

Dr. Johanna (Jo) Jensen

Curriculum Vitae

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SUMMARY

Forest Carbon Scientist and Forest Ecologist with a PhD in Forest Ecology from Columbia University and 10+ years of experience spanning forest carbon project development, technical diligence, remote sensing, and applied ecological research. Deep expertise in ARR project development and PDD authorship under Verra (VM0047) for reforestation and conservation projects across the USA, Mexico, and Brazil. Experienced in pre-investment technical evaluation of ARR, IFM, and agroforestry projects under Verra VCS, ACR, and Isometric protocols. Skilled in the full technical lifecycle of nature-based carbon projects — from land suitability assessment and baseline development to growth modeling, credit volume forecasting, leakage analysis, and MMRV framework design. Strong geospatial fluency (R, Python, GEE, LiDAR, QGIS) and statistical expertise in uncertainty quantification (Monte Carlo, Bayesian hierarchical modeling). Proven ability to translate complex forest science into decision-ready technical documentation, tools, and guidance for diverse stakeholders.

EDUCATION

PhD, Ecology (Forest Ecology) · Columbia University, New York, NY · 2023

Dissertation: "Environmental controls of growth and regeneration at the Arctic treeline in a changing climate."

Advisors: Drs. Kevin Griffin & Natalie Boelman

Funded by NASA's Arctic-Boreal Vulnerability Experiment (ABOVE)

Columbia University Dean's Fellowship (\$158,600) · NSF GRFP Honorable Mention 2018

MPhil, Ecology · Columbia University, New York, NY · 2019

MA, Ecology · Columbia University, New York, NY · 2018

BA, Environmental Science · Colorado College, Colorado Springs, CO · 2014

Cum Laude, GPA 3.8 · Graduation with Distinction in Environmental Science

SKILLS

Carbon Market & Methodology: VM0047 · ACR · Isometric Reforestation Protocol · Verra VCS · ICVCM CCPs · ARR project development · PDD authorship · Additionality & baseline analysis · Leakage assessment (VM0054) · MMRV framework design · IFM · Agroforestry · Credit volume forecasting · Pre-investment technical diligence

Project & Portfolio Management: NBS project development · Portfolio performance monitoring · Risk assessment & mitigation planning · Validation/verification management · Stakeholder engagement · Site visits & field review · Benefit sharing design

Remote Sensing & Geospatial: Google Earth Engine (GEE) · QGIS · Canopy Height Model (CHM) · Above-Ground Biomass (AGB) estimation · LiDAR (terrestrial & aerial) · Satellite time-series analysis · Land-use change analysis · Land suitability assessment

Scientific Computing & Statistics: R (advanced) · Python · Bayesian hierarchical modeling · Monte Carlo estimation · Mixed-effects models · Machine learning (random forest, regression) · Uncertainty quantification · Power analysis · Geospatial data processing

Domain Expertise: Forest ecology · Forest growth modeling · Dynamic baseline modeling · Carbon accounting · Soil & ecosystem science · Experimental design · Reproducible research workflows · Technical report writing

Languages: English (fluent) · French (conversant)

PROFESSIONAL EXPERIENCE

Forest Carbon Scientist · Carbon Direct

Nov 2025 – Feb 2026

- Conducted independent pre-investment technical diligence on ARR, agroforestry, and IFM carbon projects across Latin America, the USA, and Africa, evaluating additionality, baseline methodology, leakage,

permanence, and credit volume forecasts against Verra VCS, ACR, and Isometric standards and investment criteria

- Authored detailed technical diligence reports for institutional buyers, assessing project integrity, methodology compliance, risk profiles, and risk mitigation actions to support portfolio-level investment decisions
- Evaluated remote sensing integration and MMRV framework design for ARR projects, including comparative analysis of VM0047 versus Isometric methodological requirements for client deliverables
- Contributed to technical writing on MMRV frameworks, ARR eligibility criteria, and carbon market concepts including stocking indices, leakage deductions, and statistical methods

Forest Carbon Scientist · Pachama

Apr 2023 – Oct 2025

- Developed ARR carbon projects end-to-end under Verra (VM0047) including site selection, land suitability assessment, additionality analysis, baseline development, carbon accounting, credit volume forecasting, and PDD authorship for conservation and reforestation projects in the USA, Mexico, and Brazil
- Managed portfolio of active projects across multiple geographies, overseeing project timelines, credit production forecasts, and overall project health and risk profiles to ensure delivery of high-quality credits and nature-positive outcomes
- Identified and managed risks associated with environmental and social aspects of projects, developing risk mitigation actions and plans in coordination with local project developers and stakeholders
- Designed and refined core scientific tools for forest carbon quantification — including Dynamic Baseline models, Growth Models, and a Monte Carlo-based Leakage Risk/Liability tool — using geospatial analysis (GEE, QGIS, R, Python), literature-based allometries, government commodity databases, and Monte Carlo estimation
- Led technical development of Digital MRV frameworks for ARR projects, integrating satellite-derived forest monitoring with field measurement protocols to enable long-term, high-resolution monitoring
- Authored a 40-page forest inventory protocol defining field data collection standards, land stratification methodology, and sample location selection procedures; designed research protocols for LiDAR and remote sensing field plots in Brazil including spatial stratification and power analyses
- Designed and quantified NCS co-benefits — including water quality improvements, soil health, and biodiversity outcomes — into PDDs for ARR projects across the USA, Mexico, and Brazil
- Evaluated ARR and agroforestry projects in Latin America and West Africa under Verra VM0047 as part of third-party technical assessment
- Delivered client-facing technical reports, translating complex remote sensing and ecological data into clear, decision-ready outputs for project developers, credit buyers, and sales teams

