

# SMALL-ANGLE SCATTERING SHORT COURSE 2010

## “BEYOND $R_G$ ”

MARCH 27-31, 2010

ADVANCED PHOTON SOURCE, ARGONNE NATIONAL LABORATORY

<http://small-angle.aps.anl.gov>

This course will provide a better understanding of small-angle scattering (SAXS) theory and the techniques used at the Advanced Photon Source (APS) at Argonne National Laboratory, together with hands-on experience.

Participants are expected to be at the post-doctoral or higher level, with their own defined experimental programs and samples to use during the course.

Highlights include:

- Overview of SAXS theory, capabilities, and use
- Description of various data reduction and analysis tools
- Hands-on experience with data collection on participants' own samples
- Supervised data reduction and analysis
- Instruction on creation of effective proposals to obtain APS general-user beam time

The course will begin with an optional two days of data collection at APS beamlines, followed by three days of morning lectures and afternoon data reduction and analysis. During both data collection and analysis, lecturers will be available for one-on-one discussions.

A CD (Windows systems) with several types of data reduction and analysis software will be provided to each student for use during and after the workshop.

Participants should bring their own notebook computers.

SEE OTHER SIDE FOR  
COURSE INFORMATION

Registration fee: \$0 (free)

Number of participants is limited to 25.

If needed, organizers reserve the right to select participants.

Registration details: <http://small-angle.aps.anl.gov>

Registration opens: November 1, 2009

Registration deadline: December 20, 2009

Information about acceptance of registration will be sent to participants before January 15, 2010

Participants will be responsible for their own transportation, accommodations, and meal costs.

A limited number of rooms has been set aside at the Argonne Guest House

*Guest House Web site:* <http://www.anlgh.org/>

*Guest House phone:* 800.632.8990 or 630.739.6000

*Guest House fax:* 630.739.1000

*Guest House email:* [argonne-guest-house@anl.gov](mailto:argonne-guest-house@anl.gov)

Participants are responsible for making their own reservations.

**FOR ANSWERS TO QUESTIONS OR FOR MORE INFORMATION CONTACT**

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## COURSE SCHEDULE

March 27-28: Experiments (optional)

March 29-31: Lectures, data reduction, and modeling

## SYLLABUS

- Small-Angle Scattering Fundamentals
- Sample Preparation and Experiments
- Overview of Available Instrumentation and Techniques
- Data Reduction Tools
- Data Analysis Tools
- Scientific Lectures on SAS in Materials Science, Chemistry, Biology, and Polymer Science
- Strategies to Write Successful Beam-Time Proposals

## SPEAKERS

Dale Schaefer (University of Cincinnati)

David Tiede (Argonne)

Randall E. Winans (Argonne)

Byeongdu Lee (Argonne)

Jan Ilavsky (Argonne)

Peter R. Jemian (Argonne)

## PARTICIPATING BEAMLINES

Bonse-Hart Ultra-SAXS: 32-ID (XOR, <http://usaxs.xor.aps.anl.gov>)

Pinhole SAXS: 5-ID (DND-CAT, <http://www.dnd.aps.anl.gov/>)

12-ID (XOR/BESSRC, <http://cep.xor.aps.anl.gov/>)

18-ID (Bio-CAT, <http://www.bio.aps.anl.gov/>)

Details on the beamlines: [http://small-angle.aps.anl.gov/aps\\_beam\\_lines.html](http://small-angle.aps.anl.gov/aps_beam_lines.html)

## EXPERIMENTAL TECHNIQUES

Ultra-SAXS (32-ID), Materials science SAXS, Bio-SAXS

## SOFTWARE

“Irena” and “Nika” (<http://usaxs.xor.aps.anl.gov/staff/ilavsky/irena.html>,  
<http://usaxs.xor.aps.anl.gov/staff/ilavsky/nika.html>)

NIST SAS package ([http://www.nenr.nist.gov/programs/sans/data/red\\_anal.html](http://www.nenr.nist.gov/programs/sans/data/red_anal.html))

ATSAS (<http://www.embl-hamburg.de/ExternalInfo/Research/Sax/software.html>)

## ILLUSTRATIONS

*Background:* Ultra-SAXS data from monosized distribution of silica spheres, courtesy of Jan Ilavsky (Argonne)

*Top image:* Small-angle scattering from aerogel as a function of axial or radial strain, courtesy of Johannes Pollanen (Northwestern University)

*Middle image:* Speckle pattern from coherent beam scattering of an aerogel, courtesy of Lawrence Lurio (Northern Illinois University)

*Bottom image:* Key polyethylene crystalline and lamellae deformation mechanisms, courtesy of Brian Landes (The Dow Chemical Company)

