Dr. Allen Larocque

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BSc – MSc – PHD - RPBIO – ASFIT (RPF Forester in Training)

Forest Ecologist / Data analyst / Soil Scientist

EDUCATION:

2022: PHD in Forestry, University of British Columbia, Department of Conservation and Forest Sciences. Dissertation: “Fish, Forests, Fungi: Soils of the ‘Salmon Forests’ of British Columbia”. Advisor: Dr. Suzanne Simard.

2012: MSc, Theoretical Ecology, McGill University, Montreal, QC

Dissertation: “Untangling the mechanisms behind the stability-diversity relationship in experimental grasslands”

Advisors: Dr. Michel Loreau & Dr. Claire de Mazancourt (co-supervised)

2006: BSc, Ecology and Environmental Science, University of British Columbia.

Undergraduate projects on protist imaging, protist molecular evolution, and social spider ecology supervised by Dr. Brian Leander, Dr. Patrick Keeling, and Dr. Leticia Aviles.

Science:

2022-2024: Postdoctoral Research Fellow, University of British Columbia. Shared position between the Simard Lab and the Mother Tree Network.

* Simard Lab research work on the Mother Tree Project, a large long-term BC forestry management experiment examining the effects of retention levels across a climatic gradient. Conceptualized, designed, and carried out a comparative metagenomic soil microbiome and carbon experiment.
* Work with the Mother Tree Network involves carbon modelling and communication for a diversity of community and First Nation carbon projects.
* Included teaching and mentorship responsibilities.

2015-2022: PHD Candidate. Project on the interconnections between salmon and forest soils. In collaboration with the Heiltsuk Integrated Research Management Department (HIRMD) and the Heiltsuk Nation. Project highlights:

* Field work: conducted vegetation plots, transects, soil cores, and both observational and manipulative experiments in remote, boat-access only locations.
* Experimental design: designed and implemented scientifically-sound observational and experimental projects.
* Molecular ecology: used PCR and next-generation environmental sequencing to characterize soil fungal and bacterial communities.
* Bioinformatics: cleaned, classified, and compared soil communities along environmental gradients.
* Stable isotopes: conducted both natural abundance and stable-isotope addition experiments to quantify ecosystem nutrient flow.
* Statistics: advanced statistical analysis, including ANOVA and regression; linear and nonlinear generalized mixed models; multivariate ordinations (PCA, CCA, etc); machine learning (random forest models); differential analysis; data manipulation, management, and visualization; and other techniques.
* Communication: wrote thesis and associated papers; created visualizations (figures and tables). Delivered Powerpoint presentations to technical audiences.
* Funding: successfully applied for, attained, and managed multiple grants.

2020: Collaborator with University of Washington PhD candidate Anne Polyakov in Bristol Bay, Alaska, on the effects of salmon on Alaskan soils. Project involved funding and coordinating a $17,000 collaboration between UBC and UW to set up a fungal network theory workshop and fund a field project. Field work components included experimental design and set up of long-term soil, vegetation, and fungal plots along salmon streams.

2013: Volunteer, Heiltsuk territory, Bella Bella, British Columbia (April- August). Salmon and Songbirds project with the Reynold’s lab at Simon Fraser University in conjunction with Heiltsuk First Nation. Tasks included vegetation and soil sampling; insect sampling; songbird surveys; songbird netting and banding; working in remote and boat-access only location.

2009-2011: Master’s Student, Theoretical Ecology, McGill University. Dissertation and associated publications involved applying simulations and theoretical models to data from four different long-term ecological experiments in order to elucidate the mechanisms behind stability-diversity relationships.

2010: Analyst and Author, Québec Centre for Biodiversity Studies, Montreal, Québec. Literature review and report on the utilization of green corridors in climate change mitigation with the Québec Centre for Biodiversity Science. Contract for the Québec Ministry of Sustainable Development, the Environment, and Parks (MDDEP).

2009: Visiting Scientist, Dr. David Tilman, University of Minnesota, Cedar Creek LTER site, Minnesota. Collaborated on the Long-Term Biodiversity Project on biodiversity-ecosystem functioning relationships.

2007-2008: Researcher, Kraft Food Inc. I was a product research-developer in their canned food department in Burlington, Ontario. I worked with colleagues to design and implement test recipes and preservation procedures to meet market demands. Company section was liquidated at the end of my term.

2006: Laboratory assistant with the Keeling molecular biology laboratory at UBC. I worked with several postdocs and visiting scientists and employed PCR and 16S amplicon sequencing to clarify the evolutionary history of apicomplexan protist *Oxyrrhis marina*.

2006: Researcher, Aviles Lab, UBC, in Tena, Peru. I designed and implemented a behavioural ecology experiment on the behaviour and social organization of the colonial social spider *Leucauge sp*.

