U.S. DEPARTMENT OF ENERGY | Office of Science

DOE Office of Science
Early Career Research Program

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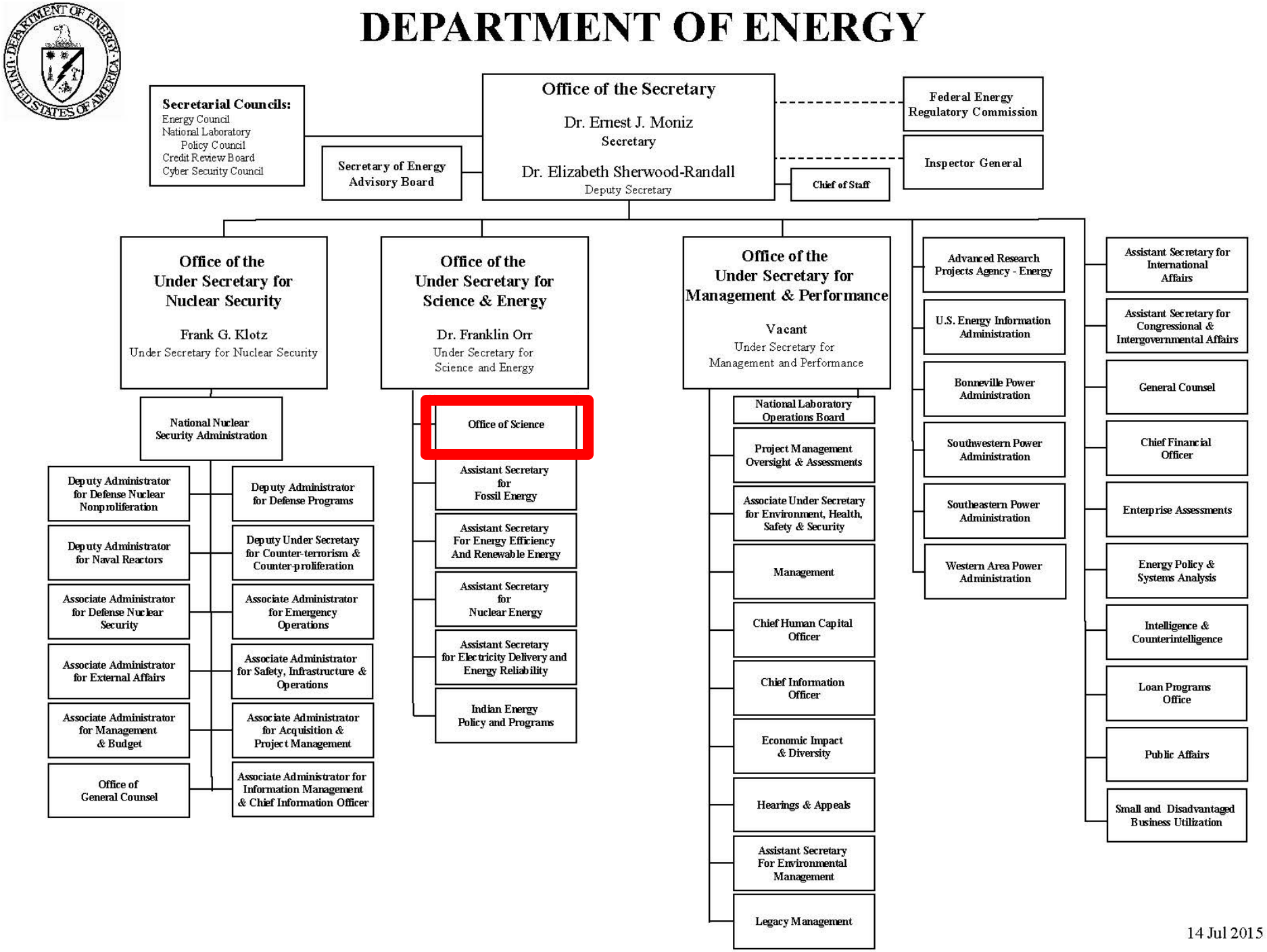
Baltimore, MD

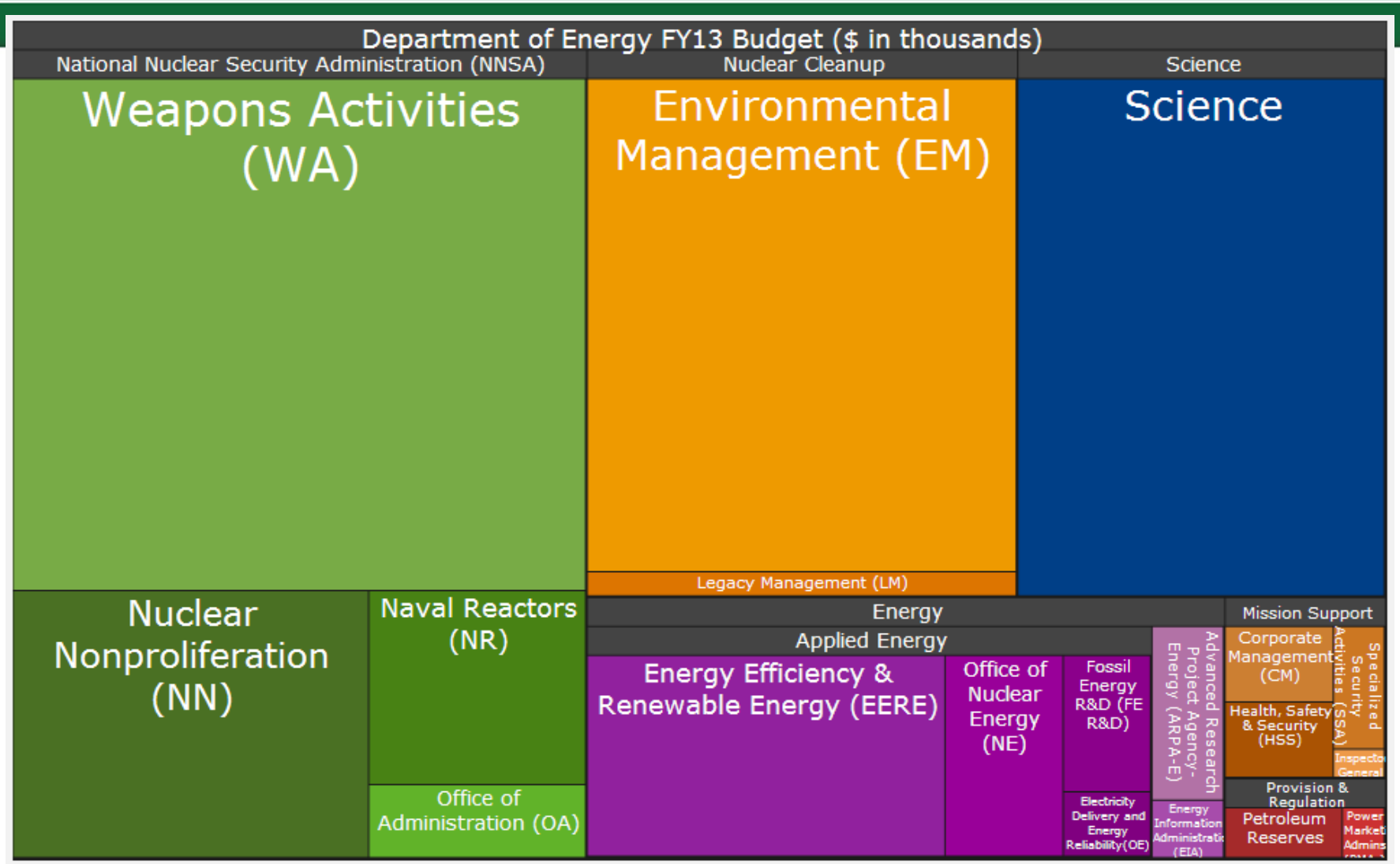
These slides will be posted for access by the public at:
http://science.energy.gov/sc-2/presentations-and-testimony/

DEPARTMENT OF ENERGY



14 Jul 2015

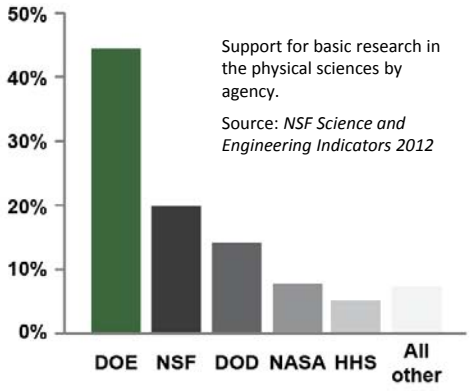
The DOE Portfolio (~$28B Total)



Credit: DOE Office of the Chief Financial Officer

The DOE Office of Science

- **The mission of the DOE Office of Science is to deliver the scientific discoveries and major scientific tools that transform our understanding of nature and advance the energy, economic, and national security of the United States.**
- **The mission is accomplished by funding**
  - The Frontiers of Science
  - The 21st Century Tools of Science
  - Science for Energy and the Environment
- **The Office of Science is the Nation's largest Federal sponsor of basic research in the physical sciences (47%).**
- **FY15 Budget was ~$5B**
- **Six program offices**
  - Advanced Scientific Computing Research (ASCR)
  - Biological and Environmental Research (BER)
  - Basic Energy Sciences (BES)
  - Fusion Energy Sciences (FES)
  - High Energy Physics (HEP)
  - Nuclear Physics (NP)



Support for basic research in the physical sciences by agency.