PhD Researcher · Columbia University (NASA ABoVE)

2016 – 2023

- Led NASA ABoVE-funded research on Arctic treeline forest dynamics in Alaska, applying mixed-effects models and LiDAR remote sensing to quantify the influence of climate change on tree growth, regeneration, and forest carbon
- Implemented advanced statistical methods including Bayesian hierarchical modeling, Monte Carlo simulation, power analysis, and supervised machine learning (random forest, mixed-effects regression) on a high-performance computing cluster; high proficiency in R and geospatial analysis
- Designed and managed a large database of sub-daily tree growth and climate measurements (>1.8 million observations) with reproducible data pipelines; published as open-access data through ORNL DAAC
- Conducted systematic global literature review on forest degradation for a World Bank report led by Prof. Ruth DeFries; compiled findings into a structured forest degradation database
- Authored successful grant applications; presented research at national conferences (AGU, ESA, NASA ABoVE); mentored and taught forestry field techniques to undergraduate students

Lead Seasonal Field Technician, Aquatic Ecology · NEON

Mar – Jul 2016

- Led and taught seasonal field technicians in aquatic and forestry protocols; measured water quality metrics including discharge, pH, temperature, stable isotopes, and dissolved gases across Colorado research sites

Seasonal Field Technician, Botany & Plant Diversity · NEON

May – Oct 2015

- Quantified plant diversity, vegetation structure, biomass, and phenology at two NEON Observatories: Niwot Ridge and Central Plains Experimental Range

Data Management Intern · NOAA Earth Systems Research Laboratory

2011 – 2012

- Quality-controlled and organized 76 years of meteorological data from seven global field sites for NOAA's Global Monitoring Division

PUBLICATIONS

- 2026** Rao, M.P., A. Pacheco-Solana, R. Li, B. Oryan, **J.E. Jensen**, M. Rodriguez-Caton, L. Klinek, Z.A. Pierrat, S. Ruehr, R. Oelkers, L.E. Boeschoten, K.L. Griffin, M.L. McCormack, X. Yang, J. Verfaillie, D. Baldocchi, J. Hise, A.J. Turner, T.M. Scanlon, L. Andreu-Hayles, J.U.H. Eitel, N. Pederson, D. Griffin, D. Stahle, J.T. Maxwell, S. Voelker, S.A. Kannenberg, J. Peñuelas, and T.S. Magney. Accepted. Decoupled carbon assimilation and growth responses to atmospheric aridity in temperate deciduous oaks. *Science Advances*.
- 2023** **Jensen, J.E.**, N. Boelman, J. Eitel, L. Vierling, A. Maguire, R. Oelkers, C. Silva, L. Andreu-Hayles, R. D'Arrigo, K.L. Griffin. Growth increases but regeneration declines in response to warming and drying at Arctic treeline in white spruce (*Picea glauca*). *BioRxiv Preprint*. doi:10.1101/2023.01.12.523811
- 2023** Weygint, W., J.U.H. Eitel, A.J. Maguire, L.A. Vierling, K.L. Griffin, N.T. Boelman, and **J.E. Jensen**. Comparison of Snow Disappearance Date Estimates and Tree Stem Radial Growth Onset at the Forest-Tundra Ecotone. *SSRN Electronic Journal* 333:109388.
- 2022** Schmiede, S.C., K.L. Griffin, N.T. Boelman, L.A. Vierling, S.G. Bruner, E. Min, A.J. Maguire, **J.E. Jensen**, and J.U.H. Eitel. Vertical gradients in photosynthetic physiology diverge at the latitudinal range extremes of white spruce. *Plant Cell and Environment* 45–63.
- 2020** Eitel, J.U.H., K.L. Griffin, N.T. Boelman, A.J. Maguire, A.J.H. Meddens, **J. Jensen**, L.A. Vierling, S.C. Schmiede, and J.S. Jennewein. Remote sensing tracks daily radial wood growth of evergreen needleleaf trees. *Global Change Biology*.
- Eitel, J., A.J. Maguire, K. Griffin, N. Boelman, **J.E. Jensen**, S.C. Schmiede, and L. Vierling. ABoVE: Photochemical Reflectance and Tree Growth, Brooks Range, Alaska, 2018–2019. *ORNL DAAC*. doi:10.3334/ORNLDAAC/1781
- Maguire, A.J., J. Eitel, L. Vierling, N. Boelman, K. Griffin, J.S. Jennewein, and **J.E. Jensen**. ABoVE: Terrestrial Lidar Scanning Forest-Tundra Ecotone, Brooks Range, Alaska, 2016. *ORNL DAAC*. doi:10.3334/ORNLDAAC/1782
- 2019** Eitel, J., A. Maguire, N. Boelman, L. Vierling, K. Griffin, **J. Jensen**, T. Magney, P. Mahoney, A. Meddens, C. Silva, and O. Sonnentag. Remotely sensing tree physiology at northern treeline: Do late-season changes in the photochemical reflectance index (PRI) respond to climate or photoperiod? *Remote Sensing of Environment*.
- Maguire, A.J., J. Eitel, L.A. Vierling, D.M. Johnson, K.L. Griffin, N.K. Boelman, **J.E. Jensen**, H.E. Greaves, and A. Meddens. Terrestrial lidar scanning reveals fine-scale linkages between microstructure and photosynthetic functioning of small-stature spruce trees at the forest-tundra ecotone. *Agricultural and Forest Meteorology*.

