

Students for the
Exploration
and Development
of Space



Étudiants pour
l'Exploration et
le Développement
Spatial



CAN-ARX

CANADIAN ARCTIC RESEARCH EXPEDITION

DELEGATE TEAM INFORMATION

Visit seds.ca/projects/can-arx for more information



www.seds.ca



SEDS-Canada



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CAN-ARX DELEGATE TEAM INFO

Dear Applicant,

Welcome to the Canadian Arctic Research Expedition (CAN-ARX), Canada's only competition for post-secondary students to design an experiment for Canada's Arctic. The CAN-ARX challenge was designed to be a real-world opportunity for students to conduct meaningful scientific research in Canada's arctic, where the Delegate Team will experience firsthand project aspects, including but not limited to: hardware, software, technology, engineering, and design.

As such, it will push your limits as you learn skills not taught in traditional classrooms. Resourcefulness and perseverance are among the many things you will develop throughout this experience, which are always in high demand in the space sector. We hope you will be inspired to apply what you've learned to even greater challenges being faced today to responsibly advance humankind's presence in space.

In this document, you will find information about the subject matters that main project teams may pursue, what is needed from you as a delegate team, and application steps to become and match with project teams. Although intended to be comprehensive, you are encouraged to contact the organizers, listed under 'Important Contacts', for further details. We look forward to your participation in this year's CAN-ARX challenge!

— The entire SEDS-Canada team

SEDS-Canada (Students for the Exploration and Development of Space) is a student-run non-profit, federally incorporated since October 2014. We are a member-based organization with students from all across Canada, and we partner with many established university student groups.

We are dedicated to promoting the development of the Canadian space sector and supporting our fellow students who wish to pursue careers in this industry. To achieve this mandate, we offer students opportunities for professional development. Our strategy includes national competitions such as CAN-RGX, CAN-SBX, the Young Space Entrepreneurs (YSpacE) competition, an annual conference, and eventually, competitive grants.

IMPORTANT CONTACTS

NOTE: For submission of proposals, questions about the competition, etc. e-mail canarx@seds.ca



Roxy Fournier | CAN-ARX Project Manager | roxy.fournier@seds.ca

Dr. Roxy Fournier received her PhD in 2020 from the University of Toronto. Her thesis was funded by the Canadian Space Agency and involved studying the effects of microgravity on bone cellular processes. Prior to this, she obtained a B.Sc in Biology from the University of Victoria, where she performed research in inherited lysosomal disorders. Within SEDS-Canada, Roxy held roles such as Project Manager for CAN-RGX and President of the Board of Directors. She is now coordinating the new CAN-ARX competition. She is also a co-organizer of Canada's first and only academic symposium focused on space health research and the lead R&D Scientist at Mission: Space Food, a startup company developing technologies that will enable safe, nutritious, and acceptable food to be brought on future space missions.



Kevin Jordan | CAN-ARX Asst. Project Manager | kevin.jordan@seds.ca

Kevin is a 3rd year undergraduate student in Electrical Engineering at the University of North Dakota. He has recently worked on payload development with UND's Advanced Rocketry Club competing in the 2021 NASA Student Launch. He also has experience in the dive industry as a technician for advanced life support systems, and guiding underwater explorations to remote environments. A lifelong interest for human spaceflight, Kevin hopes to use his experiences to develop the human spaceflight and habitation systems of the future. Kevin is very excited to be able to support the CAN-ARX project and SEDS Canada's inspiring missions.



Ricky Wang | CAN-ARX Asst. Project Manager | ricky.wang@seds.ca

Ricky is currently a 3rd year Mechanical Engineering student at the University of Waterloo with an option in Management Sciences. He has strong passions involving the aerospace and energy sectors, with experience ranging from design, manufacturing, project management, and more. He also has his private and glider pilot's licence! Ricky is currently with Waterloo Airlock as the Mechanical Lead, aiming to compete and build a feasible airlock for a Martian environment.

Project Advisors & Subject Matter Experts

- **Kristen Cote**, PhD Candidate, University of Toronto
- **Chimira Andres**, President, SEDS-Canada
- **Dr. Gordon Osinski**, Professor & Director of the Institute for Earth & Space Exploration, Western University
- **Dr. Cassandra Marion**, Science Advisor, Canadian Aviation and Space Museum

1. COMPETITION OVERVIEW

1.1. Statement on Inclusivity & Accessibility

SEDS-Canada is committed to creating an environment that is inclusive and equitable of all persons and treats all members of the community in an equitable manner. As part of this commitment, SEDS-Canada strives to provide support for, and facilitate the accommodation of all students/applicants regardless of race, ethnic group, nationality, socioeconomic status, sex, gender identity, gender expression, sexual orientation, ability, language, religious affiliation, or age. On a case-by-case basis, and to the best of our ability, we will try to accommodate individuals with different abilities. If you believe there may be an accessibility issue, please contact canarx@sedcs.ca with your concerns.

