Aug. 2015 – May 2020

MELINDA LIU PERKINS

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PROFILE

Ph.D. in electrical engineering with 10 years of experience building mathematical models for life sciences. I harness theory-driven insights and predictive simulations to support interdisciplinary innovation.

- Mathematical expertise in networked dynamical systems, with related proficiency in control systems, signal processing, and stochastic processes.
- Extensive experience coding simulations and analyzing data in Matlab and Python.
- Motivated, independent worker, evidenced by receipt of multiple academic awards, success applying for individual research funding, and sole authorship of 1 peer-reviewed journal paper.
- Strong track record of collaboration with international, multidisciplinary teams, resulting in 5 peer-reviewed journal publications.

EDUCATION

Ph.D. in Electrical Engineering , <i>University of California, Berkeley</i> Dissertation : Biological patterning in networks of interacting cells	2020
B.S. in Electrical Engineering with Honors, <i>Stanford University</i>	2015
Emphasis in Signal Processing, Minor in Biology	
Thesis: Acoustic interference between echolocation calls of two species of California bat	

RESEARCH AND PROFESSIONAL EXPERIENCE

Interdisciplinary Postdoctoral Fellow	July 2020 – Apr. 2024
Funnan Malandan Dialagu Labonatamu II. dallagua Campagan	

European Molecular Biology Laboratory, Heidelberg, Germany

Mathematical modeling expert for dynamics and performance of molecular networks.

- Designed models for gene regulation: deterministic (nonlinear dynamical systems) and stochastic (statistical mechanics/continuous-time Markov chains).
- Performed numerical optimization to maximize gene expression accuracy as a function of protein concentration, comparing results between simple vs. complex organisms.
- Developed deterministic model to quantitatively predict protein levels in embryonic cells *in vivo* based on empirical measurements and control methods for bistable systems.
- Wrote custom software for simulation, image processing, and data analysis, including methods for parameter estimation from measurement.

Ph.D. student (advised by Murat Arcak)

Department of Electrical Engineering, University of California, Berkeley, Berkeley, CA, USA

Theorist and engineer of synthetic biological patterning.

- Introduced mathematical framework applying techniques from distributed systems and image processing principles to gene expression patterning.
- Adapted mathematical theory based on networked input/output dynamical systems and model reduction to inform synthetic biological experiments.
- Spearheaded international collaboration to design and validate testbed for cell-to-cell signaling *in vivo* via computer-controlled inputs.
- Wrote custom software for simulation and data analysis, including scripts to control microscope setup for experiments.

Undergraduate researcher (advised by Elizabeth Hadly and John Pauly) Apr. 2013 – June 2015 *Department of Electrical Engineering, Stanford University*, Stanford, CA

• Developed a metric based on sonar signal processing (wideband ambiguity function) to analyze how calls from one echolocating bat interfere with another.

- Mathematical modeling: dynamical systems (linear/nonlinear), control systems, signal processing, stochastic processes
- Data analysis: exploratory, image processing, basic statistics (e.g., linear regression, ANOVA)
- Programming languages: C/C++, Matlab, Python (numpy, pandas, scipy, SQLite), R
- Languages: English (native), German (B2/C1), Spanish (C1)
- Other: Linux/Unix, cluster computing

SELECTED GRANTS AND AWARDS

EMBL Interdisciplinary Postdoc (EIPOD4) Fellowship (3-year stipend)	2020
Leon O. Chua Award , EECS Department, UC Berkeley, presented annually to one recipient for outstanding achievement in nonlinear science	2020
Berkeley Fellowship for Graduate Study (2 years full fees and tuition), UC Berkeley	2015
Excellence Award (\$5000), EECS Department, UC Berkeley	2015
Frederick E. Terman Award for Scholastic Achievement in Engineering , Stanford University, granted to top 5% of seniors by GPA in School of Engineering	2015
Undergraduate Advising and Research Major Grant, Stanford University	2014

COMMUNICATION AND LEADERSHIP

Co-organizer for Theory@EMBL seminars , which were so successful at showcasing early-career researchers that EMBL developed the NextGen Seminar Series to extend the programme to topics beyond theory
 Graduate Student Instructor, EE 120: Signals and Systems (1 semester, 100 students) 2019 (fall) Wrote problem sets, taught students during discussion section and office hours Delivered guest lecture on signal processing of bat echolocation
Graduate Student Instructor, CS 195: Social Implications of Computer2019 (spring/fall)Technology (2 semesters, 300 – 400 students per semester)2019 (spring/fall)Developed and delivered new lecture content (20% of total lecture time)2019 (spring/fall)Designed new assignments to emphasize critical thinking and intellectual humility2019 (spring/fall)Prepared and ran weekly discussion sections2019 (spring/fall)
Science outreach volunteer (e.g., Bay Area Scientists in Schools, Golden Gate Science Olympiad, Expanding Your Horizons, Bay Area Teen Science, EMBL ELLS virtual school visits)
Social co-chair for UC Berkeley Women in Computer Science and Engineering, organizing mentoring and social eventsAug. 2016 – May 2017

SELECTED INVITED TALKS

"A bistable autoregulatory module in the developing embryo commits cells to binary fates," <i>Development presents</i> , The Company of Biologists (virtual). Host: Paul François	2023
"A networked systems approach to engineering synthetic biological patterning in theory and practice," <i>Caltech Young Investigators Lecture Series</i> , California Institute of Technology (virtual). Host: Yisong Yue	2021
"Biological networking: how EE meets regenerative medicine", <i>UC Berkeley EECS Annual Research Symposium</i> (Berkeley, CA, USA), one of five invited 5-min student talks	2019