

Maya Lemmon-Kishi

COMPUTATIONAL BIOLOGIST

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Education

University of California, Berkeley

PH.D. CANDIDATE IN COMPUTATIONAL BIOLOGY

- Advised by Rasmus Nielsen
- Proposed Thesis: "Beyond Occupancy: Methods and Applications to Expand the Use of Environmental DNA"

Berkeley, California

Aug. 2019 - Exp. Aug 2025

University of Pittsburgh

B.S. IN COMPUTER SCIENCE, *magna cum laude*

- Program Honors in Computer Science
- Minors in Bioengineering and Chemistry

Pittsburgh, Pennsylvania

Aug. 2014 - Dec. 2018

Research Experience

Graduate Researcher and NSF GRFP Fellow

RASMUS NIELSEN LAB

- Building a phylogenetics-based method in C to date ancient environmental DNA (eDNA) samples from epochs that extend beyond the capabilities of traditional dating techniques, such as carbon-14 dating
- Extending the use of the phylogenetics-based molecular dating method to calibrate the molecular clock across various taxonomy using dated ancient environmental DNA samples
- Designing an algorithm in C to estimate long phylogenetically compatible haplotypes for species with poor reference databases from short read NGS eDNA to study these species with population genetic techniques
- Curating a taxonomically diverse and comprehensive organelle genome database containing whole genome alignments and phylogenetic trees for ancient eDNA workflows
- Set up a server (Ubuntu 20.04) and maintaining a second inherited server as the system administrator for 10+ users

Berkeley, California

May 2020 - Present

Graduate Rotation Student

VARIOUS LABS

- Implemented a RNA-seq pipeline to generate custom reference genomes to analyze the genomic signature of sunflower domestication
- Developed a method to calculate population genetic summary statistics from environmental DNA in Python to observe population structure without invasive tissue sampling
- Explored methods to detect non-Brownian phylogenetic signal of leaf chemical composition data for co-evolution of herbivory defense

Berkeley, California

Sept. 2019 - May 2020

Undergraduate Researcher - PittSmartLiving

ADVANCED DATA MANAGEMENT TECHNOLOGIES LAB

- Developed a Flask interactive web application to visualize public transportation connectivity of various U.S. cities
- Produced a Flask web application for researchers to quickly summarize navigate passenger density data

Pittsburgh, Pennsylvania

Sept. 2018 - May 2019

Undergraduate Researcher

KOSTKA LAB, UNIVERSITY OF PITTSBURGH

- Implemented an automated Nextflow pipeline of a commonly used single-cell Drop-Seq method to increase productivity in the lab
- Analyzed single cell kidney data in R to determine validity of the Nextflow pipeline through comparison with published results

Pittsburgh, Pennsylvania

Jan. 2018 - Dec. 2018

Undergraduate Researcher and Student Leader (Pittsburgh iGEM)

DEPARTMENT OF BIOENGINEERING, UNIVERSITY OF PITTSBURGH

- Lead an interdisciplinary team to design a lead and thallium biosensor using biological components
- Developed a Simulink model to predict long-term lead blood level concentration in children depending on lead water levels to demonstrate the importance of early lead detection
- Managed and planned all cloning and transformation related experiments with *E. coli*
- Gold medalist and nominated for Best Environmental Project at the iGEM Jamboree 2016

Pittsburgh, Pennsylvania

Apr. 2016 - May 2017

Undergraduate Researcher

BANERJEE LAB, UNIVERSITY OF PITTSBURGH

- Developed a spheroid analysis macro to analyze pancreatic organoids with ImageJ processing
- Analyzed islet organoids using qPCR to determine which organoids produced insulin in various hydrogel environments
- Cell culture of fibroblasts and human umbilical vein endothelial cells to create islet organoids for use in experiments

Pittsburgh, Pennsylvania

Jan. 2016 - May 2016

Industry Experience

Data Engineering Intern

West Sacramento, California

COMPUTATIONAL LIFE SCIENCE, BAYER CROP SCIENCE

May 2019 - Aug. 2019

- Worked with key members of the Biologics team to develop an internal R Shiny tool to improve data management and to assess the data landscape of experimental data in the biologics discovery pipeline
- Streamlined data upload and developed long term storage strategy for the laboratory analysis pipeline

Genotyping Development Scientist Intern

Chesterfield, Missouri

BAYER CROP SCIENCE (FORMERLY MONSANTO)

