SHAILI MATHUR

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EDUCATION

PhD | ***Biology*** Sept. 2021 – present
Stanford University Stanford, USA
Advised by Dmitri Petrov and Jonas Cremer

Master of Science | ***Bioinformatics*** Sept. 2019 – June 2021
University of California, Los Angeles Los Angeles, USA
Advisor: Van Savage

Bachelor of Science | ***Computational and Systems Biology & Applied Mathematics*** Sept. 2017 – June 2021
University of California, Los Angeles Los Angeles, USA

SCIENTIFIC CONTRIBUTIONS

PAPERS

Shaili Mathur, Noah A. Rosenberg "All galls are divided into three or more parts: recursive enumeration of labeled histories for galled trees", *Submitted*

Shaili Mathur, Portia M. Mira, Pamela J. Yeh, Christopher P. Kempes, Van M. Savage. "Predicting antibiotic effectiveness across the range of bacterial diversity for a variety of drugs and physiological targets", *In preparation*

PRESENTATIONS

1. **Shaili Mathur**, Portia M. Mira, Pamela J. Yeh, Christopher P. Kempes, Van M. Savage. "Allometric Scaling of Antibiotic Efficacy", UCLA QC Bio 4th Annual Retreat, 2018
2. **Shaili Mathur**, Portia M. Mira, Pamela J. Yeh, Christopher P. Kempes, Van M. Savage. "Size Effects on Antibiotic Susceptibility", UCLA Undergraduate Research Poster Day, 2017

TALKS

1. *Speaker*, Santa Fe Institute REU: "A priori prediction of Antibiotic Susceptibility across Bacterial Diversity", Santa Fe, NM 2019
2. *Speaker*, B.I.G. Summer Undergraduate Research Program: "A Model for Cell-Antibiotic Dynamics across Bacterial Diversity", Los Angeles, CA 2020

RESEARCH EXPERIENCE

PhD Student, Cremer and Petrov Labs Sept - Dec 2021
Stanford University
PhD student jointly advised by Jonas Cremer and Dmitri Petrov studying evolution and microbial physiology in dynamically changing environments.

- Using barcoded *S. cerevisiae* to study evolution under fluctuating
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Rotation Student, Rosenberg Lab Sept - Dec 2021
Stanford University
Rotation student in the Rosenberg Lab, where I worked on a mathematical phylogenetics problem, and solved the number of labelled histories for galled trees, a class of simple galled networks, with a paper submitted (Algorithms for Molecular Biology).

UCLA Bruins In Genomics Summer Undergraduate Research Program June - Aug 2020

University of California, Los Angeles

Research in the Savage lab on project on the relationship between cell size and antibiotic efficacy, using mathematical modeling and data analysis including dynamical systems models and simulations, and project on alternative labeling schemes in resource distribution networks

Santa Fe Institute, Research Experience for Undergraduates June - Aug 2019

Santa Fe Institute

Worked under the mentorship of Professor Chris Kempes to model the dynamics of antibiotics in bacteria and optimal energetic responses to antibiotic stress.

Savage Lab October 2017 - current

University of California, Los Angeles

- Project on modeling the dynamics of antibiotics in single bacterial cells and investigtaing the relationship between cell size and antibiotic susceptibility
- Project on using alternative labeling schemes in resource distribution networks, with the goal of improving classification of vasculature

Yeh Lab October 2017 - current

University of California, Los Angeles

- Experimental project on the relationship between bacterial cell size and antibiotic susceptibility using high throughput assays
- Automating experiments and collecting high-throughout data at Molecular Shared Screening Resources at the California Nano Systems Institute.

