

U.S. Department of Energy



Office of Science

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



Research Opportunities in the DOE Office of Science

*The Midwest Regional Outreach, Science, and Scholarship
Summit: Leadership in Interdisciplinarity, Networking &
Collaboration (LINC)
St. Louis, MO*

Linda G. Blevins, Ph.D.

Office of the Deputy Director for Science Programs

Office of Science

February 3, 2009

www.science.doe.gov

Download this talk at

http://www.science.doe.gov/SC-2/Deputy_Director-speeches-presentations.htm



The Office of Science supports basic research in support of the DOE mission.



The DOE is a mission agency with responsibilities in energy, environment, and national security.

The Office of Science supports research within the DOE mission at universities and national laboratories.

The Office of Science also plans, builds, and operates user facilities for the scientific community.

U.S. Department of Energy

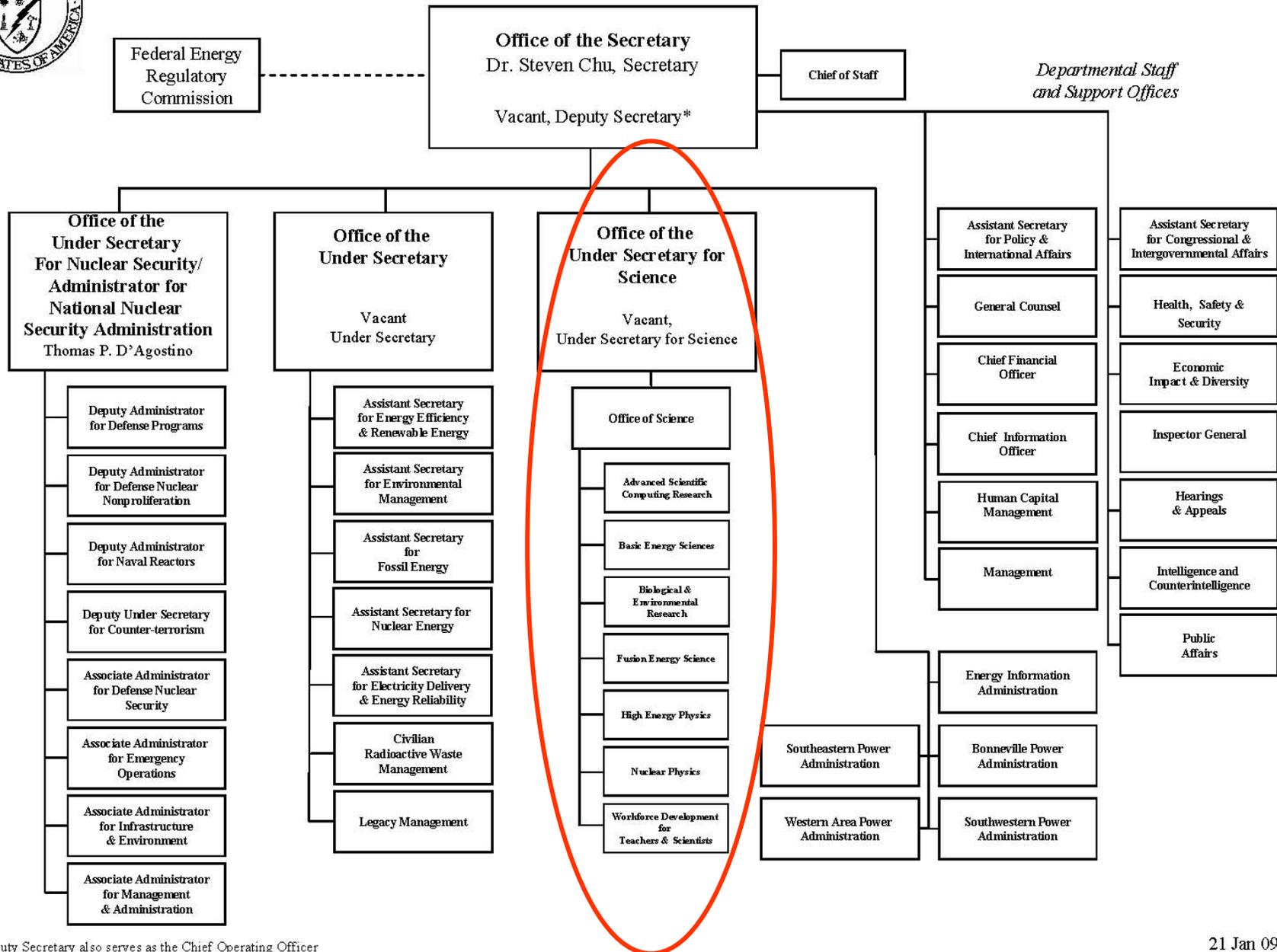


Office of Science

The Office of Science supports
fundamental science of great scale.



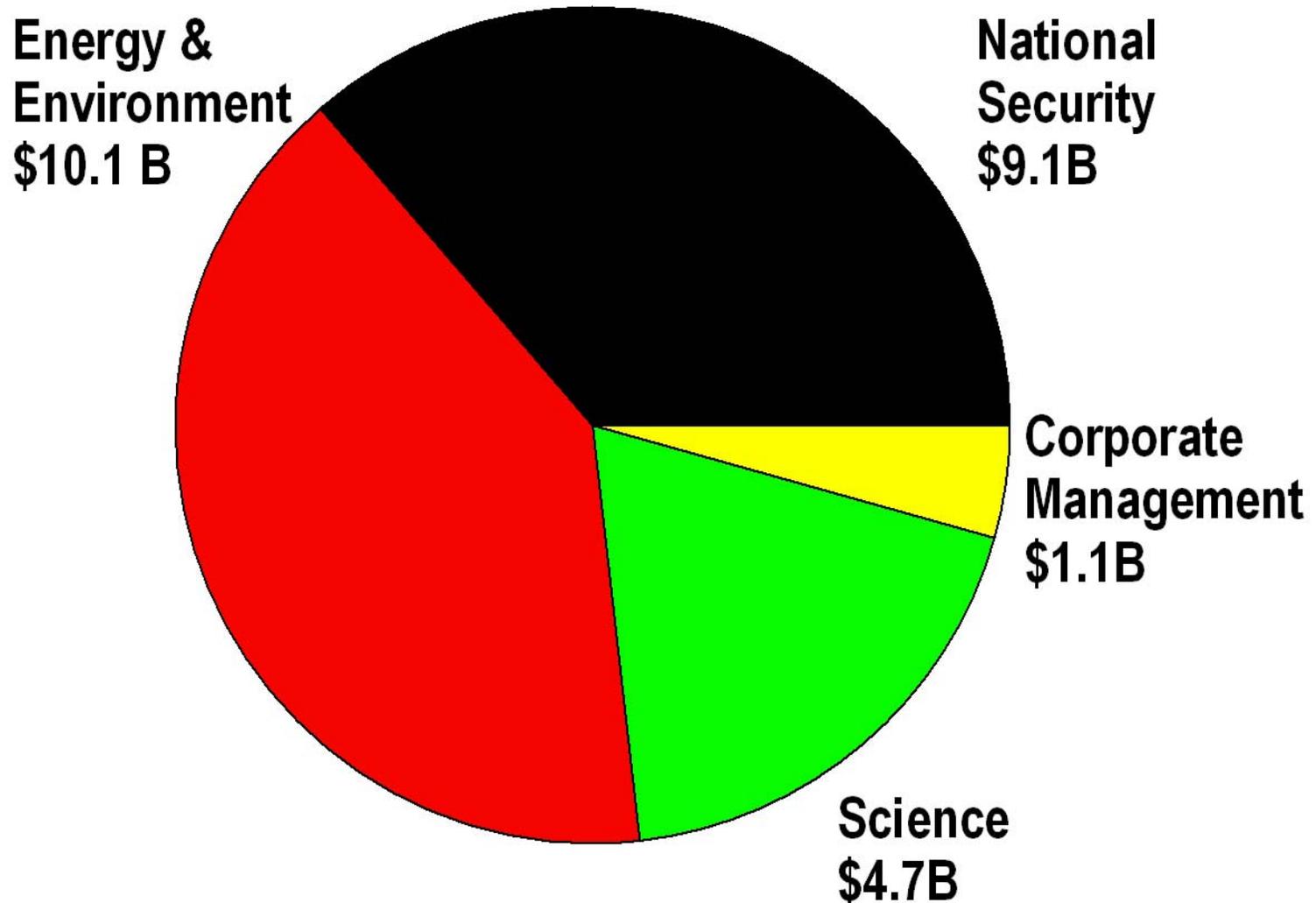
DEPARTMENT OF ENERGY



* The Deputy Secretary also serves as the Chief Operating Officer



Fiscal Year 2009 DOE Budget Request to Congress





The Office of Science supports research and facilities within defined scientific programs.

Advanced Scientific Computing Research

Discover, develop, and deploy the computational and networking tools that enable researchers in the scientific disciplines to analyze, model, simulate, and predict complex phenomena important to the DOE.

Biological and Environmental Research

Advance world-class biological and environmental research programs and scientific user facilities to support DOE's energy, environment, and basic research missions.

Basic Energy Sciences

Support fundamental research to expand the scientific foundations for new and improved energy technologies and for understanding and mitigating the environmental impacts of energy use.

Fusion Energy Sciences

Develop the knowledge needed to create a sustainable source of fusion energy and steward the fundamental science of plasmas.

High Energy Physics

Understand how our universe works at its most fundamental level by discovering the most elementary constituents of matter and energy, probing the interactions between them, and exploring the basic nature of space and time itself.

Nuclear Physics

Discover, explore, and understand all possible forms of nuclear matter.

Workforce Development for Teachers and Scientists

Help ensure that DOE and the Nation have a sustained pipeline of highly trained STEM workers.



