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Ministero
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Italiadomani
PIANO NAZIONALE
DI RIPRESA E RESILIENZA



Consiglio Nazionale
delle Ricerche

Structural Biology school



*September 9-13 and 16-20
October 14-18
2024*

Trieste



Organizers



Consiglio Nazionale delle Ricerche



Elettra Sincrotrone Trieste



Information

Speakers

Heinz Amenitsch	Graz University of Technology
Andrea Caporale	CNR – Istituto di Cristallografia
Alberto Cassetta	CNR – Istituto di Cristallografia
Michele Cianci	Università Politecnica delle Marche
Sonia Covaceuszach	CNR – Istituto di Cristallografia
Andrea Dalle Vedove	Area Science Park
Luigi De Colibus	CNR – Istituto Officina dei Materiali
Nicola Demitri	Elettra – Sincrotrone Trieste
Opher Gileadi	Structural Genomics Consortium (SGC) – Karolinska Institutet
Andrea Graziadei	Human Technopole
Doriano Lamba	CNR – Istituto di Cristallografia
Alessandra Magistrato	CNR – Istituto Officina dei Materiali
Stefano Morasso	Elettra – Sincrotrone Trieste
Luisa Napolitano	CNR – Istituto di Cristallografia
Silvia Onesti	Elettra – Sincrotrone Trieste
Angela Parise	CNR – Istituto Officina dei Materiali
Sebastiano Pasqualato	Human Technopole
Maurizio Polentarutti	Elettra – Sincrotrone Trieste
Luigi Angelo Scietti	European Institute of Oncology (IEO)
Marta Semrau	Area Science Park
Roberto Steiner	Università degli Studi di Padova – King's College London
Paola Storici	Elettra – Sincrotrone Trieste

September 9 – 13

Sample preparation for Macromolecular Crystallography and SBDD

WEEK 1

TIME / DAY	9 MONDAY	10 TUESDAY	11 WEDNESDAY	12 THURSDAY	13 FRIDAY
Oral Sessions					
Room	Conference Hall Congress Center Area Padriciano (Bld C1)	Elettra - General Seminar Room T1	Elettra - General Seminar Room T1	Elettra - General Seminar Room T1	Elettra - General Seminar Room T1
9.00 - 10.00		Protein production in eukaryotic systems (M.Semrau/P.Storici)	Protein Quality Control Methods: general overview (P. Storici)	SAXS (H. Amenitsch)	Introductiono to Protein crystallization (A. Dalle Vedove)
10.00 - 10.45		Protein production in eukaryotic systems (M.Semrau)	Protein Quality Control Methods: Circular Dichroism (D. Lamba)	SAXS (H. Amenitsch)	crystallization strategies for Drug Discovery (A. Dalle Vedove)
10.45 - 11.15		COFFEE BREAK			
11.15 - 12.00		Purification strategies (L. Napolitano)	Protein Quality Control Methods: Mass Spectrometry (A. Caporale)	BIO-SAXS (S. Covaceuszach)	Structure Based Drug Discovery & SAR (P. Storici)
12.00 - 13.00		Alpha fold and tools for structure prediction (A. Graziadei)	Cross-linking methods (A. Graziadei)	BIO-SAXS S. Covaceuszach)	Ligand and Fragment based crystallization (A. Dalle Vedove)
13.00 - 14.00		LUNCH			
Practical Sessions		Elettra - Training Room A. Graziadei, M.Semrau	Elettra - SB Lab M.Semrau, M.L.Napolitano	SAXS beamline & SB Lab H. Amenitsch, M.Semrau	SB Lab A. Dalle Vedove, M. Semrau
14.00 - 15.00	Welcome session / Introduction to sample preparation (O. Gileadi)	AlphaFold tutorial	Insect cell expression system	SAXS experimental set up - SAXS Beamline	Protein crystallization
15.00- 15.45	Construct design, cloning strategy (O. Gileadi)	AlphaFold tutorial	Insect cell expression system	SAXS experimental set up - SAXS Beamline	Protein crystallization
15.45 - 16.15		BREAK			
16.15 - 17.00	HT methods and scale-up expression (O.Gileadi)	Construct design and cloning strategy	Insect cell expression system	SEC MALS; SEC LALS-RALS (Omnisec)	Protein crystallization
17.00-18.00	HT methods and scale-up expression (O.Gileadi)	Construct design and cloning strategy	Insect cell expression system	SEC MALS; SEC LALS-RALS (Omnisec)	Protein crystallization



Monday Sept 9 classes will be held in:
Conference Hall, Building C1
Area Science Park
Padriciano, Trieste

From Tuesday Sept 10 to Friday Sept 13
classes will be held in:
Elettra Sincrotrone
Area Science Park
Basovizza, Trieste

