

about

seed2STEM



summer research program
for Indigenous youth

icord

International Collaboration on Repair Discoveries (ICORD) is an interdisciplinary spinal cord injury (SCI) research centre within the UBC Faculty of Medicine and Vancouver Coastal Health Research Institute (VCHRI). Our mission is to make spinal cord injury preventable, livable, and curable.

SBME & UBC

UBC's School of Biomedical Engineering (SBME), a partnership between the UBC Faculties of Applied Science and Medicine, is Canada's living laboratory for new models of convergent research and education.

Gynecologic Cancer Initiative

The Gynecologic Cancer Initiative provides excellence in research, advocacy and leadership by preventing, detecting, treating and helping gynecologic cancer patients and survivors.

Vancouver Coastal Health Research Institute

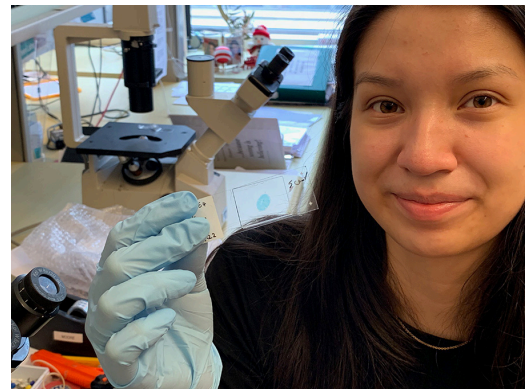
Vancouver Coastal Health Research Institute (VCHRI) is the research arm of Vancouver Coastal Health and a health partner of the UBC Faculty of Medicine.

STEM fields are critical in advancing health care and driving economic success in Canada, yet Indigenous representation in these skilled, well-paid positions remains disproportionately low.* seed2STEM, a summer research program for Indigenous high school students in Metro Vancouver and Kelowna, aims to increase Indigenous participation in STEM. Started within the International Collaboration on Repair Discoveries (ICORD) and with the support of the School of Biomedical Engineering (SBME), BC's Gynecologic Cancer Initiative, and Vancouver Coastal Health Research Institute (VCHRI), the program introduces Indigenous youth to STEM fields in a fun and supportive environment with paid placements to ease participation barriers.

In alignment with its long-term goal to increase Indigenous representation in health-related leadership, seed2STEM enhances accessibility to STEM careers for Indigenous youth. The program not only inspires and empowers Indigenous high school students to pursue STEM education/professions but also provides valuable opportunities for mentorship and leadership development. By offering paid placements, transit passes, and loaner laptops, seed2STEM works to reduce barriers to participation. Beyond reducing practical barriers, seed2STEM contributes to enhancing diversity in thought, knowledge, and mentorship approaches among current faculty and staff. The program actively fosters a culture of diversity and respect for Indigenous knowledge, values and perspectives in health research and education. By engaging current UBC students from diverse backgrounds, seed2STEM encourages early support for potential colleagues and promotes consideration of STEM-related career fields.

How it Works

In seed2STEM, university faculty invite Indigenous high school students from grades 9 to 12 for paid, six-week summer research internships on a variety of STEM topics. Students receive minimum wage for working 25 hours/week. In addition to their research projects, students in the program take part in weekly research-focused learning modules, learn from guest speakers (such as people living with spinal cord injury, STEM professionals and Indigenous community members), as well as visit local scientific and cultural places of interest on field trips. Alumni of the program who have gone on to undergraduate post-secondary studies are invited to return for four-month placements during which they can participate in research again and also act as mentors to new high school participants. Beyond this mentorship, the students are supervised by a diverse group of research faculty, staff, and graduate students, who in turn gain leadership, communication, and supervisory skills, and an understanding of some of the challenges facing Indigenous students in academia. On the final day of the seed2STEM program, students present their research at a symposium for the research community, friends, and family.



Since 2022, all program supervisors and host lab members have been encouraged to take the British Columbia Institute of Technology's online course on Indigenous Awareness, emphasizing foundational knowledge for reconciliation. As of 2023, we also offer tailored in-person training on cultural safety and strategies to support Indigenous high school students in a research environment in partnership with the Indigenous Initiatives team in the UBC Centre for Teaching and Learning Technology.

