

ACA 2008 Workshop

WK.04 Structural Biology without Crystals: Small-Angle Scattering Methods

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Workshop Fee: \$70 for Students, \$110 all others

Abstract

This full-day workshop is aimed at scientists who are not familiar with small-angle scattering (SAS), as well as more experienced SAS users. One central aim of the workshop is to introduce protein crystallographers to the basics of SAS, including reflectometry, as well as to show them how to use the techniques to complement their studies in the area of structural biology. Issues such as how to assess sample and data quality, as well as the proper use of popular structure modeling software will be discussed. Overall, the workshop aims to teach both the potential of the techniques and the pitfalls that one can fall into if they are not used carefully. The workshop will also include talks on advanced topics in biological SAS and reflectometry in order to show the non-experts what is possible with the techniques and to familiarize more expert users with the current state-of-the art in these areas.

Description

The workshop is organized into two main sessions, with SAS topics being presented in the morning and reflectometry topics in the afternoon. The main focus of the workshop will be a series of tutorial talks to introduce the non-experts to the basics of SAS and reflectometry, as related to structural biology, and to show them how to use the techniques to obtain good data and reasonable structural models. The tutorials will show how to avoid common pitfalls by performing proper background subtractions and using absolute scaling information to check for aggregation and interparticle interference. Proper use of popular structure modeling software will be discussed, again with the focus on avoiding common pitfalls associated with model fitting. The workshop will also include some examples of advanced topics, such as time resolved small-angle scattering, grazing incidence small-angle scattering and phase-inversion reflectometry. The purpose of these talks is to show the non-experts what is possible with the techniques and to familiarize more expert users with the current state-of-the art in these areas. Finally, the workshop will end with a discussion of what is next on the horizon for neutron and x-ray scattering in biology.

The introductory talks will be given by internationally-recognized experts in the SAS and reflectometry fields and will be tutorial in nature. The advanced topics talks will be given by scientists who are currently using SAS and reflectometry in their work. This workshop will benefit the crystallography community, as it will educate protein crystallographers about SAS techniques that could possibly be used to complement their own structural biology research.

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Tentative Program

Morning:

- 8:30 – 8:45: Welcome and Introduction
- 8:45 – 9:30: Introduction to Small-Angle Scattering (SAS)
- 9:30– 10:15: Correct Use of Modeling Software for SAS Data
- 10:15 – 10:45: Coffee Break
- 10:45 – 11:30: Labeling and Contrast Variation
- 11:30 – 12:00: Current Methods in Time-Resolved SAS
- 12:00 – 12:30: Recent Advances in Grazing Incidence SAS
- 12:30 – 2:00: Lunch Break

Afternoon:

- 2:00 – 2:45: Introduction to Reflectometry
- 2:45 – 3:30: Correct Use of Modeling Software for Reflectometry Data
- 3:30 – 4:15: Phase-Inversion Neutron Reflectometry Methods
- 4:15 – 4:45: Recent Advances in Reflectometry Techniques for Studying Membrane Proteins
- 4:45 – 5:30: Discussion and Wrap Up: What are the next horizons for neutron and x-ray scattering in biology?