

Practical X-ray Crystallography, BIOS535

Spring 2010, second half of the spring semester, starting March 9
Tues and Thursdays, 1-4 pm, Keck 308
Instructor: Yizhi Jane Tao; Office: Keck 326; ytao@rice.edu, x4910

Schedule

March 9	<u>Lecture</u> : Introduction – what is X-ray crystallography; crystallization <u>Lab</u> : None
March 11	<u>Lecture</u> : Crystal symmetry <u>Lab</u> : Crystallization of chicken egg white (CEW) lysozyme
March 16	<u>Lecture</u> : X-ray and radiation safety <u>Lab</u> : Preliminary crystal analysis; High throughput crystallization (demo of the Hydra II Plus-One robot)
March 18	<u>Lecture</u> : Bragg's law and Miller indices <u>Lab</u> : Mounting crystals for data collection
March 23	<u>Lecture</u> : Ewald sphere and data collection <u>Lab</u> : Data collection using the Rigaku RAXIS-IV++ diffraction system
March 25	<u>Lecture</u> : Intensity and systematic absences <u>Lab</u> : Evaluating quality of raw data and indexing - indexing using the program HKL
March 30	<u>Lecture</u> : Patterson synthesis and Patterson map <u>Lab</u> : Data reduction and space group determination – scaling using the program HKL
April 1	NO CLASS – Spring Recess
April 6	<u>Lecture</u> : MIR <u>Lab</u> : Diffraction intensity analysis, the use of program CCP4i:TRUNCATE
April 8	<u>Lecture</u> : MR <u>Lab</u> : Molecular replacement, the use of program CCP4i:AMORE
April 13	<u>Lecture</u> : MAD <u>Lab</u> : Electron density maps and model building, the use of program O
April 15	<u>Lecture</u> : Refinement <u>Lab</u> : Refinement of atomic structures, the use of program CNS
April 20	<u>Lecture</u> : Stereochemistry <u>Lab</u> : Stereochemistry and model assessment, the use of program PROCHECK
April 22	<u>Lecture</u> : Literature analysis <u>Lab</u> : Making graphical representations of atomic structures, the use of program Pymol

Assignments and Grading

This is a graduate level laboratory course and is intended to convey practical application of crystallographic methods and use of equipment and software. Very class will be started with a 30-min lecture to cover theoretical background that is necessary for understanding of various labs. Attendance and participation will count 70% in the grading of this course. Class

participation in the form of questions and comments is encouraged. There will not be an exam. In addition to the instructor's evaluation of your attendance and participation, the grade will be based on the problem sets (10%) and the results of the computational labs (20%). Students are encouraged to work together on the problem sets. The problem sets will be evaluated as either Satisfactory or Unsatisfactory.

Students with Disabilities

Any student needing academic adjustments or accommodations for this class due to a disability is encouraged to contact Dr. Tao as soon as possible during the first 2 weeks of the semester. Additionally, students should contact the Coordinator for Disabled Student Services in the Ley Student Center. All discussions regarding student disabilities will be kept strictly confidential.