# Lucas Johnson

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## Education

**State University College of Environmental Science and Forestry** **Syracuse, New York**
*Doctor of Philosophy in Environmental Science* *Aug 2019 - May 2024*
- Dissertation: *Mapping forest aboveground biomass stocks and changes to facilitate natural climate solutions in New York State*

**Tufts University** **Boston, Massachusetts**
*Bachelor of Science in Computer Science* *Aug 2013 - May 2017*

## Publications

### In Review

**2024**: **Johnson, L. K.,** Mahoney, M. J., Domke, G. M., and Beier, C. M. New allometric models for the USA create a step-change in forest carbon estimation, modeling, and mapping. In review at Remote Sensing of Environment. https://doi.org/10.48550/arXiv.2405.04507.

**2023**: Mahoney, M.J., **Johnson, L.K.,** Silge, J., Frick, H., Kuhn, M., and Beier, C. M. Assessing the performance of spatial cross-validation approaches for models of spatially structured data. In review at Environmental Modelling & Software. https://doi.org/10.48550/arXiv.2303.07334.

### Peer-Reviewed Journal Articles

**2024**: Cranmer, N., Han, T., Chedzoy, B., Smallidge, P. J., Beier, C. M., **Johnson, L.K.,** and Xu, X. 2024. Estimating merchantable and non-merchantable wood volume in slash walls using terrestrial and airborne LiDAR. Forest Ecology and Management, 569, 122211. https://doi.org/10.1016/j.foreco.2024.122211.

**2023**: **Johnson, L. K.,** Mahoney, M.J., Desrochers, M. L., and Beier, C. M. 2023. Mapping historical forest biomass for stock-change assessments at parcel to landscape scales. Forest Ecology and Management, 546, 121348. https://doi.org/10.1016/j.foreco.2023.121348.

**2022**: Desrochers, M. L., Tripp, W., Logan, S., Bevilacqua, E., **Johnson, L.K.,** and Beier, C. M. 2022. Ground-Truthing Forest Change Detection Algorithms in Working Forests of the US Northeast. Journal of Forestry, 120(5), 575–587. https://doi.org/10.1093/jofore/fvab075.

**2022**: **Johnson, L. K.,** Mahoney, M. J., Bevilacqua, E., Stehman, S. V., Domke, G. M., and Beier, C. M. 2022. Fine-resolution landscape-scale biomass mapping using a spatiotemporal patchwork of LiDAR coverages. The International Journal of Applied Earth Observation and Geoinformation, 114, 103059. https://doi.org/10.1016/j.jag.2022.103059.

**2022**: Mahoney, M. J., **Johnson, L. K.,** Guinan, A. Z., and Beier, C. M. 2022. Classification and mapping of low-statured 'shrubland' cover types in post-agricultural landscapes of the

US Northeast. The International Journal of Remote Sensing, 43(19-24), 7117-7138. https://doi.org/10.1080/01431161.2022.2155086.

**2022**: Mahoney, M. J., **Johnson, L. K.,** Bevilacqua, E., and Beier, C. M. 2022. Ground noise filtering produces inferior models of forest aboveground biomass. GIScience and Remote Sensing, 59(1), 1266-1280. https://doi.org/10.1080/15481603.2022.2103069.

### Peer-Reviewed Book Chapters

**2023**: Mahoney, M. J., **Johnson, L. K.,** and Beier, C. M. 2023. AI for Shrubland Identification and Mapping. In Sun Z, Cristea N, Rivas P (eds.), Artificial Intelligence in Earth Science, 295-316. Elsevier. ISBN 978-0-323-91737-7. https://doi.org/10.1016/B978-0-323-91737-7.00010-4.

## Awards and Honors

**2024**: **Outstanding PhD Scholar** - SUNY ESF Division of Environmental Science.

## Conference Activity

### Invited Talks

**2024**: **Johnson, L.K.,** Mahoney, M.J., Domke, G.M., and Beier, C.M. New allometric models for the USA create a step-change in forest carbon estimation, modeling, and mapping. FIA Science Symposium (Virtual).

**2022**: **Johnson, L.K.,** Mahoney, M.J., and Beier, C.M. Historical Time Series Biomass Modeling: To Train on Plots or Pixels? FIA Science Stakeholder Meeting (Virtual).