Apr. 2018 - Aug. 2018

- Completed a cross functional project to create a method in R for processing SNP data to quantify differences in recombination rates across germplasm to improve inbred line specific genetic maps used in breeding programs
- Developed an algorithm in R to impute genetic information for haploid induced maize from non-destructive tissue sampling maintaining seed viability as part of the double haploid breeding pipeline
- Identified discordance due to breeding errors in genetic cross data and built tools to identify these individuals for the quality control process

Leadership Experience

UCB Computational Biology Building Bridges to Graduate School Training Program

Berkeley, California

ORGANIZER AND REPRESENTATIVE

Oct. 2022 - Present

- Built partnerships with Berkeley undergraduate programs that aim to serve underrepresented students in STEM
- Organized a small group mentoring workshop for Berkeley undergraduate students affiliated with our on-campus partner programs
- Presented materials that cover topics, such as: components of a PhD program, preparation for PhD programs, various research training opportunities, and introduction to research in Computational Biology

Center for Computational Biology Peer Mentoring Program

Berkeley, California

CO-FOUNDER

Jan. 2021 - June 2023

- Founded a peer mentoring program that pairs junior students in the Computational Biology PhD program with senior students to build community and support networks during the first two years of graduate school
- Organized and obtained funding for workshops and panels on topics such as the qualifying exam and “Personalizing Your Graduate Training for Future Career Goals”

Center for Computational Biology DEI Committee

Berkeley, California

GRADUATE STUDENT REPRESENTATIVE

June 2020 - June 2022

- Reformed the admissions process with a formalized rubric and procedure to increase equity
- Developed an action plan for the Center for Computational Biology that highlights changes in mentoring, faculty, admissions, and outreach to increase diversity, inclusivity, and equity

Teaching Experience

Berkeley Connect Teaching Fellow

Berkeley, California

CENTER FOR COMPUTATIONAL BIOLOGY, UNIVERSITY OF CALIFORNIA, BERKELEY

Aug. 2022 - May 2023

- Designed and taught a curriculum to introduce a variety of topics and skills for computational biology for 80 students from a variety of academic backgrounds

Python Bioinformatics Bootcamp Lecturer

Berkeley, California

CENTER FOR COMPUTATIONAL BIOLOGY, UNIVERSITY OF CALIFORNIA, BERKELEY

June 2021, Jan. 2022, June 2022

- Taught students (both academic and industry, ranging from undergraduates to faculty) fundamental programming skills such as logic, control flow, and data structures in Python
- Updated the curriculum to incorporate more biologically relevant examples and problems

Python Bioinformatics Bootcamp Teaching Assistant

Berkeley, California

CENTER FOR COMPUTATIONAL BIOLOGY, UNIVERSITY OF CALIFORNIA, BERKELEY

Jan. 2021, June 2021, Jan. 2022

- Supported the lecturer by answering questions and helped students work through practice problems

Undergraduate Teaching Assistant - Cell and Molecular Biology

Pittsburgh, Pennsylvania

DEPARTMENT OF BIOENGINEERING, UNIVERSITY OF PITTSBURGH

Aug. 2017 - Apr. 2018

- Taught weekly recitation of Cellular Biology to bioengineering students
- Wrote and graded weekly quizzes and presentations

Mentorship

Center for Computational Biology Peer Mentor

Berkeley, California

CENTER FOR COMPUTATIONAL BIOLOGY, UNIVERSITY OF CALIFORNIA, BERKELEY

Aug. 2021 - Present

- Mentored two pre-qualifying exam computational biology students through their first two years and participated in program workshops

Berkeley Connect Teaching Fellow

Berkeley, California

CENTER FOR COMPUTATIONAL BIOLOGY, UNIVERSITY OF CALIFORNIA, BERKELEY

Aug. 2022 - May 2023

- Mentored around 80 students over two semesters from various backgrounds and experience interested in computational biology.
- Topics discussed included how to find research opportunities on campus, email professors, apply to internships, apply to graduate school, improve learning skills, and have a career in computational biology.

