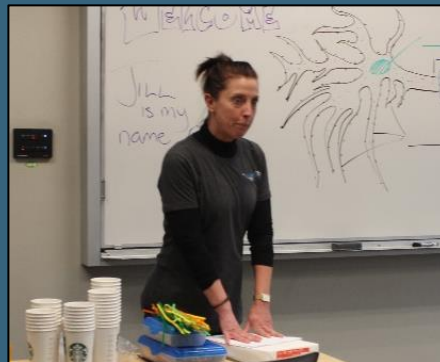


### Inclusion



### Collaboration



### Innovation

**PROGRESS REPORT**



**2021-2023**

NSERC CWSE BC and YUKON REGION

Dr. Jennifer Jakobi  
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## OVERVIEW OF REACH

WWEST has travelled ~16,000 km/year across BC and into the Yukon via automobile, airplane, ferry and water taxi. Our reach quantitatively exceeds 275,000 persons, and our qualitative feedback is overwhelmingly positive. The demand for WWEST programming has increased exponentially across the three themes:

	INCLUSION	COLLABORATION	INNOVATION
<b>Program and Event Highlights</b>	<b>September 1, 2021 - August 31, 2022</b>	<b>September 1, 2022 - *August 31, 2023</b>	<b>Total</b>
School Curricular	7,740	8,435	16,175
Science Odyssey	1,626	3,542	5,168
Camps	98	2,368	2,466
Events	2,595	1,774	4,369
Partner/Network Events	572	660	1,232
Social Media Impressions	77,281	168,956	246,237
		<b>Total Connections</b>	<b>275,647</b>

\*calculated to 31/7/2023 for reporting

“The students and I certainly enjoyed the 4 sessions in my classroom...students learn and remember activities like that even more because it was taught to them by an outside “expert” ... I am excited to use the ideas and make my own stem kits.”

“I would like to thank you for including us last week. I have been sitting with all the conversation we had for a week and there is still so much work to do. Thank you for moving the conversation forward.”

### What people are saying...

“The class had a wonderful time and I got a lot of great feedback from parents... their kid’s interests have definitely been peaked into pursuing applied sciences.”

“I learned how important it is to have these conversations... a critical awareness of the language we use in our day-to-day work has led to continued conversations about other words and phrases.”

“I would have like to clone myself so I could have had the opportunity to attend all sessions. Thank you so much for this amazing day. We had so much fun and left with very FULL brains! This was one of the BEST trips that I have been on in my 27-year teaching career. We were so grateful to be part of such a wonderful event!”





## HIGHLIGHTS OF THE CHAIR PROGRAM

The Westcoast Women in Engineering Science and Technology (WWEST) program, under the leadership of Dr. Jakobi was initiated in the fall of 2021. The name was maintained in the region to honour the longstanding history of the CWSE program in the BC and Yukon Region. The program **VISION** is to increase diversity, and grow a collaborative community through application of positive factors and forces, that excite women and underrepresented persons to pursue, and remain in STEM careers. With a goal to impact locally and influence nationally activities will advance local engagement, transformative learning, and research excellence around the three core themes of:

### INCLUSION

### COLLABORATION

### INNOVATION

**Inclusion:** *We conduct activities and lead that increase awareness and create opportunities for underrepresented persons to experience and learn about STEM. This pillar primarily focusses on learners and teachers. We have engaged 22,268 students, 1,717 teachers, 625 community members through STEM programs. Leading these programs, we have 5 high school students, 13 HQP, and 14 teacher candidates as part-time staff or volunteers. Our social media presence through Instagram, Facebook, Tiktok and the WWEST website have a reach of 246,237.*

Primary activities in this theme include the in-school Curriculum Program, Science Odyssey, and our STEM day camps for youth. We have built 40 unique hands-on lessons that are led in a four-session series in schools for K-12 learners. The program is active in 6 school districts, extends across BC and in local schools and communities surrounding Whitehorse. A primary focus of this academic year was advancing activities on Vancouver Island where we reached 768 learners and 26 teachers.

