Alyson (Aly) L. Singleton

+1 (847) 924-2708
asinglet@stanford.edu
github.com/alyson-singleton

Education

2021–2026 **Doctoral Candidate in the Emmett Interdisciplinary Program in Environment and Resources**, *E-IPER*.
Advisors: Profs. Erin Mordecai, Ph.D. (Dept. Biology) and Stephen Luby, M.D. (Div. Infectious Diseases and Geographic Medicine)
Stanford Doerr School of Sustainability, Stanford, CA

2019–2020 **Master of Arts in Biostatistics**, *Health Data Science Track*.
Brown University School of Public Health, Providence, RI

2015–2019 **Bachelor of Science in Applied Mathematics**, *Honors*.
Honors Thesis: *Network structure and rapid HIV transmission among people who inject drugs in Indiana: A simulation-based analysis.* Advisors: Prof. Matthew Harrison, Ph.D. (Div. Applied Mathematics) and Prof. Brandon Marshall, Ph.D. (Dept. Epidemiology)
Brown University, Providence, RI

Technical Skills

Programming	R, Java/Google Earth Engine, Julia, Python, SAS, ArcGIS, SQL, DAX, MATLAB, Vim, LaTeX
Operating Sys	Linux/Unix, macOS
Data Viz	R, MS Power BI, ArcGIS, Tableau

Research Experience

September'21–Present **Doctoral Candidate**, *E-IPER Program at Stanford University*.
Mentors: Profs. Erin Mordecai, Ph.D. (Dept. Bio) & Stephen Luby, M.D. (Div. Infectious Disease)
Description: PhD student in the Emmett Interdisciplinary Program in Environment and Resources, investigating the impact of large-scale global change on infectious disease transmission and broader health dynamics. Based on the concepts of One Health and Planetary Health, I focus on the design and evaluation of win-win solutions that can synergistically benefit human and environmental health. As we anticipate widening disease disparities under increasing climate instability, my research aims to identify opportunities to prevent and mitigate these compounding harms. I approach these topics by integrating novel computational methods, field-data collection, and epidemiologic techniques.

July'20–July'21 **ORISE Data Science Fellow**, *Centers for Disease Control and Prevention (CDC)*.
Mentor: Anna Blackstock, Ph.D. (CDC/DDID/NCEZID/DFWED)
Description: Designed analytic, anomaly detection tools for real-time outbreak detection and triage. Applied statistical methods for the analysis of epidemiologic, genomic, and other "big data" sources from CDC's Advanced Molecular Detection initiative to improve prediction performance. Validated machine learning algorithms for cluster characterization of multiple foodborne, waterborne, and environmental pathogens. Deployed as a Data Analyst on the Data, Analytics, and Modeling Task Force for the 2019 Novel Coronavirus Response beginning in December 2020. Analyzed large, sensitive COVID-19 surveillance datasets to build dynamic, real-time visualizations of US case and fatality trajectories with MS Power BI.

July'19–May'20 **Graduate Research Assistant**, *The People, Place & Health Collective, Brown Univ. SPH*.
Mentor: Prof. Brandon Marshall, Ph.D. (Dept. Epidemiology)
Description: Lead author on multiple HIV modeling projects investigating network dynamics and highly-effective HIV interventions. Designed statistical and machine learning analyses to derive non-obvious conclusions from model output and empiric data. Expanded and enhanced agent-based modeling techniques to simulate and quantify health epidemics.

October'16–May'19 **Undergraduate Research Assistant**, *The People, Place & Health Collective, Brown Univ. SPH.*
Mentor: Prof. Brandon Marshall, Ph.D. (Dept. Epidemiology)
Description: Honors Thesis - *Network structure and rapid HIV transmission among people who inject drugs in Indiana: A simulation-based analysis.* Created literature reviews and conducted epidemiological analysis for team's current projects. Trained incoming staff and graduate students on team's modeling techniques. Launched team's modeling website, www.titanmodel.org.