*Canadian GDP estimates attributable to Indigenous Peoples range from \$32 to \$49 billion. But according to the National Aboriginal Economic Development Board, if Indigenous Peoples' economic engagement equaled that of the population as a whole, that number would almost double. [<https://www.cpacanada.ca/en/news/pivot-magazine/indigenous-engagement>]. About 4 per cent of Canadian adults are Indigenous but comprise less than 2 per cent of workers in science, technology, engineering, and math occupations.



Some 2023 student projects included:

- Evaluation of muscle morphology following spinal cord injury (*clinical research*)
- Engineering a surrogate neck for use in creating improved safety features (*biomedical engineering*)
- FashionABLE: adaptive fashion for individuals with disabilities (*rehabilitation research*)
- Lower-limb exoskeletons in spinal cord injury research (*clinical/rehabilitation research*)
- Self-amplifying mRNA (*pre-clinical research*)
- Simulating cell movement and cargo transport (*math/biomedical engineering*)

seed2STEM is guided by an external advisory panel including former students of the program, a parent of a student, a board member of the Verna J. Kirkness Education Foundation, the Indigenous Peoples Liaison at Praxis Spinal Cord Institute, and an Indigenous Outreach Worker from Surrey School District. seed2STEM also works closely with Indigenous support and outreach workers in 10 school districts in the Lower Mainland and Kelowna, to support students before, during, and after their placements, and incorporate feedback from students and their parents in all the program planning for each following year.



Program Growth

2018: 1 student – the program started as a pilot with one Grade 10 student at UBC-Vancouver (UBC-V)

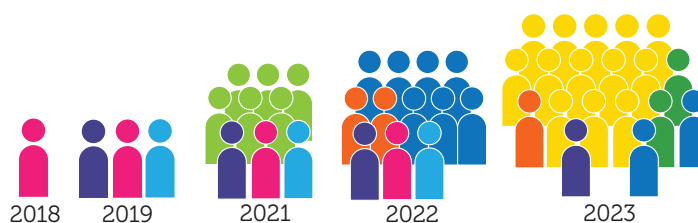
2019: 3 students - all at UBC-V (the student from 2018, along with two other Grade 11 students).

2020: Program cancelled due to the COVID-19 pandemic.

2021: 9 students - 3 of the 2021 group were returning summer students now in their first year of undergraduate studies, who were offered 3.5-month full-time placements at UBC-V. Some projects were offered virtually.

2022: 12 students - We expanded the program to UBC-Okanagan (UBC-O) in Kelowna, BC. 7 high school students were placed at UBC-O, while 5 students were placed at UBC-V (2 high school students, 3 returning 2nd year undergraduates). One returning undergraduate student who started in this program in 2019 supervised and mentored a summer high school student in 2022.

2023: 17 students - We hosted 13 students at UBC-V (11 new and 1 returning high school students, 1 returning undergraduate) and 4 students at UBC-O (3 high school students plus 1 returning undergraduate). Most students live within commuting distance of the UBC-V or UBC-O campuses, but in 2023, two students from rural communities participated. They were supported by their families, who arranged accommodation and supervision for their children in Kelowna and Vancouver.



Program Costs

High school students are paid \$2,515 for their 6-week term, which is the equivalent of 25 hours/week at minimum wage. They also receive transit passes for July and August, snacks, and some lunches.

These costs, along with seed2STEM program operating costs, are covered by: ICORD, UBC School of Biomedical Engineering, Stryker, Vancouver Coastal Health Research Institute, Gynecologic Cancer Initiative, UBC Faculty of Medicine, individual faculty members, and private donations.

Making a Difference for Indigenous Youth in STEM

Since its inception, the seed2STEM program has been making a positive impact for Indigenous youth. From developing transferable skills in research, communication, teamwork, and organization, to forming professional and supportive connections with undergraduate and graduate research students at UBC, participants are gaining valuable experiences through this meaningful program.

seed2STEM fosters a culture of inclusion and respect for Indigenous knowledge, values and perspectives in health and STEM research and education. Program participants are connected to resources such as support services for Indigenous students, academic guidance, career counselling, information about financial assistance, and social and cultural activities.

Following each summer term, we ask participants for feedback on their experience.