**Collaboration:** *This theme recognizes the need to partner to advance underrepresented persons in STEM. Activities have focused on Indigenous people, girls, and older adults. We have conducted hands-on STEM activities within 10 Indigenous communities, and hosted 17 events on campus to reduce barriers and increase perceived access to postsecondary programs for 538 Indigenous learners. We have also developed Intergenerational, middle-school girls, and gender diverse programs. 19 university students were supported to travel to STEM competitions or conferences. We partner with Indigenous organizations, school districts, science centres and for-and not-for-profit organizations.*

With campus partners we lead Indigenous STEAM Day, UBCO STEM Engagement Day, and Math to Power Her Life. Community partnerships facilitate many events and Intergenerational outreach. We aim to elevate understanding of the NSERC CWSE and WWEST programs, and increase awareness of diverse STEM fields for family and community to support underrepresented persons to explore and consider STEM as career paths.

**Innovation:** *Within the Outreach strategy the goal is to empower individuals within STEM industries and academia to develop activities that instill deep understanding of the benefits of diverse and inclusive learning and working environments. We have led 226 events and workshops to elevate women and underrepresented persons in STEM fields. In these activities we have engaged 5601 people, published 1 paper (2nd under revision), made 6 invited presentations, produce quarterly teacher newsletter resources, and supported 2 full-time and 2 HQP. Within this theme we also include online reach of Podcasts and Thursday Thoughts which have 1181 downloads and 45,304 views, respectively.*

Primary activities include the Deconstructing Whitepaper project (project initiated from the BC/Yukon CWSE and is being led on behalf of CWSE Network), research on the in-school Curriculum Program, and database development for Women’s Consulting Engineers, and professional development workshops.

## PROGRESS TO DATE

**Objectives of Inclusion:** Excellence in innovation and discovery depends upon diverse perspectives and equitable opportunities and approaches. A core commitment of the CWSE is fostering paths to access STEM experiences, education and careers through activities at UBCO (Objectives 1 and 2) and within the community through family and teachers (Objective 3).

### Contributions and Successes:

#### Youth Camps:

Youth camps are held throughout the year, either as day camps, or week-long camps to spark curiosity and excite youth aged 5-12 years in STEM related learning and activities. **Outcome Success:** Since 2022, we have grown our camps from

spring and summer with a maximum enrollment of 30 youth in one location, to an additional location for up to 60 youth in both sites for six weeks. Two, week-long winter camps, and a second week of spring camps are also offered. Staff have increased from 3 to 10 for the 2023 summer camps.

#### Intergenerational STEM:

An initiative grounded on literature which indicates family supports are key to increasing diversity in STEM. We aim to break down barriers to exploring and learning STEM across all ages. This program creates shared hands-on learning opportunities for

youth, parents/caregivers, and grandparents.

#### Outcome Success:

In the spring of 2023, events for adults and older adults were implemented in 2 locations as a pilot and directed at increasing accessibility, and STEM knowledge in a safe and non-judgmental learning environment. The initiative recognizes family influences, and the rapid advances of technology. The feedback and requests to return (monthly), will drive future planning and budgeting in an attempt to accommodate persons of low socioeconomic status, English as a second language, and other unique ongoing requests. Initiatives will align with publicly recognized days (such as Dads and Daughters in STEM).

#### Collaborations:

We have active partners at UBCO (9), with provincial and territorial businesses (5), educational organizations (7), Indigenous communities (4), not-for-profits (5).

*“We had high engagement from our families who attended (over 100 attendees), the activities truly were appropriate and enriching for all ages, and there were big smiles all around! The self-guided stations had clear instructions which made it easy for families to interact with all the materials and learning outcomes at each station. Families were talking about this event (and especially the Ozobots!) for weeks afterwards.” ~Balsam School*





## PROGRESS TO DATE

**Objectives of Collaboration:** The original application identified that this theme recognizes the need for cultivated, coordinated and engaged partners for meaningful positive impact for girls, women and underrepresented persons. We are achieving this goal through our 20 partners engaged across BC and the Yukon to achieve Objectives 4 and 5 of the initial application. Our priority was to reach rural and remote regions and identifying locations for WWEST hubs. In 2023-24 we hope to have hubs in Prince George and Vancouver Island and we continue to actively work on developing hubs for in the Kootenays and Whitehorse.