Office of Science FY 2009 Budget Request to Congress

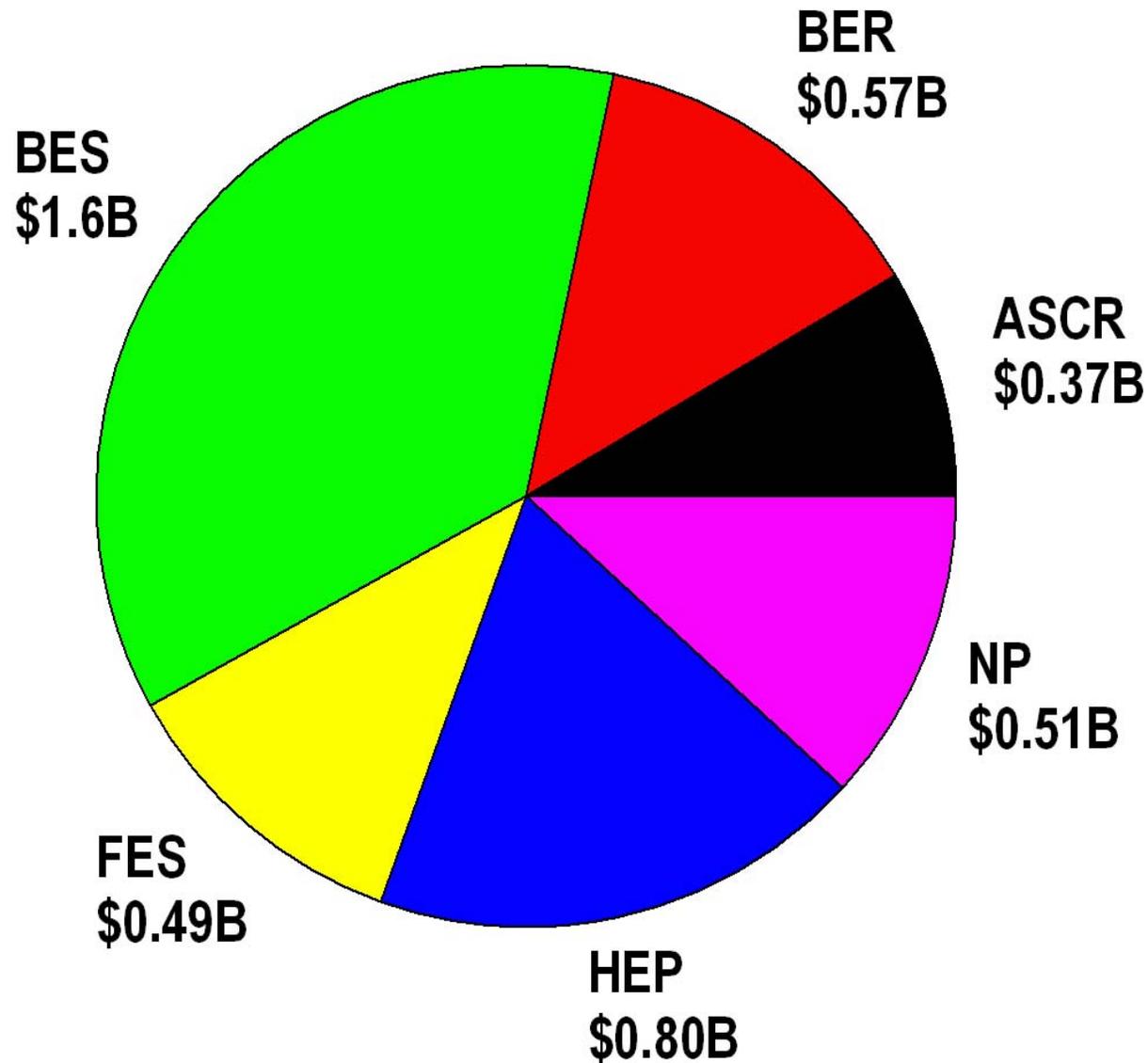
(dollars in thousands)

	FY 2007 Approp.	FY 2008 Approp. (incl. Supplemental)	FY 2009 Request to Congress	FY 2009 Request to Congress vs. FY 2008 Approp.	
Basic Energy Sciences.....	1,221,380	1,252,756	1,568,160	+315,404	+25.2%
Advanced Scientific Computing Research.....	275,734	341,774	368,820	+27,046	+7.9%
Biological and Environmental Research.....	480,104	531,063	568,540	+37,477	+7.1%
High Energy Physics.....	732,434	702,845	804,960	+102,115	+14.5%
Nuclear Physics.....	412,330	423,671	510,080	+86,409	+20.4%
Fusion Energy Sciences.....	311,664	294,933	493,050	+198,117	+67.2%
Science Laboratories Infrastructure.....	41,986	66,861	110,260	+43,399	+64.9%
Science Program Direction.....	166,469	177,779	203,913	+26,134	+14.7%
Workforce Dev. for Teachers & Scientists.....	7,952	8,044	13,583	+5,539	+68.9%
Safeguards and Security (gross).....	75,830	75,946	80,603	+4,657	+6.1%
SBIR/STTR (SC funding).....	86,936	92,997	—	-92,997	-100.0%
Subtotal, Office of Science.....	3,812,819	3,968,669	4,721,969	+753,300	+19.0%
Adjustments*.....	23,794	114,214	—	-114,214	-100.0%
Total, Office of Science.....	3,836,613	4,082,883	4,721,969	+639,086	+15.7%

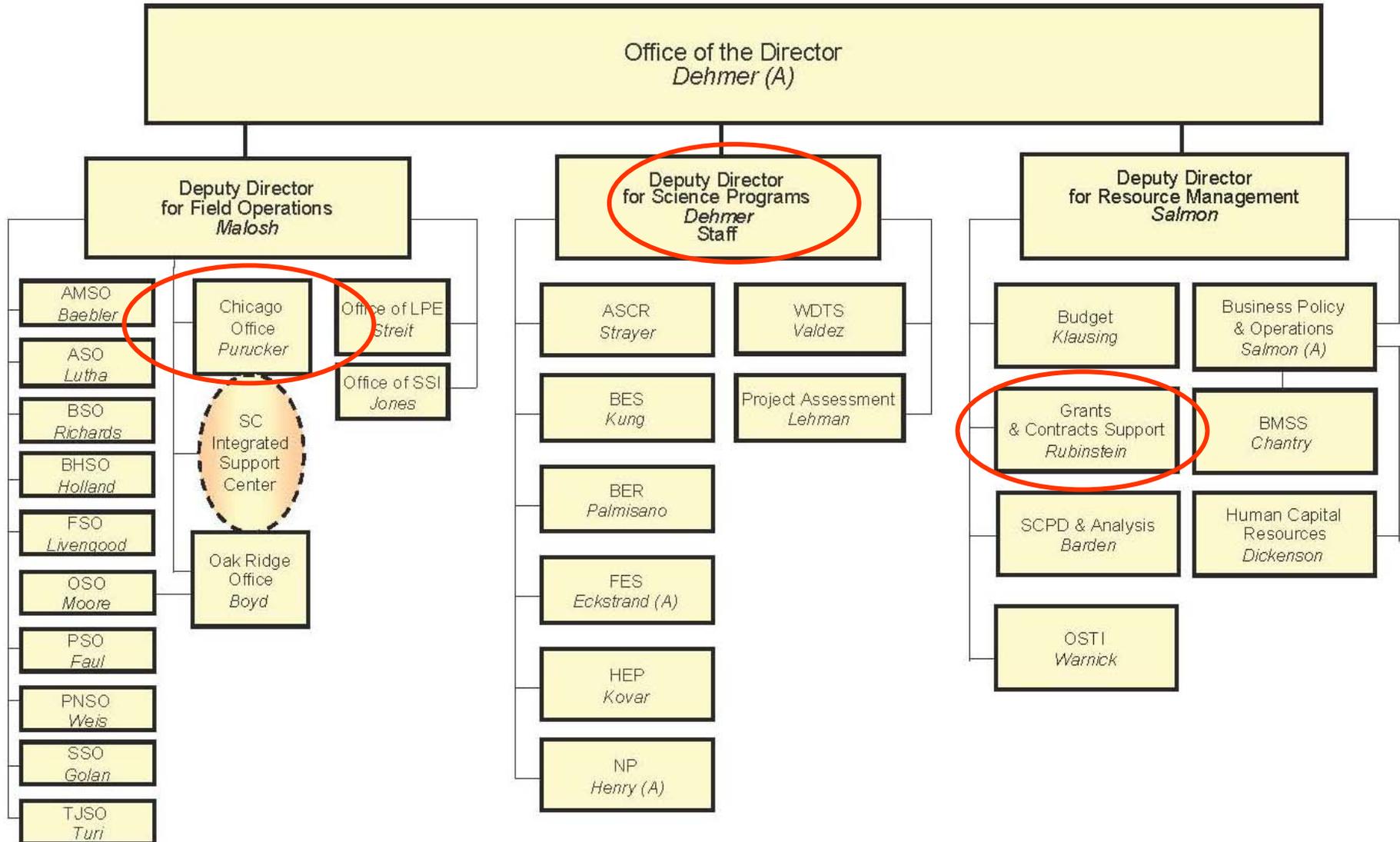
* Adjustments include SBIR/STTR funding transferred from other DOE offices (FY 2007 and FY 2008), a charge to reimbursable customers for their share of safeguards and security costs (FY 2007 and FY 2008), Congressionally-directed projects (FY 2008 only), a rescission of a prior year Congressionally-directed project (FY 2008 only), and offsets for the use of prior year balances to fund current year activities (FY 2007 and FY 2008).



Science Programs FY 2009 Budget Request to Congress



OFFICE OF SCIENCE





Office of Science Numbers

The Office of Science is a steward for 10 of 17 DOE national labs and operates more than 30 major scientific user facilities.

Approximately 1/2 of the budget supports operations of the scientific user facilities and construction of new facilities; the other 1/2 supports research at the national laboratories and universities.

