Thank you for your interest in UBC Mars Colony

Mars Colony is a student engineering design team at the University of British Columbia. As of February 2022, we have 30 members from 15 different programs. Inspired by recent private industry and government efforts, our team is dedicated to designing and manufacturing technology needed to establish a human presence on Mars. We provide students with hands-on experience with engineering design and manufacturing processes well beyond typical course material. The team cultivates excellence for industry-relevant areas such as CAD design using Solidworks, machining, control algorithm integration, circuit design, materials testing, mathematical modeling and much more.

The UBC Mars Colony Team (Pre-COVID)

Message from the Captains

My name is Joya Yamagishi and I'm currently co-captaining alongside my partner Hang Zou. We joined the team in 2019 and have worked our way up to become co-Captains this year. Through the years we have experienced our team grow first hand and strive to continue this. We work hard every day to provide an experiential learning environment for our team and are happy that people are interested to support.

We would like to extend an immense thank-you to all of our past and future sponsors. The team relies heavily on the support of local industry and community partners. Your contributions affect each and every one of our members, enhancing professional development and opening up career opportunities. This team has helped us shape a sense of teamwork, friendship, excitement, and changed our lives. We are so proud of our achievements so far and can't wait to see what the future has in store for all of us.

Joya Yamagishi

Hang Zou

Completed Project: *The Mars Expandable Airlock (MEA)*

Our inaugural project was to design, prototype, and manufacture a fully functional and collapsible airlock. We presented our design at the International Astronautical Congress in Bremen, Germany, in October of 2018 thanks to the support from our sponsors and the Canadian Space Agency. This incredibly complex system took over a year to design, and even longer to manufacture. Our three subteams, Mechanical, Electrical, and Structural, created all the necessary aspects of an airlock so that they would be able to survive the extreme conditions on Mars. The picture below showcases the collapsibility of the airlock for transport, and our fearless former Captain Kyle Marquis, who drove this project from the start.

For more information on this project and its outcomes please see **Project Airlock - Final Words**.

Current Project 1: *The Sabatier Fuel Plant*

The Sabatier Fuel Plant project aims to solve the problem of creating fuel on Mars. In-situ propellant production is the key to creating a self-sufficient base on Mars and reducing space exploration costs. Carbon dioxide and hydrogen can be extracted from Mars-based resources, and used to produce methane through the Sabatier Reaction. A lab-scale prototype is currently being constructed and tested. This project also includes a process design focusing on the sizing and energy consumption of a full-scale Sabatier Fuel Plant to be deployed on Mars that can refuel SpaceX's "Starship" within one launch window. We have already presented a project update at the 2020 Mars Society Convention and the 2021 ASCE Earth and Space Conference to an audience of over 200 space professionals and enthusiasts. The process design was completed in December 2021 and we are currently at our last stage of building the prototype, moments away from creating methane.

Current Project 2: *Mars Farming*

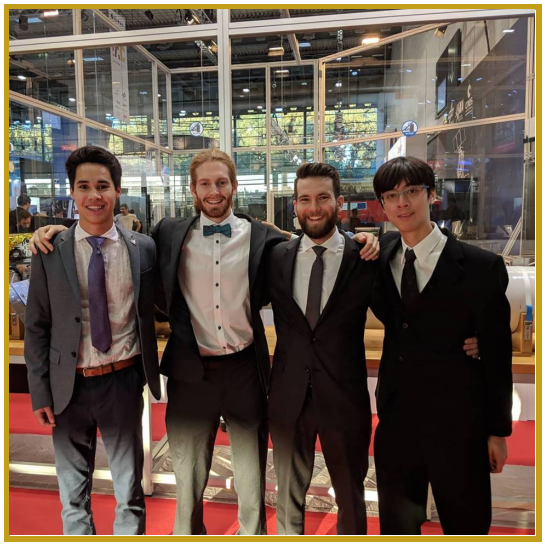
UBC Mars Colony's most recent project Feeding All Required Martians (FARM) is dedicated to solving the challenge of supplying food on Mars, aiming to study the feasibility of a fully sustainable environment that can **produce enough food to feed a crew of 4 Martians over a period of 2 years** (based on a minimal crew size and standard 2-year cyclic launch window between Earth and Mars). A positive outcome will completely overturn the approach towards the nutrition supply aspect of any space exploration mission and thus contribute to a more lengthy mission.

Ongoing design and preliminary testing of a mock-up "Earth Lab" will help to study the effect of low pressure environments on plants, as growing in such environments will help reduce the overall energy use of the base significantly. Results from these experiments can be used to inform a full-scale design of a Martian Growth Lab, and its ability to operate at various atmospheric pressures. Given favorable results from these experiments, the proposal of a Mars based aeroponic growth lab would be more attainable.

