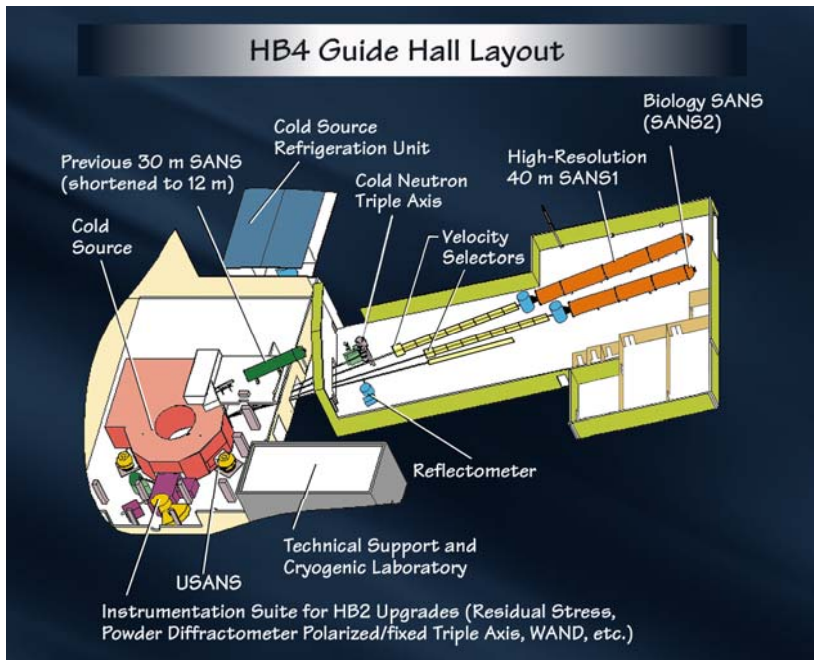


SUPPORT FACILITIES NEEDS FOR SOFT MATTER

Infrastructure: Needs & Requirements

HFIR

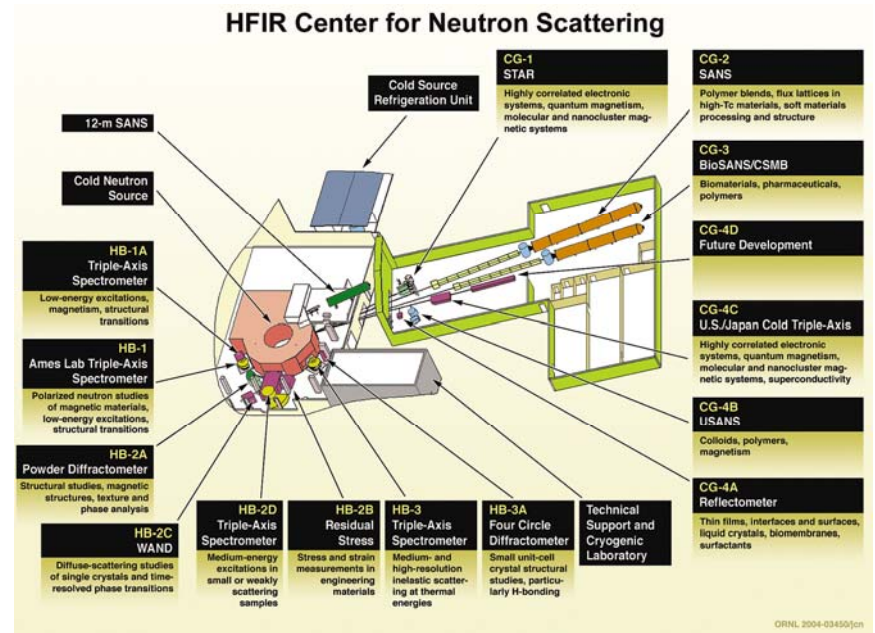


SNS



CSMB - Biological SANS at HFIR

- Bio-SANS station designed specifically for biology
 - Designed with community
 - Low background/high flux
 - Additional Shielding
 - Resolution $d\lambda/\lambda \sim 20\%$ (8-45%)
 - User friendly operation



