

Swathi Nachiar Manivannan

PhD candidate in Ecology and Evolutionary Biology, Yale University
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I am an evolutionary biologist interested in understanding the underlying mechanisms that shape the capacity of microbes to adaptively evolve.

EDUCATION

PhD in Ecology and Evolutionary Biology Yale University	08/2022— <i>present</i> New Haven, CT, USA
Proposed thesis: <i>The path(s) to optimality: towards a mechanistic understanding of evolvability in (pathogenic) microbes</i> Thesis Committee: C. Brandon Ogbunugafor (advisor), Richard O. Prum, Günter P. Wagner, Jeremy Draghi	
MS in Ecology and Evolutionary Biology Yale University	08/2022—12/2024 New Haven, CT, USA
BA (Hons) in Natural Sciences (Genetics) Homerton College, University of Cambridge	10/2018—06/2021 Cambridge, UK
Thesis: <i>The genetics of hybridisation: What systems biology-based models can tell us</i> (Advised by John J. Welch)	

RESEARCH EXPERIENCE

Graduate Research Fellow (PI: C. Brandon Ogbunugafor) Department of Ecology & Evolutionary Biology, Yale University	08/2022— <i>present</i>
Research Officer (PI: Sebastian Maurer-Stroh) Bioinformatics Institute, A*STAR, Singapore	02/2022—06/2022
Research Officer (PI: Swaine Chen) Genome Institute of Singapore, A*STAR, Singapore	07/2021—01/2022
Undergraduate Research (Part II Genetics) Student (PI: John J. Welch) University of Cambridge	11/2020—03/2021
Undergraduate Research Student (PI: Simon A. Levin) International Student Internship Program, Princeton University	06/2020—09/2020
Undergraduate Research Student (PI: Wei Leong Chew) Genome Institute of Singapore, A*STAR, Singapore	07/2019—08/2019

HONOURS AND AWARDS

Associates in Teaching, Yale University	2026
CRC Mellon Pedagogy Fellow, RITM, Yale University	2025
Sterling Prize Fellowship, Yale University	2022—2024
A*STAR National Science Scholarship (PhD)	2022— <i>present</i>
David Thompson Scholarship, Homerton College, University of Cambridge	2019
A*STAR National Science Scholarship (BS)	2018—2021

GRANTS

Yale Institute for Biospheric Studies (YIBS) Small Early Grant (\$3000)	2023
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PUBLICATIONS

Peer-reviewed articles

- Manivannan, S.N., & Ogbunugafor, C.B. (2026). *Deconstructing empirical fitness seascapes across scales of granularity*. In press at G3: Genes, Genomes, Genetics [[pre-print](#)].
- Surasinghe, S., Manivannan, S.N., Scarpino, S.V., Crawford, L., Ogbunugafor, C.B. (2026). *Structural causal influence (SCI) captures the forces of social inequality in models of disease dynamics*. In press at Biology Letters [[pre-print](#)].

4. **Manivannan, S.N.**, & Ogbunugafor, C.B. (2026). *Maynard Smith's analogy, realized: Common ancestry constrains evolutionary percolation through protein space*. PNAS, 123(21), e2610113123.
3. **Manivannan, S.N.**, Diaz Arenas, C., Grubaugh, N.D. & Ogbunugafor, C.B. (2025). *The importance of epistasis in the evolution of viral pathogens*. Virus Evolution, 11(1), veaf091.
2. **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, 16.
1. 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

1. Surasinghe, S.*, **Manivannan, S.N.***, Crawford, L. & Ogbunugafor, C.B. *Classification and regression trees clarify the role of epistasis and environment in genotype–phenotype maps*.

Magazine article(s)

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

*denotes shared first author

PRESENTATIONS

Talks

Ecology & Evolutionary Biology Graduate Student Symposium, Yale University	04/2026
† Ecology and Evolution of Infectious Diseases Early Career Researchers Symposium, Yale University	02/2026
† Graduate Research in Ecology, Behaviour and Evolutionary Biology, Rutgers University	02/2026
** Fisher's Fishes	06/2025
Ecology & Evolutionary Biology Graduate Student Symposium, Yale University	12/2024
** Li-Richter lab group, Institute of Ecology & Evolution, Universität Bern	05/2024

Posters

Population, Evolutionary, and Quantitative Genetics (PEQG) Conference	06/2026
QBio/PEB Symposium, Yale University	05/2026
Molecular Mechanisms in Evolution, Gordon Research Conference & Seminar	06/2025

† lightning talk, ** invited talk

TEACHING EXPERIENCE

Yale University

(forthcoming) Instructor on record <i>Biology of Humans (MCDB/HSHM 4690)</i> , Yale University	Spring 2027
Guest Lecturer <i>Evolutionary Biology (EEB 2225)</i> , Yale University	Spring 2026
McDougal Graduate Teaching Fellow Poorvu Center for Teaching and Learning, Yale University	2024—2026
Teaching Fellow <i>Evolution and Medicine (E&EB 335)</i> , Yale University	Fall 2023
Teaching Fellow <i>Principles of Ecology and Evolutionary Biology (BIOL 104)</i> , Yale University	Spring 2023
Teaching Fellow <i>Biology of Terrestrial Arthropods (E&EB250, E&EB251L)</i> , Yale University	Fall 2022

University of Cambridge

Volunteer Teaching Assistant <i>A Level Chemistry</i> Long Road Sixth Form College (STIMULUS Cambridge)	10/2019—03/2020
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PROFESSIONAL DEVELOPMENT

SLiM Workshop , American Natural History Museum	10/2024
Complexity Global School for Emerging Political Economics , Santa Fe Institute and Universidad de los Andes	07/2024
Evolutionary Biology Graduate Student Workshop , Department of Biology, University of Virginia	07/2023

MENTORSHIP

Undergraduate Senior Thesis

Kemper Lowry (Yale Anthropology and E&EB'25)

Women in Science at Yale (WISAY)

1 undergraduate, 2 Master's students

PROFESSIONAL SERVICE

Contributing Writer

The Yale Environmentalist, BlueSci, Varsity (Features), The Cambridge Language Collective

Institutional Service

Co-facilitator, Course (Re)Design Institute , Poorvu Center for Teaching and Learning, Yale University	2026
Organising Team, Spring Teaching Forum , Poorvu Center for Teaching and Learning, Yale University	2026
Organising Team, Graduate Student Symposium , Department of Ecology and Evolutionary Biology, Yale University	2026
Organising Team, Spring Teaching Forum , Poorvu Center for Teaching and Learning, Yale University	2025
International Committee Chair and Student Representative (E&EB) , Graduate Student Assembly, Yale University	2024—2025
Organiser, Hutchinson Speaker seminars , Department of Ecology and Evolutionary Biology, Yale University	2023—2024
Talk Coordinator for Science in the News , Yale Science Communication (<i>A graduate student organisation</i>)	2023
International Students' Representative , Women's Campaign, Cambridge Students' Union	2020—2021
International Officer , Homerton Union of Students, Homerton College, University of Cambridge	2019—2020

Other Service

Tamil Translator , Covid-19 Migrant Support Coalition (CMSC) in Singapore	2020—2021
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