**Milos Simovic**

PhD candidate in Botany, The University of British Columba

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**Website:** <https://msimovic21.github.io/>

**Google Scholar:** <https://scholar.google.com/citations?user=DCRmkbAAAAAJ&hl=en>

**GitHub:** <https://github.com/MSimovic21>

**Research Interests**

Plant ecophysiology, soil-plant-water relations, forest mortality, winter ecology, climate change, functional traits, urban ecology, ecosystem services, mathematical & statistical modeling.

**Academic History**

**University of British Columbia Vancouver, British Columbia**

Doctor of Philosophy in Botany September 2020-present

* GPA: 4.1

**Cleveland State University Cleveland, Ohio**

Master of Science in Environmental Science *August 2017-May 2020*

* + - * GPA: 4.0

**Cleveland State University Cleveland, Ohio**

Bachelor of Science in Biology *January 2013-December 2014*

* + - * GPA: 3.55

**Research/Teaching Experience**

**Guest lecturer Vancouver, British Columbia**

University of British Columbia December 2023

* Invited on behalf of the course instructor to present two lectures (*Scaling of ecosystem processes* and *Climate change and global carbon budgets*) to a class of approximately 100 students.

**Graduate Teaching Assistant Vancouver, British Columbia**

University of British Columbia September 2020-present

* Responsible for teaching BIOL306 Advanced Ecology and BIOL121 Genetic, Evolution, and Ecology.
* Consistently received a mean student evaluation score of 4.5 or above (out of 5) on my annual evaluation for BIOL306 (taught the course 4 times), and I improved my overall evaluation score from 4.5 in 2021 to 4.9 in 2023.

**Graduate Research Assistant****Cleveland, Ohio**

Cleveland State University *May 2017-August 2018*

* Conducted research on functional ecology and ecosystem services of common urban tree species at two research sites near Cleveland, OH.

**Graduate Teaching Assistant Cleveland, Ohio**

Cleveland State University *August 2017-Present*

* Teaching experience includes 6 semesters of Human Biology Lab (BIO 107) and 3 semesters of Plant Biology Lab (BIO 301).

**Mentorship**

Brendan Hansen May 2021 – August 2022

* I mentored Brendan Hansen (undergraduate student at UBC) as part of NSERC Undergraduate Student Research Award program in May – August 2021 and May – August 2022, and as part of a Directed Studies program in September – December 2021.
* I was responsible for helping Brendan develop basic field, laboratory, and statistical skills.

Paul English January – April 2023

* I mentored Paul English (undergraduate student at UBC) as part of a Directed Studies program at UBC.
* I was responsible for helping Paul develop field and laboratory research skills, as well as skills related to data processing, statistical analysis, and scientific communication.

Justin Chan March – May 2023

* I mentored Justin Chan (undergraduate student at UBC) as part of the Biology Undergraduate Diversity in Research micro-experience.
* I was responsible for teaching Justin how to perform free-hand sectioning of plant tissues, mount the tissues onto microscope slides, optical and fluorescence microscopy techniques, and microscope image analysis in ROXAS.

Ria Raut May – August 2023

* I co-mentored Ria Raut (along with Marcella Cross) as part of UBC’s undergraduate Work Learn program.
* I was primarily responsible for teaching Ria how to operate the LI-6800 portable photosynthesis system, which she used to measure a host of photosynthesis-related traits on seedlings and excised branches. I also taught Ria how to measure a host of leaf and wood functional traits.

River Knockaert November 2023 – March 2024

* I mentored River Knockaert as part of the Biology Undergraduate Diversity in Research micro-experience.
* I was responsible for teaching River how to perform soil texture analysis using the hydrometer method, calibrating TOMST soil moisture data using soil texture values, and transforming volumetric soil moisture content into soil matric potential using pedotransfer models.

Sumant Kumble May 2024 – August 2024

* I mentored Sumant Kumble as part of the Work Learn International Undergraduate Research Award program at UBC.
* Sumant has been developing a machine learning approach for detecting mechanical injuries in root cortical cells driven by freeze-thaw events.