- User Program, Infrastructure & Support
 - Laboratory for bio-sample preparation
 - DLAB - H/D-labeling, isolation & characterization
 - Computational tools for structural biology
 - **New SAXS and Light Scattering**



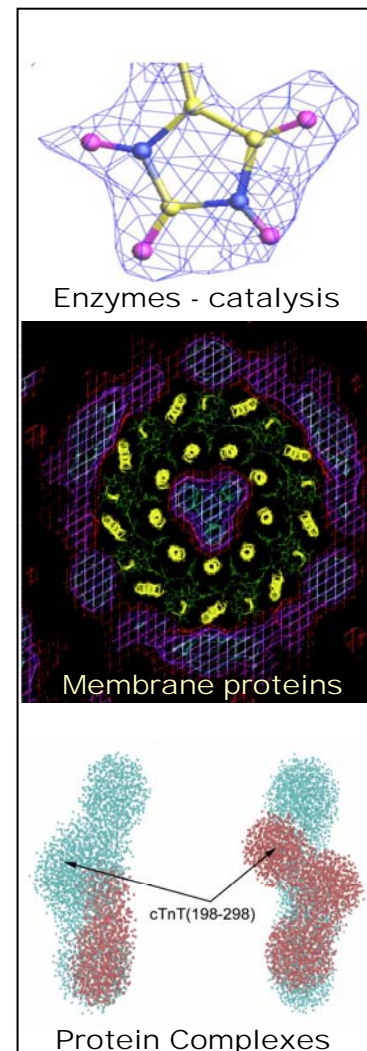
A world class facility for the US user community.

Deuteration Laboratory

Central facility and user program for *in vivo* H-D labeling of macromolecules
FY05 LDRD with Dale Pelletier (*Life Science Division*)

- **Develop a Central Deuteration Laboratory** dedicated to specific H/D labeling of cells, proteins, nucleic acids and other bio-molecules.
- **Develop better and faster systems and methods** to produce deuterium labeled biological macromolecules for the biology community
- **Improving downstream technologies** to exploit these reagents (including data collection and interpretation for neutron scattering)
- **Train research students and staff** in application of these powerful techniques

2005 - ORAU Visiting Scholar Program



Community Needs – Community Support

- Neutron Scattering for Chemistry and the Chemistry/Biology Interface
- Sample Environments for Neutron Scattering Experiments

http://www.sns.gov/jins/tallahassee_workshops_2003/workshops.htm

September 23-25, 2003, Florida State University, Tallahassee, Florida

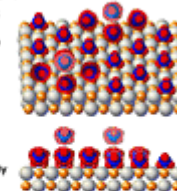


Neutron Scattering for Chemistry and the Chemistry/Biology Interface

Joint Institute for Neutron Sciences Workshop Series

This workshop focuses on scientific grand challenges and the role neutrons can play in chemistry and of the chemistry-biology interface. Graduate students, postdocs and researchers who are new to neutron scattering are especially encouraged to participate. Attendees will learn about applications of neutron scattering and spectroscopy to structure and dynamics in:

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This workshop is held in conjunction with the SENSE Workshop, Sample Environments for Neutron Scattering Experiments, on September 24-26. Together, the workshops will:

- Inform the chemistry and chem-bio communities of opportunities—instrumentation and supporting facilities—currently planned for the Spallation Neutron Source (SNS)
- Solicit the community's ideas on the needs for instrumentation, detector development, and sample environment development to support neutron scattering experiments
- Identify the tools needed and outline a path to realization via the formation of concept teams to develop science cases and funding proposals for instrumentation, detectors, sample environment and related laboratory facilities
- Tour of the National High Magnetic Field Laboratory
- Poster session to share research ideas



