1. Summary

1.1 Project Title	Possible Methods for Detection and Removal of Microplastics Contamination in Municipal Compost
1.2 Project Duration	5 Months
1.3 Number of Internship Units	1
1.4 Total Project Value	$15,000.00
1.5 Keywords	microplastics, organic and food waste, municipality, detection, removal, compost
1.6 Academic Discipline	Engineering
1.7 Project Priority Sectors	Environmental Science & Technology
1.8 Preferred Language of the Proposal	English

1.9 Project Description

Public Project Overview

Our proposed research aims to find ways to detect and remove harmful microplastics from municipal compost, an area that has not been widely studied. By identifying the types and concentrations of microplastics and testing effective removal techniques, this project will contribute to improved municipality composting processes and management. Our partnership with the City of Kamloops will allow for the practical application of these findings, leading to the development of detection and removal best practices for compost management at the municipality level. The intended outcomes are hoped to enhance policies and regulations in compost management and quality, not only in Kamloops but for municipalities across Canada, promoting safer environmental and economic practices for a better and sustainable quality of life.
We believe that this work will support healthier communities and contribute to Canada's leadership in sustainable waste management, providing both economic and societal advantages.

Research Abstract

1.10 Participants

Academic supervisor(s)

First name	Last name	Academic Institution	Department	City and Country
Naowarat	Cheeptham	Thompson Rivers University	Biological Sciences	Kamloops, Canada
Anusha	Venkataraman	Thompson Rivers University	Faculty of Science	Kamloops, Canada
Kingsley	Donkor	Thompson Rivers University	Chemistry	Kamloops, Canada

Partner Organization Contacts

First name	Last name	Partner Organization	Legal Status	City and Country
Glen	Cheetham	City of Kamloops	Municipality	Kamloops, Canada
Sarah	Candido	City of Kamloops	Municipality	Kamloops, Canada

Interns

First name	Last name	Academic Institution	Department	City and Country
Emma	Trotta	Thompson Rivers University	Faculty of Science	Kamloops, Canada

1.11 Budget Summary

Total Award	$15,000.00
Stipend	$10,000.00
Research expenses	$5,000.00
Partner contribution(s)	$7,500.00
Mitacs contribution	$7,500.00
Number of interns	1
Number of IUs	1
Project start date	2025-02-01

mitacs

Express Accelerate Research Proposal

1. Intern Summary

1.1 Please state the name of each intern (enter 'TBD' if unknown), the intern's academic level, and the number of internship units (IUs) associated with each intern. Note that each IU corresponds to one 4–6-month internship. Please refer to the **Accelerate Guide: Writing your proposal** for assistance.

Projects submitted on this template are limited to a combined maximum of 3 IUs in total. These can be allocated to a single intern or divided among a maximum of 3 interns.

Intern(s) Name	Academic Level	Number of internship units (maximum cumulative total of 3 IUs)	Internship duration (indicate 4, 6, 8, 12 or 18 months)
Emma Trotta	Undergrad	1	6
Name	Select	##	Click or tap here to enter text
Name	Select	##	Click or tap here to enter text

2. Description Of Proposed Research

2.1. Project Summary (maximum 300 words):

(1) State the research question that this project will address, (2) Describe the main activities of the partner organization and the challenge(s) the partner aims to solve through this project, (3) Outline the anticipated social or economic benefits of the project for the partner organization(s). Note that this section will be used to recruit reviewers.

- The City of Kamloops has adopted a curbside program for collecting residential food and organic waste. However, it has been discovered that the compost generated from this program contains microplastics, which are harmful to the environment. Microplastics—tiny plastic particles often less than 5 mm in size—contaminate municipal compost and can pose significant risks to human health and the ecosystem [1,2,6]. These particles may also carry hazardous substances such as heavy metals and organic pollutants, making them even more dangerous to human, animal, and environmental health [7]. The contamination of microplastics in our compost is problematic because, while reducing plastic contamination at the source is essential, some microplastics inevitably end up in composting facilities. If left unmanaged, microplastics may unintentionally spread when contaminated compost is used as fertilizers, potentially harming agricultural practices, humans, animals, and the environment.
- The City of Kamloops aims to utilize this compost as fertilizer; however, the presence of microplastics in its current form raises concerns about environmental and everyone's safety. Given the limited research in this area, through this project our team aims to collaborate with the City of Kamloops to develop strategies for identifying, detecting, and removing microplastics from municipal compost. The anticipated outcomes of this research includes a comprehensive understanding of the types and quantities of microplastics present, the development of effective detection methods for both small and large scale compost facilities, and potential removal techniques. These results will not only enhance possible compost management and quality in Kamloops but also provide valuable insights for municipalities across Canada, promoting safer environmental and economic practices for a better and sustainable quality of life.

2.2. **Background** (Novelty of Proposed Research):

Provide a review of relevant prior work in order to situate this project relative to its significance as a novel area of inquiry. For guidelines on eligible research, refer to Mitacs' Responsible Conduct of Research Policy. Please ensure all sources are appropriately cited and a list of references is included in section 2.8.

