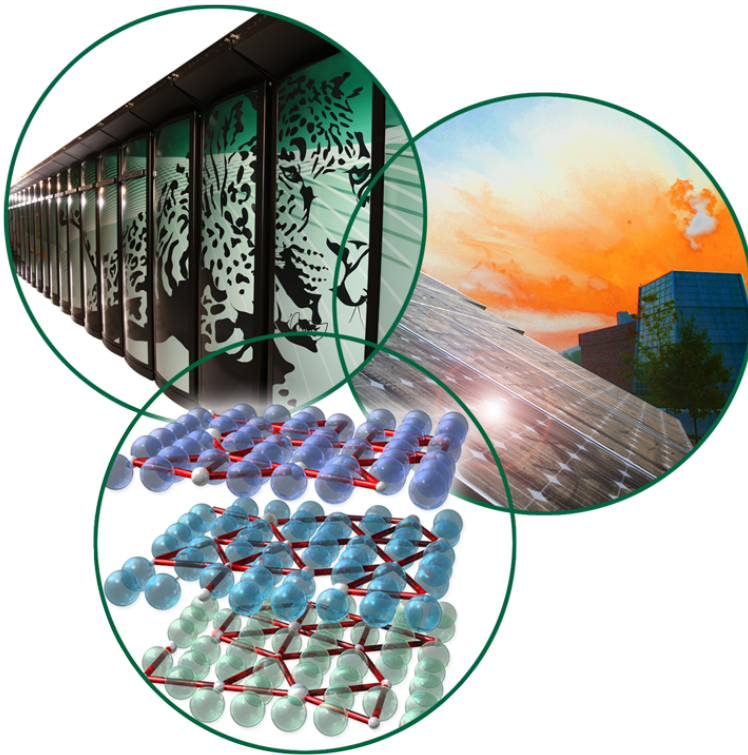


Proposal Writing: Hints for maximizing your chances for getting beam time

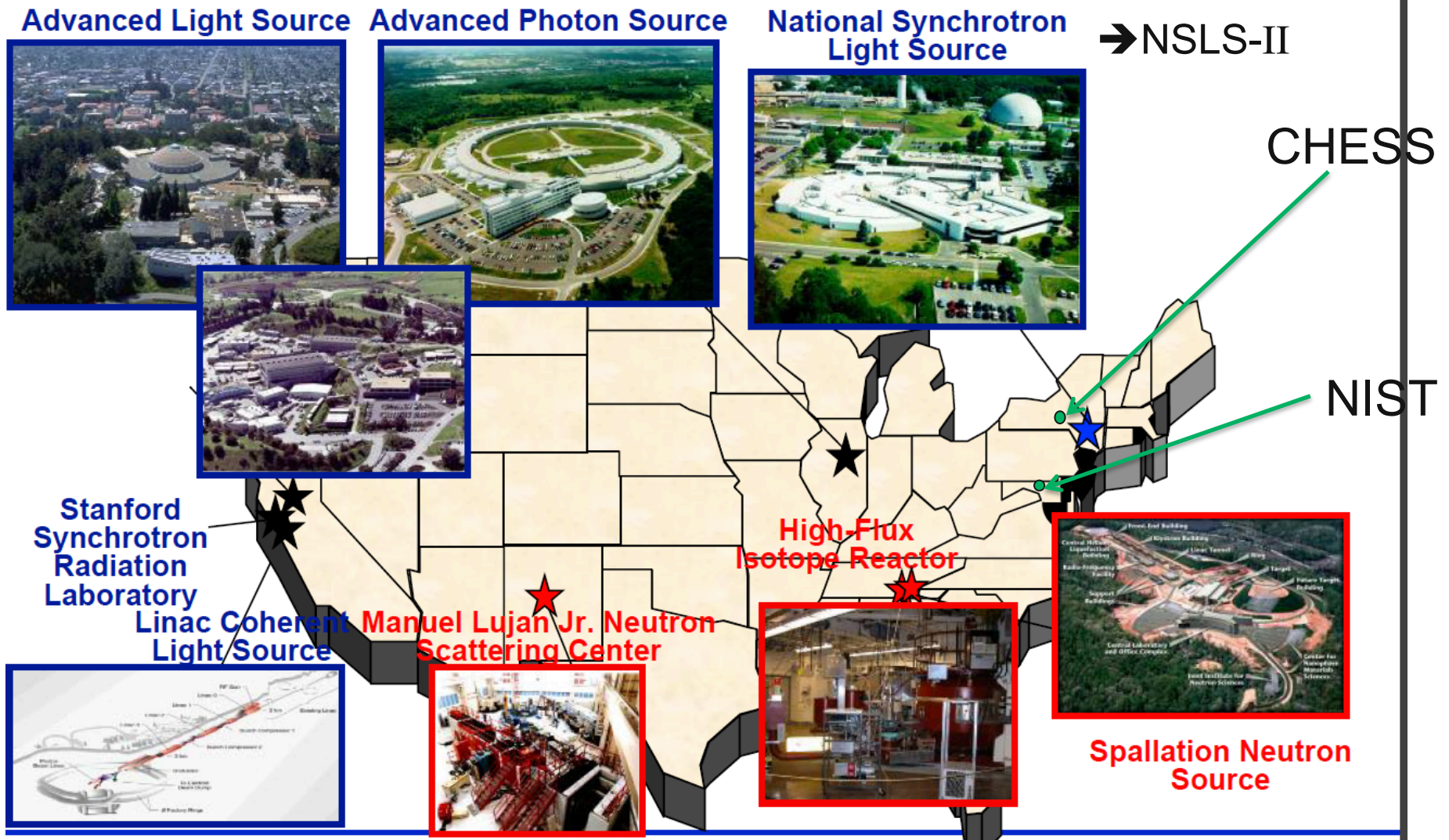


***John Budai
Materials Science and Technology Division
Oak Ridge National Laboratory***

***Bryan Chakoumakos
Neutron Scattering Sciences Division
Oak Ridge National Laboratory***

***Neutron X-ray Scattering School
June 25, 2010***

DOE X-ray and Neutron Sources

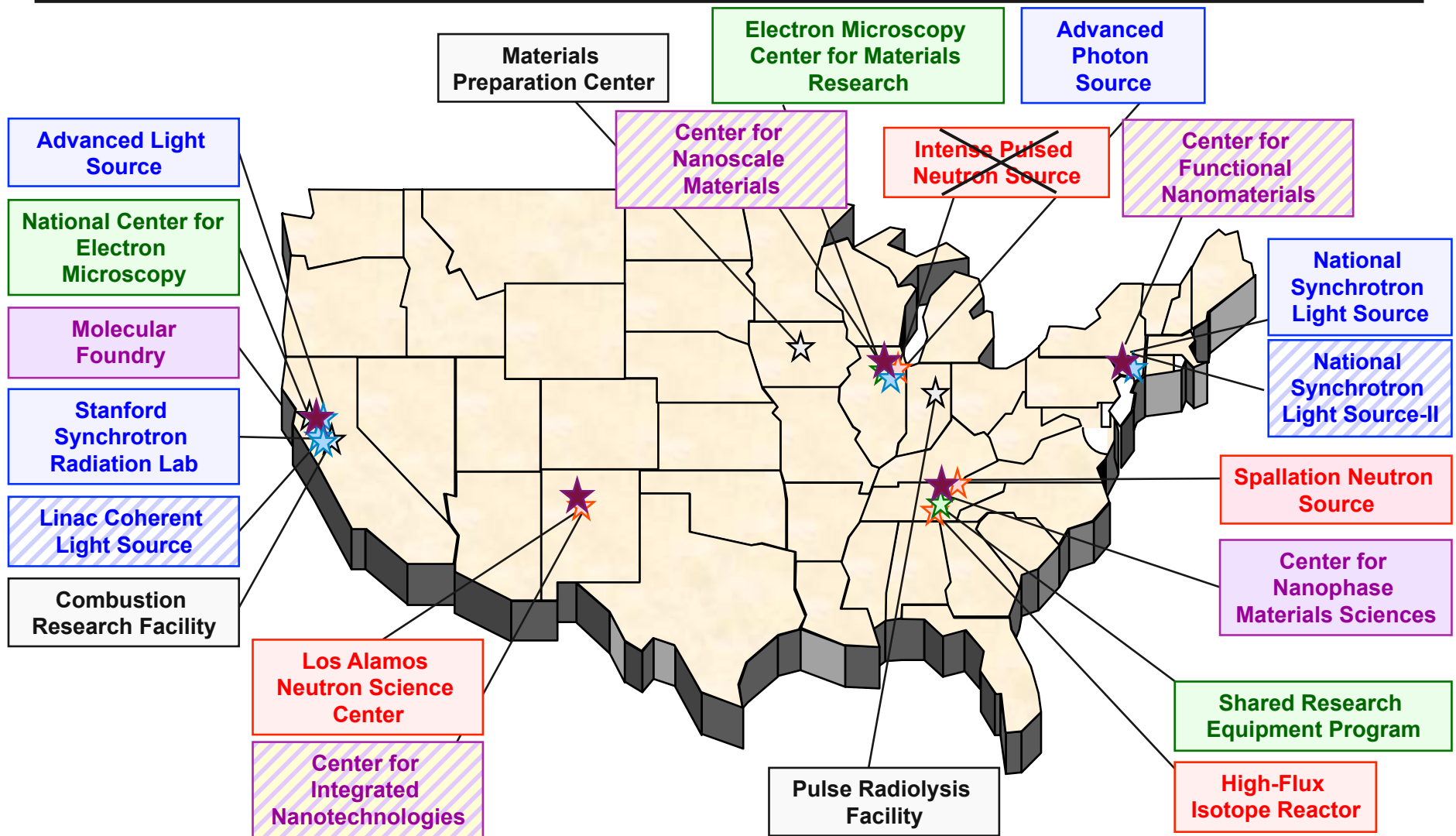


