

Day 1: Monday, April 17, 2023

9.00-10.00 am	Registration (UG 05, EMF, Basement (-1) Convergence Block)
10:05 am	Inauguration by Lamp Lighting
10:10 am	Remarks by Prof. T. C. Nag , In Charge EM Facility
10:15 am	Remarks by Prof. A. Shariff , Head, Dept. of Anatomy
10:20 am	Address by Dr. Garima Gupta , Dept of Biotechnology, Ministry of Science & Technology, Govt of India
10:30 am	Address by Dr. Pratishtha Pandey , Head, Department of R&D Infrastructure DST, Government of India
10:40 am	Inaugural remark by the Chief Guest Prof. M Srinivas , Director, AIIMS, New Delhi
10:50 am	Introduction to the workshop participants
11:00 am	Vote of Thanks by Dr. S. C. Yadav , EMF, Anatomy
11:00-11.30am	High Tea
11:30-12:00pm	Key Note Lecture Prof. T.P. Singh , Department of Biophysics, AIIMS, New Delhi Lecture 1: Structure of mammalian heme lactoperoxidase enzyme and enhancement of its innate immune action by adding new substrates to the lactoperoxidase system
12:00-1:00 pm	Dr. Partha Pratim Datta , IISER, Kolkata Lecture 2: Introductory Room temperature to Cryo-Electron Tomography
1:00-2:00 pm	Lunch Break
2:00-3:00 pm	Shikha Chaudhary and Saniya Yasmin, Dr. Ravi Prakash Hands-on 1: Growing cells on the grid for cryo-ET
3:00-3:45 pm	Dr. Dilip Kumar , Ashoka University, Haryana Lecture 3: Cryo-electron tomography: a 3D snapshot of macromolecular complexes in their native environment
3:45-4:45 pm	Prof. Peter J Peters , Maastricht University, Netherlands Lecture 4: Understanding of the invisible hands of sample preparation for Cryo-EM Tea Break
4:45-5:45 pm	Shikha Chaudhary, Dr. Ravi Prakash & ThermoFisher Scientific Hands-on 2: Plunge freezing of macromolecules (vitrobot)
5:45-7:30 pm	Shikha Chaudhary, Dr. Ravi Prakash Hands-on 3: Demonstration of cryo GRID transfer and sample insertion

Day 2: Tuesday, April 18, 2023

9:00-10:00 am	Prof. Peter J Peters, Maastricht University, Netherlands Lecture 5: Cryo-EM structures from sub-nl volumes using pin printing and jet vitrification
10:00-10:45 am	Dr. Vineet Chaudhary, AIIMS, New Delhi Lecture 6: High-Pressure Freezing Tea break during the Hands-on
10:45-12:00 pm	Dr. Ramanujam Srinivasan, NISER Bhubaneswar and Dr. Indu Barwal, Mr. Shrikant Wakankar, Leica Microsystem Hands-on 4: Demonstration of experimental procedure for high- pressure freezing
12:00-1:00 pm	Dr. Partha Ghosal, DMRL, Hyderabad Lecture 7: 3D advanced characterization of bio-materials using electron microscopy
1:00-2:00 pm	Lunch Break
2:00-3:00 pm	Dr. Indu Barwal, Mr. Shrikant Wakankar, Leica Microsystem & Shikha Chaudhary, Dr. Ravi Prakash Hands-on 5: Plunge freezing of cells (EMGP2)
3:00-3:45 pm	Dr. Ramnathan Natesh, IISER, Thiruvanthapuram Lecture 8: MicroED and cryoET in structural characterization of macromolecules/macromolecular complexes
3:45-4:30 pm	Mr. Nie Xin (Thermo Fisher Scientific) Hands-on 6: Application of Cryo FIB and fluorescence light microscope correlative system (iFLM) Tea Break along with Hands-on
4:30-5:15 pm	Dr. Saikat Chakraborty, MPI Biochem , Germany Lecture 9: Prospects of high resolution visual proteomics in cellular structural biology
5:15-6:30 pm	Dr. Rengarajan Pelapur (Thermo Fisher Scientific) Hands-On 7: Qualitative Cryo-electron tomography using image processing and convolutional neural networks

