

# Workshop on Machine Learning for cryoEM (16 Sep 2022–23 Sep 2022)



**Venue**  
IMS Auditorium  
Hybrid

## ORGANIZING COMMITTEE

### Co-Chairs

Hui Ji  
National University of Singapore

Duane Loh  
National University of Singapore

Steven J Ludtke  
Baylor College of Medicine

Paul Matsudaira  
National University of Singapore

Ardan Patwardhan  
European Molecular Biology Laboratory,  
European Bioinformatics Institute (EMBL-  
EBI)

Yong Zi Tan  
National University of Singapore

# Workshop on Machine Learning for cryoEM (16 Sep 2022–23 Sep 2022)

All times are indicated in **GMT+8**.

For time zones conversion: [Click Here](#)

Friday, 16 September 2022		
Time	Title	Speaker
0920–0930	Registration	
0930–1130	<i>Tutorial</i> Single particle imaging	Dari Kimanius MRC Laboratory of Molecular Biology, UK  Kun Qu National University of Singapore, Singapore  Yong Zi Tan National University of Singapore, Singapore
1130–1330	Lunch Break	
1330–1600	<i>Tutorial</i> RELION	Dari Kimanius MRC Laboratory of Molecular Biology, UK  Kun Qu National University of Singapore, Singapore  Yong Zi Tan National University of Singapore, Singapore

Monday, 19 September 2022		
Time	Title	Speaker
0900–0920	Registration	
0920–0930	Opening Remarks	Duane Loh National University of Singapore, Singapore
0930	Session Chair: Duane Loh (National University of Singapore)	
0930–1030	ZOOM Machine learning approaches to automate single particle cryo-EM data acquisition	Yilai Li University of Michigan, USA
1030–1130	Detection and segmentation of objects in cryo-electron micrographs using geometric deep learning	Tristan Bepler Simons Machine Learning Center, USA
1130–1330	<b><i>Lunch at IMS</i></b>	
1330–1430	SmartScope	Jonathan Bouvette National Institutes of Health, USA
1430–1530	ZOOM Machine learning needs and trends for Single Particle Analysis	Carlos Sorzano Spanish National Research Council (CSIC), Spain
1530–1600	Group Photo & Coffee Break Poster Session at IMS Lounge	

  

Tuesday, 20 September 2022		
Time	Title	Speaker
0920–0930	Registration	
0930	Session Chair: Yong Zi Tan (National University of Singapore)	
0930–1030	ZOOM Fast, Accurate, and Fully Automated Macromolecular Complex Structure Prediction and Determination from 3D CryoEM	Dong Si University of Washington Bothell, USA
1030–1130	Representation learning with prior constraints	Dari Kimanius MRC Laboratory of Molecular Biology, UK
1130–1330	<b><i>Lunch Break</i></b>	
1330–1430	ZOOM A new era in (structural) biology - Impact of structure prediction using AI methods	Sameer Velankar EMBL-EBI Hinxton, UK
1430–1530	At-scale cryo-ET data processing for high-resolution structural determination of membrane proteins	Mikhail Kudryashev Max Delbrück Center for Molecular Medicine in the Helmholtz Association (MDC), Germany

Tuesday, 20 September 2022		
Time	Title	Speaker
1530–1600	Coffee Break Poster Session at IMS Lounge	
1600–1630	Cryo-EM inspired EM applications	Duane Loh National University of Singapore, Singapore
Wednesday, 21 September 2022		
Time	Title	Speaker
0920–0930	Registration	
0930	Session Chair: Lu Gan (National University of Singapore)	
0930–1030	ZOOM Heterogeneity analysis in cryo-EM by covariance estimation and manifold learning	Amit Singer Princeton University, USA
1030–1130	Deep learning based Gaussian mixture model for characterizing variability in CryoEM	Muyuan Chen Stanford University
1130–1330	Lunch Break	
1330–1430	Smart Leginon	Anchi Cheng New York Structural Biology Center, USA
1430–1530	ZOOM TomoTwin: Generalized particle picking for cryo-ET with metric learning	Thorsten Wagner MPI Dortmund, Germany
1530–1600	Coffee Break Poster Session at IMS Lounge	
Thursday, 22 September 2022		
Time	Title	Speaker
0920–0930	Registration	
0930	Session Chair: Tristan Bepler (Simons Machine Learning Center, USA) Duane Loh (National University of Singapore)	
0930–1030	ZOOM Reducing the training data annotation cost for deep learning based cryo-electron tomography analysis	Min Xu Carnegie Mellon University, USA
1030–1130	ZOOM Building and Validating Protein Structure Models for cryo-EM Maps Using Deep Learning	Daisuki Kihara Purdue University, USA
1130–1330	Lunch Break	

Thursday, 22 September 2022		
Time	Title	Speaker
1330–1430	Towards automatic shape-based clustering and recognition in cryo-ET	Jola Mirecka Collaborative Computational Project for electron cryo-microscopy (CCP-EM), UK
1430–1530	Modeling large macromolecular assemblies: can we combine integrative approaches with deep learning?	Shruthi Viswanath National Center for Biological Sciences (TIFR), India
1530–1600	Coffee Break Poster Session at IMS Lounge	
1600–1630	Poster Talk Closing Remarks	Paul Matsudaira Yong Zi Tan National University of Singapore, Singapore
Friday, 23 September 2022		
Time	Title	Speaker
0920–0930	Registration	
0930–1130	<i>Tutorial</i> SmartScope	Jonathan Bouvette National Institutes of Health, USA
1130–1330	Lunch Break	
1330–1530	<i>Tutorial</i> Smart Leginon	Anchi Cheng New York Structural Biology Center, USA

\*This schedule is accurate as of 15 Sep 2022.