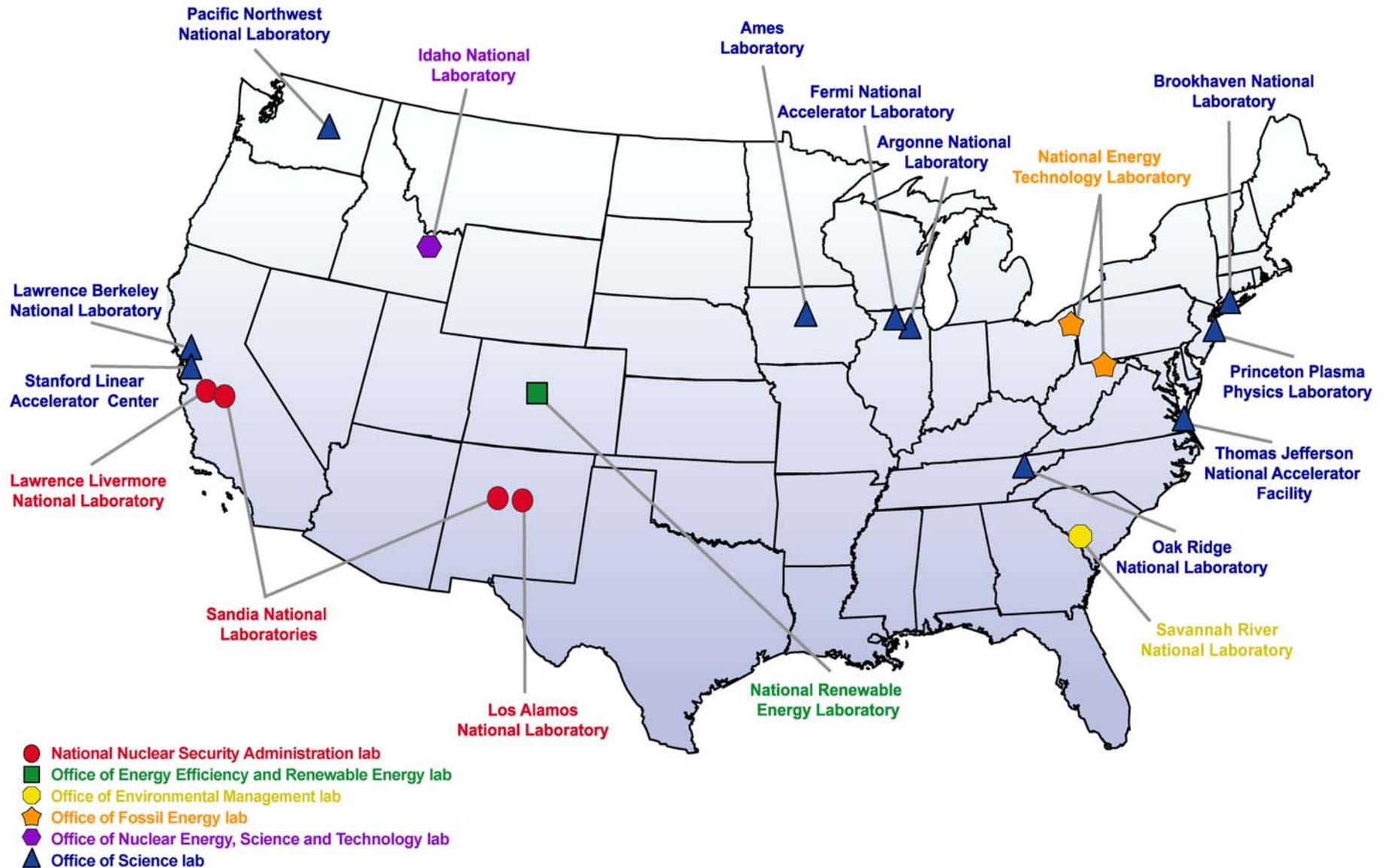
About 1/3 of Office of Science research funding goes to support grants at more than 300 colleges and universities nationwide.

In FY 2009 SC plans to support the research of ~24,000 faculty, postdoctoral researchers, graduate students, and undergraduates.

- ~20,000 users of scientific facilities a year
 - ~1/2 of the annual 20,000 facility users come from universities;
 - ~1/3 of the users come from DOE national laboratories;
 - the remaining come from industry, other agencies, and international entities.



DEPARTMENT OF ENERGY NATIONAL LABORATORIES





Office of Science User Facilities



- Four operating **synchrotron light sources**, and two next-generation light sources
- Three **neutron sources**
- **Particle accelerators/colliders** for high energy and nuclear physics
- **Fusion/plasma facilities**, including **ITER** which aims to demonstrate the feasibility of fusion energy
- **Joint Genome Institute** – for rapid whole genome sequencing
- **Three Bioenergy Research Centers**
- Five **Nanoscale Science Research Centers** – assembly of capabilities unmatched in the world
- **Environmental Molecular Science Laboratory** – integrated experimental resources for discovery and innovation in the environmental molecular sciences
- Advanced **computational resources** – terascale to petascale computing and networks for open science



All research funded at laboratories and universities, including facilities construction and operations, is awarded through a peer-reviewed, merit-based process.

Merit Review Criteria* :

Scientific and/or technical merit of the project

Appropriateness of the proposed method or approach

Competency of the personnel and adequacy of proposed resources

Reasonableness and appropriateness of the proposed budget

* From 10 C.F.R. 605

The Office of Science has ~3000 active grants, entertaining ~2000 new and renewal applications per year.



How to Find Office of Science Research Opportunities



Annual Open Solicitation

<http://www.sc.doe.gov/grants/grants.html>

Notice 09-01 - Microsoft Internet Explorer provided by Office of Science

Address: <http://www.sc.doe.gov/grants/FAPN09-01.html>

U.S. DEPARTMENT OF ENERGY

**Office of Science
Financial Assistance
Funding Opportunity Announcement
DE-PS02-09ER09-01**

*Annual Notice
Continuation of Solicitation for the Office of
Science Financial Assistance Program*

The Office of Science of the Department of Energy hereby announces its continuing interest in receiving grant applications for support of work in the following program areas: Basic Energy Sciences, High Energy Physics, Nuclear Physics, Advanced Scientific Computing, Fusion Energy Sciences, Biological and Environmental Research, and Workforce Development for Teachers and Scientists. On September 3, 1992, DOE published in the Federal Register the Office of Energy Research Financial Assistance Program (now called the Office of Science Financial Assistance Program), 10 CFR Part 605, Final Rule, which contained a solicitation for this program. Information about submission of applications, eligibility, limitations, evaluation and selection processes and other policies and procedures are specified in 10 CFR Part 605.

APPLICATION DUE DATE: December 31, 2008, 8:00 PM Eastern Time.

For this Solicitation the Office of Science is using Grants.gov for the electronic submission of applications. Please reference Funding Opportunity DE-PS02-09ER09-01 when submitting applications for this Solicitation.

For more information about the Office of Science Grant Program, go to the Office of Science Grants and Contracts Web Site.

Open throughout the year.

Funding Opportunity Announcements can be more specific, too.

Submission is through Grants.gov.



More information on funding opportunities can be found on the program websites.

Advanced Scientific Computing Research

<http://www.sc.doe.gov/ascr/index.html>

Basic Energy Sciences

<http://www.sc.doe.gov/bes/bes.html>

Biological and Environmental Research

http://www.sc.doe.gov/ober/ober_top.html

Fusion Energy Sciences

<http://www.science.doe.gov/ofes/>

High Energy Physics

<http://www.science.doe.gov/hep/index.shtm>

Nuclear Physics

<http://www.sc.doe.gov/np/>

Workforce Development for Teachers and Scientists

http://www.scied.science.doe.gov/scied/sci_ed.htm



Recent Examples of Topical Solicitations: Watch
<http://www.sc.doe.gov/grants> for future opportunities

Advanced Detector Research Program Notice DE-PS02-08ER08-31 --Posted September 17, 2008. Letters of Intent requested by November 15, 2008. Formal applications due December 2, 2008.

Fusion Simulation Program Notice DE-PS02-09ER09-04 --Posted October 6, 2008. Preapplications required by October 31, 2008. Formal applications due by December 10, 2008.

Fundamental Research in Superconducting RF Cavity Design Notice DE-PS02-09ER09-05 --Posted October 15, 2008. Letters of Intent encouraged by December 15, 2008. Formal applications due by January 15, 2009.

Plasma Science Centers Notice DE-PS02-08ER08-25 --Posted June 26, 2008. Letters of Intent requested by August 11, 2008. Preapplications required by September 1, 2008. Formal applications due February 18, 2009.

Plant Feedstock Genomics for Bioenergy: A Joint Research Funding Opportunity Announcement USDA, DOE Notice DE-PS02-09ER09-03 --Posted November 12, 2008. Preapplications are required and should be submitted by December 9, 2008. Formal applications must be received by February 18, 2009.

Environmental Remediation Science Program Notice DE-PS02-09ER09-07 --Posted December 24, 2008. Preapplications are strongly encouraged and must be submitted by January 30, 2009. Formal applications must be received by April 9, 2009.

Integrated Radiochemistry Research Projects of Excellence Notice DE-PS02-09ER09-08 --Posted January 12, 2009. Preapplications are required and must be submitted by February 16, 2009. Formal applications must be received by April 2, 2009.

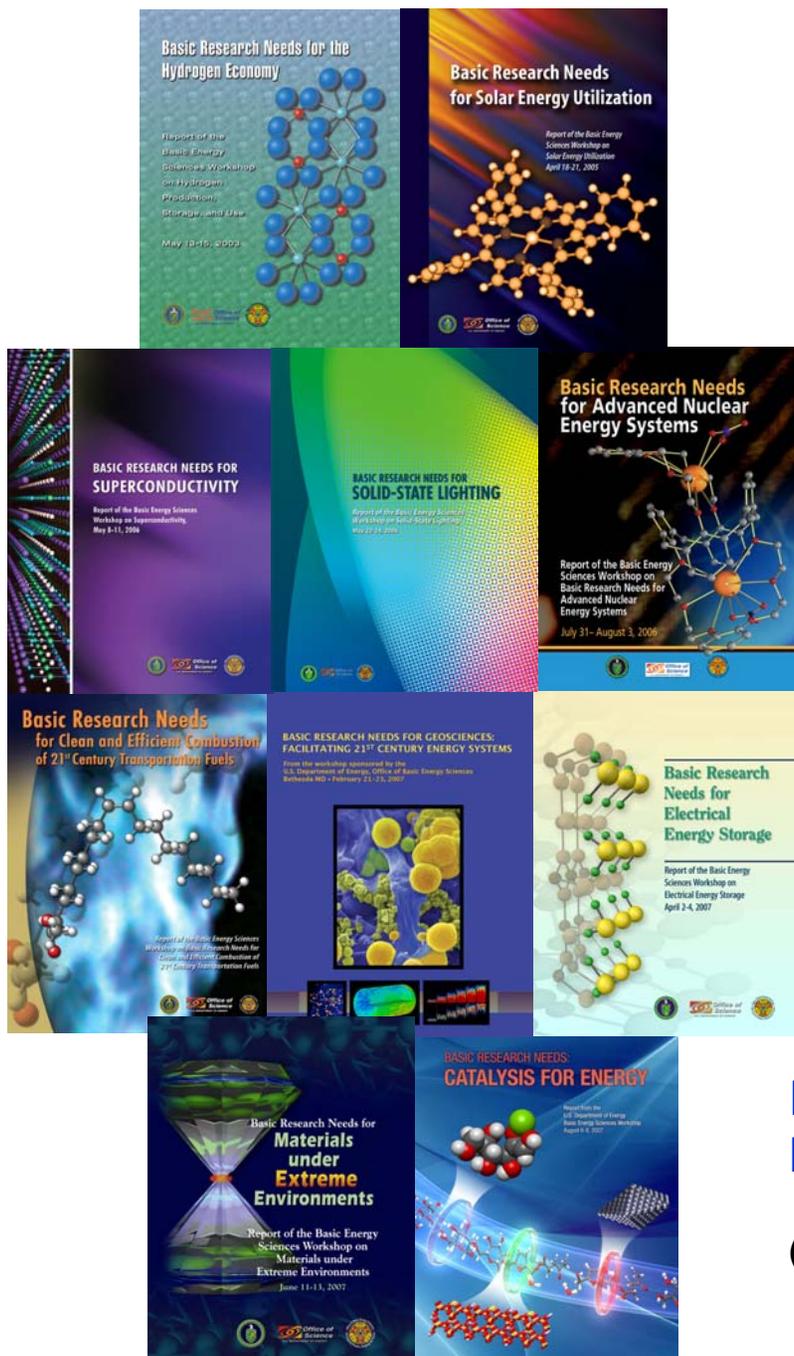


The Office of Science develops its programs and plans within the context of the DOE mission and in concert with the science community.