The Kamloops Residential Organics program is new in Kamloops aimed to help reduce and reuse food waste throughout the city. Compost and organic waste are valuable resources that can help us achieve several global and local sustainability objectives [5, 7,8,9,12]. Like many other municipalities, Kamloops recognizes these benefits and desires to incorporate and utilize composts from the organic waste programs as fertilizer. However, the major hurdle to the wider implementation and use of municipal compost is the contamination of plastics. Plastics are one of the most widespread types of contamination in municipal compost, and to manage and come up with solutions, we need better ways to identify and quantify the plastics currently found in organic waste and resulting compost [19]. Several methods have been used to detect microplastics in organic waste, and most can fall under three main categories - microscopy, spectroscopy, and thermal degradation methods [6]. Inspired by all the work done so far, our goal is to find methods appropriate for microplastic detection potential removal in Kamloops municipality compost.

Prior work on this project is already underway. In the Fall of 2024, samples collected from Grasslands Organics were analyzed using microscopy techniques to identify the presence of microplastics. The organic matter from the compost was degraded in 30% hydrogen peroxide and using a light microscope under 10x and 40x magnification, microplastics were potentially identified in the compost samples (Figure 1). Further work will need to be done to expand on this method and create a consistent protocol to identify and isolate microplastics in Kamloops' compost samples.

a. b.

Figure 1: Preliminary microscopic observation of some fiber and film microplastics in Kamloops municipality compost. a, shows 7-month aged compost under 10x optical microscope- an arrow indicates a fiber microplastics. In b, with a scale bar of 150 µm, an unstained fluorescent microscope image of 7-month aged compost with TRANS UV- an arrow indicates a film microplastic [7].

Additional and related research that will be used to supplement this project was conducted over the Summer of 2024 with successful grants from the TRU Undergraduate Research Enhancement Fund and TRU Sustainability Student Research Fund. Compost samples were matured in the lab setting on TRU campus under similar conditions to that of Grasslands Organics. The focus of this research was to study microbial communities, and the impact different types of cardboard have. Microbial diversity was determined through microbiology culturing techniques like spread plating, plate counting, and Gram staining. Additionally, 16S rRNA amplicon sequencing will be done to determine the microbial diversity between all compost samples. To date, it is found that cardboard increases diversity and the microbial community is shown to be different from compost without cardboard [9]. This research can help assist in natural degradation methods using the native bacterial species as a potential source to degrade microplastics in compost.

This research will generate useful knowledge in natural sciences by finding better ways to detect and potentially remove harmful microplastics from municipal compost, an area that has received limited attention. By identifying the types and concentrations of microplastics and testing effective removal techniques, the project will contribute to improved composting processes. Partnering with the City of Kamloops will allow for the practical application of these findings, leading to the development of new technologies and best practices for compost management. The intended outcomes will help inform policies and regulations aimed at reducing microplastic pollution in Canada, offering significant environmental benefits by enhancing soil quality and food safety. This work will support healthier communities and contribute to Canada's leadership in sustainable waste management, providing both economic and societal advantages.

2.3. Project Plan:

Describe the (1) objectives of the project, (2) specific methodologies, and (3) expected deliverables (including any publications or knowledge translation activities). If the project includes multiple interns, consider including a table to outline the unique activities for each intern and their relationships.

1. **Objectives:**
   To identify and characterize the types/sizes and amounts of microplastics in Kamloops' municipal compost using techniques such as UV-Vis spectroscopy, Coulter counter analyzers, Inductively Coupled Plasma Mass Spectrometry (ICP-MS), Capillary electrophoresis (CE), Matrix-Assisted Laser Desorption/Ionization-Time of Flight (MALDI-TOF) mass spectrometry, Atomic Force Microscopy (AFM), and Raman spectrophotometry.

2. **Specific methodologies:**
   To address our objectives, the above-listed techniques and instruments would be used to identify and characterize microplastics.
   Microscopy will be a primary tool for the viewing of microplastic fragments in the compost to determine its morphological characteristics, such as size, shape, and surface texture. This will be followed by Nile Red staining, a fluorescence-based technique, that has been widely used to enhance contrast in microplastic imaging [14,10]. As demonstrated in the work by Maes, T., Nile Red dye is demonstrated to adsorb onto plastic surfaces and renders them fluorescent when irradiated with blue light. This will provide an improved contrast to make the samples more distinguishable under fluorescence microscopy [12]. The samples will then be viewed under high magnification, and the morphology of microplastics can be characterized.

   Following microscopy-based qualitative analysis, the compost samples will be analyzed using Raman spectroscopy and MALDI-TOF-MS. Raman spectroscopy involves illuminating the compost samples with a laser beam and analyzing the scattered light to detect spectral shifts caused by interactions between the laser and the chemical components of the compost sample. These shifts produce spectra unique to different polymer types [3,15]. MALDI-TOF Mass spectrometers can determine the molecular weight of the polymers, which will be used to identify the polymers present, allowing for a more detailed characterization of plastic composition [13]. UV-Vis spectroscopy will be utilized to assess the absorbance properties of compost samples. Additional techniques like Coulter counter analysis, ICP-MS and CE will provide further insight into the composition of microplastics and potentially assist in separating microplastic fragments based on their size and other properties [1,11,13,14].

