EMILY C. LAUBSCHER

elaubsch@caltech.edu
(650) 483-4696

EDUCATION

California Institute of Technology *Fall 2018-Present*
Ph.D. Student in Chemistry – Chemical Biology, GPA 3.6

University of California, Berkeley *Fall 2014 – Spring 2018*
College of Chemistry, B.S. Chemistry, GPA 3.74
High Honors in Chemistry

RESEARCH INTERESTS

I have a strong background using microscopy techniques to probe the biophysical parameters of reconstituted and live cell samples. In graduate school, I plan to construct novel live cell reporters to explore the cellular variables involved in the immunometabolism of macrophages. I am passionate about developing new technologies and methods that will allow the mechanisms of cellular decision making to be elucidated.

RESEARCH EXPERIENCE

Van Valen Lab, Pasadena, CA *March 2019-present*
Graduate Student at CalTech

- Constructing a live cell reporter library to measure the cellular variables of the immunometabolism of macrophages
- Designing and validating SPARK reporters that phase-separate in specific subcellular compartments that would allow the activity of up to nine kinases to be measured simultaneously in live cells
- Creating a novel assay for measuring the chromatin state of single cells using SeqFISH

Goentoro Lab, Pasadena, CA *Jan. 2019 – March 2019*
Rotation Student at CalTech

- Studied the mechanism of signal transduction in Tgf-beta signaling
- Generated reproducible live cell time lapse data sets that demonstrated the robust transcription factor translocation upon pathway stimulation and translational response
- Utilized manifold learning to characterize the relationship between signal input and output dynamics, giving insight into its underlying mechanism

Groves Lab, Berkeley, CA *Dec. 2015 – Aug. 2018*

Undergraduate Researcher at University of California, Berkeley

Worked under Dr. Jay T. Groves, mainly investigating how oncogenic Ras mutations perturb the catalysis of RasGEF, SOS, while contributing to other efforts

- Led independent efforts to characterize interactions between SOS and oncogenic Ras mutants in vitro and in live cells with single molecule TIRF microscopy techniques
- Preparing a first author manuscript for publication
- Contributed to projects studying signaling kinetics of MAPK pathway and T cell activation, getting the opportunity to lead exploratory side efforts
- Learned cell culture, transduction, and cloning techniques

PUBLICATIONS

"Oncogenic Ras mutations perturb the catalytic behaviors of RasGEF SOS" Emily C. Laubscher, Steven A. Alvarez, Jenny J. Y. Lin, Meredith G. Triplet, Shalini T. Low-Nam, Jay T. Groves. In preparation

PRESENTATIONS

UC Berkeley, Undergraduate Research Fair, Berkeley, CA *April 2016 – 2018*

Presented a poster each spring detailing the progress in the ongoing project exploring the effect of oncogenic Ras mutations on the catalytic behaviors of RasGEF SOS

Biophysical Society Meeting, San Francisco, CA *February 2018*

Presented a poster demonstrating the effects of protein expression on the temporal dynamics of T-cell activation

RESEARCH SKILLS

Fluorescence microscopy, TIRF microscopy, confocal microscopy
Cloning, lipid bilayer preparation, protein purification, oligo library preparation
Cell culture, live cell imaging, SeqFISH, ChIL-Seq
Python, Matlab, ImageJ, Adobe Illustrator

TEACHING EXPERIENCE

Graduate Student Teaching Assistant, Pasadena, CA *Oct. 2018 – Present*

- Taught section of general chemistry lab, encouraging students of all academic disciplines to take on challenging organic chemistry concepts
- Performed lecture demonstrations that enhance student engagement with course material

MCB100A/Chem 130 Undergraduate tutor, Berkeley, CA *Jan. 2018 – May 2018*

Offered one-on-one tutoring for the undergraduate biophysics course at UC Berkeley

- Obtained a top score in the class in the previous semester, so was invited to tutor
- Helped individuals and small groups with homework questions and exam preparation

Private Tutor, Berkeley, CA *Aug. 2016 – Aug. 2017*
Tutored high school students, preparing for AP Chemistry, AP Calculus, and Chemistry SAT II.

- Worked with students weekly to improve standardized test scores
- Designed personalized curriculum to meet student needs and interests

COMMUNITY SERVICE

Science Olympiad, Pasadena, CA *Feb. 2019 – Present*
LEARNS Coach

- Coaching elementary-age students weekly for their engineering event in the upcoming Science Olympiad tournament
- Encouraging collaboration and inspiring innovation in a team of young aspiring scientists

Expanding Your Horizons, Berkeley, CA *April 2016 – April 2018*
Undergraduate Mentor

- Facilitated workshop activities, encouraging young female students to pursue their interests in STEM careers
- Mentored participants, answering questions about my high school and college experiences

Alta Bates Summit Medical Center, Berkeley, CA *Jan. 2016 – Sep. 2016*
Collegiate Volunteer

- Represented the hospital at the front desk, welcoming and escorting patients and guests
- Discharged and tended to patient needs in the postpartum department

Lawrence Hall of Science, Berkeley, CA *Jan. 2015 – Dec. 2015*
Adult volunteer in Ingenuity Lab

- Made science activities accessible to guests of all ages and backgrounds
- Learned valuable communication skills, facilitating activities for guests

Camp CuriOdyssey, San Mateo, CA *2009 – 2014*
Leader in training, Leader at CuriOdyssey

- Led activities, highlighting zoology, evolutionary biology, and ecology for young students
- Learned important team work and collaboration skills, handling stressful and sensitive situations with staff members of a range of ages and backgrounds

HONORS

UC Berkeley, College of Chemistry, High Honors in Chemistry
UC Berkeley, College of Chemistry Honors Thesis, Spring 2018 – "Oncogenic Ras mutations perturb the catalytic behaviors of RasGEF SOS"
UC Berkeley College of Chemistry, Dean's List – Fall 2017, Spring 2018
Valedictorian, San Mateo High School, Class of 2014, San Mateo, CA

IMPORTANT CLASSES

Caltech: Data Analysis in the Biological Sciences, Introduction to Computational Biology and Bioinformatics, Macromolecular Function: Kinetics, Energetics, and Mechanisms, Topics in Systems Biology, Mathematics in Biology

UC Berkeley: General Chemistry, Organic Chemistry, Advanced Synthesis Laboratory, Physical Chemistry (quantum mechanics, statistical mechanics), Physical Chemistry Laboratory, Inorganic Chemistry, Chemical Biology, Advanced Mechanistic Organic Chemistry, Biology, Physics, Multivariable Calculus, Linear Algebra and Differential Equations

REFERENCES

(1) Dr. David Van Valen; Professor of Biology, California Institute of Technology, email: vanvalen@caltech.edu

(2) Dr. Jay T. Groves; Professor of Chemistry, University of California, Berkeley, email: jtgroves@lbl.gov

(3) Dr. Shalini Low-Nam; Professor of Biochemistry, Purdue University, email: slownam@purdue.edu