Nathan Roe

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Personal Statement

I am a plant ecologist interested in using modeling techniques to understand the distribution and abundance of functional traits, organisms, and communities, particular related to global change and the future of terrestrial ecosystems.

Education

University of New Hampshire **Sep., 2009 – May, 2013**
Environmental Sciences (B.S.) & Environmental Conservation Studies (B.A.) – GPA 3.52 *Durham, New Hampshire*

University of New Hampshire **Sep., 2018 – Dec., 2020**
Master's of Forestry (M.S.) – GPA 4.0 *Durham, New Hampshire*

Publications

Roe NA, Ducey MJ, Lee TD, Fraser OL, Colter RA, and Hallett RA (2022). Soil chemical variables improve models of understorey plant species distributions. Journal of Biogeography 49(4): 753-766.

Roe NA (2021). Determining the factors that drive understory plant species distribution in the White Mountains of New Hampshire (Master's thesis). University of New Hampshire.

Lee TD, Perkins AL, Campell AS, Passero JS, Roe NA, Shaw CM, and Congalton RG (2015). Incipient Invasion of Urban and Forest Habitats in New Hampshire, USA, by the Nonnative Tree, Kalopanax septemlobus. Invasive Plant Sci Manag 8(2):111-121.

Conference Presentations

Roe NA, Ducey MJ, Fraser OL, Colter RA, Lee TD (2020). Modeling the distribution of forest understory plants using remote sensing and soil chemical predictors. Oral session, AGU Fall Meeting.

Roe NA, Ducey MJ, Fraser OL, Colter RA (2020). Determining the indicator value of understory plant species using niche modeling techniques. Oral session, ESA Annual Meeting.

Grants, Funding, and Awards

- Employee of the Quarter, Natural Resources Conservation Service - SPSD Q1, 2023
- National Science Foundation - Graduate Research Fellowship Program (GRFP) honorable mention 2019
- University of New Hampshire two-year teaching assistantship (TA) 2018-2020
- Recipient of University of New Hampshire College Woods Scholarship 2012
- Recipient of Farrington Fund Scholarship 2011

Experience

Natural Resources Conservation Service (NRCS) **May 5th, 2021 – present**
Ecological modeling detail (0408) – $80,000/year (GS-11), 40 hours/week *Sonora, CA*
Supervisor: Jamin Johanson (907) 982-5827, may be contacted

- Developed standardized methodologies, and published an associated R package - ecositer, for predicting the distribution of plant species and land capability classes, including:
  - Querying, retrieving, and performing QA/QC on government databases
  - Using efficient and reproducible methods for assembling a suite of predictor variables (spectral, topographic, and in-situ soil properties)
  - Leveraging appropriate statistical methods for prediction (GLM, GAM, RF, ANN, ensemble, and others)
  - Assessing the accuracy of model predictions using multiple performance metrics
- Co-lead the Research and Technology team, focusing on projects such as open-sourcing NRCS ecological data for interactive visualization and interpretation using a publicly available Shiny App
- Published a training document for NRCS ecological sciences detailing fundamental concepts and best practice workflows – NRCS Ecologist FAQs
- Worked with government contractors as a Subject Matter Expert for the migration and improvement of the Ecosystem Dynamics Interpretive Tool, a government-owned application for accessing NRCS ecological products

University of New Hampshire - Ducey Lab **May 1st, 2020 – May 1st, 2021**
Research Ecologist – $28/hour, 40 hours/week *Durham, New Hampshire*
Supervisor: Mark Ducey (207) 337-3690, may be contacted

- Published research in the Journal of Biogeography on the spatial distribution of plant species in New Hampshire's White Mountains, developing predictive models using remotely sensed variables such as lidar and multispectral imagery.
- Used statistical techniques - including, generalized linear models, generalized additive models, random forests, and ensemble techniques - to create niche models for species and evaluate species' responses to environmental gradients, including soil chemistry
- Coordinated field sampling campaigns, including hiring personnel, training, outlining field sampling schedule, and ensuring safety measures are followed
- Prepared manuscripts for peer-reviewed journal including *Forest Ecology and Management* and *Journal of Biogeography*
- Collaborate with the U.S. Forest Service and Natural Resources Conservation Service on data analysis, publication, and ongoing data collection

University of New Hampshire - Ducey Lab **Sept. 1st, 2018 – May 1st, 2020**
Master's of Science, Forestry – $26/hour, 20 hours/week *Durham, New Hampshire*
Supervisor: Mark Ducey (207) 337-3690, may be contacted

- Collected understory vegetation data across 100+ plots in the White Mountains, identifying over 200 plant species
- Analyzed species–environment relationships in R using reproducible workflows and parallelized high-performance Linux computing
- Presented findings at the *Ecological Society of America* and *American Geophysical Union* conferences
- Teaching assistant for four semesters (Intro to GIS, Field Methods, Forest Ecology)

Great Basin Institute **May 1st, 2017 – Nov. 27th, 2017**
Ecological Field Monitoring Lead – $18/hour *Challis, Idaho*
Supervisor: Paul Hood (612) 481-7477, may be contacted

- Led a 3-person crew collecting BLM AIM vegetation and soil data, including LPI, species inventory, and soil horizon characteristics
- Planned logistics for 8-day field hitches, managed safety communications via SPOT, and oversaw technician schedules and reporting

University of New Hampshire - Lee Lab **Sept. 1st, 2016 – Feb. 15th, 2017**
Research Assistant – $20/hour, 40 hours/week *Durham, NH*
Supervisor: Dr. Tom Lee (603) 862-3791, may be contacted

- Studied a chronosequence of red pine stands throughout New England to determine the impact of red pine scale
- Extracted tree cores and performed dendrochonology using WinDENDRO to estimate the date of red pine scale emergence and the impact on tree productivity

U.S. Forest Service - Rocky Mountain Research Station **May 1st, 2015 – Nov. 20th, 2015**
Crew Lead – $15/hour, 40 hours/week *St. Regis, MT*
Supervisor: Josh Rokosch (406) 360-9617, may be contacted

- Managed a three-person crew collecting stream geomorphology and water quality data in the Columbia River Basin

U.S. Forest Service - Tongass National Forest **May 1st, 2016 – Sept. 1st, 2016**
Crew Lead – $15/hour, 40 hours/week *Sitka, AK*
Supervisor: Chris Leeseberg (907) 747-4343, may be contacted

- Monitored populations of four Pacific salmon species and created population estimates that determined fishing regulation

Technical Skills

Languages: R, LaTeX, git, C, Python
Geospatial: ArcMap, R, QGIS, SAGA, GDAL, Python
Technologies/Frameworks: AI, Linux, GitHub, WordPress
Statistics: Linear models, generalized linear models, multivariate, machine learning, ensemble models

Relevant Coursework

- Forest Ecology
- Community Ecology
- Terrestrial Ecosystems
- Biogeochemistry
- Soil Ecology
- Analysis of Ecological Data
- Advanced Statistical Modeling and Programming
- Forest Mapping and Measurements

References

Jamin Johanson (Natural Resources Conservation Service) (209) 591-3708 jamin.johanson@usda.gov
Dr. Mark Ducey (University of New Hampshire) (603) 370-8943 mark.ducey@unh.edu
Dr. Tom Lee (University of New Hampshire) (603) 988-9022 tom.lee@unh.edu