### Contributions and successes:

#### Indigenous Program and Services (IPS) STEM Mentorship and Outreach Events:

- Formalized strong collaborations with Indigenous Program and Services (IPS) at UBCO. With a co-developed and funded grant (\$92,410), we have built relations with University of Northern British Columbia (UNBC) to expand the Indigenous Leaders Program to their institution.
- Open to all self-identified Indigenous students interested in gaining professional and mentorship skills. Indigenous HQP receive training, resources, and travel costs to home communities or local schools to lead STEM outreach.
- Actively hosted Indigenous student events at UBCO.
- Travelled to remote and rural Indigenous communities on Vancouver Island and the Yukon to deliver hands-on STEM and Intergenerational experiences.



**Outcome success:** Have engaged ~3000 Indigenous persons. With IPS we have reached 284 students across 7 events, and sponsored a Disney/Pixar Indigenous animator workshop for high school youth.

#### Math to Power her Life Event:

- A collaboration that developed from the BIRS network event. WWEST supported Dr. Jane MacDonald (Postdoctoral fellow at Simon Fraser University) to design activities. We planned the event and recruited student volunteers to lead the girls and self-identified gender diverse attendees.

*“The day was amazing. I would not change anything about it.”*

*“The day could be longer because it was so much fun.”*

*“I really loved the entire day! Thank you!”*

*“Thank you very much for helping me feel comfortable being there.”*

**Outcome success:** Registration filled in one day for 56 attendees. We fostered a community for girls and women within mathematics to feel welcomed and valued. Survey data and feedback suggest that there is high demand for repeat events and additional activities.

#### Collaborations - UBCO STEM; STEAM Ecosystems BC, Yukon University:

- We have built a network to exchange ideas, and resources that support STEM outreach and advocacy activities. The inward goal is to ensure that resources and processes are shared to; 1) enhance efficiencies, and 2) support broad connections across the region.
- **Outcome successes:** Events have engaged ~800 students and teachers on campus with 22 University groups contributing. In 2023, 7 individual schools/groups requested STEM days, which we accommodated, organized and facilitated. We are already fielding requests for 2023-2024. We have an established leadership role in the provincial STEAM Ecosystem (R McCullough, WWEST Manager member of board) comprised of School Boards, Science Centres, private and public tech organizations, Library systems, etc. To ensure reach across the province we train facilitators and share resources.



### PROGRESS TO DATE

**Objectives of Innovation:** The objective of this theme is to focus on positive social, cultural and personal experiences that contribute to the choices made by girls, women, and underrepresented persons to pursue and remain in STEM fields (Objective 6).

**Contributions and successes:** Evidence informed programs were developed, with ongoing evaluation of these programs. Through workshops, social media and the ‘Renaming Whitepaper’ project environments that are free of obtrusive and abusive language and inclusive of equitable and diverse opportunities are being fostered and supported.

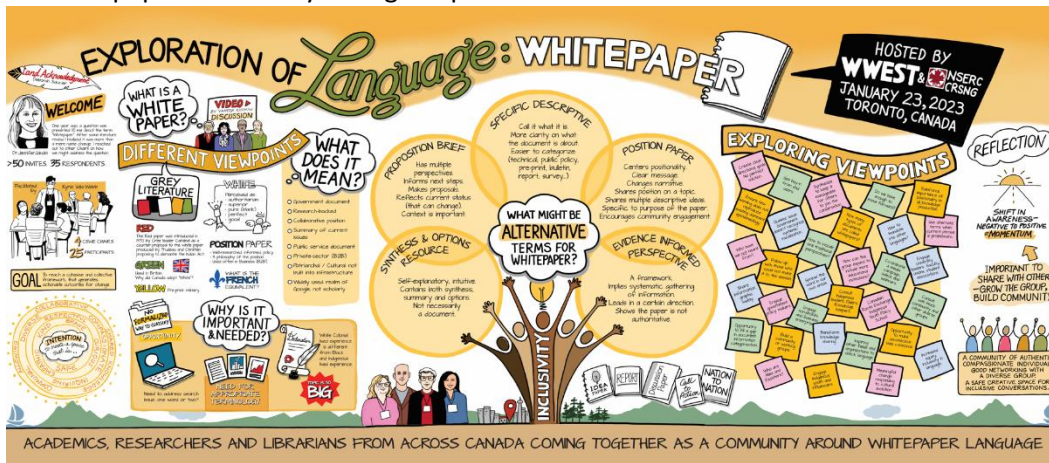
#### WWEST STEM Curriculum Supports Program:

We are evaluating teacher’s perspectives of how STEM outreach experiences contribute to their confidence and enjoyment of teaching STEM. We explored the positive aspects of what helps educators succeed in their professional practice. The completed survey and focus group data are currently being analyzed. Preliminary findings presented at professional development workshops.

- Workshops: COTA 09 2022; 09 2023 (scheduled) and Innovate Ed 10 2023 (scheduled).
- Publication: Calkins C, Jakobi, JM, Cherkowski S, Trevor-Smith H (submitted April 2023). Positive Aspects of Sport for Fostering Strong STEM Identities. Frontiers in Education.

#### White papers:

“White paper” is used by a range of professionals to describe material made available to the public through non-



traditional publishing. WWEST led, in partnership with the CWSE Network a ‘think-tank’ with attendees from across Canada (academics, advocacy, government) to rename this racialized term. A paper is under review (University Affairs), and three working groups

(Library Science, Government and Academia, Business) were developed to action this work.

#### Mind Map, Allyship Workshop Series, Podcasts, Thursday Thoughts, STEM on the Streets:



With collaborators we are educating professionals on how to create equitable, diverse, and inclusive intersectional STEM learning and working environments. We co-hosted a 3-part series skill builder for men (14 men attended). Sessions identified

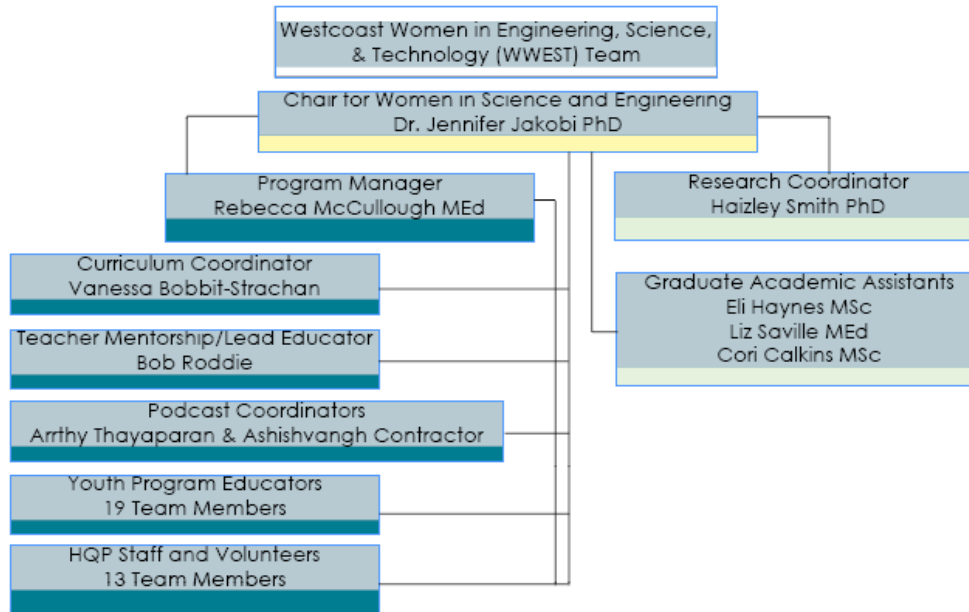
unique aspects and experiences that women and other underrepresented groups face in academia.

We built a searchable database of information for women and girls transitioning between secondary, postsecondary, and careers in STEM. We developed 17 podcasts and guests represent women, LGBTQ+, Indigenous, Black, and Immigrant persons with 10744 views/impressions since November 2021. We have Posted 72 Thursday Thoughts from an array of STEM women and underrepresented persons. Our TikTok videos are youth focused and capture perspective, and sometimes debunking misinformation.