Research areas are identified using federal advisory committees, program and topical workshops, interagency groups, National Academies' studies, and open and targeted solicitations.

As an example, the Office of Basic Energy Sciences (BES) recently completed an important workshop series....

"Basic Research Needs" Workshops



- **Basic Research Needs to Assure a Secure Energy Future**
BESAC Workshop, October 21-25, 2002
The foundation workshop that set the model for the focused workshops that follow.
- **Basic Research Needs for the Hydrogen Economy**
BES Workshop, May 13-15, 2003
- **Basic Research Needs for Solar Energy Utilization**
BES Workshop, April 18-21, 2005
- **Basic Research Needs for Superconductivity**
BES Workshop, May 8-10, 2006
- **Basic Research Needs for Solid-state Lighting**
BES Workshop, May 22-24, 2006
- **Basic Research Needs for Advanced Nuclear Energy Systems**
BES Workshop, July 31-August 3, 2006
- **Basic Research Needs for the Clean and Efficient Combustion of 21st Century Transportation Fuels**
BES Workshop, October 30-November 1, 2006
- **Basic Research Needs for Geosciences: Facilitating 21st Century Energy Systems**
BES Workshop, February 21-23, 2007
- **Basic Research Needs for Electrical Energy Storage**
BES Workshop, April 2-5, 2007
- **Basic Research Needs for Materials under Extreme Environments**
BES Workshop, June 10-14, 2007
- **Basic Research Needs for Catalysis for Energy**
BES Workshop, August 5-10, 2007

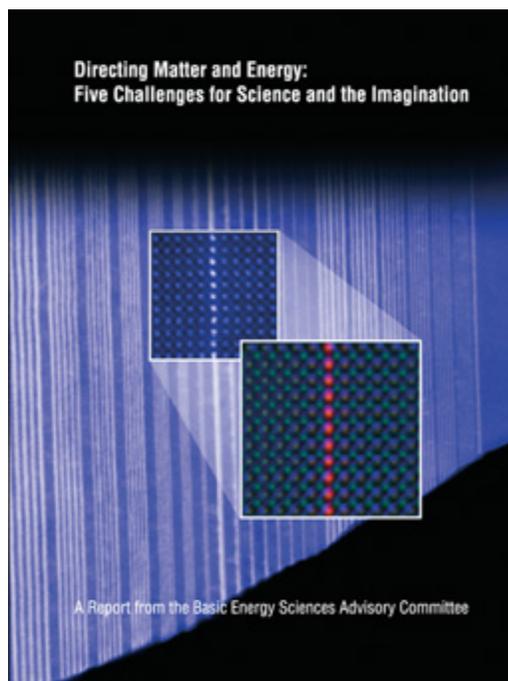
Reports available at
<http://www.sc.doe.gov/bes/reports/list.html>

(BESAC = Basic Energy Sciences Advisory Committee)



The scientific challenges that emerge from the workshop series are no longer discussed in terms of traditional scientific disciplines.

Directing Matter and Energy: Five Challenges for Science and the Imagination



*BESAC Grand Challenge Subcommittee Report
January 2008*

- How do we control materials processes at the level of electrons?
- How do we design and perfect atom- and energy-efficient syntheses of revolutionary new forms of matter with tailored properties?
- How do remarkable properties of matter emerge from the complex correlations of atomic or electronic constituents and how can we control these properties?
- How can we master energy and information on the nanoscale to create new technologies with capabilities rivaling those of living things?
- How do we characterize and control matter away—especially very far away—from equilibrium?
- Addressing these grand challenges is key to making the transition from observation to control of matter.

http://www.sc.doe.gov/bes/reports/files/GC_rpt.pdf



The workshop series inspired a new BES funding opportunity.

Energy Frontier Research Centers (~\$100M/yr)

Innovative basic research to accelerate scientific breakthroughs needed to create advanced energy technologies for the 21st century

Awards to be \$2M-\$5M per year for an initial 5-year period

The Office of Science seeks to engage the Nation's intellectual and creative talent to tackle the scientific grand challenges associated with determining how nature works, leading the scientific community to direct and control matter at the quantum, atomic, and molecular levels, and harness this new knowledge and capability for some of our most critical real-world challenges.

Energy Frontier Research Centers will pursue basic research in areas such as:

Solar Energy Utilization

Catalysis for Energy

Electrical Energy Storage

Solid State Lighting

Superconductivity

Geosciences for Nuclear Waste and CO₂ Storage

Advanced Nuclear Energy Systems

Combustion of 21st Century Transportation Fuels

Hydrogen Production, Storage, and Use

Materials Under Extreme Environments

U.S. universities, DOE laboratories, and other institutions eligible

FOA opened April 4, 2008 - FOA closed October 1, 2008 - ~260 applications received
Under review now. Expect awards in April 2009, pending appropriation.

<http://www.sc.doe.gov/bes/EFRC.html>



Energy Frontier Research Centers are based on the scientific knowledge base of energy-relevant research that has been articulated through the series of twelve workshop reports and have the following attributes:

-
- The research program is at the forefront of one or more of the challenges described in the BESAC report Directing Matter and Energy: Five Challenges for Science and the Imagination.
 - The research program addresses one or more of the energy challenges described in the ten BES workshop reports in the Basic Research Needs series.
 - The program is balanced and comprehensive, and, as needed, supports experimental, theoretical, and computational efforts and develops new approaches in these areas.
 - The program provides opportunities to inspire, train, and support leading scientists of the future who have an appreciation for the global energy challenges of the 21st century.
 - The center leadership communicates effectively with scientists of all disciplines and promotes awareness of the importance of energy science and technology.
 - There is a comprehensive management plan for a world-leading program that encourages high-risk, high-reward research. The Center's management plan demonstrates that the whole is substantially greater than the sum of the individual parts.
 - A number of EFRC awards will be initiated in FY 2009 based on an open competition among academic institutions, DOE laboratories, and other institutions. Research activities may be sited at universities, at DOE laboratories, or in joint university-laboratory collaborations.
 - The EFRC awards are expected to be in the \$2–5 million range annually for an initial 5-year period. Pending Congressional appropriations, it is anticipated that approximately \$100 million will be available for multiple EFRC awards.
 - As the EFRC program matures, it is anticipated that EFRC competitions will be held every 2 or 3 years and that renewal submissions will be openly competed with new submissions.
 - Out-year funding is subject to satisfactory progress in the research and the availability of funding appropriations.
 - While capital investment in instrumentation and infrastructure are expected as part of the EFRC awards, usage and leverage of existing facilities, including the BES user facilities, is encouraged.



Current EFRC Funding Opportunity Announcement

DOE/BES received approximately 260 applications involving some 385 institutions.

The EFRC applications come from lead institutions in 41 states and the District of Columbia.

The approximate breakdown of applications by lead institution is about:

- 71% from universities

- 13% from DOE/NNSA laboratories

- 16% from other institutions (for-profit, nonprofit, and individuals).

Approximately 3800 senior investigators are participating in the EFRC applications; 98% of these come from the U.S. and 2% come from 26 foreign countries.

The average number of investigators per application is 15; the average number of institutions per application is 4.8.

The total requested budget for all applications over the 5-year project period is approximately \$5B.



Additional Funds for BES Single-Investigator and Small Group Research (SISGR) Requested in FY09

Pending Congressional appropriation, it is anticipated that up to \$60 million will be available for core research program awards in FY 09.

Web announcement issued to request applications from the scientific community as part of the Office of Science Financial Assistance Funding Opportunity Announcement.

While no limit is set for each of the awards, this funding is primarily aimed at single PI or small-group projects with an initial funding of 3 years.

Examples of topical areas covered in the solicitations include:

mid-scale instrumentation, ultrafast science, chemical imaging, emergent behavior;

basic research for electrical energy storage, advanced nuclear energy systems, solar energy utilization, hydrogen production, storage, and use;

other research areas identified in the BESAC and BES workshop reports, with an emphasis on nanoscale phenomena;

accelerator research and development

879 pre-applications have been received under the first round. BES will transmit encourage/discourage decisions soon after FY 2009 appropriations.

<http://www.sc.doe.gov/bes/SISGR.html>



The Office of Science provides opportunities for early career researchers.

- (1) Fusion Energy Sciences Plasma Physics Junior Faculty Development Program
- (2) Advanced Scientific Computing Research Early Career Principal Investigator Program
- (3) High Energy Physics Outstanding Junior Investigator Program
- (4) Nuclear Physics Outstanding Junior Investigator Program
- (5) SC Early Career Scientist and Engineer Award (SC-ECASE) recognizes researchers at national laboratories. If an SC-ECASE winner is selected for PECASE, they receive ~\$50k per year for five years.



University researchers can become involved in many ways.

Read about the core research areas on our websites and contact program managers to discuss whether your ideas fit within their programs.

Volunteer to become a reviewer or participate in a workshop.

Incorporate our large scientific user facilities into your research. Apply to compete for time at one of them.

Follow federal advisory committee meetings.

Respond to open and topical solicitations.



Opportunities in DOE Science Programs

Research and Facilities



Advanced Scientific Computing Research (ASCR)

To discover, develop, and deploy the computational and networking tools that enable researchers in the scientific disciplines to analyze, model, simulate, and predict complex phenomena important to DOE.

