

Korena Mafune, PhD

E-Mail: kmafune@uw.edu

Education

PhD, Soil Ecology, University of Washington

June 2021

My PhD research focused on soil nutrient dynamics, soil microclimate, and high-throughput sequencing of root-associated fungal communities in canopy soils of old-growth *Acer macrophyllum* in Washington's temperate rainforests.

MSc, Soil and Fungal Ecology, University of Washington

June 2015

My master's research focused on gathering preliminary data to assess the role of fungal communities present in canopy and forest floor soils.

BSc, Environmental and Forest Sciences, University of Washington

June 2013

My undergraduate research project focused on how prairie restoration treatments affected soil microbial communities.

Minor, Quantitative Sciences, University of Washington

June 2013

Experience in performing various statistical analyses and bioinformatics.

Research Experience

Washington Research Foundation Postdoctoral Fellow

October 2021-Present

Dept. of Civil and Environmental Engineering, Winkler Lab, University of Washington, WA.

My postdoctoral research focuses on tripartite interactions among plants, fungi, and bacteria and aims to harness these organisms as sustainable biofertilizers.

National Geographic Explorer

May 2019-Present

Program Advisor: Arslan Ahmad, National Geographic Headquarters, D.C.

Funded as part of the National Geographic Explorer Team. The goal of this project is to collect and identify any mushrooms fruiting in the canopy soil environments. Field techniques include tree climbing and specimen collection.

Lab Manager

September 2016-June 2021

School of Environmental and Forest Sciences Soils Lab, University of Washington, WA

Responsibilities: Implementing soil research projects, overseeing lab protocols, mentoring undergraduates and graduates, and managing lab chemicals and safety protocols.

Predoctoral Researcher

September 2013-June 2021

Advisor: Daniel Vogt, Ecosystem Conservation Lab, University of Washington, WA

For my PhD work, I implement field techniques that include tree climbing in temperate rainforests, soil sampling, experimental set-up, and greenhouse gas sampling. In the lab, I implement soil chemical extractions, DNA extractions, PCR, cloning, high-throughput and Sanger sequencing, tissue prep, and microscopy.

Research Assistant

June 2011-June 2013

Advisor: Jon Bakker, Terrestrial Restoration Ecology Lab, University of Washington, WA

For my independent capstone project, I explored how microbial communities reacted to different prairie restoration treatments. I also was part of a project that was identifying a native arbuscular mycorrhizal inoculum. Field techniques included soil sampling, plant sampling, and plot monitoring. Lab techniques included soil processing, chemical extractions, plate assays, and microscopy.

Research Assistant

May 2011-June 2013

Advisor: Darlene Zabowski, Soil Ecology Lab, University of Washington, WA

As an undergraduate research assistant, I helped a graduate student with their project by aiding with field collections, categorizing soils, drying and weighing samples, and recording data and results.

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Publications

A Klock, K Vogt, D Vogt, J Gordon, J Scullion, A Suntana, **K Mafune**, A Polykov, S Gmur, C Gómez de la Rosa. See the forest not the trees! Ecosystem-based assessment of response, resilience, and potential-for-growth of global forests. In Review, Science of the Total Environment.

K Mafune, B Godfrey, K Vogt, D Vogt. A rapid approach to profiling diverse fungal communities using the MinION™ nanopore sequencer. *Biotechniques*. doi.org/10.2144/btn-2019-0072

L Geiser, T Patel-Weynand, A Marsh, **K Mafune**, D Vogt. Chapter 10: Challenges and Opportunities. In: *Sustainable Forest Management Research - Forest and rangeland soils of the United States under changing conditions: A comprehensive science synthesis*. National Soils Assessment. Anticipated release 2020.

Works in Progress ⁺ Denotes undergraduate mentee

K Mafune, Z Leika⁺, D Vogt. Available nutrients in canopy soils of old-growth *Acer macrophyllum* provide a nutrient reserve for adventitious roots and contribute to forest floor nutrient dynamics. *In preparation*.

F Tuo, D Vogt, **K Mafune**, L Moskal. The impact of climate change and topography on spatial and temporal NPP dynamics: A case study in Pacific Northwest Olympic Temperate rainforests. *In preparation*.

K Mafune, A Meade⁺, K Vogt, D Vogt. A diversity and colonization comparison of *Acer macrophyllum* root-associated fungi in canopy and forest floor soils. *In preparation*.

K Mafune, E Cline, K Vogt, D Vogt. A unique suite of fungi associate with old-growth adventitious rooting systems in canopy soil environments. *In preparation*.

