# International Electric Propulsion Conference Presentation at MIT

**By Maria Abbi**

Presenting at the International Electric Propulsion Conference (IEPC) was the highlight of my time at Imperial. Held in MIT in Boston, the 37th IEPC gathers an international community of academics and industry experts to share the most recent developments in Electric Propulsion for spacecraft. The focus of our research was an investigation into the wall interactions of a Hall effect thruster using water vapor as propellant, by using an in-

*Figure 1 The author presenting at the 37th IEPC*

house simulation: PlasmaSim, developed by the Imperial Plasma Propulsion Laboratory. PlasmaSim can simulate the motion and behaviour of the plasma within a Hall effect thruster to high fidelity. The interest in this area of research comes from the need to find alternative propellants for Hall effect thrusters. Hall effect thrusters

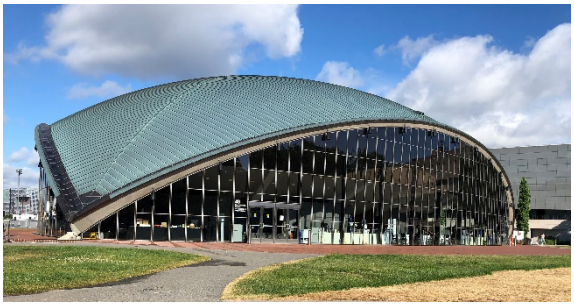

*Figure 3 Kresge Auditorium at MIT*

typically use noble gases but the scarcity and volatility in price of such resources demand that other propellants are considered. The effect of wall interactions, collisions between electrons and the walls of the thruster, is also of interest since they are phenomena not currently modelled by PlasmaSim. I presented within the numerical-simulation electric propulsion section of the conference, and had the opportunity to answer questions on the potential applications of our research and future work. It was fascinating to learn of the other approaches to tackling the implementation of wall interactions and the scope of other authors' research.

This research was conducted as part of my Masters' thesis and was in collaboration with Jesús Manuel Muñoz Tejeda, Maryam Reza, Aaron Knoll, Kieran Jones-Tett and Emmanuelle Rosati Azevedo.

I was fortunate to attend a panel session discussing "Delivering NASA's Gateway for Sustainable Lunar Missions", with panellists: Peter Peterson of NASA, Sarah Shark of Aerojet Rocketdyne, and Scott Tilley of Maxar. NASA's Gateway will be a manned space-station in orbit around the moon to facilitate lunar missions. Maxar will be providing the Power and Propulsion Element. This is a 60-kilowatt solar electric propulsion using Hall effect thrusters. These thrusters will be used for attitude control, and orbital transfer manoeuvres for the Gateway.

It was an honour to present at this conference and I would like to thank the Old Centralians' Trust and the City and Guilds' College Association for their support, which made this experience possible. It has been a privilege to represent the CGCA and Imperial at such an institution. I would also like to thank Dr Knoll, Jésus

*Figure 2 Panel talk Delivering NASA's Gateway for Sustainable Lunar Missions held in the Kresge Auditorium*

Manuel Muñoz Tejeda, Maryam Reza, Kieran Jones-Tett and Emmanuelle Rosati Azevedo for their expertise and guidance and their essential academic contributions.