**PROGRESS TO DATE: Current Team Members:**



**Expected Sustainability:**

Based on continued demand for WWEST programming, it is our goal to create hubs that will allow us to effectively and economically expand efficiently into more rural and remote communities across BC and the Yukon. This will provide stability and sustainability of CWSE resources as we develop, and provide region specific resources branded with WWEST. Partners who have committed or are in current talks include:

- Thompson Rivers University
- Kootenay Association for Science and Technology (KAST)
- University of Victoria
- University of Northern BC
- Yukon University
- Exploration Place
- Science World Vancouver
- School divisions across BC/Yukon

**Obstacles:**

With a vast geographical footprint, a challenge is the increasing cost of travel across the CWSE region. Most schools and communities need and desire in-person programming. For example, to send 4 staff members for a work-week to the Yukon cost ~\$18,000 (travel, accommodation, food, supplies, car rental, wages). Support in the form of a northern supplement for travel would help to off-set costs and allow travel to occur more than once a year, or to further distant communities in the north. Similarly, Vancouver Island costs totaled ~\$10,000 for 2 staff for 1 week. Having hubs will reduce these costs, however, travel costs will still exist to ensure training, staffing and oversight of high quality and CWSE goal-oriented programs. With travel reduced through hubs the above example costs would be reduced by 50-60%.

- Further obstacles include staffing to keep up with demand and access to space to host events. We are often charged a rental fee, or are limited to small classrooms.
- Balancing lab-based program of research with the demand for CWSE activities and research. A PDF and/or lab coordinator lessens the burden, yet the COVID-19 gap for in-person research continues to 'show' in trainee hands-on knowledge gap. There is a continuity gap created by 'living room' rather than 'lab-based' research work. The numerous reports and the cycle of these reports are also onerous. We welcome the opportunity to discuss with NSERC and UBCO a means to minimize reporting and establish similar time scales and metrics needed.



**PROPOSED ACTIONS**

**Expected Impact:**

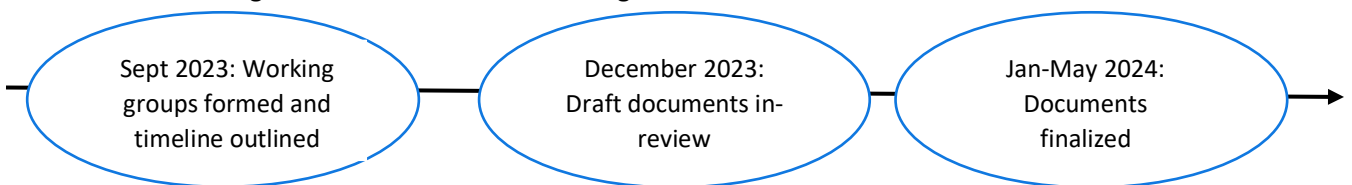
To maintain impact while increasing efficiencies we will revise and **STREAMLINE** the STEM Curriculum Supports program to focus more on teacher training and maintain the in-class program. This will be done with care, as our current program is in high demand. Priority focus will be placed on **COMPLETION** of research in the Innovation theme whereby publishing and presenting findings from the Curriculum Program with the ultimate aim of gaining a SSHRC grant to catapult this program of research to the next phase. We will **MAINTAIN** current UBCO STEM leadership events with attention being placed on finessing rather than expanding. These approaches should preserve quantitative metrics, as well as qualitative positive feedback with the intended outcome being increased efficiency and reduced staff and CWSE workload and financial strain. We will continue to work with the UBCO Development Office for increased funding through donors. WWEST wrote 8 grants in 2023 (40% success rate). This activity constrains research output and knowledge translation activities. We expect the curriculum program and intergenerational STEM events to have increased demand and will begin evaluating impact of these activities on changing the STEM learning and working environment.