Teaching and Outreach Experience

Educational Planner

April 2020-June 2021

Olympic National Park

K-12 Outreach Workshop

This is a side project and collaboration with the Educational Outreach Specialist for the Olympic National Park. I am the scientific advisor that is helping shape a hands-on program for children and young adults who visit the park with their school.

Predoctoral Instructor

June 2019-June 2020

University of Washington

Course: ESRM 409 – Soil Ecology

For this course, I designed a new syllabus, presented my lectures, created lab exercises, and managed the course website.

Teaching Assistant

September 2017-June 2021

University of Washington

Course: ESRM 201 – PNW Ecosystems

For this course, I present various lectures, manage the class website, help structure course content, grade all assignments and exams, and hold regular office hours.

Guest Lecturer

May 2016-June 2021

Edmonds Community College

Guest lecturer in two different courses (Plant Biology and Intro to Environmental Studies), introducing students to plant-fungal interactions and native plant ID.

Co-Instructor and Teaching Assistant

June 2013-June 2021

University of Washington

Course: ESRM 304 - Environmental Assessment

For this course, I manage the website and attendance, facilitate assignments and communication between 5+ module instructors, proctor exams, and hold regular office hours.

Co-Instructor and Teaching Assistant

June 2013-June 2021

University of Washington

Course: ESRM 311 - Soils and Land-use

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For this course, I have been both TA and co-instructor. Both positions require presenting lectures, taking students on weekly field site visits, creating assignments, grading, and managing the course website.

Biology Field Trip Leader

September 2016-June 2019

University of Washington

Course: Bio 180 - Introductory Biology I

For the Introductory Biology course I led mandatory field trips that focused on biodiversity, plant/fungal identification, and ecosystem dynamics.

Lab Instructor – Earth and Space Sciences

January 2017-March 2017

University of Washington

Course: ESS 101 – Intro to Geology

Lab instructor for introductory geology. Responsibilities include structuring lab and syllabus, teaching introductory concepts, and grading.

Doris Duke Conservation Scholars Program

July 2016

Taught a group of 30 competitive and diverse scholars about the importance of biodiversity and ecosystem function.

BioBlitz Educational Team Member

May 2016

Chosen by the National Parks System to help lead an educational event for the National Parks Centennial BioBlitz. This event had more than 50 people and we were responsible for a research demonstration, table activities, and answering general questions while promoting the mission of the park. A majority of the National Parks created a Centennial science video, and ours was 1 of 4 chosen to stream on the jumbotron screen at the main event in Washington D.C.

Awards and Grants

Mycological Society of America Best Student Oral Presentation

July 2021

Won an award for best oral presentation at the 2021 joint Botany/Mycological Society of America Annual Meeting.

USDA NIFA Postdoctoral Fellowship (\$168,000 – declined)

March 2021

Proposal was recommended for funding, but had to be declined due to acceptance of the WRF postdoctoral fellowship.

Washington Research Foundation Postdoctoral Fellowship (\$277,500)

October 2020

Postdoctoral fellowship award, current position.

GO-MAP Dissertation Fellowship (\$26,664)

September 2020

Awarded internally by the University of Washington's GO-MAP organization to support under-represented students of color during their final stages of PhD writing. You are only eligible for this award through a departmental nomination.

Molecular Lab Upgrade – Student Technology Grant (\$106,000)

July 2019

Awarded internally by the University of Washington's Student Technology Committee to provide equipment for students to progress their research outside of the classroom.

National Geographic Early Career Award (\$7,818)

May 2019

Awarded to exemplary scientists early in their career to explore unknowns in rare or under-represented ecosystems.

MSA Student Travel Award (\$750)

May 2019

Awarded to select graduate students presenting a talk at the annual meeting.

University of Washington's Husky 100

June 2018

Awarded to 100 students across all three UW campuses that are making the best of their experience at UW, while demonstrating excellence.

MSA Forest Fungal Ecology Award (\$5,000)

July 2017

Awarded to graduate students pursuing outstanding mycological research in forests.

MSA Student Travel Award (\$500)

July 2017

Awarded to select graduate students presenting a talk at the annual meeting.

Sonoma County Mycological Society Student Award (\$1,000)

May 2017

Awarded to graduate students pursuing outstanding mycological research.