Source: *NSF Science and Engineering Indicators 2012*

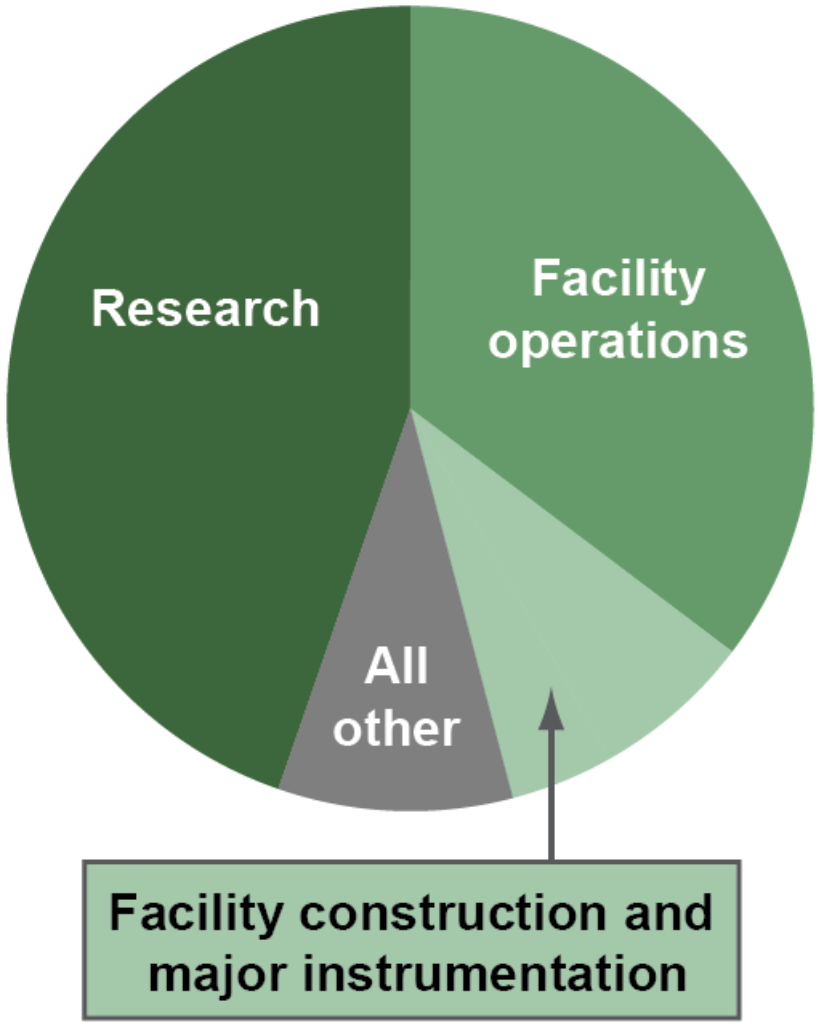
The DOE Office of Science Research Portfolio

Basic Energy Sciences	• Understanding, predicting, and ultimately controlling matter and energy flow at the electronic, atomic, and molecular levels
Advanced Scientific Computing Research	• Delivering world leading computational and networking capabilities to extend the frontiers of science and technology
Biological and Environmental Research	• Understanding complex biological, climatic, and environmental systems
Fusion Energy Sciences	• Building the scientific foundations for a fusion energy source
High Energy Physics	• Understanding how the universe works at its most fundamental level
Nuclear Physics	• Discovering, exploring, and understanding all forms of nuclear matter

The Office of Science Supports Research at More than 300 Institutions Across the U.S.

Office of Science Numbers

- **The Office of Science (SC) is a steward for 10 of 17 DOE national labs and operates more than 29 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 SC research funding goes to support grants at more than 300 colleges and universities nationwide.**
- **In FY 2015, SC supported ~22,000 Ph.D.s, postdoctoral researchers, graduate students, and undergraduates.**
- **~31,000 users of scientific facilities a year**
  - ~1/2 of the annual 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.



Office of Science User Facilities

> 30 world-leading facilities serving over 29,000 researchers annually

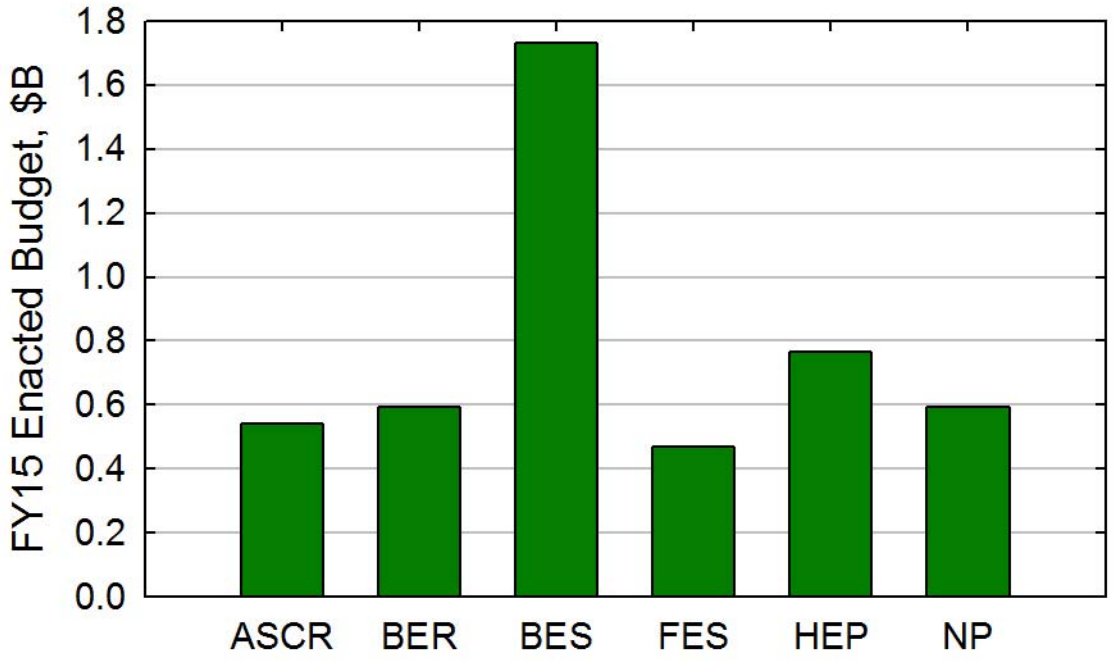
- **supercomputers,**
- **high intensity x-ray, neutron, and electron sources,**
- **nanoscience facilities,**
- **genomic sequencing facilities,**
- **particle accelerators,**
- **fusion/plasma physics facilities, and**
- **atmospheric monitoring capabilities.**

- Open access; allocation determined through peer review of proposals

- Free for non-proprietary work published in the open literature

- Full cost recovery for proprietary work

FY2015 Enacted Budget by Program Office



Early Career Research Program: Purpose

- **To support the development of individual research programs of outstanding scientists early in their careers and to stimulate research careers in the disciplines supported by the DOE Office of Science.**

- **Proposals are invited in the following program areas:**
  - Advanced Scientific Computing Research (ASCR)
  - Biological and Environmental Research (BER)
  - Basic Energy Sciences (BES)
  - Fusion Energy Sciences (FES)
  - High Energy Physics (HEP)
  - Nuclear Physics (NP)

Early Career Research Program: Overview

- **Universities and national labs eligible**
  - University grants at least $150,000 per year for 5 years for summer salary & expenses.
  - Lab awards at least $500,000 per year for 5 years for full annual salary & expenses
- **Plan is for about 300 active awards in steady state**
  - 200 university awards & 100 lab awards
- **Roughly $80M in funding for new and ongoing awards each year**
  - About 60 new awards (40 university & 20 lab) per year in steady state

- **Management Principles**
  - One common solicitation for Office of Science
  - Decisions based on peer review with common review criteria
  - Reviewed, awarded, and managed locally in the programs
  - Program rules governed by the Office of the Deputy Director for Science Programs with advice from a six-member (ASCR, BER, BES, FES, HEP, and NP) coordinating committee

Early Career Research Program: Eligibility

- **No more than ten (10) years can have passed between the year the Principal Investigator's Ph.D. was awarded and the year of the deadline for the proposal.**
- **DOE National Laboratories**
  - full-time, permanent, non-postdoctoral employee.
- **U.S. Academic Institutions**
  - untenured Assistant Professor or Associate Professor on the tenure track.
- **An employee with a joint appointment between a university and a DOE national laboratory must apply through the institution that pays his or her salary and provides his or her benefits; the eligibility criteria above must also be met.**

Early Career Research Program: Merit Review Criteria

1. **Scientific and/or technical merit of the project.**
2. **Appropriateness of the proposed method or approach.**
3. **Competency of applicant's personnel and adequacy of proposed resources.**
4. **Reasonableness and appropriateness of the proposed budget.**
5. **Relevance to the mission of the specific program (e.g., ASCR, BER, BES, FES, HEP, or NP) to which the proposal is submitted.**
6. **Potential for leadership within the scientific community.**

Strongly Encourage Funding (5-6); Encourage Funding (3-4); or Discourage Funding (1-2).

