramatically improve hardware performance on DOE scientific problems.
- Develop scientific simulation codes to fully exploit the capabilities of terascale computers for DOE problems.
- For Simulation of:
  - Climate
  - Nano-Materials
  - Protein Folding
  - Cell Functions via Genomes to Life
  - Origins of Mass (QCD)
  - Quark-Gluon Plasma
  - Fusion Confinement
  - Combustion

Revolutionary New Materials Through Nanoscience

- Five Nanoscale Research Centers linked to large scientific research instruments at the DOE National Labs to enable:
  - High Efficiency energy storage & conversion.
  - Miniature sensors.
  - Nanocatalysts with enhanced specificity and reactivity.
  - Novel materials that are light weight, strong and conductive.
  - Low cost, high-efficiency photovoltaic cells.
  - Low activation materials for high-temperature applications

National Security, a Clean Environment & Energy Security Through Basic Research

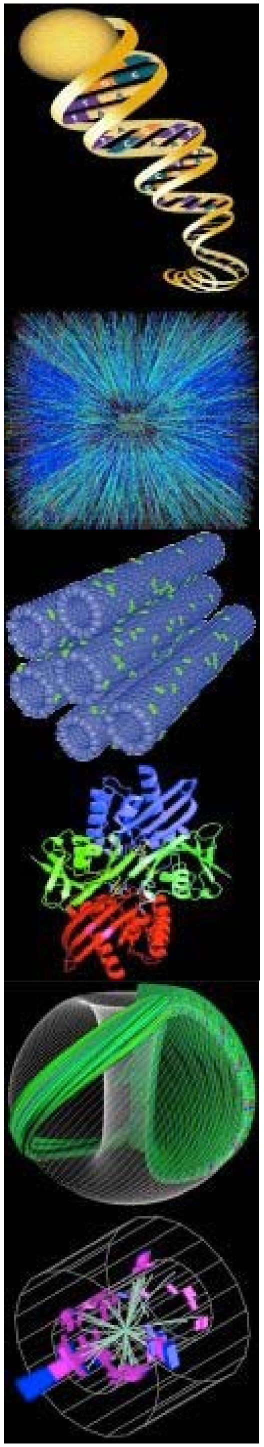
- Demonstrate the scientific and technical feasibility of fusion energy on ITER by 2020.
- New materials for lighter weight vehicles, more efficient engines, more efficient photovoltaic cells.
- Harnessing microbes, microbial communities and other organisms to produce energy, sequester carbon, and remediate hazardous waste sites.

Uncovering the Origins of Time and Matter

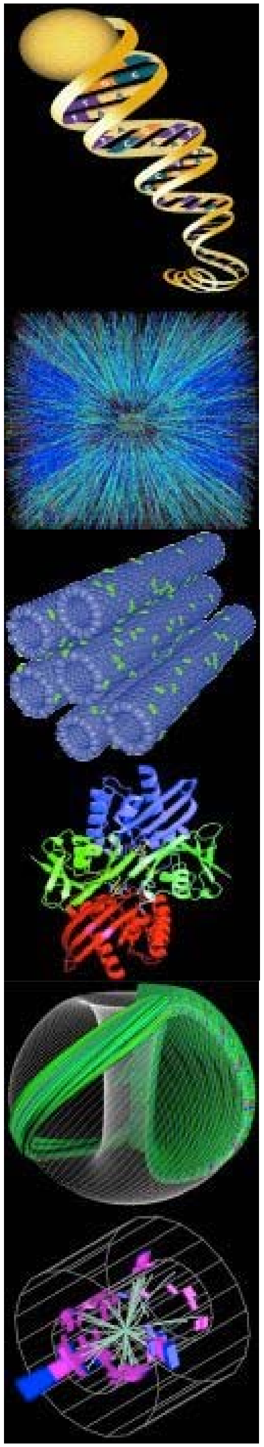
- Understand the origins of the Universe:
  - Mass
  - Accelerating Universe
  - Beginning of Time
  - Dominance of Matter over Anti-matter
- Create the quark-gluon plasma that existed immediately after the “Big Bang”, providing fundamental insights in the evolution of the early universe.
- Nature of Quarks and Gluons: internal structure of protons and neutrons.

Tomorrow’s Science and Technology Capabilities

- By 2004: Initiate pilot “Laboratory Science Teacher Professional Development Program”.
- By 2006: Provide hands-on experience in science and math research to 2,500 K-14 teachers each year.
- By 2006: Complete Spallation Neutron Source for improved drugs and materials.
- By 2008: Complete 5 unique Nanoscience Research Centers, providing the tools for nanoscale machines, designer materials & medical advances.
- By 2009: Construct a Linear Coherent Light Source, providing the ability to image atoms.

