Metro Vancouver
SUSTAINABLE REGION SCHOLARS
UBC Sustainability Scholars Program
Summer 2018

Title of Research Project:

Textiles Recycling Technologies and Colouring Methods.

1. How will this project make a contribution to regional sustainability?

The Metro Vancouver Board Strategic Plan calls for reduction of solid waste by continuing to expand effective reuse and recycling programs and policies in the region. This project is aimed at reducing the barriers to textiles recycling.

Textiles are one of the fastest growing waste streams. Textiles make up approximately 5% of the waste generated in the region. But that is expected to increase due to a trend towards "fast fashion". Some fast fashion brands offer 12-24 collections per year. And, according to a survey of two thousand women in the UK, the average clothing item was only worn an average of seven times before being discarded.

While there are good markets established for re-using clothing, the options are limited for recycling old clothing/textiles into new clothing/textiles or other products. Most of the opportunities are for "open-loop" recycling where the clothing is downgraded into insulation or industrial cleaning rags before eventually going to disposal. Less than one percent of garments are remanufactured into new garments.

Dyes, softeners and other chemicals used to make clothing impede existing textile recycling methods and can be as much as 5-15% by weight of the textiles. New dyes and alternative colouring techniques that are compatible with existing recycling technologies (and/or new recycling technologies not adversely affected by existing dyes) are needed in order to move the industry forward.

2. The purpose of the project is:

The purpose to the project is to advance the knowledge of recycling technologies and compatible colouring techniques for the textiles industry. The knowledge can then be shared broadly with researchers, industry and policy makers. Researchers can use the information as a base for further research such as lab scale pilots of new and best alternatives, industry can consider implementation of preferred technologies and chemicals, and policy makers can consider restricting chemicals that are not compatible with recycling technologies for the most prevalent fibres.

3. Outline the scope of project and how the scholar's work will be used by Metro Vancouver:

For the most prevalent fibres used in garment manufacturing (polyester, cotton, wool, nylon), carry out a literature review and industry interviews to

(a) summarize existing chemical recycling techniques for the most prevalent fibres,
(b) research which fabric dyes are and are not currently compatible with current recycling options,
(c) research potential new dyes and alternative colouring techniques (e.g. from other industries and biomimicry)
(d) research new and emerging textile recycling technologies that are not adversely affected by existing dyes, and
(e) recommend those dyes/technologies with the most potential based on their potential to create new textile recycling alternatives, and which are therefore best candidates for future research and lab testing. The recommendation should be based on an analysis of financial, human health, technical and environmental impacts.

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

For the 250 hours allocated for the project, the regional scholar should prioritize time approximately as follows:

20 hours – Correspondence and check-in meetings with MV staff
20 hours – Develop a list of industry experts and questions for interview.
50 hours – Research and summarize existing chemical recycling processes for polyester, cotton, wool and nylon.
50 hours – Research and summarize chemicals used in production of textiles and which ones are compatible with chemical recycling processes.
50 hours – Research and summarize recycling technologies, dyes and alternatives (commercial and lab) that are complicate or prevent textiles recycling.
60 hours – Analyse results based on cost, technical feasibility and environmental impacts.

4. Project Deliverables:

The final deliverable will be a report summarizing the research. The report should include the following key components:

a. A series of process diagrams detailing the steps for existing chemical recycling methods for nylon, polyester and cotton.
b. A table summarizing of the top five to ten chemicals used in production of apparel with a check list of which chemical recycling technologies they are compatible with.
c. A table summarizing the top five to ten new advances to improve the compatibility of the dyes with apparel recycling or vice versa.
d. An analysis of which new textiles recycling alternatives are the best candidate for future research and lab testing based on financial, technical and environmental impacts.
e. Final report or executive summary for the UBC Sustainability Scholars Program online project library.

5. 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 expected to complete approximately 15 to 20 hours of work per week.
- The successful candidate will work directly with the project lead to determine the project timeline based on the Scholar's schedule and commitments.
- Scholar to be available, either in person or by telephone as agreed, for project start-up meeting, periodic status updates and draft and final report presentations.

6. Describe the required/preferred skill set and knowledge base for a Scholar

☒ Excellent research and writing skills.
☒ Experience in textiles recycling and colouring techniques.an asset
☒ Background in Chemical, environmental, integrated, or materials engineering preferred
☒ Excellent research and writing skills.
☒ Strong analytical skills
☒ Ability to work independently
☒ Demonstrated time management skills

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☒ Deadline oriented

7. <u>Identify specific requirements required for completing this project *(if any)*</u>

Metro Vancouver will provide a small budget to cover incidental expenses such as:
- International phone calls to interview industry experts
- Purchase of industry data or publications

The scholar will need to get prior approval from the Metro Vancouver lead through an email request describing the expense and the estimated cost.