Early Career Research Program: Special Rules

General Rules:

- **Preproposals are required.**
- **A full proposal is not allowed if the work proposed in the preproposal is not responsive to the research topics identified in the solicitation.**
- **No co-PIs.**
- **A PI can submit one proposal per competition.**
- **A PI cannot participate more than three times.**
- **No letters of recommendation.**
- **Optional letters of collaboration, if included, must use a template.**
- **For DOE National Laboratories**
  - A letter from the lab director confirming that the proposed research idea fits within the scope of Office of Science-funded programs at the lab is required.
  - Lab scientists must charge at least 50% of their time to the award.
  - Execution of funding is at the PI's discretion according to the approved budget.
  - Employing lab addresses funding transition issues when the award ends.

Early Career Research Program: This Year's Solicitations DE-FOA-0001386 and LAB 15-1386

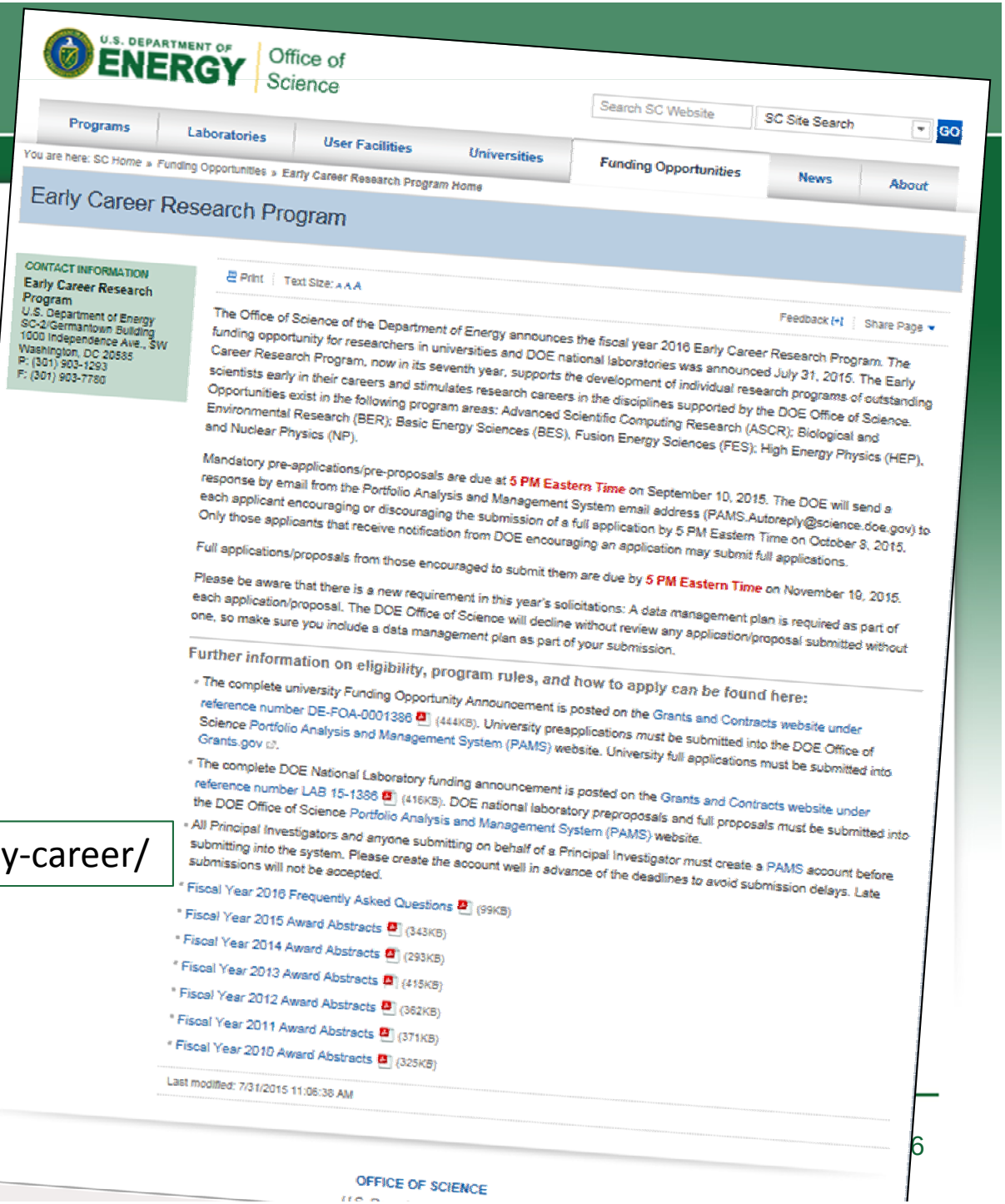
Step	Date	Time	Notes
Issue Solicitation:	Jul 31, 2015		mid-summer
Due date for Preproposals:	Sep 10, 2015	5 PM Eastern	6 weeks for PIs to write preproposals
Encourage / Discourage Decisions:	Oct 8, 2015	5 PM Eastern	4 weeks for DOE to decide
Due date for Proposals:	Nov 19, 2015	5 PM Eastern	8 weeks for PIs to write proposals
Target Award Start Date:	Jul 15, 2016		

The schedule above is fairly typical of the Early Career Research Program

Early Career Research Program Website

- Deadlines
- Direct links to announcements
- Links to PAMS for submitting preproposal
- Frequently Asked Questions (FAQ)
- Award abstracts from first six years of the program office

- http://science.energy.gov/early-career/



Program offices differ in how much of their research portfolios they offer each year in the Early Career solicitation.

Advanced Scientific Computing Research (ASCR)	Subset of research portfolio topics, varies some by year
Biological and Environmental Research (BER)	Subset of research portfolio topics, varies significantly by year
Basic Energy Sciences (BES)	All or most research portfolio topics; some topics appear only every other year
Fusion Energy Sciences (FES)	All or most research portfolio topics
High Energy Physics (HEP)	All or most research portfolio topics
Nuclear Physics (NP)	All or most research portfolio topics

Conclusion: Read the solicitation every year.
Not every topic will fit within our solicitations.

Example: This Year's Topics – ASCR, BER, & FES

Advanced Scientific Computing Research (ASCR)

- **Applied Mathematics**
- **Computer Science**
- **Next Generation Networking for Science**

Biological and Environmental Research (BER)

- **Systems biology-enabled research on the role of microbes and microbial communities in the plant-soil-environment interactions**
- **Improved Understanding of Tropical Forest Ecosystems to Climate Change**
- **Human Component of Earth System Models**

Fusion Energy Sciences (FES)

- **Magnetic Fusion Energy Science Experimental Research**
- **Magnetic Fusion Energy Science Theory and Simulation**
- **High-Energy-Density Plasma Science**
- **General Plasma Science Experiment and Theory**
- **Fusion Nuclear Science, Materials Research and Enabling R&D Programs for Fusion**

Example: This Year's Topics - BES

Basic Energy Sciences (BES)

- Materials Chemistry
- Biomolecular Materials
- Synthesis and Processing Science
- Experimental Condensed Matter Physics
- Theoretical Condensed Matter Physics
- Physical Behavior of Materials
- Mechanical Behavior and Radiation Effects
- X-ray Scattering
- Neutron Scattering
- Electron and Scanning Probe Microscopies
- Atomic, Molecular, and Optical Sciences (AMOS)
- Gas Phase Chemical Physics (GPCP)
- Computation and Theoretical Chemistry
- Condensed Phase and Interfacial Molecular Science (CPIMS)
- Catalysis Science
- Separations and Analysis
- Heavy Element Chemistry (HEC)
- Geosciences Research
- Solar Photochemistry
- Photosynthetic Systems
- Physical Biosciences
- Nanoscale Science Research Centers and Electron-Beam Microcharacterization Centers Research
- Accelerator and Detector Research
- X-ray Instrumentation and Technique Development
- Neutron Scattering Instrumentation and Technique Development

Example: This Year's Topics – HEP & NP

High Energy Physics (HEP)

- **Experimental Research at the Energy Frontier in High Energy Physics**
- **Experimental Research at the Intensity Frontier in High Energy Physics**
- **Experimental Research at the Cosmic Frontier in High Energy Physics**
- **Theoretical Research in High Energy Physics**
- **Accelerator Science & Technology R&D in High Energy Physics**
- **Detector R&D in High Energy Physics**

Nuclear Physics

- **Medium Energy Nuclear Physics**
- **Heavy Ion Nuclear Physics**
- **Low Energy Nuclear Physics**
- **Nuclear Theory**
- **Nuclear Data and Nuclear Theory Computing**
- **Accelerator R&D for Current and Future Nuclear Physics Facilities**
- **Isotope Development and Production for Research and Applications**

Department of Energy
Office of Science
Washington, DC 20585

http://science.energy.gov/~/media/grants/pdf/FullFundingMemo.pdf

January 29, 2014

MEMORANDUM FOR OFFICE OF SCIENCE GRANT AND COOPERATIVE AGREEMENT APPLICANTS AND RECIPIENTS

FROM: PATRICIA M. DEHMER
ACTING DIRECTOR, OFFICE OF SCIENCE

SUBJECT: FULL FUNDING FINANCIAL ASSISTANCE AWARDS UNDER $1 MILLION

On Friday, January 17, 2014, President Obama signed the Consolidated Appropriations Act, 2014, funding the Federal Government through September 30, 2014.

