



Office of Science Projects Perspective

Stephen W. Meador
Director
Office of Project Assessment

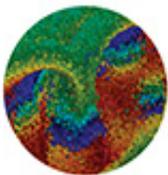
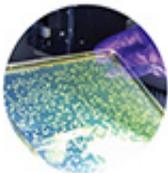


The Science Mission

SC delivers scientific discoveries and tools to transform our understanding of nature and advance the energy, economic, and national security of the U.S.

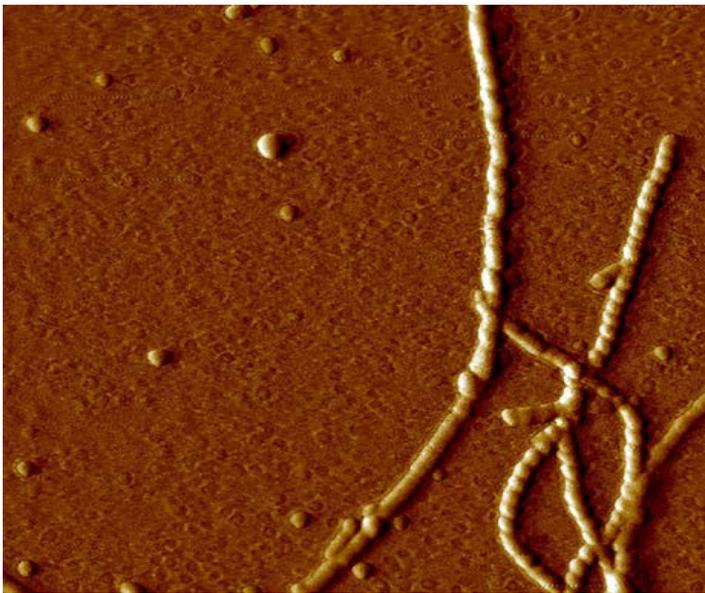
Science Serving
the Nation

Office of Science



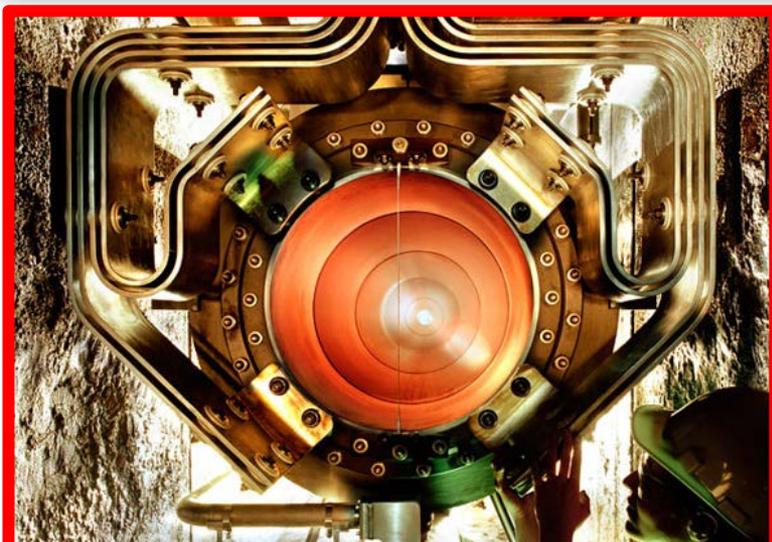


The Science Mission





Some of the 27 SC User Facilities



NSLS

NSLS-II



NuMI Beamline, FNAL; TITAN HPC, ORNL; NSTX, PPPL; STAR Detector, RHIC, BNL; APS, ANL; CEBAF, TJNAF; NSLS-II, BNL,



FY16 Congressional Request

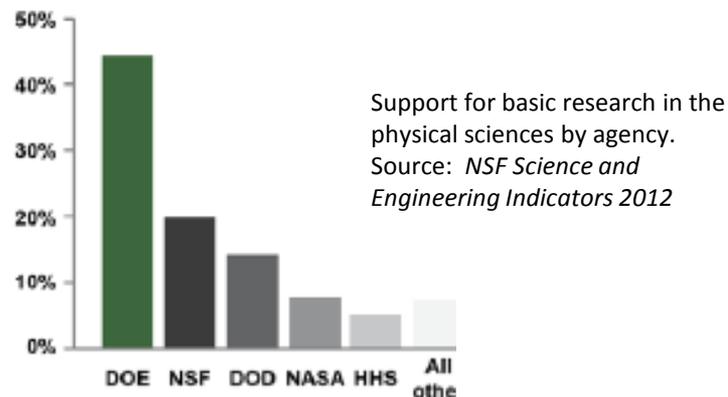


Shown is a portion of SLAC's two-mile-long linear accelerator (or linac), which provides the electron beam for the new Linac Coherent Light Source (LCLS)—the world's first hard x-ray, free electron laser. For nearly 50 years, SLAC's linac had produced high-energy electrons for physics experiments. Now researchers use the very intense X-ray pulses (more than a billion times brighter than the most powerful existing sources) much like a high-speed camera to take stop-motion pictures of atoms and molecules in motion, examining fundamental processes on femtosecond timescales.

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Research

- Support for 47% of the U.S. Federal support of basic research in the physical sciences.
- ~22,000 Ph.D. scientists, grad students, engineers, and support staff at >300 institutions, including all 17 DOE labs.
- U.S. and world leadership in high-performance computing and computational sciences.
- Major U.S. supporter of physics, chemistry, materials sciences, and biology for discovery and for energy sciences.