Also

5 DOE Nanoscience Centers (BNL, SNL/LANL, ORNL, ANL, LBNL)

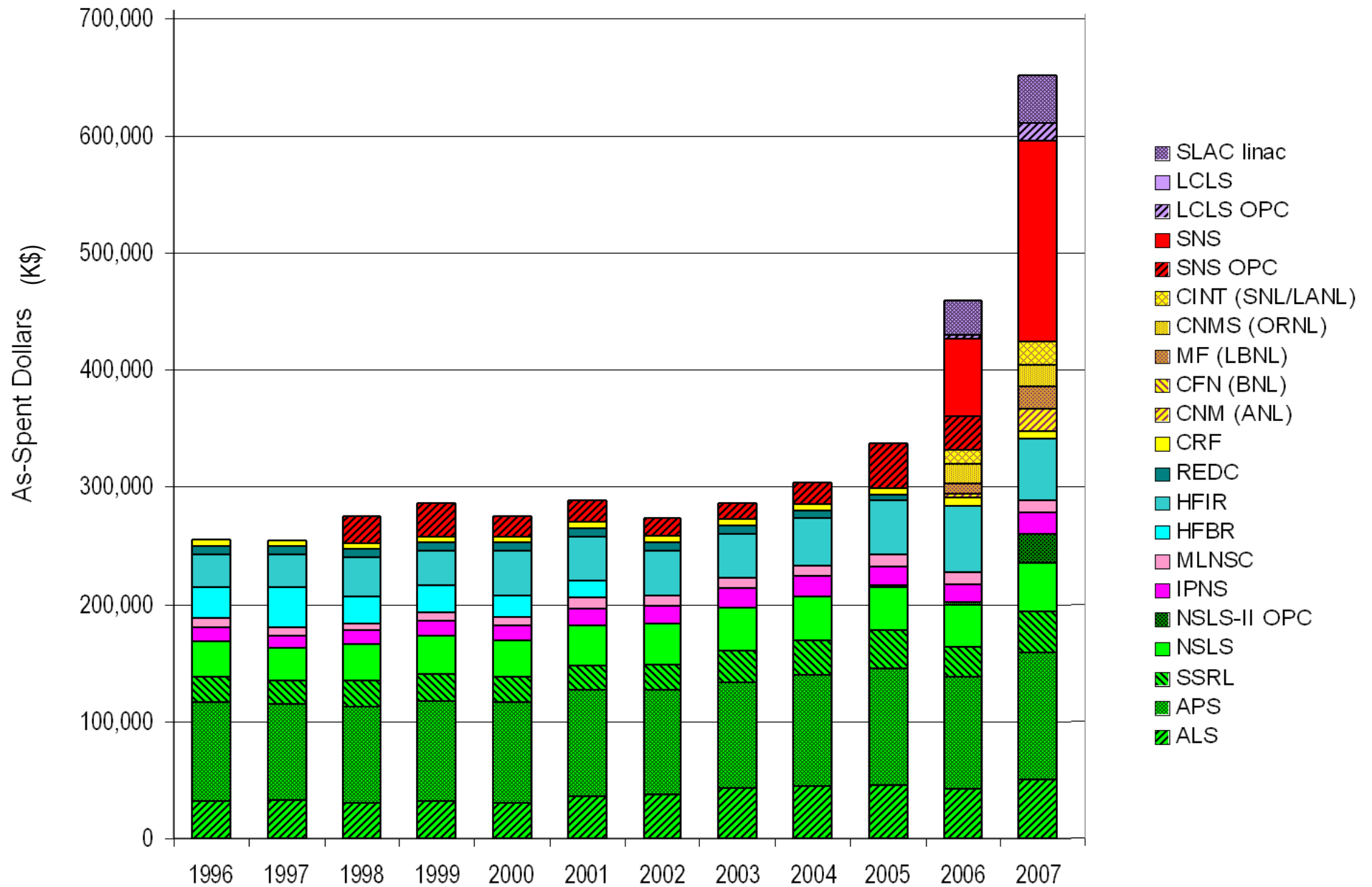
3 DOE Electron Microscopy Centers (ANL, LBNL, ORNL)

BES Scientific User Facilities - (from Pat Dehmer presentation 2007)



- 4 Synchrotron Radiation Light Sources
- Linac Coherent Light Source
- 4 Neutron Sources
- 3 Electron Beam Microcharacterization Centers
- 5 Nanoscale Science Research Centers
- 3 Special Purpose Centers

