

Soren L. Larsen

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Curriculum Vitæ

EDUCATION

Doctor of Philosophy, Ecology, Evolution, and Conservation Biology, University of Illinois at Urbana Champaign, IL, Jan. 2021 - May 2025

Advisor: Pamela Martinez (School of Molecular and Cellular Biology, Department of Statistics). Dissertation title: *Host heterogeneity and respiratory disease dynamics: from structural inequity to immune history*.

Master of Science, Mathematics, University of Illinois at Urbana Champaign, IL, Jan. 2021 - May 2022

Advised by Pamela Martinez.

Bachelor of Science, Mathematics, University of Washington, Seattle, WA, Sep. 2016 - Jun. 2020

Magna Cum Laude. Minors in Norwegian and the Comparative History of Ideas.

Complexity-GAINS International Summer School (Santa Fe Institute), Vienna, Austria, July 2022

In-person and remote participation in a two week, NSF-funded workshop on disintegration of societies: quantitative modeling of complex socio-behavioral systems. Co-organized by the Santa-Fe Institute. Project on monkeypox transmission dynamics across networks of sexual partners. Focus on potential impacts for sexual minority populations including stigmatization.

RESEARCH

Postdoctoral Scholar, University of California, Berkeley, May 2025 - present

Department of Demography. PI: Ayesha Mahmud.

Research Collaboration, Scenario Modeling Hub, May 2024 - present

- *Round 19*: Calibrated models to historical COVID-19 data and generated projections for 2025-26.
- *Heterogeneity research round*: Mentored by Cecile Viboud at Fogarty International Center, NIH, in collaboration with Samantha Bents. Calibrated models and generated projections for a Scenario Modeling Hub research round on heterogeneity in COVID-19 transmission and severity.

Graduate Research Assistant, University of Illinois at Urbana-Champaign, Jan. 2021 - May 2025

Program in Ecology, Evolution, and Conservation Biology. PI: Pamela Martinez.

MARTIANS Student Intern, Sandia National Labs, May 2023 - Aug. 2023

Worked with the epidemiology group under Patrick Finley, exploring the differences between socioeconomically-explicit vs. -agnostic models on determining SARS-CoV-2 optimal control.

Undergraduate Volunteer, Yager Group, University of Washington, Oct. 2017 - Dec. 2018

Developed a combinatorial model to better understand the biophysical chemistry of a diagnostic assay. Ran DNA amplification reactions (PCR/iSDA) and used gel electrophoresis to visualize results.

HONORS AND AWARDS

Isabel Norton Award, Spring 2024

PEEC Travel Grant, Spring 2024

Best Talk, Annual Microbiology Research Conference, Monticello, Illinois, October 2023

Barbara Sando Scholarship in Mathematics, awarded for Winter/Spring 2020

Phi Beta Kappa, inducted Spring 2019

Annual Dean's List, University of Washington, 2016-17 and 2017-18

PREPRINT AND UNDER REVIEW

Larsen, S. L., Yang, J., Lu, H., Huang, X. W., Tao, Q., Bhattacharya, T., Lei, B., Casati, A. D., Shao, F. K., Talmage, J.

Mok, C.K.P, Takahashi, S., Kraay, A.N.M., Wu, N.C., & Martinez, P. P. (2024). Reimagining the serocatalytic model for infectious diseases: a case study of common coronaviruses. *medRxiv*, 2024-12.

Larsen, S.L., Noor, I., West, H., Chandra, E., Martinez, P. P., Kraay, A. N. M. Immune history influences SARS-CoV-2 booster impacts: the role of efficacy and redundancy. *Under review*.
<https://doi.org/10.1101/2024.03.06.24303879>

PEER-REVIEWED PUBLICATIONS

Kostandova, N., Schluth, C., Arambepola, R., Atuhaire, F., Bérubé, S., Chin, T., Cleary, E., Cortes-Azuero, O., Garcia-Carreras, B., Grantz, K.H., Hitchings, M.D.T., Huang, A.T., Kishore, N., Lai, S., **Larsen, S.L.**, Loiate, S., Martinez, P., Meredith, H.R., Purbey, R., Ramiadantsoa, T., Read, J., Rice, B.L., Rosman, L., Ruktanonchai, N., Salje, H., Schaber, K.L., Tatem, A.J., Wang, J., Cummings, D.A.T., Wesolowski, A. (2024). A systematic review of using population-level human mobility data to understand SARS-CoV-2 transmission. *Nature Communications*, 15(1), 1-12.