A particular challenge is fulfilling the science potential of emerging multi-core computing systems and other novel “extreme-scale” computing architectures, which will require significant modifications to today’s tools and techniques.

Director: Dr. Michael Strayer



ASCR Programs

Research Areas

- Applied Mathematics
- Computer Science
- Integrated Networking Environments

User Facilities and Networks

- National Energy Research Scientific Computing Facility (NERSC) at Lawrence Berkeley National Laboratory (LBNL)
- Leadership Computing Facility at Argonne National Laboratory (ANL)
- Leadership Computing Facility at Oak Ridge National Laboratory (ORNL)
- Energy Sciences Network (ESnet)

Cross-Cutting Projects

- Scientific Discovery through Advanced Computing (SciDAC)
- Innovative and Novel Computational Impact on Theory and Experiment
- Multiscale Mathematics Initiative

**Office of the Associate Director for Advanced
Scientific Computing Research
(ASCR)**

Michael Strayer, Associate Director
Barb Helland – Senior Advisor
Walt Polansky – Cyber Security Advisor
Robert Lindsay – Special Projects
Julie Scott – Financial Analyst
Melea Baker – Administrative Assistant
Betsy Riley – Detailee
Sue Morss - Detailee

Budget and Planning
Christine Chalk – Budget Formulation
Julie Scott – Budget Execution
Dan Hitchcock – Budget Planning
Barb Helland – Budget Planning

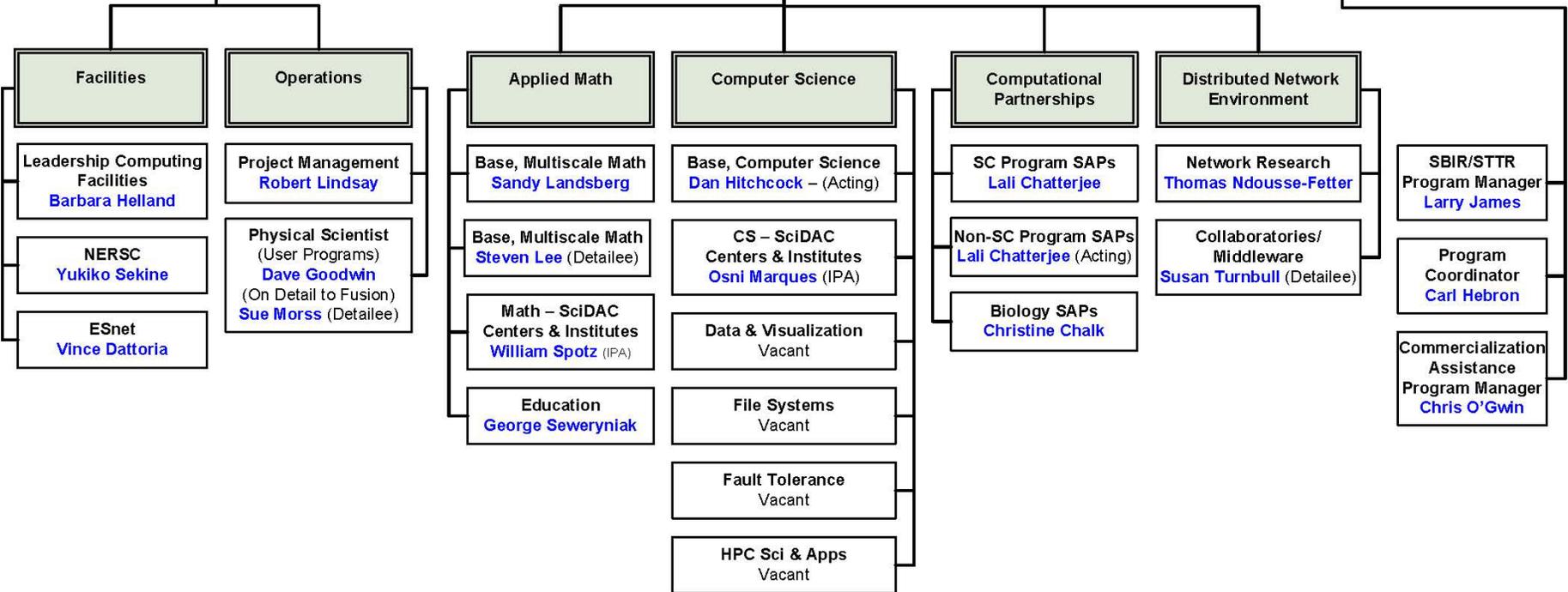
ASCAC
Christine Chalk – Lead
Melea Baker – Admin Support

Operations
Barb Helland – Ops Lead
Julie Scott – Admin/HR Lead

Facilities Division
 Vacant - Director (**Vince Dattoria** – Acting)
Dan Hitchcock - Senior Technical Advisor
Sally McPherson - Administrative Support

**Computational Science Research and
Partnerships (SciDAC) Division**
 Vacant - Director (**Walt Polansky** – Acting)
Amy Clark – Administrative Specialist
Teresa Beachley – Grants and Contracts

**Small Business
Research Division**
Larry James – Director (Acting)
Jackie Stone - Administrative Support



January 6, 2009



ASCR Website

http://www.sc.doe.gov/ascr/index.html

ASCR | ORGANIZATION | NEWS | CONTACT US

SEARCH

GO



U.S. DEPARTMENT OF ENERGY



Office of Science

What is Advanced Scientific Computing? ASCAC FACILITIES RESEARCH SBIR/STTR

NAVIGATE ASCR PAGES

- About ASCR
- ASCR Staff
- Budget Information
- Accomplishments
- Program Documents
- News
- Workshops & Conferences
- ASCR Discovery
- Advisory Committee
- Facilities
- Research
- INCITE
- SBIR/STTR
- CSGF
- ECPI
- HBCU



The Office Of Advanced Scientific Computing Research

Breakthroughs - 2008

A panel of computational scientists, applied mathematicians, and computer scientists gathered in February 2008 to identify recent breakthroughs in computational science and enabling technologies, supported in a broad sense by ASCR through the Innovative and Novel Computational Impact on Theory and Experiment (INCITE) program, the Scientific Discovery through Advanced Computing (SciDAC) program, and/or its base program. Their report details the accomplishments that have significantly advanced a scientific frontier during the past 18 months.



[Read the Report >](#)

ESnet Helps Distribute LHC Data

ESnet helps researchers seeking the Origins of Matter. The Large Hadron Collider (LHC) will produce an enormous amount of data and in the forefront of providing researchers access to that data is ESnet. ESnet foresaw this data challenge years ago and developed ESnet 4, a new



CLICK HERE TO SEE WHAT'S NEW ON THE ASCR WEB SITE

[ASCR Monthly News Roundup](#)

[Current Funding Opportunities](#)

[ASCR 10-Year Vision](#)
100k PDF

[ASCR HPC Facilities Strategic Plan](#)
476k PDF



[SciDAC Review - Issue #9](#)

Related Links of Interest



Biological and Environmental Research (BER)

To understand complex biological, climatic, and environmental systems across spatial and temporal scales ranging from sub-micron to the global, from individual molecules to ecosystems, and from nanoseconds to millennia.

This will be accomplished by exploring the frontiers of genome-enabled biology; discovering the physical, chemical and biological drivers of climate change; and seeking the molecular determinants of environmental sustainability and stewardship.

Director: Dr. Anna Palmisano



BER Research Programs

Biological Systems Sciences

Genomics: GTL

Bioenergy Research Centers

Joint Genome Institute

Low Dose Radiation

Radiochemistry, Imaging & Instrumentation

Structural Biology

Climate & Environmental Sciences

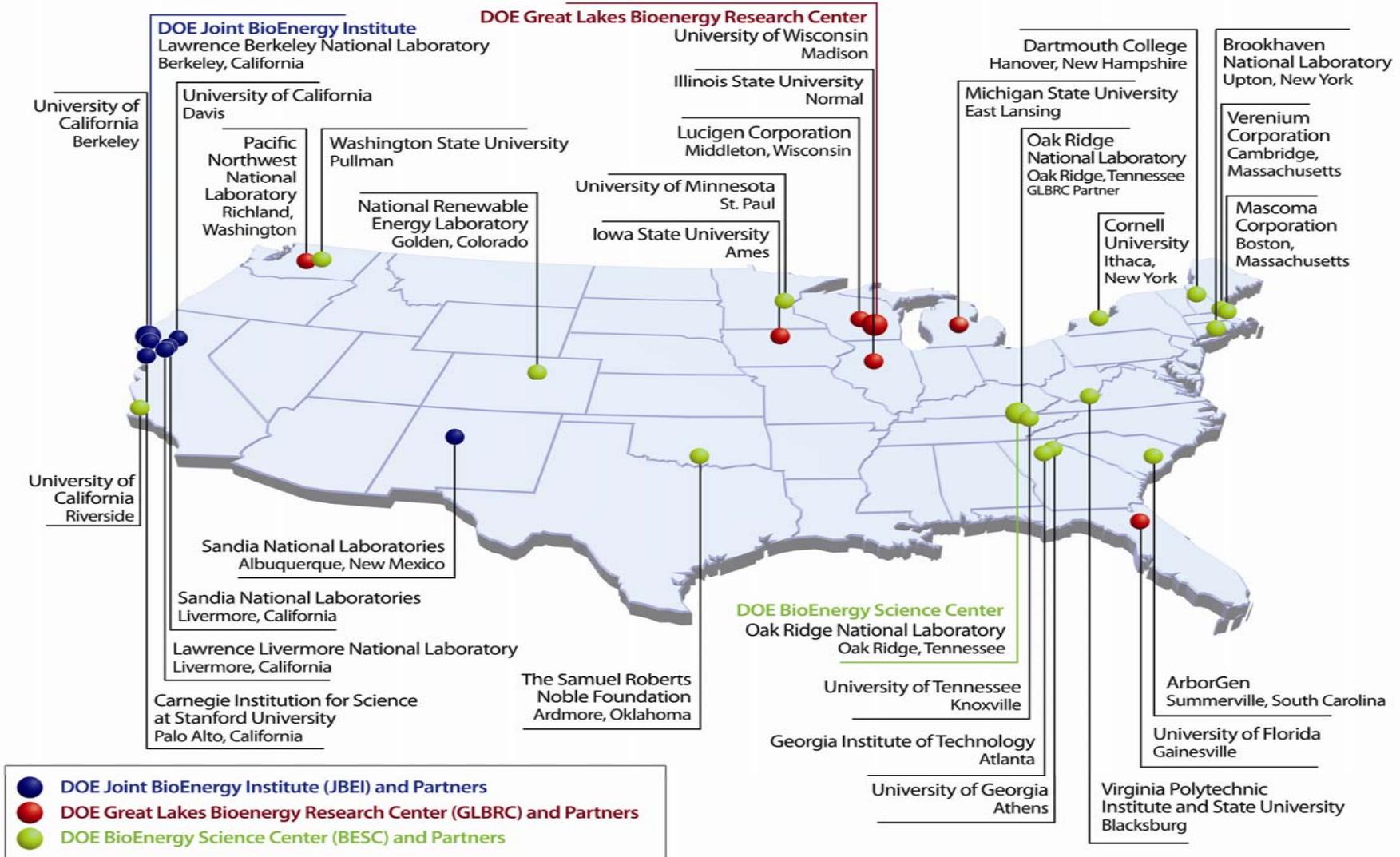
Climate Change Research

Environmental Remediation Science Program

Environmental Molecular Science Lab



DOE Bioenergy Research Centers: Multi-Institution Partnerships





BER Program Contacts (1 of 4)