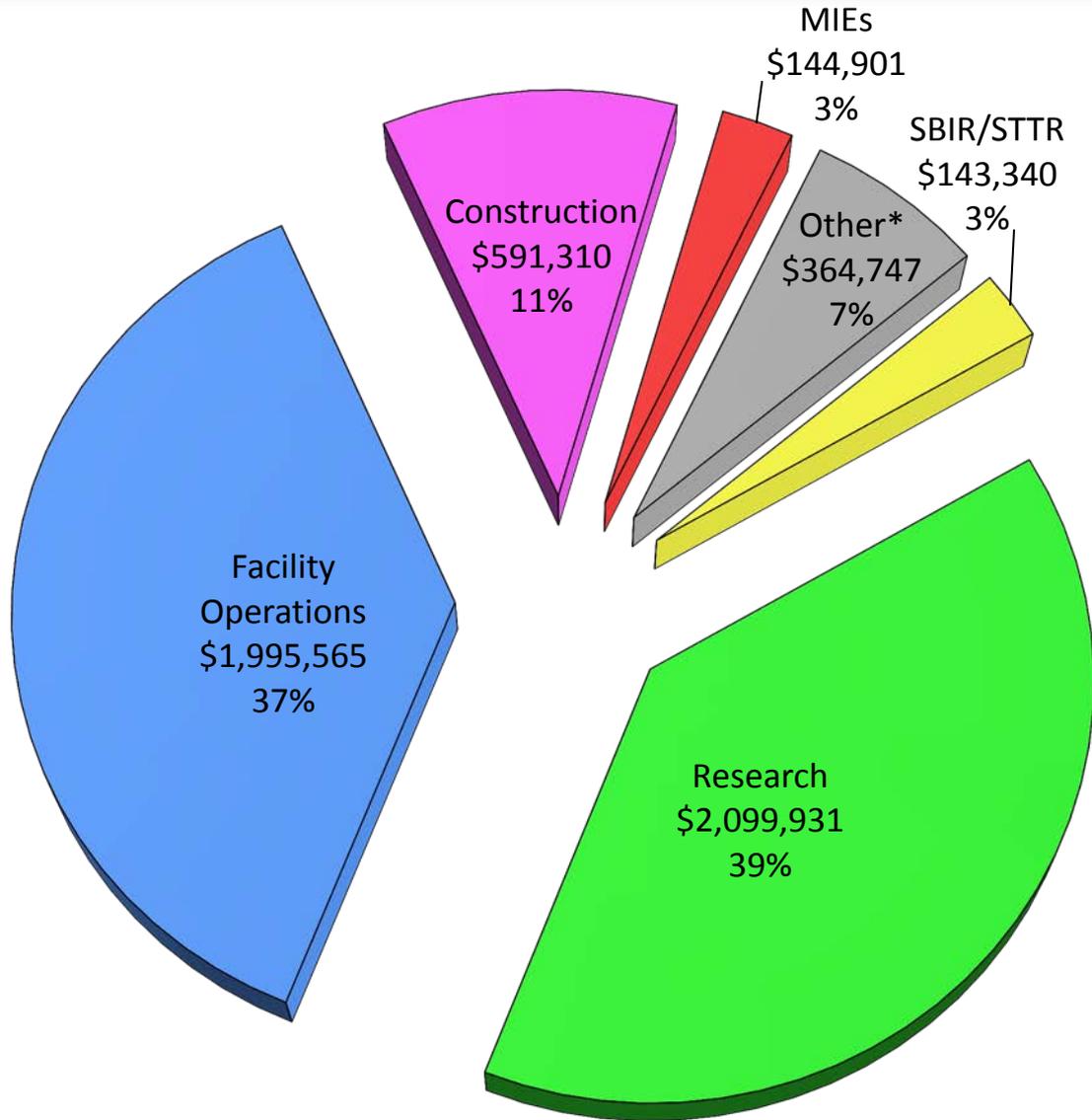


Scientific User Facilities

- The world's largest collection of scientific user facilities (aka research infrastructure) operated by a single organization in the world, used by 31,000 researchers each year.



FY16 SC Congressional Request



\$ in Thousands

*Other includes GPP/GPE amounts for BES, GPP for FES, Other (DOE/SC/Fermi/LBNL) for NP, WDTS, SLI non-construction funding, S&S, and Program Direction.



SC Organization

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 - Argonne SO
Joanna Livengood
 - Berkeley SO
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 - Brookhaven SO
Frank Crescenzo
 - Fermi SO
Michael Weis
 - Oak Ridge SO
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 - Princeton SO
Frank Crescenzo (A)
 - Pacific NWest SO
Roger Snyder
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 - Thomas Jeff. SO
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- Chicago Office
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- Office of Laboratory Policy (SC-32)
