

**MCELLBI N184 | 2 Units**  
**IGI CRISPR Workshop: Practical Aspects of Precision Biology for Undergraduates**

**Course Description:** This 3 week lab course will focus on applications of CRISPR technology as a platform for genome editing and functional genomics. The program will consist of lectures from experts in the field and a hands-on laboratory experience demonstrating CRISPR editing both in vitro and in vivo. Workshop faculty will address topics in genome editing and CRISPR-Cas9 research, including basic and enhanced CRISPR methods, cellular repair mechanisms, regulation of gene expression, bioinformatics, applications to various organisms, and bioethics

**Course Session:** 3-week session (July 23 - August 10)

**Course Schedule:** Lecture on MTuWTh 1-2 PM in 2063 VLSB and Lab on MTuWTh 2-5pm in 4054 VLSB

**Prerequisites:** Anyone of the lab courses (110L, 133L, 140L, 150L or 160L) or equivalent lab experience

**Division:** MCB

**Grading Option:** P/NP

**Final or other assessment format:** Lab Report 80% Class Participation/Lab Citizenship 20%

**Instructors:**

Jacob Corn  
Office: 212C  
e-mail: jcorn@berkeley.edu  
Office Hours: by appointment

**Lab TAs:** TBD

**Guest Lecturers:** TBD

**Absences**

If you are ill or have an unplanned absence, please work with your lab partner to review any lectures or lab procedures that you missed. Extended unplanned absences may result in a NP grade.

**Resources and Readings:**

TBD, will include:

- All protocols for lab works
- Rubric for grading lab report
- Major CRISPR publications
- News articles and popular science CRISPR articles

### **Week 1: Acquisition Assay**

Monday

- Lecture: Welcome, Course Introduction, Lab Safety
- Lab: Transformation of Cas1 and Cas2 plasmids, plating of bacteria, take initial sample

Tuesday

- Lecture: CRISPR immunity
- Lab: Take additional samples, PCR of CRISPR locus, run agarose gel, pick colonies for overnight cultures

Wednesday

- Lecture: Structure and Function of Cas9
- Lab: miniprep cultures and send for sequencing

Thursday

- Lecture: Genome Editing and DNA repair
- Lab: Analyze sequencing results and present.

### **Week 2: In Vitro Cleavage Assay**

Monday

- Lecture: gRNA Design
- Lab: PCR, Run agarose gel, Set up ivt overnight

Tuesday

- Lecture: Reducing Off-Target Effects
- Lab: Purification, Run RNA gel to check product

Wednesday

- Lecture: CRISPR Applications: Plants
- Lab: in vitro cleavage assay

Thursday

- Lecture: CRISPR Applications: Human Therapeutics
- Lab: Presentation of results. Bioinformatics Practical: gRNA design

### **Week 3: In Vivo Editing**

Monday

- Lecture: CRISPR Applications: Bioenergy
- Lab: Transformation of control RFP expression plasmid, Transformation of Cas9 gRNA RFP editing plasmid, Plate cells.

Tuesday

- Lecture: CRISPR Applications: Model Systems
- Lab: Observe results, pick colonies, inoculate overnight cultures with and without selection.

Wednesday

- Lecture: CRISPR Ethics/ Policy
- Lab: Plate cultures, Ethics discussion

Thursday:

- Lecture: CRISPR Ethics/ Policy
- Lab: Observe results. Presentations of final project.

## **Safe, Supportive, and Inclusive Environment**

Whenever a faculty member, staff member, post-doc, or GSI is responsible for the supervision of a student, a personal relationship between them of a romantic or sexual nature, even if consensual, is against university policy. Any such relationship jeopardizes the integrity of the educational process.

Although faculty and staff can act as excellent resources for students, you should be aware that they are required to report any violations of this campus policy. If you wish to have a confidential discussion on matters related to this policy, you may contact the Confidential Care Advocates on campus for support related to counseling or sensitive issues. Appointments can be made by calling (510) 642-1988.

The classroom, lab, and work place should be safe and inclusive environments for everyone. The Office for the Prevention of Harassment and Discrimination (OPHD) is responsible for ensuring the University provides an environment for faculty, staff and students that is free from discrimination and harassment on the basis of categories including race, color, national origin, age, sex, gender, gender identity, and sexual orientation. Questions or concerns? Call (510) 643-7985, email [ask\\_ophd@berkeley.edu](mailto:ask_ophd@berkeley.edu), or go to <http://survivorsupport.berkeley.edu/>.