Relevant Coursework

Population Health: Models for Understanding and Controlling Global Infectious Diseases, Global Change and Emerging Infectious Disease, Practical Approaches to Global Health Research, Fundamentals of Epidemiology, Foundations in Epidemiologic Research Methods, Intermediate Methods in Epidemiologic Research, Infectious Disease Epidemiology, Viral Epidemics, HIV/AIDS in Africa: A Multidisciplinary Approach to Support HIV/AIDS Care and Treatment Programs

Mathematics and Statistics: Time Series Analysis, Applied Generalized Linear Models, Practical Data Analysis, Bayesian Statistical Methods, Statistical Learning/Big Data, History of Mathematics, Mathematics and Climate, Honors Linear Algebra, Real Analysis, Abstract Algebra, Statistical Inference I, Applied ODEs, Applied PDEs, Operations Research and Probabilistic Models

Computer Science: Machine Learning, Computer Science: An Integrated Intro, Statistical Programming in R, Introduction to Geographic Information Systems (ArcGIS)

Environmental Studies: Epistemology and Social Values in Interdisciplinary Environmental Research, Designing Environmental Research, Questionnaire Design for Surveys and Laboratory Experiments: Social and Cognitive Perspectives, Environmental Research Design Seminar, Empirical Methods in Sustainable Development

Publications and Presentations

Preprints

Glidden, C. K., **Singleton, A. L.**, Chamberlin, A., Tuan, R., Palasio, R. G., Caldeira, R. L., ... Mordecai, E. A., De Leo, G. A. (2024). Climate and urbanization drive changes in the habitat suitability of *Schistosoma mansoni* competent snails in Brazil. bioRxiv, 2024-01. www.biorxiv.org/content/10.1101/2024.01.03.574120v2.full

Singleton, A. L., Glidden, C. K., Chamberlin, A. J., Tuan, R., Palasio, R. G., Pinter, A., ... Mordecai, E. A., De Leo, G. A. (2023). Species distribution modeling for disease ecology: A multi-scale case study for schistosomiasis host snails in Brazil. MedRxiv, 2023-07. www.medrxiv.org/content/10.1101/2023.07.10.23292488v1.full-text

Published Manuscripts

Turner, M. A., **Singleton, A. L.**, Harris, M. J., Harryman, I., Lopez, C. A., Arthur, R. F., ... Jones, J. H. (2023). Minority-group incubators and majority-group reservoirs support the diffusion of climate change adaptations. Philosophical Transactions of the Royal Society B: Biological Sciences, 378(1889). doi.org/10.1098/rstb.2022.0401

Benedict, K., **Singleton, A. L.**, Jackson, B. R., Molinari, N. A. M. (2022). Survey of incidence, lifetime prevalence, and treatment of self-reported vulvovaginal candidiasis, United States, 2020. BMC Women's Health, 22(1), 1-9. doi.org/10.1186/s12905-022-01741-x

Singleton A. L., Marshall B. D. L., Bessey S., Harrison M. T., Galvani A. P., Yedinak J. L., Jacka B. P., Goodreau S. M., Goedel W.C. (2020). Network structure and rapid HIV transmission among people who inject drugs: A simulation-based analysis. Epidemics 2020;100426. doi.org/10.1016/j.epidem.2020.100426

Singleton A. L., Marshall B. D. L., Zang X., Nunn A. S., Goedel W.C. (2020). Added benefits of pre-exposure prophylaxis use on HIV incidence with minimal changes in efficiency in the context of high treatment engagement among men who have sex with men. AIDS Patient Care and STDs, Volume 34 Issue 12. doi.org/10.1089/apc.2020.0151

Marshall B. D., Goedel W. C., King M. R., **Singleton, A.**, Durham D. P., Chan P. A., Townsend J. P., Galvani A. P. (2018). Potential effectiveness of long-acting injectable pre-exposure prophylaxis for HIV prevention in men who have sex with men: a modelling study. The Lancet HIV, 5(9), e498–e505. doi.org/10.1016/S2352-3018(18)30097-3

Conference Presentations

Singleton A. L., Glidden C. K., Chamberlin A. J., Caldeira R. L., Tuan R., Palasio R. G. S., Pinter, A., Monteiro M. V., Athni T., Sokolow S., Mordecai E., De Leo G. Species distribution modeling for disease ecology: a multi-scale case study for schistosomiasis host snails in Brazil. Poster presentation at the Stanford Data Science Conference; May 2023; Stanford, California.

Singleton A. L., Glidden C. K., Chamberlin A. J., Caldeira R. L., Tuan R., Monteiro M. V., Domingues A., Tallam K., Kirk D., Mitchell K., Pereira T. D. A., Aslan I. H., Athni T., Liul P., Lwiza K. M., Sokolow S., Mordecai E., De Leo G. Multi-scale analysis of species distribution modeling for non-human disease hosts: a case study with Schistosomiasis in Brazil. Poster presentation at the XVI International Symposium on Schistosomiasis; November 2022; Ouro Preto, Minas Gerais, Brazil.