### Contributed Talks

**2024**: **Johnson, L.K.,** Yang, Z., Erb, A., Domke, G.M., Frescino, T.S., Schaaf, C.B., and Healey, S.P. Integrating albedo offsets in reforestation decisions for climate mitigation outcomes in 2050: a case study in the USA. FIA Science Symposium (Virtual).

**2023**: Mahoney, M. J., **Johnson, L. K.,** and Beier, C. M. Consistent Workflows for Assessing Model Performance: Tools and Applications to Natural Climate Solutions. American Geophysical Union Fall Meeting, San Francisco, CA.

**2023**: Beier, C.M., **Johnson, L.K.,** Mahoney, M.J., Desrochers, M.L, and Domke, G.M. An integrated carbon monitoring framework for stock-change GHG inventory at parcel to landscape scales: approach, outputs and applications. American Geophysical Union Fall Meeting, San Francisco, CA.

**2022**: **Johnson, L.K.,** Mahoney, M.J., and Beier, C.M. A Map-based Stock Change Approach for Fine-scale Biomass and Carbon Accounting in NYS. Forest Ecosystem Monitoring Cooperateive Conference, Burlington, VT.

**2022**: **Johnson, L.K.,** Mahoney, M.J., and Beier, C.M. Historical Time Series Biomass Modeling: To Train on Plots or Pixels? American Geophysical Union Fall Meeting (Virtual).

**2022**: Mahoney, M.J., **Johnson, L.K.,** and Beier, C.M. Detecting regenerating forestland at a landscape level. Ecological Society of America and Canadian Society for Ecology and Evolution Joint Annual Meeting, Montreal, Quebec, Canada.

**2022**: **Johnson, L.K.,** Mahoney, M.J., Bevilacqua, E., and Beier, C.M. Filtering ground noise

from LiDAR returns produces inferior models of forest aboveground biomass North American Forest Ecology Workshop, Sault Ste Marie, Ontario (Virtual).

**2021**: **Johnson, L.K.,** Mahoney, M.J., Bevilacqua, E., and Beier, C.M. Broad-scale forest biomass mapping: generating contiguous high-resolution predictions using a spatio-temporal patchwork of LiDAR coverages across a mixed-use landscape. American Geophysical Union Fall Meeting (Virtual).

**2021**: **Johnson, L.K.,** Mahoney, M.J., and Beier, C.M. Greening Up Before Growing Up: Challenges in Modeling Forest Biomass Recovery Post-Harvest Using Satellite Imagery. Society of American Foresters National Convention (Virtual).

### Poster Presentations

**2023**: **Johnson, L.K.,** Mahoney M.J., Domke, G.M., and Beier, C.M. Bridging the Gap Between Pixels and Minimum Estimation Units: Small-Area Uncertainty Estimation with Forest Aboveground Biomass Maps. American Geophysical Union Fall Meeting, San Francisco, CA.

## Experience

**2024 - Present**: **Oregon State University**
**Postdoctoral Scholar**. Quantifying radiative feedbacks associated with the albedo change that results from forest growth, reforestation, and afforestation. Assisting in operationalizing forest carbon reporting tools that leverage data from NASA's GEDI mission.

**2019 - 2024**: **Climate and Applied Forest Research Institute (SUNY ESF)**
**Research Assistant**. Developed cloud computing infrastructure, geospatial databases, and data sharing software. Contributed writing, code, and statistical/spatial analysis to technical reports.

**2017 - 2019**: **Lightkeeper, LLC**
**Data Engineer**. Developed internal data management tools and software in python.

## Service to the Profession

**2024**: **Reviewer:** Carbon Balance and Management.

**2023**: **Reviewer:** Forest Ecology and Management, Journal of Applied Earth Observation and Geoinformation, PNAS Nexus.

**2023**: **Workshop Assistant:** Foundations of Scientific Computing at SUNY ESF.

**2022**: **Workshop Assistant:** Foundations of Scientific Computing at SUNY ESF.

## Community Service

**July 2020 - July 2021**: **Code for Burlington - Courtbot Project** Technical Lead (Volunteer). A free service providing text message notifications for court appearances.

## Affiliations

**2021 - Present**: **American Geophysical Union**. Member.

**2021 - Present**: **NYS GIS Association**. Member.

## Skills

**Programming**: R, Python, SQL, git, and Linux shell languages.
**GIS**: QGIS, ArcGIS, GDAL, Google Earth Engine, and the R spatial ecosystem.