Advanced Biomedical Technology	Dean Cole
Atmospheric Radiation Measurement (ARM) Science	Kiran Alapaty
Atmospheric Radiation Measurement (ARM) Climate Research Facility (ACRF)	Wanda Ferrell
	Rickey Petty
Atmospheric Sciences	Ashley Williamson
	Rickey Petty
Bioenergy Research Centers	Sharlene Weatherwax
	John Houghton
	Joseph Graber
BioHydrogen Production and BioEthanol	John Houghton
	Joseph Graber
Bioinformatics	Susan Gregurick
Carbon Management Science	Sharlene Weatherwax
	Michael Kuperberg
Climate Change Prediction	Anjuli Bamzai
Computational Biology	Susan Gregurick



BER Program Contacts (2 of 4)

DNA Sequencing	Dan Drell
Environmental Molecular Sciences Laboratory (EMSL)	Paul Bayer
Environmental Remediation Science Program (ERSP)	R. Todd Anderson
	Paul Bayer
	Roland Hirsch
	Michael Kuperberg
	David Lesmes
Ethical, Legal, and Social Issues	Daniel Drell
	Libby White
Genomics: GTL	Sharlene Weatherwax
	Dan Drell
	Joseph Graber
	Roland Hirsch
	John Houghton
	Arthur Katz
	Marvin Stodolsky



BER Program Contacts (3 of 4)

Global Change Education	Rickey Petty
Human Subjects	Libby White
	Peter Kirchner
Information and Integration	Wanda Ferrell
Integrated Assessment - Climate	Bob Vallario
Joint Genome Institute and Production Genomics Facility	Daniel Drell
	Sharlene Weatherwax
Low Dose Radiation Research	Noelle Metting
	Arthur Katz
Medical Imaging	Dean Cole
Plant Feedstocks	Sharlene Weatherwax
Program for Ecosystem Research	Jeff Amthor
Radiopharmaceutical and Molecular Nuclear Medicine	Prem Srivastava



BER Program Contacts (4 of 4)

Small Business Innovation Research - Climate Change Sciences	Rickey Petty
Small Business Innovation Research - Environmental Remediation Sciences	David Lesmes
Small Business Innovation Research - Life Sciences	Marvin Stodolsky
Small Business Innovation Research - Medical Sciences	Prem Srivastava
Structural Biology	Roland Hirsch
	Noelle Metting
Terrestrial Carbon	Michael Kuperberg



BER Website

U.S. Department of Energy

Office of Science

Office of Biological & Environmental Research

Climate and Environmental Sciences Division | Biological Systems Science Division



Research Programs

Contacts

Opportunities

Human Subjects

User Facilities

Advisory
Committees

Congress and BER

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Fellowships &
Education

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BER Data Sources

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Mission

BER advances world-class biological and environmental research programs and scientific user facilities to support DOE's energy, environment, and basic research missions. Mission priorities:

- Develop biofuels as a major secure national energy resource
- Understand relationships between climate change and Earth's ecosystems, and assess options for carbon sequestration
- Predict fate and transport of subsurface contaminants
- Develop new tools to explore the interface of biological and physical sciences

Organizational Structure

- [Biological Systems Science Division \(BSSD\)](#) - supports fundamental research and technology development to achieve a predictive, systems-level understanding of complex biological systems to advance DOE missions in energy, climate, and environment.
- [Climate and Environmental Sciences Division \(CESD\)](#) - supports fundamental research to achieve a predictive, systems-level understanding of climate change, as well as subsurface contaminant fate and transport, to advance DOE missions in energy, climate, and environment.

Research Activities

Since initiating the Human Genome Project in 1986, BER has spearheaded the development of modern genomics-based systems biology and played a major role in seeding and fostering the contemporary biotechnology revolution, while at the same time supporting forefront research on the impacts of energy production and use on climate change. BER's research program, closely aligned with DOE mission goals, aims at understanding complex biological and environmental systems across many spatial and temporal scales, from the sub-micron to the global, from

Search BER Site

(Includes BER Abstracts Database)

Search

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NEWS

[DOE Report on New Frontiers of Science in Radiochemistry and Instrumentation for Radionuclide Imaging](#)

In November 2008, BER organized a workshop to discuss new paradigms for its Radiochemistry and Radionuclide Imaging Instrumentation research that would both advance DOE's missions in biology and the environmental sciences and be useful for medical applications pursued by other agencies and industry. This [report](#) outlines the workshop's findings and presents a series of new opportunities for DOE developments.

[DOE Report on Carbon Cycling & Bioresequestration: Integrating Biology & Climate Through Systems Science](#)



Basic Energy Sciences (BES)

To support fundamental research to understand, predict, and ultimately control matter and energy at the electronic, atomic, and molecular levels in order to provide the foundations for new energy technologies and to support other aspects of DOE missions in energy, environment, and national security.

Director: Dr. Harriet Kung



BES Research Programs

Materials Sciences & Engineering

Condensed Matter & Materials Physics
Experimental Condensed Matter Physics
Theoretical Condensed Matter Physics
Physical Behavior of Material
Mechanical Behavior & Radiation Effects

Materials Discovery, Design, & Synthesis
Materials Chemistry
Biomolecular Materials
Synthesis & Processing

Scattering & Instrumentation Sciences
X-ray Scattering
Neutron Scattering
Electron & Scanning Probe Microscopies
Ultrafast Science & Instrumentation

Chemical Sciences, Geosciences, & Biosciences

Fundamental Interactions
Atomic, Molecular, & Optical Sciences
Gas-Phase Chemical Physics
Condensed-Phase & Interfacial
Molecular Science
Computational & Theoretical Chemistry

Photo- & Bio-Chemistry
Solar Photochemistry
Photosynthetic Systems
Physical Biosciences

Chemical Transformations
Catalysis Science
Heavy Element Chemistry
Separations & Analysis
Geosciences

Scientific User Facilities: Accelerator & Detector R&D



BES User Facilities

Four synchrotron radiation light sources

- Advanced Light Source
- Advanced Photon Source
- National Synchrotron Light Source
- Stanford Synchrotron Radiation Laboratory

Three neutron scattering facilities

- Spallation Neutron Source
- High Flux Isotope Reactor
- Manuel Lujan Jr. Neutron Scattering Center

Five nanoscale science research centers

- Center for Nanoscale Materials
- Center for Functional Nanomaterials
- Molecular Foundry
- Center for Nanophase Materials Sciences
- Center for Integrated Nanotechnologies

Two facilities under construction

- Linac Coherent Light Source
- National Synchrotron Light Source II

Office of Basic Energy Sciences

Harriet Kung, Director
Wanda Smith, Administrative Specialist

BES Budget and Planning

Bob Astheimer, Technical Advisor
Margie Davis, Financial Management
Vacant, Program Support Specialist

BES Operations

Rich Burrow, DOE Technical Office Coordination
Don Freeburn, DOE and Stakeholder Interactions
Ken Rivera, Laboratory Infrastructure/ES&H
Vacant, Program Analyst/BESAC