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- Office of Operations Program Management (SC-33)
Vacant
- Oak Ridge Office
Vacant
- SC Integrated Support Center

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 - Biological & Environ. Research (SC-23)
Sharlene Weatherwax
 - Fusion Energy Sciences (SC-24)
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 - High Energy Physics (SC-25)
James Siegrist
 - Nuclear Physics (SC-26)
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- Workforce Development for Teachers/Scientists (SC-27)
P. Dehmer
- Office of Project Assessment (SC-28)
Stephen Meador
- Small Business Innovation Research (SC-29)
Manny Oliver

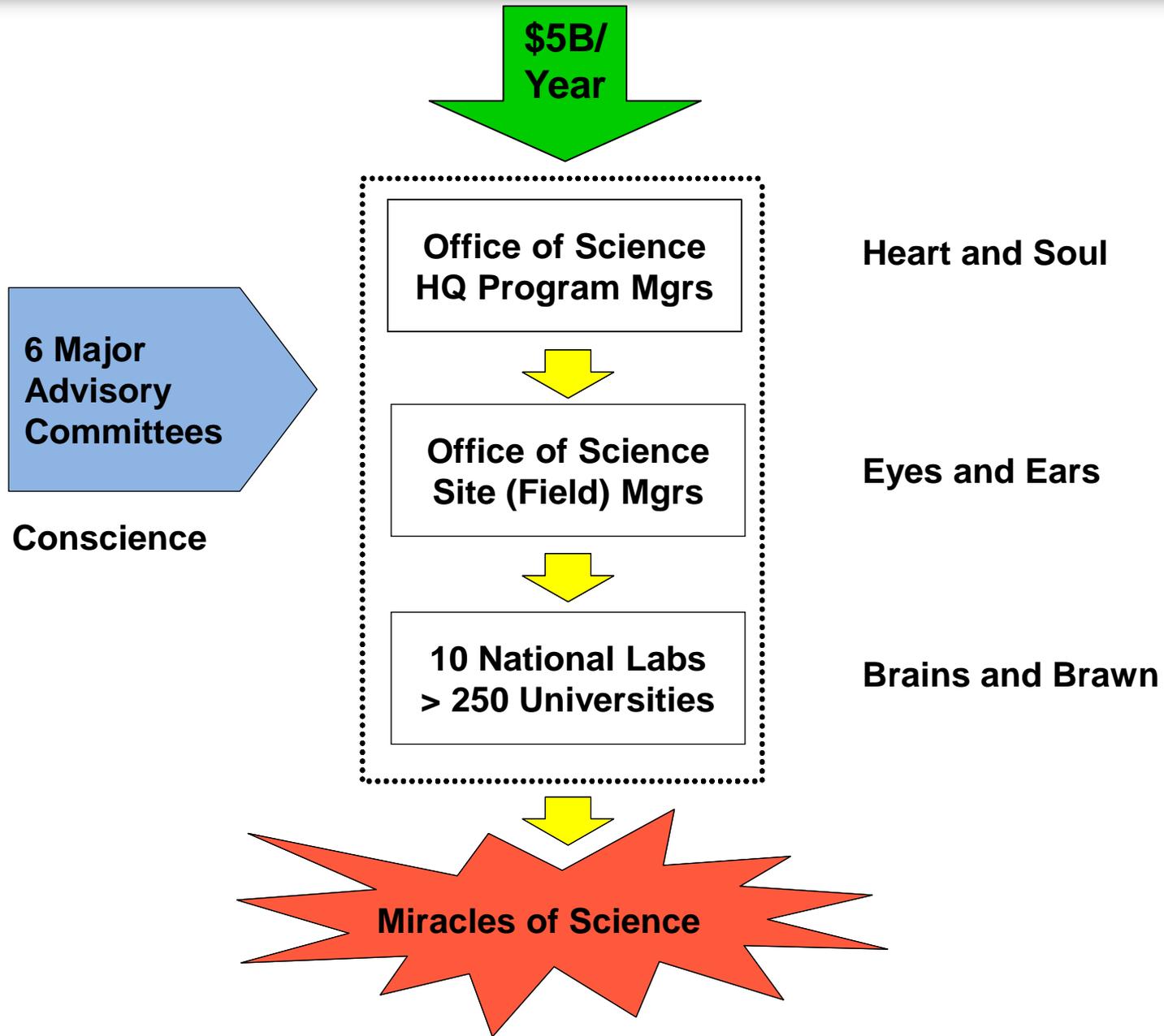
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- Office of Grants/ Cont. Support (SC-43)
Linda Shariati
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Daniel Division
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Brian Hitson
- Office of Information Technology and Services (SC-45)
V. Kountouris
- SC Communications & Public Affairs (SC-47)
Rick Borchett
- Human Resources & Admin. (SC-48)
Waltrunette Gardner

