

### **Cryo-EM mini-course (1 credit)**

This is an introductory course on methods and applications of cryo-EM single-particle analysis and tomography. The course will be broken up into three parts: 1) Principles of single-particle reconstruction including hands-on experience with the technology; 2) Principles of cryo-EM tomography including data analysis; 3) Student presentations of their 3D reconstructions and research article.

### **Co-Directors**

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### **Time and place**

Lectures will be on Wednesday 2:00 PM – 3:00 PM (4:00 PM) from January 15 - April 29. (except March 11 in spring break) in 202 Anat-Chem (Unless otherwise indicated)

### **Required Text**

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

### **Course Outline**

The course will be broken up into three parts

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

Grading will be based on the following: the results of 3D reconstructions (40%), presentation (40%) and a final exam (20%)

### **Tentative Schedules:**

#### Jan. 15, 22.

Coordinators: Kenji Murakami, Sudheer Molugu,  
Principles of cryo-EM single particle analysis (Fourier Transform, CTF correction, single-particle reconstruction)

#### Jan. 29, Feb. 5, 12, 19, 26, Mar. 4

Coordinators: Kenji Murakami, Sudheer Molugu, Trevor Van Eeuwen  
(1) Hands-on workshop of sample freezing and data collection (Jan. 29, Feb 5)  
(2) Data analysis (Feb 12, 19, 26, Mar. 4)

#### Mar 18, 25, Apr. 1

Coordinators: Yi-Wei Chang  
(1) Principles of cryo-electron tomography (Mar 18, 25)  
(2) Hands-on workshop of cryo-electron tomography data analysis (Apr 1)

#### Apr. 8, 15, 22

Students will present a 10 min lecture on their cryo-EM single-particle analysis and 15 min presentation of research article.

#### Apr. 29

The final exam will be held on the final day assigned to the course.