2004-2005: Assistant and student researcher, BioImaging laboratory, UBC. I prepared lab materials, cleaned glassware, prepared samples, and used various electron- and light- microscopes to help various departmental clients image their samples.

Coordination and Outreach:

2023-present: Biology Advisor to Chief David Mungo Knox, Kwagiulth First Nation.

2023-present: Director on the board for the Forest History Association of BC. This year I started a new monthly Speaker Series, and helped organize the AGM.

2022: Planned, organized, facilitated, and summarized the results of the “Financial Pathways to Forest Transitions” workshop on Salt Spring Island, BC.

2022-2023: Organized and facilitated Simard Lab meetings at UBC.

Teaching:

2023-present: UBC Postdoctoral Teaching Fellow/ sessional lecturer for FRST 399: “Introduction to Research Methods”. Curriculum design and delivery. Contract renewed to teach a second time winter 2024.

2021: Primary Instructor and curriculum designer for ‘Budding Scientists: An Introduction to Biological Science’, a hybrid summer laboratory/field course for high school students. Collaboration with Caford Academy, the Vancouver Community Lab, and UBC.

2018: Primary Instructor and curriculum design for UBC FRST 411/522c (Complex Adaptive Systems, Global Change Science and Ecological Sustainability). Class focusing on applications of complex systems theory to forestry and conservation applications.

2015 - 2022: TA at UBC. Courses taught: FRST 201 (Forest Ecology), CONS 330 (Conservation Science and Sustainability), FRST 411/532C (Complex Adaptive Systems and Forest Management), FRST 495 (Biological Diversity and Forest Management). Program delivery and curriculum design.

2016: Lead Instructor at Zhejiang and Fujian Agriculture and Forestry Universities in China. Courses taught: “Topics in Natural Resources Conservation and English Communication”, and “Academic English”. Curriculum design and delivery.

2011 - 2014: Curriculum director and teacher at Epsilon Learning Centre, Toronto. I taught English as a Second Language, Mathematics, Science, and French to children and adults of all ages in a small start-up company. I designed curricula, managed staff and worked on advertising, web design, and strategic decisions.

2010-2011: High School Teacher, Kutaisi, Republic of Georgia.

English language teacher in Georgian public high school. Taught courses of 10-25 students, prepared course materials, trained local teachers and provided feedback to program coordinators.

2008-2010: Teaching Assistant, McGill University, Montreal, QC.

Courses taught: Organismal Biology, Molecular Biology, Behavioural Ecology. Directed classes of 15-25 students, created course and lecture material, and edited papers.

Highlighted Technical skills:

Science: Experimental design, field work, microbiome analysis, molecular biology, stable isotope research.

Communication: Extensive experience with teaching and curriculum design, including online modalities. Workshop organization and facilitation. Adept at science communication with lay and professional audiences.

Experience working with First Nations in a Canadian context.

Data analysis: Extensive experience with R. Advanced statistical analysis techniques, including: generation and interpretation of summary statistics, ANOVA and regression, generalized linear mixed-effects models; nonlinear modelling; general additive models (GAMs); multivariate statistics including PCA and other ordination procedures and associated hypothesis testing; machine learning (random forest models); differential abundance analysis (DA); structural equation modelling (SEM); time series analysis (ARIMA etc); and variance partitioning (VP).

PUBLICATIONS:

Accepted/ in review / in prep:

**Larocque, A.**, Mondi,N., Simard,S. Differential effects of forest management on soil carbon, microbiome diversity and food web dynamics (working title). In prep (postdoc 2023).

**Larocque, A.** & Simard, S. “Salmon density gradients change soil bacterial microbiome abundance, diversity and community composition”. In prep (PhD).

**Larocque, A.** & Simard, S. “Salmon density gradients change soil fungal microbiome abundance, diversity and community composition”. In prep PhD).

**Larocque, A.** & Simard, S. “Ecosystem functioning and nutrient flow in Salmon Forests”. In prep(PhD).

**Larocque, A.**, Dennert, A., Simard, S., Reynolds, J. “Marine-derived nutrients, soil microbiomes, and plant pollinator success in an estuary experiment” In prep, collaboration.

**Larocque, A.,** Simard, S. Effects of salmon on soils – a review. In prep.

**Larocque, A.**, Simard, S. Fungal influences on nutrient flow in a spatial manipulative experiment (working title). In prep.

Published:

**Larocque, A.** & Simard, S. “Legacy of salmon-derived nutrients on riparian soil chemistry and soil fertility on the Central Coast of British Columbia, Canada”. Frontiers of Forestry and Global Change. 2023. https://www.frontiersin.org/articles/10.3389/ffgc.2023.1010294/full

**Larocque, Allen**. “Fish, Forests, Fungi: Soils of the ‘Salmon Forests’ of British Columbia”. PhD Thesis, University of British Columbia, 2022.

de Mazancourt, C., Isbell, F., **Larocque, A**., Berendse, F., De Luca, E., Grace, J.B et al. "Predicting ecosystem stability from community composition and biodiversity". Ecology Letters, DOI: 10.1111/ele.12088, May 2013.

