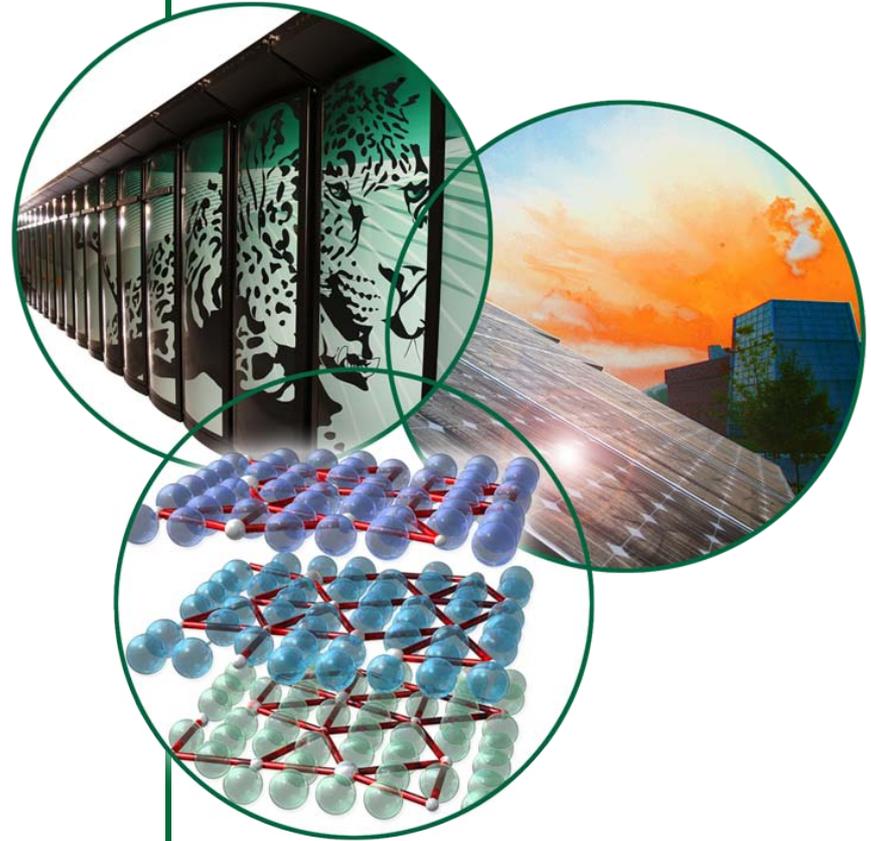


# SNS & HFIR User Group

Dean Myles et al. (Lou)  
Neutron Scattering Sciences Division

ACNS, June, 2010



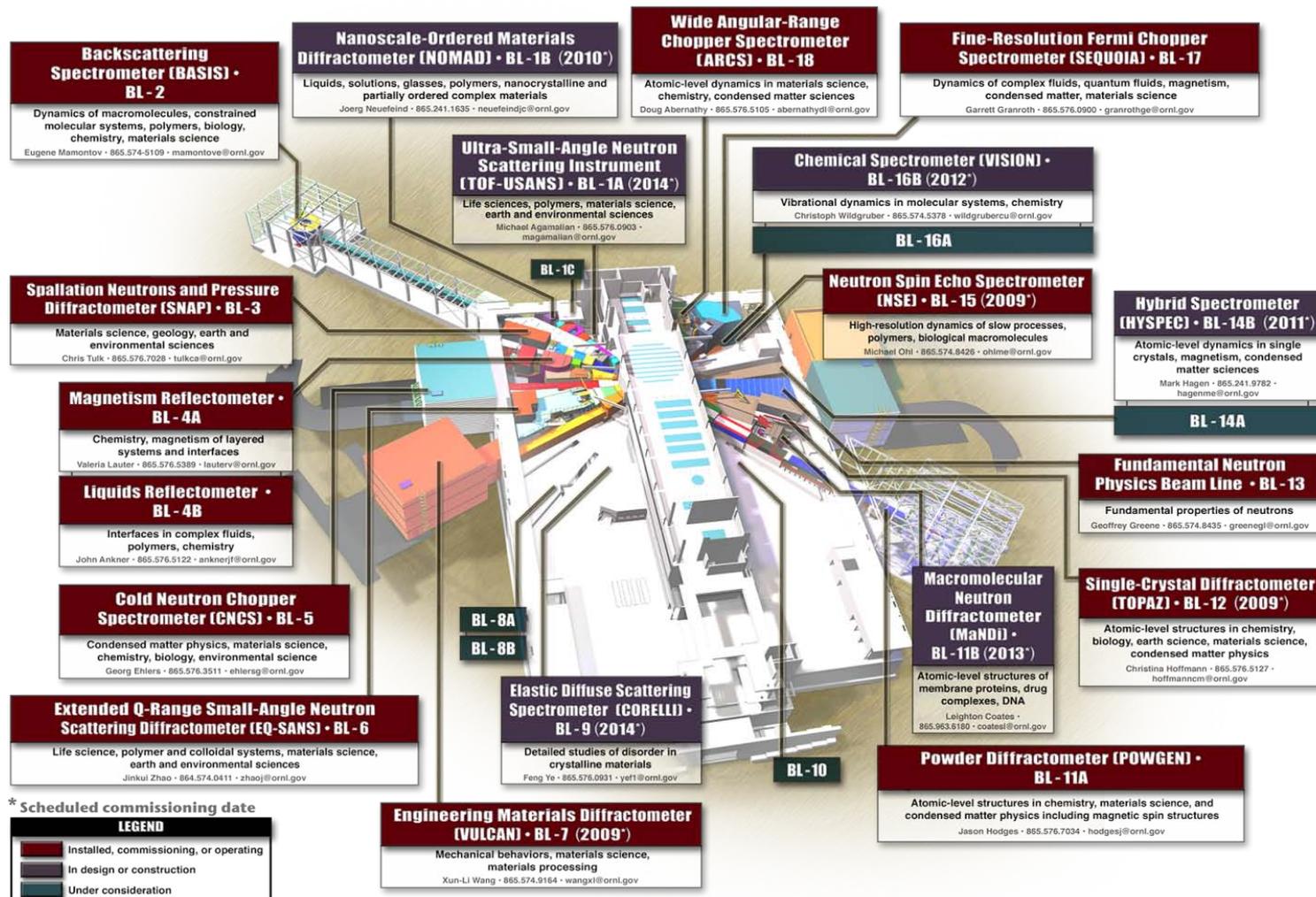
# A world leading science center and user facility for neutron scattering research