   By integrating these techniques, our aim is to potentially qualitatively and quantitatively assess microplastics in compost. This multi-faceted approach ensures a thorough evaluation of the presence, morphology, and chemical composition of microplastics, addressing the study's short-term objectives while providing a foundation for future research.

3. **Expected deliverables:**

The primary objective of this research project is to identify and characterize the types/sizes and amounts of microplastics in Kamloops' municipal compost. In addition, the long-term goals of this project (intended to be done in subsequent units) are to find, explore, and test possible ways to remove microplastics from compost. A comparison of lab-based experiments with real-world results from the Kamloops' municipal compost system will be used to expand the implications of this project further.

For the first unit, we intend to lay the groundwork for getting background information and doing preliminary tests to meet our research's short- and long-term objectives. The initial unit will focus on creating a plan for detecting, categorizing, and quantifying microplastics in compost, specific to the City of Kamloops's context. The table below provides a detailed timeline of the activities in the first phase (unit) of this project:

Month	Activities	Delivery
February-April	**Identification** • Experimental design, different aged compost sample collection, and preparation • Prepared samples will be tested with Nile red staining and Atomic Force Microscopy (AFM)	A protocol on sample preparation and identification of the microplastics in Kamloops municipality compost

March-May	**Quantification** • Prepared samples will be tested with microscopy and mass spectroscopy based methods - UV-Visible spectrophotometry, Coulter counter analyzers, ICP-MS,CE, MALDI- TOF-Mass spectrometer, AFM, and Raman spectrophotometry. These are potential techniques, and through this project, we will explore the best practices and methods suitable for our project's scale, addressing the study's short-term objectives while laying a foundation for future research.	Knowledge sharing with all stake holders on types, sizes, and quantity of the microplastics in Kamloops municipality compost
June-July	Result analyses and planning for potential application(s) of the subsequent units to meet long-term objectives	

2.4. Partner Interaction: Please state the nature of the partner interaction: Onsite ☐ Virtual☐ Hybrid☒

Describe the activities that will be performed with the partner organization(s) (and incubator, for **Accelerate Entrepreneur applicants**). Indicate (1) who the intern(s) will have direct interaction with, (2) the partner resources provided for the project and intern(s), and (3) the partner's physical/virtual facilities (include location if physical) at which interns will be working.

Our interactions with our partners will be hybrid. Intern (Emma Trotta) will actively collect compost samples from Grasslands Organics, Strawberry Hill Ltd., located at 801 Strawberry Hill Lane, Kamloops. Grasslands Organics is a new composting facility situated on the Tk'emlúps te Secwépemc Indigenous band land and is a partner with The Indigenous Zero Waste Technical Advisory Group (IZWTAG). The Grasslands Organics is a subcontractor of the Arrow Transport for the City of Kamloops in regards to compost management. In addition, all the academic supervisors will regularly be in touch via online/in-person meetings with members of our Partner Organizations to keep them informed of the results and updates to this project.

2.5. Indigenous community involvement or impact (if applicable):

Internships that involve or impact Indigenous communities must comply with Mitacs' Indigenous Research Policy. Please provide information on (1) Indigenous community support for the project, and their role in shaping its objectives & approach, (2) plans for Indigenous community access, use, and governance of resulting knowledge / data, and (3) the team's background in Indigenous research, including any planned training / mentorship the intern(s) will receive to address deficits in experience. You may also submit **1-2 letter(s) of support from Indigenous Elders** who are members of the partner community / communities and possess the authority to speak on community interests.

For this project, the team will actively collect compost samples from Grasslands Organics, Strawberry Hill Ltd., located at 801 Strawberry Hill Lane, Kamloops. Grasslands Organics is a new composting facility situated on the Tk'emlúps te Secwépemc Indigenous band land and is a partner with The Indigenous Zero Waste Technical Advisory Group (IZWTAG). IZWTAG provides training and resources to First Nations by implementing a zero waste system within their communities. The team will work closely with Grasslands Organics (that is a subcontractor of Arrow Transport) to help shape the project to fit the needs of the city and the Tk'emlúps te Secwépemc Indigenous band. Our goal is to have a positive impact in Kamloops by providing a healthier environment for both Indigenous and non-Indigenous people. The data will be shared with both the City of Kamloops and Grasslands Organics in hopes to implement a solution regarding the microplastics' contaminants and management in compost.

2.6. Relationship with Past/Present Mitacs projects:

Is this project related to, or a continuation of, any past/present Mitacs projects? ☐ Yes ■ **No**

If **Yes**, provide specifics about the relationship(s), including relevant project IT#(s). If the current project is a continuation of prior work, briefly describe how it meaningfully furthers what has been previously achieved.

2.7. Benefit to Canada (if applicable):

If the proposed research will involve (1) a partner organization located outside of Canada, (2) a partner organization that is a Canadian subsidiary or branch office of an organization headquartered outside of Canada, or (3) a collaborator from an organization (academic, industrial, government, or non-profit) located outside of Canada, describe the expected societal / economic benefits to Canada from this project.

Not Applicable

2.8. References:

Please cite academic references listed in this proposal.

