MUSEUMS & PLANETARY MISSIONS

M. M. Mader1, K. T. Tait1, D. Ireland1. 1Royal Ontario Museum, 100 Queen’s Park, Toronto, ON M5S 2C6, mmader@rom.on.ca.

Introduction: Planetary mission milestones provide key opportunities to engage the public in the day to day work and showcase the value, wonder, and innovative technologies of planetary exploration.

Museums are in a rare position of being trusted to provide accurate and reliable information in a national conversation increasingly dominated by bias and vested interest [1, 2] and are well situated to share planetary mission experiences with the public. The public view the following as essential purposes of museums – care, preservation and display of heritage; entertaining education for youth; and trustworthy information for all adults, which explains why museums are held in such high regard [2].

Most Trustworthy

<table>
<thead>
<tr>
<th>History Museums/Historic Sites</th>
<th>6.7</th>
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<td>Museums</td>
<td>6.4</td>
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<td>Art Museums</td>
<td>5.9</td>
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<td>Wikipedia</td>
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<td>Local Paper</td>
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<td>Academic Researchers and Professors</td>
<td>5.7</td>
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<td>US Government</td>
<td>4.9</td>
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<td>Nonprofit Researchers</td>
<td>4.9</td>
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<td>Corporate Researchers</td>
<td>3.6</td>
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Scale: 9 = not at all trustworthy; 10 = completely trustworthy

Figure 1: Public survey results regarding trustworthy sources of information in America. Image credit: American Alliance of Museums [3].

Museums can engage with the public across numerous platforms, including exhibits and galleries housed within the institution, public programs such as lecture series, and family events, school visits as well as online through social media and online exhibits.

The Royal Ontario Museum (ROM) situated in Toronto, Canada houses diverse collections of world cultures and natural history holdings making it one of the largest museums in North America. With over 6 million objects and over 1 million visitors each year, the ROM is Canada’s essential destination for unforgettable insights that reveal how the earth and its culture have evolved, and how the changes we face today will shape the world we’ll live in tomorrow.

In addition, the ROM houses a significant planetary science collection (over 550 meteorites) including 22 martian meteorites, 12 lunar, 34 HED’s, and 35 primitive achondrites, many the largest know samples of their type. There are few places where the public can go to learn about planetary science mission and the ROM is well situated to be the “go-to” place in Canada for this work.

ROM and OSIRIS-REx: On Tues. Sept. 8, 2016, NASA successfully launched OSIRIS-REx, a sample return mission to the asteroid Bennu, with a Canadian science instrument on board (OLA. It will be the largest extraterrestrial sample return mission since the lunar Apollo missions. Dr. Kim Tait, Teck Endowed Chair of Mineralogy at the ROM, is a collaborating scientist on the mission. She will be part of the team studying the asteroid sample once returned to Earth in 2023. The ROM also provided mineral and meteorite samples to the Canadian instrument development team. The samples are used to practice and fine-tune the tests scientists will run on the Bennu sample.

Figure 2: Royal Ontario Museum’s martian meteorite collection. Largest specimen in photos is NWA 7042 main mass weighing 2.98 kilograms. Image credit: ROM.

Figure 3: Artist’s rendition of OSIRIS_REx Laser Altimeter (OLA), Canadian instrument on OSIRIS-Rex spacecraft. Image credit: MDA.
The ROM has worked closely with the Canadian Space Agency (CSA) and the University of Arizona over the past year to promote the mission across numerous platforms, including the following initiatives:

- A new display case in the ROM Vale Gallery of Minerals.
- Co-hosting a ROM lecture panel event that featured 7 Canadian scientists and engineers involved in the mission - moderated by Ziya Tong, Discovery Channel host.
- Partnering with a Fleming College Environmental Visual Communication (EVC) class to create media assets that were used by the CSA in their social media campaign. One video used by the CSA had a marketing reach of 20,000 with 3025 views.
- Commercialized video game about asteroids created during the “Space Rocks” themed ROM Game Jam [4].
- Numerous social media events (e.g., Facebook Live 15,000 reach, 3600 views).
- Over 20 ROM volunteers and staff completed OSIRIS-REx Ambassador training.
- Four 3D printed models of Bennu for hands-on outreach purposes.
- Providing a ROM special school visit program about the mission.
- Special talks to 10 ROM summer camps about the mission.

A new display case in a gallery can take up to 1-2 years to be realized. Museums are able to be more responsive through public programming and social media, however, a holistic approach that activates all available outreach platforms allows for greater impact and reach.

**Partnerships.** When developing public engagement strategies for planetary missions, museums should be considered as central partners. With research and outreach mandates, they are uniquely able to help share and communicate mission research with the public and are trusted by the public to do so.

**Future Work:** The ROM is designing unique experiences that will allow new audiences to relate to planetary mission results, through direct interaction with planetary materials and data. Through co-creation and collaboration, we aim to encourage STEM and STEAM learning through interactive programs that incorporate 21st century engagement principles, including the following qualities:

- Immersive
- Open-ended
- Interest driven
- Project-based
- Two-way engagement

We’re exploring Citizen Science opportunities related to OSIRIS-REx and are exploring new opportunities related to Mars missions.

To learn more about our planetary science public engagement initiatives and to share ideas contact Dr. Marianne Mader, Managing Director, Earth & Space/Fossils & Evolution, Royal Ontario Museum at mmader@rom.on.ca

**References:**