Swathi Nachiar Manivannan

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Department of Ecology & Evolutionary Biology, Yale University
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EDUCATION

Yale University — New Haven, CT, USA
Doctor of Philosophy in Ecology and Evolutionary Biology — Aug 2022—*present* (Expected May 2028)
Proposed Thesis: *Towards a mechanistic understanding of evolvability in (pathogenic) microbial systems*
Advisor: Dr. C. Brandon Ogbunugafor (advisor)
Thesis Committee: Drs. Richard O. Prum, Günter P. Wagner, Jeremy Draghi

Yale University — New Haven, CT, USA
Master of Science in Ecology and Evolutionary Biology — Aug 2022—Dec 2024

Homerton College, University of Cambridge — Cambridge, England, UK
Bachelor of Arts (Hons) in Natural Sciences (Genetics) — Oct 2018—Jul 2021
Thesis: *The genetics of hybridisation: What systems biology-based models can tell us.* (Advised by Dr John Welch)

RESEARCH EXPERIENCE

Graduate Research Fellow — *Aug 2022—present*
Department of Ecology & Evolutionary Biology, Yale University
Advisor: Dr C. Brandon Ogbunugafor

Research Officer — *Feb 2022—Jun 2022*
Bioinformatics Institute, A*STAR — *Singapore*
- Research Officer in Dr Sebastian Maurer-Stroh's group. Assisted with various projects pertaining to SARS-CoV-2 virus surveillance efforts on GISAID involving curation, analysis and tools

Research Officer — *Jul 2021—Jan 2022*
Genome Institute of Singapore, A*STAR — *Singapore*
- Research Officer in Dr Swaine Chen's group. Worked on a computational biology project to characterise a potential recipient-based plasmid conjugation inhibition system in *Escherichia coli*, using sequence analysis.

Undergraduate Research Student — *Nov 2020—Mar 2021*
University of Cambridge — *Cambridge, England, UK*
- Part II Genetics student under Dr John Welch. Worked on a computational biology project to investigate the ability of a systems biology-based simulation model in predicting hybrid fitness. *Project was undertaken remotely due to the COVID-19 pandemic.*
- Submitted undergraduate research thesis: *The genetics of hybridisation: what systems biology-based models can tell us.*

Undergraduate Research Student — *Jun 2020—Sep 2020*
Princeton University — *Princeton, NJ, USA*
- Summer undergraduate student in Prof Simon Levin's group as part of the International Student Internship Program, Princeton University. *Internship was undertaken remotely due to the COVID-19 pandemic.*
- Worked on a mathematical biology project, on understanding how evolutionary dynamics of infectious diseases are shaped when epidemiological models are modified. Published manuscript: *Modelling the evolutionary dynamics of an infectious disease with an initial asymptomatic stage with recovery.*

Undergraduate Research Intern — *Jul 2019—Aug 2019*
Genome Institute of Singapore, A*STAR — *Singapore*
- Research Intern in Dr Chew Wei Leong's group. Assisted with projects investigating different aspects of CRISPR/Cas systems. Contributed to the following paper: *Programmable C:G to G:C genome editing with CRISPR-Cas9-directed base excision repair proteins* (Chen et al., 2021)

HONOURS, AWARDS AND GRANTS

- Yale Institute for Biospheric Studies (YIBS) Small Early Grant — *Summer 2023*
- Sterling Prize Fellowship, Yale University — *2022—2024*
- A*STAR National Science Scholarship (PhD) — *2022—present*
- David Thompson Scholarship, Homerton College, University of Cambridge. — *2019*
- A*STAR National Science Scholarship (BS) — *2018—2021*

PUBLICATIONS

Peer-reviewed articles

- **Manivannan, S.N.,** Levin, S.A. (2023) *Modelling the evolutionary dynamics of an infectious disease with an initial asymptomatic stage with recovery.* SIAM Undergraduate Research Online (SIURO), Volume 16.
- Chen, L., Park, J.E., Paa, P., Rajakumar, P.D., Prekop, H-T., Chew, Y.T., **Manivannan, S.N.**, & Chew, W.L. (2021). *Programmable C:G to G:C genome editing with CRISPR-Cas9-directed base excision repair proteins.* Nature Communications, 12(1).