Section 310 of Division D of the act states

> Notwithstanding section 301(c) of this Act, none of the funds made available under the heading 'Department of Energy—Energy Programs—Science' may be used for a multiyear contract, grant, cooperative agreement, or Other Transaction Agreement of $1,000,000 or less unless the contract, grant, cooperative agreement, or Other Transaction Agreement is funded for the full period of performance as anticipated at the time of award.

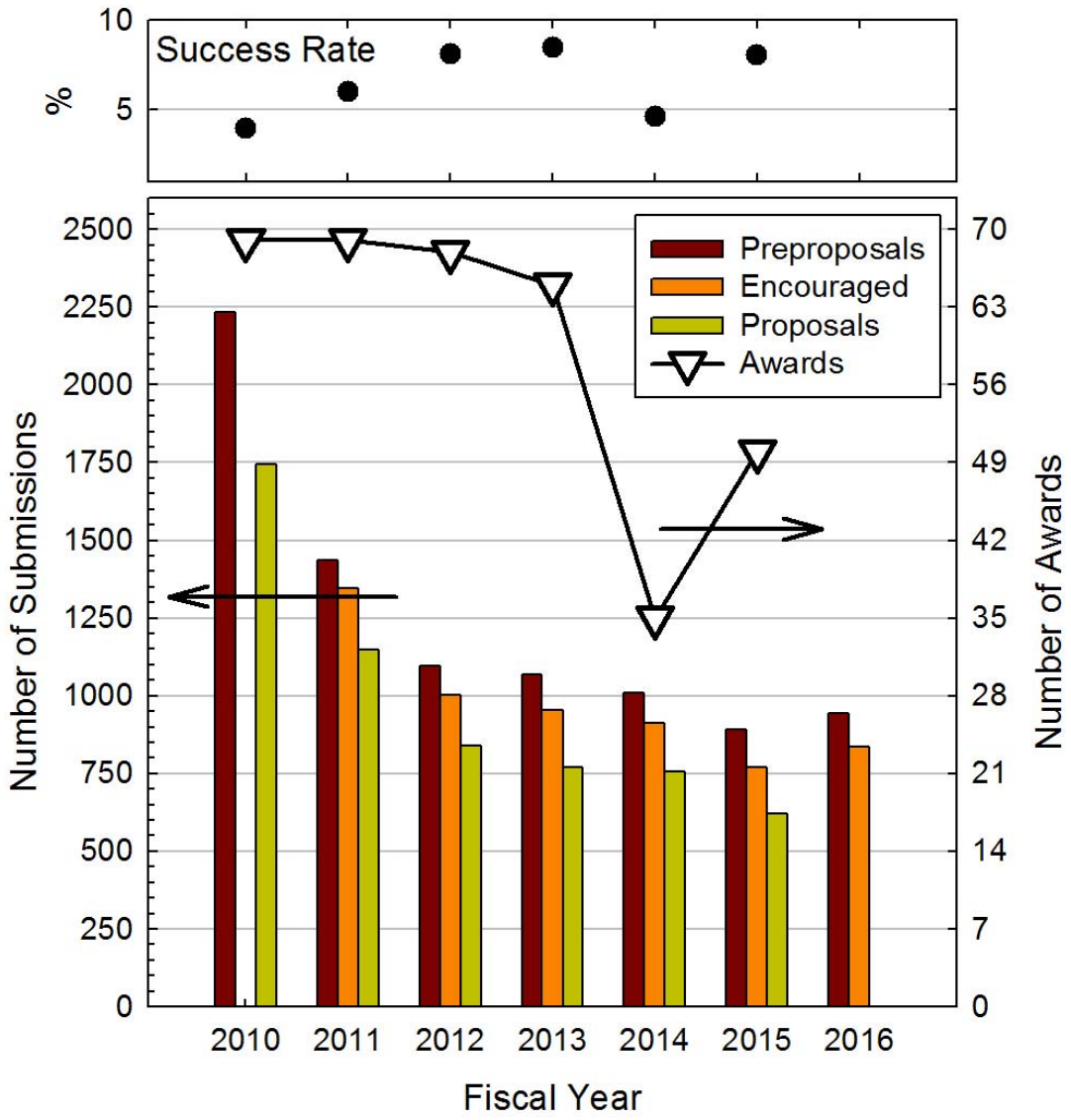
The Office of Science's financial assistance awards have historically been made for three- to five-year project periods with funding provided annually in discrete budget periods. We will no longer fund awards with a project period total cost of $1,000,000 or less in this way. Any new or renewal financial assistance award with a project period total cost of $1,000,000 or less will be funded in full.

Beginning immediately, the entire value of any grant or cooperative agreement with a

Early Career Research Program: Results

- **359 awards made over six years.**
  - 240 university awards
  - 119 DOE National Laboratory awards
- **Awards made at 15 labs and 97 universities in 39 states.**
- **Percentage women awardees 28%, 28%, 26%, 20%, 25%, and 33% in FY15, FY14, FY13, FY12, FY11, and FY10, respectively.**

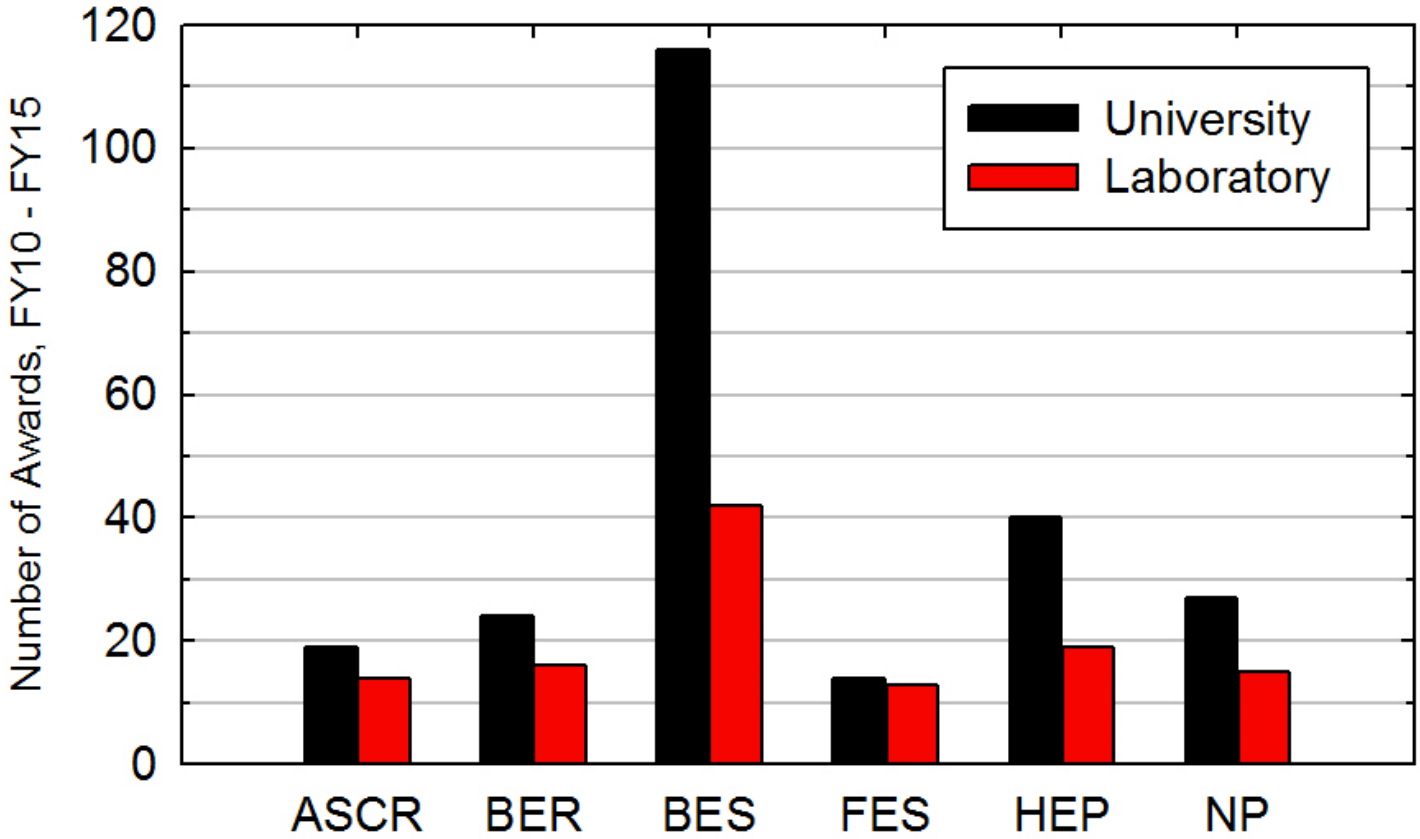
Demand is high for the Early Career Research Program.



- The process of encouraging proposal submission based on preproposal fit began in FY2011.
- Proposal submission is encouraged for 85-90% of preproposals.
- Proposals are received from about 80% of those encouraged to submit.
- The number of awards was low during FY2014 and FY2015 because of the transition to full funding, which is expected to take three more years (FY2016, FY2017, and FY2018).
- Full proposals for FY2016 are due Nov 19, 2015 from those who were encouraged.