Operating Budgets for the BES Scientific User Facilities



ORNL Home to 12 User Facilities

- Building Technologies Research and Integration Center
- Center for Nanophase Materials Sciences (CNMS)
- Center for Structural Molecular Biology (Bio-SANS)
- High Flux Isotope Reactor (HFIR) User Facilities
- High Temperature Materials Laboratory (HTML)
- Holifield Radioactive Ion Beam User Facility (HRIBF)
- National Center for Computational Sciences
- National Transportation Research Center (NTRC)
- Oak Ridge Electron Linear Accelerator (ORELA)
- Safeguards Laboratory (SL)
- Shared Research Equipment (SHaRE) User Facility
- Spallation Neutron Source Experimental Facility (SNS)

Basics of the facility proposal systems

- All the DOE (NIST & NSF) neutron and x-ray sources offer access to beam time through an experimental proposal system. “General Users (GU)”.
- Proposal submission is done through a web-based application. When and how often proposals are submitted varies by facility.
 - APS and NSLS three times (“cycles”) per year.
 - SNS/HFIR and ALS two times per year
- All proposals are peer-reviewed and rated, and beam time is allocated using the scores of these reviews. Once time has been allocated, the beamline staff schedule the proposals.

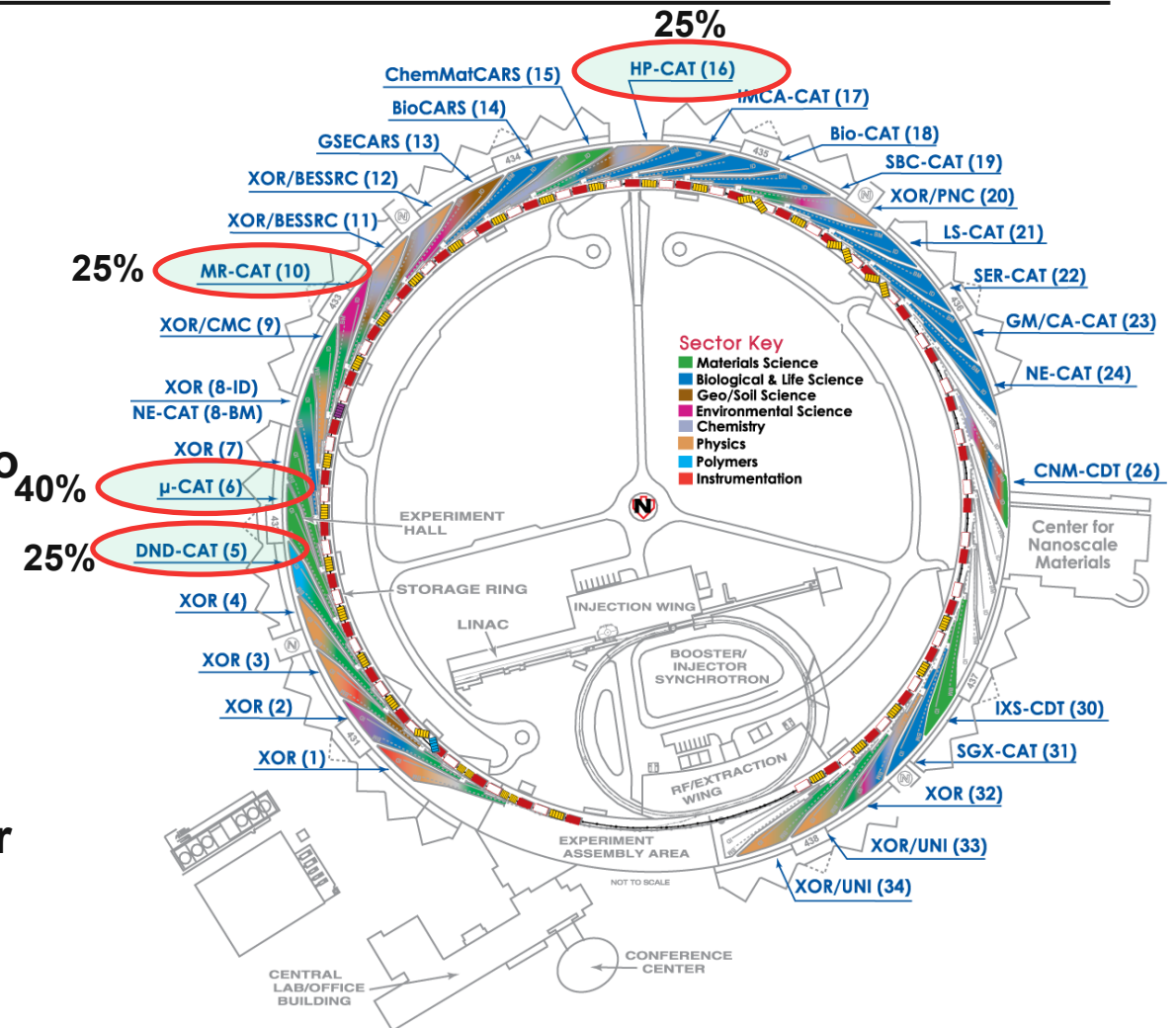
Amount of general user time available

APS/NSLS/SSRL/ALS

- ✓ All beamlines offer GU beam time.
- ✓ Most DOE/NSF funded beamlines provide 80-100% of their time to general users.

SNS/HFIR

- ✓ Amount varies by instrument.
- ✓ ~75% of time will be for general users.



Upcoming Proposal Deadlines:

X-ray sources

(<http://www.lightsources.org/cms/?pid=1000336>)

Deadlines

APS

July 9, 2010

ALS

July 15, 2010

NSLS

Sept 30, 2010

Neutron sources

HFIR/SNS

Aug 25, 2010

LANSCCE

July 26, 2010

NIST-NCNR

Aug 17, 2010

(10.5 month shutdown commences in April)

Note at most facilities these are hard deadlines:

APS always at Friday midnight (12:05 → next cycle)

Users Get Started with Assistance of the Instrument Scientists

- Study instrument web pages
- Contact an Instrument Scientist to discuss your research
 - What is the research problem?
 - Which instrument(s) are appropriate?
 - How mature is the research project (risk, size)?
 - What is the material – sample composition, form, size, availability?
 - What are the experimental conditions (temperature, pressure, magnetic field, etc)?
 - What will be measured?
 - Probability of success? Impact? Significance?
 - How will results be presented and to whom?
 - What is the timeline?