**Larocque, Allen**. “Untangling mechanisms behind the stability-diversity relationship in experimental grasslands”. Master’s Thesis, McGill University, 2011.

Solomon, Sponarski**, Larocque** & Aviles. “Social organization of the colonial spider Leucauge sp. in the neotropics: vertical stratification within colonies”. J. Arachnology. 38, 3, pp. 446-451, 2010.

Matthew Mitchell, Jonathan Whiteley, **Allen Larocque**, Andrew Gonzalez. “Impact of climate change on corridors and ecological services”. Report for Quebec’s Ministry of the environment (MDDEP), 2010.

Claudio H. Slamovits, Juan F. Saldarriaga, **Allen Larocque**, Patrick J Keeling. “The Highly Reduced and Fragmented Mitochondrial Genome of the Early-branching Dinoflagellate *Oxyrrhis marina* Shares Characteristics with both Apicomplexan and Dinoflagellate Mitochondrial Genomes”. J. Mol. Biol. July 2007.

Highlighted Presentations:

2023: “Fish, Forests, Fungi” – Vancouver Mycological Society Speaker Series (regional).

2022: “Salmon legacies in riparian soils”, Awi’nakola Launch; COP15 in Montreal (International).

2021: “Mycorrhizal Networks in Salmon Forests”. Fungal Modelling Conference, University of Washington, WA (international; online).

2015: “Salmon and the Soil”. Pacific Evolution and Ecology Conference, Bamfield, BC (regional; also presented poster).

2015: “Soil metabolism and marine-derived nutrients”. CONFORWEST, Friday Harbour, WA (International).

2015: “Theoretical Ecology of Mycorrhiza”. Western Mycorrhizal Gathering, Cowitchan Lake, BC (regional).

2012: “History in Georgian and Canadian Culture”. A presentation to the students of school 12F, Gelati Monastery, Kutaisi, Republic of Georgia (regional)

2010: "Mechanisms behind stability-diversity relationships in grasslands: a cross-system comparison". Canadian Society for Ecology and Evolution, Laval University, Québec City, Québec (Canadian National).

2009: “How is Social Spider behaviour shaped by colony structure?” CEEB symposium, McGill University (departmental).

Highlighted Communication for general public and stakeholders::

2022: “Salmon in the Soil”. Project TEACH webinar, Raincoast Conservation Foundation. YouTube: https://www.youtube.com/watch?v=HR\_n3ZR6G3s&t=195s

2020: “The Salmon Forest”. Film with Suzanne Simard and Bill Heath. YouTube: https://www.youtube.com/watch?v=OGH6VWUn7Dk

2019: “Insights to the Wood Wide Web”, Pacific Horticulture Society Webinar (online). https://www.pacifichorticulture.org/articles/insights-into-the-wood-wide-web/

2015-Present: Gave professional advice to three books and two film projects.

AWARDS, GRANTS, SCHOLARSHIPS:

2023: Forestry Undergraduate Summer Research Grant ($10,000). First grant awarded to one of my mentee students (Natalia Mondi, UBC).

2020: University of British Columbia – University of Washington Collaborative Research Mobility Grant ($17,000)

2017: Canadian Donner Foundation Grant ($150,000)

2014-2017: MITACS Accelerate Grant($105,000). Partnered with Brinkman Associates Inc.

2015-2018: TerreWeb Scholar, UBC ($45,000).

2015: Mary and David Macaree Fellowship ($1,000).

2008-2009: McGill University Provost Graduate Fellowship ($1,500).

2008-2009: McGill University Principal Graduate Fellowship ($2,500).

2003: Janusz J. Klawe Science One Award, UBC ($1,000).

CERTIFICATES, TRAINING, AND STATUS:

Registered Professional Biologist

Trainee to become Registered Professional Forester (ASFIT). Projected registration: late 2024.

Canadian Citizen

First Aid: Red Cross Wilderness First Aid

Marine certifications: Pleasure Craft Operator’s Card (SPOC); Small Vessel Operator Proficiency (SVOP); Marine Emergency Duties (MED A3); Restricted Operator’s Certificate (Maritime radio).

BC Driver’s License, perfect driving record.

Registered Project Management Course, 2016

PRSSS Soil Course 2015

Active Memberships:

Forest History Society of British Columbia

Vancouver Mycological Society

Canadian Institute of Forestry (CIF)

LANGUAGES:

English (mother tongue)

French (fluent)