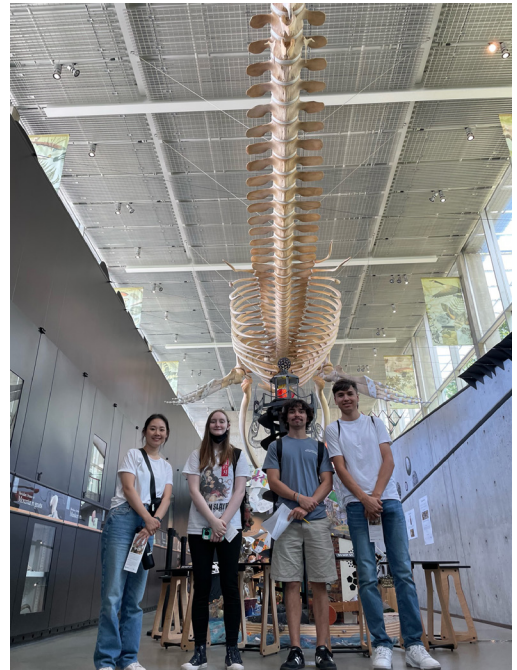
Results from our 2023 survey indicated that the high school students learned new skills and techniques that they can use in their future studies. They felt included and supported in the labs and developed more interest in STEM fields including clinical research, engineering, and laboratory research. Students also reported increased confidence in their ability to complete tasks independently and work as part of a research team.

Empowering Indigenous Youth to Thrive

The seed2STEM program is growing each year. This is encouraging, and we want to support as many applicants as possible. As the program grows, we are hearing from more student participants and supervisors about significant opportunities to make the program even more inclusive, supportive, and accessible for Indigenous youth.

We plan to empower even more Indigenous youth in the future by offering travel bursaries for students based in rural communities. We have already seen an increase in interest beyond Vancouver and Kelowna-based students. In 2023 we had two students join the program from remote BC communities and we know there are many more students who would love to take advantage of this introduction into the world of STEM research.

Improving Indigenous participation and leadership in STEM research and education is vital and guided by UBC's Indigenous Strategic Action Plan*. The Truth and Reconciliation Commission of Canada Calls to Action and the United Nations Declaration on the Rights of Indigenous Peoples both call for educational reforms to ensure Indigenous peoples are accepted as equals in all fields, including STEM. seed2STEM is working to address these calls for action by directly developing a pipeline that supports, inspires and empowers Indigenous high school students to pursue STEM careers.



Learn more:

Visit our web page
<http://icord.org/issp>

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I loved that the work I was doing would contribute to the science community and I got to learn what it really means to be a part of research science.

- Jenna, Grade 10

in their own words

I worked with biomedical research engineers and was tasked with improving the intervertebral discs that were used in their anthropomorphic test device (the omnidirectional neck). I then had the opportunity to design different intervertebral discs and design a protocol to test the disks. I made many friends this work term and met amazing new people.

- Dean, 2nd year university

I came from over 1,000 kilometres away and I definitely do not regret it! This is one of my biggest accomplishments. Being a researcher is my long-term goal.

- Nishaya, Grade 10

It's an incredible experience that opens a lot of doors to your future. Personally, I used to believe that a job in science was past my abilities, but this program inspired me to think about science as a career.

- Iris, Grade 10

program accomplishments

Graduation rate
100%

of grade 12 students who have completed the program have successfully graduated.

Post-secondary acceptance rate:
90%

of grade 12 students who have completed the program currently attend / have plans to attend post-secondary.

Intake growth rate:
220%

on average.

Retention rate:
85%

(excluding years not operating or operating virtually because of COVID-19 shutdowns).

Over 90% of students expressed an interest in returning in 2024.

Alumni mentor placement rate:
66%

of grade 12 students who have completed the program have returned as program mentors for younger students for at least one year.

Publication & Research Outputs:

44

student presentations + 2 invited talks.

Program reach at UBC:

22 labs

13 depts/schools

2 research centres

2 campuses

An additional research centre will join the program in 2024 offering additional lab placements and department offerings.

student feedback (2023)

86%

felt confident in their skills/abilities to contribute to research & felt a sense of purpose in their lab.

93%

felt included in lab activities and supported when they had questions and problems.

93%

learned new skills/techniques that they could use to achieve their individual goals.

100%

felt accepted and respected by supervisors, lab mates and staff.

100%

were glad they signed up for the program.

93%

plan to return next summer.