Summer 2023 Sustainability Scholars Program Internship Opportunity

The UBC Sustainability Initiative (USI) is pleased to offer current UBC graduate students the opportunity to work on funded sustainability internship projects. Successful candidates work under the mentorship of a partner organization, and are immersed in real world learning where they can apply their research skills and contribute to advancing sustainability across the region.

- Visit the Sustainability Scholars Program website to learn how the program works and to apply.
- Be sure to review the application guide on the Apply page to confirm your eligibility before applying.

Applications close at midnight on Sunday January 29, 2023.

Project title: Research to understand tree leaf fall in a changing climate to inform timing of debris removal and flood prevention.

Project Background & Overview:

Every year, from November to January, the City of Vancouver operates a program to clear residential streets of leaf debris to decrease residential flood risks by clearing catch basins and cleaning up leaf litter. This program is managed by the City's Engineering Sanitation Operations Division, known as the Street Leaf program. Keeping catch basins free of leaf litter is critical for flood prevention as we work toward adapting city services to ensure assets are resilient to Climate Change. According to the Climate Change Adaptation Strategy, Vancouver should expect an increase in the frequency and intensity of rainfall events. As rainfall events increase in frequency and intensity, the risk of flooding also increases. Vancouver's Rain City Strategy also focuses on managing water assets to prevent flooding in urban areas where the impervious material disrupts the natural water cycle in cityscapes.

Engineering and Operations developed the street leaf program many years ago; since then, over 150,000 trees have been planted across the city. Currently, the leaf removal program was designed to focus on ease of movement across the city, allowing a systematic deployment of operational crews. It is unknown if vegetation and environmental details are included within the deployment pattern.

Our team is looking to gain a broad understanding of the following knowledge areas:
- information relating to leaf debris based on species type and leaf volume estimate based on available urban forestry tree data (such as species, age, canopy height, etc.)
- what environmental factors (temperature, water availability) would result in delayed leaf debris based on vegetation species type
- are operations collecting from neighbourhoods at locations when most leaves have fallen, based on tree type?
- are there opportunities to optimize sanitation operations based on leaf debris patterns and high-risk flood areas using geographic information systems (GIS) data
- should the street leaf program start later in the year to address climate changes in vegetation debris?

Project description

This study aims to understand how changing environmental variables, vegetation cover, and urban forestry efforts might influence Engineering's Street Leaf program to reduce flood risk in residential areas from leaf debris in catch basins. Specifically focused on several tasks: identifying tree species with different rates of leaf senescence and abscission (leaf fall), categorizing local species based on the timing of abscission, and understanding climatic variables that can alter the timing of leaves falling from the trees.

Project scope

Key Research Questions:

- Can the City of Vancouver develop a categorization/classification scheme for grouping tree species across Vancouver when they experience senescence and abscission in the fall?
- Do all species in these categories react the same to changing climate variables?
- Are there spatial groupings in these categories? Can we see the impacts of microclimates across the City on categorized species?
- Can the City use the categories and spatial distribution to improve how service is provided

Primary Activities:

- Review of COV tree database to develop a prioritised list of trees to research
- Literature review to understand climate impacts on timing of seasonal leaf fall for deciduous trees similar to those growing in the City of Vancouver
- Development of some kind of leaf fall categorisation scheme and apply it to the COV urban tree database
- Using existing City of Vancouver tree geospatial database, develop a leaf fall categorisation methodology and apply it to the COV urban tree database
- Research to identify, define and map microclimate zones in COV
- Review the spatial distribution of categorized trees to determine if there are communities around the City that will experience heaver leaf litter on streets at different points in autumn.

Secondary Activities (based on time allowance):

- Literature review of predictive modelling focusing on predicting when and where leaves will fall based on changing climate conditions.

Deliverables

- A final report containing a summary of the work completed
- A final report for the online public-facing Scholars Project Library.
- **Primary Deliverables:**
  - A classification scheme operations groups can use to group Vancouver tree species based on leaf senescence.
  - Report detailing the impacts of climatic variables on different tree species that could cause changes in timing of leaf fall
  - (optional) GIS analysis of areas with high flood risk, and changing leaf senescence and abscission
- **Secondary Deliverables (time permitting):**
  - Predictive analytics that could enable COV staff to prepare for anomalies in leaf fall patterns and adapt operational plans to account for this.

Time Commitment
- This project will take 250 hours to complete
- This project must be completed between May 1 to August 15, 2023
- The Scholar is to complete hours between 9 am and 5 pm, Monday to Friday, approximately 17 to 20 hours per week.

Required/preferred Skills and Background
☒ Excellent research and writing skills
☒ Familiarity with research methodologies and survey techniques
☒ Statistical analysis
☒ Strong analytical skills
☒ Ability to work independently
☒ Deadline oriented
☒ Demonstrated experience in biology, plant science and tree identification
☒ GIS training or experience.
☒ Demonstrated understanding of the effects of climate variables on different types of vegetation

Additional information UBC should know to help find a suitable candidate for this project.
The successful candidate should have education in one of the following programs: Botany, Ecology, Forestry, Geography (with a focus on Ecology, Biology or Botany), Urban Forestry Leadership or Plant Science. Candidates from other disciplines would be considered if they are able to display adequate knowledge of the project scope.

Additional project requirements.
ESRI (ArcGIS) software may be required to complete the analysis of vegetative species cover. The City of Vancouver will provide a GIS capable computer and access to all required GIS datasets.

Applications close **midnight Sunday January 29, 2023**
Apply here: Click here to apply
Contact Karen Taylor at sustainability.scholars@ubc.ca if you have questions

SUSTAINABILITY SCHOLARS PROGRAM

Useful Resources

We are holding a special **resume preparation workshop for prospective Scholars** on January 23, 2023. [Click here for details and to register.](#)

Below are some links to useful resources to help you with your resume and cover letter (there are many more online). Some of these resources also provide information on preparing for your interview.

https://students.ubc.ca/career/career-resources/resumes-cover-letters-curricula-vitae

https://www.grad.ubc.ca/current-students/graduate-pathways-success

https://www.grad.ubc.ca/cover-letter-cv-resume-templates-ubc-career-services