(A) Acting



Meador's Metaphors





SC Project Portfolio (Feb. 2015)

- 26 Active projects with TPC > \$10M
 - Performance
 - 25 projects are assessed as **Green**
 - 1 project is assessed as **Yellow**
 - Phase
 - 13 projects are post CD-2
 - 13 projects are pre-CD-2
 - Scale
 - 7 projects have a TPC of \$100M or greater
 - 19 projects have a TPC less than \$100M



SC Portfolio of Projects

Office of Science - Summary Project Data (OPA)

Report Date: February 24, 2015

DOE Project Number	Project Name	Site Code	Program Office	TPC (\$K)
<i>Past CD-2 and > \$20M</i>				
07-SC-06	National Synchrotron Light Source-II (NSLS-II)	BNL	BES	912,000
NEXT	NSLS II Experimental Tools (NEXT)	BNL	BES	90,000
MIE-NSTX-U	National Spherical Torus Experiment (NSTX) Upgrade	PPPL	FES	94,276
SC-25-11-LSST	LSST Camera	SLAC	HEP	168,000
11-SC-30YD	LHC ATLAS Detector Upgrade	BNL	HEP	33,250
SC-30YB	LHC CMS Detector Upgrade	FNAL	HEP	33,217
06-SC-01	12 GeV Continuous Electron Beam Accelerator Facility (CEBAF) Upgrade	TJNAF	NP	338,000
10-SC-70	Research Support Building (RSB) & Infrastructure Modernization Project	SLAC	SSI	97,400
12-SC-70	Science and User Support Building (SUSB)	SLAC	SSI	65,000
13-SC-71	Utility Infrastructure Modernization (UIM)	TJNAF	SSI	29,900
<i>Past CD-2 and < \$20M</i>				
NRP-1	NERSC Relocation Project	LBNL	ASCR	19,980
SC-BER-2010-1035070	High Resolution and Mass Accuracy Capability Development Project	PNNL	BER	17,500
MIE-21-XB	U.S. Belle II	PNNL	HEP	15,000
<i>Not Past CD-2</i>				
13-SC-10	Linac Coherent Light Source (LCLS) II	SLAC	BES	1,200,000
MIE-12-SC-APSU	Advanced Photon Source Upgrade (APS-U)	ANL	BES	450,000
11-SC-40	Long Baseline Neutrino Experiment (LBNE)	FNAL	HEP	1,100,000
11-SC-41	Muon to Electron Conversion Experiment (Mu2e)	FNAL	HEP	310,000
SC-30YC	Muon g-2 Project at Fermi National Accelerator Laboratory (FNAL)	FNAL	HEP	50,100
41ZA	Mid-Scale Dark Energy Spectroscopic Instrument (DESI)	LBNL	HEP	42,000
	Coordinated Second-Generation Dark Matter Experiments (DM-G2)	TBD	HEP	38,000
	LUX-Zeplin Dark Matter Experiment (LZ)	LBNL	HEP	
16-SC-76	Materials Design Laboratory (MDL)	ANL	SSI	96,000
15-SC-78	Integrative Genomics Building (IGB) Project	LBNL	SSI	91,500
15-SC-77	Photon Science Laboratory Building (PSLB)	SLAC	SSI	57,000
13-SC-70	Utilities Upgrade (UU)	FNAL	SSI	36,000
15-SC-75	Infrastructure and Operational Improvements (IOI) Project	PPPL	SSI	26,000



