



Alaya Greene

Postdoctoral Research Associate, Biological Invasions, Ecology, and Artificial Intelligence

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SUMMARY

Postdoctoral ecological data scientist with four years of doctoral and postdoctoral research applying machine learning, **advanced statistical modeling**, and spatial analysis to biodiversity and environmental questions. Ph D trained in Ecology, with publications focused on species distributions, invasion risk, ecological forecasting, and integrated environmental datasets. Develops reproducible Python and R workflows for probabilistic modeling, interpretable AI, **uncertainty quantification**, calibration, transfer learning, and ensemble analysis. Experience includes GIS, version control, **high performance computing**, cloud research workflows, independent research, **peer reviewed publications**, international collaboration, scientific communication, and mentorship. Research connects transparent model evaluation with transferable ecological inference and decision relevant forecasting across species, ecosystems, and geographic regions. Prepared to contribute thoughtful analysis, clear communication, and collaborative research leadership within an interdisciplinary academic setting.

EXPERIENCE

Postdoctoral Research Fellow, Ecological AI

Front Range Biodiversity Center 📅 August 2025 - Present 📍 Boulder, CO

Leads interdisciplinary **ecological forecasting** research across occurrence, climate, land cover, and trait data, while mentoring researchers and supporting publishable computational science.

- Combined occurrence, climate, land cover, and trait data for invasion risk forecasting across **species** and regions
- Built probabilistic **Python** workflows producing calibrated predictions with explicit uncertainty estimates for ecological interpretation
- Created feature attribution diagnostics that clarified drivers behind high risk predictions for **ecology** collaborators
- Evaluated **transfer learning** across regions, identifying reliable predictions and locations needing recalibration
- Maintained version controlled pipelines across data preparation, modeling, evaluation, figures, cluster, and cloud environments
- Mentored graduate and **undergraduate researchers** through code review, reproducibility, and publishable research preparation

Doctoral Researcher, Quantitative Ecology

University Research Lab 📅 August 2022 - July 2025 📍 Fort Collins, CO

Designed independent dissertation research on biodiversity change and species distributions, integrating spatial datasets with advanced models, reproducible computing, publications, and student guidance.

- Designed dissertation studies linking biodiversity change with species distributions across regional monitoring datasets
- Compared statistical and **machine learning** ensembles through cross validation, calibration diagnostics, and out of sample evaluation
- Integrated **GIS** layers, species observations, climate records, and remote sensing variables into spatial datasets
- Built Git workflows with documented scripts, data checks, and jobs on a university cluster
- Produced peer reviewed manuscripts and conference presentations for **ecology**, conservation, and **data science** audiences
- Guided junior researchers through data review, **spatial analysis**, **model interpretation**, and reproducible documentation

Graduate Researcher, Invasion Ecology

University Research Lab 📅 August 2021 - July 2022 📍 Fort Collins, CO

STRENGTHS



Ecological modeling

Connected species records with environmental data in difficult forecasting studies. Colleagues sought guidance when model results needed ecological context.



Probabilistic analysis

Built calibrated predictions with visible uncertainty. That transparency helped research partners trust results and ask better scientific questions.



Reproducible computing

Documented data, code, and evaluation steps across cluster and cloud work. Review became easier, and shared workflows gained steady use.



Interdisciplinary communication

Translated technical findings for ecology and conservation audiences. Clear presentations opened productive conversations with researchers outside data science.



Research mentorship

Guided students through code review and spatial analysis. Small coaching moments became stronger habits for independent, publishable work.