Materials Sciences and Engineering Division

Jim Horwitz, Acting Director

Christie Ashton, Program Analyst
Charnice Waters, Secretary

Scientific User Facilities Division

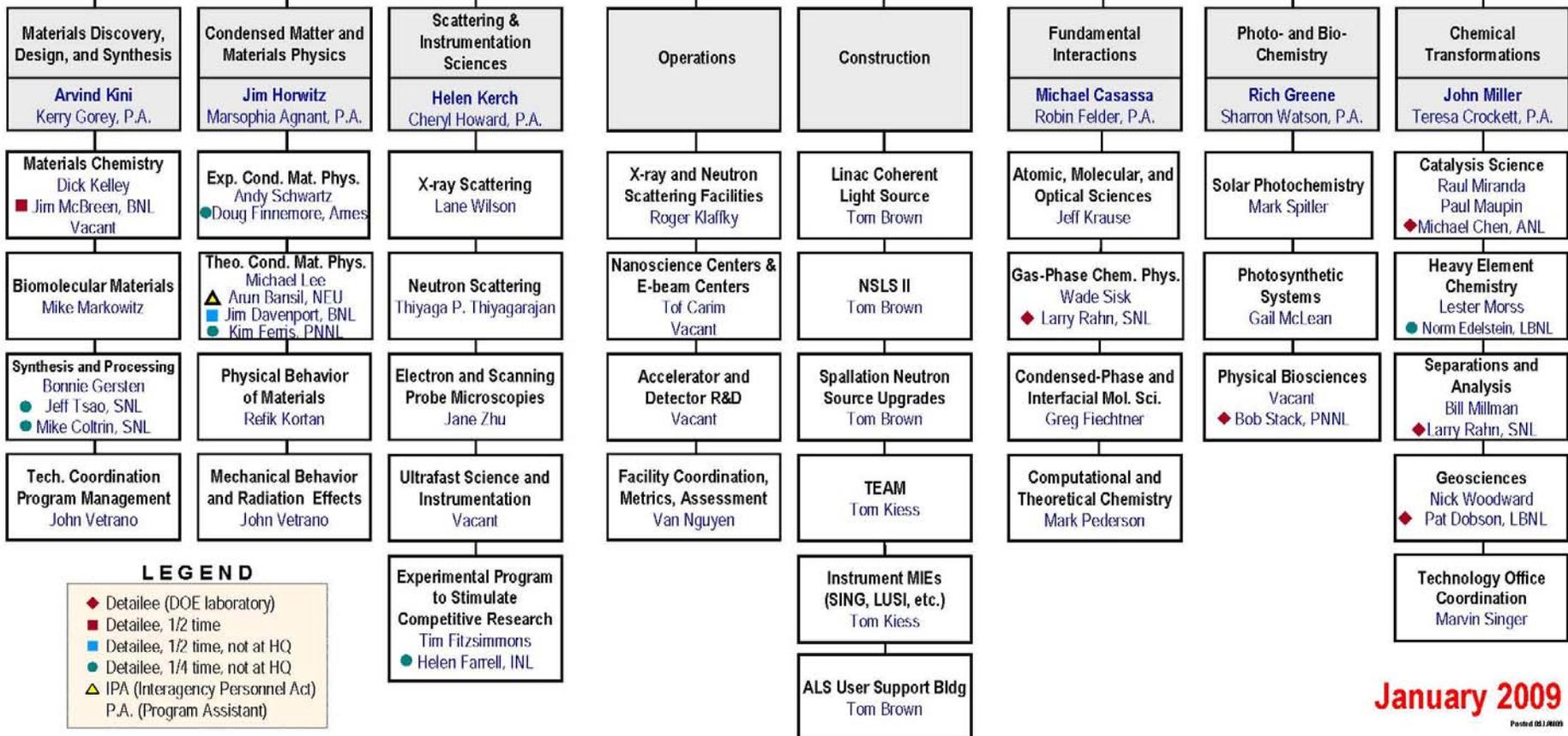
Pedro Montano, Director

Linda Cerrone, Program Support Specialist
Rocio Meneses, Program Assistant

Chemical Sciences, Geosciences, and Biosciences Division

Eric Rohlfling, Director

Diane Marceau, Program Analyst
Michaelene Kyler-King, Program Assistant



LEGEND

- ◆ Detailee (DOE laboratory)
- Detailee, 1/2 time
- Detailee, 1/2 time, not at HQ
- Detailee, 1/4 time, not at HQ
- ▲ IPA (Interagency Personnel Act)
- P.A. (Program Assistant)

January 2009

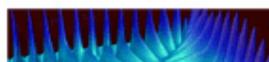
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BES Website

http://www.sc.doe.gov/bes/bes.html

Serving the Present ...
Shaping the Future



*** What's NEW ***

- **FY09 Solar Research Funding Opportunity**
 - Theory, Modeling and Simulation (TMS)
 - Computational and Theoretical Chemistry

- **Staff Contacts**
- **Core Research Areas**
- **Program Summaries**
- **Budget**

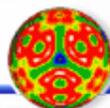
- **Proposal Submission**
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 - Results of Solicitations

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U.S. Department of Energy

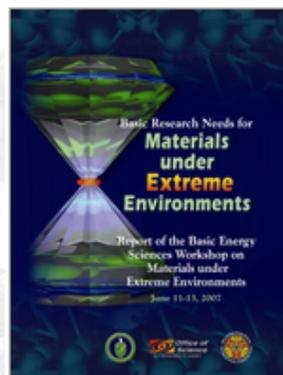
Office of Science

Monday, October 27, 2008



Office of Basic Energy Sciences

The Basic Energy Sciences (BES) program supports fundamental research in **focused areas** of the natural sciences in order to expand the scientific foundations for new and improved energy technologies and for understanding and mitigating the environmental impacts of energy use. BES also supports work that creates knowledge and develops tools to strengthen national security. The BES program plans, constructs, and operates major scientific **user facilities** to serve researchers from universities, national laboratories, and private institutions.



Click on images for reports.
List of [BES reports](#).

SEARCH GO

Additional Search Engines

The BES program is one of the Nation's largest sponsors of the natural sciences by funding experiments at more than 160 research institutions through the following three Divisions:

- ◆ **Materials Sciences and Engineering Division**
- ◆ **Chemical Sciences, Geosciences, and Biosciences Division**
- ◆ **Scientific User Facilities Division**

*** FY 2009 Funding Updates ***

- **Energy Frontier Research Centers (EFRCs)**
- **Single-Investigator and Small-Group Research (SISGR)**
 - Theory, Modeling and Simulation
 - Computational and Theoretical Chemistry

Harriet Kung
Associate Director of Science
for Basic Energy Sciences
SC-22/Germantown Building
U.S. Department of Energy

- ◆ [BES staff Phone Directory](#)
- ◆ [Basic Energy Sciences Organization Chart](#)
- ◆ [Directions](#) and Local Information



Fusion Energy Sciences (FES)

To expand the fundamental understanding of matter at very high temperatures and densities and the scientific foundations needed to develop a fusion energy source. This is accomplished by studying plasmas under a wide range of temperature and density, developing advanced diagnostics to make detailed measurements of their properties, and creating theoretical/computational models to resolve the essential physics.

Director (Acting): Dr. Steve Eckstrand



FES Areas of Emphasis

Magnetic Fusion Energy Sciences, which encompasses support for Burning Plasma Science, Advanced Tokamak Physics, Toroidal Confinement Physics, the ITER Project and Program, Theory and Computation, Enabling Technologies, Diagnostics, Materials Science, and International Collaborations;

Plasma Sciences, which encompasses support for Fundamental Properties of Plasmas, High Energy Density Laboratory Plasmas, Atomic Processes, Electromagnetic Confinement, and Low-Temperature Plasmas; and

National/Shared Facilities, which encompasses support for the DIII-D Advanced Tokamak, the Alcator C-Mod Advanced Tokamak, the National Spherical Torus Experiment, ITER, the Madison Symmetrical Torus, and the Large Area Plasma Device.



FES Opportunities

Major Facilities:

DIII-D: Research in ITER-relevant low rotation regimes. Advancing the Advanced Tokamak to complement and look beyond ITER through detailed control of plasma profiles

Alcator C-Mod: Research in the steady-state high Z wall, high field tokamak for ITER and beyond. Radiofrequency wave heating and plasma wall interactions at ITER parameters

National Spherical Torus Experiment (NSTX): Research at the extremes of geometry for toroidal confinement and stability understanding. Developing spherical torus scenarios for potential next-step options for domestic activities in ITER era

New Initiatives:

Fusion Simulation Program (FSP) to develop an integrated predictive simulation capability for fusion burning plasmas, fully validated against experiments

Joint Program in High Energy Density Laboratory Plasmas (HEDLP) with NNSA will provide stewardship of this compelling area of fundamental science and fusion-energy inspired basic science.

Office of Fusion Energy Sciences

Steve Eckstrand, Acting Director

Associate Director of Science for Fusion Energy Sciences

Al Opdenaker
Executive Assistant, Strategic Planning
Systems Studies

Shahida Afzal
Administrative Specialist

Vacant
Visual Information Specialist

Princeton Site Office

Jerry Faul
Manager

Sharon Stevens*
Office Operations,
Budget

Research Division

Curt Bolton, Acting Director

Marty Carlin, Administrative Specialist

Yvette Walker, Administrative Specialist
John Sauter, Program Analyst

ITER & International Division

Erol Oktay, Acting Director

Tom Vanek, Senior Policy Advisor

Sandy Newton, Administrative Specialist (International)

Samuel Barish
ICC Prog. Leader, Stellarator
Prog. Manager, HBCU

Mark Foster
DIII-D Site Rep.

Barry Sullivan
NCSX Project Management,
ESH, Fac. Ops. Upgrades,
Heating and Fueling;
SBIR/STTR

Jeff Hoy
U.S. ITER Program Manager

Curt Bolton
Theory Team Leader

T.V. George
Innovative Confinement
Concepts Program, MST

Francis Thio
HEDP Program Leader

Debra Frame
International Administration

Michael Crisp
General Plasma Science,
Theory Team

John Mandrekas
SciDAC, Fusion Simulation
Proj., Theory Team

John Glowienka
ITER Assistant Program
Manager

Rostom Dagazian
Alcator C-Mod
Deputy Leader Theory Team

Darlene Markevich
Diagnostics, University Liaison,
Education, Outreach

Gene Nardella
ITER Technology Officer

Steve Eckstrand
NSTX, Fusion Simulation
Project

Gene Nardella
Technology Team Leader

* Detailee

Erol Oktay
ITER Science Officer

Dave Goodwin*
General Plasma Science

Erol Oktay
DIII-D, International Tokamaks



FES Website

http://www.science.doe.gov/ofes/

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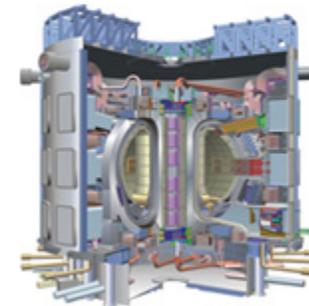
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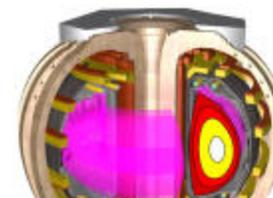
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The signatories of the ITER Agreement, together with French President Jacques Chirac, in Paris, France on November 21, 2006. From left to right: Vladimir Travin (Deputy Director of the Federal Atomic Energy Agency, Russian Federation), Kim Woo Sik (Vice Prime-Minister, Ministry of Science and Technology, Korea), Takeshi Iwaya (Vice-Minister for Foreign Affairs, Japan), José Manuel Barroso (President of the European Commission), Jacques Chirac (President of the French Republic), Xu Guanhua (Minister



ITER





High Energy Physics (HEP)

To understand how our universe works at its most fundamental level. This is accomplished by discovering the most elementary constituents of matter and energy, probing the interactions between them, and exploring the basic nature of space and time itself.

