Canadian Reduced Gravity Experiment (CAN-RGX)

2020 Design Challenge

Hosted By

SEDS ÉEDS CANADA

Canada NRC-CNRC



Students for the Exploration and Development of Space (SEDS)

SEDS-Canada is Canada's only **student-run non-profit** that operates at a national level to inspire and **empower students** joining the space industry, and to advocate for the advancement of space exploration in the public sphere. SEDS-Canada was established in 2014 and has since developed multiple initiatives including our annual Ascension conference and CAN-RGX and CAN-SBX design challenges. For more information, please visit us at https://seds.ca/

Canadian Reduced Gravity Experiment (CAN-RGX) Design Challenge

The Canadian Reduced Gravity Experiment Design Challenge (CAN-RGX) is a competition for Canadian post-secondary students to **design and test a small scientific experiment on board the National Research Council's (NRC's) Falcon 20**, which has been modified for reduced gravity flight in association with the Canadian Space Agency (CSA).

CAN-RGX Organizing Team

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Senior Mechanical Eng.

AARON PERSAD, PhD
Postdoctoral Fellow

Competition Overview

- **Only** competition of its kind in Canada
- First competition was held in 2017, with **annual runs** each school year
- A call for proposals is sent out in late-September, after which **four teams are selected** to design experiments
  - Selection is based off of scientific merit, need for microgravity environment, relevance to CSA's priorities, and project management and public outreach plans
- Two students per team get to fly with their experiment and experience microgravity!

Visit
seds.ca/can-rgx/
for more info!

Competition Objectives

CAN-RGX is an opportunity for students to:

- Perform **meaningful science** & publish their work
- Learn about microgravity sciences (& experience microgravity!)
- Build connections with professionals in relevant industries
- Gain valuable **project management** experience through a **full engineering design cycle**
- Gain communication & presentation skills

The project benefits Canada's space sector too by contributing to the CSA's vision and mandate, training highly qualified personnel for future careers in STEM fields, and advancing Canadian technology in the space sector.

Post-campaign survey

Of the students who have participated in our post-campaign survey (78%):

100% **agreed** or **strongly agreed** that the competition allowed them to:

- Strengthen **leadership skills**
- Connect and **network with mentors and SMEs**
- Gain **project management experience**
- Develop **teamwork and problem-solving skills**
- Contribute **meaningful science**

100% responded that the competition **increased** their **interest in working in the space industry**

Post-campaign survey (con’t)

Of the students who participated in the survey:

66% ranked COST as the most prohibitive factor for their project:
The NRC & CSA cover the costs of microgravity flights, but teams still have to travel to the flight campaign location and pay for their own travel, food, and accomodations

CAN-RGX: some statistics

>75 post-secondary students & 3 high-school students

have participated in the design and build of a novel experiment, gaining experience in a full engineering design cycle

>15 major grants and awards

were awarded to previous CAN-RGX participants (including 4 sponsorships to present at last year's International Astronautical Congress alone)

32 students

have flown in microgravity on board the Falcon 20

>6 conference publications

have been written based on the results of the CAN-RGX Design Challenge

CAN-RGX results have been presented via a poster or a talk at over

11 conferences

>15,000 unique people

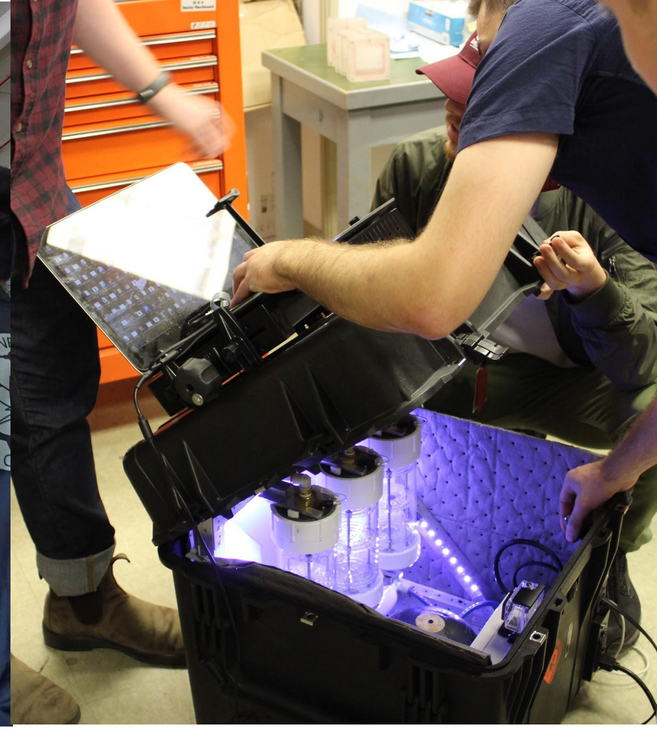
across Canada are reached on social media during one flight campaign

