

INSTRUCT theoretical and practical course: Integrative Structural Biology in Latin America

Aims of the course

Structural biology is at the heart of most major advances in our understanding of the mechanisms governing biological processes. As the biological systems under study become more complex, the results from individual techniques fail to address the problems with enough depth to provide a full understanding of their structural and dynamic features..

In the present course we will be giving the participants a broad display of the fundamentals of X-ray crystallography, X-ray scattering, NMR and electron microscopy, with a focus on current strategies used to integrate the information gathered from different techniques.

Course implementation

Due to the limitations imposed by the COVID-19 pandemics, the course will be held remotely. Theoretical modules will be presented by speakers with help of a moderator from the organizing committee. Practical modules will consist of real dataset analyses.

The course will include virtual poster presentations open for discussion, where participants will show their projects via slides. Posters will be evaluated by a group of instructors. The best presentation will be awarded a 100 € prize and two mentions will be awarded 50 € each.

List of course speakers and tutors

- Alberto Podjarny, Department of Integrative Biology, IGBMC, CNRS, INSERM, Université de Strasbourg, France.
 - Alejandro J. Vila, IBR-CONICET-University of Rosario, Argentina.
- Andrés Binolfi, IBR-CONICET-University of Rosario, Argentina.
- Carlos Oscar Sánchez Sorzano, Biocomputing Unit (BCU), National Center for Biotechnology, Madrid, Spain.
 - Claudia Alen Amero, Instruct-ERIC, Oxford, UK
- Daniela Albanesi, IBR-CONICET-University of Rosario, Argentina.
- Dmitri Svergun, European Molecular Biology Laboratory, Hamburg Unit, Germany.
- Irina P. Suarez, IBR-CONICET-University of Rosario, Argentina.
- Javier M. González, Institute of Bionanotechnology (Inbionatec-CONICET-University of Santiago del Estero), Argentina.
 - José María Carazo, Biocomputing Unit (BCU), National Center for Biotechnology, Madrid, Spain.
 - Leandro C. Tabares, Institute for Integrative Biology of the Cell (I2BC), Department of Biochemistry, Biophysics and Structural Biology, (Université Paris-Saclay, CEA, CNRS), France.
 - Lucia Banci, Magnetic Resonance Center - CERM, University of Florence, Italy.
 - Luciano Abriata, School of Life Sciences, Institute of Bioengineering, École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland.
- María Natalia Lisa, IBR-CONICET-University of Rosario, Argentina.
- Richard Garrat, Institute of Physics of São Carlos, University of São Paulo, Brazil.
- Rodolfo M. Rasia, IBR-CONICET-University of Rosario, Argentina.
- Terese Bergfors, Department of Cell and Molecular Biology, Uppsala University, Sweden.

PROGRAMME & ACTIVITIES

NOV 23 – 27, 2020

TIME (GMT-3)	MON 23-Nov	TUE 24-Nov	WED 25-Nov	THU 26-Nov	FRI 27-Nov
8:00	Welcome & general information on the workshop				
8:30	INSTRUCT vision & mission (CAA)	SAXS basic principles and applications (DS) (TM)	Cryo-EM 1 basic principles and applications (JMC) (TM)	NMR of biomolecules basic principles and applications (RMR/AJV) (TM)	Molecular modeling (LA) (TM)
	Struct. biol. overview (AP) (TM)				
10:00	Coffee break	Coffee break	Coffee break	Coffee break	Coffee break
10:30	Sample preparation (MNL/AB/RMR/IPS) (TM)	X-ray prot. crystallography (RG/MNL) (TM)	Cryo-EM data processing and analysis. Tutorials and demonstrations (JMC/MNL/IPS/CSS) (PM)	In-cell NMR (LB) (TM)	DEER basic principles and applications (LT) (TM)
12:00	Lunch	Lunch		Lunch	Lunch
13:00	Protein crystallization (TB/IPS/DA) (PM)	Molecular replacement. Model building and refinement. Tutorials and demonstrations (MNL/JMG) (PM)	Detail of the methods and challenges ahead (JMC) (TM)	NMR and In-cell NMR. Acq. Proc and analysis of NMR spectra <i>in vitro</i> and in bacterial cells (AB/RMR) (PM)	Poster session
14:30					
16:00			Round table		Closing remarks

TM: theoretical module; **PM:** practical module; CAA: Claudia Alen Amaro; AJV: Alejandro J. Vila; MNL: María Natalia Lisa; AB: Andrés Binolfi; RMR: Rodolfo M. Rasia; IPS: Irina P. Suarez; TB: Terese Bergfors; DA: Daniela Albanesi; LA: Luciano Abriata; RG: Richard Garratt; JMG: Javier Marcelo González; AP: Alberto Podjarny; JMC: José María Carazo; LB: Lucia Banci; LT: Leandro Tabares; DS: Dmitri Svergun; CSS Carlos Oscar Sanchez Sorzano