Undergraduate Mentor

Berkeley, California

UNIVERSITY OF CALIFORNIA, BERKELEY

Sept. 2021 - May 2022

- Chris Dong: Mentored Chris on a project to incorporate environmental variables in population structure analysis of environmental DNA and developed his skills in computational tools.

iGEM Summer Research Fellowship Supervisor (Pittsburgh iGEM)

Pittsburgh, Pennsylvania

DEPARTMENT OF BIOENGINEERING, UNIVERSITY OF PITTSBURGH

May 2017 - Oct. 2017

- Developed laboratory management skills supervising the team on day to day planning and experiments

Fellowships

2021 -

Present

NSF Graduate Research Fellow, University of California, Berkeley

Berkeley, California

Aug. 2022 -

May 2023

Berkeley Connect Research Fellowship, University of California, Berkeley

Berkeley, California

Publications

Candiello, J., Grandhi, T.S.P., Goh, S.K., Vaidya, V., **Lemmon-Kishi, M.**, Eliato K.R., Ros, R., Kumta, P., Rege, K., Banerjee, I. (2018) "3D Heterogeneous Islet Organoid Generation from Human Embryonic Stem Cells Using a Novel Engineered Hydrogel Platform." *Biomaterials*. 177: 27-39.

Presentations

ORAL

Lemmon-Kishi, M. and Nielsen, R. What's the Rate: Molecular Clock Calibration Using Sedimentary Ancient DNA. SMBE 2024: Molecular Evolution Through Metagenomics Symposium. Puerto Vallarta, Mexico. July 7-11, 2024.

Lemmon-Kishi, M. and Nielsen, R. ratePlacer: An Efficient Molecular Dating Method for Ancient sedDNA Samples. Center for Computational Biology Retreat. Los Gatos, California. November 3-5, 2023.

Lemmon-Kishi, M. and Nielsen, R. Haplotype Estimation for Environmental DNA. Center for Computational Biology Retreat. Los Gatos, California. November 4-6, 2022.

Lemmon-Kishi, M. and Nielsen, R. A Penalized Likelihood Approach to Estimating Haplotypes from Environmental DNA. Evolution 2022. Cleveland, Ohio. June 24-28, 2022.

Lemmon-Kishi, M. and Nielsen, R. Estimating haplotypes for environmental DNA. Evolution 2021. Virtual. June 21-25, 2021.

Lemmon-Kishi, M. and Nielsen, R. A Computationally Efficient Method to Estimate Phylogenetically Compatible Haplotypes from eDNA. 2021 NHGRI Research Training and Career Development. Virtual. April 19-21, 2021.

Lemmon-Kishi, M., Chu, C., Peddada, V., et. al. Hot Metal Switch: Synthetic in vitro gene circuit for the detection of metal ions. iGEM Jamboree 2017. Boston, Massachusetts. October 27-31, 2016.

POSTER

Lemmon-Kishi, M. and Nielsen, R. ratePlacer: An Efficient Molecular Dating Method for Ancient sedDNA Samples. sedDNA Meeting. Potsdam, Germany. June 6-9, 2023.

Lemmon-Kishi, M. and Nielsen, R. A Penalized Likelihood Approach to Estimating Haplotypes from Environmental DNA. Biology of Genomes. Cold Spring Harbor Laboratories, New York. May 10-14, 2022.

Lemmon-Kishi, M. and Nielsen, R. A Penalized Likelihood Approach to Estimating Haplotypes from Environmental DNA. Center for Computational Biology Retreat. Berkeley, California. October 21-22, 2021.

Lemmon-Kishi, M. and Nielsen, R. A Computationally Efficient Method to Estimate Phylogenetically Compatible Haplotypes from eDNA. Center for Computational Biology Retreat. Virtual. March 3-5, 2021.

Lemmon-Kishi, M., Chu, C., Peddada, V., et. al. Thallium and Lead Detection Using Cell-Free Circuitry. Biomedical Engineering Society Conference 2016. Minneapolis, MN. October 8, 2016.

Honors & Awards

2023	SACNAS Travel Scholarship , 2023 SACNAS NDiSTEM Conference	<i>Portland, Oregon</i>
2018	2nd Place , ShelInnovates Hackathon	<i>Pittsburgh, Pennsylvania</i>
2018	Most Creative Hack , ShelInnovates Hackathon	<i>Pittsburgh, Pennsylvania</i>
2016	Nomination for Best Environmental Project , iGEM 2016	<i>Boston, Massachusetts</i>
2016	Gold Medal , iGEM 2016	<i>Boston, Massachusetts</i>