Program Offices make awards according to the sizes of their budgets

Number of awards made in the six-year period from FY2010 to FY2015



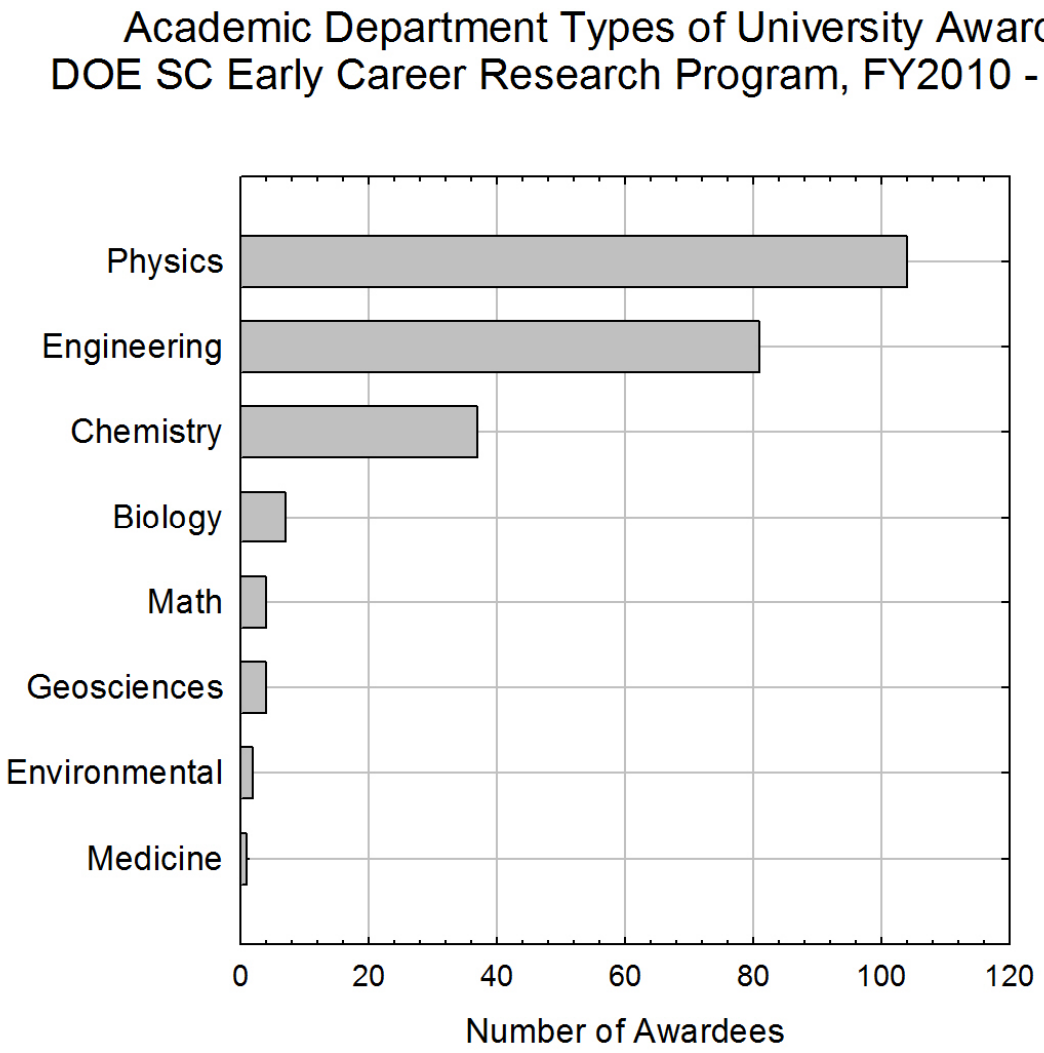
Awards by Program Office and Institution Type

Program Office	Total Number of Awards					
	FY10	FY11	FY12	FY13	FY14	FY15
ASCR	7	5	6	5	5	5
BER	8	7	9	7	4	5
BES	26	31	29	31	16	25
FES	6	6	4	4	3	4
HEP	14	13	12	9	6	5
NP	8	7	8	9	4	6
Total	69	69	68	65	38	50

Program Office	Number of University Awards					
	FY10	FY11	FY12	FY13	FY14	FY15
ASCR	5	3	3	3	3	2
BER	5	4	6	4	1	4
BES	18	24	21	26	10	17
FES	4	4	1	2	1	2
HEP	10	8	8	7	3	4
NP	5	4	5	6	3	4
Total	47	47	44	48	21	33

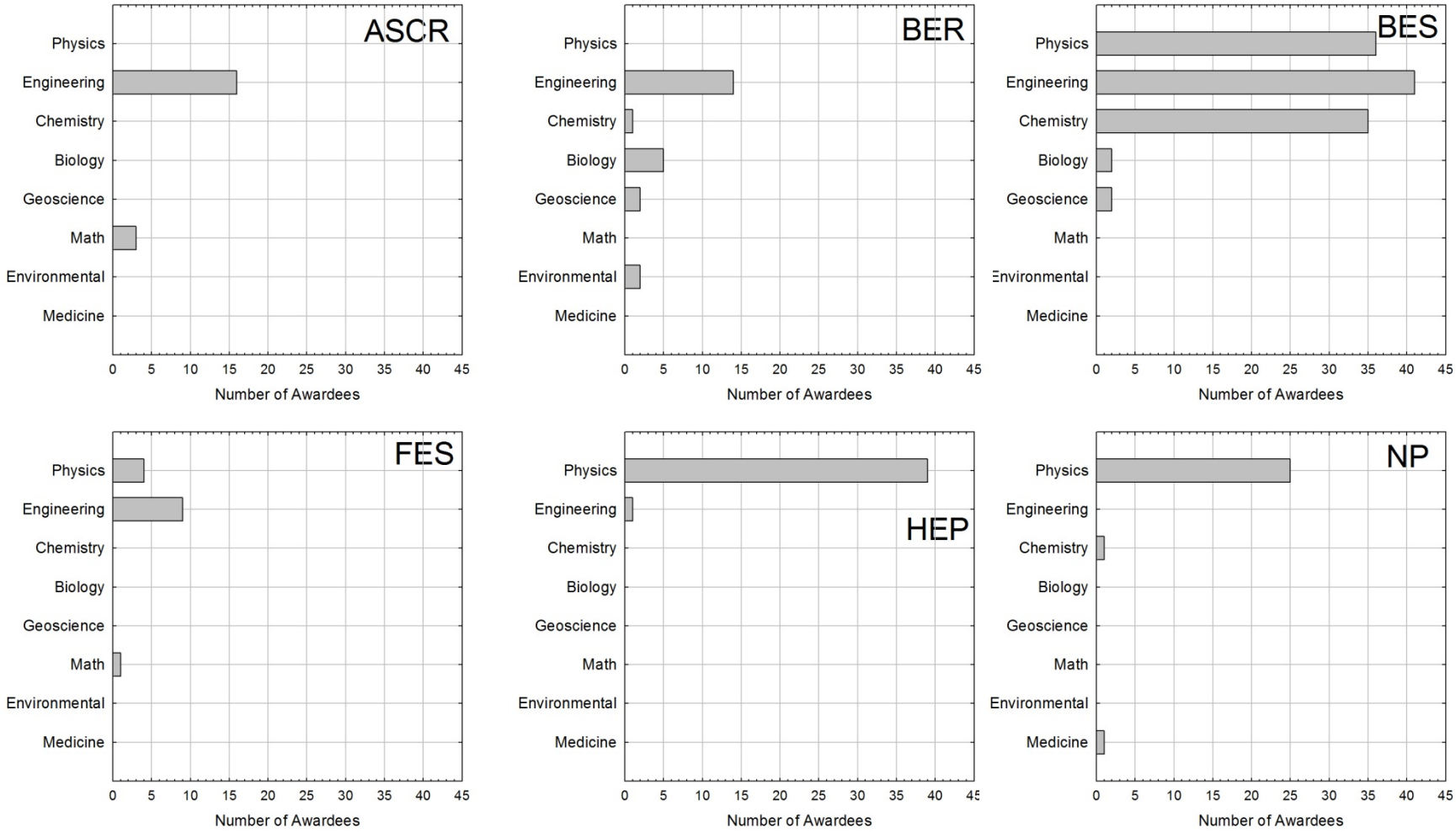
Program Office	Number of Laboratory Awards					
	FY10	FY11	FY12	FY13	FY14	FY15
ASCR	2	2	3	2	2	3
BER	3	3	3	3	3	1
BES	8	7	8	5	6	8
FES	2	2	3	2	2	2
HEP	4	5	4	2	3	1
NP	3	3	3	3	1	2
Total	22	22	24	17	17	17

About 1/3 of our academic awardees are in engineering departments



- Physics includes physics, astronomy, etc.
- Engineering includes all engineering plus computer science, materials science, engineering physics, etc.
- Biology includes biology, bacteriology, biological sciences
- Math includes math, statistics