In review

- **Manivannan, S.N.,** Diaz Arenas, C., Grubaugh, N.D., Ogbunugafor, C.B. *The importance of epistasis in the evolution of viral pathogens.*
- Surasinghe, S., **Manivannan, S.N.,** Scarpino, S.V., Crawford, L., & Ogbunugafor, C.B. *Structural causal influence (SCI) captures the forces of social inequality in models of disease dynamics.*

Magazine article(s)

- Giovanetti-Singh, G.*, Kent, R.*, **Manivannan, S.N.*** October 2021. *Hidden Figures.* BlueSci Issue 52 (p.18-23).
- **Manivannan, S.N.** *The construction of a metropolis, or the cost of uprooting.* The Yale Environmentalist Spring 2023 (p. 66-67).

*contributed equally

INVITED/CONTRIBUTED PRESENTATIONS

Presentations

- **Manivannan, S.N.** *Does epistasis belong in the canon of viral genomic epidemiology?* Bank and Li-Richter lab groups, Institute of Ecology and Evolution, Universität Bern (Invited, May 2024)
- **Manivannan, S.N.** *Measuring evolvability in fitness landscapes: What do mutations tell us about "evolvability potential"?* Graduate Student Symposium, Ecology & Evolutionary Biology, Yale University (Dec 2024)

TEACHING EXPERIENCE

McDougal Graduate Teaching Fellow *Fall 2024—present*
Poorvu Center for Teaching and Learning, Yale University

Teaching Fellow, Yale University *Fall 2023*
Course: Evolution and Medicine (E&EB 335)
Responsibilities: Teaching assistant/Grader of Lecture course (20 students)

Teaching Fellow, Yale University *Spring 2023*
Course: Principles of Ecology and Evolutionary Biology (BIOL 104)
Responsibilities: Discussion Section Leader (20 students) for introductory course in Ecology and Evolutionary Biology

Teaching Fellow, Yale University *Fall 2022*
Course: Biology of Terrestrial Arthropods (E&EB 250, E&EB 251L)
Responsibilities: Grader/Tutor of Lecture course (53 students) and lab section (7 students).

Volunteer Teaching Assistant *Oct 2019—Mar 2020*
STIMULUS Cambridge
Responsibilities: Teaching assistant for A Level Chemistry at Long Road Sixth Form College, Cambridge. Part of STIMULUS, a community service programme in Cambridge to provide local schools support for teaching STEM subjects.

PROFESSIONAL DEVELOPMENT

SLiM Workshop *October 2024*
Organised by the American Natural History Museum and Ben Haller *New York, USA*

Complexity Global School for Emerging Political Economics *July-August 2024*
Organised by the Santa Fe Institute and the Universidad de los Andes *Bogotá, Colombia*

Evolutionary Biology Graduate Student Workshop *July 2023*
Organised by the Biology Department, University of Virginia *Mountain Lake Biological Station, Virginia, USA*

MENTORSHIP

Undergraduate Research

- Kemper Lowry (Yale E&EB '25)

Women in Science at Yale (WISAY) *Aug 2022—May 2024*
2022-2023

- Elizabeth Schaefer, Yale College '26

2023-2024

- Hannah Chung, Postgraduate Associate at Yale School of Medicine, 2022-24
- Jun Jiang, Yale School of Public Health MPH'25

SERVICE & OUTREACH

International Committee Chair and Student Representative (E&EB) *May 2024—present*
Graduate Student Assembly, Yale University

Graduate Student representative, DEI committee *Oct 2023—May 2024*
Department of Ecology and Evolutionary Biology, Yale University

Student Organiser, Hutchinson Speaker seminars *June 2023—May 2024*
Department of Ecology and Evolutionary Biology, Yale University

Talk Coordinator for Science in the News *Feb 2023—May 2023*
Yale Science Communication *(A graduate student organisation)*

Tamil Translator *Jul 2020—Sep 2021*
Covid-19 Migrant Support Coalition (CMSC) *Singapore*

Contributing Writer *Apr 2020—Oct 2021*
Varsity (Features); The Cambridge Language Collective *University of Cambridge, UK*

International Students' Representative *Oct 2020—Jun 2021*
Women's Campaign, Cambridge Students' Union *University of Cambridge, UK*

International Officer *Sep 2019—Jun 2020*
Homerton Union of Students *Homerton College, Cambridge, UK*

LANGUAGE PROFICIENCIES

English (native), Tamil (native), German (C1)