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## *Three Dimensional Electron Microscopy Imaging Technology in Life Sciences*

Biological electron microscopy has gone into a new era with great advances of specimen preparation, instrumentation and data processing. With the three dimensional reconstruction technique, the three dimensional electron microscopy (3DEM) has been becoming important approaches to image the biological system in high resolution and multiple scales. Based on the principle of the methodology itself, 3DEM can be classified into several categories to meet different needs from structural biology to cell biology, developmental biology and neuron sciences. In this talk, I will summarize my personal view of different 3DEM techniques and then introduce the relevant technology developments in our biological imaging center.

### *References*

- [1] Li X., Zhang S., Zhang J. and Sun F. (2018), In situ protein micro-crystal fabrication by cryo-FIB for electron diffraction. *Biophysics Reports* 4(6): 339–347.
- [2] Li S., Ji G., Shi Y., Klausen L.H., Niu T., Wang S., Huang X., Ding W., Zhang X., Dong M., Xu W., and Sun F. (2018), High-vacuum optical platform for cryo-CLEM(HOPE): a new solution for non-integrated multiscale correlative light and electron microscopy. *Journal of Structural Biology*, 201(1): 63–75.
- [3] Li X., Ji G., Chen X., Ding W., Sun L., Xu W., Han H., and Sun F. (2017), Large scale three-dimensional reconstruction of an entire *Caenorhabditis elegans* larva using AutoCUTS-SEM. *Journal of Structural Biology*, 200(2): 87–96.
- [4] Shi, Y., Wang, L., Zhang, J., Zhai, Y. and Sun F. (2017) Determining the target protein localization in 3D using the combination of FIB-SEM and APEX2, *Biophysics Reports*. 3, 92–99.
- [5] Deng Y., Chen Y., Zhang Y., Wang S., Zhang F. and Sun F. (2016), ICON: 3D reconstruction with ‘missing-information’ restoration in biological electron tomography. *Journal of Structural Biology* 195(1): 100–112.
- [6] Zhang J., Ji G., Huang X., Xu W. and Sun F. (2016), An improved cryo-FIB method for fabrication of frozen hydrated lamella. *Journal of Structural Biology* 194(2): 218–223.

- [7] Han R., Wang L., Liu Z., Sun F. and Zhang F. (2015), A novel fully automatic scheme for fiducial marker-based alignment in electron tomography. *Journal of Structural Biology* 192: 403–17.