

Teaching Small Angle X-ray Scattering for Structural Biology

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Small angle x-ray scattering (SAXS) is a well-established and important tool in the general toolbox of today's structural biologist. Although the technique provides only moderate structural resolution it is one of the few experimental techniques that can access structural information of macromolecules in the solution phase. In addition to that, due to the conceptual simplicity of the experiment and its complementarity to high resolution techniques, the relative ease of sample preparation and speed of measurement SAXS is widely used by today's structural biologists. With this growth in popularity, an increasing number of structural biologists with none or only limited experience in SAXS data collection and analysis are reaching out to use the technique for their research. These non-experts are often not very familiar with the technique and need an in-depth introduction into the technique, its strengths and weaknesses, in order to successfully apply it in their daily research.

The Stanford Synchrotron Radiation Lightsource (SSRL) the BioSAXS beamline BL4-2 is a dedicated facility for synchrotron based biological small angle X-ray scattering and diffraction. We regularly organize introductory as well as in-depth, focused SAXS workshops specifically targeted to structural biologists who are interested in the technique. These workshops focus on solution x-ray scattering studies applied to biological macromolecules and macromolecular complexes. They cover the necessary scattering theory, experimental aspects of solution scattering, as well as some recent applications. Particular emphasis is given to data interpretation and software tutorials, covering all aspects from basic SAXS data judgement and analysis to advanced modeling methods. Here we will discuss strategies for efficiently structuring and selecting the materials as well as lessons learned from past workshops.