Resources: Cryo-EM Biophysics 101
61st Annual Biophysical Society Meeting 2017

Reviews

- **Realizing the potential for electron cryo-microscopy.**
  Henderson, Richard. (2003) Quarterly Reviews of Biophysics. 37:3-13.
- **How cryo-EM is revolutionizing structural biology**
  Xiao-chen Bai, Greg McMullan, Sjors H.W Scheres
  Trends in Biochemical Sciences, Volume 40, Issue 1, 49 - 57 (2015).
- **Particle Cryo-EM at Crystallographic Resolution.**
  Cheng, Yifan. (2015) *Cell 161*.
- **The Current Revolution in Cryo-EM.**
  Egelman, H. Edward. (2016) *Biophysical Journal*. 110: 1008-1012
- **Cryo-electron tomography: The challenge of doing structural biology in situ.**
  Lučić, Vladan, Alexander Rigort, and Wolfgang Baumeister.
  The Journal *of Cell Biology* 202.3 (2013): 407–419.

Recommended Reading

- **Three-Dimensional Electron Microscopy of Macromolecular Assemblies: Visualization of Biological Molecules in Their Native State** by Joachim Frank. *Oxford University Press* (2006).
- **Electron Tomography Methods for Three-Dimensional Visualization of Structures in the Cell** by Joachim Frank. *Springer* (2006).

Courses

Online Courses:

- Lectures on structural biology software including cryo-EM packages hosted by SBGrid consortium: https://www.youtube.com/playlist?list=PLVetO1F9gm_oa--j37yrjzJ4yVJYzPVN5
- Training webinars on 3DEM modeling apps *Situs* and *Sculptor:* https://sbgrid.org/news/sbgrid-lunch-break-willy-wriggers-2016-08-05
- Course on the fundamental principles underlying cryo-electron microscopy www.cryo-em-course.caltech.edu
- iBioSeminar on cryo-EM: http://www.ibiology.org/ibioseminars/techniques/eva-nogales-part-1.html
- Getting Started in Cryo-EM. https://www.coursera.org/learn/cryo-em
- Do's and Don'ts of Cryo-electron Microscopy https://www.jove.com/video/52311/do-s-don-ts-cryo-electron-microscopy-primer-on-sample-preparation

On-Site Courses:

- Lecture series on EM given at the MRC Laboratory of Molecular Biology - LMB: ftp://ftp.mrc-lmb.cam.ac.uk/pub/scheres/EM-course
- Lectures from workshops at the National Resource for Automated Molecular Microscopy (NRAMM): http://nramm.nysbc.org/workshops
- Workshops and Symposiums from National Center for Macromolecular Imaging (NMCI): http://ncmi.bcm.edu/ncmi/events/workshops
- EMBL Practical Course on Cryo-EM and Image Processing http://www.embl.de/training/events/2016/CRY16-01/programme/index.html

- Advanced Workshop on Cryo-Electron Tomography: https://www.nexperion.net/expertise/cryotomo2017
- University of Zurich Winter School - Practical course in advanced microscopy. http://www.zmb.uzh.ch/en/teaching/Winterschool.html
- The Brazil School for Single Particle Cryo-EM: https://www.imagescience.de/school.html
- Enhancing your Image Course: http://www.rms.org.uk/discover-engage/event-calendar/enhancing-your-image-2016.html
- Collaborative Computational Project (CCP)-EM workshops and courses. http://www.ccpem.ac.uk/courses.php and CCP-EM Spring Symposium. https://sas.stfc.ac.uk/vportal/VideoPlayer.jsp?ccsid=C-5190fde7-53fa-43d6-968d-843ac15a202c:1#

On-line Materials

- 3DEM Wiki. https://en.wikibooks.org/wiki/Three_Dimensional_Electron_Microscopy
- Software Tools For Molecular Microscopy. https://en.wikibooks.org/wiki/Software_Tools_For_Molecular_Microscopy
- 3D EM Methods. https://biocomp.cnb.csic.es/3DEM-Methods/index.php/Main_Page
- 3D-EM Mailing List. http://3dem.ucsd.edu/mailinglist.shtm
- Tomography Software. http://www.andrewnoske.com/wiki/Tomography_software

Major Meetings

- **Gordon Research Conference on Three-Dimensional Electron Microscopy**
- **Microscopy and Microanalysis Annual Meeting**
- **Biophysical Society Annual Meeting: Cryo-EM Biophysics 101**
- **Other Meetings and workshops: http://www.emdatabank.org/3dem_events.html**

Shared Facilities

- **National Center for Macromolecular Imaging (NCMI) Baylor School of Medicine.** NCMI offers Collaborative and Service Projects. http://ncmi.bcm.edu/ncmi/collaborations/project_proposal/confirmpage
- **iNEXT** network: European researchers can apply for cryo-electron microscope time at EMBL Heidelberg and at other major centers in Europe http://www.inext-eu.org/
- **Janelia Research Campus.** Cryo-Electron Microscopy https://www.janelia.org/support-team/cryo-electron-microscopy and Micro-ED http://cryoem.janelia.org/pages/MicroED
- **European Molecular Biology Laboratory (EMBL).** **http://www.embl.de/services/core_facilities/em/index.html**
- **New York Structural Biology Center (NYSBC).** National Resource for Automated Molecular Microscopy. http://nramm.nysbc.org
- **National Center for Microscopy and Imaging Research (NCMIR).** University of California San Diego. https://ncmir.ucsd.edu
- **Instruct-FI CryoEM Facility.** University of Helsinki. Collaborative and Service projects. http://blogs.helsinki.fi/butcher/tietoja/
- **Molecular Electron Microscopy Core.** University of Virginia School of Medicine. https://med.virginia.edu/molecular-electron-microscopy-core/
- **Massachusetts Facility for High-Resolution Electron Cryo-Microscopy.** University of Massachusetts Medical School. http://www.umassmed.edu/research/cores/cryo-em-core-facility/
- **Biological Science Imaging Resource,** Florida State University. http://bsir.bio.fsu.edu/
- **Multiscale Microscopy Core,** Oregon Health & Science University. http://www.ohsu.edu/xd/research/research-cores/multi-scale-microscopy-core/