

# JONATHAN LIU

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Quantitative systems biology ◇ Live cell imaging ◇ Statistical inference ◇ Modeling and data science

## EDUCATION

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**University of California, Berkeley**  
PhD in Physics (*expected graduation 2021*)

*Aug 2016 - Present*

**California Institute of Technology**  
BS in Applied Physics with Honors

*Sept 2011 - June 2015*

## TECHNICAL SKILLS

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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

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**NDSEG Graduate Research Fellow** - UC Berkeley

*Aug 2017 - Present*

- 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 - Present*

- 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 - Present*

- 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)

## PUBLICATIONS

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1. **Jonathan Liu**, *et. al.* “Single-cell characterization of the eukaryotic transcription cycle using live imaging and statistical inference.” *bioRxiv*, Aug 2020. In review at *PLoS Computational Biology*.
2. Elizabeth Eck\*, **Jonathan Liu\***, *et. al.* “Quantitative dissection of transcription in development yields evidence for transcription factor-driven chromatin accessibility.” *eLife*, Oct 2020. (\*equal)
3. 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

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**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

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1. “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-harness>
2. “The Ins and Outs of Informational Interviewing.” *Berkeley Science Review*.  
<https://berkeleysciencereview.com/2020/12/informational-interviewing/>
3. “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>
4. “Machine Learning: Chapter 3 (Particle Physics).” *Berkeley Science Review*.  
<http://www.berkeleysciencereview.com/article/machine-learning-chapter-3/>
5. “Why (anti)hydrogen matters.” *Berkeley Science Review*.  
<http://berkeleysciencereview.com/article/why-antihydrogen-matters/>