In CAN-ARX, SEDS-Canada is committed to creating a safe, welcoming, and inclusive environment that supports learning, research activities, and community outreach/engagement with a broad nationwide reach, specifically within Indigenous communities in the Canadian High Arctic.

1.2. Project Scope

The Canadian Arctic Research Expedition (CAN-ARX) is a competition for Canadian post-secondary students to test an experiment in the Canadian Arctic in collaboration with Western University's Institute for Earth and Space Exploration. For the first time in Canada, student teams will operate a full research project in the Arctic from design to execution, outlining their scientific goals, project feasibility, and management plan. A major component of the CAN-ARX challenge will be to build connections with the scientific community and public living near the selected research station. SEDS-Canada is pleased to contribute to the development of Canada's next generation of space industry leaders with the introduction of the CAN-ARX challenge.

There is a vast amount of science one can do in the Arctic, but CAN-ARX focuses on four key subject areas. These are:

planetary science (incl. astrobiology, remote sensing)
atmospheric science
resource utilization & food production
remote healthcare

Within each of these broad subjects, projects will be either **science-based** (i.e. utilizing an instrument, or doing fundamental science) or **engineering-based** (designing and testing an instrument, tool, or mechanism).

1.3. Primary CAN-ARX Team

The Primary Team will consist of a group of students chosen by CAN-ARX to conduct their experiments in the Arctic. Projects chosen will follow the subject areas listed above, and will have integrations in place to incorporate you as a Delegate into the project. The primary team is the main group of students proposing an experiment; as a Delegate Team member you will assist in creating and advancing the primary team's project, learning about and contributing to a space-related project. More details to follow in [Section 1.4 Delegate Team](#) below.

Example projects that the Primary Team may create could include, but are not limited to:

Planetary Science

- Collection and testing of extremophiles from a lake or stream
- Field-testing a novel imaging spectroscopy technique using a commercial instrument
- Perform remote sensing over the field site to detect e.g. mineral types, soil moisture content, water ice using a commercial sensor

Atmospheric Science

- Field-testing a novel, team-built instrument that detects atmospheric composition
- Collecting atmospheric composition samples

Resource utilization & food production

- Testing a novel, team-built greenhouse component for Martian/Lunar environments
- Collecting soil samples near the station & analyzing them for greenhouse use

Remote Healthcare

- Testing commercial biomonitoring equipment in and around the field site (e.g. does it perform well in cold remote areas)
- Testing a device and/or software application related to remote healthcare
- Field-testing novel spacesuit hardware on a human subject
- Field-testing geological sample collection methods (including studies looking at future human space exploration, e.g. how do you effectively collect samples with big gloves)

1.4. Delegate Team

The Delegate Team will be composed of students who are interested in space and ready to share their knowledge. They will be matched with the selected primary team to work remotely to achieve mission goals. Delegates can provide critical input to the team in areas such as:

- aiding in the design of an instrument, payload, or other device via participation on a subsystem team,
- creation of any required software, as well as analysis of data post-expedition,
- performing in-depth background research for the experiment as it relates to the specific expedition site,
- providing insight into site-specific considerations,
- setting up a research paper, white paper, or other working group paper post-experiment,
- participation in the field expedition (incl. guiding the team to appropriate field locations, field portable instrument operation, documentarian, etc.),
- and other contributions.

Please note that students are eligible to apply to CAN-ARX via the regular proposal submission route as a Primary Team, as long as their team meets the eligibility requirements listed in the main handbook for the primary teams found on the CAN-ARX website (seds.ca/can-arx).

1.5. Eligibility

To be eligible to apply for the Delegate Team, the student will:

- Be enrolled in a post-secondary institution within Canada, either part-time or full-time (any program or discipline is eligible);
- Provide official or unofficial proof of enrolment at the given institution (e.g. a picture of a student ID card showing the student ID, name, and expiry date; a screenshot of a timetable showing the student ID and name; a financial statement showing the student ID and name, etc.);
- Be a current or past resident of the Northern Territories (YT, NT, NU);
- Have enough availability throughout the year to commit to meetings, webinars, and discussions with the primary team and SEDS-Canada;
- Be 17-25 years of age;
- Provide a resume or CV; and,
- Submit an application form on the CAN-ARX website (seds.ca/can-arx). The link is also provided below.
- (Optional) A recommendation letter from someone who knows you well (i.e. teacher, professor, community leader...etc.)

[**Click Here to Apply \(Google Form\)**](#)