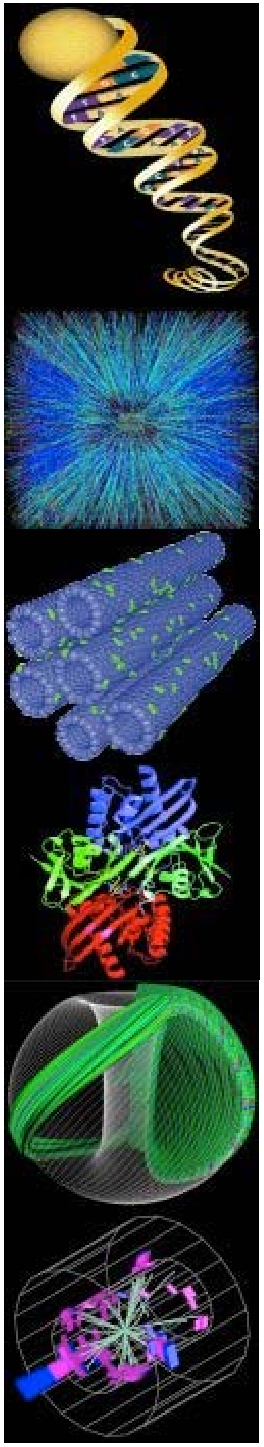


Backup



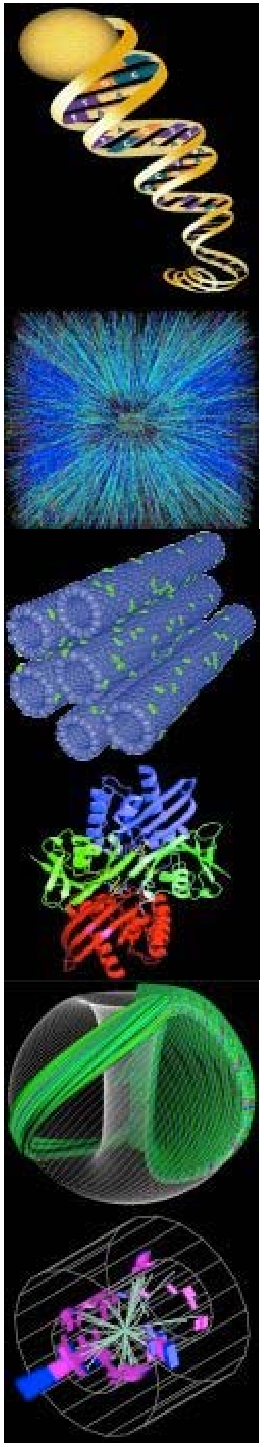
Science for a Hydrogen Economy

- Basic Energy Sciences
  - Catalysts and mechanisms for hydrogen production
  - Modeling of hydrogen combustion for NOx minimization
  - Electrochemical energy conversion mechanisms and materials research for fuel cells
  - Biological mechanisms of generation and metabolism
- Biological and Environmental Research
  - Genomes to Life
    - Biotechnology mechanisms of generation and metabolism
    - Microbial Biotechnology
- Fusion Energy Sciences
  - Options for off peak production of hydrogen
    - Hydrolysis



Science for Security

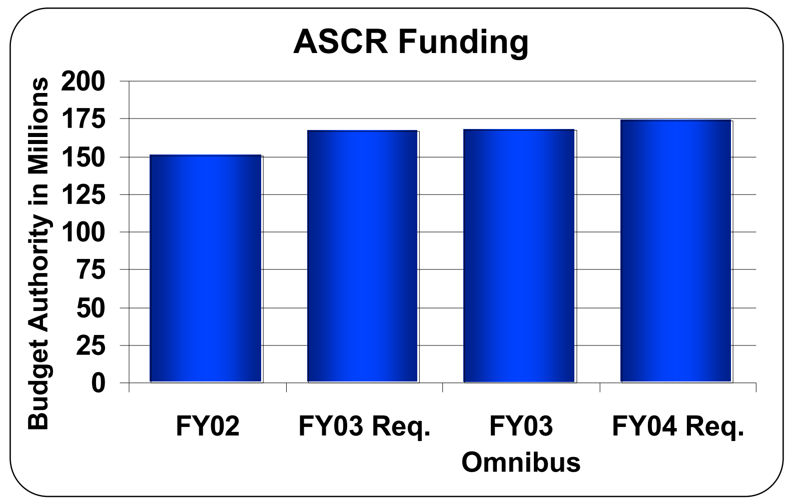
- National Security
  - Nanomaterials for Chemical Signature Detection
  - Mass Spectrometry Underpins Chemical & Biological Detectors
- Energy Security
  - U.S. Investment in Fusion Research
  - Research to Advance the Hydrogen Economy
  - New Materials, Catalysts, and Processes for Improved Energy Efficiency
  - Research to Mediate the Health and Environmental Impacts of Energy Production and Use
- Economic Security and Public Welfare
  - Giant Magnetoresistance Revolutionizes Magnetic Data Storage
  - Artificial Retina may Restore Sight to the Blind



Advanced Scientific Computing Research (ASCR)

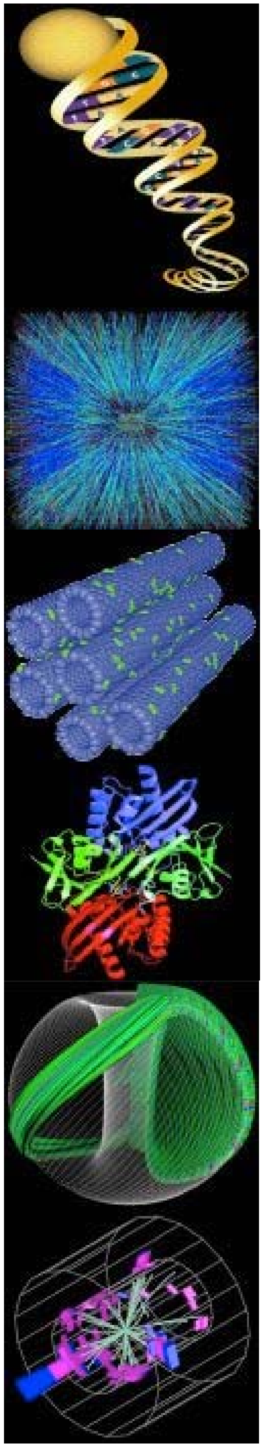
Mathematical, Information & Computational Sciences ($170M, +7M from FY03 Req., +6M from FY03 Omnibus)