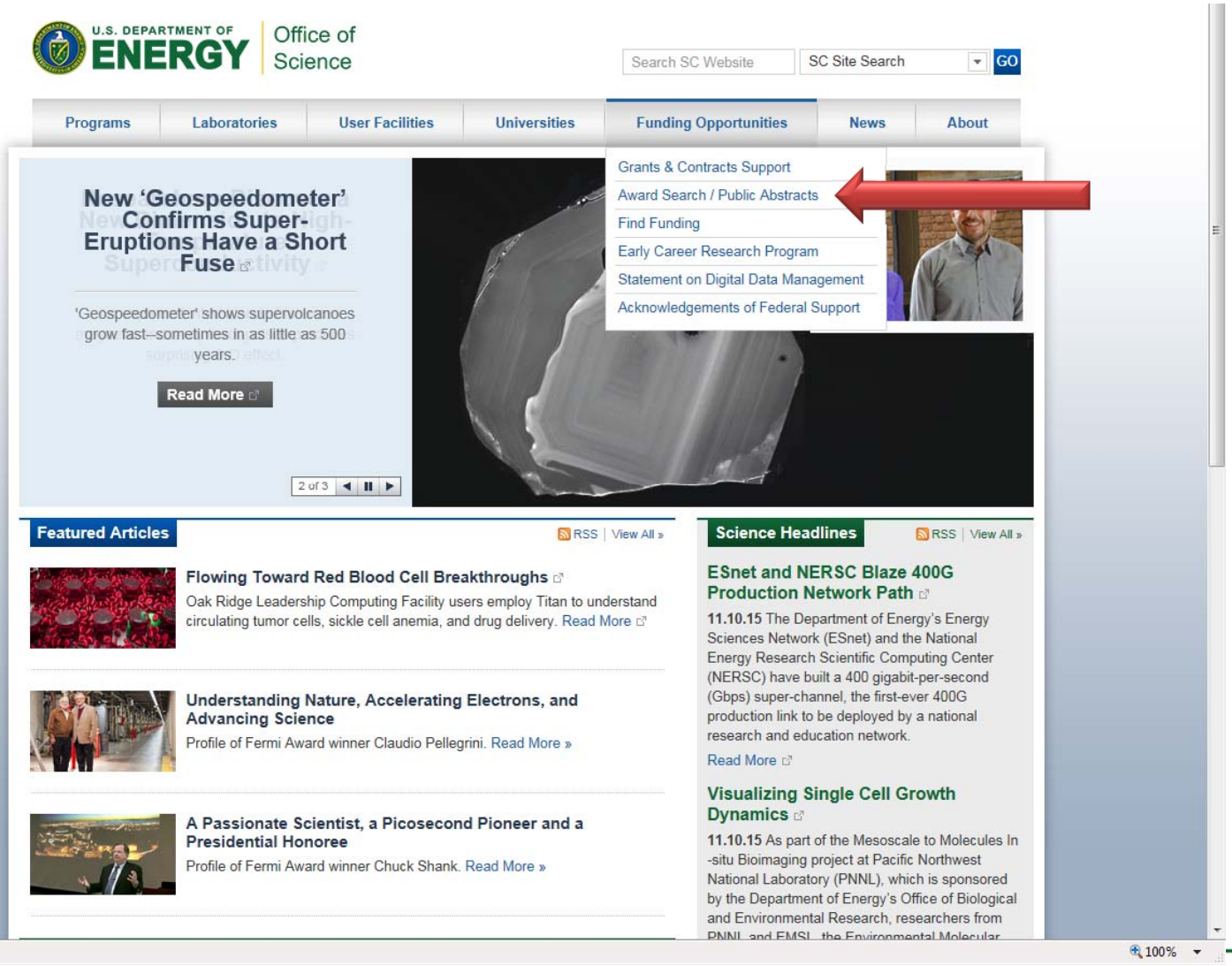
Awardee academic department varies by program office



Early Career Research Program Tips

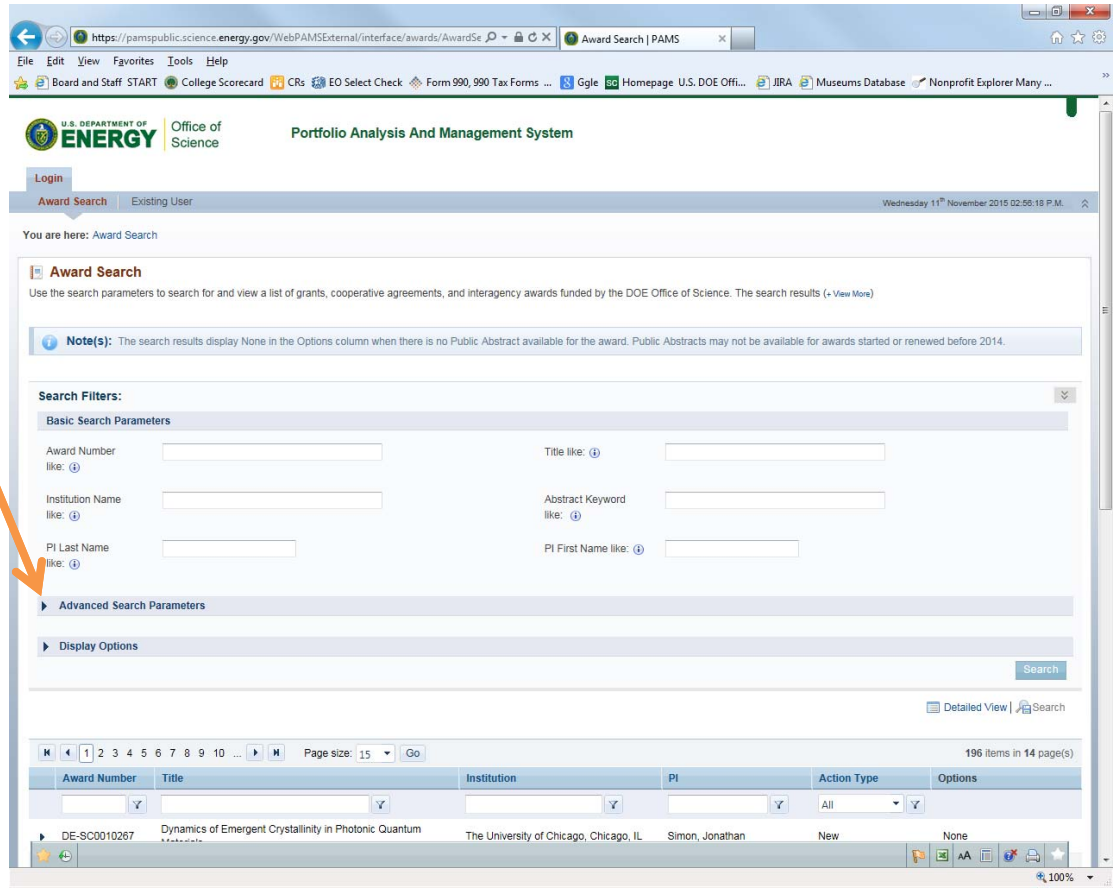
- You may contact the program manager before you submit your preproposal.
  - Do so if you are uncertain about which topic from the solicitation is the best fit for your idea. The program manager can provide informal feedback on your idea and suggest other program areas if the idea does not fit within his or her area.
  - You may formally submit any preproposal you believe fits within the topics described in the solicitation, regardless of the informal feedback you may receive from a program manager.
  - A formal encourage/discourage decision based on topical fit with the solicitation will be issued for every preproposal we receive.
- Learn what kinds of research the Office of Science has funded in the past.
  - The Early Career Research Program website has an abstract for every early career award we have made from FY 2010 – FY 2015.
  - The Office of Science Award search can be used to learn more generally about what we fund.
- Plan ahead and submit early.
- Take the technical descriptions in the solicitation very seriously. Follow them.
- Our programs are looking for very fundamental research. (There are other DOE offices that fund applied research; the Office of Science does not.)
- Some program managers require hypothesis-driven proposals.
- Meet program managers and volunteer to be a reviewer.
- Use impeccable grammar and spelling.

A link to the DOE Office of Science Award Search can be found at science.energy.gov



Tips for Using the Award Search

- **Direct URL:** https://pamspublic.science.energy.gov/WebPAMSExternal/interface/awards/AwardSearchExternal.aspx
- **Hints**
  - The default search parameters are set for Active awards in the U.S.
  - To access other values, expand Advanced Search Parameters
  - Try searching on Solicitation Name like = Early Career Research Program
  - About 20,000 historical and active awards are discoverable using the search, but abstracts are only available for those started or renewed before 2014.
  - Abstracts for all early career awards are in PDF form on the early career site, http://science.energy.gov/early-career/



Office of Science PECASE Process

- **PECASE = Presidential Early Career Award for Scientists and Engineers**
- **Candidate pool is that of the eligible winners of the Early Career Research Program**
- **External peer review is performed by a cross-disciplinary panel based on two broad criteria defined by the White House**
  - Innovative research at the frontiers of science and technology that is relevant to the mission of the sponsoring organization or agency.
  - Community service demonstrated through scientific leadership, education or community outreach.
- **Evaluated based on research proposal, expert reviews, and updated C.V.**
- **DOE selects nominees and advances them to the White House, which makes its selections and announces the awards.**
- **No additional financial award is provided beyond already lucrative five years of early career funding.**

U.S. DEPARTMENT OF ENERGY | Office of Science

Questions about the Early Career Research Program?

