

Living Lab Fellowship Program for Sustainability AY 23-24

Project Overview: Carbon Accounting & Sequestration on Stanford's Natural Lands

Living Lab Fellowship Program for Sustainability:

Offered in partnership with the Stanford Office of Sustainability and the Bill Lane Center for the American West, the [Living Laboratory Fellowship Program](#) provides Stanford students real-world sustainability leadership and project management opportunities that meaningfully advance Stanford's operational sustainability goals. Successful student applicants will be matched with a pre-identified [campus sustainability project](#), mentored by operational experts in the project field, and paid to work up to 10 hours per week over the course of an academic year on their project.

Project Background:

Stanford University is currently in the process of updating its Climate Action Plan, a pivotal step in its commitment to achieving its goal of net zero emissions by 2050. Over the next year, Stanford will engage in a campus-wide, collaborative effort to develop comprehensive strategies and recommendations focused on mitigation, adaptation, climate resilience, and justice. One significant yet largely unexplored aspect of this initiative pertains to carbon accounting and a deeper understanding of carbon dynamics within the extensive natural lands under Stanford's purview. This project seeks to address this gap by conducting a thorough carbon assessment of these natural areas and assessing their untapped potential for carbon sequestration. The ultimate objective is to clarify the role and potential contribution of natural lands in Stanford University's pursuit of its climate objectives.

Project Description:

The project encompasses a comprehensive research and benchmarking effort, with a focus on evaluating carbon accounting methodologies employed by peer institutions across the nation, particularly those managing extensive natural areas. Review and summary of nature-based carbon accounting may also draw upon local municipalities and counties engaged in carbon accounting initiatives. Additionally, the project entails the utilization of ArcGIS tools for in-depth analysis of Stanford's natural lands, involving the examination of aerial images and plant community maps. Through this analysis, the project aims to calculate the total area covered by various plant community types and leverage existing literature estimates of average above ground carbon stored within each type. This data will be instrumental in estimating the overall carbon content within each plant community and the cumulative carbon storage across Stanford's property. To bolster these assessments, field samples will be collected and analyzed to evaluate below ground carbon stored within plant community types, taking special note of the differences between below ground carbon stored within grasslands dominated by native, perennial grasses vs. non-native annual grasses. Ultimately, the project seeks to identify opportunities for carbon sequestration that are compatible with Stanford's goal to preserve and enhance of native biodiversity and assess the potential magnitude of carbon storage enhancements. In the event that the carbon sampling results yield publishable data, the fellow leading the project will receive support in preparing and publishing the findings.

Desired Project Outcomes & Deliverables:

- A comprehensive final report and presentation materials encompassing:
 - Exemplary carbon accounting methodologies employed by peer institutions, municipalities, and counties.
 - In-depth carbon accounting and analysis specific to Stanford's natural lands.
 - Identification and assessment of viable opportunities for carbon sequestration and storage.

Collaborating Departments:

LBRE-LUEP

Living Lab Fellow

Lihan Huang, M.S. '24 Environmental Engineering | lihan95@stanford.edu

Project Mentor:

Esther Cole Adelsheim, Conservation Program Manager, LBRE | ecolea@stanford.edu

Advisory Board Members:

Scott Fendorf
Jorge Ramos
Sam Lubow
Moira Zbella
Sophie Christel

Office of Sustainability Contact:

Christopher Kuntzsch, Strategy Manager | christopher.kuntzsch@stanford.edu