**Selected presentations**

1. **Simovic, M.** and Michaletz, S.T. Acquisitive fine root strategy could predispose yellow-cedar (*Callitropsis nootkatensis*) to climate change induced decline. *10th International Symposium on the Environmental Physiology of Ectotherms and Plants*, July 14– 18th, Vancouver, B.C.
2. **Simovic, M.** Yellow-cedar decline: a complex mass-mortality event triggered by climate change. *Climate Conversations at UBC Botanical Garden*, May 22nd, 2025, Vancouver, B.C.
3. Michaletz, S. T.**\*** From tropics to treeline: Extending and assessing metabolic theory for global variation in plant mortality rates. *Ecological Society of America Annual Meeting*, August 5-8th, 2024, Long Beach, CA. **\*performed talk on behalf of S.T.M.**
4. **Simovic, M.** and Michaletz, S. T. Is freeze-thaw embolism induced by snowpack loss the root cause of yellow-cedar decline? *Ecological Society of America Annual Meeting*, August 5-8th, 2024, Long Beach, CA.
5. **Simovic, M.** and Michaletz, S. T. Is snowpack loss killing the climate sensitive yellow-cedar trees? Investigating freeze-thaw embolism as the root cause of yellow-cedar decline. *American Geophysical Union Fall Meeting,* December 10-15th,2023, San Francisco, CA.
6. **Simovic, M.** and Michaletz, S. T. Axial scaling of xylem traits: implications for sap transport and resilience to extreme drought stress. *Ecology & Evolution Symposium*, October 22nd, 2022, Squamish, B.C.
7. **Simovic, M.** and Michaletz, S. T. Yellow-cedar decline: conduit widening and freeze-thaw

embolism. *Canadian Society for Ecology and Evolution (CSEE) Annual Meeting*, August 17th

2021, Vancouver, B.C.

1. Danielson, S.C., Mueller, K.E., **Simovic, M.**, and Medeiros, J.S. Comparative leaf hydraulics in five tree species growing in urban and rural locations. *Ecological Society of America* *Annual Meeting*, August 11-16th, 2019, Louisville, KY.
2. **Simovic, M.**, Mueller, K.E., and McMahon, S.M. An assessment of co-variation among anatomical, morphological, and phenological traits of 9 tree species growing in urban conditions. *Ecological Society of America* *Annual Meeting*, August 11-16, 2019th, Louisville, KY.
3. Mueller, K.E. and **Simovic, M.** An assessment of covariation among phenological, anatomical, and morphological traits of 50 tree species growing in ‘urban’ conditions. *American Geophysical Union Fall Meeting,* December 10-14th,2018, Washington, D.C.
4. **Simovic, M.**, and Mueller, K.E. Interspecific variation in bole growth and leaf phenology among fifty tree species in Northeast Ohio. *Ecological Society of America* *Annual Meeting*, August 5-9th, 2018, New Orleans, LA.

**Publications**

*Published*

1. **Simovic, M.**, & Michaletz, S. T. (2025). Hydraulics and Structural Mechanics Jointly Shape Root‐to‐Leaf Scaling of Xylem Conduit Traits. *Plant, Cell & Environment*. <https://doi.org/10.1111/pce.15660>.
2. **Simovic, M.**, & Michaletz, S. T. (2025). Harnessing the Full Power of Data to Characterise Biological Scaling Relationships. *Global Ecology and Biogeography*, *34*(2). <https://doi.org/10.1111/geb.70019>.
3. **Simovic, M.**, Mueller, K. E., McMahon, S. M., & Medeiros, J. S. (2024). Functional traits and size interact to influence growth and carbon sequestration among trees in urban greenspaces. *Functional Ecology*, *38*(4), 967–983. <https://doi.org/10.1111/1365-2435.14505>.