Team Feature: UAlberta Space Design Group

Did you know that approximately **1/6 of people on Earth** are affected by knee osteoarthritis? For this year's CAN-RGX campaign, UASDG's team of engineering and medical students are excited to investigate gene expression of bio-engineered cartilage tissue in microgravity. We will be tracking changes in precise gene expression and metabolites, as well as comparing male and female tissues. Not only is the experiment pertinent to **astronauts returning to the ground**, their findings could contribute to improving the health outcomes of knee osteoarthritis patients on earth!

Team Feature: UBC Rocket

UBC Rocket's experiment will study the behaviour of **microbial fuel cells** in both micro- and hyper-gravity conditions. Microbial fuel cells are likely to play an important role in the **future of space travel** due to their ability to produce electricity while simultaneously doing useful work such as waste-water treatment in extreme conditions or methane production. The team intends to measure the current and voltage of two microbial fuel cells throughout a parabolic flight path, which will yield information about the behaviour of multiple types of bacteria in various gravitational environments.



How Does Supporting SEDS-Canada Help You?

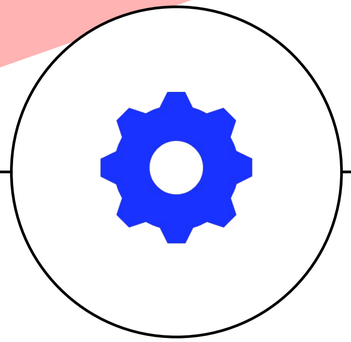
SEDS-Canada connects students from across Canada with public, private, and academic institutions in the space industry. Becoming a sponsor allows you to access our network of students across Canada, recruit talent to your company with relevant experience, and join us in investing in basic research and STEM education to support the Canadian space industry.

CAN-RGX Timeline: Opportunities for Support

Dec. 2019 – July. 2020

Payload Design

July. 2020 –Feb. 2021



Assembly & Testing

Dec. 2019 – Feb. 2021

Outreach & Public Engagement

Feb. 15-19, 2021

Flight Campaign & Closing Ceremonies (Ottawa, ON or Calgary, AB)

Help provide subject-matter expertise, or sponsor our teams through funding, tools, materials, and manufacturing facilities

