WASHINGTON STATE UNIVERSITY
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School of Biological Sciences
14204 NE Salmon Creek Ave.,
Vancouver, WA 98686

Graduate Position: PhD on the Evolutionary Ecology of Plant-Microbe Symbiosis

The Porter Lab at Washington State University, Vancouver seeks a PhD student for Fall, 2025. We study how mutualisms–cooperative interactions between species–impact evolutionary processes and ecological dynamics. We work with plants and their beneficial microbial associates to test fundamental theory about cooperative interactions. Our research integrates evolutionary ecology, genomics, and quantitative genetics, in lab, greenhouse, and field experiments.

Research topics. We use the symbiosis between nitrogen-fixing rhizobia bacteria and their plant hosts as a model system. We are investigating, (1) How do wild microbial symbioses adapt to variable and changing environments? Transmissible mobile genetic elements enable rhizobia to adapt to stresses such as heavy metal in soil (https://doi.org/10.1073/pnas.2311127121). Other mobile genetic islands can enable rhizobia to adapt to a symbiotic lifestyle with legumes, while prophage can parasitize, but also protect, rhizobia from other phage. With collaborators, we are investigating evolutionary dynamics for these adaptive mobile elements, as well as their ecological and agricultural impacts. We also ask, (2) How do host plants control and optimize mutualistic interactions with multiple symbionts? Legumes winnow symbionts to preferentially interact with superior rhizobia partners (https://doi.org/10.1038/s41564-024-01762-2). With collaborators, we are using experiments to develop models of optimal carbon allocation among multiple rhizobia symbionts. We also have an interest in, (3) How has crop domestication impacted plant-microbe symbiosis? Some crops may have abandoned beneficial microbial symbionts, while others may have evolved to enhance these mutualisms (https://doi.org/10.1016/j.tree.2020.01.006). We take an evolutionary perspective to enhance symbiotic nitrogen fixation, a key pillar of sustainable agriculture.

Lab Description. The Porter lab (https://labs.wsu.edu/stephanie-porter/) is housed in the School of Biological Sciences at Washington State University, Vancouver. Located on a beautiful 351-acre campus across the Columbia River from Portland, Oregon, WSU Vancouver offers an excellent quality of life. Recognized by *Insight Into Diversity Magazine* as a top college for diversity, WSUV and this collaborative project team commit to inclusive excellence by advancing equity and diversity.

How to Apply. A BS or BA in a relevant scientific field is required. Tuition, benefits, and stipend will be funded by a combination of research and teaching assistantships, and guaranteed for five years. If interested, please email an informal inquiry to stephanie.porter@wsu.edu by December 7th, 2024. Later inquiries will be considered but leave less time to coordinate a time to meet. Please include the subject header, “Plant Microbe PhD 2025”, a CV or resume that lists relevant experience and coursework, a copy of your academic transcript (unofficial is fine), and a short statement that explains your interest in the position. The steps for formally applying to our graduate program for a Biology or Plant Biology PhD are described here: https://cas.vancouver.wsu.edu/science-graduate-programs/biology-and-plant-biology-ms-and-phd. Formal applications received by WSUV before January 10th, 2025 will be given full consideration, applications can still be considered after this date.