1. Ali, S. S., Elsamahy, T., Koutra, E., Kornaros, M., El-Sheekh, M., Abdelkarim, E. A., & Sun, J. (2021). Degradation of conventional plastic wastes in the environment: A review on current status of knowledge and future perspectives of disposal. Science of The Total Environment, 771, 144719.https://pubmed.ncbi.nlm.nih.gov/33548729/

2. Anand, U., Dey, S., Bontempi, E., Ducoli, S., Vethaak, A. D., Dey, A., & Federici, S. (2023). Biotechnological methods to remove microplastics: A review. Environmental Chemistry Letters, 21(3), 1787–1810.https://pubmed.ncbi.nlm.nih.gov/36785620/

3. Arauji, FC., Nolasco, MM., Ribeiro, MPA., Riberiro-Carlo, PAJ. (2018). Identification of microplastics using Raman spectroscopy: Latest development and future prospects. ScienceDirect, 142, 426-440. https://www.sciencedirect.com/science/article/abs/pii/S0043135418304421#preview-section-abstract.

4. Bolea-Fernandez, E., Rua-Ibzar, A., Velimirovic, M., Tirez., Vanhaecke. (2019). Detection of microplastics using inductively coupled plasma-mass spectrometry (ICP-MS) operated in single-event mode. *Royal Society of* Community Climate Action Plan.(2021). *City of Kamloops*. https://www.kamloops.ca/sites/default/files/docs/cityofkamloops_communityclimateactionplan_june2021_final_0. pdf

5. Cottom, J. W., Cook, E., & Velis, C. A. (2024). A local-to-global emissions inventory of macroplastic pollution. Nature, 633, 101–108. https://www.nature.com/articles/s41586-024-07758-6

6. Emma Trotta, Elliot Andrew, Anusha Venkataraman, *Naowarat Cheeptham (2024) Exploratory Investigation of Microplastic Detection in Municipal Organic Waste. Canadian Undergraduate Physics Conference (CUPC), The University of British Columbia UBC campus, October 24-27, 2024.

7. Emma Trotta, Lisa Forth, and Naowarat Cheeptham (2024) Amicrobial perspective on cardboard waste reduction through vermicompost. The 73rd Annual Conference of the Canadian Society of Microbiologists (CSM). The Western University of Ontario. June 23 to 26, 2024.

8. Emma Trotta, Lisa Forth, and Naowarat Cheeptham (2024) Amicrobial perspective on cardboard waste reduction through vermicompost. SUPER (Science Undergrad Poster Exhibition of Research) Conference. TRU Kamloops campus, Kamloops. April 4, 2024.

9. Engelhardt, H., Grosche, O. (2000). New Developments in Polymer Analytics. *Journal of Chromatography*. 150, 189-217.

10. Konde, S., Ornik, J., Prume, JA., Taiber, J., Koch, M. (2020). Exploring the potential of photoluminescent spectroscopy in combination with Nile Red Staining for microplastic detection. *Marine Pollution Bulletin*. 159:111475. https://www.sciencedirect.com/science/article/abs/pii/S0025326X20305932.

11. Lead, J. R., Batley, G. E., Alvarez, P. J. J., Croteau, M.-N., Handy, R. D., McLaughlin, M. J., Judy, J. D., & Schirmer, K. (2018). Nanomaterials in the environment: Behavior, fate, bioavailability, and effects—An updated review. Environmental Toxicology and Chemistry, 37(8), 2029–2063. https://setac.onlinelibrary.wiley.com/doi/10.1002/etc.4147.

12. Maes, T., Jessop, R., Wellner, N. *et al.* (2017) A rapid-screening approach to detect and quantify microplastics based on fluorescent tagging with Nile Red. *Sci Rep,* 7, 44501. https://www.nature.com/articles/srep44501.

13. McEwen, C. N.,Jackson, C., Lasren, B. L. (1997). Instrumental effects in the analysis of polymers of wide polydispersity by MALDI mass spectrometry. *Science Direct,* 160(1-3), 387-394. https://www.sciencedirect.com/science/article/pii/S0168117696045016.

14. Meyers, N., Caraeino, AI., Delcercq, AM., et al. (2022). Microplastics detection and identification. By Nile red staining: Towards a semi-automated, cost- and time- effective technique. Science of The Total Environment, 823:153441. https://www.sciencedirect.com/science/article/pii/S0048969722005332.

15. Nava, V., Frezzotti, ML., Leoni, B. (2021). Raman Spectroscopy for the Analysis of Microplastics in Aquatic Systems. *Applied Spectroscopy*, 75(11): 1341-1357. https://www.sciencedirect.com/science/article/abs/pii/S0025326X20305932.

16. Sun, Y., Ren, X., Rene, E. R., Wang, Z., Zhou, L., Zhang, Z., & Wang, Q. (2021). The degradation performance of different microplastics and their effect on microbial community during composting process. Bioresource Technology, 332, 125133. https://doi.org/10.1016/j.biortech.2021.125133.

17. Jadaun, J. S., Bansal, S., Sonthalia, A., Rai, A. K., & Singh, S. P. (2022). Biodegradation of plastics for sustainable environment. Bioresource Technology, 347, 126697. https://pubmed.ncbi.nlm.nih.gov/35026422/.