- Initiate a new Next Generation Computer Architecture (NGA) effort to address major science application performance bottlenecks.
  - Emphasis on impact of alternative architectures on application performance with particular attention to data movement from memory to processor between processors in parallel systems.
  - Complement software focus of Scientific Discovery through Advanced Computing (SciDAC).
- Continue Integrated Software Infrastructure Centers
  - Partnerships to discover, develop & deploy key enabling technologies for science applications.
  - Provides the SciDAC software infrastructure for applications.
- Supports operation of facilities:
  - NERSC, Collaboratory Tools, and Energy Sciences Network.



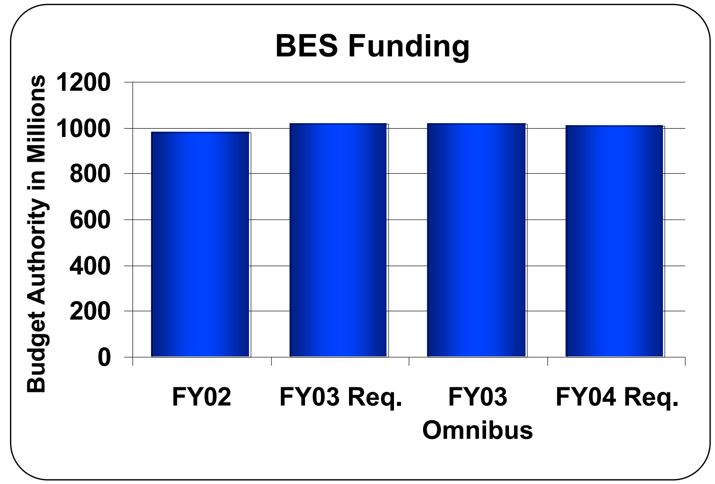
Laboratory Technology Research ($3M, *no change*)

Basic Energy Sciences (BES)



Research ($492M, +6M from FY03 Req., +7M from FY03 Omnibus)

- Catalysis research, especially at the nanoscale, supporting multiple DOE missions continues to be emphasized.
- Major item of equipment for Argonne Nanoscale Science Research Center.

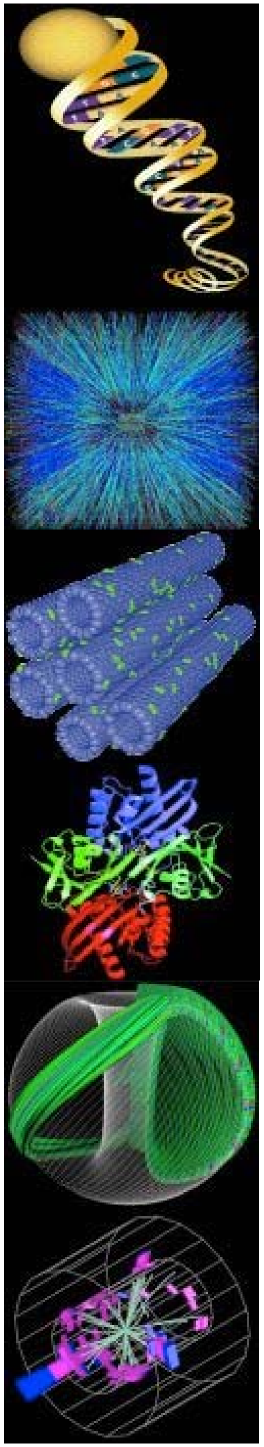


Facilities ($296M, +16M from FY03 Req., +19M from FY03 Omnibus)

- Continued high level of service at major user facilities.

Construction, Engineering & Design ($221M, -31M from FY03 Req., -34M from FY03 Omnibus)

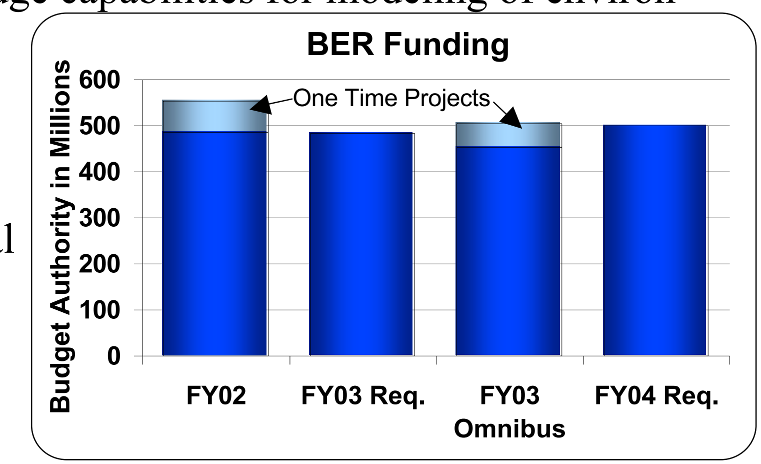
- Spallation Neutron Source construction is fully funded. *($125M, -86M from FY03 Req., -83M from FY03 Omnibus)*
- Nanoscale Science Research Centers (NSRC):
  - Continue Construction Oak Ridge Center *($20M, -4M)*
  - Start Construction of Lawrence Berkeley Center *($35M)*
  - Start Construction of Sandia/Los Alamos Center *($30M)*
  - Design Activities for NSRC's *($3M, -8M from FY03 Req., -9M from FY03 Omnibus)*
- SLAC Linac Coherent Light Source continues PED. *($8M, +2M)*