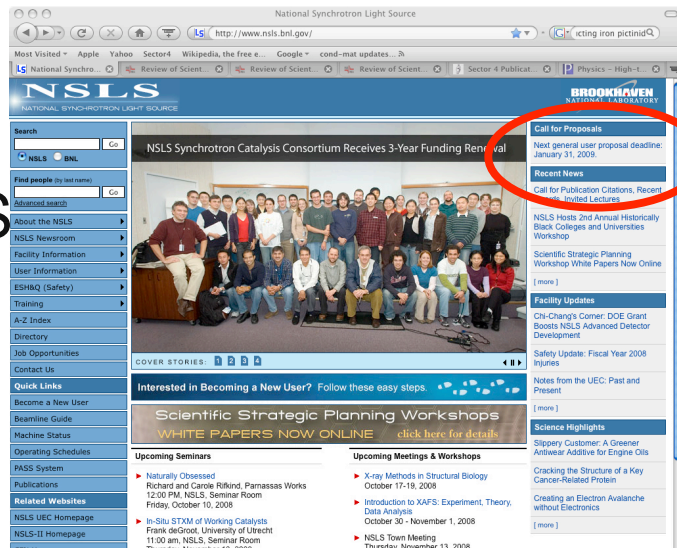
Instrument Scientists Assist First-time and Returning Users

- **Provide technical advice, guidance, and assistance**
 - Instrument options
 - Sample and experiment preparation
 - Number of experiment days
 - Logistics (scheduling, transporting and storing samples)
 - Proposal preparation tips and assistance
 - Experiment team members
 - Data analysis
 - Publication considerations

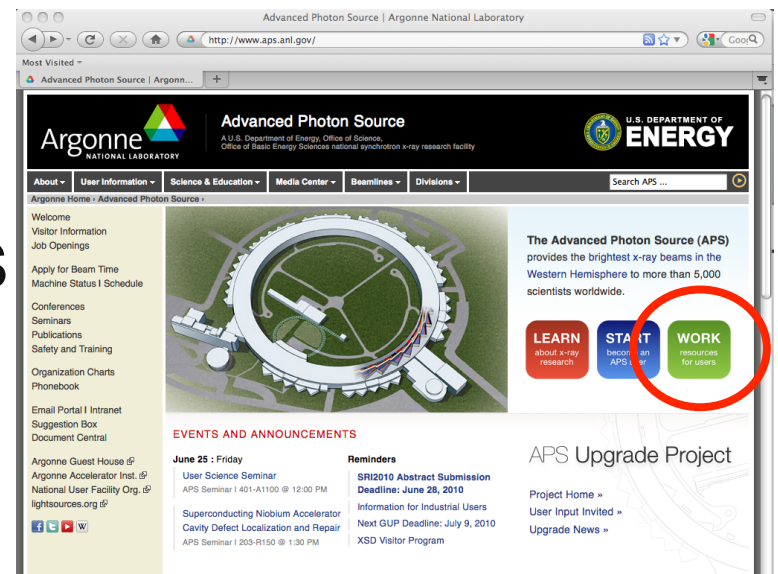
Submitting a proposal

Facilities have link on home page

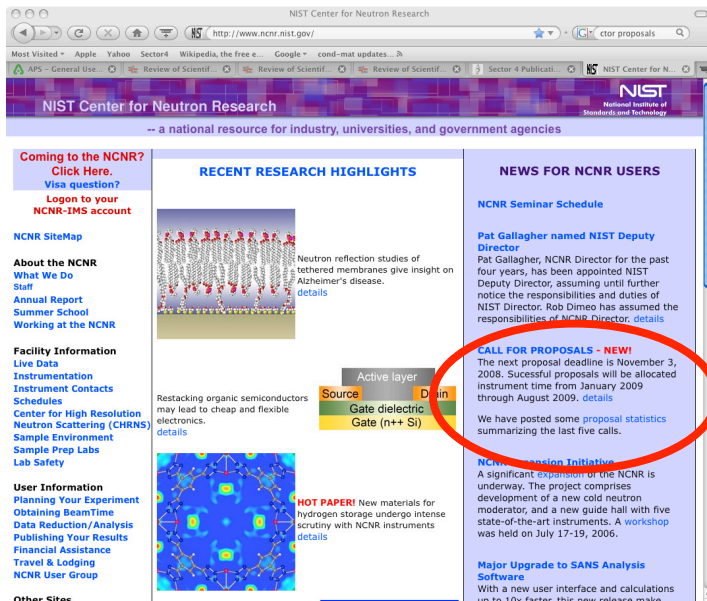
NSLS



APS



NIST



SNS
HFIR



Different types of proposals allow facility flexibility

Each facility has particular systems or proposal modes:

APS

GUP - General User Proposal. A "rapid-access beamtime request" against a submitted proposal can be considered for any unallocated general user time during the current run.

PUP – Partner User Proposal - Groups whose work involves a greater degree of collaboration with the APS. (e.g. major new instrumentation).

11-BM User Program – Accepts user proposals for both on-site experiments and for the rapid-access mail-in service (~60% of user beamtime reserved for mail-in samples). Very easy – they send you capillary tubes. This capability is not obvious on the GUP website.

CHESS - Cornell

Express-Mode proposals are for a single visit of limited duration to CHESS to perform a straight-forward experiment. Express-Mode proposals undergo a rapid on-line review process to enable users to quickly gain access to beam time.

Feasibility Study proposals are to test an idea or procedure at one of the CHESS stations.

NSLS

MAIL-IN EXAFS Service at Beamline X18B

Prepare your samples according to their thickness guide and mount on standard holder.

Transmission mode. Charges are ~\$100/hr.

Different types of proposals allow facility flexibility – cont.

NIST NCNR

MAIL-IN SAMPLES FOR POWDER DIFFRACTION

We will accept proposals for experiments on the BT1 powder diffractometer on “mail-in” samples. That is, samples may be mailed to NCNR staff, who will execute the data collection.

QUICK ACCESS PROPOSALS

If a user feels that beam time is required very soon to carry out important measurements that cannot be delayed, a proposal may be submitted requesting expedited access. The proposal will be reviewed by the BTAC, and held to a substantially higher standard than regular proposals.

Crystallography is somewhat a separate, self-contained community

- A separate proposal system at APS.
- Highly automated for mail-in measurements.
- Beamtime relatively available.

Proposal forms at SNS and APS

SNS/HFIR

The screenshot shows the 'Create Proposal' form for SNS/HFIR. The browser window title is 'Create Proposal - Mozilla Firefox'. The URL is 'https://snsapp1.sns.ornl.gov/jsp/createProposal.jsp?prodId=100-49-3910448804620322:INO'. The page has a navigation bar with 'Home', 'Create a New Proposal', 'Create a Proposal From an Existing Proposal', 'My Proposals', and 'All Proposals'. The main content area is titled 'Integrated Proposal Tracking System'. Below this is a 'Create a New Proposal' button. The form itself is titled 'Base Proposal Information' and includes fields for 'Proposal Number' (Pending), 'Name' (Suzanne Te Velthuis), 'Date' (23-SEP-2008), and 'Email' (tevelthuis@anl.gov). There are several yes/no questions regarding data collection, classification, and safety. A large text area for the 'Abstract' is at the bottom, with a character count '0 of 4000'.