Day 3: Wednesday, April 19, 2023

9:00-9:45 am *Dr. Digvijay Singh, University of California San Diego, USA*

Lecture 10: Molecular photography inside the cell

9:45-10:30 am *Dr. Tofayel Ahmed, SINP, Kolkata*

Lecture 11: Grid-freezing machine accessories for Cryo-tomography users

10:30-12:15 pm *Shikha Chaudhary and Dr. Ravi Prakash, AIIMS and ThermoFisher Scientific*

Hands-on 8: Data collection for tomography on Talos S

Tea along with Hands-on

12:15-1:00 pm *Dr. Debnath Ghoshal, University of Melbourne, Australia*

Lecture 12: Subtomogram averaging: Bringing signal out of noise

1:00-2:00 pm Lunch break

2:00-2:30 pm *Departure from AIIMS to IIT, New Delhi*

2:30-3:00 pm *Prof. Manidipa Banerjee, IIT, Delhi*

Hands-on 9: Demonstration of Grid Clipping

3:00-4:00 pm *Prof. Manidipa Banerjee, IIT, Delhi*

Hands-on 10: Screening of the Grids, Atlas, and medium montage

4:00-6:00 pm *Prof. Manidipa Banerjee, IIT, Delhi*

Hands-on 11: Tilt Series data collection

6:00-6:30 pm Return to AIIMS, New Delhi

7:00-9:00 pm *Dr. Tofayel Ahmed, SINP, Kolkata*

Hands-on 12: Tomogram generation by IMOD

Day 4: Thursday, April 20, 2023

8:00-10:30 am	<p><i>Dr. Digvijay Singh, University of California, San Diego, USA</i></p> <p>Hands-on 13: Subtomogram averaging and segmentation using AMIRA</p> <p>Tea along with Hands-on</p>
10:30-12:15 pm	<p><i>Dr. Vidya Mangala Prasad, MBU, IISC, Bengaluru</i></p> <p>Lecture 13: Principle and processes involved in determining high resolution structures using sub-tomogram averaging</p>
12:15-1:00 pm	<p><i>Dr. Somnath Dutta, MBU IISC, Bengaluru</i></p> <p>Lecture 14: Cryo-EM sample preparation and data collection using a 200kv microscope</p>
1:00-2:00 pm	<p>Lunch Break</p>
2:00-3:00 pm	<p><i>Prof. Peter J Peters, Maastricht University, Netherlands</i></p> <p>Lecture 15: Cryo-electron tomography on focused ion beam lamellae transforms structural cell biology</p>
3: 00-3:45 pm	<p><i>Dr. Saikat Chowdhury, CCMB, Hyderabad</i></p> <p>Lecture 16: From tomography to single particle: Using tilts to solve structures of macromolecular assemblies</p>
3:45-4:00 pm	<p>Tea Break</p>
4:00-5:00 pm	<p><i>Dr. Appu Kumar Singh, IIT-Kanpur</i></p> <p>Lecture 17: Two-dimensional class average methods of image processing in cryo-electro microscopy</p>
5:00-6:00 pm	<p><i>Shikha Chaudhary AIIMS, Dr. Indu Barwal and Mr. Shrikant Wakankar, Leica Microsystem</i></p> <p>Hands-on 14: Demonstration of CEMOVIS (Cryo Ultramicrotomy)</p>

Day 5: Friday, April 21, 2023

9:00-10:00 am Registration (Dr Ramalingaswami Boardroom)

10:05 am Inauguration by Lamp lighting

10:10 am Remarks by Prof. T. C. Nag, In Charge EM Facility

10:15 am Remarks by Prof. A. Shariff, Head, Dept. of Anatomy

10:20 am Address by Dr. Garima Gupta, Dept of Biotechnology, Ministry of Science & Technology, Govt of India

10:30 am Release of Souvenir

10:35 am Address by Dr. Pratishtha Pandey, Head, Department of R&D Infrastructure DST, Government of India

10:40 am Inaugural remark by the Chief Guest Prof. M Srinivas, Director, AIIMS, New Delhi

10:45-11:30 am Prof. Peter J Peters, Maastricht University, Netherlands

Key Note Talk 1: Beauty and Benefit of Cryo-electron Microscopy

11:30-12:00 pm Tea Break

Theme: "Recent development in Cryo Electron Tomography"
Session Chair: Prof T. C. Nag, Dr. Tony G Jacob

12:00-12:30 pm Dr. Saikat Chowdhury, CCMB, Hyderabad

Invited Talk 2: A tale of tilting: Resolving actin filament nucleation by Arp2/3 complex