SC Projects are Hard

- High Energies
- Extreme Temperatures
- Strong Magnetic Fields
- Exotic Materials
- Demanding Tolerances
- High Reliability Requirements
- Mass Production, Assembly, Testing
- Data Acquisition
- ISS, Chilean High Desert, Mile Deep





Superconducting Magnets

WARNING

**SUPERCONDUCTING MAGNET
STRONG MAGNETIC FIELD**

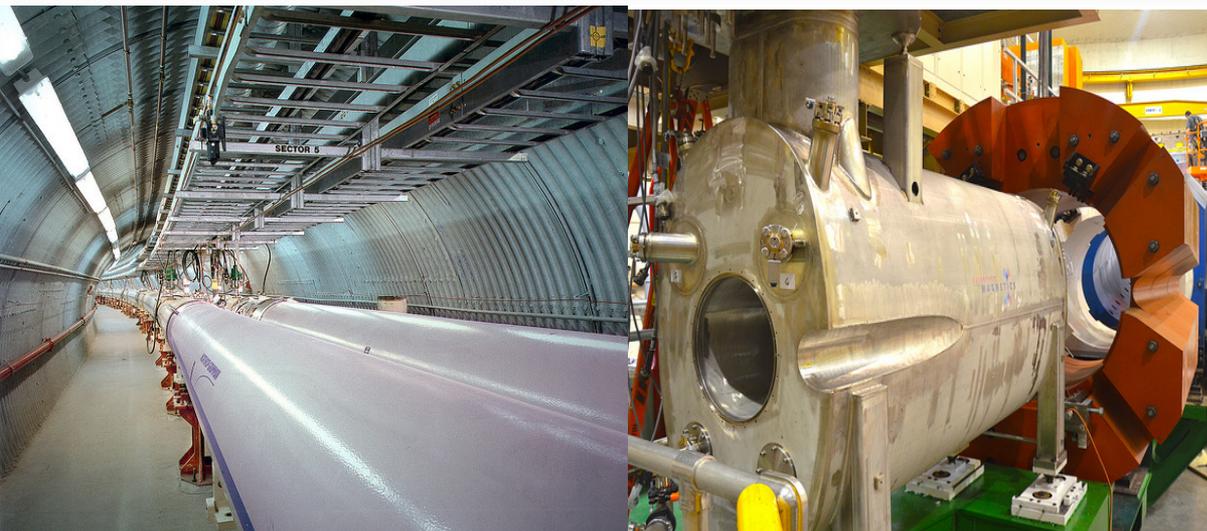
MAY BE HAZARDOUS TO:

- HEART PACEMAKERS**
- MECHANICAL WATCHES**
- MAGNETIC TAPE AND DISKS**
- MAGNETIC STRIP CREDIT CARDS**

...and project cost and schedule



All Numbers, Shapes, and Sizes





SC PM Culture

- Projects are typically '*build to cost*' with a goal of maximizing science capability
- Project designs consider *future upgrades*—programs and projects take a long view
- *Facility users* (and science community) are thoroughly *engaged* throughout the project lifecycle
- *Internal project advisory committees* (technical and managerial) are thoughtfully appointed and valued
- *DOE/SC peer (Lehman) reviews* are regular, recognized by the science community, and facilitate active sharing of lessons learned from other projects