APS

The screenshot shows the 'APS - General User Proposal' form. The browser window title is 'APS - General User Proposal - Mozilla Firefox'. The URL is 'https://beam-aps.anl.gov/jsp/apsweb/gup0001.display_exp?pid=752659010641428&page_num=1&gup_id=10'. The page has a navigation bar with 'Main Menu', 'Search Criteria', 'Instructions', and 'Logout'. The main content area is titled 'APS - General User Proposal'. Below this is a 'Proposal Title' field. The form includes a table for 'Shifts Recommended by PRP', 'Shifts Allocated by BAC or Scheduled by Beamline in current cycle', 'Shifts Used to date', and 'Shifts Remaining'. There are several yes/no questions regarding data collection, classification, and safety. A large text area for the 'Subject of Research' is at the bottom, with a character count '500 characters or less'. The form also includes a 'Subject of Research' section with checkboxes for various fields like Materials science, Physics, Chemistry, Polymers, Medical applications, Biological and life sciences, Earth sciences, Environmental sciences, Optics (excluding x-ray optics), Engineering, Instrumentation related to user facilities, and Purchase of specialty service or materials. A 'Specify Other' field is also present. At the bottom, there are buttons for 'Generate Report', 'Copy Proposal', 'Next Page', 'Save', and 'Submit'. A yellow banner at the bottom states: 'Pressing SAVE will allow you to save this proposal and continue to make changes. Notifications will not be sent. Pressing SUBMIT will save this proposal AND notifications will be sent to the APS. No changes can be made thereafter.'

Each proposal system will ask very similar questions

Questions asked

- Proposal Title
- General Info (Title, Experimenters, Funding source, etc.)
- Abstract - What is the scientific importance of the proposed research?
- Why do you need the facility to do this research?
 - Neutron vs. X-rays
 - Why do you need an insertion device beamline instead of a bending magnet?
 - Spallation source vs. reactor source
 - Hard X-rays vs. Soft X-rays
- Why do you need the beam line (and/or instrument)?
 - Particular technique or sample environment
- What previous experience / results do you have?
- Describe the proposed experiment(s), including samples and procedures.
- Justification of the amount of time requested.

General Information

Edit Proposal - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://snsapp1.sns.ornl.gov/pls/xprod/f?p=100:11:3910448804620322::NO::P11_PRPSL_ID:1498&cs=379C651964E7D8D6B013400184A7F54

Most Visited Getting Started Latest Headlines Hotmail NetZero E-mail Argonne National Lab...

Integrated Proposal Tracking System

Home Proposal Details Funding Research Areas Facilities Instruments Team Members Samples Scheduling Submit for Review

My Proposals > **Edit Proposal IPTS-1498**

Help

Edit Proposal Cancel Apply Changes

Proposal Number IPTS-1498

Status Saved for Further Editing by Applicant

Name Suzanne Te Velthuis

Email tevelthuis@anl.gov

Proposal Date 23-SEP-2008 15:23

User Institution US - Argonne National Laboratory Search

Proposal Title test

Proposal Type General User

Will the data collected be considered proprietary? ☐ Yes ☒ No

Will the data collected be considered classified? ☐ Yes ☒ No

Is this research required for a student's thesis? ☒ Yes ☐ No

Does this experiment involve exposure to, or use of, biological materials? Such as recombinant DNA, virus or components of a virus, a biological toxin, exposure or handling of risk group 1 or 2 microorganisms (dead or alive), select agents or toxins (dead or alive) or any other sort of biologically hazardous material, to either plants or animals. ☐ Yes ☒ No

Will human subjects or laboratory animals be used in this experiment, or does this operation involve exposure to, or handling of, human tissue or body fluids, human cells in culture or animal matter? ☐ Yes ☒ No

Will Hazardous substances, equipment, or procedure be brought to ORNL as part of this proposed experiment? If Yes, provide detailed safety procedures in proposal text. ☐ Yes ☒ No

Abstract

This is the abstract

20 of 4000

Download Template Attach Statement of Research (.pdf)

Please use the Template Provided to Prepare your Proposal.

Last Modified Date 23-SEP-2008 15:23

Done snsapp1.sns.ornl.gov

Proposal: General information

- Pick a good title. Specific and to the point is better than spectacular and vague.
 - Good: “XAS study of Fe valence in CaFe_2As_2 under pressure ”
 - Bad: “Understanding superconductivity in iron pnictides”

- Is it thesis related? Is there a deadline?
 - Will push your proposal up if scores are close

- Fill in the abstract. Do not just upload a PDF document!
 - More work for reviewer.

- Do upload a publication from previous work (mention previous proposal).
 - Shows you made good use of beam time.
 - Do not upload a 20 pages of supplemental information (figures often help, couple of plots with text OK)

Proposal: Experimenters page

General Experimenters Abstract Beamtime Request Questions Review Panel

Proposal : GUP-10325

Spoke person: [Find](#)

First Name : Last Name

Phone: Email Badge

Institution:

Mailing Address:

Experimenters Coming to APS:

Badge	First Name	Last Name	Affiliation	Phone	Email	Delete
Find	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Find	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Find	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Find	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Experimenters Not Coming to APS:

Badge	First Name	Last Name	Affiliation	Phone	Email	Delete
Find	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Find	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Find	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Find	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Previous Page Generate Report Next Page

Pressing SAVE will allow you to save this proposal and continue to make changes. Notifications will not be sent.

Pressing SUBMIT will save this proposal AND notifications will be sent to the APS. No changes can be made thereafter.

Proposal # : 10325

- Use the “find” feature
- List everyone involved in experiment

Experiment Description

General Experimenters Abstract Beamtime Request **Questions** Review Panel

Proposal : GUP-10325

Please specify the funding source(s) for your proposed research:

<input type="checkbox"/> DOD (specify)	<input type="checkbox"/> DOE, Office of Basic Energy Sciences	<input type="checkbox"/> DOE, Office of Biological and Environmental Research
<input type="checkbox"/> DOE, Other (specify)	<input type="checkbox"/> Foreign (specify)	<input type="checkbox"/> HHIH
<input type="checkbox"/> Howard Hughes Medical Institute (HHMI)	<input type="checkbox"/> Industry	<input type="checkbox"/> NASA
<input type="checkbox"/> NIH	<input type="checkbox"/> NSF	<input type="checkbox"/> Other U.S. Government
<input type="checkbox"/> USDA	<input type="checkbox"/> Other (specify)	Specify Other: <input type="text"/>

What is the scientific or technical purpose and importance of the proposed research? (limit : 500 words)

Why do you need the APS for this research? (limit : 100 words)

Why do you need the beamline you have chosen? (limit : 100 words)

Note guidance.
Don't write one
sentence or
1000 words.

Experimental Details

- Give background information why it is important.
 - Science at facilities is very diverse. Reviewer is not necessarily an expert on your subject.
 - @ APS each committee gets ~60 proposals each cycle (~700 total/cycle)
- Clearly state what you want to measure and how
 - Give details. Temperature range, X-ray Energy, Sample geometry
 - What sample characterization has been done already? (XRD, SEM, etc.)
 - Reviewer needs to judge if experiment is feasible
 - *Does x-ray energy match laser penetration depth*
 - *% of dilute atoms OK for fluorescence measurements*
- Why use x-rays or neutrons?
 - Neutron vs. X-rays
 - TEM, Mössbauer, Laser Raman, etc.
- Justify the amount of beam time requested (ask instrument scientist!)