Singleton A. L., Glidden C. K., Chamberlin A. J., Caldeira R. L., Tuan R., Monteiro M. V., Domingues A., Tallam K., Kirk D., Mitchell K., Athni T., Sokolow S., Mordecai E., De Leo G. Compounding impacts of climate and land use change on human schistosomiasis in Brazil. Oral presentation at the 8th Stanford Global Health Research Convening; April 2022; Stanford, California.

Singleton A. L., Marshall B. D. L., Zang X., Nunn A. S., Goedel W. C. Added benefits of pre-exposure prophylaxis use on HIV Incidence with minimal changes in efficiency in the context of high treatment engagement among men who have sex with men. Poster presentation at IDWeek 2020; October 2020; Philadelphia, Pennsylvania. *(virtual due to COVID-19 precautions)*

Singleton A. L., Marshall B. D. L., Harrison M. T., Goodreau S. M., Goedel W. C. Structural network characteristics and vulnerability to rapid HIV transmission among people who inject drugs in a rural county in the United States: a modelling study. Poster presentation at the 7th International Conference on Infectious Disease Dynamics; December 2019; Charleston, South Carolina.

Journal Review

2023 PLOS Global Public Health: 1

2021 AIDS Patient Care & STDs: 1

Fieldwork Experience

Nov 2022 To study impacts of land-use change on *Biomphalaria* snail presence across Brazil, visited multiple *Biomphalaria* snail collection field sites across São Paulo state, Brazil with the Coordination for Disease Control of the State Health Secretariat of São Paulo state. *Biomphalaria* snails are obligate hosts for schistosomiasis, a debilitating parasitic disease affecting 200-300 million people globally. Also visited the Image Processing Division of Brazil's National Institute for Space Research (INPE) in São José dos Campos, SP, Brazil to further understand remote-sensing data of deforestation, agricultural land development, and other land-use change.

Aug–Sept 2022 Conducted epidemiologic and ecologic field research in Madre de Dios, Peru studying the compounding impacts of land use and human behavior change on vector-borne disease transmission. Designed and facilitated household sampling strategies, assisted with human sampling procedures, and rotated to support and learn from all other teams (domestic animals, vectors, wild mammals). Over the course of six weeks in the field, conducted household surveys, directly observed household characteristics, tested blood, stool, and urine samples, and trapped hosts and vectors of interest. Data collection procedures took place in six communities spanning stages of the land use gradient (urban, mining, and agricultural areas). Successful in a Spanish-only working environment.

Honors and Awards

2023 Award from the King Center on Global Development and Spotlight Award for Creative and Effective Visualization at Stanford Data Science Conference

2021 Delta Omega Honorary Society in Public Health, Epsilon Iota Chapter, Brown University School of Public Health

2019 Honors in Applied Mathematics, Brown University

Teaching and Workshops

Spring 2024 Workshop Teaching Assistant and Scientific Planning Committee Member for the 2024 Ecology and Evolution of Infectious Disease Conference

Fall 2022 Co-led workshop on species distribution modeling techniques for international collaborators and students visiting from Universidad Peruana Cayetano Heredia (UPCH). https://github.com/ckglidden/UPCH-species-distribution-tutorial

Spring 2022 Global Change and Emerging Infectious Disease (Teaching Assistant)

Mentoring and Leadership

King Center *King Center Undergraduate Research* mentor for one junior Stanford University undergraduate in the Mordecai Lab of Stanford University (Fall 2023-Spring 2024)

STEM Fellows *STEM Fellows* mentor for one junior Stanford University undergraduate in the Mordecai Lab of Stanford University (Fall 2023-Spring 2024)

B-SURP *Biology Summer Undergraduate Research Program* mentor for one sophomore Stanford University undergraduate in the Mordecai Lab of Stanford University (Summer 2023)

REU *NSF Research Experiences for Undergraduates* mentor for one junior Howard University undergraduate in the Mordecai Lab of Stanford University (Summer 2022)

SURA *Stanford Undergraduate Research Advising* mentor for two first-year Stanford University undergraduates (2021-22) and four first-year undergraduates (2022-23)

SIMSO Surveillance, Information Management, and Statistics Office representative and voting member for *CDC DFWED Tactical and Mission Coordination Teams* (2020-21)

RIDOC Volunteered and co-taught for a community college business math class within the *Rhode Island Department of Corrections* (2019-20)

WiSE *Women in Science and Engineering* mentor for three young women in STEM at Brown University (2017-20)

MAPS *Matched Advising Program for Sophomores* mentor for the Applied Mathematics and Public Health Departments at Brown University (2017-20)

STEMS *Swearer Tutoring and Enrichment in Math and Sciences* tutor for high-school students in Providence, RI (2015-16)

Languages

English First Language

Spanish Oral and Written Proficiency