- Carry out world class research
- Provide an outstanding User Science Program
- Develop cross cutting signature science programs and partnerships
- Stay at the leading edge of neutron science by developing new capabilities, instruments, and tools



# SNS instruments

13 operating (6 in user program, 7 in commissioning) plus 6 in construction

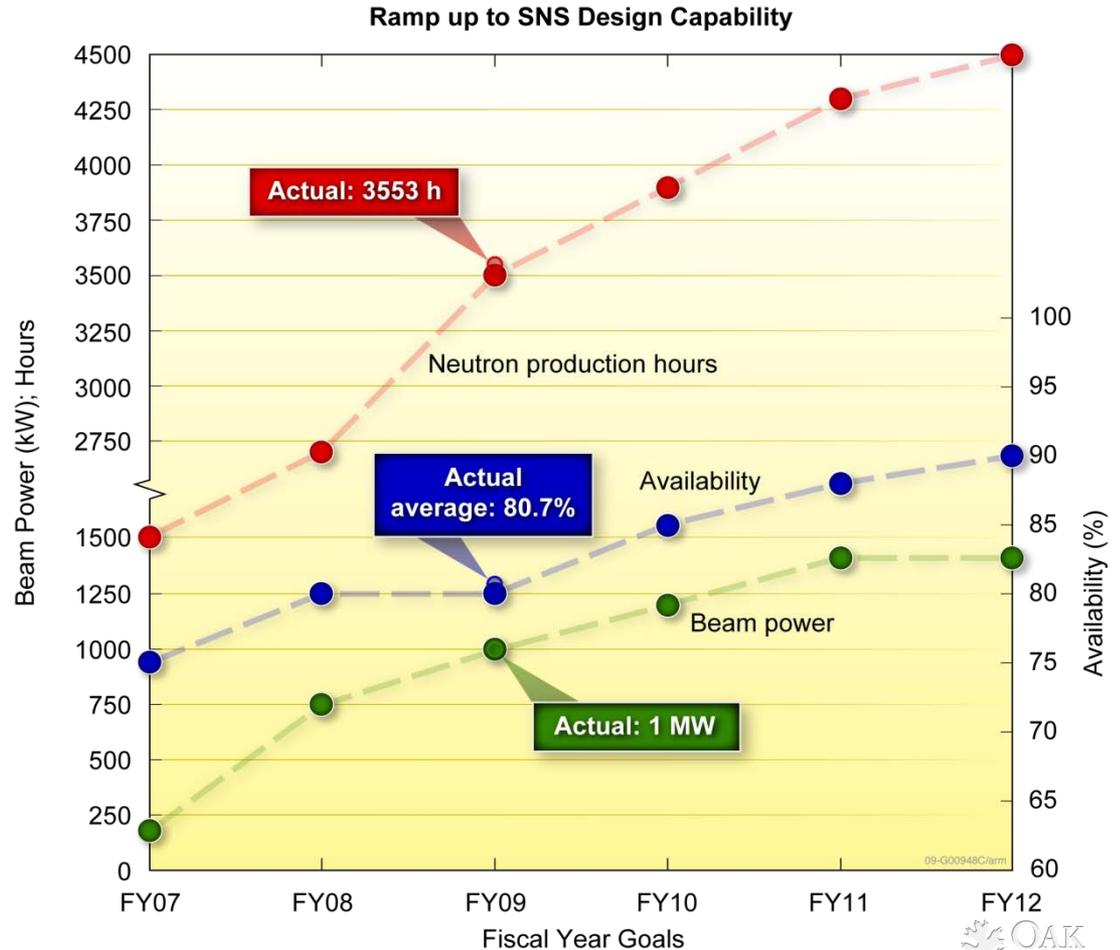


06-G00400M/arm