Beamtime Request

General Experimenters Abstract **Beamtime Request** Questions Review Panel

Proposal : GUP-10325

Rapid Access Description Make New Request 3rd

Total 8-hour shifts requested for the LIFE OF THE PROPOSAL

Total 8-hour shifts recommended by the Proposal Review Panel for the LIFE OF THE PROPOSAL : not available

Total shifts used to date: 0

Number of the shifts remaining not available

For which scheduling period are you applying? Status :

Techniques Required:

Choice Of Beamline:

Please select the instrument based on your beamline selection: ☒ For 1st beamline ☐ For 2nd beamline ☐ For 3rd beamline

Any appropriate beamline ☒

Number of 8-hour shifts requested for THIS scheduling period

Minimum number of usable shifts per visit:

Do you have specific scheduling requirements ?

What equipment is required ?

What equipment will you bring ?

Please list any new publications resulting from your work at the APS.

Describe the progress made during your most recent beamtime. (2000 characters including spaces)

Unacceptable Dates (MM/DD/YYYY) From to

Previous Page Generate Report Next Page

Pressing SAVE will allow you to save this proposal and continue to make changes. Notifications will not be sent. Save

Pressing SUBMIT will save this proposal AND notifications will be sent to the APS. No changes can be made thereafter. Submit

Proposal #: 10325

- Proposals are valid for two years, but need to put in beam time request each cycle.
- Chose multiple beamlines.
 - SAXS (12-ID, 5-ID, 15-ID)
 - XAFS (20-BM, 10-ID, 12-BM)
 - General Diffraction
- Don't list only one week that you can come. Holidays?
- Special sample environment / detectors will place more constraints on schedule.
 - GE amorphous Si detector
 - Magnet
 -

Ratings for APS Proposals

Table 1. Definition of Ratings Used in Reviewing General User Proposals	
1 - Extraordinary	The proposal involves highly innovative research of great scientific importance. Proposed research will significantly advance knowledge in a specific field or scientific discipline. Considerable societal relevance is demonstrated. The radiation characteristics of the APS are highly desirable for the success of the proposed work.
2 - Excellent	The proposed research is of high quality and has potential for making an important contribution to a specific field or scientific discipline. The work is cutting edge and is likely to be published in a leading scientific journal. The radiation characteristics of the APS are important to the success of the proposed work.
3 - Good	The proposed research is near cutting-edge and likely to produce publishable results. Impact on a specific field or scientific discipline is likely. Synchrotron radiation is essential to accomplish the intended goals of the research. The proposed work will greatly benefit from access to the APS.
4 - Fair	The proposed research is interesting but may not significantly impact a specific field or scientific discipline. Publication may or may not result from this research. Synchrotron radiation is required, but the proposed work could be performed at other facilities.
5 - Poor	The proposed research is not well planned or is not feasible. Results would not make important contributions to fundamental or applied understanding, and work is not likely to result in publication. The need for synchrotron radiation is not clear.

APS proposals are rated on a scale from 1 to 5

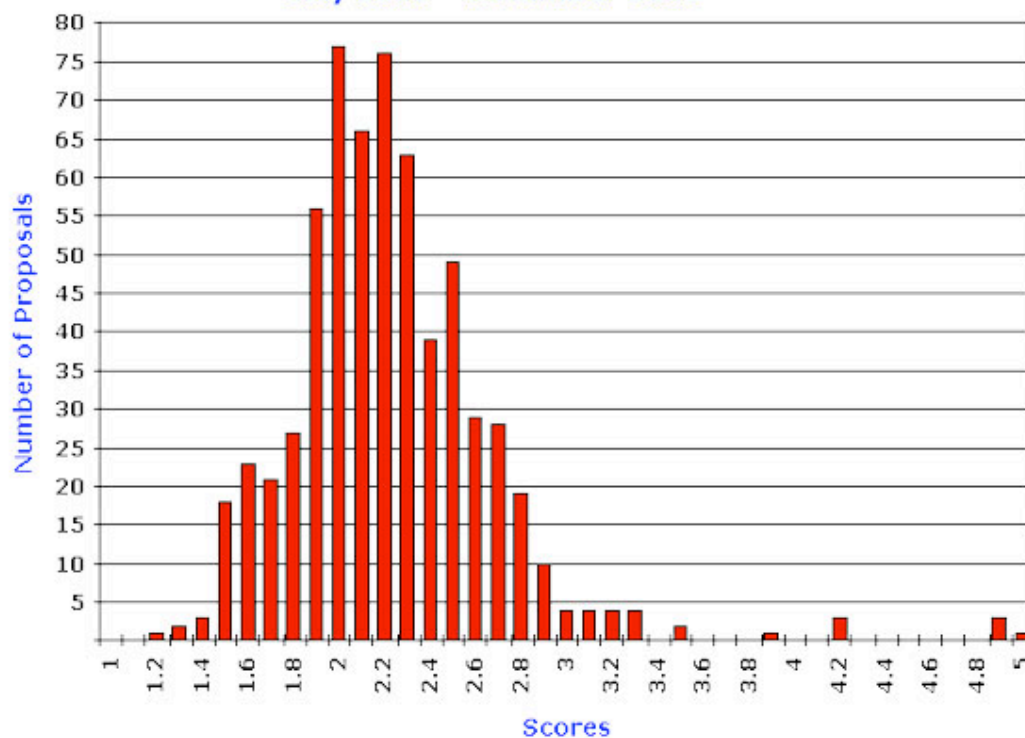
Average score is ~2.2

Cut off score for receiving beam time varies by beamline (1.5 - 2.2)

Proposal “**ageing**” (score improves by 0.2 each cycle it does not receive time). This is needed for getting time at some oversubscribed beamlines, so long-term planning is needed.

ALS provides cutoff scores – Helps you know what to expect

Distribution of Proposal Scores for General Science Proposals
All Beamlines
July 2010 - December 2010



Beamline	Cutoff Score	
1.4 (IR)	2.70	easier
4.0.2 (EPU)	1.90	
5.3.2 (Polymers XAFS)	2.32	
6.0.1 (Femtosecond)	--	
6.0.2 (Femtosecond)	2.22	
6.1.2 (Soft X-Ray Microscopy)	2.40	
6.3.1 (Materials Sciences)	--	
6.3.2 (Calibration and Standards)	3.90	easier
7.0.1 (XPS, STXM, SXF, SPEM)	2.03	
7.3.3 (SAXS)	2.14	
8.0.1 (SXF)	2.14	
8.3.2	2.50	
9.0.2 (Chemical Dynamics, Coherent Imaging)	2.32	
9.3.1 (XAMS)	--	
9.3.2 (APSD/AMC, High-Pressure XPS)	2.04	
10.0.1. (HERS/AMO)	2.23	
10.3.2 (Micro XAFS)	2.20	
11.0.1 (Magnetic Microscopy, Spectromicroscopy; PEEM3)	2.43	
11.0.2 (Molecular Environmental Sciences)	1.78	harder
11.3.1 (Small Molecule Crystallography)	2.58	
12.0 (ARPES)	2.12	
12.2.2 (High Pressure)	2.29	
12.3.2	2.53	
*Total allocation		

Tips

- Give a concise explanation of this specific proposal
 - Provide background on importance (i.e., “bigger picture”)
 - State clearly and exactly what you are going to measure and why.
 - *Reviewer want so assess likelihood of success.*
- Include relevant details to experiment but do not get too verbose
 - Reviewer needs to judge not only scientific importance, but also if the experiment is feasible and if you are asking for the right instrument.
- If you are a first time user, talk to the local contact/instrument scientist.
 - Find out about details of the instrument, typical measuring times...
 - Over-subscription rate? Can a less popular instrument do the same measurements?
 - Send them the proposal ahead of time and ask for advice.
Collaborate?
- If you have previous results from other experiments include them!
 - Home, other institution, previous experiment.
 - Sample characterization.
- Take advantage of proposal ageing. **Plan ahead!**

Several common pitfalls

- Proposer assumes committee is familiar with their specialty.
- Proposer writes large general proposal asking for multiple weeks of time. Better to write a shorter proposal with a well defined objective. Be realistic with beam time request.
- Proposal deadline (for next cycle) is before scheduled beam time this cycle.

