Celia Hein

celia.d.hein@gmail.com
647-913-2218
github.com/celiahein
https://celiahein.github.io/

Education

2024/12 **PhD Ecology and Evolutionary Biology**
University of Toronto

2016/12 **BSc Wildlife Ecology Research and Management**
University of Wisconsin - Stevens Point

Skills

Project Management and Collaboration
Lead and managed multiple projects simultaneously. Collaborated and organized a diverse research team via Github

Data Management and Visualization
Experienced in data collection, management, and quality control. Designed and programmed R scripts that create data visualizations and statistical interpretations for both broad and expert audiences

High Performance and Parallel Computing
Programmed statistical analyses to run in parallel and on high performance computing clusters

Oral and Written Scientific Communication
Skilled public speaker able to communicate highly technical information to broad audiences. Wrote first-author articles for peer-review and technical reports

Programming
Highly expert in data management and statistical programming in R (shiny, stats, lme4, tidyverse, ggplot, MCMCglmm, brms, Rmarkdown). Experienced in Git, command line, SQL, ArcGIS, and Python (pandas, NumPy, scikit-learn, matplotlib, TopHat, Bowtie)

Creativity and Critical Thinking
Lead multiple research projects from conception to completion. Able to identify solve relevant problems

Projects

Data Extraction, Management, and Quality Control
- Programmed R scripts to extract data from map (raster) files at 45 different spatial scales and cleaned, organized, and summarized a complex, spatial, quantitative dataset of over 100,000 records.
- Independently extracted, edited, and reclassified large landcover maps from Agriculture and AgriFood Canada.

Regression Modelling and Optimization
- Designed and programmed R scripts to fit over 36,500 generalized linear mixed models (logistic, Poisson, negative binomial, and hurdle models) using a job array on high performance computing clusters on Niagara through the Digital Research Alliance of Canada.
- Automated model selection, fit and select secondary regression models to scale-trends (including 2nd and 3rd degree polynomials), and wrote several algorithms to calculate the optimum scale of effect.

Bootstrap Resampling and Machine Learning
- Programmed R script (Rmarkdown notebook) to automatically conduct bootstrap resampling, make statistical pairwise comparisons of calclated confidence intervals, and perform post-hoc tests.
- Designed, fitted, and interpreted Bayesian models (MCMCglmm), PCAs, NMDS models, and random forests in R.

Simulation and Genetic Analyses
- Simulated genetic data and programmed a sensitivity analysis to test for bias in proposed statistical methods
- Identified and communicated statistical limitations preventing further research development

Relevant Professional Experience

2025/01 – present **Postdoctoral Researcher**
University of Toronto
- Programmed landscape connectivity and network analyses to identify priority areas for the Alberta Prairie Conservation Forum

2022/01 – 2022/06 **Course Instructor/Lecturer of Biostatistics I**
University of Toronto
- Using real data from published peer-reviewed studies, I walked students step-by-step from experimental design to statistical interpretation and application in lecture, exams, and tutorials (via R and Rstudio)
- Managed a large, relational database of course material for over 100 students and made it accessible on the cloud via Canvas
- Supervised and managed a team of 5 teaching assistants

2017/09 – 2024/12 **Teaching Assistant of Ecology, Biostatistics I, and Biostatistics II**
University of Toronto
- Managed a team's field data collection, data manipulation, statistical analysis, and interpretation for a large citizen-science project
- Taught an intensive, in-person course on regression-based modelling (conceptual and applied) in R and RStudio for beginners
- Created and evaluated case study assignments, written reports, and oral presentations
- Trained and mentored new employees

2015/04 – 2017/09 **Wildlife Ecology Technician**
Government of Wisconsin Department of Natural Resources
- Designed and conducted multiple surveys to assess populations and nest sites of black terns (*Chlidonias niger surinamensis*), which are endangered in Wisconsin, and wrote a technical report for internal use

Relevant Courses and Workshops

2024/07 **Machine Learning in Python**
Compute Ontario

2024/06 **Introduction to Neural Networks (Deep Learning) in Python**
Compute Ontario

2024/06 **Working with Jupyter on High Performance Computing Clusters**
Compute Ontario

2023/07 **Incorporating Indigenous Knowledge into Biological Research**
University of Toronto

2022/07 **Introduction to Structured Query Language (SQL)**
Canadian Society of Ecology and Evolution

2022/01 **Statistics: GLMM, Bayesian, and Network Analysis**
University of Toronto