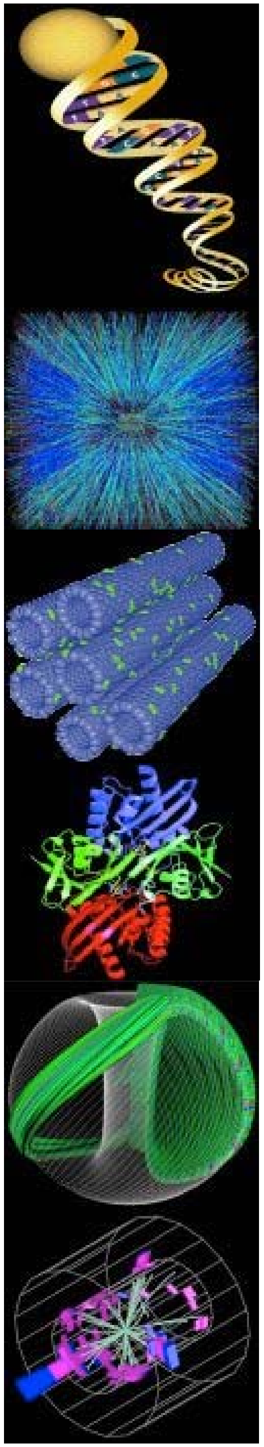


Biological and Environmental Research (BER)

Research ($499M, +15M from FY03 Req., -4M from FY03 Omnibus, +45M from 03 Omnibus excluding earmarks)

- **Life Sciences** *($201M, +15M from FY03 Req., -4M from FY03 Omnibus)* - Revolutionary advances for energy and the environment
  - Genomes to Life will enable revolutionary advances in energy supply, greenhouse gas mitigation, and environmental cleanup
  - Human Genome Program supports national DNA sequencing needs
- **Climate Change Research** *($143M, +5M from FY03 Req., +17M from FY03 Omnibus)* - Underpinning the President's Climate Change Research Initiative
  - Improved climate models and understanding of the global carbon cycle
  - New research to understand ecosystems on scales from molecules to miles.
- **Environmental Remediation Sciences** *($109M, no change from FY03 Req., +6M from FY03 Omnibus)* – Research solutions to environmental challenges Environmental Molecular Sciences Laboratory offers leading edge capabilities for modeling of environ-mental and molecular processes
- **Medical Sciences** *($46M, no change from FY03 Req., -46M from FY03 Omnibus,+4M from 03 Omnibus excluding earmarks)* – Applying energy-related research to solve critical problems in medicine Multi-disciplinary imaging sciences continue research on an artificial retina that may restore sight to the blind





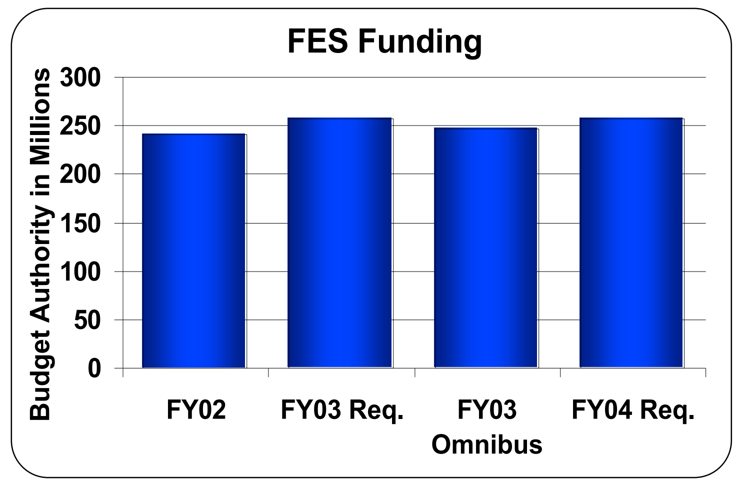
Fusion Energy Sciences (FES)

The Fusion Energy Sciences Advisory Committee and the National Academy of Sciences have concluded that the program is ready to proceed with a burning plasma experiment. Fusion program resource changes ($12M) in preparation for ITER are included in the FY04 Budget Request.

The President has decided the U.S. should enter ITER negotiations.