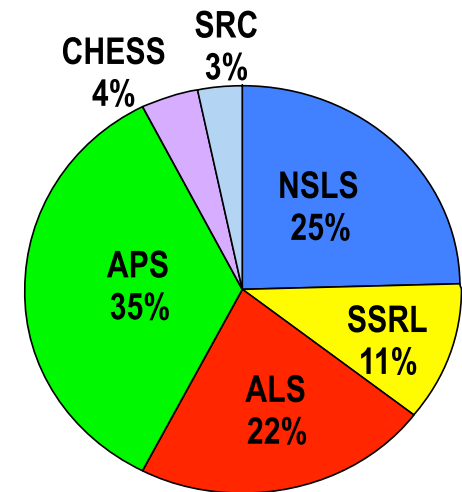
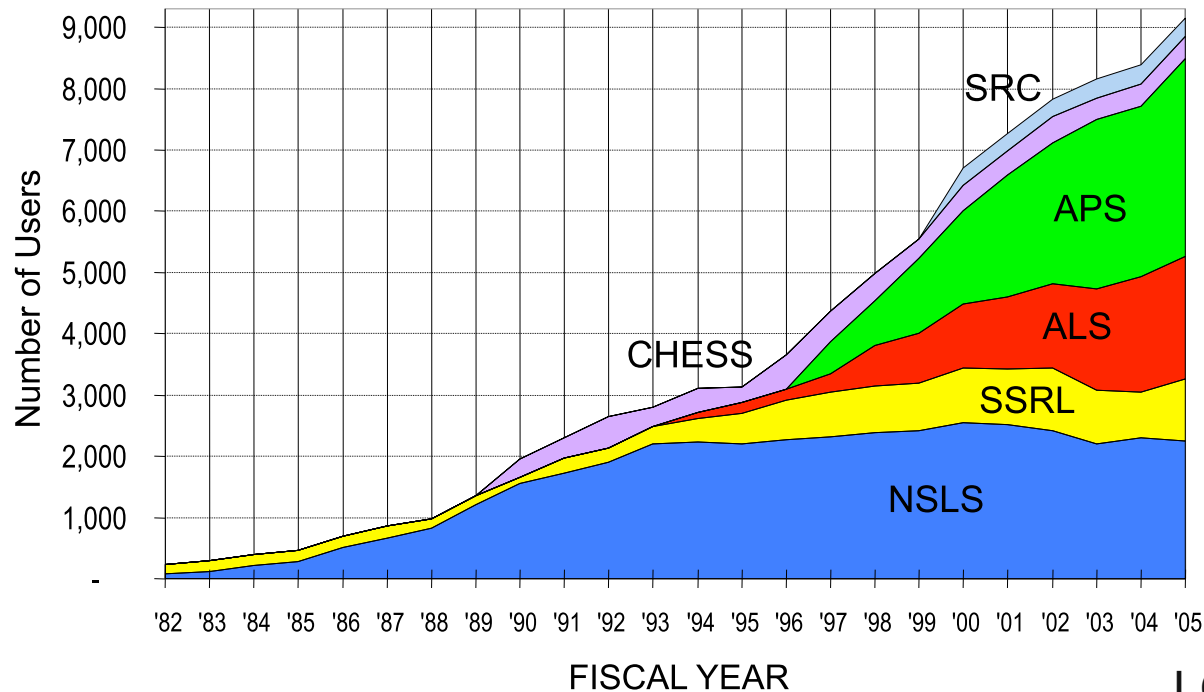
Common Reviewer comments:

- “Proposers could improve their score by including more experimental details, attaching previous results and expanding on the purpose and importance of the research.”
- “Hasn't the proposed research been published previously?”
- “We do not feel that granting 20 shifts/cycle for 2 years is consistent with the history of publication of this work.”
- “Proposer should perform initial characterization with lab sources or TEM.”

After submission

- Allow time for review and revisions
- Expect feedback several weeks from the call close
- Be ready to schedule experiment if approved
 - Identify participating team members
 - Respond to facility access approval information
 - Facilitate execution of user agreements
 - Complete required training
 - Confirm sample availability and description and laboratory needs
- Consider reviewer comments if not approved and plan to resubmit this proposal or a new proposal in the next call. Opportunities (# of facilities and beamlines/facility) continue to grow.

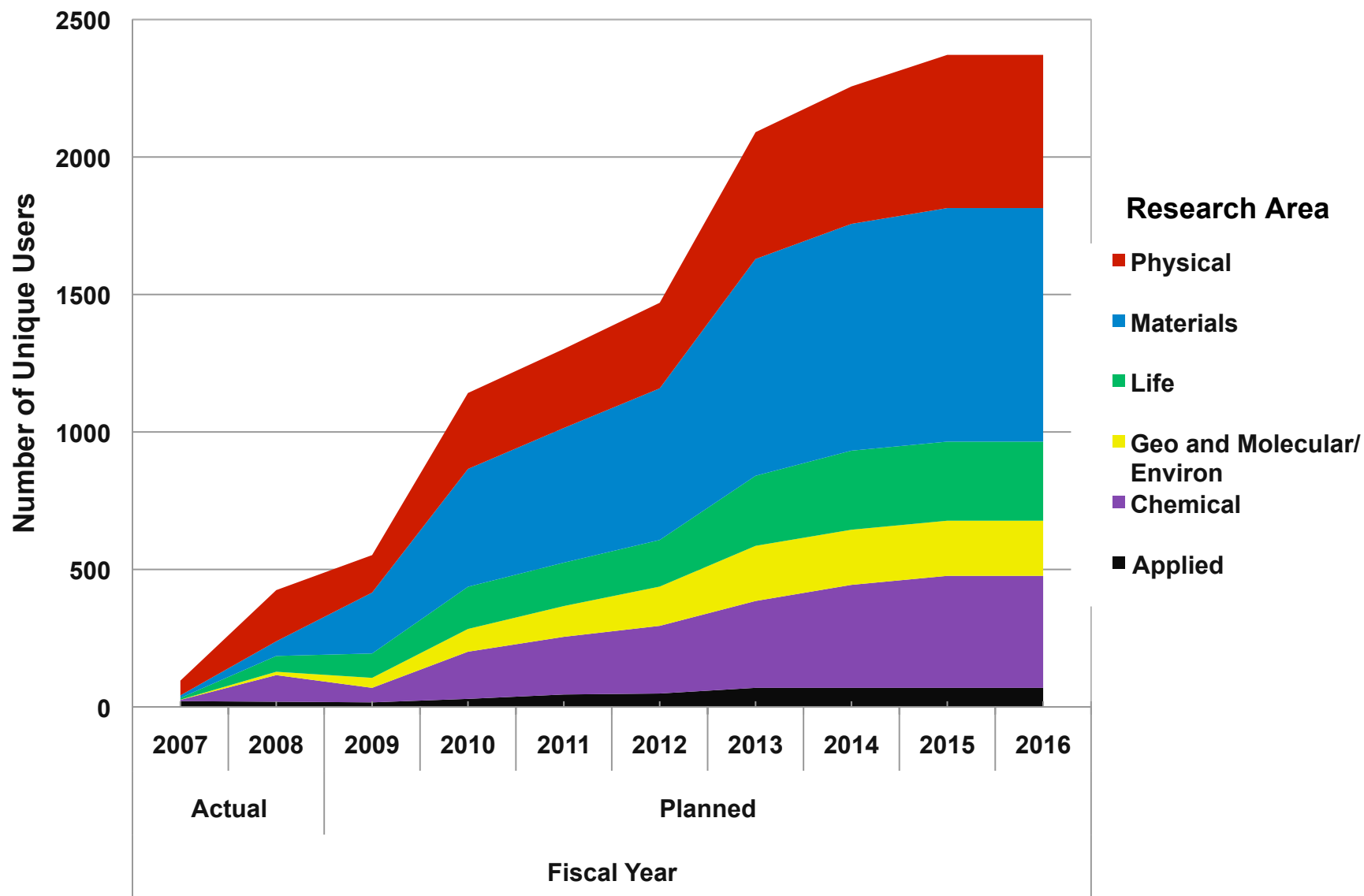
The 6 Federally Funded U.S. Light Sources Hosted 9,159 Users in FY 2005



