

THE SPACE EXPLORERS PROGRAM AT THE CENTRE FOR PLANETARY SCIENCE AND EXPLORATION. P. P. Patel¹, G. R. Osinski^{1,2}, and I. DeCoito^{1,3} ¹Centre for Planetary Science and Exploration, University of Western Ontario, London, Ontario, Canada, ²Department of Earth Science, University of Western Ontario, London, Ontario, Canada, ³Faculty of Education, University of Western Ontario, London, Ontario, Canada (cpsxoutreach@uwo.ca).

Introduction: Public Education and Outreach forms one of the three pillars at the Centre for Planetary Science and Exploration (CPSX) at the University of Western Ontario (Western). The program has seen steady growth and the development and expansion of the program with focus on planetary science and space exploration. The vision for CPSX is “To strengthen and grow the Canadian space community through inspiring and training the next generation of scientists and engineers.”. The outreach program shares this vision and is guided by the following objectives: i) offer educational resources to teachers and educators, ii) encourage and inspire students to consider career opportunities in science by engaging them in activities related to planetary science and space exploration, iii) raise awareness and general interest of the public in science through planetary science and space exploration events, and iv) train graduate students in teaching and outreach practices. The current program offered can be divided into three broad categories: i) training, ii) public events and activities, and iii) school visits and academic programs.

Guided by the objectives mentioned above, the *Space Explorers Program* was launched in 2016 under the category of public events and activities. The *Space Explorers Program* offers space science and technology themed programming on-campus during the summer and throughout the school year. The aim of the program is to empower children with the basic knowledge and workings of the many branches of planetary sciences and inspire the next generation of scientists and engineers. The program is intended for children ages 9 to 14. The participants engage in hands-on activities, daily projects, and demonstrations highlighting space focused issues in the fields of astronomy, biology, engineering, geography, and geology. The program is currently divided into a summer camp, summer academy, march break camp and professional development (PD) day camps.

Past Programming: In the inaugural year, the program was launched as a 1 week camp, offered over 6 different weeks over the summer. 50 participants of ages 9-14 participated in the program (Figure 1). The programming for the first year included the same set of activities and material every week. The activities included building telescopes, visiting the on-campus Hume Cronyn Memorial Observatory, mapping plane-

tary landscapes, building scaled models of Solar System, amongst other activities.



Figure 1. Campers posing with their telescope after a telescope building activity at *Space Explorers Camp*.

The program was expanded in the second year (2017) to offer 8 weeks of camp in the summer, with two distinct themed weeks as well as separate weeks for campers aged 9-11 and 12-14. During the second year, 157 campers experienced the camp (Figure 2). The two distinct themes introduced in 2017 were *Journey to Mars* and *Journey through the Universe*. In *Journey to Mars* theme, campers prepared a mission to Mars through various activities such as mapping possible landing sites, designing missions, building rovers using Lego Mindstorms to traverse martian landscapes and designing and building a Mars habitat. In *Journey through the Universe*, campers learn about the celestial bodies, big and small, in our Solar System as well as in the universe! Activities include building your own solar system, creating a cosmic calendar, building a spectroscope, designing an alien, decoding the universe and visiting the on-campus observatory telescope to test their own star-finding tools.



Figure 2. Engaged campers designing their mission to Mars.

For the third year (2018), the program was expanded to a second location in the Greater Toronto Area at the historic David Dunlap Observatory in Richmond Hill, Ontario, in partnership with the Town of Richmond Hill. At both the locations, the themes were kept same as in 2017 – *Journey to Mars* and *Journey through the Universe* for campers aged 9-11. For the London location, 129 campers attended the camps and 221 campers attended the Richmond Hill location (Figure 3).



Figure 3. First batch of campers pose in front of the historic David Dunlap Observatory.

In 2018, a new program was introduced for campers aged 12-14 called *Space Explorers Academy* at the London location. The academy is 1-week summer camp more academic version of the camp with a blended learning experience where the participants learn about various topics in space science and technology while engaging in several experiments, hands-on activities as well as discussions led by CPSX faculty, post-doctoral fellows and/or graduate students. The program was full with 30 participants in attendance with the waiting list of 15 participants (Figure 4). The topics in the academy covered included robotics, impact cratering, mapping the Moon, spectroscopy, meteorites, blackholes, indigenous astronomy and telescopes.



Figure 4. CPSX PhD Candidate Patrick Hill guides the campers through the Moon mapping activity.

In Fall 2018, *Space Explorers Program* expanded to offer PD day camps at the London, Ontario location. Two PD day camps have been conducted in October and November respectively.

Current and Future Programming: The program is slated to continue in 2019 with two distinct themes and activities in the summer. The themes for 2019 will include *Journey to the Moon* – to celebrate Apollo 11's 50th landing anniversary – and *Journey through the Universe*. Based on the feedback from the campers and parents, the academy will be offered twice at the London, Ontario location. Program's first march break camp will be held in 2019.

Collaborations: Since its inception, the *Space Explorers Program* had worked with various on-campus and national organizations to bring diversity and expertise to the next generation of space explorers. In the three years, the program has collaborated with the Hume Cronyn Memorial Observatory, Western University's Biodiversity Museum, Rotman Institute of Philosophy, Royal Astronomical Society of Canada – London and Toronto Chapter, the Town of Richmond Hill, and the David Dunlap Observatory.

Assessment. Feedback from the campers and parents is crucial in assessing the success of the program. The participants of the program are asked to fill out post-camp survey on the last day of the camp, thus instantly receiving feedback from all the campers. The parents requested to fill out the feedback form after each camp. In addition to evaluating the program, strong efforts have been made to create a survey that allows us to gauge the impact of the program on campers' interest in space science and technology as well as whether they are considering a career in this field.

Acknowledgements: We would like to thank the Department of Physics and Astronomy, Department of Earth Science and Faculty of Science at Western University for the providing facilities and support to make this program possible. This program was supported by the Canada Summer Jobs Grant in 2018. We would like to thank our past and current CPSX graduate students, program staff and volunteers who have contributed the *Space Explorers Program*.