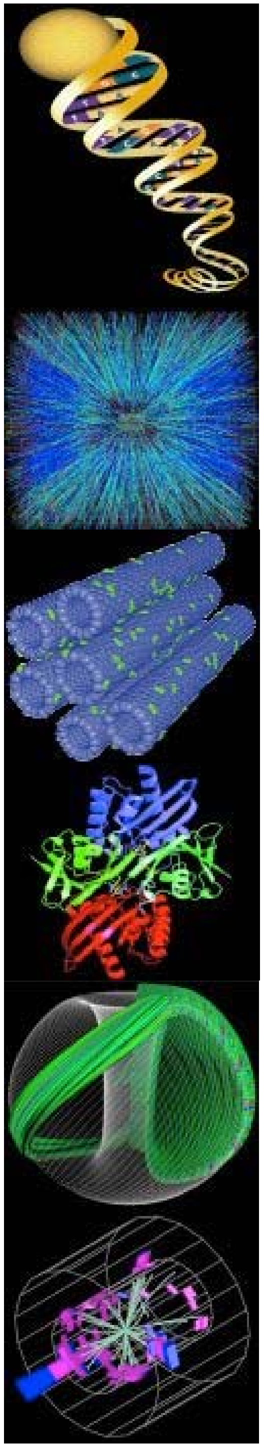
Science and Enabling R&D ($170M, -9M from FY03 Req., -11M from FY03 Omnibus)

- Burning Plasmas
- Fundamental Understanding
- Configuration Optimization
- Materials and Technology

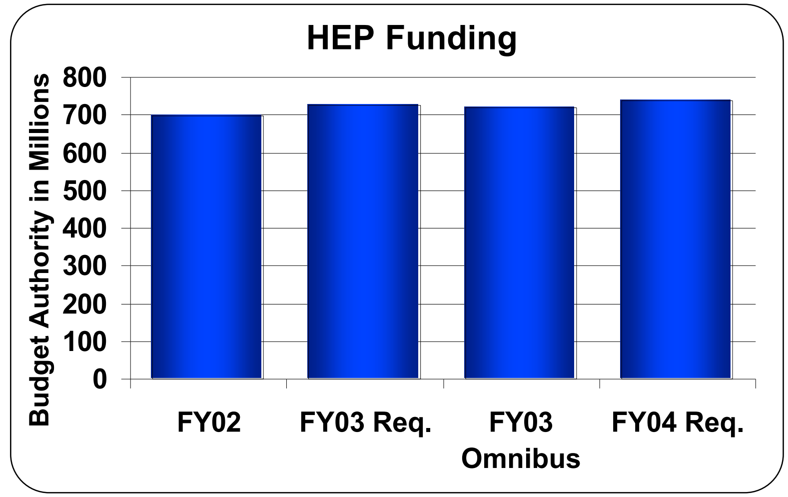


Facilities ($88M, +9M from FY03 Req., +21M from FY03 Omnibus)

- Continue design and initial fabrication of the NCSX at Princeton Plasma Physics Lab.
- Conduct experimental program directed toward ITER needs.



High Energy Physics (HEP)



Research ($256M, -3M from FY03 Req., -3M from FY03 Omnibus)

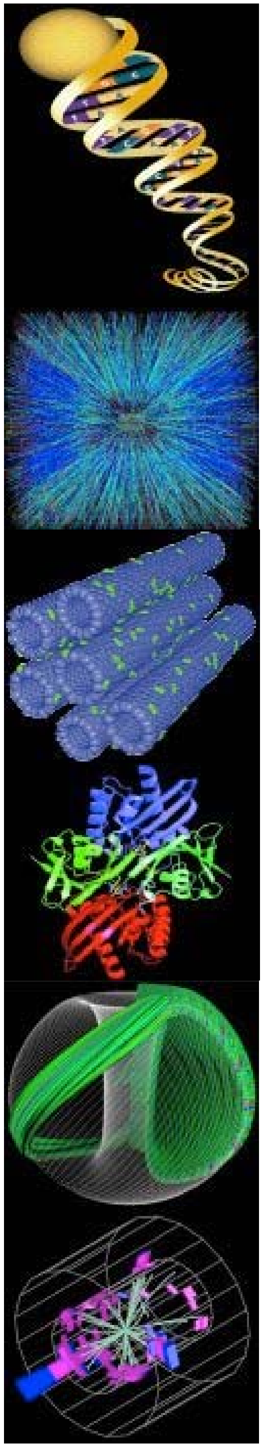
- Increase astro-particle physics: proposed SNAP experiment to explain dark energy.
- Increase research in electron accelerator physics at the SLAC B-Factory.
- Maintain Linear Collider R&D.
- Reduce near term accelerator and detector R&D to provide support for Tevatron at Fermilab and B-Factory at SLAC.

Facilities ($447M, +22M from FY03 Req., +29M from FY03 Omnibus)

- Enhance capabilities for Tevatron Run II at Fermilab by continuing luminosity upgrades.
- Continue capability upgrades for the B-Factory at SLAC.

Construction and Infrastructure/Stewardship ($35M, -6M from FY03 Req., -6M from FY03 Omnibus)

- Neutrinos at the Main Injector (NuMI), SBIR/STTR, and GPP/GPE Activities.