*In review*

1. Borrego, Isaac; Perez, Timothy; Bentley, Lisa; Bison, Nicole; Byrnes, Lachlan; Galvão Candido, Hugo; Chmurzynski, Adam; Durán, Sandra; Fox, Tim; Gaitan, Megan; Garen, Josef; Orwig, David; Pau, Stephanie; Scott, Joel; **Simovic, Milos**; Swenson, Nathan; Wieczynski, Daniel; Buzzard, Vanessa; Enquist, Brian; Michaletz, Sean. (2025). From tropics to treeline: extending and assessing metabolic scaling theory for global variation in plant mortality rates. Target: *Ecology Letters.*

*In preparation*

1. **Simovic, M.**, Michaletz, S.T. Snowpack loss and associated increase in soil temperature variability does not contribute to freeze-thaw embolism formation in tree roots. Target: *Global Change Biology.*
2. **Simovic, M.**, Michaletz, S.T. Root economic strategy explains unique vulnerability of yellow-cedar to freeze-thaw injuries. Target: *Global Change Biology.*
3. Sharon, C.D., **Simovic, M.**, Mueller, K.E., Medeiros, J.M. Seasonal Shifts in Leaf Hydraulics and Trait Coordination with Relative Growth Provide Insight into the Performance of Urban Park Trees. Target: *AoB Plants.*
4. Leftwich, S.J., **Simovic, M.**, Mueller, K.E. The resilience of forests to the urban ecosystem. Target: *undecided.*

**R packages**

1. balancR – data balancing and scaling analysis (<https://michaletzlab.github.io/balancR/>).

**Peer review experience**

* *New Phytologist* – co-reviewed an article on xylem scaling (April 2024).
* *Plants, People, Planet* – reviewed an article on functional traits of wild coffee plants (February 2025).
* *Journal of Ecology* – reviewed an article on the interaction between functional traits and ontogeny on tree growth (April 2025).
* *Journal of Tropical Ecology* – reviewed an article on the effects of phylogenetic and trait diversity on carbon stocks in a dryland forest (May 2025).

**Honors & Awards**

Wall Research Award *September 2024 – August 2026*

ESA Canada Chapter Travel Award *June 2024*

UBC Graduate Student Travel and Research Award *December 2023*

Biology Undergraduate Diversity in Research Mentor Honorarium *March 2023 & November 2023*

Vladimir J Krajina Scholarship in Plant Ecology *April 2022*

UBC President’s Academic Excellence Initiative Award *September 2020-August 2024*

UBC International Tuition Award *September 2020-August 2024*

UBC Four Year PhD Fellowship Tuition Award *September 2020-August 2024*

UBC Four Year PhD Fellowship Award *September 2020-August 2024*

ESA New Phytologist Poster Award *August 2019*

ESA Ecological Physiology section travel award *August 2019*

Cleveland State University BGES Tuition Award *August 2017-2020*

Graduated *Cum Laude* with a B.S. in Biology from Cleveland State University *December 2014*

**Technical Skills**

**Field ecology methods and other relevant skills**

***Project management*:** research site scouting and establishment, obtaining permits at district and provincial levels, communication with land & environmental managers and relevant stakeholders.

***Ecophysiology***: LI-6800 (field and lab), LI-6400XT (field only; trained), LI-600 (trained), LI-600N (trained), SPAD-502 PLUS (field and lab), Scholander pressure chamber (PMS 1505D and Soilmoisture SAPS II; field and lab), Sperry hydraulic apparatus (experience in building the instrument from parts and using to measure hydraulic conductance).

***Temperature and soil moisture monitoring*:** TOMST TMS-4 regular and “dwarf” version (experience in calibrating, installing, and retrieving data from sensors).

***Tissue and soil sampling***: sampling leaves, branches, roots, and seeds for variety of ecophysiological, nutritional, and functional trait measurements, soil sampling (via slide-and-hammer corer and auger). Labeling, processing, and storage of samples.

***Surveying*:** Forest MacroSystems Network census protocol, USDA Urban Tree Health Analysis, Carolina Vegetation Survey.

