

Victorya (Tory) Richardson

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Mathematical modeler and computational scientist developing analytical and computational approaches to complex problems. Translates scientific questions into tractable models, simulations, and interpretable results.

EDUCATION

PhD in Mathematics, University of Utah 2026

Dissertation: *Stochastic transport and first-passage phenomena in biological systems* Salt Lake City, UT

BS in Applied Mathematics, Temple University 2020

summa cum laude Philadelphia, PA

TECHNICAL SKILLS

Programming

Python, MATLAB, R,
Git, Bash

Modeling and Analysis

Stochastic and mechanistic modeling,
machine learning, ODES and PDEs,
asymptotic analysis, numerical methods

Scientific Computing

Simulation design, bioinformatics,
large-scale data analysis,
high-performance computing

EXPERIENCE

Graduate Researcher

2021–2026

Department of Mathematics, University of Utah

Salt Lake City, UT

- Formulated and analyzed stochastic models of biological search and transport, deriving asymptotic scaling laws that quantified how key system parameters govern binding and transport times.
- Developed kinetic Monte Carlo simulations of confined particle systems, linking microscopic interactions and channel geometry to macroscopic transport behavior.

Research Assistant

Summer 2022

Hughes Lab for Microbial Genetics, University of Utah

Salt Lake City, UT

- Investigated the role of FlhZ in regulating flagellar biogenesis in *Salmonella*.
- Cultured and isolated bacterial colonies, generated targeted gene knockouts, and performed PCR-based screening of experimental strains.

Bioinformatics Researcher

2017–2021

Kulathinal Lab for Evolutionary Genomics, Temple University

Philadelphia, PA

Engel Lab, Fels Cancer Institute for Personalized Medicine, Temple University

- Built Python and R workflows for comparative genomics, applying statistical enrichment tests and gene interaction network analysis to identify signatures of rapid male-driven adaptation in *Drosophila* and great apes.
- Analyzed single-cell RNA-sequencing data from mouse and human embryos to characterize the emergence and conservation of sex-biased gene expression during early development.

PUBLICATIONS

↗ **Victorya Richardson**, Yick Hin Ling, and Sean D. Lawley. “Yet another look at narrow escape through a tube.” *SIAM Journal on Applied Mathematics*, 2026.

↗ **Victorya Richardson** and Sean D. Lawley. “Quantifying the transition from single file to Fickian diffusion.” *Journal of Chemical Physics*, 2025.

↗ **Victorya Richardson**, Nora Engel, and Rob J. Kulathinal. “Comparative developmental genomics of sex-biased gene expression in early embryogenesis across mammals.” *Biology of Sex Differences*, 2023.

SELECTED PRESENTATIONS

Intermittent diffusion enables fast DNA target finding

SIAM Conference on the Life Sciences

Minisymposium: Stochastic Transport and Resource Accumulation in Biology

July 2026

Cleveland, OH

Extreme first-passage times in intermittent search

NSF-Simons National Institute for Theory and Mathematics in Biology

Workshop: Extreme Events in Biological Functions

June 2026

Chicago, IL

Fast search processes for transcriptional regulation

SIAM Annual Meeting

Minisymposium: Modeling Dynamics in Biological Systems

July 2024

Spokane, WA

Statistically enriched signatures of co-adaptation among Great Ape genomes

Temple University Symposium for Undergraduate Research and Creativity

April 2019

Philadelphia, PA

TEACHING AND LEADERSHIP

Instructor of Record and Teaching Assistant, University of Utah

2022–2026

- Taught seven undergraduate course sections in linear algebra, differential equations, and vector calculus and supported two additional courses as a teaching assistant.
- Designed and adapted course structures, lectures, exams, grading policies, and review materials with substantial autonomy, communicating abstract concepts to students in mathematics, engineering, and computer science.

Undergraduate Research Mentor, University of Utah

Summers 2022, 2023

- Mentored undergraduate teams through weeklong mathematical biology projects in the Summer Graduate School Preview Program, guiding project design, background research, and mathematical and computational analysis.

AWM Speaker Series Co-Chair, University of Utah

2024–2026

- Co-led the Association for Women in Mathematics speaker series, organizing research talks and professional-development events and coordinating invited speakers, faculty, and students.

Recruitment Committee Member, University of Utah

2024

- Organized the department's graduate recruitment weekend, coordinating event logistics and opportunities for prospective students to connect with faculty and current graduate students.