18. Pfohl, P., Wagner, M., Meyer, L., Domercq, P., Praetorius, A., Hüffer, T., Hofmann, T., & Wohlleben, W. (2022). Environmental degradation of microplastics: How to measure fragmentation rates to secondary micro- and nanoplastic fragments and dissociation into dissolved organics. Environmental Science & Technology,

56(16),https://pubs.acs.org/doi/10.1021/acs.est.2c01228.

19. Scopetani, C., Chelazzi, D., Cincinelli, A., Martellini, T., Leinio, V., Pellinen, J. (2022). Hazardous contaminants in plastics contained in compost and agricultural soil. *Science Direct.* 293. https://www.sciencedirect.com/science/article/pii/S0045653522001382.

3. Declarations

3.1	**Will the intern conduct any of the proposed research activities outside of the academic institution or partner premises?**	**No**
3.2	**Does the proposed research involve the following?**	
ai.	Human participants whose data, or responses to interventions, stimuli, or questions by the researcher, are relevant to answering the research question?	No
aii.	Secondary use of human data or health information (even if anonymized)?	No
bi.	Human biological materials, as well as human embryos, fetuses, fetal tissue, reproductive materials, and stem cells? This applies to materials derived from living and deceased individuals	No
bii.	Secondary use of biological materials (even if anonymized)?	No
3.3	**Will the proposed research require the use of laboratory animals, and/or potentially impact the well-being of wild/domesticated animals?**	**No**
3.4	**Will the proposed research require the interns to handle or be exposed to biohazards?**	**No**
	Biohazards (e.g., viruses, bacteria, fungi, parasites, toxins, prions, zoonotic pathogens, recombinant DNA, genetically modified organisms, viral vectors, synthetic organisms, cell lines/cultures)	No
	Radioactive materials	No
	Restricted substances (e.g., cannabis)	No
	Other:	No
3.5	**Will the project involve the use of personal data or large datasets that could be considered sensitive (for additional information, see List 2 of Annex A of the National Security Guidelines for Research Partnerships)?**	**No**
3.6	**Will the project involve research related to critical minerals and/or one of the critical infrastructure sectors?**	**No**
3.7	**Will the project involve research related to goods or technology that are included on the Export Control List (ECL) of the Export and Import Permits Act (EIPA)?**	**No**
3.8	**Will background intellectual property (IP) be transferred from Canadian institution(s) to the partner organization(s)?**	**No**
3.9	**Will intellectual property (IP) arising from the project be owned by, assigned to, or licensed to the partner organization(s)?**	**No**
3.10	**Does the project aim to advance any of the listed Sensitive Technology Research Areas (STRAs)?**	**No**

3.11	**Have any academic supervisors declared a Conflict of Interest (COI)* as part of this application?**	**No**
3.12	**Have any interns declared a Conflict of Interest (COI)* as part of this application?**	**No**

4. Suggested Reviewers

Language of reviewers comments:	EN			
First Name	**Last Name**	**Email**	**Academic Institution**	**Department**
Carolyn	Ren	c3ren@uwaterloo.ca	University of Waterloo	Faculty of Engineering, Dept.of Mechanical and Mechatronics Engineering
Juewen	Liu	liujw@uwaterloo.ca	University of Waterloo	Faculty of Science, Dept. of Chemistry
Paolo	Mussone	mussone@ualberta.ca	University of Alberta	VPRI Research Development and Success
Roberto	Rosal	roberto.rosal@uah.es	University of Alcalá, Spain	Department of Analytical Chemistry, Physical Chemistry and Chemical Engineering
Sandhya	Babel	sandhya@siit.tu.ac.th	Thammasat University, Thailand	School of Biochemical Engineering and Technology, Sirindhorn International Institute of Technology
Eric	Roy	eric.roy.1@uvm.edu	The University of Vermont	Rubenstein School of Environment and Natural Resources

Reviewers not to be contacted by Mitacs due to potential conflict of interest:

5. Funds Allocation and Internship Details

Project Budget Summary	
Total Award	**$15,000.00**
Stipend	**$10,000.00**
Research Expenses	**$5,000.00**
Partner(s) Contribution	**$7,500.00**
Mitacs Contribution	**$7,500.00**
Number of Interns	**1**
Number of IUs	**1**
Earliest Start Date	**2025-02-01**

Intern Summmary				
Intern Name	**Intern degree**	**Total Internships**	**Estimated Start Date**	**Estimated End Date**
Emma Trotta	Undergraduate student	1	2025-02-01	2025-07-31

Project Budget Details	
Intern Full Name	**Emma Trotta**
Intern Degree	Undergraduate student
Lead Academic Supervisor	Naowarat Cheeptham
Academic Co-supervisor	Anusha Venkataraman , Kingsley Donkor
Academic Institution Name	Thompson Rivers University
Number of Internship units (IUs)	1
Internship Length (months)	6
Estimated Start Date	2025-02-01
Estimated End Date	2025-07-31
Internship Type	$15,000 Standard Award
Stipend (per/IU)	$10,000.00
Total Stipend	$10,000.00
Research Expenses (per/IU)	$5,000.00
Total Research Expenses	$5,000.00
Total Award (per/IU)	$15,000.00
City of Kamloops (per/IU)	$7,500.00
Total Partner Contribution (per/IU)	$7,500.00
City of Kamloops Total Contribution	$7,500.00
Total Partner Contribution	$7,500.00
Total Award (incl. Mitacs provided funds)	**$15,000.00**
Notes (Please provide details if there will be gaps in internships, if the top-ups amounts differ for each internship unit, etc)	