Director: Dr. Dennis Kovar



HEP Areas of Emphasis

Theoretical and experimental research in elementary particle physics

Fundamental accelerator science and technology

Operation of scientific user facilities

Development, design, and construction of the next generation of facilities

Three frontiers: Energy frontier; Intensity frontier; Cosmic frontier

International and interagency collaborations



HEP Program Areas

Proton Accelerator Based Research

Electron Accelerator Based Physics

Non-Accelerator Physics

Theoretical Physics

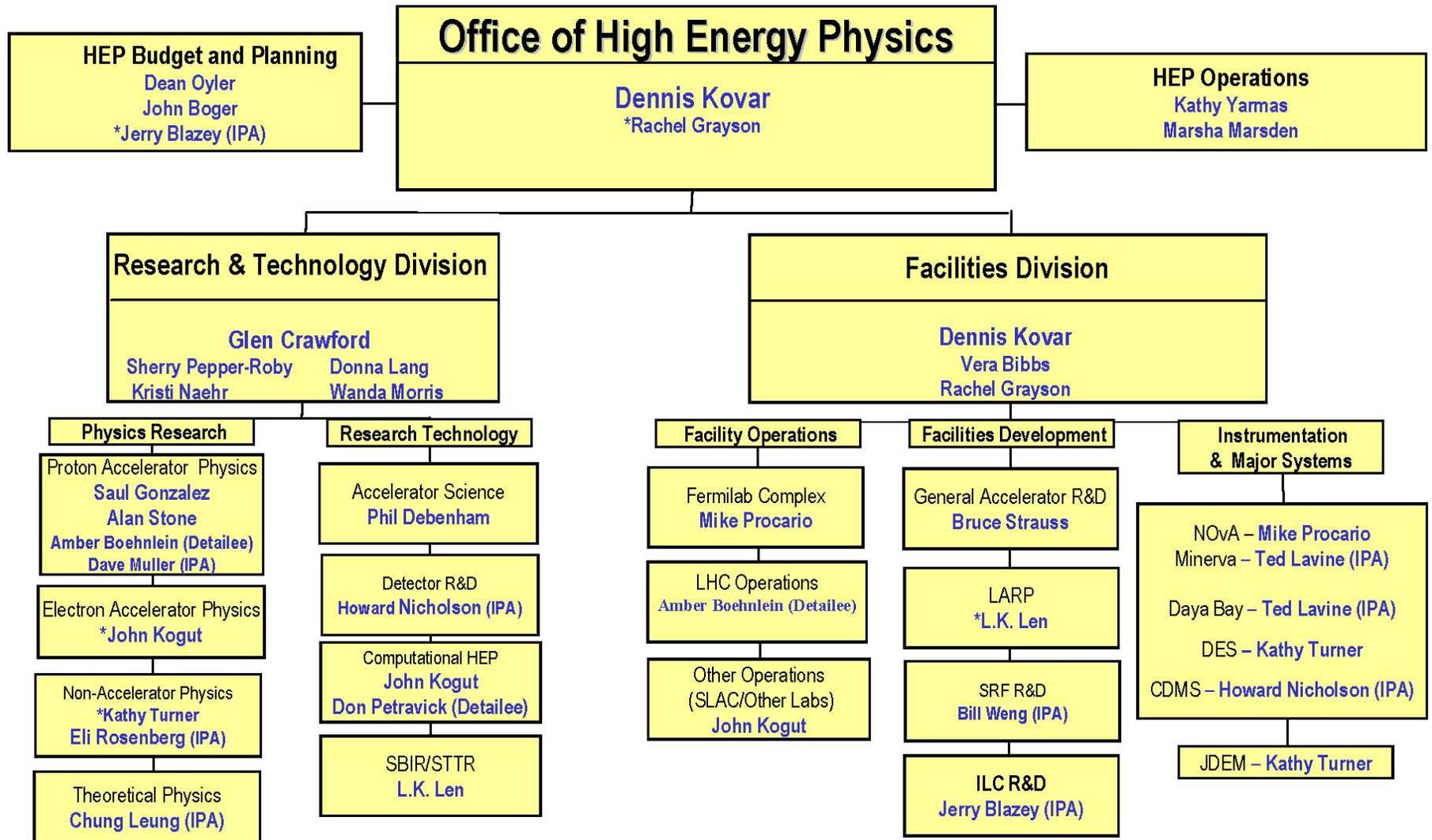
Fermilab Accelerator Complex Operations

Large Hadron Collider Support

Accelerator Science & Development

etc.

HEP Organization Chart



*Denotes base position



HEP Website

Office of Science

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HEP

OFFICE OF HIGH ENERGY PHYSICS

U.S. DEPARTMENT OF ENERGY

SUPERCONDUCTING ILC CAVITY IN HORIZONTAL TEST STAND AT FERMILAB

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EXPLORING THE QUANTUM UNIVERSE

High Energy Physics explores the most fundamental questions about the nature of the universe. The Office of High Energy Physics supports a program focused on three frontiers of scientific discovery. At the energy frontier, powerful accelerators investigate the constituents and architecture of the universe. At the intensity frontier, astronomically large amounts of particles and highly sensitive detectors offer a second, unique pathway to investigate rare events in nature. At the cosmic frontier, natural sources of particles from space reveal the nature of the universe. Together these three interrelated discovery frontiers create a complete picture, advancing Department of Energy missions through the development of key cutting-edge technologies and the training of future generations of scientists.

New forms of matter,
new forces of nature
and **NEW**
DIMENSIONS
OF SPACE...

VISIT THE US/LHC >

ANNOUNCEMENTS

October 16, 2008
Program Notice DE-PS02-09ER09-05 entitled "Fundamental Research in Superconducting RF Cavity Design" was posted on the Grants and Contracts website on October 15, 2007. Letters of Intent are due by December 15, 2008. Formal applications are due by January 15, 2009. The program point-of-contact is Dr. ...

RESEARCH AREAS

- Proton Accelerator-Based Physics**
Discovering the Quantum Universe
- Electron Accelerator-Based Physics**
Exploring the Quantum Universe
- Non-Accelerator Physics**
Other Windows into the Quantum Universe



Nuclear Physics (NP)

To discover, explore, and understand all forms of nuclear matter. The fundamental particles that compose nuclear matter—quarks and gluons—are relatively well understood, but exactly how they combine to create different types of matter in the universe is still largely a puzzle. To solve this mystery, the NP program supports experimental and theoretical research—along with the development and operation of particle accelerators and advanced technologies—to create, detect, and describe the different forms and complexities of nuclear matter that can exist in the universe, including those that are no longer naturally found.

Director (Acting): Dr. Eugene Henry



NP Research Program Areas

Medium Energy Nuclear Physics

Heavy Ion Nuclear Physics

Low Energy Nuclear Physics

Nuclear Theory

Isotope Production and Applications

Office of Nuclear Physics

Eugene A. Henry, Acting Director

Cathy Slaughter, Administrative Specialist

Director's Office Staff

Technical Advisor
(vacant)

Program Analyst
Cathy Hanlin

Program Support Specialist
Brenda May

Physics Research Division

Eugene Henry, Director

Christine Izzo, Program Assistant

Medium Energy Nuclear Physics

Brad Tippens

Heavy Ion Nuclear Physics

Gulshan Rai

Low Energy Nuclear Physics

Cyrus Baktash

Nuclear Theory & Nuclear Data

Physicist (vacant)
Ted Barnes (Detailee)

Facilities & Project Management Division

Jehanne Simon-Gillo, Director

Cassie Dukes, Program Support Specialist

Nuclear Physics Facilities

Physicist (vacant)
John D'Auria (Detailee)

Nuclear Physics Instrumentation

Helmut Marsiske

Laboratory Operations

General Engineer (vacant)

Advanced Technology R & D

Manouchehr Farkhondeh

Nuclear Physics Major Initiatives

James Hawkins



NP Website

Address <http://www.sc.doe.gov/np/>

Office of Science



Office of Nuclear Physics

supporting the **community of scientists** who seek to understand
the **fundamental forces** and **particles of nature**
as manifested in **nuclear matter**.

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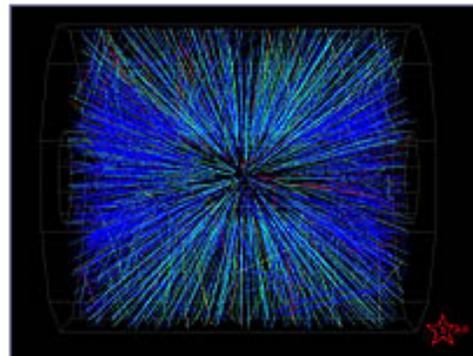
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[NSAC](#)

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searching for quark-gluon plasma
@ RHIC

FYI: [About Nuclear Physics](#)

Employment Opportunities

All applications for federal employment with the Office of Nuclear Physics are posted and available on the USAJobs.gov website.

What's New

► **Notice: May 20, 2008** :: The Department of Energy released a Funding Opportunity Announcement (FOA) regarding the submission of applications for the conceptual design and establishment of a [Facility for Rare Isotope Beams \(FRIB\)](#). Proposals are due July 21, 2008.

► [Workshop on the Nation's Needs for Isotopes: Present and Future](#) - August 5-7, 2008, Hilton Hotel, Rockville, MD. [View Workshop Plenary Presentation's](#). (click on speakers name)

► [DOE/NSF Nuclear Science Advisory Committee Meeting](#) was held on August 21, 2008, at the Marriott Crystal Gateway Hotel. [Minutes Posted](#).

► [The Organisation for Economic Co-Operation and Development \(OECD\) Global Science Forum](#) released

U.S. Department of Energy



Office of Science

Office of Science Awards



Ernest Orlando Lawrence Awards



Presented by the Secretary of Energy to mid-career scientists and engineers for exceptional contributions to the development, use, control, or production of energy in basic and applied research supporting the DOE and its mission to advance the national, economic and energy security of the U.S.

The Lawrence Award is given in each of the following fields:
(1) Chemistry; (2) Materials Research; (3) Environmental Science and Technology; (4) Life Sciences (including Medicine); (5) Nuclear Technologies (Fission and Fusion); (6) National Security and Non-Proliferation; (7) High Energy and Nuclear Physics



Open to mid-career U.S. citizens (within 20 years of Ph.D. or M.D.). Awarded for an outstanding contribution of an exceptionally creative or innovative character in research principally funded by the DOE. Judged primarily on the scientific and technical significance of the work to its field.

Each Lawrence Award category award winner receives:
a citation signed by the Secretary of Energy;
a 14 karat gold medal bearing the likeness of E.O. Lawrence; and
a \$50,000 honorarium.

Call now open!

<http://www.sc.doe.gov/lawrence/>



Enrico Fermi Award

Bestowed by the President of the United States to an individual or individuals of international stature in recognition of a lifetime of exceptional scientific, technical, engineering, and/or management achievements related to the development, use, control, or production of energy.

The Fermi Award is given for a lifetime of achievement.

Only living nominees will be considered.

The Fermi Award is not limited to U.S. citizens.

The Fermi Award is not limited to scientists whose work has been funded by the U.S. DOE (or its predecessor agencies).

A Fermi Award recipient receives:

a citation signed by the President of the United States and the Secretary of Energy;

a gold medal bearing the likeness of Enrico Fermi; and

a \$375,000 honorarium.



<http://www.science.doe.gov/fermi/index.htm>



Thank You

linda.blevins@science.doe.gov

301-903-1293