# SNS Operations: beam power will reach 1.2 MW by 2010 and 1.4 MW by 2011

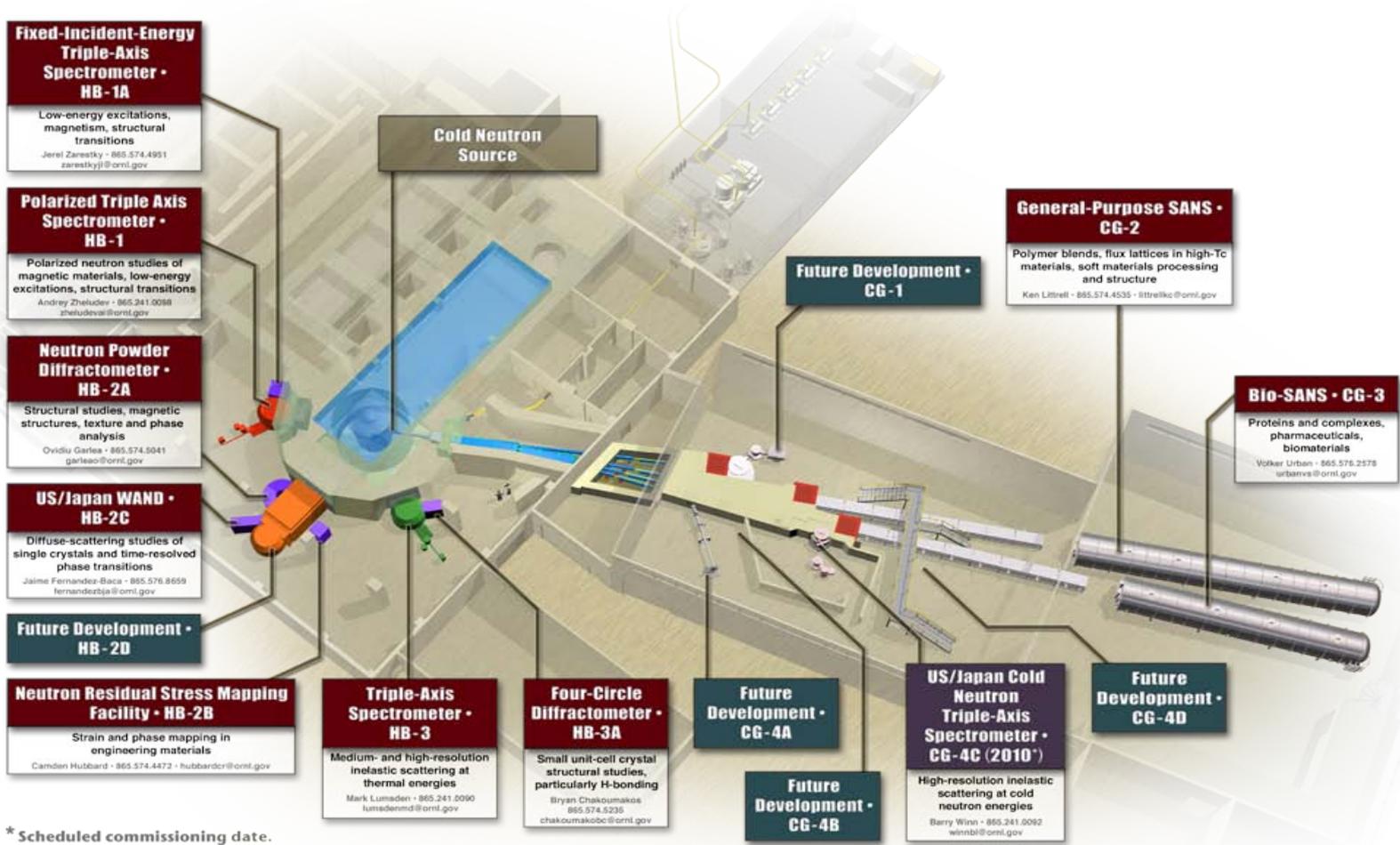
## SNS Operating Statistics (FY 2009)

- Neutron production hours: 3553
- Average availability 80.7%; availability as high as 98%
- Beam power on target: 1 MW
- Proton bunch intensity:  $1.55 \times 10^{14}$  protons per pulse



# HFIR instruments

9 operating, plus 2 in construction and 1 in development

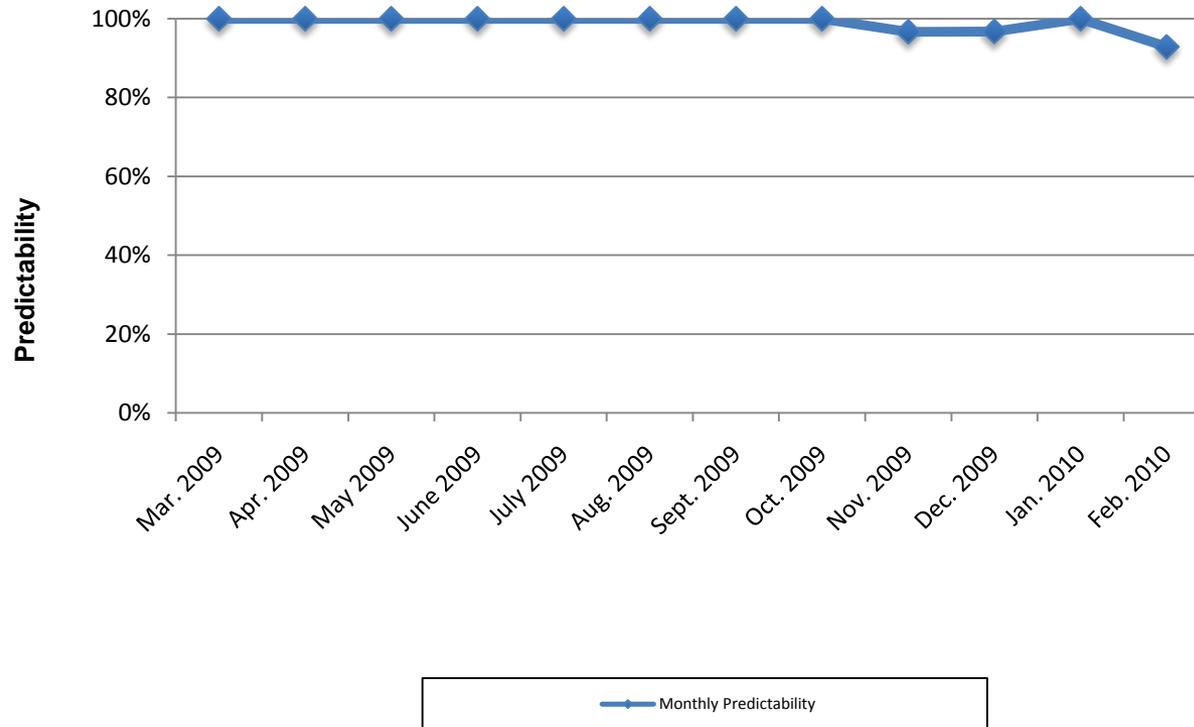


\* Scheduled commissioning date.