SELECTED PRESENTATIONS

- 2020** *Jensen, J.E., K.L. Griffin, J.U.H. Eitel, N. Boelman, L.A. Vierling, A. Maguire. The influence of environmental variables on intra-seasonal radial stem growth dynamics at the Arctic forest-tundra ecotone using point dendrometers. Oral Presentation, AGU, Virtual.
- 2018** *Jensen, J.E., A. Maguire, R. Oelkers, L. Andreu, N. Boelman, R. D'Arrigo, K. Griffin, C. Silva, J. Jennewein, A.J.H. Meddens, M. Russell, L.A. Vierling, and J.U.H. Eitel. Using aerial lidar to understand the role of

climate and herbivory in shaping forest demographics at the Arctic forest-tundra ecotone. Presentation, AGU, Washington D.C.

*Jensen, J.E., et al. Towards lidar-based mapping of tree age at the Forest Tundra Ecotone. Poster, NASA ABoVE Annual Conference, Seattle, WA.

2017 *Jensen, J.E., et al. Towards lidar-based mapping of tree age at the Forest Tundra Ecotone. Poster, AGU, New Orleans.

*Jensen, J.E., et al. Chasing Treeline: Reconstructing the history of the Forest-Tundra Ecotone from lidar-derived tree height. E3B Student Seminar Series, Columbia University.

2014 *Jensen, J.E., M. Kummel, and L.E. Herbert. Ecological regular pattern formation of Alpine Avens and Northern Pocket Gopher disturbance on Pikes Peak, Colorado. Poster, ESA, Sacramento, CA.

AWARDS & GRANTS

2021 Lamont-Doherty Earth Observatory Climate Center Grant (\$10,000). Temporal dynamics of tree-growth and photosynthesis and their environmental drivers in the Lamont Sanctuary Forest Preserve.

2018 NSF Graduate Research Fellowship Honorable Mention

2017 Theodore Gordon Flyfishers Foundation Fund Grant (\$3,500)

2016 Dean's Fellow, Graduate School of Arts and Sciences, Columbia University (\$158,000)

2014 Outstanding Senior Academic Award in Environmental Science, Colorado College

TEACHING EXPERIENCE

Teaching Assistant, Forest Ecology · Columbia University *Fall 2018*

- Coordinated weekly field trips; created dendroclimatology assignment; developed and led data analysis workshops; taught field data collection techniques

Teaching Assistant, Fundamentals of Ecology · Columbia University *Spring 2018*

- Led 13+ small group discussions on classic ecological papers; created review sessions; assisted with coursework and grading

Teaching Assistant, Intro to Statistics for Ecology & Evolution · Columbia University *Fall 2017*

- Taught statistical techniques using R during 14 lab sessions for ~60 students; graded one-third of all assignments

WORKSHOPS DEVELOPED & FACILITATED

Data Visualization using ggplot2 in R (Aug 2018, May 2019) · Data Manipulation using tidyverse in R (Feb 2019)
— Two-hour workshops designed and taught for E3B graduate students at Columbia University

SERVICE & OUTREACH

Founding Member, Outreach Outside Columbia & Outreach Within Columbia Committees (2020–2022) · Girls' Science Day Volunteer, Columbia University (2016–2019) · Director, Environmental Program Student Committee, Colorado College (2014)

FIELD LOCATIONS

Campeche, Mexico · Hildaglo, Mexico · Bahia, Brazil · New York, USA · Toolik Field Station, Alaska, USA · Aurora Research Institute, Inuvik, NWT, Canada · Wiseman, AK, USA · NEON sites across Colorado, USA (Niwot Ridge, CPER, Como Creek, Arikaree River, West St. Louis Creek, North Sterling) · Marine Biological Laboratory, Woods Hole, MA, USA · Pikes Peak, CO, USA · O Grove, Galicia, Spain

References available upon request