Larsen, S. L., & Kraay, A. N. (2024). Transparent transmission models for informing public health policy: the role of trust and generalizability. *Proceedings of the Royal Society B*, 291(2015), 20232273.

Larsen, S. L., Shin, I., Joseph, J., West, H., Anorga, R., Mena, G. E., Mahmud, A.S., & Martinez, P. P. (2023). Quantifying the impact of SARS-CoV-2 temporal vaccination trends and disparities on disease control. *Science Advances*, 9(31), eadh9920.

OTHER PUBLICATIONS

Larsen, S.L., Noor, I., West, H., Chandra, E., Martinez, P.P., Kraay, A.N.M. "Disentangling the impact of natural infections and vaccination in a rapidly evolving pandemic: prioritizing limited vaccine supplies in low- and middle-income countries" WHO pink book. Meeting of the Advisory Committee on Immunization and Vaccines related Implementation Research. February 2023, pages 215-271.

Larsen, S. L., Beyeler, W. E., Acquesta, E. C. S., Klise, K. A., & Finley, P. D. (2023). *Socioeconomically-inspired modeling to justify use of fine-grain mobility data* (No. SAND2023-07730). Sandia National Lab.(SNL-NM), Albuquerque, NM (United States).

GRANTS

SHIELD Illinois, 2023 (Co-Investigator), \$100,000

Disentangling the effect of racial, ethnic, and socioeconomic health disparities on respiratory disease transmission in Illinois before and during the COVID-19 pandemic

CONTRIBUTED TALKS AT MEETINGS, CONFERENCES AND SEMINARS

Epidemiology and Population Studies modeling seminar, NIH Fogarty International Center, Bethesda, Maryland, October 2024

Reimagining the serocatalytic model for infectious diseases: a case study of common coronaviruses - 50-minute research talk

Models of Infectious Disease Agent Study (MIDAS) Network Annual Meeting, Silver Springs, Maryland, November 2024

Reimagining the serocatalytic model for seasonal coronaviruses - 5 minute speed talk

Brook Lab, University of Chicago, Chicago, Illinois, November 2024

Host heterogeneity and SARS-CoV-2 dynamics: from structural inequity to immune history - 50-minute research talk

Epidemiology and Population Studies modeling seminar, NIH Fogarty International Center, Bethesda, Maryland, October 2024

Host heterogeneity and SARS-CoV-2 dynamics: from structural inequity to immune history - 50 minute research talk

Bohrer Memorial Student Workshop in Statistics, April 2024

Immune history influences SARS-CoV-2 booster impacts - 15-minute research talk and poster presentation

Microbe Mondays, April 2024

Host heterogeneity and SARS-CoV-2 dynamics: from structural inequity to immune history - 20-minute research

talk

Annual Microbiology Research Conference, Monticello, Illinois, October 2023

30-minute research talk on host heterogeneity, social disparities, and impacts for SARS-CoV-2 control

Applied Math Graduate Seminar, University of Illinois at Urbana-Champaign, April 2022

25-minute research talk on social inequity and COVID-19 transmission

MicroERA, University of Illinois at Urbana-Champaign, April 2022

Research speed talk on social inequity and COVID-19 transmission

POSTERS AT MEETINGS AND CONFERENCES

American Society of Tropical Medicine and Hygiene (ASTMH) Annual Meeting, New Orleans, Louisiana, November 2024

Reimagining the serocatalytic model for seasonal coronaviruses

Institute for Disease Modeling (IDM) Annual Symposium, Seattle, Washington, September 2024

Reimagining the serocatalytic model for seasonal coronaviruses

Ecology and Evolution of Infectious Diseases (EEID), Stanford, California, June 2024

Disentangling the relative benefit of bivalent vs. monovalent boosters in the context of host immune history and socioeconomic status: a modeling study

MicroERA, University of Illinois at Urbana-Champaign, March 2024

Disentangling the seroconversion and seroreversion rates of seasonal coronaviruses using age-stratified seroprevalence data

Models of Infectious Disease Agent Study (MIDAS) Network Annual Meeting, Atlanta, Georgia, October 2023

Influence of immune history on booster impacts in low- and middle-income countries

ASTMH Annual Meeting, Chicago, Illinois, October 2023

Influence of immune history on booster impacts in low- and middle-income countries

MIDAS Network Annual Meeting, Bethesda, Maryland, September 2022

Funded by MIDAS to attend annual meeting and present on social inequity and COVID-19 transmission

Bohrer Memorial Student Workshop in Statistics, University of Illinois at Urbana-Champaign, April 2022

Poster presentation on social inequity and COVID-19 transmission

PUBLIC ENGAGEMENT

Science on Tap, Rigg's Brewery, November 2023

"Who gets sick and why: from COVID-19 to the common cold" - 1 hour discussion for a lay audience.