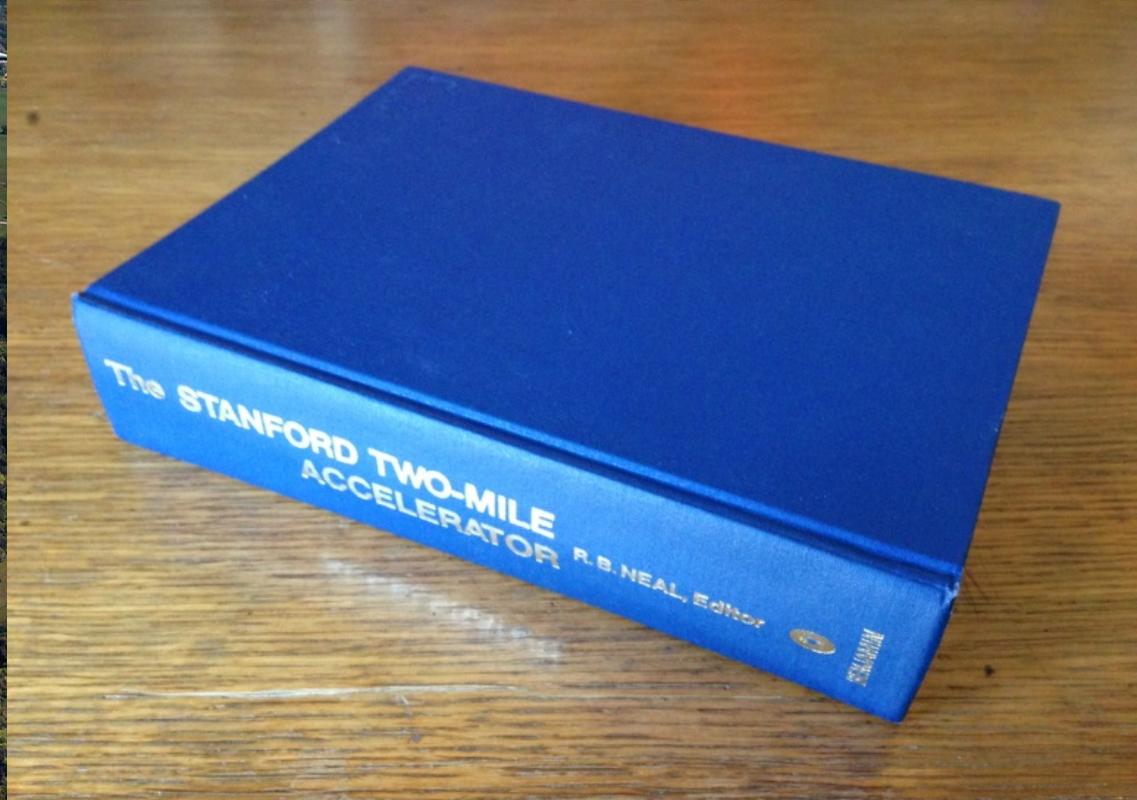


SC PM Workshop—July 2014





The Blue Book





Backup Slides



SC Project History

(Completed projects since 2002)

SITE	# of Completed Projects	# Cost Success	% Success by Cost	# Schedule Success	% Success by Schedule	Initial Baseline TPC (\$M)	Final TPC (\$M)	% Cost Increase
Argonne National Laboratory	5	5	100%	3	60%	\$59.5	\$59.5	100%
Brookhaven National Laboratory	12	12	100%	12	100%	\$261.0	\$259.5	99%
Fermi National Laboratory	10	10	100%	10	100%	\$1,069.2	\$1,095.7	102%
Jefferson National Accelerator Facility	2	2	100%	2	100%	\$84.1	\$84.1	100%
Lawrence Berkeley National Laboratory	13	12	92%	12	92%	\$440.3	\$435.4	99%
Oak Ridge National Laboratory*	13	13	100%	13	100%	\$1,702.3	\$1,772.8	104%
Pacific Northwest National Laboratory	1	1	100%	1	100%	\$224.0	\$224.0	100%
Princeton Plasma Physics Laboratory**	3	2	67%	2	67%	\$141.4	\$142.5	101%
Sandia National Laboratory (NNSA Operated)	1	1	100%	1	100%	\$75.8	\$75.8	100%
Stanford Linear Accelerator Center	8	6	75%	7	88%	\$595.4	\$638.2	107%
TOTAL SC PROJECTS*	68	64	94%	63	93%	\$4,652.9	\$4,787.3	103%

Capital Asset Projects—defined as having Total Project Cost (TPC) \$5M or greater.

* Defined by as completed within original cost & schedule baseline with the exception of SNS and ALS-USB which were Directed Changes. SNS baseline cost adjusted to reflect the directed change. The unsuccessful projects include: NuMI, LAT, LCLS, SORIP, ANL Fire Safety Upgrade.

**Includes NCSX which was cancelled on July 2008.