LCLS operating
NSLS-II under construction.

The size and demographics of the user community have changed dramatically since the 1980s when only a few hundred intrepid users visited the synchrotron light sources each year. Here, “user” is a researcher who proposes and conducts peer-reviewed experiments at a scientific facility or conducts experiments at the facility remotely. A user does not include individuals who only send samples to be analyzed, pay to have services performed, or visit the facility for tours or educational purposes. Users also do not include researchers who collaborate on the proposal or subsequent research paper but do not conduct experiments at the facility. For annual totals, an individual is counted as 1 user at a particular facility no matter how often or how long the researcher conducts experiments at the facility during the year.

Neutron User Community and Research Opportunities Growing



Join SNS HFIR User Group (SHUG)

- Chartered 1998
- Open to individuals interested in using SNS and HFIR
- Provides input to management on user concerns
- Serves as a forum for keeping the user community informed
- Acts as an advocacy group for neutron scattering science



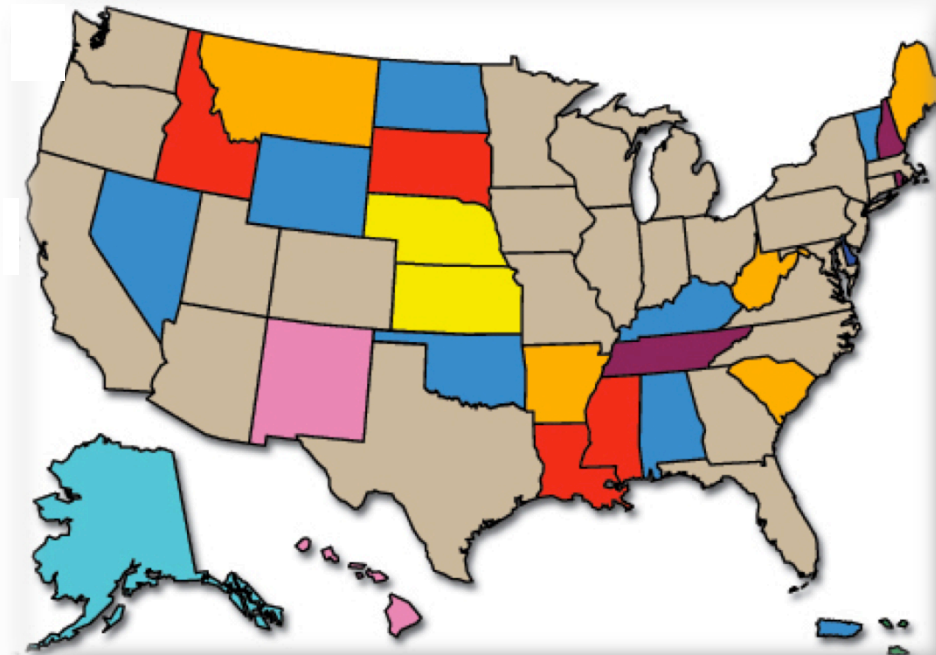
ORNL's Neutron Scattering Facilities HFIR and SNS

■ Numerous opportunities for collaboration

- Become a user
- Join SNS/HFIR User Group (SHUG)
- Have your friends and colleagues apply to the National School on Neutron and X-ray Scattering
- Attend workshops and conferences
- Seek EPSCoR grants
<http://www.nsf.gov/div/index.jsp?org=EPSC> and
<http://www.sc.doe.gov/BES/EPSCoR/about.html>
- Promote ORISE internships, fellowships, and research participation programs <http://orise.ornl.gov/sep/index.htm>
- Bring student groups to ORNL
- Invite ORNL scientists to your campus

Seek EPSCoR Grants

- EPSCoR State Institutions are eligible for grants to support research
 - <http://www.nsf.gov/div/index.jsp?org=EPSC>
 - <http://www.sc.doe.gov/BES/EPSCoR/about.html>
- Travel support for users from UT-ORNL Joint Institute for Neutron Sciences (JINS). Contact Takeshi Egami at egami@utk.edu



Scientific User Facilities – (mostly from Pat Dehmer presentation 2007)



BESAC evaluation February 2003
Report released late 2003

Available at
www.science.energy.gov/bes/archives/plans/FFS_10NOV03.pdf

- Under construction at the time of the evaluation
 - Spallation Neutron Source operating
 - 5 Nanoscale Science Research Centers operating
 - SSRL (SPEAR3) upgrade operating
- Facilities underway since the evaluation
 - Transmission Electron Aberration Corrected Microscope operating
 - Linac Coherent Light Source ~ operating
 - National Synchrotron Light Source - II construction
- Facilities rated longer-term priority at the time of the evaluation
 - Spallation Neutron Source power upgrade (CD-0 signed)

 - Spallation Neutron Source 2nd target station
 - Advanced Light Source upgrade
 - Advanced Photon Source upgrade CD-0 signed
- What's next in our planning?
 - Future Science Needs and Opportunities for Electron Scattering: Next-Generation Instrumentation and Beyond , March 1-2, 2007
 - BESAC Future Science Needs and Opportunities for Light Sources, 2007

Impact of large Scientific User Facilities has grown significantly in the past ~25 yrs. They now represent more than 50% of BES budget and growth will likely continue. They enable powerful new techniques, but researchers (you) have to do the science.