

PROFESSIONAL SUMMARY

- 7 years of experience using dynamical modeling to understand biological systems spanning from yeast reproduction to human infectious disease in collaboration with experimentalists and theoreticians
- Published 7 papers, including a co-first author work in *Cell* where I built tools for kinetic analysis and clustering of molecular trajectories, a co-authored work in *Cell* where I built multiscale viral dynamics models to predict efficacy of a new SARS-CoV-2 therapy, and a co-authored work revised and resubmitted at *Cell* on a herpesvirus therapy.
- Presented research at national and international conferences; received multiple awards.

WORK EXPERIENCE

The J. David Gladstone Institutes | UCSF, Postdoctoral Scholar 2020 – now

- Predicted efficacy of a new SARS-CoV-2 therapeutic using ordinary differential equation models based on clinical and lab data; fit models to longitudinal SARS-CoV-2 data to extrapolate unobserved data
- Characterized the mechanism of a new herpesvirus therapy, targeting viral transcriptional feedback, by using a combination of flow cytometry, live-cell time lapse imaging, and mathematical modeling.
- Investigated host regulation of a key human cytomegalovirus transcriptional feedback circuit by modulating expression through nucleofection of expression vectors and siRNAs, followed by using flow cytometry, confocal microscopy, viral titering to measure changes in dynamics and infectiousness.
- Mentored a doctoral student during his rotation in a joint experimental-computational project.

University of North Carolina at Chapel Hill, Graduate Student Researcher 2015 – 2020

- Modeled biochemical reaction-diffusion systems using partial differential equations and particle-based methods to study how yeast harness and filter stochasticity during reproduction
- Developed new computational tools to analyze microscopy and single particle tracking datasets
- Deployed simulations on high-performance computing clusters using LSF and SLURM
- Secured competitive funding from multiple sources (NIH, UNC, Biophysical Society)
- Mentored a doctoral student during his rotation and co-authored a paper under revision; mentored an undergraduate student through her senior thesis, completed with top honors.

Northeastern University, Undergraduate Researcher 2012 – 2015

- Published a peer-reviewed paper studying protein post-translational modifications

Amgen Inc., Undergraduate Co-op 2013 – 2014

- Conducted analytical chemistry to support medicinal chemistry and process chemistry teams.
- Designed statistical models to quantify the kinetics of byproduct formation during synthesis of an active pharmaceutical ingredient, enabling kilogram scale production of the desired drug

EDUCATION

The J. David Gladstone Institutes | UCSF **San Francisco, CA**
Postdoctoral Scholar, Center for Cell Circuitry, Institute for Virology 2020 – now

The University of North Carolina **Chapel Hill, NC**
PhD Chemistry, Certification in Biophysics 2015 – 2020

Northeastern University **Boston, MA**
BS Chemistry, Minor in Mathematics, *summa cum laude* 2011 – 2015

TECHNICAL SKILLS

Computational

- Programming languages: Python, MATLAB, R
- High performance computing: Parallelization; LSF/SLURM
- Simulation: Systems of ODEs and PDEs; Markov chain models; agent-based models
- Fitting: Markov Chain Monte Carlo; evolutionary algorithms; nonlinear mixed-effect models
- Image analysis: Segmentation and tracking in FIJI/MATLAB
- Bioinformatics: Basic differential gene expression analysis

Experimental

- Molecular biology: Cloning; site-directed mutagenesis; PCR; RNA extraction
- Cell culture: mammalian tissue culture; lentiviral packaging; transfections/transductions
- Virology: HCMV stock preparation and infection; viral titering by TCID50
- Assays: flow cytometry, live-cell fluorescence microscopy; qRT-PCR

AWARDS, HONORS, AND FELLOWSHIPS

2022	Faces of Cell feature, <i>Cell Press</i>
2021	Poster Prize in Immunobiology & Infection, <i>Society for Mathematical Biology</i>
2020	Poster Prize in Mathematical Epidemiology, <i>Society for Mathematical Biology</i>
2020	Conference Travel Award, <i>Biophysical Society</i>
2019	Graduate Student Transportation Grant, <i>UNC Chapel Hill</i>
2016	T32 Training Grant in Molecular & Cellular Biophysics, <i>National Institutes of Health</i>
2015	Matthew Stuart Morrison Summer Fellowship, <i>UNC Chapel Hill</i>
2014	Provost Undergraduate Research and Creative Endeavors Award, <i>Northeastern University</i>
2011	National Merit Scholarship, <i>National Merit Scholarship Corporation</i>

SERVICE AND PROFESSIONAL MEMBERSHIPS

Member	Society for Mathematical Biology	2020 –
Member	Biophysical Society	2019 –
Executive Board	STEM Pride of the Triangle	2019 – 2020

SELECT CONFERENCE PRESENTATIONS

1. *Modeling and validation of SARS-CoV-2 transmission reduction by a therapeutic interfering particle.* Society for Mathematical Biology Epidemiology/Immunology Subgroup 2022. Online. Feb 2022. (Oral)
2. *Multiscale modeling of a self-renewing, self-deploying antiviral for SARS-CoV-2.* Society for Mathematical Biology 2021. Online. May 2021. **Received SMB Poster Award for Immunobiology and Infection.** (Poster)
3. *Early phase decoupling between population mobility and death rates.* Society for Mathematical Biology 2020. Online. Aug. 2020. **Received SMB Poster Award for Mathematical Epidemiology.** (Poster)
4. *Binder/tag: A versatile approach to probe and control the conformational changes of individual molecules in living cells.* The 64th Annual Meeting of the Biophysical Society. San Diego, CA. Feb. 2020. (Oral)
5. *Uncovering single-molecule kinetics and nanoscale architecture of Src activation.* The 7th Winter Q-Bio Conference. Oahu, HI. Feb. 2019. (Oral)