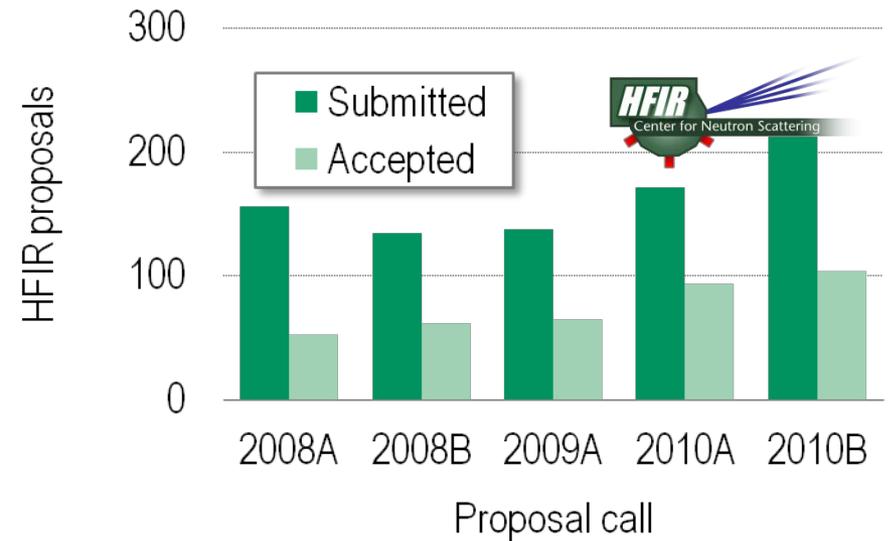
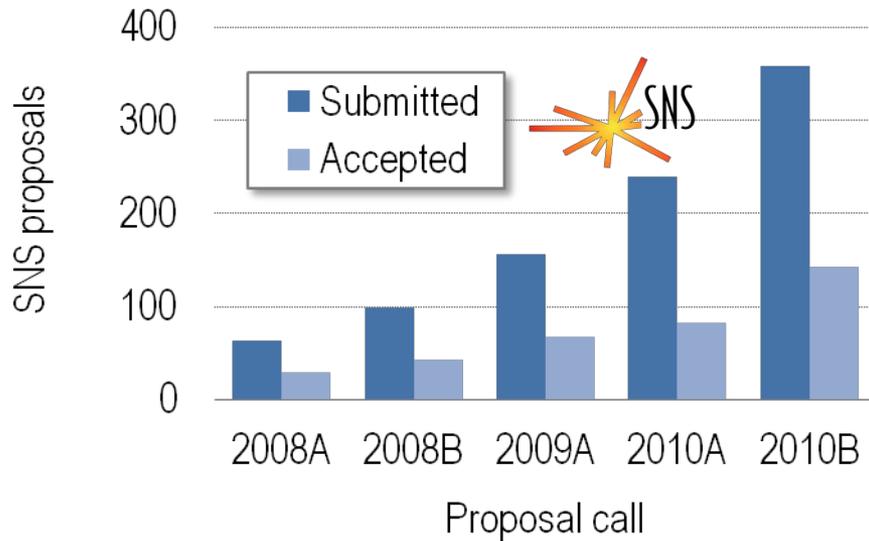
LEGEND	
<span style="display:inline-block; width:15px; height:15px; background-color:red; border:1px solid black;"></span>	Installed, commissioning, or operating
<span style="display:inline-block; width:15px; height:15px; background-color:purple; border:1px solid black;"></span>	In design or construction
<span style="display:inline-block; width:15px; height:15px; background-color:blue; border:1px solid black;"></span>	Under consideration

# HFIR Operations:

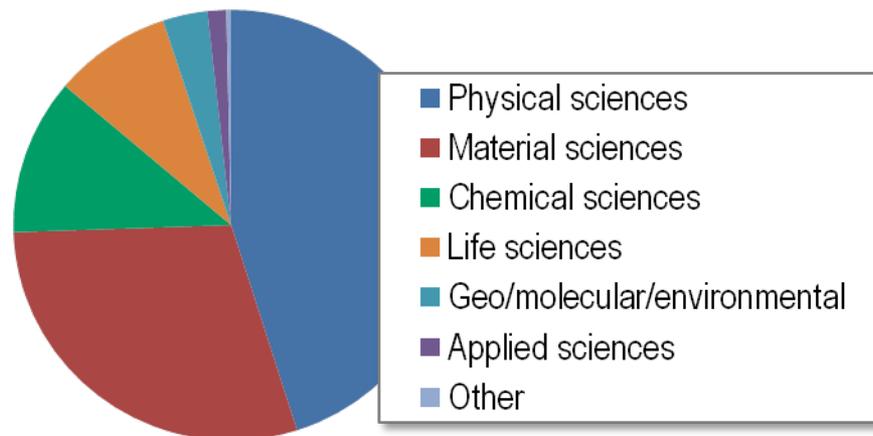
EOC 426 Refueling outage ended in February with cycle 427 starting on February 19th at 0915 on fuel elements 427-I and 426-O. Cycle 427 continued into March accumulating 815.21 MWd in February.