September 16 – 20

Macromolecular Crystallography: structure solution and analysis

WEEK 2

TIME / DAY	16 MONDAY	17 TUESDAY	18 WEDNESDAY	19 THURSDAY	20 FRIDAY
Oral Sessions					
Room	Elettra - General Seminar Room T1	Elettra - General Seminar Room T1	Elettra - Training Room	Elettra - General Seminar Room T2	Elettra - General Seminar Room T2
9.00 - 10.00	Crystals and Crystallography (A. Cassetta)	Data Collection (M. Cianci)	The Phase Problem (S. Onesti)	Model Building (R. Steiner)	Computational methods in Drug Discovery (A. Magistrato)
10.00 - 10.45	Diffraction Theory (A. Cassetta)	Data Collection (M. Cianci)	MIR/SIR (S. Onesti)	Refinement (R. Steiner)	Computational methods in Drug Discovery (A. Parise)
10.45 - 11.15	COFFEE BREAK				
11.15 - 12.00	Women in Crystallography (S. Onesti)	Synchrotron Radiation (M. Polentarutti)	MAD/SAD (M. Cianci)	Refinement (R. Steiner)	Validation of Crystallographic Data (A. Cassetta)
12.00 - 13.00	Crystallography: An Historical perspective (D. Lamba)	Data Processing (M. Cianci)	Molecular Replacement (D. Lamba)	Crystallography and CryoEM (S. Onesti)	From Crystallography to Cryo-EM (L. De Colibus)
13.00 - 14.00	LUNCH				
Practical Sessions	Elettra SB Lab + XRD2 bl N. Demitri, A. Dalle Vedove	Elettra XRD2 bl + Training Room N. Demitri, M. Cianci	Elettra Training Room M. Cianci	Elettra Training Room R. Steiner	
14.00 - 15.00	Crystal Mounting	XRD2 - Data Collection	Computing / Structure Solution	Computing / Model Building	
15.00- 15.45	Crystal Mounting	XRD2 - Data Collection	Computing / Structure Solution	Computing / Model Building	
15.45 - 16.15	BREAK				
16.15 - 17.00	Crystal Mounting	Computing / Data Processing	Computing / Structure Solution	Computing / Refinement	
17.00-18.00	Crystal Mounting	Computing / Data Processing	Computing / Structure Solution	Computing / Refinement	



Classes will be held in:
Elettra Sincrotrone
Area Science Park
Basovizza, Trieste

October 14 - 18

WEEK 3

Sample Preparation for Single-Particle Cryo-Electron Microscopy (Cryo-EM)

TIME / DAY	14 MONDAY	15 TUESDAY	16 WEDNESDAY	17 THURSDAY	18 FRIDAY
Oral Sessions					
Room	Elettra - General Seminar Room T1	Elettra - General Seminar Room T1	Elettra - General Seminar Room T1	Elettra - General Seminar Room T1	Elettra - General Seminar Room T1
9.00 - 10		Sample preparations for Cryo-EM experiments (L. Scietti)	Microscale Thermophoresis (MST) (S. Pasqualato)	Protein interactions: binding methods (S. Covaceuszach)	Grating Coupled Interferometry (S. Covaceuszach)
10.00 - 10.45		Sample preparations for Cryo-EM experiments (L. Scietti)	Microscale Thermophoresis (MST) (S. Pasqualato)	Protein interaction: binding methods TSA (S. Covaceuszach)	Grating Coupled Interferometry - Examples (S. Covaceuszach)
10.45 - 11.15		COFFEE BREAK			
11.15 - 12.00		Quality Control and instruments (S. Pasqualato)	Mass Photometry (S. Pasqualato)	Protein interaction: binding methods ITC (A. Cassetta)	Nanollever based methodologies (S. Covaceuszach)
12.00 - 13.00		Quality Control and instruments (S. Pasqualato)	Mass Photometry (S. Pasqualato)	Protein interaction: binding methods SPR (S. Covaceuszach)	Nanollever based methodologies Examples (S. Covaceuszach)
13.00 - 14.00		LUNCH			
Practical Sessions		Elettra SB Lab (S. Pasqualato, L. Scietti, M. Semrau)	Elettra SB Lab (S. Pasqualato, M. Semrau)	Elettra SB Lab / IC-CNR Lab (S. Morasso, A. Cassetta)	IC-CNR Lab (L. Napolitano, S. Covaceuszach)
14.00 - 15.00	Sample preparations for Cryo-EM experiments (S. Onesti)	Microscale Thermophoresis (MST) trials	Mass Photometer (MP) trials	Protein QC and binding: TSA	GCI / Nanollever
15.00 - 15.45	Sample preparations for Cryo-EM experiments (S. Onesti e L. Scietti)	MST trials	MP trials	Protein Quality Control: TSA	GCI / Nanolveer
15.45 - 16.15		BREAK			
16.15 - 17.00	Sample preparations for Cryo-EM experiments	MST trials	MP trials	Protein Quality Control and binding: ITC	GCI / Nanolver
17.00-18.00	Sample preparations for Cryo-EM experiments	MST trials	MP trials	Protein Quality Control and binding: ITC	GCI / Nanolver



Classes will be held in:
Elettra Sincrotrone
Area Science Park
Basovizza, Trieste

Information

Project information and coordinator

The Structural Biology school is organized as part of the “Pathogen Readiness Platform for CERIC-ERIC Upgrade” – PRP@CERIC project and promoted by Area Science Park, CNR and Elettra Sincrotrone Trieste.

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School coordinators

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Organizing Secretariat



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Locations

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Area Science Park – Padriciano Campus
Loc. Padriciano, 99
34149 Trieste

Building T1-T2
Elettra Sincrotrone
Area Science Park – Basovizza Campus
Loc. Basovizza SS14
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