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- Rugged Forest Climate Monitors – Student Technology Grant** (\$33,267) **March 2017**
Awarded internally by the University of Washington's Student Technology Committee to provide equipment for students to progress their research outside of the classroom.
- Oregon Mycological Society Award** (\$1,500) **July 2016**
Awarded to graduate students pursuing outstanding mycological research in the Pacific Northwest.
- Xi Sigma Pi Graduate Award** (\$1,000) **June 2016**
Awarded to graduate students within the School of Environmental and Forest Sciences who are conducting interesting research and have strong academic merit.
- Canopy Research and Education – Student Technology Grant** (\$30,246) **March 2016**
Awarded internally by the University of Washington's Student Technology Committee to provide equipment for students to progress their research outside of the classroom.
- Ben Hall Conservation Genetics Award** (\$6,000) **March 2016**
Awarded to students in the College of Environment who are conducting ground-breaking genetic research, in honor of the late Dr. Ben Hall.
- Ben Woo Scholarship** (\$2,000) **January 2016**
Awarded by the Puget Sound Mycological Society to students pursuing outstanding mycological research in the Pacific Northwest.
- Daniel E. Stuntz Memorial Foundation Grant** (\$9,150) **December 2015**
Awarded to students pursuing outstanding mycological research in the Pacific Northwest, in memory of the late Dr. Daniel Stuntz.
- SEFS Senior Capstone Award** (\$200) **June 2012**
Awarded to students pursuing independent capstone projects. Funding was used to follow out research on microbial communities and nitrogen mineralization processes on prairie restoration plots.
- Dean's Award for Undergraduate Innovation** (\$1,000) **December 2012**
The first recipient of the College of Environment's Undergraduate Innovation Award. This grant funded soil microbial research in prairie restoration plots.

Invited and Contributed Talks

Invited

- WILD society film festival** **February 2020**
Title: The Parallel Evolution of Plant & Fungi
- International Mycological Congress – Puerto Rico** **July 2018**
Title: Fungal community analysis using the MinIon Nanopore Sequencer
- Oregon Mycological Society** **March 2018**
Title: Fungi in Canopy Soils of Washington State
- Puget Sound Mycological Society** **April 2018**
Title: Fungi up High: Adventitious Roots in Canopy Soils
- Olympic National Park – Perspective Series** **November 2017**
Title: Soils in the Sky - Plants and their Fungal Partners
- Olympic Natural Resource Center – Evening Talk Series** **November 2017**
Title: The Potential Role of Canopy Soils
- Olympic Native Plant Society** **October 2017**
Title: Fungi Associating with Adventitious Roots in Canopy Soils of Western Washington
- Olympic Natural Resource Center – Evening Talk Series** **May 2017**
Title: What the Fungi?!: Adventitious Roots in Canopy Soils

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Contributed

Mycological Society of America's Annual Meeting

July 2021

Title: Root-associated fungal diversity in canopy soils of old-growth *Acer macrophyllum* in Washington State's temperate rainforests

Mycological Society of America's Annual Meeting

August 2019

Title: Sequencing fungal communities on the MinION™ – A mock community approach

International Union of Forest Researchers' Annual Meeting

September 2017

Title: A diversity of fungi adapts to form relationships with adventitious rooting systems growing in canopy soils of an old-growth temperate rainforest

Ecological Society of America's Annual Meeting

August 2017

Title: Fungal associates and soil characteristics in adventitious canopy soils of old-growth *Acer macrophyllum* trees in a temperate rainforest

Mycological Society of America's Annual Meeting

July 2017

Title: Characterizing fungal root associates in canopy and forest floor soils of old-growth *Acer macrophyllum* trees, located in the Olympic temperate rainforests

Mycological Society of America's Annual Meeting

July 2016

Title: Fungi in Canopy and Forest Floor Soils of Big leaf Maple –Coastal Old-Growth Temperate Rainforests, Western Washington

Media and Press

The Seattle Times

August 2021

Interviewed by Seattle Times Reporter Joseph O'Sullivan for the article titled: *The majestic Hoh Rain Forest is one of the natural wonders of Washington state; venture in and wander.*

PBS Terra

July 2021

My PhD research and I were featured in a PBS Overview special titled: *Saving Lonely Doug.*

Overview is a broad scientific docuseries produced by 6x Emmy Award Winner Michael Werner.

Areas of Research Interest

Fungal ecology

Soil nutrient cycling

Molecular ecology

Botany

Plant ecophysiology

Forest conservation

Bioinformatics

Microbial Ecology

Biogeochemistry

Scientific Skills

Field collection protocols

Soil chemical analyses

DNA extractions

Microbial culturing

Molecular library preparation

Microscopy

High-throughput sequencing

Statistical analyses (R, python)

Technical writing

Community outreach

Team collaboration

Public speaking

Professional Societies

Mycological Society of America

International Mycorrhiza Society

Ecological Society of America

Xi Sigma Pi Forestry Honor Society