# The user community is growing with the buildup of instruments



Distribution of proposals for 2010B by scientific area



# NSSD staffing: >65 new positions opened

- *Building a strong ORNL team, balanced across beam line, user program and science needs*
- ORNL jobs: <http://jobs.ornl.gov/>
  - Powder diffraction group leader
  - SANS instrument scientist
  - Senior Scientist: energy materials, environmental geosciences, nano-structured materials, and biological systems
  - Scientific computing scientist for SANS and reflectometry
- ORAU positions: <http://www.ornl.gov/orise/edu/ornl/default.htm>
  - Entry-level (5 year) trial instrument scientist positions
  - Postdoctoral fellowships
  - Post-masters instrument associates

# Excellence in Science

## Building critical mass and experience

Science Theme	Focus areas
Condensed Matter Sciences	<ul style="list-style-type: none"> <li>• Correlated electrons</li> <li>• Magnetism</li> <li>• Superconductivity</li> <li>• Phase transitions</li> </ul>
Biological and Biomedical Sciences	<ul style="list-style-type: none"> <li>• Bio-energy and bio-fuels</li> <li>• Bioremediation</li> <li>• Human health</li> <li>• Pharmaceuticals</li> </ul>
Materials Science and Engineering	<ul style="list-style-type: none"> <li>• Advanced ceramics</li> <li>• Super alloys</li> <li>• Composites and nanomaterials</li> <li>• Engineering systems</li> </ul>
Soft Matter Science	<ul style="list-style-type: none"> <li>• Nano-structured materials</li> <li>• Surfactants/colloids/micelles</li> <li>• Biomimetic materials</li> </ul>
Materials Chemistry	<ul style="list-style-type: none"> <li>• Energy materials and storage</li> <li>• Smart materials</li> <li>• Crystal engineering</li> </ul>
Environmental Geosciences	<ul style="list-style-type: none"> <li>• Geosciences</li> <li>• Liquid and amorphous</li> <li>• Materials under extreme environments</li> </ul>



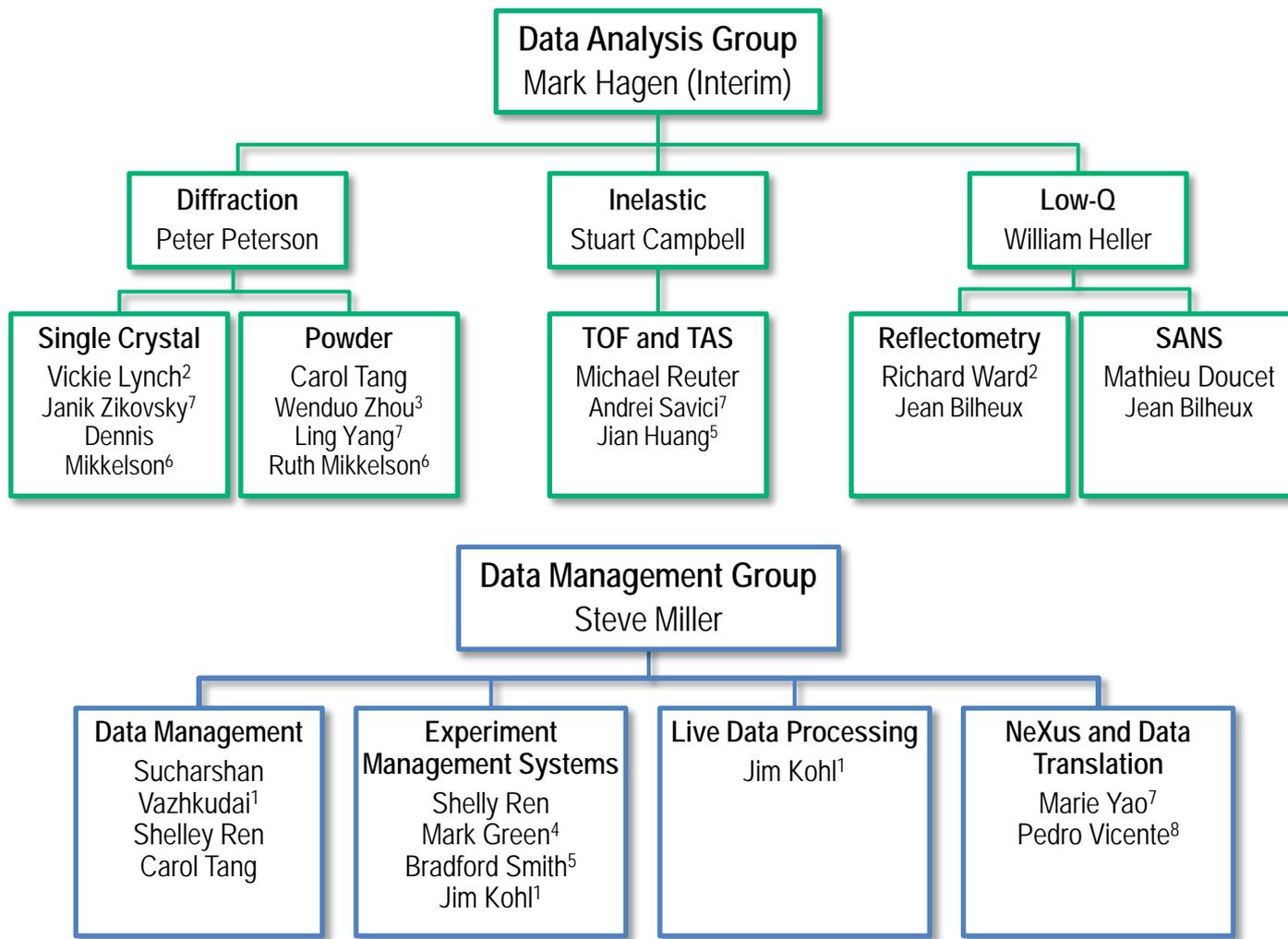
# Delivering excellence in science and operations