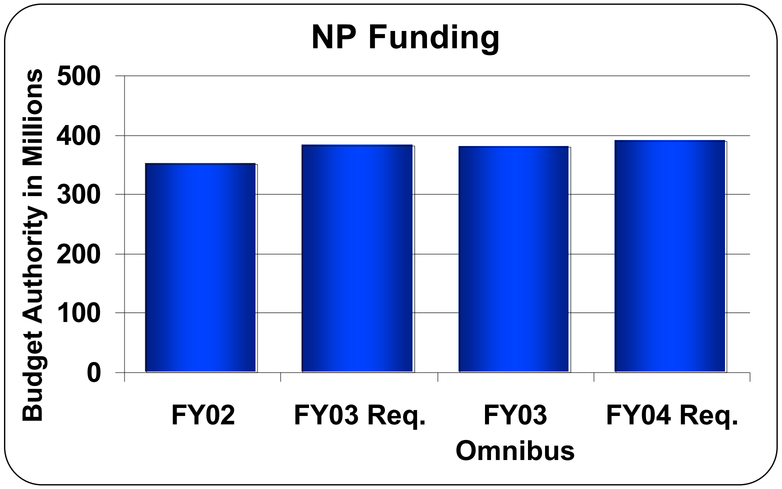
Nuclear Physics (NP)

Research ($136M, +4M from FY03 Req., +5M from FY03 Omnibus)

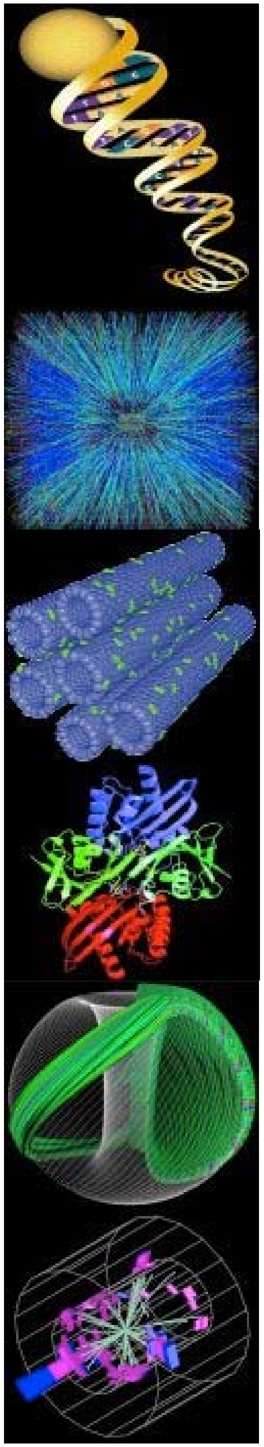
- Increased research support at labs and universities to enhance scientific productivity.
- Maintain R&D activities for RIA and the TJNAF 12 GeV upgrade
- Increase support for:
  - High priority non-accelerator activities
  - Compelling opportunities identified in the recent NSAC Long Range Plan (e.g. gamma-ray tracking and fundamental neutron measurements)
  - Nuclear Theory

Facility Operations ($232M, +2M from FY03 Req., +3M from FY03 Omnibus)

- Terminate 88-Inch Cyclotron operations
- Supported operating user facilities to maintain productive research programs (Average 83% of Max.)
- Support core accelerator competencies and capability upgrades to increase efficiency

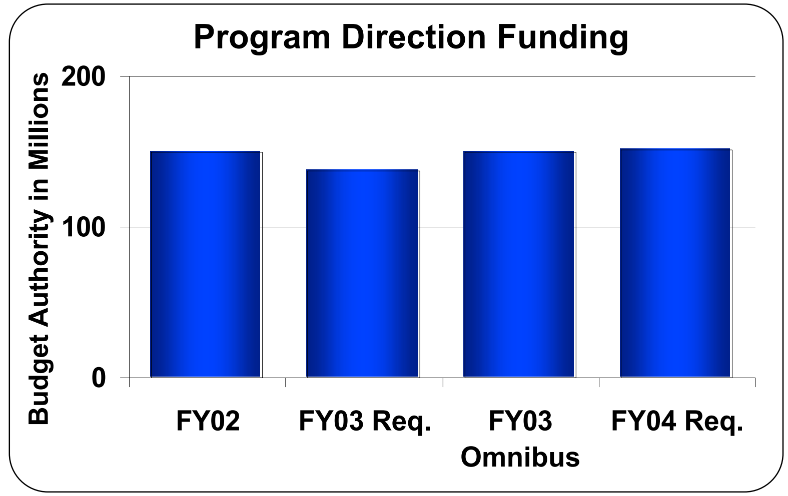


Infrastructure/Stewardship ($21M, -1M from FY03 Req., +2M from FY03 Omnibus)

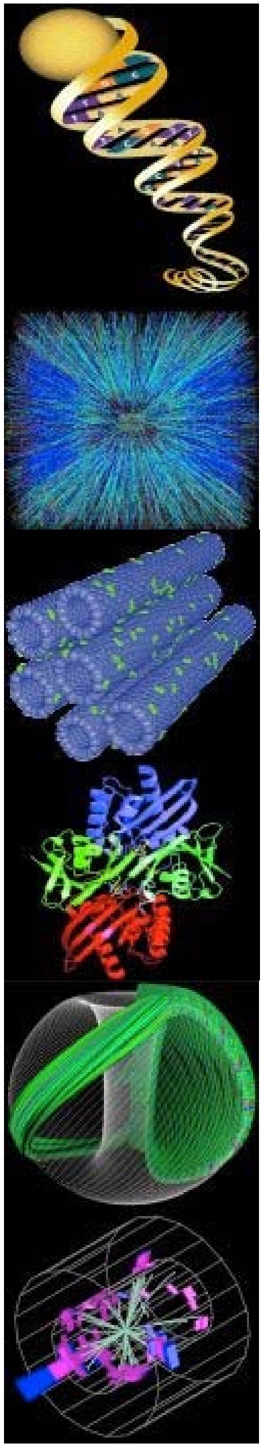


Science Program Direction

- FY03 operations are lean.
  - Possible only through use of uncosted balances.
  - Funds 965 on-board Full-Time Equivalents (FTEs) in FY03 & FY04 - Reduction In Force (RIF) avoided.
    - 284 – Headquarters
    - 609 – Field
    - 72 – Technical Information Management Program (OSTI)



