2 June 2023

Dear Professor ***,

I am writing to apply for your group's postdoc in Plant Ecophysiology in Agroecosystems. I will graduate with my PhD in Biology in June 2024, and my research focuses on plant-soil-fungi interactions and how these interactions relate to carbon and nutrient cycles. Through both my time as a student and as a staff researcher, I have gained extensive experience in all aspects of the research process from data collection and analysis to funding applications to team leadership. My current project focuses on plant ecophysiology and carbon fluxes in herbaceous plants, and I would be excited to continue expanding that focus with The Grasslands Science group. Three major projects connecting plant traits and carbon cycles form the core of my thesis.

- **Organism form to function**. I analyzed natural abundance $\delta^{13}C$ as a proxy for water-use efficiency and interspecific leaf trait variation to answer *how does drought stress in Pacific Northwest grasslands alter the relationship between plant structure and function?* My results are published in JGR Biogeosciences (doi.org/10.1029/2022JG007060).

- **Community structure to function**. I used gaseous $\delta^{13}C$ and $\delta^{15}N$ tracers, plant traits, and fungal DNA-based network analyses in a large scale field experiment to answer *how do common mycorrhizal networks function with their associated plant communities?* My results are currently under review as an invited submission at Proceedings of the Royal Society B and are available as a preprint on bioRxiv (doi.org/10.1101/2022.10.05.511035).

- **Individual form to community function**. I am working on a greenhouse experiment connecting above- and belowground traits with measured individual and community CO_2 fluxes to test *how can we use temporal variation of plant traits to better predict carbon fluxes?* As an extension of this project, I am also collaborating with Dr. Vigdis Vandvik's lab to connect inter- and intraspecific leaf traits with broader community fluxes in Norwegian heathlands.

I have six seasons of experience conducting field research in a variety of ecosystems and settings during both my undergraduate and graduate degrees. The first two chapters of my PhD were field-focused and examined grassland plant traits under experimental drought. My first paper found that established relationships between plant form and function held under drought. My second paper (currently in review) used stable isotopic tracers to test carbon and nitrogen transfer between grassland plants through a potential common mycorrhizal network. I found that the rate of nitrogen transfer was independent from fungal metrics, instead best predicted by plant stoichiometry. To accomplish this work, I labeled plants in the field with stable-isotopically enriched gasses, collected and processed the resulting leaves, and analyzed data in R. As part of my third project, I will be in the field this summer measuring leaf traits and carbon fluxes in Norwegian heathlands to compare inter- and intraspecific variation across a climatic gradient. On a separate project, I managed the launch of a long-term reforestation experiment for the past three years. In this role, I designed large scale experiments (~27 ha total) testing the effects of plant functional types, planting density, and mycorrhizal associations on soil carbon. In the lab, I performed soil analyses, including operating and maintaining two different combustion elemental analyzers.

I have extensive experience teaching and mentoring students. As someone who benefited greatly from undergraduate research experiences, I consider student mentoring to be an important part of my research. I

have mentored five undergraduates during my tenure in my current lab, many of whom were new to science when they first began research under my guidance. In my mentoring, I focus on helping students find their place in science and conduct meaningful projects that they feel ownership of. I offer hands-on guidance where appropriate, but ensure that advanced students reach independence quickly. My first mentee *** is now a science teacher at a local secondary school, and my current mentee *** recently presented her research at an international conference. My teaching experience began as an undergraduate when I worked both as a teaching assistant and a writing tutor. As a graduate student, I have taught two introductory biology lab sections, as well as assisted with an advanced botany course and led a weekly graduate seminar discussing plant-soil interactions.

Before beginning my PhD, I worked in my lab as a project manager to establish a long-term reforestation experiment. In this role, I managed a team of nine lab members as well as outside collaborators. I led field teams collecting plant biodiversity and soil property baseline data, mentored undergraduates on their own independent projects, and liaised with community organizations to ensure our work had a meaningful local impact. Beyond my PhD work, I do freelance fungal biodiversity research as part of a truffle dog team. I have successfully obtained funding for this research, led biodiversity surveys, participated in public outreach efforts, and collaborated with regional experts.

This position with the *** group will give me the opportunity to specialize my knowledge of grassland plants, traits, and carbon fluxes while contributing my experience to on-going long-term experiments. My research is best aligned with the *** projects, particularly ***, ***, and ***. I would be excited to broaden this work by connecting observational and experimental data on a smaller scale to the broader scale flux measurements that are ongoing in your research. I see this post-doctoral position as an opportunity for me to grow from an experienced student researcher to an established scientist, a key point on my career path towards a faculty position leading my own research group. My view of science has been shaped through the wide variety of people and landscapes I have encountered through international experiences. I am excited to continue expanding this broad perspective by working in Zurich in a group coming from a diversity of worldviews.

Thank you for your time and consideration,

Hilary Rose Dawson
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