Genome Day, Champaign Public Library, November 2023

Two weekends of science exhibits and activities for a K-12 audience

TEACHING EXPERIENCE

List of Teachers Ranked as Excellent, Spring 2021, Fall 2021, Spring 2022, Fall 2022

Teaching Assistant, University of Illinois at Urbana-Champaign, Jan. 2021 - Dec. 2022

- *Fall 2022*: one Merit discussion section of Calculus 2 (Math 231). Wrote worksheets/mock exams and facilitated complex problem solving and collaboration.
- *Spring 2022*: two discussion sections of Calculus 2 (Math 231). Graded worksheets and helped develop exams.
- *Fall 2021*: two discussion sections of Calculus I (Math 221). Graded worksheets and exams.
- *Spring 2021*: two discussion sections of Calculus for Business (Math 234)

Math Grader, University of Washington, Winter/Summer Quarters 2019, Summer Quarter 2020

- *Summer 2020*: Graded homework for one section of Linear Analysis (MATH 309)
- *Summer 2019/2020*: Graded homework with feedback for one section of Introduction to Mathematical Reasoning (MATH 300) each summer
- *Winter 2010*: Wrote homework keys and graded homework for two sections of Linear Analysis (MATH

Volunteer Peer-Mentor, University of Washington, Spring/Fall 2018, Fall 2019

- Peer-mentors are part of the UW STEM-Dawgs program, whose purpose is to foster a sense of community within large undergraduate lecture courses, and address disparities in performance for women, underrepresented groups, and first-generation college students.
- *Spring 2018*: Trained in research-based pedagogical methods
- *Fall 2018*: Facilitated problem-solving and study skill development in a weekly discussion workshop for General Chemistry (CHEM 142), under the supervision of a graduate teaching assistant.
- *Fall 2019*: Facilitated an additional workshop with a graduate student

UNDERGRADUATE MENTEES

Alyssa Anastasi, Statistics, UIUC, 2025 - present || **Chloe Yang**, Statistics, UIUC, 2023 - 2025

Lydia Schieleit, Statistics, UIUC, 2024 || **Annika Venegas**, Mathematics, UIUC, 2023 - 2024

Erin Haslett, Political Science, UIUC, 2023 - 2024

Haylee West, Molecular and Cellular Biology, UIUC, 2021 - 2023

Jefrin Joseph, Molecular and Cellular Biology, UIUC, 2021 - 2022 || **Ikgyu Shin**, Statistics, UIUC, 2022

Eliana Chandra, Statistics/Sociology, UIUC, 2022 || **Rafael Anorga**, Integrative Biology, UIUC, 2022

SERVICE

MIDAS Trainee Committee Co-Chair, November 2024 - present

MIDAS Trainee Committee, January 2024 - present

Organize events for trainees in the Models of Infectious Disease Agent Study (MIDAS) Network

Disability Caucus, Graduate Employees Organization, Spring 2021 - Spring 2023

With Disability Caucus, which advocates for disabled students and workers on campus, developed a workshop on disability and the accommodations process aimed at teaching assistants, staff, and faculty. The workshop ran in multiple departments including as part of math department TA training.

Accommodation Working Group, August 2022 - October 2022

Contributed to early stages of a working group formed by the Department of Mathematics to develop recommendations of best practices for accommodating disabled students in the graduate program

Undergraduate Affairs Committee, Fall 2021 - Spring 2022

Served on the committee as the graduate representative. Helped make decisions about undergraduate curriculum and programs.

AD-HOC REVIEWER

Epidemics, Proceedings of the Royal Society B, Bulletin of the World Health Organization, Mathematical Biosciences

INDEPENDENT STUDY

Math Special Topics, University of Washington, Winter/Spring 2019

Independent study of *Differential Topology* (Guillemin & Pollack) under the supervision of Dr. Lucas Braune.

Math Special Topics, University of Washington, Fall 2018

Independent study of *An Illustrated Theory of Numbers* by Martin Weissman, under the supervision of Prof. Bianca Viray.

SELECTED COVERAGE

This Week in Virology, Episode 1035, August 2023

Poxvirus wars, warpspeed COVID-19 vaccine rollout

University of Illinois at Urbana-Champaign

School of MCB Communications, April 2024: Cheers to 'Science on Tap:' Graduate students demystify science topics at local brewery

Department of Statistics News, January 2023: Heat waves, stock prices, and COVID vaccines among student research projects presented at recent URES symposium