Agashe Lab Summer, 2015 and Summer 2016

University of California, Los Angeles

- Project on the effect of diet sterilization on the microbiome of *Adriadne ariadne* (castor butterflies)
- Project on male sexual selection in *Tribolium castaneum* (flour beetles) based on last male sperm precedence

Honors and Awards

Stanford Graduate Fellowship, Gabilan Fellow

Department-nominated Stanford-wide fellowship; three years of funding

Dean's Honor List

Recognition of high scholastic recognition in any one term at UCLA; all quarters except Spring 2019

UCLA Undergraduate Research Scholars Program 2020

Merit based scholarship to support upperclassmen conducting advanced STEM research projects at UCLA

Whitcome Summer Undergraduate Research Fellowship Summer 2018

Merit based scholarship supporting summer research in ecology and evolutionary biology at UCLA

UCLA Undergraduate Research Fellows Program Winter, Spring 2018

Merit based scholarship supporting students doing STEM research at UCLA

Appointments

UCLA Computational and Systems Biology Interdepartmental Program 2019-2021

Student Representative on Advisory Committee

Representing the concerns of students to the faculty, serving as a resource for students in the major, and organizing events for the major, and providing input at planning retreats and committee meetings. Served on the Curriculum Sub-committee, which is responsible for redesigning the curriculum for the Computational and Systems Biology major.

Skills and Relevant Coursework

Languages: English (Native), Hindi (Native), Spanish (Beginner)
Programming: Python (NumPy, SciPy, Matplotlib, Pandas), MATLAB, Mathematica, R, Julia, C++, MySQL
Document Creation: Microsoft Office Suite, LaTeX
Coursework at Stanford (Graduate Level): Introduction to Causal Inference, Topological Data Analysis, Principles of Cell Signalling
UCLA QCB Collaboratory Technical Workshops: Machine Learning with Python, Advanced Python, Introduction to Modern Statistics Python for Data Science
Mathematics Coursework (Upper Division Undergraduate Level): Mathematical Statistics, Linear Algebra, Linear and Non-linear Systems of Ordinary Differential Equations, Ordinary Differential Equations, Probability Theory I and II, Stochastic Processes, Mathematical Game Theory, Introduction to Networks, Real Analysis, Complex Analysis, Discrete Mathematics
Online (MOOC) classes: Python for Data Science (Online course through Microsoft on EdX), Relational Databases and SQL (Online course through StanfordOnline on EdX)
Computer Science Courses: Data Structures, Algorithms and Complexity, Introduction to Data Mining
Bioinformatics Courses (Graduate Level): Statistical Methods in Computational Biology, Machine Learning in Bioinformatics, Algorithms in Bioinformatics, Applied Bayesian Inference
Biomathematics Courses (Graduate Level): Structure, Function and Evolution of Biological Systems, Top Computational Algorithms
Life Science Coursework: Evolutionary Ecology (graduate level), Biological Modeling: Mathematical and Computational Approaches, Cell and Molecular Biology, Genetics, Ecology and Evolution, Physiology and Human Biology

Outreach and Service

Stanford Ecology and Evolution Lunch Seminar Series 2022 - current
Organizer

Stanford Biology Department Mentorship Committee 2022 - current
Committee Member

Stanford Biology Department Orientation Committee 2022 - current
Committee Member

Stanford Biology Department Interview Committee 2021 - current
Committee Member

Letters to Pre-Scientists 2019 - 2021
Scientist Pen Pal

Best Friends Animal Society Oct 2019 - current
Volunteer and Foster Los Angeles, USA

Computational and Systems Biology Undergraduate Seminar Series 2-18 - current
Organizer Los Angeles, USA

Thubrahalli Government School Summer, 2019
Volunteer Teacher and Curriculum Developer Bangalore, India

UCLA Undergraduate Research Center 2018
UCLA Undergraduate Research Week Student Champion Los Angeles, USA

UCLA Undergraduate Research Center - Sciences 2018
Bruin Day Student Research Ambassador Los Angeles, USA

UCLA Undergraduate Science Journal 2017
Biological Review Board Member Los Angeles, USA
Reviewed biology papers produced by students participating in faculty mentored research.

APSA Dream School Summer, 2016
Volunteer Teacher Bangalore, India

TEDxGWHSchool 2016

Founder, Organizer Bangalore, India

Founder/organizer of the TEDx event at Greenwood High International School, Bangalore