

Summer 2021 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](#) to confirm your eligibility before applying.

Applications close at midnight on Sunday March 7, 2021.

Research project title:

Making buildings greener: Which building industries need support to successfully implement high performance residential building envelopes?

Background: The Township of Langley (TOL) has adopted the BC Energy Step Code for residential buildings and will require all applicable buildings to be built to Step 3, starting January 1st 2021 and the Upper Steps, 4 and 5, in the future. The average air changes per hour. (ACH) at Step 1, where there are no air tightness requirements is roughly 3.5* and as TOL adopts Step 5 in the foreseeable future, there will be an expected air tightness improvement of 62% to get to 1 ACH.

In order to effectively build air tight envelopes, which contribute to energy/GHG/operating cost reductions, many different segments of industry will need to know how their work will impact the overall effectiveness of the air barrier.

The success of a high-performance envelope relies on a number of stakeholders in the design and multi-step construction process. Each relevant industry will have different degrees of understanding and experience in the implementation of a high-performance envelope. Where there are capacity gaps in any given industry group, the overall chance of achieving success with the implementation of a high-performance envelope can be dramatically reduced. Failure in achieving airtightness at the final blower test can result in cost burdens to development teams to address envelopes with higher than anticipated air leakage rates after-the-fact through added labour, materials, design and even mechanical retrofits. In other words, we need to identify the weakest links and the stage(s) where there is most risk. This aspect of the envelope capacity is the largest concern for builders. See Figure 1 below.

Project Overview:

The Green Buildings team proposes to conduct an industry wide online survey focusing on three major components of the envelope: air tightness, envelope, and thermal bridging. The survey will be built in such a way that once the survey has completed, for each industry group (general contractors, design and construction industry, residential construction industry etc.), we will have a detailed report on where there are gaps in understanding of how to build a high-performance envelope and at what stage. This will allow

SUSTAINABILITY SCHOLARS PROGRAM

us, and other larger support bodies, to prioritize our industry education efforts as BC heads towards Net Zero Energy Buildings, a key part of our Climate Action Plan.

The scholar will be asked to review publications that showcase a variety of strategies for designing/constructing high performance envelopes, addressing thermal bridging, and improving air tightness. BC Housing issues a number of resources which have already listed out many relevant building/design strategies that can make up the survey matrix and these publications will supply the resources needed for the survey. These strategies will then be converted into an online industry survey with a large series of Yes and No questions starting at the basic questions and leading up to advanced questions. For each industry that participates, we will then know exactly where there are limitations in understanding and how they impact the overall performance of the air barrier.

The survey participants are anyone in the design and construction industry for TOL buildings; however, all building industry sectors will be invited.

Upon completion of the survey a report will be created by the scholar describing the capacity profile of each member of the construction process and identifying who and where is the weakest link. The report will be actionable by TOL immediately; the results will inform our industry education program and we will share the results with BC Hydro, BC Housing, BCIT and other major partners in Step Code adoption to help create systems to bridge the overall gaps. Overall, the report will help BC Builders meet the requirements of the BC Energy Step Code, a key step in our path towards Net Zero Energy Buildings.

Further, the development community can use these findings to improve their own construction methods. This report can act as a very insightful tool adding value to their process and thus adding value to TOL by not passing on inflated construction costs to the consumer.

Additionally, this will support our progress with adopting non-residential Step Code requirements, which is supported by a UBC Sustainability Scholars project conducted in 2020; the results from the 2021 study will form a part of our consultation process. When we discuss what the community's barriers are in terms of capacity, we will be able to more specifically support their needs knowing who needs support, at what stages, and how we (and they) can address those gaps.

The Scholar will benefit from becoming highly experienced in understanding the ins-and-outs of building envelopes and will be able to identify the stages at which different industries and trades will have the most influence on the success of the air barrier.

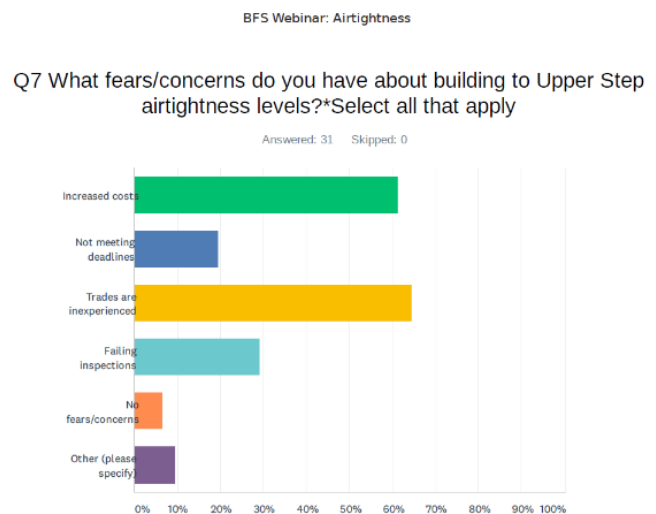


Figure 1: This data, November 19, 2020, highlights the #1 concern the building industry has around Upper Step air tightness – trade capacity. N.B. this concern is higher than even costs.

SUSTAINABILITY SCHOLARS PROGRAM

Deliverables

- A survey to identify the gaps in understanding of how to build a high-performance envelope and at what stage. Survey will use cascading logic to gather increasingly detailed trade-specific information
- A list of informational industry resources to make available to the building industry. TOL can provide a list of some resources to start with, but the Scholar will do research to find more.
- Based on the survey findings and using existing assembly configuration data available from BC Hydro, prepare a matrix of envelope components and related building strategies by construction industry actor and their capacity profile.
- A final report summarising the results of the survey, including an analysis of gaps and opportunities within the industry groups (for example, which industries are at higher risk of compromising the success of the envelope, which industry groups would benefit by being brought earlier into the design and construction process, etc.)
- Final report for the online Scholars Project Library (same as above but potentially anonymized)

Time Commitment

- This project will take 250 hours to complete.
- This project must be completed between May 3 and August 13.
- The scholar is to complete hours between 8:30am to 4:30am, Monday to Friday, approximately 20 hours per week.
- The scholar is anticipated to work remotely and will have access to our network. To enrich the experience of the Scholar and provide network opportunities, we anticipate three optional in-person working days at the Township Civic Centre.
 - It may be possible to have more on-site working days if the Scholar wishes.
- The Scholar will also have the opportunity to present their findings to the building industry through the Township's successful Builder Forum Series, this event had an audience of 170 people in January 2021.

Required/preferred Skills and Background

- ☒ Excellent research and writing skills
- ☒ Demonstrated interest in sustainability
- ☒ Familiarity developing complex online surveys an asset
- ☒ Experience with statistical analysis
- ☒ Community engagement experience
- ☒ Strong analytical skills
- ☒ Ability to work independently
- ☒ Deadline oriented
- ☒ Project management and organizational skills
- ☒ Experience in or around construction, an asset
- ☒ An eye for clean page layout and design, an asset
- ☒ Intermediate/general understanding of buildings including envelopes, energy efficiency, and the construction process.

SUSTAINABILITY SCHOLARS PROGRAM

Applications close **midnight Sunday March 7, 2021**

Apply here: [Click here to apply](#)

Contact Karen Taylor at sustainability.scholars@ubc.ca if you have questions

Useful Resources

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>