## Key enablers

Instrument Software	<ul style="list-style-type: none"><li>• Focused on science structure</li></ul>
Sample Environment	<ul style="list-style-type: none"><li>• Science support and innovation</li></ul>
Instrument Support Groups	<ul style="list-style-type: none"><li>• User surveys consistently rank staff support highly</li></ul>
Science Support Laboratories	<ul style="list-style-type: none"><li>• X-ray characterization suite (with CNMS)</li><li>• Sample synthesis and characterization</li></ul>
Instrument Core User Groups	<ul style="list-style-type: none"><li>• Continual evaluation of operating instrument effectiveness</li><li>• Core user engagement in commissioning new instruments – Extended Commissioning Plan (ECP)</li></ul>
Sabbatical and Visitor Program	<ul style="list-style-type: none"><li>• Faculty sabbaticals and secondments</li><li>• Internships for Students and Post-Docs</li><li>• EPSCoR Travel grants for faculty and students</li></ul>



# Instrument software Focused on science structure



<sup>1</sup> ORNL Computer Science and Mathematics

<sup>2</sup> ORNL Computational Sciences and Engineering

<sup>3</sup> NSSD Data Acquisition and Controls Group

<sup>4</sup> Tech-X Corporation

<sup>5</sup> University of Tennessee, Knoxville

<sup>6</sup> University of Wisconsin, Stout

<sup>7</sup> ORISE

<sup>8</sup> Space Research Inc.

# Instrument software: Focused on science

## Generation 1: Today

- Stabilize the current software situation
- Provide operating instruments with efficient data reduction software
- Ensure that upcoming instruments have reliable reduction software

## Generation II: Next 2 years

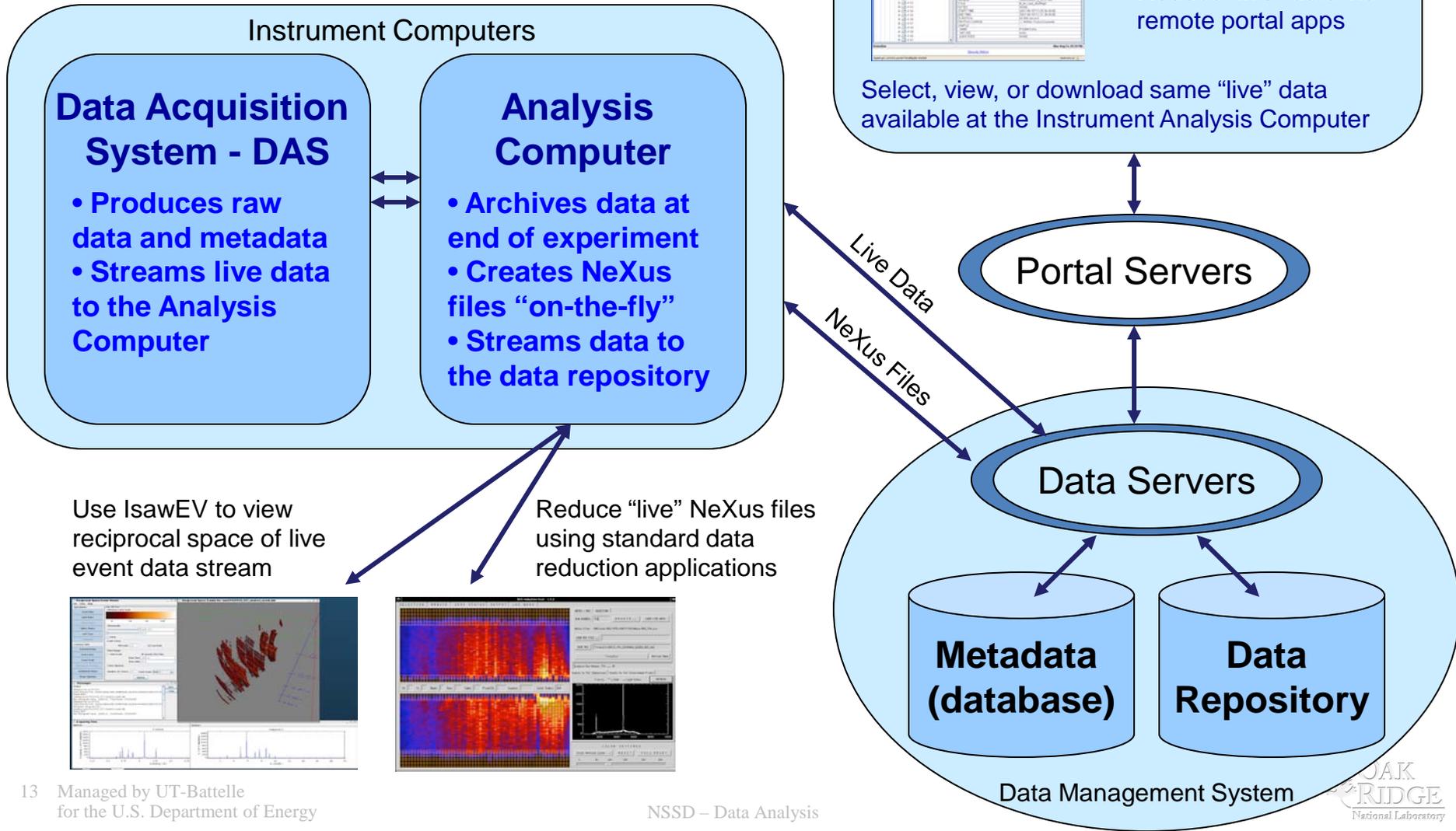
- Create a single high-performance data reduction workbench for all instruments that works at SNS/HFIR and can be distributed to users
- Incorporate Powder and SANS software from DANSE
- Build in automated reduction and parametric/real-time features

## Generation III: Long-term outlook

- Advanced analysis methods utilizing modeling, simulation, DFT, etc.