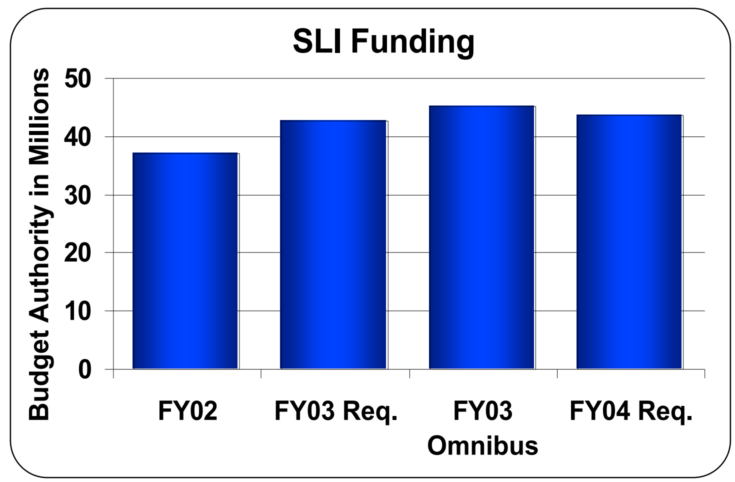
- SC Restructuring Project is in progress:
  - Functional consolidations, process reengineering, and eradication of skills imbalances will be completed by end of FY04.
  - Functions targeted for workforce reductions will be identified.
- SC plans to reduce staffing levels by offering buyouts in FY03 and FY04.

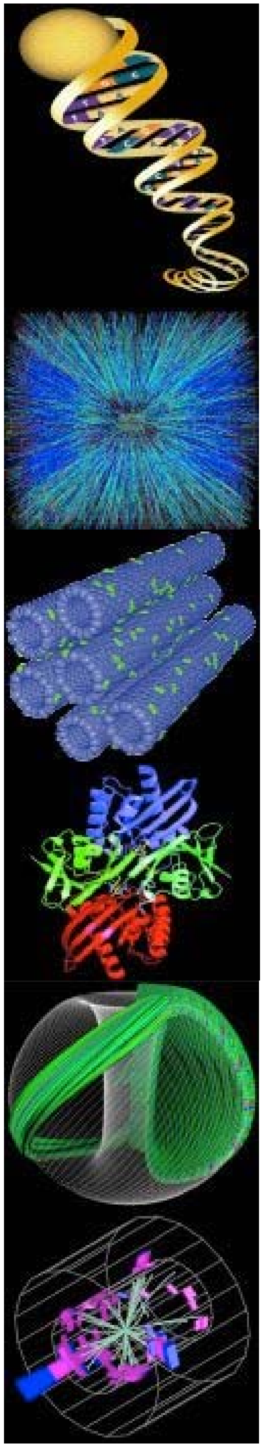


Science Laboratories Infrastructure (SLI)

- Challenge: aging facilities at ten science laboratories.
- FY 2004 budget increases funding for critical infrastructure improvements and supports removal of excess facilities.
  - Line Item Construction ($32M, +0M from FY03 Req., +0.7M from FY03 Omnibus)

    Continues on-going projects and starts one new project – SLAC Safety and Operational Reliability Improvements
  - Payment in Lieu of Taxes ($1.5M, +0.5M from FY03 Req., +0.5M from FY03 Omnibus)
  - Oak Ridge Landlord ($5M, no change from FY03 Req., +0.1M from FY03 Omnibus)
  - Excess Facilities Disposition ($5M, no change from FY03 Req., -2.8M from FY03 Omnibus)
- These vital funds position DOE provide world class science in the 21st century, while reducing the costly footprint of worn-out or obsolete buildings/utility systems.