Connect teams with opportunities or educational resources to share their work

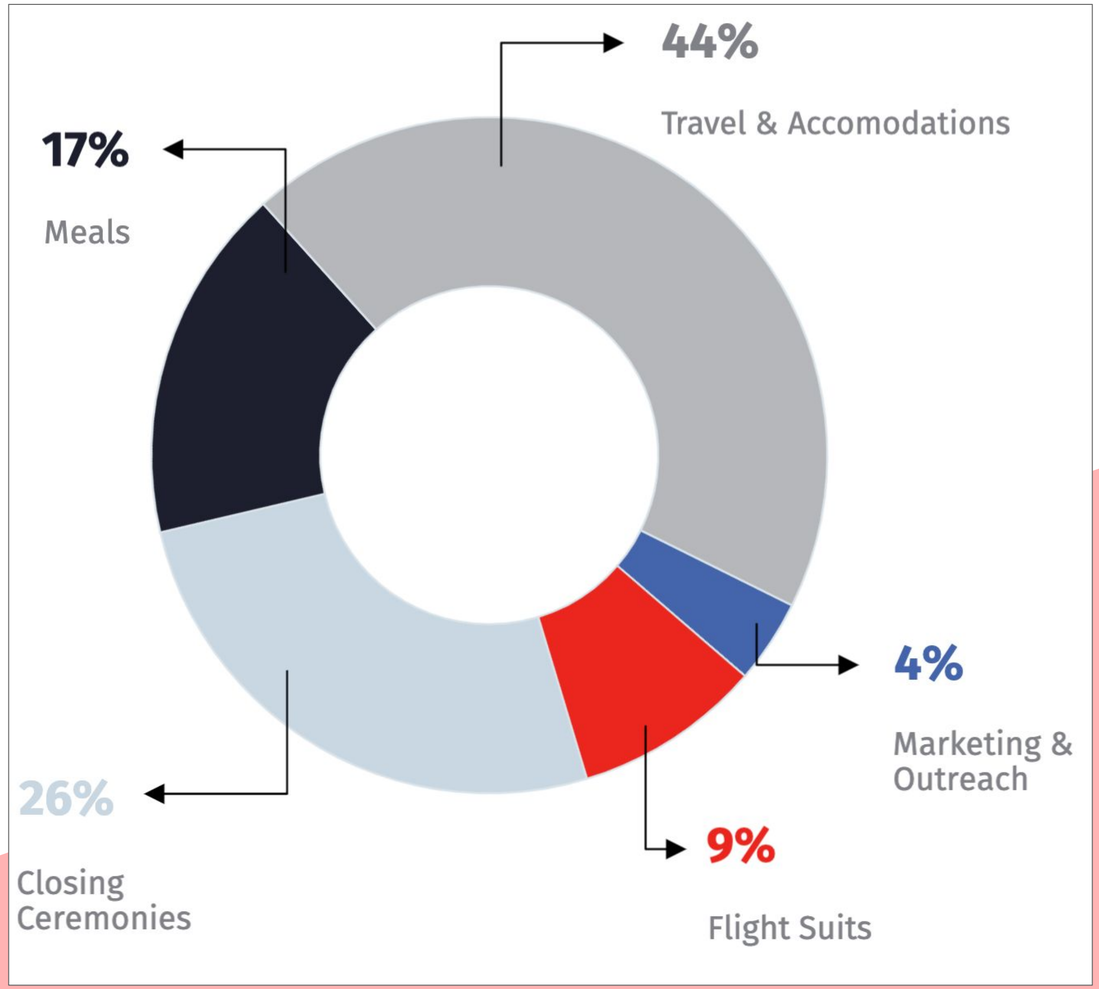
Help make our mission a success by sponsoring meals, transportation, and accommodations

For more info or if you are interested in sponsoring, please contact canrgx@seds.ca

Where Does Your Money Go?

The CAN-SBX budget (not including the cost of microgravity flights) is **$12,458.13**. This includes ~$5,500 in travel and accommodation expenses and ~$2,200 in meals for student teams.

A large portion of the budget is given to the Closing Ceremony, where we celebrate the accomplishments of our students.



Sponsorship Benefits

We appreciate your support in providing students opportunities to explore the space industry,

Our full sponsorship package showing sponsorship opportunities and benefits is available at bit.ly/canrgx2020sponsorship

	Gold: $1500+	Silver: $750+	Bronze: $300+
Logo Placement on flight suits via Mission Patches	✓	✗	✗
Logo Placement (in flight Cabin, videos)	✓	✓	✗
Logo Placement (website, social media, documents, and banners)	Large Logo	Medium Logo	Small Logo
Ascension 2021 Discount	50%	50%	30%
Contributors to Press Conference	1	none	none
Closing Ceremony Tickets	2	1	1
Closing Ceremony Speaker Slots	1	none	none
Lunch Sponsor (4 available)	For **$200**, your company can become a Lunch Sponsor for one day during the Flight Campaign. You will receive all perks of the Bronze level.		
Prize Sponsor: Outreach Prize and First Place Prize	For **$1000** you can name either the Outreach or First Place Prizes, present the award, and advertise your company at the Closing Ceremony. You will receive all perks of the Silver level (with the addition of a closing ceremony speaking slot).		

Join Us!

www.seds.ca/can-rgx

canrgx@seds.ca

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Advancing Canada's space program through nationwide student opportunities