Small Angle X-ray Scattering (SAXS):
Data Collection, Reduction, Analysis and Modeling

October 23-24, 2018

Place: Lecture Hall F101 & Computer Class Room F132, Aapistie 7B, 90220, Oulu
Credits: 1.0 ECTS
Organizer: Rajaram Venkatesan, Faculty of Biochemistry and Molecular Medicine, University of Oulu
&
Health and Biosciecnes Doctoral Program, University of Oulu Graduate School
Contact Persons: Rajaram Venkatesan & Pia Askonen (firstname.lastname@oulu.fi)
Registration: Deadline Sep 24th, 2018
The course is limited to 20 participants
Online registration **here!**
Invited instructors: **Dr. Robert Rambo**
Science Group Leader for the Soft Condensed Matter village and former Principal Beamline Scientist for B21,
Diamond Light Source, UK
&
Dr. Nathan Cowieson
Principle Beamline Scientist on the solution State SAXS beamline, B2,
Diamond Light Source, UK

Course description:

The course is mainly intended for those who are using or will be using Small angle X-ray scattering (SAXS) for biological macromolecules in their research work. The course constitute lectures as well as hands-on experience for analyzing the SAXS data. The selected participants can send a protein sample to DLS directly for SAXS data collection. The beamline personnel will collect SAXS data at the beamline B21 prior to the course. Each participant will have his/her own SAXS data (or test data) for analysis during the course. The participants will present the results from the analysis and there will be a group discussion/presentation at the end of the course to evaluate the results obtained.

After attending the course, the participant should be able to

- Understand the theory behind SAXS
- Know how to prepare samples for SAXS data collection
- Process the data after data collection
- Assess the quality of the SAXS data and decide whether the sample quality is good enough to proceed with the data for the next steps
- Calculate Rg, Dmax and molecular weight of the protein sample
- Calculate *ab-inito* models
- Compare the known homologous models with the experimental SAXS data
- Calculate electron density from the collected data

Apply online **here** with a brief motivation letter (maximum 2500 characters) and a letter of reference from your supervisor before 24th Sep 2018. Doctoral students are given priority in the selection. However, postdoctoral researchers and Masters students can also apply. Selected participants will be notified by email in a week after the deadline. There is no registration fee for the course.

Preliminary program

Day 1: Oct 23, 2018	10:15-12:45	Lectures (open to everyone)
	10:10-10:15	Opening Remarks
	10:15-11:15	Introduction: Basic Theory of SAXS
	11:15-12:00	Review of recent applications of BioSAXS
	12:00-12:45	Sample prep considerations
	12:45-13:45	**Lunch**
	13:45-19:00	**Practical with SAXS Software (Registered participants only) (BayesApp, ATSAS, Scatter)**
	13:45-14:45	Attendee Introduction/Presentation 1 slide per user explaining their SAXS project
	13:45-14:45	Workshop data
	14:45-15:00	**Coffee/Tea Break**
	15:00-18:00	User data
Day 2: Oct 24, 2018	**08:30-11:45**	**Lectures (open to everyone)**
	08:30-09:15	*Ab initio* Modeling
	09:15-10:00	Atomistic Modeling
	10:00-10:15	**Coffee/Tea Break**
	10:15-11:00	SAXS and Hybrid methods
	11:00-11:45	Membrane proteins, detergents and SAXS
	11:45-13:00	**Lunch**
	13:00-18:00	**Practical with SAXS Software (Registered participants only) (ATSAS, CNS, Scatter, FOXS)**
	13:00-13:45	*Ab initio* modeling
	13:45-14:15	Bespoke Modeling
	14:15-14:45	Atomistic Modeling (with CNS)
	14:45-15:15	FOXS +Denss
	15:15-15:30	**Coffee/Tea Break**
	15:30-16:30	User data/Preparation of results
	16:30-17:30	Attendee Presentation of results of SAXS analysis
	17:30-18:00	General discussion/Feedback/Wrapping up