6. Application Participant Details

6.1 Interns

Note all related CVs and COIs will be found in section 6.4 and sorted by Intern's last name

Name:	**Emma Trotta**		
Academic Institution:	Thompson Rivers University	**Department:**	Faculty of Science
Email:	eltrotta7@gmail.com	**Phone:**	7782577815
Degree program during internship:	Bachelor's	**Grad Date:**	2026-04-30
*Are you currently affiliated with, or in receipt of funding or in-kind support from any of the listed Named Research Organizations (NROs)?			No
*** Partner Organization: City of Kamloops**			
*Do you have any current or previous relationships, ownership, influence, positions (whether salaried or not) or circumstances with the partner organization or other program participants that could contribute to a conflict of interest, or to the appearance of a conflict of interest? Please refer to the Mitacs Conflict of Interest Policy here.			No
*Have you disclosed a Conflict of Interest pertaining to this Mitacs application to your academic institution in accordance with your academic institution's Conflict of Interest policies?			No
Internship Schedule			
Start and end date: 2025-02-01 – 2025-07-31		**Occurrence**	**Amount**
		1	$15,000.00

6.2 Academic Supervisors

Note all related CVs and COIs will be found in section 6.4 and sorted by last name

Name:	**Naowarat Cheeptham**		
Academic Insitution:	Thompson Rivers University	**Department:**	Biological Sciences
Email:	ncheeptham@tru.ca	**Phone:**	2503715891, ext. 5891
*****Are you currently affiliated with, or in receipt of funding or in-kind support from any of the listed Named Research Organizations (NROs)?			No
*** Partner Organization: City of Kamloops**			
*Do you have any current or previous relationships, ownership, influence, positions (whether salaried or not) or circumstances with the partner organization or other program participants that could contribute to a conflict of interest, or to the appearance of a conflict of interest? Please refer to the Mitacs Conflict of Interest Policy here.			No
*Have you disclosed a Conflict of Interest pertaining to this Mitacs application to your academic institution in accordance with your academic institution's Conflict of Interest policies?			No
Name:	**Anusha Venkataraman**		
Academic Insitution:	Thompson Rivers University	**Department:**	Faculty of Science
Email:	avenkataraman@tru.ca	**Phone:**	2508132545
*****Are you currently affiliated with, or in receipt of funding or in-kind support from any of the listed Named Research Organizations (NROs)?			No
*** Partner Organization: City of Kamloops**			
*Do you have any current or previous relationships, ownership, influence, positions (whether salaried or not) or circumstances with the partner organization or other program participants that could contribute to a conflict of interest, or to the appearance of a conflict of interest? Please refer to the Mitacs Conflict of Interest Policy here.			No
*Have you disclosed a Conflict of Interest pertaining to this Mitacs application to your academic institution in accordance with your academic institution's Conflict of Interest policies?			No
Name:	**Kingsley Donkor**		
Academic Insitution:	Thompson Rivers University	**Department:**	Chemistry
Email:	smartgemini26@gmail.com	**Phone:**	2508285406
*****Are you currently affiliated with, or in receipt of funding or in-kind support from any of the listed Named Research Organizations (NROs)?			No
*** Partner Organization: City of Kamloops**			
*Do you have any current or previous relationships, ownership, influence, positions (whether salaried or not) or circumstances with the partner organization or other program participants that could contribute to a conflict of interest, or to the appearance of a conflict of interest? Please refer to the Mitacs Conflict of Interest Policy here.			No
*Have you disclosed a Conflict of Interest pertaining to this Mitacs application to your academic			No

institution’s Conflict of Interest policies?	

6.3 Partner Organization

(Sorted by last name)

Legal business name:	**City of Kamloops**		
Operating name:	City of Kamloops		
Date of incorporation:	1893-07-01	**NAICS Code:**	913
Address:	7 Victoria Street West, Kamloops, BC V2V 2C6, Canada		
Website:	www.kamloops.ca		
Partner size:	500-999		
Partner size in Canada:	500-999		
Is your organization a parent company?	No		
Is your organization a subsidiary?	No		
Does the organization have an R&D department in Canada?	No	**Is R&D conducted on the organization's premise in Canada?**	Yes
Is this the first time the partner has collaborated with the academic institution?	No		
Legal Status:	Municipality		
Funding Amount:	$7,500.00		
Name:	Glen Cheetham		
Email:	gcheetham@kamloops.ca	**Phone:**	2508283857
Title/Position:	Climate and Sustainability Manager	**Department:**	Development, Engineering and Sustainability
Have the funds committed by the Organizations identified in this application been leveraged against other federal or provincial programs?			No
Will Company/Organization transfer funds directly to MITACS?			Yes
Invoicing Requirements:	Please email directly to Crystal Gelineau for processing.		
Invoicing Contact from Partner Organization			
Name:	Crystal Gelineau		
Email:	cgelineau@kamloops.ca	**Phone:**	2508283494
Address:	7 Victoria Street West, Kamloops, BC V2V 2C6, Canada		
Payments should be:	Every 4 months		
Net Invoice Term:	30 days		
Legal business name:	**City of Kamloops**		
Operating name:	City of Kamloops		
Date of incorporation:	1893-07-01	**NAICS Code:**	913

