

**GIAN - 1st Course on Cryo Electron Microscopy and 3D Image Processing of Macromolecular Assemblies and Cellular Tomography (CEM3DIP) - July 2 - July 13, 2016– Timetable.**

Venue	UDS Kovalam (Seaview Hall)			IISER-TVM (Prateeksha Building)	UDS Kovalam (Seaview Hall)
Date	9:30 to 10:30 + 15 minutes discussion.	11:15 to 12:15 + 15 minutes discussion.	12:30 to 13:20 *	14:30 to 17:30	19:00 to 20:00 20:00 to 21:00
02/07/2016 Saturday				<p><b>14:00</b> Coaches Depart from UDS Kovalam to IISER – TVM Vithura Campus.</p> <p><b>16:00**</b> Registration of Participants and Speakers @ IISER-TVM Vithura Campus.</p>	<p><b>17:00**</b> Inauguration by <b>Professor V. Ramakrishnan, Director, IISER Thiruvananthapuram @IISER-TVM Vithura Campus.</b></p> <p><b>17:30**</b> Overview of course. Participants Quick Introduction (R. Natesh, E. Orlova and M. Banerjee).</p>
<p><b>18:00 L1: CEM3DIP Keynote Lecture 1: Professor Wah Chiu.</b> “3D EM History, Basic Principles and its recent advances in Electron Microscopy to obtain High Resolution structures”.</p> <p><b>19:30</b> Dinner. <b>20:30</b> Coaches Depart to UDS Kovalam.</p>					
03/07/2016 Sunday	<b>L2 :</b> EM sample, specimen preparation methods. - <b>Ramanathan Natesh</b>	<b>L3:</b> Basic Concepts of Fourier Transform in TEM image analysis. - <b>Steven Ludtke</b>	Lunch	<b>Practical 1:</b> EMAN v2.12, Session 1. <b>Steven Ludtke</b>	<b>Posters session 1</b> (P1 to P10) Dinner
04/07/2016 Monday	<b>L4:</b> Contrast Transfer Function, Point Spread Function and its effect on image acquisition and concepts of convolution etc. - <b>Steven Ludtke</b>	<b>L5:</b> Principles of TEM Image formation, Particle detection from TEM images and noise handling <b>Manidipa Banerjee</b>	Lunch	<b>Practical 2:</b> EMAN v2.12 Session 2. <b>Steven Ludtke</b>	<b>Selected participant talks</b> (ST1 to ST3) Dinner
05/07/2016 Tuesday	<b>L6:</b> MSA and classification of particles <b>Steve Ludtke</b>	<b>L7:</b> Refinement of Classifications, Dealing with orientation and Heterogeneity of particles <b>Ramanathan Natesh</b>	Lunch	<b>Practical 3:</b> EMAN v2.12 Session 3. <b>Steven Ludtke</b>	<b>Poster Session 2</b> (P11 to P20) Dinner
06/07/2016 Wednesday	<b>L8: Methods in single particle 3D orientation determination</b> - <b>Kutti Raghunath Vinothkumar</b>	<b>L9:</b> Methods in single particle 3D reconstruction, Resolution and FSC - <b>Elena Orlova</b>	Lunch	<b>Practical 4:</b> Relion, Session 1. <b>Kutti Raghunath Vinothkumar</b>	<b>Poster Session 3</b> (P21 to P30) Dinner
07/07/2016 Thursday	<b>L10:</b> Conical Tilt (CT) and Projection Matching (PM). Getting the first model using CT and PM <b>Kutti Raghunath Vinothkumar</b>	<b>L11:</b> Point Group Symmetries. <b>Manidipa Banerjee</b>	Lunch	<b>Practical 5:</b> Relion, Session 2. <b>Kutti Raghunath Vinothkumar</b>	<b>Poster Session 4</b> (P31 to P40) Dinner
08/07/2016 Friday	<b>L12:</b> Single Particle Cryo-electron Microscopy and 3D reconstruction of Viruses <b>Manidipa Banerjee</b>	<b>L13:</b> General principles of image processing in Cryo EM <b>Elena Orlova</b>	Lunch	<b>Practical 6:</b> IMAGIC, Session 1. MSA Classification and angular reconstitution <b>Elena Orlova &amp; R. Natesh</b>	<b>Poster Session 5</b> (P41 to P50) Dinner
09/07/2016 Saturday	<b>L14:</b> Hybrid methods: Protein Crystallography, computational methods and Cryo EM <b>Ramanathan Natesh</b>	<b>11:15: L15:</b> FEI: Microscopes for cryo-automated data collection - <b>Rishi Matadeen</b> <b>12:00: L16:</b> Leica: EM Cryo preparation workflows. Update on the latest instrumentation. <b>Ian Lamswood</b>	Lunch	<b>Practical 7:</b> IMAGIC, Session 2. 3D reconstruction <b>Elena Orlova &amp; R. Natesh</b>	<b>Poster Session 6</b> (P51 to P58) Dinner
10-Jul-2016	Sunday (Free Day). Proposed Group Excursion(Depending on Weather) – Poovar Backwaters and Kovalam Beach.				
11/07/2016 Monday	<b>L17:</b> Reconstruction principles and applications of Cryo Tomography. Cellular Tomography and Subtomogram averaging. Macromolecular structures, cells and tissues by cryo-electron tomography - <b>Lu Gan</b>	<b>L18:</b> Gatan : Applications of electron-counting direct-detection cameras in high-resolution cryo-electron microscopy <b>Christopher Booth</b>	Lunch	<b>Practical 8:</b> Tomographic reconstruction practical using IMOD <b>Lu Gan</b>	<b>Selected participant talks</b> (ST4 to ST6) Dinner
12/07/2016 Tuesday	<b>L19**:</b> The EMBO Global Exchange Lecture Series – <b>CEM3DIP Keynote Lecture 2: Professor Wolfgang Baumeister.</b> “The Challenge of doing Structural Biology in situ”.	<b>L20**:</b> Interpretation of maps, fitting / docking of atomic structures <b>Garib N Murshodov</b>	Lunch	<b>Practical 9:</b> Fitting, Refinement of atomic models and Model building in EM maps using Molrep/Refmac/Coot <b>Garib N Murshodov</b>	<b>L21:</b> Macromolecular dynamics: Flexible fitting into cryo-EM maps <b>Jayati Sengupta</b> Dinner
13/07/2016 Wednesday	<b>L22:</b> Refinement of atomic models against cryo-EM maps (refmac, prosmart etc.) <b>Garib N Murshodov</b>	<b>L23:</b> Validation, Assessment, Data deposition: EMDB and EMPIAR: trends, developments, opportunities and challenges <b>Ardan Patwardhan</b>	Lunch	<b>Practical 10:</b> Chimera for Interpretation of maps, docking and fitting of atomic structures ( <b>Manidipa Banerjee</b> ) and MDFE Flexible fitting ( <b>Jayati Sengupta</b> )	Questions, Suggestions, Summary, feedback, Certificate distribution and departure after dinner. Dinner

\* All days coaches depart after Lunch @13:20 from UDS Kovalam to IISER-TVM Transit Campus.  
Abbreviations: L - Lecture, PXX Poster (XX)Number, STX - Selected participants Talk (X)Number.

\*\* Venue CSB, IISER Thiruvananthapuram, Vithura Campus.  
All days Tea will be served at venues @10:45 and @14:30