

MHRD Scheme on Global Initiative on Academic Network (GIAN)

“The 1st Cryo Electron Microscopy and 3D Image Processing of Macromolecular Assemblies and Cellular Tomography (CEM3DIP)”

Tentative Time Table

Time	Title
Day 1 2nd July 2016	Saturday
16:00 to 17:00	Arrival and Registration of Selected Participants and Speakers.
17:00 to 18:00	Inauguration Prof. V. Ramakrishnan, Director, IISER Thiruvananthapuram. Overview of course and introduction of attendees.
18:00 to 19:00 + 15 minutes discussion.	CEM3DIP Keynote Lecture 1: Professor Wah Chiu. “3D EM History, Basic Principles and its recent advances in Electron Microscopy to obtain High Resolution structures”.
Day 2 3rd July 2016	Sunday
9:30 to 10:30 + 15 minutes discussion.	EM sample, specimen preparation methods (Single Particle and Tomography) (R. Natesh)
11:15 to 12:15 + 15 minutes discussion.	Basic Concepts of Fourier Transform in TEM image analysis (Professor Wah Chiu)
14:30 to 17:30	Practical 1: EMAN v2.12. Session 1. (Steven Ludtke)
Day 3 4th July 2016	Monday
9:30 to 10:30 + 15 minutes discussion.	Contrast Transfer Function, Point Spread Function and its effect on image acquisition and concepts of convolution etc. (Steven Ludtke,)
11:15 to 12:15 + 15 minutes discussion.	Principles of TEM Image formation, Particle detection from TEM images and noise handling (Manidipa Banerjee)
14:30 to 17:30	Practical 2: EMAN v2.12 Session 2. (Steven Ludtke)
Day 4 5th July 2016	Tuesday
9:30 to 10:30 + 15 minutes discussion.	MSA and classification of particles (Steve Ludtke)
11:15 to 12:15 + 15 minutes discussion.	Refinement of Classifications, Dealing with orientation and Heterogeneity of particles (R. Natesh)
14:30 to 17:30	Practical 3: EMAN v2.12 Session 3. (Steven Ludtke)
Day 5 6th July 2016	Wednesday
9:30 to 10:30 +	Methods in single particle 3D orientation

15 minutes discussion.	determination (Kutti Ragunath Vinothkumar)
11:15 to 12:15 + 15 minutes discussion.	Methods in single particle 3D reconstruction, Resolution and FSC (Elena Orlova)
14:30 to 17:30	Practical 4: Relion, Session 1. (K.R. Vinothkumar)
Day 6 7th July 2016	Thursday
9:30 to 10:30 + 15 minutes discussion.	Conical Tilt (CT) and Projection Matching (PM). Getting the first model using CT and PM (K.R. Vinothkumar)
11:15 to 12:15 + 15 minutes discussion.	Point Group Symmetries. (Manidipa Banerjee)
14:30 to 15:30	Practical 5: Relion, Session 2. (K.R. Vinothkumar)
Day 7 8th July 2016	Friday
9:30 to 10:30 + 15 minutes discussion.	Single Particle Cryo-electron Microscopy and 3D reconstruction of Viruses (Manidipa Banerjee)
11:15 to 12:15 + 15 minutes discussion.	General principles of image processing in Cryo EM (Elena Orlova)
14:30 to 17:30	Practical 6: IMAGIC, Session 1. MSA Classification and angular reconstitution (Elena Orlova & R. Natesh)
Day 8 9th July 2016	Saturday
9:30 to 10:30 + 15 minutes discussion.	Hybrid methods: Protein Crystallography, computational methods and Cryo EM (R. Natesh)
11:15 to 12:15 + 15 minutes discussion.	Participating Industry Invited Lecture: Microscopes for cryo-automated data collection.
14:30 to 17:30	Practical 7: IMAGIC, Session 2. 3D reconstruction (Elena Orlova & R. Natesh)
10 th July 2016	Sunday (Free day)
	Proposed Group Excursion - Poovar Backwaters and Kovalam Beach.
Day 9 11th July 2016	Monday
9:30 to 10:30 + 15 minutes discussion.	Reconstruction principles and applications of Cryo Tomography. Cellular Tomography and Subtomogram averaging. Macromolecular structures, cells and tissues by cryo-electron tomography (Lu Gan)
11:15 to 12:15 + 15 minutes discussion.	Participating Industry Gatan Inc. Invited Lecture: Applications of electron-counting direct-detection cameras in high-resolution cryo-electron microscopy (Dr. Christopher Booth)

14:30 to 17:30	Practical 8: Tomographic reconstruction practical using IMOD. (Lu Gan)
Day 10 12th July 2016	Tuesday
9:30 to 10:30 + 15 minutes discussion.	The EMBO Global Exchange Lecture Series – CEM3DIP Keynote Lecture 2: Professor Wolfgang Baumeister. “The Challenge of doing Structural Biology in situ”.
11:15 to 12:15 + 15 minutes discussion.	Interpretation of maps, fitting / docking of atomic structures (Garib N Murshodov)
14:30 to 17:30	Practical 9: Modeller / Chimera for Interpretation of maps, docking and fitting of atomic structures (Garib N Murshodov and R. Natesh)
Day 11 13th July 2016	Wednesday
9:30 to 10:30 + 15 minutes discussion.	Refinement of atomic models against cryo-EM maps (refmac, prosmart etc.) (Garib N Murshodov)
11:15 to 12:15 + 15 minutes discussion.	Validation, Assessment, Data deposition: EMDB and EMPIAR: trends, developments, opportunities and challenges (Ardan Patwardhan)
14:30 to 16:30	Practical 10: Refinement of atomic models and Flexible fitting MDFF (Garib N Murshodov and Jayati Sengupta)
17:00 to 19:00	Questions, Suggestions, Summary, Examination for students and Certificate distribution.