

Chemistry 7770, section 002 Fall 2018
Special Topics: Introduction to Cryo-EM



Professor Sean J. Johnson

Time: Wednesday 12:30-2:00 pm, Widt 333

Office Hours: By appointment (W237)

Text: No text is required for this course. All reading materials will be made available on the Canvas site.

Canvas: Course materials, including assignments and lecture notes will be available through the course Canvas page. This site is found at canvas.usu.edu. Username = banner ID; Password = banner pin. Only students who are registered for the class will have access to the course Canvas pages.

Computer Resources: Web-based and freely downloadable software (mac and PC compatible) will be required to complete course assignments. All required software will be available on designated departmental computers.

Prerequisites: Chem 6750 (Structural Biology), or instructor permission.

Provisions: The administration of Chem 7770 will adhere strictly to the regulations outlined in the Fall Semester Schedule of Classes. Students not enrolled in the course may sit in only with instructor approval.

Course content: Chemistry 7770 is a special topics course in biochemistry. The course is designed to introduce students to basic concepts of performing a Cryo-EM experiment. A major emphasis will be placed on data processing and refinement. A tentative outline of the topics to be covered in the class meetings is included on the last page of the syllabus.

Grading:

| | |
|---------------------------|-------------------|
| Lecture discussions | 80 points |
| Tutorial project | 100 points |
| Other assignments..... | 40 points |
| Total | 220 points |

Description of Graded Assignments/Presentations:

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

Everyone will be expected to review and be prepared to discuss the assigned lectures and concept check questions each week. Students will be assigned individual concept sections to present to the class.

Tutorial Project –

Each group will develop and present a detailed tutorial describing a critical step in the cryo-EM workflow. This project will represent a significant component of the overall grade. Grades will be assessed at defined benchmarks throughout the course.

Other Assignments –

In addition to the projects and presentations described below, additional assignments will be given throughout the semester to reinforce topics discussed in class. There will be no final exam.

Tentative Course outline:

| # | week | Caltech lectures/Discussion | Tutorial Project | Other |
|----|---------|---|--|---------------------------------|
| 1 | Aug 29 | | | |
| 2 | Sept 5 | Part 1 – EM anatomy | Finalize tutorial topics & groups | Literature/Topic assignment due |
| 3 | Sept 12 | | | |
| 4 | Sept 19 | Part 2 – Fourier Transforms | Project updates | |
| 5 | Sept 26 | Part 3 – Image Formation | Project updates | |
| 6 | Oct 3 | Part 3 (continued) Part 4 – Fundamental Challenges | Project updates | |
| 7 | Oct 10 | Part 5 – Tomography | Tutorial Presentations/Initial Feedback | |
| 8 | Oct 17 | Part 6 – Single Particle Analysis | Tutorial practice | |
| 9 | Oct 24 | Part 6 (continued) | Group Feedback report/proposed revisions | |
| 10 | Oct 31 | Part 7 – Electron Crystallography | Final Tutorial Presentations | |
| 11 | Nov 7 | | | |

In accordance with the Americans with Disabilities Act, reasonable accommodations will be provided for all persons with disabilities in order to ensure equal participation in Chem 7770. In cooperation with the Disability Resource Center, reasonable accommodation will be provided for students with disabilities. Please meet with the instructor during the first week of class to make arrangements. Alternative format print materials, large print, audio, diskette or Braille, will be available through the Disability Resource Center.