**Timeline:**

<b>Aug. &amp; Sept. 2023</b> Curriculum Program focus on Teacher Mentorship Launch	<b>Nov 2023</b> UBCO STEM Day Indigenous STEM and Math to Power Her Days	<b>Dec 2023</b> Two hubs formalized Whitepapers published & reports in draft form	<b>Jan-Feb. 2024</b> Annual Yukon Outreach & Academic Advancement workshop
<b>Mar. 2024</b> Donor Secured Train staff in the HUBs White paper project complete	<b>May 2024</b> Science Odyssey Participation. Hiring for summer	<b>June-Aug 2024</b> Data collection Curriculum Project complete. Year-end evaluation. Summer programs	<b>Aug 2024</b> Preparation for 2024 programs

**Whitepapers:**

A CWSE Network activity initiated and led by WWEST. Following a successful workshop we have a submission to University Affairs and CAUT highlighting findings and promoting upcoming activities. Working groups are being formed with CWSE co-leads. Working groups will be supported by WWEST staff. The end-goal is to formally generate knowledge on racialized language and support the recommendations put-forth by TRC on decolonization. End-goal is a formalized name change.



**Research Activities:**

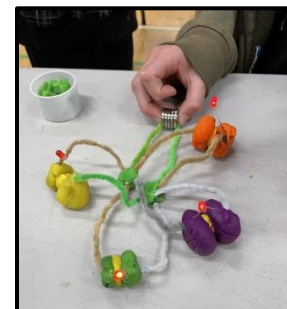
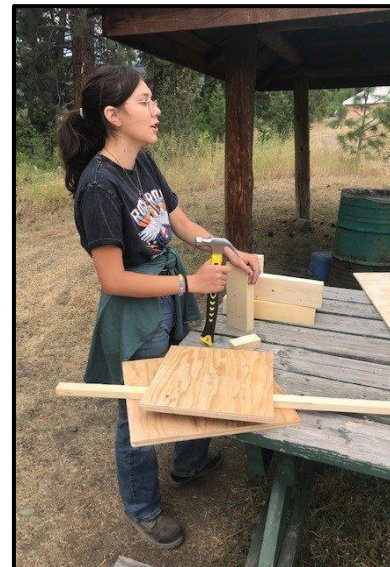
The first PDF within the CWSE position has secured a faculty position and recruitment for a replacement is underway. By intent I have decreased the number of HQP (n=9 to n=4) through graduation and reducing UG intake to ensure a quality trainee experience while balancing CWSE portfolio activities. COVID-19 research resumption at UBCO was not seamless and trickled well into this year, creating additional time-consuming activities e.g., re-establishing basic lab protocols that are not demonstrable through traditional metrics e.g., publications. There was time needed, akin to setting-up a lab, to get equipment and protocols reestablished and the space redesigned (lab moved 2 months prior to COVID shutdown). The focus will be taking recent studies to publication and knowledge translation activities.

**USE OF FUNDS**

Summary of Costs	Year 3	Year 4	Year 5
Staff Salaries (2@1.0FTE, 1@0.8FTE)	122,000	130,500	140,000
CWSE Transfer initiatives (Podcast; Associate Chair)	8,000	10,000	10,000
PDF for NSERC research program	45,000	45,000	45,000
<b>THEME: INCLUSION</b>			
UBCO STEM supports and small grant system (Obj 1)	2,500	2,500	2,500
Rural and Remote Outreach and Hubs (Obj 2)	20,000	23,000	23,000
Intergenerational STEM (Obj 3)	3,000	3,000	3,000
<b>THEME: COLLABORATION</b>			
Girls and 2SLGBTQI+ programs (Obj 4)	7,000	7,000	7,000
Allies Program (partner determines program continuation) (Obj 5)	20,000	Funding Dependent	
<b>THEME: INNOVATION</b>			
Maximizing Meaningful Contributions (Obj 6)	8,000	8,000	8,000
Research for STEM Change (Obj 7)	15,000	15,000	15,000
Media: Advertising events, paid promotion and new media equipment (camera and podcast equipment)	3,000	3,000	3,000
<b>Total Cash expenses</b>	<b>\$256,500</b>	<b>247,000</b>	<b>256,500</b>

**Confirmed Revenue**

FUNDING SOURCE	CASH	IN-KIND
NSERC	110,000	
NSERC PDF	25,000	
Westmar Advisors	10,000	
Aspire	10,000	
VPRI	10,000	
FHSD	15,000	11,522
IPS	20,000	
University PDF	20,000	
Youth Camps	36,500	
<b>Total</b>	<b>\$256,500</b>	





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