Confirmed Speakers

Sherrill Baker, *Rovens Mudd College*
David Butler, *Indiana University*
Lutz Dammann, *Los Alamos*
Joanna Knapik, *U. North Carolina, Charlotte*
Nancy Kroll, *U. California, Davis*
John Lennie, *U. Tennessee and Oak Ridge*
David Miles, *Oak Ridge*
Demetri D'Avino, *Chicago*
John Birt, *Clark River, Canada*
Doug Johnson, *U. California, Irvine*
John Tompkinson, *ISIS, UK*
Hans-Thomas Lee, *Wisc.*
Joe Derwigler, *Indiana University*

Program Committee

Sherrill Baker, *Rovens Mudd College, Co-chair*
John Lennie, *University of Tennessee, Co-chair*
Paul Butler, *Oak Ridge National Laboratory*
W. Ross Kinghorn, *Florida State University*
Bernie Gewirth, *Texas A&M University*
Markus Dornheim, *Bulgarian University*
Johannes Loh, *Argonne National Laboratory*
Lee Migdal, *University of Tennessee and Joint Institute for Neutron Sciences*
James Mueller, *North Carolina State University*
David Miles, *Oak Ridge National Laboratory*
Doug Mills, *University of California at Irvine*
John Turner, *University of Tennessee*

Contacts

Technical: Lee Migdal, 850-714-4238
Local: Janet Patten, 850-444-9411

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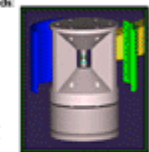
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Sample Environments for Neutron Scattering Experiments

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Confirmed Speakers

Joe Bevilacqua, *ISIS, UK*
John Kulkarni, *Clark River, Canada*
Ben Lorenz, *Oak Ridge*
Michael Mamer, *Wisc., Germany*
Pete Pashley, *Harvard*
Ivan Schuster, *University of California, San Diego*
John Turner, *University of Tennessee*
Steven White, *University of California, Irvine*
Special Discussion Panel:
High-Field Infrared Research Group
Infrared Pulsed Neutron Source
Ray Yellin
Los Alamos Neutron Science Center
Joint Institute for Neutron Sciences
National Institute of Standards and Technology
Jeff Lynn
Spallation Neutron Source
Team Meese

Program Committee

Jack Cox, *Co-chair, National High Magnetic Field Laboratory, Florida State University*
Paul Butler, *Co-chair, Pennsylvania State University*
Chris Beavers, *Argonne National Laboratory*
Peter Linn, *University of Tennessee*
Markus Dornheim, *Johns Hopkins University*
John Pates, *BNFL, UK*
Thomas Poppo, *Los Alamos National Laboratory*
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Ivan Schuster, *University of California at San Diego*
Barbara Wysocki, *Warsawer Polytechnic*

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Materials Science and SNS
Oak Ridge Associated Universities

Registration fee: \$200, scholarships for students and faculty, register at http://www.sns.gov/jins/tallahassee_workshops_2003/workshops.htm

NSF CHEMBIO Sept. 25, 2003

Paul Butler & Joanna Krueger

- 1) X-ray scattering/reflectivity instrumentation on site at the neutron facility is essential
 - A) Reflectometer geometry (theta-theta diffractometer, Goebel mirrors and a scintillation detector)
 - B) Small-angle x-ray scattering
- 2) Significant laboratory space on the floor in close proximity to the instrument is critical
 - A) A full chemistry & soft matter laboratory in CLO
 - B) substantial amount of floor space be available around the sample area

Sense: Biological and Life Sciences

David Worcester, Jim Torbet

Outline of Needs and Recommendations

- Deuteration (Essential)
- Relative Humidity (accurate measure, homogeneous)
- Sample changer 10-20 positions, horizontal.
- Hydrostatic Pressure. ~5kbar. Al or Ti,Zr AND sapphire
- Magnetic Field for orientation. ~10T (cryogen free?)
- Hydrodynamic shear for orientations and Rheology
- Pulsed Electric Fields for Rotational Diffusion
- Software Control (as part of data acquisition)
- Ventilation for organics in Reflectometry
- Langmuir Trough

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NSFChemBio

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