Address:	7 Victoria Street West, Kamloops, BC V2V 2C6, Canada		
Website:	www.kamloops.ca		
Partner size:	500-999		
Partner size in Canada:	500-999		
Is your organization a parent company?	No		
Is your organization a subsidiary?	No		
Does the organization have an R&D department in Canada?	No	**Is R&D conducted on the organization's premise in Canada?**	Yes
Is this the first time the partner has collaborated with the academic institution?	No		
Legal Status:	Municipality		
Funding Amount:	$7,500.00		
Name:	Sarah Candido		
Email:	scandido@kamloops.ca	**Phone:**	2508283312
Title/Position:	Indigenous and External Relations Man	**Department:**	Administration, Indigenous and External Relations
Have the funds committed by the Organizations identified in this application been leveraged against other federal or provincial programs?			No
Will Company/Organization transfer funds directly to MITACS?			Yes
Invoicing Requirements:	Please email directly to Crystal Gelineau for processing.		
Invoicing Contact from Partner Organization			
Name:	Crystal Gelineau		
Email:	cgelineau@kamloops.ca	**Phone:**	2508283494
Address:	7 Victoria Street West, Kamloops, BC V2V 2C6, Canada		
Payments should be:	Every 4 months		
Net Invoice Term:	30 days		

6.4 CVs and COI

See attachments on the following pages

Emma Trotta

emma.trotta7@gmail.com
778-257-7815
Kamloops, BC

Education:

Thompson Rivers University - 2021-Present

Bachelor of Science (Cellular Molecular Microbial Biology)

- Currently a third year undergraduate student
- Dean's List (2021, 2022, 2023,2024)
- TRU Leadership Entrance Scholarship

Research Experience:

Thompson Rivers University

- Undergraduate Research Apprenticeship (Fall 2023-Winter 2024)
- Directed Studies (Winter 2024)
- Undergraduate Research Experience Award Program (Summer 2024)
- Cave Microbiology Lab
- ICP-MS training
- Scanning electron microscope training
- City of Kamloops composting project

Volunteer Experience:

Microbiology Outreach Foundation- 2024

- Helped start up our own non-profit organization
- Our goal is to teach and inspire high school students in rural communities about the field of microbiology
- I have planned teaching session for the students and helped organize the logistics of the event

motionbal TRU- 2024

- Coordinated sponsorships in support of the special Olympics
- Organized a day of sport to connect Special Olympics athletes, undergraduate students and community partners

Science World- 2022/2023

- Assisted in teaching grade 11 student from South Kamloops Secondary School and Sun Peaks Secondary School in microbiology lab techniques
- Helped organize and set up experiment

Kamloops Immigrant Services Youth Outreach Program- 2024

- Created an outline and theme of activities to be taught at both the elementary and highschool level relating to the “One Health Concept” in microbiology
- Assisted in laboratory, classroom and field experiments
- Gave lectures to highschool students regarding key topics in microbiology

Sd73 Heritage Fair Judge- 2023

- Gave constructive criticisms on elementary student heritage research projects

7. MOU and Intern Consent

7.1 Mitacs Accelerate Memorandum

The participants listed below confirm that the information presented accurately reflects their intention to apply to the Mitacs Accelerate program. The participants have also agreed to set in place an internship based upon the attached proposal. The participants acknowledge that they have read, understood and agreed to abide by and uphold the Project Responsibilities applicable to each of them, available for reference at http://www.mitacs.ca/en/programs/accelerate/project-responsibilities which include and are not limited to the following: it is understood that the partner organization contribution shall be provided to Mitacs Inc. in Canadian dollars prior to commencement of the internship; in the event that the sponsor organization funds are at the academic institution, the academic institution shall forward these funds to Mitacs. Upon research approval and the receipt of the partner funds at Mitacs, Mitacs shall forward the funds to the Canadian academic institution as a research grant to the Canadian supervising professor, and the internship stipend/salary will be paid to the student by the academic institution from the grant. Costs associated with this proposal as outlined in the budget can only be incurred after research approval of the proposal and the receipt of the partner funds at Mitacs.

Mitacs is unable to assume liability for any losses including—but not limited to—accidents, illness, travel, or other losses that may occur during the internship period. All undersigned parties agree that they are responsible for ensuring that they have appropriate insurance and meet any institutional policies regarding health, safety, and travel preparation requirements. All parties also agree that the intern will provide Mitacs with a final report and that all participants will complete an exit survey within one month of project completion.

