

Open lectures within the Structural Biology school as part of the PRP@CERIC project: a training opportunity promoted by Area Science Park, Elettra Sincrotrone Trieste and CNR

Subject. Structural biology aims to identify the three-dimensional structure of biological macromolecules, such as proteins, amino acids and nucleic acids, and to explain how this relates to their functions, thus promoting understanding of the molecular mechanisms and interactions. In virology, this means understanding mechanisms through which viruses grow, replicate and survive in host cells, thus providing crucial insights for medical research. This area of interest has obviously received increasing attention following the COVID-19 pandemic, representing a fertile ground for the prevention, detection and development of new pharmacological strategies and effective treatments (e.g., vaccines and antiviral drugs) against pathogens posing potential epidemic threats. We could say the only way to beat our enemy is actually to be able to see and know him. Starting from these premises, the following and other questions will underpin the theoretical lessons and practical sessions of the school: How do macromolecular complexes form? How do ligands interact with target proteins? What are potential binding sites and poses for drugs? How could such drugs be designed to be effective?

The following four thematic modules will be addressed during the school: 1) Protein production and characterization; 2) Macromolecular Crystallography (MX) and structure-based drug design; 3) Sample Preparation for Single-Particle Cryo-Electron Microscopy (Cryo-EM); 4) Cryo-EM Single Particle Analysis and Cryo-Electron Diffraction (Cryo-ED).

For each of the first three of the four modules indicated above, selected internationally recognized invited speakers, with sector-specific skills and expertise, will hold theoretical and practical lessons offering a perspective of the field.

The theoretical lessons held by the invited speakers will be open to interested people and will be available in hybrid mode.

Calendar of "open" lectures held by Invited Speakers

Module 1: Protein production and characterization		
Date & location	Time slot	Speaker & Topics
Monday 9 September 2024 Conference Hall, Building C1 Area Science Park, Padriciano 99	02:00-06:00 PM	Prof. Opher Gileadi , University of Oxford, Medical Sciences Division, UK <i>Protein expression and purification for structural biology studies: Introduction to sample preparation; construct design, cloning strategy; high-throughput methods and scale-up expression</i>
Tuesday 10 September 2024	12:00 AM-01:00 PM	Dr. Andrea Graziadei , Structural Proteomics SSU – Human Technopole, Milan, Italy



Elettra Sincrotrone Trieste – General Seminar Room T1 SS 14 Km 163,5 in Area Science Park, Basovizza		<i>Bioinformatics methods for recombinant protein design: Alpha fold and tools for structure prediction</i>
Wednesday 11 September 2024 Elettra Sincrotrone Trieste – General Seminar Room T1 SS 14 Km 163,5 in Area Science Park, Basovizza	12:00 AM-01:00 PM	Dr. Andrea Graziadei , Structural Proteomics SSU – Human Technopole, Milan, Italy <i>Cross-linking methods associated with mass spectroscopy in structural biology</i>
Module 2: Macromolecular Crystallography (MX) and structure-based drug design		
Date & location	Time slot	Speaker & Topics
Tuesday 17 September 2024 Elettra Sincrotrone Trieste – General Seminar Room T1 SS 14 Km 163,5 in Area Science Park, Basovizza	09:00-10:45 AM	Prof. Michele Cianci , Polytechnic University of Marche, Ancona, Italy <i>X-ray diffraction data acquisition from protein crystals: Data Collection</i>
	12:00 AM-01:00 PM	Prof. Michele Cianci , Polytechnic University of Marche, Ancona, Italy <i>X-ray diffraction data acquisition from protein crystals: Data Processing</i>
Wednesday 18 September 2024 Elettra Sincrotrone Trieste – Training Room SS 14 Km 163,5 in Area Science Park, Basovizza	11:15-12:00 AM	Prof. Michele Cianci , Polytechnic University of Marche, Ancona, Italy <i>Anomalous scattering-based methods for resolving the phase problem: MAD/SAD</i>
Thursday 19 September 2024 Elettra Sincrotrone Trieste – General Seminar Room T2 SS 14 Km 163,5 in Area Science Park, Basovizza	09:00-12:00 AM	Prof. Roberto Steiner , University of Padua, Italy <i>Crystallographic refinement methods: Molecular model building; crystallographic refinement</i>
Module 3: Sample Preparation for Single-Particle Cryo-Electron Microscopy (Cryo-EM)		
Date & location	Time slot	Speaker & Topics

Monday 14 October 2024 Elettra Sincrotrone Trieste – General Seminar Room T1 SS 14 Km 163,5 in Area Science Park, Basovizza	03:00-06:00 PM	Dr. Luigi Scietti , European Institute of Oncology, Milan, Italy <i>Single Particle Cryo-EM: Sample preparations for Cryo-EM experiments</i>
Tuesday 15 October 2024 Elettra Sincrotrone Trieste – General Seminar Room T1 SS 14 Km 163,5 in Area Science Park, Basovizza	09:00-10:45 AM	Dr. Luigi Scietti , European Institute of Oncology, Milan, Italy <i>Single Particle Cryo-EM: Sample preparations for Cryo-EM experiments</i>
	11:15 AM-01:00 PM	Dr. Sebastiano Pasqualato , Structural Biology Research Centre, Human Technopole, Milan, Italy <i>Quality control methods and instruments for Cryo-EM samples</i>
Wednesday 16 October 2024 Elettra Sincrotrone Trieste – General Seminar Room T1 SS 14 Km 163,5 in Area Science Park, Basovizza	09:00 AM-01:00 PM	Dr. Sebastiano Pasqualato , Structural Biology Research Centre, Human Technopole, Milan, Italy <i>Experimental methods for studying protein-ligand interactions: Microscale Thermophoresis (MST); Mass Photometry</i>