

BBCB6340 Cryo-EM course (1 credit)

This is an introductory and practical course on cryo-electron microscopy methods and applications. The purpose of this course is to help students jump start their research using cryo-electron microscopy or to obtain critical knowledge to design their research with cryo-electron microscopy methods. The course will include the following components: 1) lectures on the principles of cryo-electron microscopy, single particle analysis (SPA), and cryo-electron tomography (cryo-ET), 2) a sample freezing workshop, 3) hands-on SPA and cryo-ET data analysis activities, 4) student presentations of cryo-EM related research articles.

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SUPPORT (Don't hesitate to ask questions!!)
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TAs

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Time and place

Lectures will be on Wednesday 1:45 PM – 3:15 PM from January 22 – April 30
(except March 12 in spring break) in BRB 253 (Unless otherwise indicated).

Class resource

<http://cryo-em-course.caltech.edu/>

Course Outline

- (1) Principles of cryo-electron microscopy
- (2) Principles and practical workshop of cryo-electron microscopy single particle analysis
- (3) Principles and practical workshop of cryo-electron tomography
- (3) Student presentations

Grading will be based on the written report of single particle analysis and cryo-ET data analysis hand-on activities (75%) and research article presentation (25%).

Class schedule:

Jan 22

Coordinators: Yi-Wei Chang

- (1) Principles of cryo-electron microscopy

Jan 29, Feb 5, 12, 19, 26

Coordinators: Kenji Murakami, Linh Pham

- (1) Principles of single particle analysis (Jan 29)
- (2) Hands-on activates of SPA data analysis (Feb 5, 12, 19, 26)

Mar 5

Coordinators: Shrawan

- (1) EMRL sample freezing and imaging workshop

Mar 19, 26, Apr 2

Coordinators: Yi-Wei Chang, Leon Palao III, Matthew Martinez

- (1) Principles of cryo-electron tomography (Mar 19)
- (2) Hands-on activates of cryo-ET tomogram reconstruction and subtomogram averaging (Mar 26, Apr2)

Apr 16

Last day of turning in SPA and cryo-ET analysis reports

Apr 9, 16, 23, 30

Each student conducts a 10-min presentation (+2-min Q/A) of cryo-EM-related research article.