# Live Data at SNS

View and process near-real-time data on the Analysis Computers and via the Neutron Science Portal



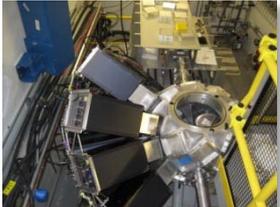
# User Support Laboratories:

User survey: 913 surveys - 170 detailed responses.

- HFIR Cold Guide Hall (Operational)
- SNS Experiment Hall (Operational)
- SNS Central Labs and Offices (will operate in July)
  - Deuterium labeling laboratories with CSMB and CNMS
  - Joint X-ray Characterization Laboratory with CNMS
  - Magnetic Materials Characterization Laboratory with CNMS

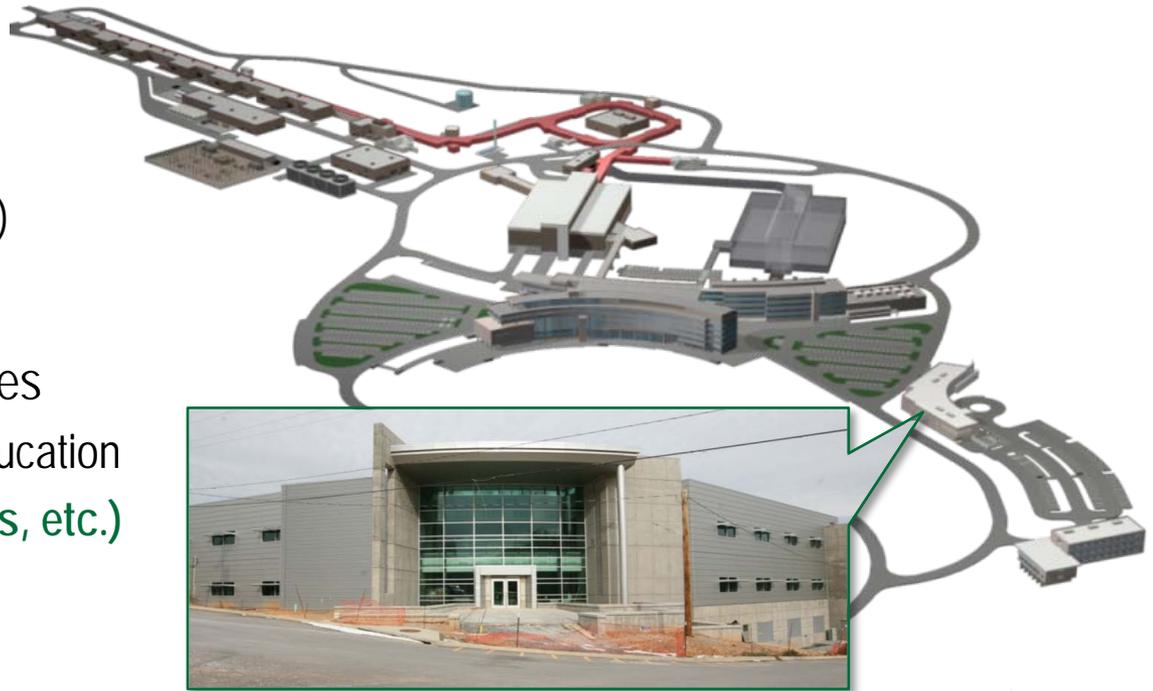


# New instruments – ready for science

	Instrument	CD4 date	ECP end date	Core user (affiliation)
	<b>SEQUOIA (BL 17)</b>	September 2008	IRR for users complete science review TBD	<ul style="list-style-type: none"> <li>• Bruce Gaulin (McMaster University)</li> </ul>
	<b>POWGEN (BL11a)</b>	December 2008	September 2010	<ul style="list-style-type: none"> <li>• Mike Crawford (DuPont)</li> <li>• Angus Wilkinson (Georgia Tech)</li> <li>• Peter Khalifah (Stony Brook University)</li> <li>• Andrew Payzant (ORNL, CNMS)</li> </ul>
	<b>EQ-SANS (BL 6)</b>	December 2008	October 2010	<ul style="list-style-type: none"> <li>• Sow-Hsin Chen (MIT)</li> <li>• Greg Beaucage (University of Cincinnati)</li> <li>• Sheng Dai (ORNL, CNMS)</li> <li>• Besim Ogretman (University of South Carolina)</li> </ul>
	<b>VULCAN (BL 7)</b>	June 2009	December 2010	<ul style="list-style-type: none"> <li>• Tom Holden (Northern Stress Technologies)</li> <li>• Bjorn Clausen (LANL)</li> <li>• Sven Vogel (LANL)</li> <li>• Zhili Feng (ORNL)</li> </ul>
	<b>TOPAZ (BL 12)</b>	August 2009	September 2010	<ul style="list-style-type: none"> <li>• Art Schultz (former IPNS SCD Inst. scientist)</li> <li>• Gary McIntyre (ILL)</li> <li>• Bo Iverson (Aarhus University)</li> <li>• Joe Ng (University of Alabama–Huntsville)</li> </ul>

