

JONATHAN LIU

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Quantitative systems biology ◇ Spatial transcriptomics ◇ Statistical inference ◇ Modeling and data science

EDUCATION

University of California, Berkeley
PhD in Physics

Aug 2016 - Jun 2021

California Institute of Technology
BS in Applied Physics with Honors

Sept 2011 - June 2015

TECHNICAL SKILLS

Programming languages: MATLAB, Python, Java, Mathematica, Jupyter
Software: GitHub, NumPy, SciPy, Pandas, Matplotlib, ggplot2, Adobe Illustrator
Analytical skills: Statistical inference, stochastic modeling, numerical simulations, image analysis
Mathematical knowledge: Calculus, linear algebra, differential equations, probability, statistics
Molecular biology: PCR, cloning, CRISPR/Cas9, transgene design, fluorescence microscopy

EXPERIENCE

Data Scientist, Computational Biology - Chan-Zuckerberg Biohub

Aug 2021 - Present

NDSEG Graduate Research Fellow - UC Berkeley

Aug 2017 - Jun 2021

- Investigated biophysical models of gene regulation through live imaging fluorescence microscopy of nascent RNA transcription, with 2 first-author publications (1 accepted, 1 in review)
- Used image analysis tools such as machine learning segmentation to convert single-cell microscopy data into large time series (several TB, hundreds of cells over minutes with time resolutions of seconds)
- Applied statistical inference techniques (e.g. Markov Chain Monte Carlo) in MATLAB to generate single-cell datasets of kinetic transcriptional parameters
- Developed and investigated models of gene regulation (e.g. deterministic ODEs, stochastic simulations)
- Generalist experience spanning experiment and theory with emphasis in computational analysis

Visiting Researcher - Chan-Zuckerberg Biohub

Jan 2021 - Jun 2021

- Conducted data analysis in Python to compare resolution of spatial transcriptomics with existing single-cell RNA-seq technologies
- Collaborated with wet-lab researchers and industrial partners for project design and management

Co-director, team member - Beyond Academia

Aug 2019 - Jun 2021

- Co-director of volunteer organization that hosts an annual two-day conference for 300+ current PhDs and postdocs and features over 100 speakers
- Managed transition to virtual conference due to COVID-19 pandemic and oversaw 10x growth (3000+ registrations across 6 continents with >50% attendance) with widespread attendee satisfaction
- Fundraised and wrote grant proposals to secure \$60k yearly budget
- Project management experience organizing ~10 member team in tasks involving event logistics, conference speaker recruitment, finance, and media outreach

Mentorship and Communication

- Wrote 4 layperson-targeted articles for *Berkeley Science Review*, QB3-Berkeley, and *Physics Today*
- Invited sole graduate student speaker at DoD science policy event (STIX on the Hill 2019)
- Advisor for the Berkeley Summer Undergraduate Research Fellowship program, providing mentorship and support for several hundred undergraduate researchers (*Summer 2019*)

- 4 trainees supervised (2 graduate, 2 undergraduate)

SELECTED PUBLICATIONS

1. Pranathi Vemuri*, **Jonathan Liu***, et. al. “Comparison of MERFISH spatial transcriptomics with scRNA-seq methodologies.” In preparation. (*equal authorship)
2. **Jonathan Liu**, et. al. “Real-time single-cell characterization of the eukaryotic transcription cycle reveals correlations between RNA initiation, elongation, and cleavage.” *PLoS Computational Biology*, May 2021.
3. Elizabeth Eck*, **Jonathan Liu***, et. al. “Quantitative dissection of transcription in development yields evidence for transcription factor-driven chromatin accessibility.” *eLife*, Oct 2020. (*equal)
4. Matthias Morasch, **Jonathan Liu**, et. al. “Heated gas bubbles enrich, crystallize, dry, phosphorylate, and encapsulate prebiotic molecules.” *Nature Chemistry*, Jul 2019 (cover article).

HONORS AND AWARDS

2017 NDSEG Graduate Fellowship: 1 of 195 graduate students selected for four-year fully-funded research fellowship, supported by the Department of Defense. (\$200k total)

2015 U.S. Fulbright Student Fellowship: 1 of about 100 students selected for yearlong visiting research appointment in Germany, funded by the U.S. and German Fulbright programs. (\$15k total)

WRITING

1. “Revamping graduate biophysics education.” *PhysicsToday*.
<https://physicstoday.scitation.org/doi/10.1063/PT.6.3.20210623a/full/>
2. “An interview with QB3 Professional in Residence Tracy Teal - harnessing community to support scientific research.” *QB3-Berkeley*.
<https://qb3.berkeley.edu/news/an-interview-with-professional-in-residence-tracy-teal-harnessing-community-to-support-scientific-research/>
3. “The Ins and Outs of Informational Interviewing.” *Berkeley Science Review*.
<https://berkeleysciencereview.com/2020/12/informational-interviewing/>
4. “Using physics to search for meaning in the chaos of gene regulation.” *QB3-Berkeley*.
<https://qb3.berkeley.edu/using-physics-to-search-for-meaning-in-the-chaos-of-gene-regulation/>
5. “Machine Learning: Chapter 3 (Particle Physics).” *Berkeley Science Review*.
<http://www.berkeleysciencereview.com/article/machine-learning-chapter-3/>
6. “Why (anti)hydrogen matters.” *Berkeley Science Review*.
<http://berkeleysciencereview.com/article/why-antihydrogen-matters/>