Learning outcomes:

Electron Tomography and Correlative Light & Electron Microscopy
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Lecture part 1: Basics of Transmission Electron Microscopy and Electron Tomography

- The beginnings (and revival) of EM – a brief history
  TEM: Transmission Electron Microscopy principles
- In a nutshell: how does an electron microscope work?
- What is principally common between light and electron microscopes?
- What are the key differences between light and electron microscopy?
- What do you really see in an electron micrograph?

- TEM sample preparation
- How are samples for classical TEM prepared (fixation, embedding, ultrathin-sectioning, contrasting)?
- What are the caveats – where can artifacts appear?

- ET: Electron Tomography
- How can we increase the depth resolution (z-resolution) of TEM sections?
- How can we interpret and quantify 3D-EM data?

Lecture part 2: Basics of Scanning Electron Microscopy and Correlative Light and Electron Microscopy

- SEM: Scanning Electron Microscopy
- In a nutshell: how does an scanning electron microscope work?
- What is principally common between SEM and TEM?
- What are the key differences between SEM and TEM?

- SEM sample preparation
- How are samples for classical SEM prepared (fixation, (critical point) drying, coating (carbon coating / sputtering)?
- What are the caveats – where can artifacts appear?

- CLEM: Correlative Light and Electron Microscopy and 3D-EM
- What are the principles of array tomography (AT) as example of a CLEM technique?
- How is correlation of epitopes and ultrastructure achieved?
- How can AT be advanced to label RNAs?