# Building a vibrant science community and constituency

- SHUG and Instrument Core User Groups:
  - Invested in facility, staff and science
  - Drive leading-edge science – challenge capabilities
  - Demand continual improvement and enhanced capabilities
- Science Review Committees:
  - Spring/Fall, 100 experts on site
- Sabbatical and Visitor Program
  - Science symposia (with Science centers and JINS)
  - Fellowships/sabbaticals
- Joint Institute for Neutron Sciences
  - Partnership for Science and Education
  - **Strategic partnerships (EFRCs, etc.)**
  - Workshops and schools



# Visitor & Collaborative Research Program

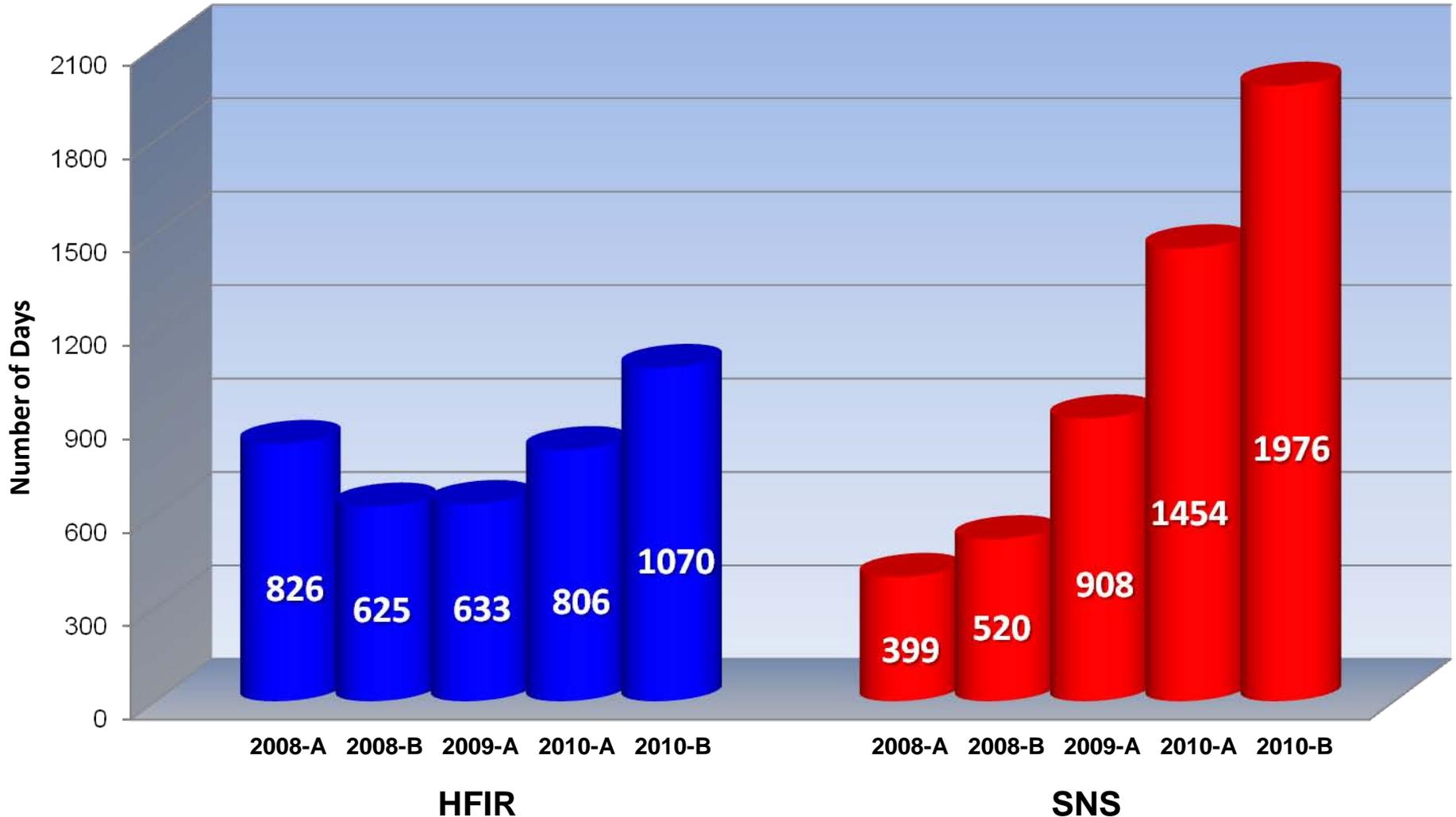
- Sabbatical program
  - Short stay: summer salary -> 12 months
  - Secondments: 1- 5 years
- Collaborative research program
  - (a) Faculty summer sabbaticals up to \$40,000
  - (b) Postdoctoral researchers up to \$30,000 per year
  - (c) Graduate students up to \$20,000 dollars per year
- Instructions at <http://neutrons.ornl.gov/crv/application.shtml>

# EPSCoR travel grants

- To carry out experiments at the Spallation Neutron Source and the High Flux Isotope Reactor at Oak Ridge National Laboratory
- For travels to discuss experiments before and after the measurements
- Available through The University of Tennessee for a limited number of faculty and students from EPSCoR institutions
- Contact Hope Moore-Webb, [hmoore2@utk.edu](mailto:hmoore2@utk.edu), 865-974-1407 for details
- EPSCoR funding provided by the U.S. Department of Energy, Office of Basic Energy Sciences

# Questions ?

# General User Proposal Days Requested by Proposal Call



# Subscription Rates by Proposal Call

