

TECHNICAL SKILLS

Statistical Modeling: Bayesian & Frequentist inference, generalized & linear regression, hierarchical/multilevel models, sensitivity analysis, multivariate analysis
Programming: R, C++, Stan, Bash, Python
Systems & Infrastructure: Git, VS Code, Linux (remote machines), HPC (SLURM), SSH, L^AT_EX

RELEVANT EXPERIENCE

ORISE Research Fellow — USDA APHIS Jun. 2024 – Present
Statistical Modeling, Data Analysis, & Scientific Software Development Remote, US

- Conceived and implemented an end-to-end analysis that leveraged hierarchical Bayesian modeling, stochastic simulation, and optimization to improve disease surveillance protocols.
- Estimated power-law kernel function parameters using custom MCMC samplers, likelihood functions, and sensitive survey data.
- Engineered reproducible HPC pipelines in Bash and R to run and process millions of simulations.
- Developed a Python algorithm to optimize sampling targets using both empirical and estimated parameters.
- Translated technical results for non-technical stakeholders to iteratively improve the modeling framework.

Research Associate II — Colorado State University Oct. 2023 – Jun. 2024
Statistical Modeling & Simulation Development Fort Collins, CO

- Conceived of a system of ordinary differential equations and fit them to messy survey data within a Bayesian framework using Stan and R in order to infer latent processes.
- Performed sensitivity analyses to attribute uncertainty to specific model parameters (estimate effect sizes) and inform where data collection and parameter estimation should be improved.
- Built reproducible HPC workflows using Bash and R to orchestrate large-scale simulation and analysis pipelines.

Graduate Research Assistant – Colorado State University Aug. 2021 – Aug. 2023
Simulation Development, Data Engineering & Analysis Fort Collins, CO

- Engineered new features in a large C++ simulation to evaluate counterfactual management strategies and support decision making during future disease outbreaks.
- Built R-based data pipelines to process large simulation outputs, generate standardized figures, and run sensitivity analyses quantifying how parameter uncertainty impacts model outcomes.
- Maintained a reproducible and version-controlled codebase with Git for multi-institution, international collaboration.
- Generated quarterly reports and presented biweekly updates to funding institutions.

EDUCATION

Colorado State University Aug. 2021 – Aug. 2023
M.S. Ecology (Applied Statistics Focus) Fort Collins, CO

Lewis & Clark College Aug. 2017 – May 2021
B.A. Biology, Honors (Significant International Affairs Coursework) Portland, OR

SELECTED PUBLICATIONS & PRESENTATIONS

Simony, B. J. et al., *Stochastic modeling of bovine tuberculosis dynamics in white-tailed deer*, in: Research in Veterinary Science (2025), p. 105970.

Smith, Samuel M et al., *Potential benefits of adaptive control strategies are outweighed by costs of infrequent, but dramatically larger disease outbreaks*, in: Royal Society Open Science 12.8 (2025).

Smith, Samuel M et al., *United States cattle market location and annual market sales estimate data*, in: Data in Brief (2025), p. 111877.

Smith, Samuel M, Beck-Johnson, L. M., and Webb, C. T., “United States Disease Outbreak Simulation and United States Animal Movement Model”, in: *USDA-ARS Geospatial and Environmental Epidemiology Scoping Workshop*, Mississippi State University, Starkville, MS, May 2024.

Smith, Samuel M et al., “Harnessing a National-Scale Disease Transmission Model to Understand the Impact of Control on Livestock Disease Spread”, in: *CEAH ASF Mini Conference*, Fort Collins, CO, Sept. 2024.

Smith, Samuel M, Beck-Johnson, L. M., and Webb, C. T., “Supporting Emergency Disease Management with Structured Decision-Making”, in: *Ecology and Evolution of Infectious Diseases Annual Meeting*, Pennsylvania State University, State College, PA, May 2023.