SKILLS

Python R Machine learning

Statistical modeling

Probabilistic ML Interpretable AI

Uncertainty quantification

- Model calibration
- Transfer learning
- Domain adaptation
- Causal inference
- Ensemble modeling
- Ecological forecasting
- Spatial analysis
- Reproducible research

LANGUAGES



MY CAREER



- Postdoctoral Research Fellow, Ecological AI at Front Range Biodiversity Center (1.2 Years)
- Doctoral Researcher, Quantitative Ecology at University Research Lab (2.9 Years)
- Graduate Researcher, Invasion Ecology at University Research Lab (11 Months)

- Investigated introduced plant establishment using ecological records and environmental covariates, producing transparent analyses, collaborative manuscripts, and training for undergraduate researchers.
- Investigated introduced plant establishment using occurrence records, environmental covariates, and biodiversity databases
 - Created **R** workflows for cleaning, exploration, spatial joins, visualization, and statistical modeling
 - Tested model uncertainty through resampling and sensitivity analysis, separating stable signals from sampling effects
 - Applied GIS methods across environmental gradients to identify geographic gaps affecting **transferability**
 - Contributed analyses and scientific writing to collaborative manuscripts with transparent method records
 - Presented findings to interdisciplinary lab groups and trained undergraduates in reproducible ecological analysis

PROJECTS

- Probabilistic Invasion Forecasting** 📅 2026
- Built an interpretable forecasting workflow that combines ecological observations, environmental predictors, uncertainty estimates, and calibration diagnostics for invasion risk assessment. Work connected model outputs with practical ecological questions across regions.
- Transferable Biodiversity Modeling** 📅 2025
- Evaluated ensemble models across geographic domains using spatial data integration, transfer learning, and reproducible computational workflows. Findings clarified when ecological predictions transferred and when local recalibration supported sound inference.

LEADERSHIP & AWARDS

- Colorado State University Research Computing and High Performance Computing Certificate, 2024
- Graduate research recognition for interdisciplinary quantitative ecology contributions, Colorado State University, 2025
- Research mentor recognition for guidance provided to undergraduate ecology researchers, 2024

EDUCATION

- Ph.D. in Ecology**
- Colorado State University 🎓 GPA: 4.0 📅 2025 📍 Fort Collins, CO
- Coursework:** Ecological modeling, statistical analysis, spatial ecology, biodiversity science*
- B.S. in Environmental Science**
- University of Vermont 🎓 GPA: 4.0 📅 2021 📍 Burlington, VT
- Coursework:** Environmental science, ecology, GIS, conservation biology*

CERTIFICATIONS

- Research Computing and High Performance Computing Certificate 📅 2024
- GIS and Spatial Analysis Graduate Certificate 📅 2024

TECHNICAL SKILLS

- Programming Languages:** Python, R, SQL
- Machine Learning:** Scikit learn, XGBoost, TensorFlow
- Statistical Modeling:** Bayesian modeling, hierarchical models, generalized linear models
- Probabilistic Methods:** Probabilistic ML, uncertainty quantification, model calibration
- Interpretable AI:** Feature attribution, sensitivity analysis, partial dependence
- Ecological Analysis:** Species distributions, invasion ecology, ecological forecasting
- Spatial Analysis:** GIS, spatial joins, spatial interpolation
- Geospatial Tools:** QGIS, ArcGIS, GeoPandas
- Reproducible Research:** Git, documented workflows, version control

- **Computing Infrastructure:** High performance computing, cloud computing, cluster jobs
- **Data Integration:** Biodiversity data, environmental data, remote sensing
- **Research Methods:** Transfer learning, domain adaptation, causal inference
- **Model Evaluation:** Cross validation, ensemble modeling, out of sample evaluation
- **Scientific Communication:** Peer reviewed publications, conference presentations, scientific writing
- **Collaboration Platforms:** Jupyter, GitHub, Linux

PROFESSIONAL AFFILIATIONS

- Interdisciplinary ecology and environmental data science research collaborator
- Graduate and undergraduate ecological research mentorship community participant
- Scientific writing and quantitative ecology seminar contributor

ADDITIONAL INFORMATION

Work Status : Authorized to work in United States. No sponsorship required.

REFERENCES

AVAILABLE ON REQUEST