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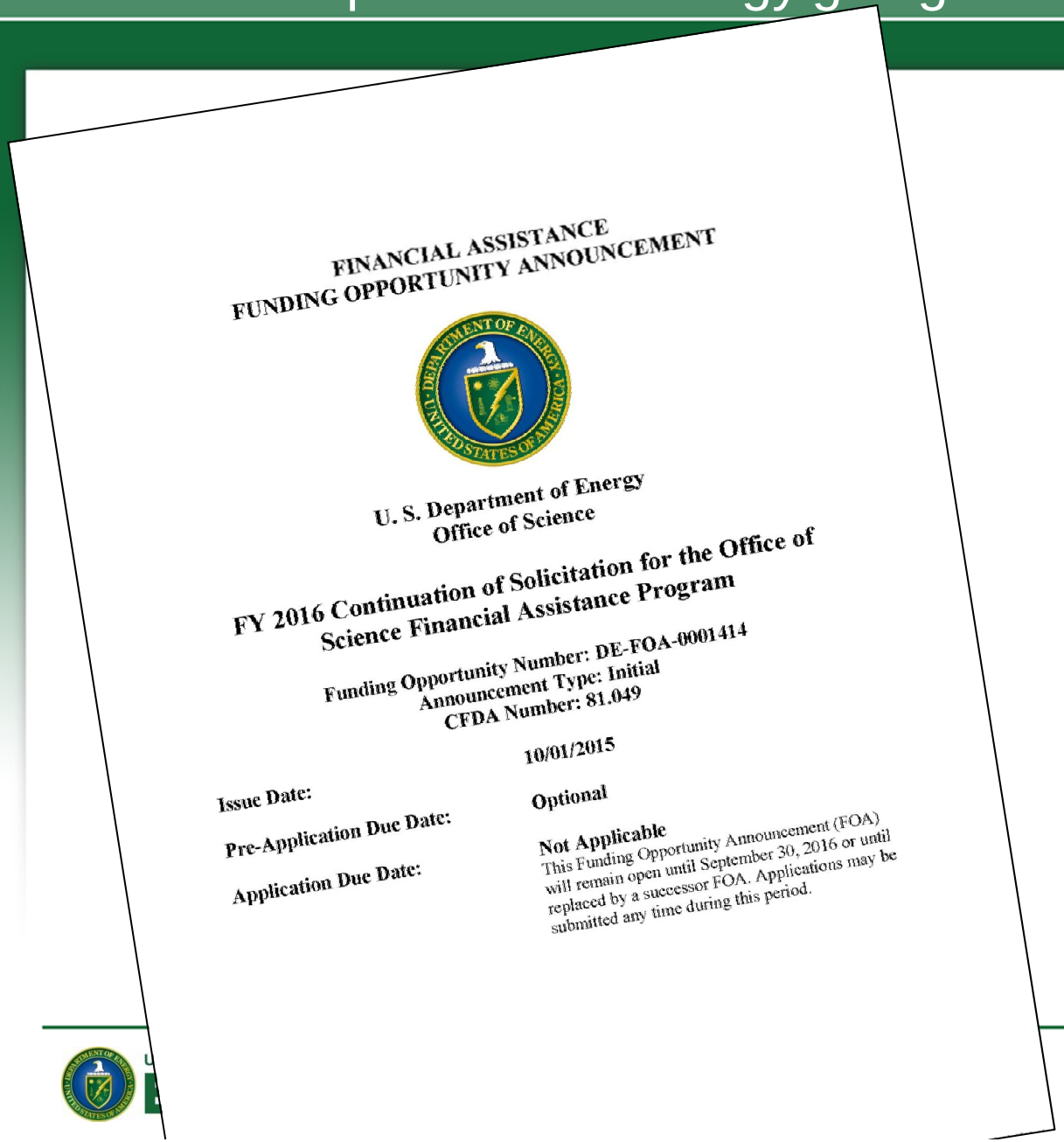
http://science.energy.gov/early-career/

U.S. DEPARTMENT OF ENERGY | Office of Science

Other Funding Opportunities in the DOE Office of Science

http://science.energy.gov/

Annual Open Solicitation
http://science.energy.gov/grants/foas/open/



FINANCIAL ASSISTANCE
FUNDING OPPORTUNITY ANNOUNCEMENT

U. S. Department of Energy
Office of Science

FY 2016 Continuation of Solicitation for the Office of Science Financial Assistance Program

Funding Opportunity Number: DE-FOA-0001414
Announcement Type: Initial
CFDA Number: 81.049

Issue Date: 10/01/2015

Pre-Application Due Date: Optional

Application Due Date: Not Applicable
This Funding Opportunity Announcement (FOA) will remain open until September 30, 2016 or until replaced by a successor FOA. Applications may be submitted any time during this period.

Open throughout the year.

Funding Opportunity Announcements can be more specific, too. (The Office of Science issues about 40 FOAs per year.)

Submission is through Grants.gov.

You may submit an optional preproposal / white paper electronically.

Recent Examples of Topical Solicitations: Watch

science.energy.gov/grants/foas/open/ for future opportunities

Org	Solicitation Name	Solicitation Number	Estimated Funding Available	Issue Date	Closing Date
BER	Plant Feedstock Genomics for Bioenergy: A Joint Research Funding Opportunity Announcement USDA, DOE	DE-FOA-0001444	$4,000,000	11/4/2015	2/2/2016
BES	Experimental Program to Stimulate Competitive Research (EPSCoR); Building EPSCoR-State/National Laboratory Partnerships	DE-FOA-0001432	$3,000,000	10/14/2015	1/28/2016
BER	Environmental System Science	DE-FOA-0001437	$5,000,000	10/9/2015	1/22/2016
BER	Atmospheric System Research Program	DE-FOA-0001430	$10,000,000	10/2/2015	1/20/2016
BER	Atmospheric System Research Program–New Data Products	DE-FOA-0001431	$2,500,000	10/2/2015	1/13/2016
HEP	FY2016 Research Opportunities in Accelerator Stewardship	DE-FOA-0001438	$4,000,000	10/13/2015	12/21/2015
FES	Collaborative Fusion Energy Research in the DIII-D National Program	DE-FOA-0001375	$3,000,000	7/22/2015	10/2/2015
FES	National Spherical Torus Experiment – Upgrade: Diagnostic Measurements of Spherical Torus Plasmas	DE-FOA-0001359	$4,500,000	7/1/2015	9/18/2015
HEP	FY 2016 Research Opportunities in High Energy Physics	DE-FOA-0001358	$40,000,000	7/14/2015	9/17/2015
NP	Intermediate Neutrino Research Program	DE-FOA-0001381	$10,000,000	7/14/2015	9/2/2015
FES	Research on Innovative Approaches to Fusion Energy	DE-FOA-0001348	$6,200,000	6/1/2015	8/3/2015
ASCR	Storage Systems and Input/Output for Extreme Scale Science	DE-FOA-0001338	$4,000,000	5/18/2015	7/13/2015
ASCR	Dynamic Distributed Resource Management (DDRM)	DE-FOA-0001344	$3,500,000	5/6/2015	7/6/2015
ASCR	SDN-Enabled Terabits Optical Networks for Extreme-Scale Science	DE-FOA-0001295	$5,000,000	5/20/2015	7/2/2015
FES	Theoretical Research in Magnetic Fusion Energy Science	DE-FOA-0001336	$5,000,000	4/15/2015	6/30/2015

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

- **It is the policy of DOE that discretionary financial assistance be awarded through a merit-based selection process.**
- **Merit review means a thorough, consistent, and objective examination of applications based on pre-established criteria by persons who are independent of those submitting the applications and who are knowledgeable in the field of endeavor for which support is requested.**
- **Each program office must establish a merit review system covering the financial assistance programs it administers.**

10 CFR 605:

- **Program managers perform an initial evaluation of all applications to ensure that the required information is provided; the proposed effort is technically sound and feasible; and the effort is consistent with program funding priorities.**
- **For applications that pass the initial evaluation, program managers use peer review to evaluate them based on criteria specified in 10 CFR 605.**

Peer review is the cornerstone of our work.

- **Funding decisions in the Office of Science are made based on peer review.**
  - Also used by our user scientific facility directors to allocate time.
- **Proposals and programs are typically reviewed triennially.**
- **Each proposal receives three or more reviews.**
- **Reviewers must agree that they do not have a conflict of interest before completing the review.**
- **Reviewer identity and review contents are confidential; anonymous reviews are returned to the Principal Investigator.**
- **Proposals are reviewed generally within 6 months and no longer than 12 months from the date of receipt.**

Common review criteria are used. (10 CFR 605)

- **Scientific and/or technical merit of the project;**
- **Appropriateness of the proposed method or approach;**
- **Competency of applicant's personnel and adequacy of proposed resources;**
- **Reasonableness and appropriateness of the proposed budget; and**
- **Other appropriate factors, established and set forth in a notice of availability or in a specific solicitation.**

For renewals and continuations, program managers also consider performance under current award.

The review method varies according to need.

- **Mail Review**
  - Generally used for the open solicitation, when proposals arrive throughout the year.
  - Reviews trickle in over time.
  - Reviewers are generally given six weeks to return the review.
  - Reviewer identity kept confidential.
- **Panel Review**
  - Used for targeted solicitations when many proposals arrive simultaneously.
  - Multiple panels of 5-15 people apiece convene and submit reviews; the total number of panelists at a given time can be in the hundreds.
  - Each panelist provides his/her own input.
  - Reviewer identity kept confidential.
- **Site Visit or "Reverse Site Visit"**
  - Generally used for large, group programs such as national laboratory efforts, large facility competitions, etc.
  - Researchers make presentations to site visit reviewers.
  - The site visit team may interact with and ask questions of the investigators.
  - The site visit team members submit independent reviews to DOE.