12:30-1:00 pm Dr. Debnath Ghoshal, University of Melbourne, Australia

Invited Talk 3: Understanding architecture , assembly and regulation of bacterial toxin delivery systems by electron cryotomography

1:00-1:30 pm Dr. Ramanujam Srinivasan, NISER, Bhubaneswar

Invited Talk 4: Assembling of the Bacterial cytokinetic Z-Ring

1:30-2:30 pm Lunch Break and Posters

Day 5: Friday, April 21, 2023

Theme: "Exciting applications of Cryo Electron Tomography"
Session Chair: Prof. A Shariff, Dr Prabhakar Singh

2:30-3:00 pm *Dr. Dilip Kumar, Ashoka University, Haryana*

Invited Talk 5: Structural and functional insights into rotavirus capping machinery and its role in host innate immune response

3:00-3:30 pm *Dr. Uddipan Das, AIIMS, New Delhi*

Invited Talk 6: Cryo-EM structure of ABC transporter complex from Mycobacterium sp.

3:30-3:40 pm *Dr. Ravi Prakash, EMF, AIIMS, New Delhi*

Oral Talk 1: Aryl Hydrocarbon Receptor-interacting Protein-like 1 (AIP1): a specialized chaperone for effector enzyme in the phototransduction cascade

3:40-3:50 pm *Ajay Pal, NBRC, Manesar*

Oral Talk 2: SARS-CoV-2's ORF6 cause ROS surge and necroptosis in culture neurons

3:50-4:00 pm *Dr. Indu Barwal, Leica Microsystems*

Promontory talk 1: See the Hidden with Precision

4:00-4:30 pm **Tea Break**

4:30-5:00 pm *Dr. Somnath Dutta, MBU IISC Bengaluru*

Invited Talk 7: Structural and functional characterization of DNA-binding protein with genomic DNA and pore forming toxin with liposomes using cryo-EM

5:00-5:30 pm *Dr. Saikat Chakraborty, MPI Biochemistry, Munich Germany*

Invited Talk 8: Microtubule quality control inside neurons

5:30-8:00 pm **Posters Session and Dinner**

Day 6: Saturday, April 22, 2023

Theme: "Recent high impact biological results through Cryo Electron Tomography"

Session Chair: Prof Peter J Peters, Dr SC Yadav

- 9:00-9:30 am **Dr. Digvijay Singh, UC San Diego, USA**
Invited Talk 9: May the pores be with you on your journey to understand why one ring can't rule them all
- 9:30-10:00 am **Dr. Appu Kumar Singh, IIT-Kanpur**
Invited Talk 10: Cryo-EM illuminates new biology of orphan receptors
- 10:00-10:30 am **Dr. Partha Pratim Datta, IISER Kolkata**
Invited Talk 11: Understanding cellular functionality of an essential GTPase CgtA in vibrio cholerae through biochemical means and electron microscopy
- 10:30-10:40 am **Mansi Sharma, IIT, Kanpur**
Oral Talk 3: Unravelling molecular organization of photoreceptor synapses by cryo-electron tomography
- 10:40-10:50 am **Sania Yasmin, Shikha Chaudhary**
Oral Talk 4: Growing Cells on copper grids for Electron Tomography
- 10:50-11:00 am **Promontory Talk 2**
- 11:00-11:30 am **Tea Break**
- 11:30-12:00 pm **Dr. Ramanathan Natesh, IISER, Trivandrum**
Invited Talk 12: Structural studies of Transcription regulators in mycobacterial spp.
- 12:00-12:30 pm **Dr. Tofayel Ahmed, SINP, Kolkata**
Invited Talk 13: Molecular landscape of chloroplast and mitochondrial membranes by Cryo-ET
- 12:30-1:00 pm **Dr. Gayathri Pananghat, IISER, Pune**
Invited Talk 14: Cytoskeletal filaments that sculpt a helical bacterial cell
- 1:00-1:10 pm **Swarandeeep Singh, AIIMS, New Delhi**
Oral Talk 5: Generation & Structural Characterization of HIV-1 envelope mimics from a pediatric elite-neutralizer
- 1:10-1:20 pm **Promontory Talk 3**
- 1:20-1:30 pm **Promontory Talk 4**
- 1:30-2:30 pm **Lunch Break**
- 2:30-3:30 pm **Valedictory Function**