Our Goals

Education

We strive to enhance the academic careers of our members. Our upper-year members in leadership positions are closely involved in mentoring general members. By applying engineering concepts to real-world applications, we deepen our understanding of fundamental theories. Our projects typically venture outside the realm of what is usually taught in the standard engineering student curriculum, allowing students to pursue topics that they would never be exposed to otherwise.



Contribution to the Industry

Our projects are specially selected such that they provide new and unique outcomes to the field of Space Exploration. We hope to disrupt the industry and showcase our abilities as UBC Engineering Students, promoting the Canadian presence in the field. We do this by submitting papers to and attending international conferences to present our work to industry leaders. Pictured left are our members attending the 2018 International Astronautical Congress in Germany, where they were able to meet and speak with researchers and engineers representing leading aerospace institutes and companies from around the world.

Outreach

We actively participate in outreach events to promote the field of engineering to the general public and encourage youth to pursue engineering as a career. We have held several “STEM Workshops” with local high schools with great success; encouraging all to get involved with the process of engineering through hands-on activities. We have also previously teamed up with Women in Engineering (WIE) to promote female presence in the engineering field at a local high school. Maintaining a diverse and inclusive team is extremely important to us.

Sponsor Benefits

We recognize the generosity of our sponsors through the following means, grouped into three tiers. Benefits for gift-in-kind donations and standard discounts are negotiated on a case by case basis. Additional benefits may be offered as opportunities arise, or may be adjusted to best suit the needs of your company. Sponsors offering workspaces for our team to use while UBC is closed (provided COVID-19 safety protocols can be upheld) will be granted Gold status by default.

	Bronze (up to $1000)	**Silver** ($1000 - $2500)	**Gold** ($2500+)
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Invitation to Project Exhibitions*		✓	✓
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How to Contribute

If you'd like to make a difference today, becoming a sponsor of our team is easier than ever! By clicking on our personalized sponsor link below you will be able submit a donation online that will be directly routed to our team's account.

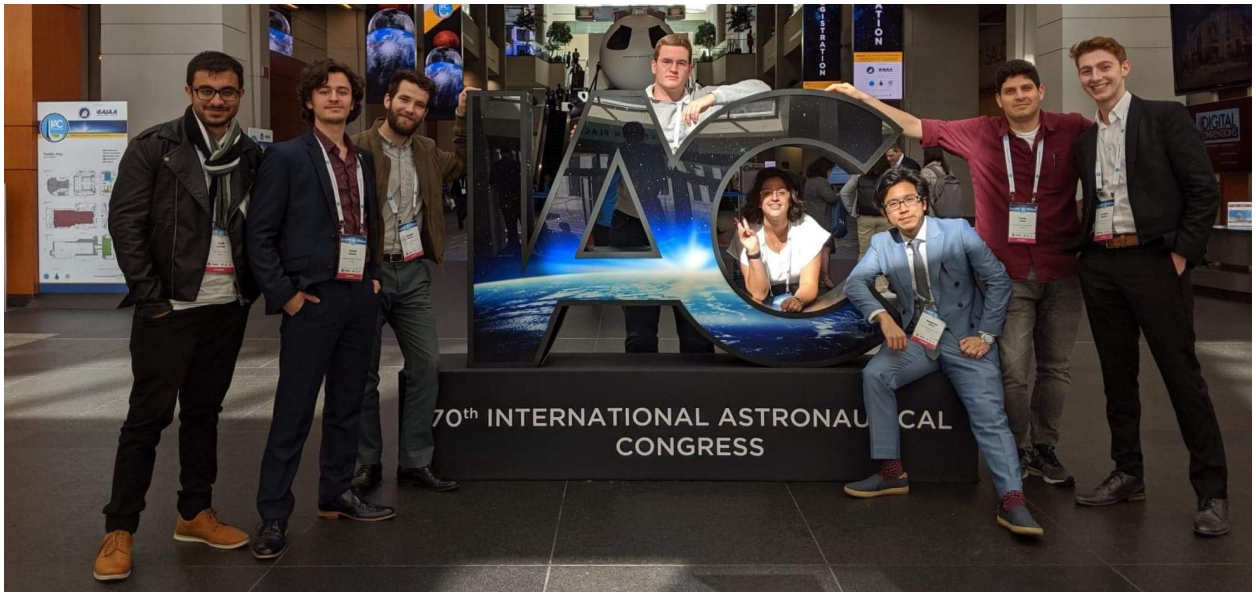
Sponsor Now

(https://support.ubc.ca/projects/student-team-sponsorships/)

If you organization would prefer to pay by cheque, please address the envelope as shown here:

Attention: Ana Merino
UBC Development - Faculty of Applied Science
David Strangway Building
500 - 5950 University Blvd, Vancouver BC V6T 1Z3

Additional payment options are available (by phone, wire transfer, EFT, etc.) and can be accommodated. Please reach out directly to our team or to team.sponsorship@apsc.ubc.ca for more information.



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