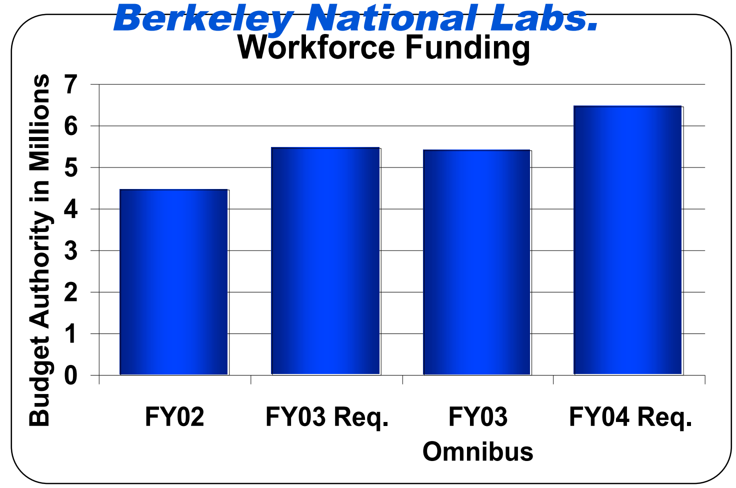


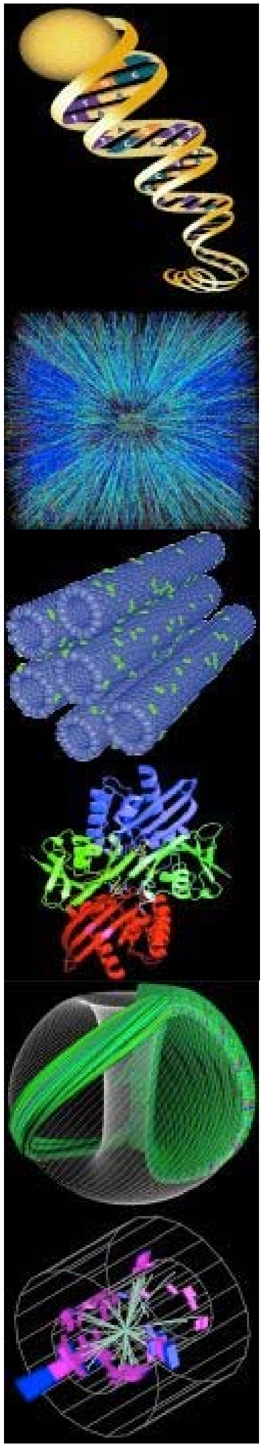
Workforce Development (WD)

- Pre-College Activities – National Science Bowl. ($0.8M, +0.1M from FY03 Req, -0.1M from FY03 Omnibus)
  - Academic & hands-on educational events for middle school & high school students.
- Undergraduate Internships for students entering STEM careers, including K-12 science and math teaching careers. ($3.8M, -0.3M from FY03 Req, +0.1M from FY03 Omnibus)
  - Science Undergraduate Laboratory Internship, Community College Institute of Science and Technology, and Pre-Service Teachers.
- Graduate/Faculty Fellowships for STEM teachers and faculty. ($1.9M, +1.2M from FY03 Req, +1.1M from FY03 Omnibus)
  - Laboratory Science Teacher Professional Development, Faculty and Student Teams, Einstein Fellowships, and energy related laboratory equipment.

Success Stories:

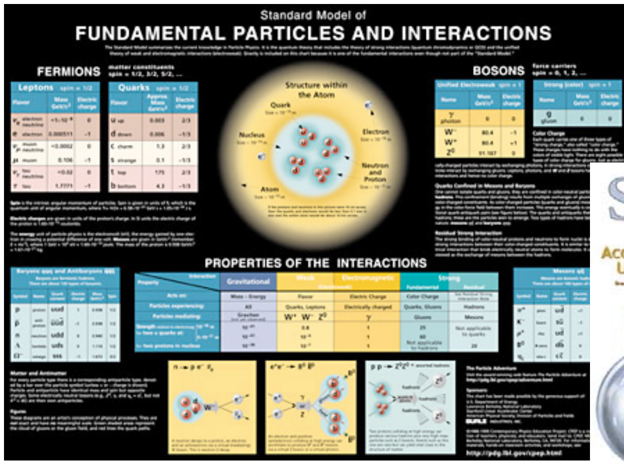
- ***Rick Stevens, Director of the Math & Computer Science Division at Argonne National Lab, was an undergraduate intern in that division in 1982.***
- ***Thomas Cech, a 1989 Nobel Prize Winner in Chemistry, was an undergraduate researcher at Argonne & Lawrence Berkeley National Labs.***





"…having a sustained source of consistent funding is really extremely important in all areas of science for advancing fundamental understanding and having an environment that is really conducive to doing good science."

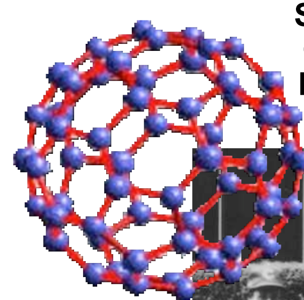
Dr. C. Jeffrey Brinker,
2002 E.O. Lawrence Award WInner

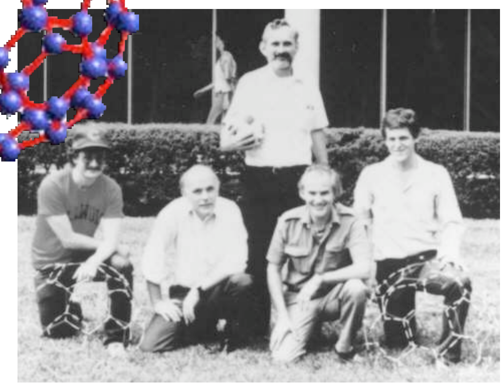


From the Laboratory to Text Books, SC Research is Revealing the Secrets of the Origins of the Universe

SC's "Accelerating Universe" was the Top Science Discovery of 1998

SC Support Enabled the Creation of Bucky Balls Launching a Revolution in Nano-scale S&T





SC Initiative to Apply the Tools and Techniques of the Physical Sciences for Novel Applications: Human Genome and BioTechnology.

Sensors Can Warn You When Food Is Spoiled

Cleveland Net5News January 18, 2003

SC Led the Transition from Vector Computers to Massively Parallel Computers with an Enormous Impact on Research.

Sustained Multidisciplinary, Effort May Soon Restore Sight to the Blind