Expert federal program managers recommend proposals for funding.

- **Our federal program managers generally hold science doctorates and are experienced researchers.**
- **The Office of Science employs about 150 federal program managers, all stationed in Germantown, Maryland.**
- **Program managers stay current and connected in science.**
  - Have access to the Web of Science and full text articles of important journals
  - Host and attend workshops
  - Host regular meetings of Principal Investigators with invited speakers and attendees
  - Attend conferences (within travel budget allowance)
  - Converse with the leaders in the field frequently
  - Organize and attend peer review panels and site visits, where they listen to debate
- **External experts from national laboratories and universities rotate and bring fresh perspectives.**
- **Merit review is advisory and does not replace the authority of the program manager or contracting officer.**
- **Program managers consider peer review, funding availability, and programmatic fit to recommend awards to the contracting officers, who make the final decisions.**
- **Program manager decisions are reviewed by committees of visitors at regular intervals.**

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.**

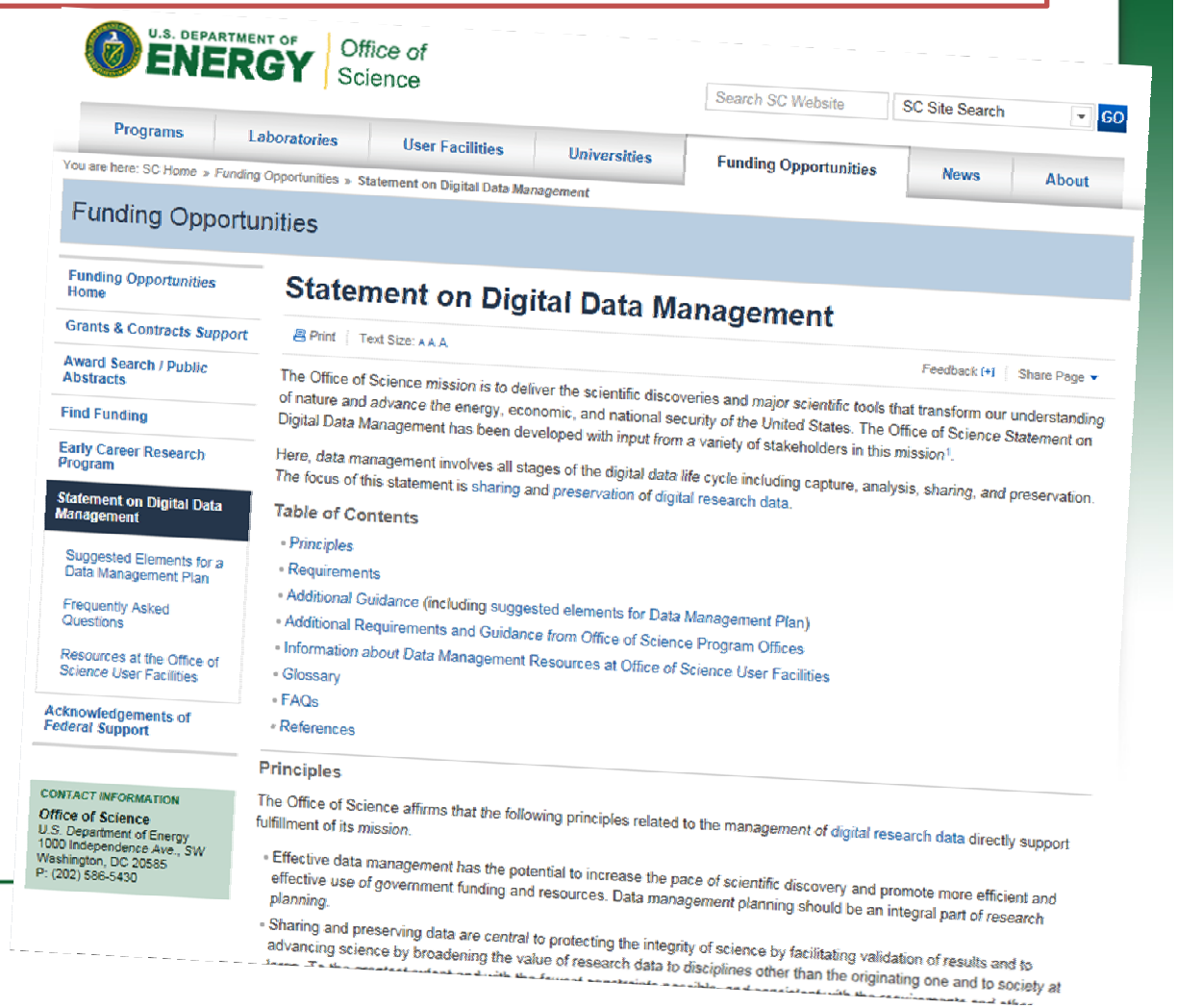
Office of Science Statement on Digital Data Management

http://science.energy.gov/funding-opportunities/digital-data-management/

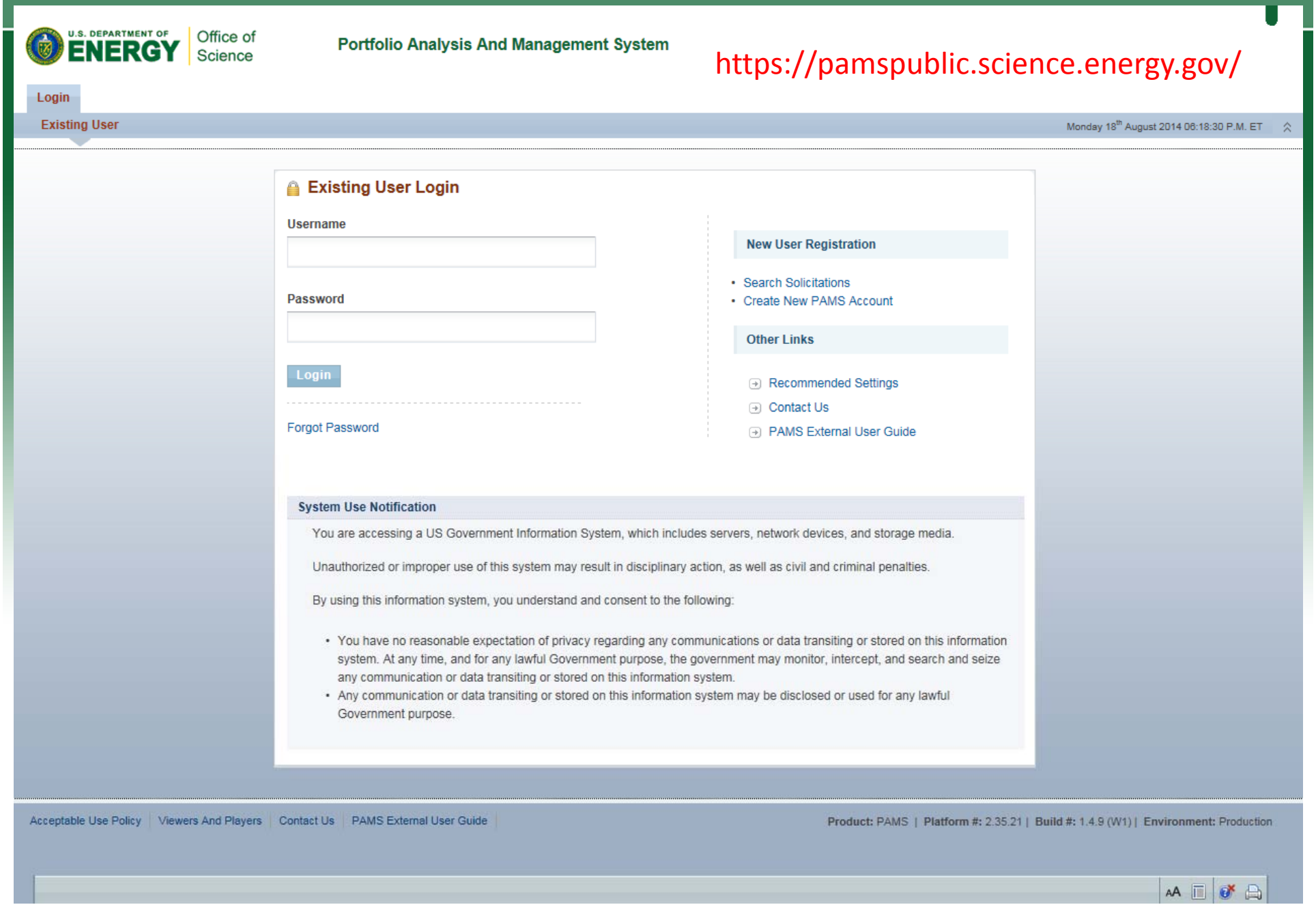
All proposals submitted to SC for research funding are required to include a Data Management Plan

Detailed requirements and further information on:

- Suggestions for what to include in a Data Management Plan
- Supplemental guidance and requirements from SC Program Offices
- Links to information about data management resources at SC user facilities
- Definitions of key terms
- FAQs



Portfolio Analysis and Management System (PAMS)



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Questions about Other Office of Science funding opportunities?

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http://science.energy.gov/