For projects involving international travel: In acknowledging that international exposure can greatly enhance an intern's learning and experience, Mitacs will approve international travel provided that participation does not impact the safety and security of the intern and meets the policies outlined by the home academic institution. By signing this memorandum, you are acknowledging that the home academic institution agrees to assist the intern in meeting all academic institution requirements pertaining to research abroad and that the intern understands that he/she is responsible for obtaining insurance appropriate for the travel destination. Participants in projects involving international travel acknowledge that additional project responsibilities apply to each of them, available for reference at https://www.mitacs.ca/en/programs/accelerate/mitacs-accelerate-international. Participants in projects involving international travel also acknowledge that the internship cannot begin and funds cannot be released until Mitacs receives the signed International Pre-Departure Form and Code of Conduct and Ethics forms.

All parties involved with Mitacs Accelerate are bound by the standard intellectual property (IP) terms of the academic institution where the intern is enrolled; except where intellectual property is covered by separate agreements to which the academic institution(s) and the sponsor organization are parties and that are active during the dates of the internship. By signing this memorandum, if you have separate agreements covering IP between you and the academic institution, you are acknowledging that you are bound by their specific terms and conditions. Otherwise, if you don't have separate agreements, you are bound by the standard intellectual property terms of the academic institution, and by signing this memorandum you agree to the terms of the academic institution where the intern is enrolled. Institution-specific IP policies regarding Accelerate internships can be found at https://www.mitacs.ca/en/programs/accelerate/faq.

The participants also agree that Mitacs will post the title of the project, the public project overview, the name of the partner(s) organization(s), the name of the intern(s), the name of supervisor(s) and the involved academic institution on www.mitacs.ca/en/projects and may be used by Mitacs to publicize Mitacs Accelerate. Mitacs Privacy Policy can be found at www.mitacs.ca/en/privacy-policy.

Mitacs does not require, inspect, or enforce any additional terms as outlined by participants beyond this memorandum.

If there are any addendums required by Internship participants (intern, supervising professor, and partner) please contact your Business Development representative contact to attach this with your submission

7.2 Intern Consent Form

USE AND DISCLOSURE OF PERSONAL INFORMATION PROVIDED TO MITACS

1. All personal information collected is subject to privacy legislation and Mitacs Privacy Policy for Program Participants. For a description of Mitacs' commitment to protect the personal information provided by program applicants, please see www.mitacs.ca/en/privacy-policy .

2. All the information supplied in this application will be made available to Mitacs staff responsible for managing the application, for activities including identifying appropriate peer reviewers, administering and monitoring awards, compiling statistics, and evaluating the program.

3. Information supplied in this application will be made available to internal and/or external reviewers, being composed of experts recruited from the academic, public and private sectors. All reviewers are required to commit to keep the application information confidential.

4. Contact information in this application may be used by Mitacs staff to contact you in future for:
a. Invitations to be profiled in stories or news items, to speak at or attend events, to provide a spotlight story and/or blog post;
b. Communications about opportunities for Mitacs alumni; and
c. Research surveys for Mitacs alumni. You will have the opportunity to unsubscribe from emails sent to you, once all commitments regarding the internship that is the subject of this application are complete.

5. Your name, academic institution and department, and the title of your project may be provided to the federal, provincial and academic institution funders of the program, to:
a. Enable Mitacs to report on funding contract commitments; and
b. Allow the funders to evaluate the program.
Note that all Canadian provincial and federal governments, and academic institutions, are bound by privacy legislation and are therefore bound to keep your personal information confidential.
Additional information, such as passport numbers and dates of birth, may be provided to the international funders of the program (if applicable), for adjudication and reporting purposes.

6. Your name, contact information, and other personal information as required may be provided to the academic institution(s) participating in the internship to enable the academic institution(s)to manage the award, to sign off on the pre-departure form (if applicable),and for reporting purposes.

8. Sign-off Status

8.1 Intern (approvals below also indicate acceptance of the MOU and Consent as seen in section 7 of the report)

Name	Status	Date/time	Sign-off Notes
Emma Trotta	Completed Sign-off	2024-11-30	

8.2 Academic Supervisors

Name	Status	Date/time	Sign-off Notes
Naowarat Cheeptham	Completed Sign-off	2024-11-29	
Anusha Venkataraman	Completed Sign-off	2024-11-30	
Kingsley Donkor	Completed Sign-off	2024-11-29	

8.3 Partner Organization

Name	Status	Date/time	Sign-off Notes
Glen Cheetham	Completed Sign-off	2024-12-02	
Sarah Candido	Completed Sign-off	2024-12-02	

8.4 Office of Research Services Approval Template

Project: Possible Methods for Detection and Removal of Microplastics Contamination in Municipal Compost 2024-11-19

Personnel from each participating university belonging to the Office of Research Services (or equivalent) must review and approve this project.

Please print out this page for each university for which there is an academic supervisor on this project.

For example, if there are three supervisors from University of Toronto and one from UBC then we need to print one sign off page for University of Toronto and one for UBC.

The professor responsible to execute this project must collect all these signatures, scan each signed page and upload them to the ORS section of the Mitacs RAP submission page. **Only upload this signature page please.**

Thompson Rivers University	Dr. Shannon Wagner Vice-President Research
(Print the name of the University above)	**(Print the name of the ORS reviewer or equivalent)**
DocuSigned by: Shannon Wagner F28811EFFBB94B6...	2024-12-03
(Signature here with heavy ink pen as this will be scanned)	**(Print the date of the signature above)**