Research project title

Web application developer for UBC Sustainable Farming Tool

Goal or Operations Plan objective

Short term Goals:
- Develop and pilot a systems analysis methodology for socio-ecological processes and outcomes at the Long-Term Socio-Ecological Research Station at the UBC Farm;
- This will involve development of underlying data sets and algorithms for monitoring multifunctional processes related to urban agriculture, food security and ecosystem services.

Long Term Goals:
- Develop farm management software that accounts for multiple aspects of sustainability (economic, ecological, social, cultural).
- Test and demonstrate approaches to sustainable agriculture and food systems.
- Develop a framework for and then implement a network of Long-Term Socio-Ecological Research Stations on urban campus farms across North America.
- Develop knowledge mobilization strategies for sustainable agricultural transition.

Outline scope of project and why it is of value to your organization and describe how and when the scholar's work will be actionable

The Centre for Sustainable Food Systems (CSFS), located at UBC Farm, is a 60 acre research and teaching site that aims to understand and fundamentally transform local and global food systems towards a more sustainable, food secure future. The centre is a living laboratory, committed to finding solutions to both the local and global challenges facing food systems sustainability and translating solutions to improve community, and environmental health.

We are currently spearheading an initiative that aims to generate the decision-support tools that are needed for an environmentally sustainable and foods secure future (http://ubcfarm.ubc.ca/research-teaching/research/). The central aim of this project is to develop and test a functional prototype of a software management tool that allows for the monitoring of socio-ecological factors that matter to farming system choices – inputs (e.g. labour, fertilizers, water, energy, fertility), biodiversity (e.g. birds, pollinators, plant life, soil invertebrates), climate impacts (e.g. carbon stocks and fluxes), water pollution (e.g. leaching, run-off), profitability, nutrient supply (calories, micronutrients), and system resilience from both ecological (e.g. yield, pollinator populations) and social (e.g, consumer; producer) perspectives. We are looking for a bright, creative and enthusiastic sustainability scholar to help with full stack development for this project.

Duties

Submit applications here: http://bit.ly/2DC2jpP

- Full stack development for the project (front-end and back-end development of the software application).
- Implementing high fidelity prototypes for the user interface of the software
- Integrating existing data and APIs into the software for enhanced functionality
- Writing automated testing code (unit, integrated, API)

Deliverables

- Solid maintainable code base
- Implementing a nitrogen simulation model, a green-house gas emissions model, a water use model, a weather station data API, and biodiversity data API into the software.
- Extend an existing mapping API for mapping important landscape features such as woodland and riparian buffers, and layers for soil chemistry, soil water status, and biodiversity data
- Extending reporting modules to include benchmarking for other users in the test network.
- Final report or executive summary for the UBC Sustainability Scholars online project library.

Time Commitment

- This project will take **250** hours to complete.
- This project must be completed between **01 May 2018** and **10 August 2018**
- The scholar is to complete 15 to 20 hours per week.
- There is some flexibility, however we expect that the scholar will be based at the CSFS office in MCML 170 (with regular visits to the UBC Farm) during regular working hours.

Skill set/background required/preferred

- Strong Interest in developing tools for environmental and social sustainability
- Web application skills
- Proficiency in Javascript, and good working knowledge of the MERN stack (MongoDB, Express, React, and Node.js), as well as material UI and D3.js
- Experience working with geospatial data, and mapping principles.
- Understanding of crop physiology, water budgeting, nutrient budgeting, or agriculture a massive asset

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