***Canopy Structure***: LAI-2200C.

***Tree size and growth***: Nikon Forestry Pro II laser hypsometer, custom dendrometer band crafting and fitting.

***Dendrochronology***: Haglof increment borer (sampling of cores, preservation, and preparation for analyses).

***Plant phenology***: Qualitative leaf, flower, and fruit phenology assessment using the USA National Phenology Network protocol.

**Laboratory equipment methods and other relevant skills**

***General laboratory and wet chemistry methods*:** Laboratory safety; sample preparation, processing, and storage; titrimetry, distillation, filtration, weighing (microbalance), pH determination, gravimetry, etc.

**Experimental methods:** experimental design, random treatment assignment, blocking, growing plants in greenhouse and outdoors and associated skills (e.g., setting up automated irrigation, pest management), using growth chambers (Conviron E-15) to administer temperature treatments, temperature tracking using thermocouples and loggers (Pico TC-08, OMEGA HH806AU), building custom wiring systems for thermocouples.

***Sectioning*:** sectioning of leaves, stems, and roots (via free-hand sectioning, manual sliding microtome, and Leica VT1000S vibrating microtome), staining, and slide preparation.

***Microscopy*:** optical and fluorescence microscopy.

***High-performance liquid chromatography:*** Pigment extraction and analysis.

***Fine root hydraulic conductance:*** via the capillary and pressure chamber methods.

***Functional traits:***leaf**,** root, and stem economical traits, nutrient content (e.g., leaf nitrogen and carbon content), phenological traits (e.g., budburst, leaf-out, canopy senescence).

**Computing, software, and collaboration skills**

**R Studio:** 8 years of experience working with data processing, manipulation, and visualization, variety of statistical analyses, and coding mathematical models.

* ***Data processing, manipulation, and visualization packages:*** dplyr, lubridate, xlsx, ggplot2, ggridges, etc.
* ***Statistical packages:***stats, car, lme4, emmeans, smatr, leaps, multcomp, lsmeans, etc.
* ***Ecology-related packages****:* RDendrom, LeafArea, vegan, conductR, BIEN, etc.
* ***Package and website development*:** experienced in creating, testing, and publishing R packages, as well as GitHub websites for said packages, via devtools, usethis, testthat, roxygen2, rlang, pkgdown, knitr, etc.

**GitHub:** creating GitHub websites, collaborating on R-based projects, archiving data & R code.

**GIS:** ArcGIS and QGIS.

**Image analysis:** ImagePro Plus, ROXAS, ImageJ/Fiji.

**Miscellaneous software:** lolly, FV2200, PicoLog, Microsoft Office.

**Other languages**: limited experience with Python and MATLAB.

**Certifications**

Canadian Red Cross Remote First Aid with CPR-C (valid until July 2025).

**Affiliations**

Varsity Outdoor Club member (University of British Columbia).

Ecological physiology section member (Ecological Society of America).

Member of the Student Environmental Movement (Cleveland State University).

Volunteer with Cleveland Metroparks and Cuyahoga Valley National Park.

**Workshops**

* Facilitated a workshop at UBC titled “Experiential Learning: TAing Lab and Field Courses” (March, 2025).
* LI-COR Photosynthesis training workshop at The University of British Columbia, February 2024. Received training in the use of LI-600 and LI-600N instruments.
* Introduction to GitHub, The University of British Columbia, September 2021.
* PhysFest 2 ecophysiology workshop at Holden Arboretum, July 2018 (website: <https://www.k-state.edu/ecophyslab/phys_fest_2.html>). Received training in the use of LI-6800 and LI-6400XT instruments.

**Current collaborators**

Sean T. Michaletz (University of British Columbia); Kevin E. Mueller, Sarah Blair, and Samuel Leftwich (Cleveland State University); Sean McMahon (Smithsonian Environmental Research Center); Sharon Danielson and Juliana Medieros (Case Western Reserve University/Holden Arboretum).

**References**

Dr. Kevin E. Mueller (MSc advisor) Dr. Sean T. Michaletz (PhD advisor)

Assistant Professor Assistant Professor

Cleveland State University University of British Columbia

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