YORK UNIVERSITY
DEPARTMENT OF EARTH AND SPACE SCIENCE AND ENGINEERING
and
CENTRE FOR RESEARCH IN EARTH AND SPACE SCIENCE

S E M I N A R

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Dawn's Exploration of Vesta and its First Views of Ceres

ABSTRACT

NASA's Dawn mission completed its year-long orbital exploration of the asteroid Vesta at the end of 2012, and is now just beginning to image its second target, the asteroid Ceres. Vesta is one of the largest asteroids, it melted and formed a basaltic lava crust and an iron core, and certain types of meteorites that fall on Earth were believed to have come from its surface. The Dawn mission has confirmed the link between Vesta and these meteorites, and has revealed a world intermediate between the small asteroids that have been targets of previous space missions and full-grown bodies like the Moon and Mars. Vesta has a diverse surface composition, including mysterious layers of bright and dark material, a giant system of grooves that circles the equator, and numerous large impact craters, one of which has a central peak that is among the tallest mountains in the Solar System. Its cratered surface records the collisional history of the Solar System, and provides useful constraints on planetary cratering chronology. Dawn's second target, Ceres, is roughly twice as large as Vesta, and most of what we currently know about it is based on telescopic observation. It has a density consistent with a significant water ice content, a shape consistent with internal differentiation, hydrated minerals have been detected on its surface, and water vapor has been detected emanating from its surface. Thermal models suggest that liquid water could remain stable beneath its crust even to the present day. Dawn is currently on its approach phase to Ceres and will not enter orbit until after this talk, but at up to 8x the resolution of Hubble, the approach imaging will already be able to provide new insights into this fascinating dwarf planet.

BIOGRAPHY

Dr. O'Brien holds a PhD in Planetary Science from the University of Arizona. Since obtaining his doctoral degree he has worked as a Poincare Fellow at the Observatoire de la Cote d'Azur in Nice, France and was selected as a NASA Early Career Fellow in 2006. Since this award, he has been a research scientist at the Planetary Science Institute. From 2010-2014, Dr. O'Brien was a participating scientist on the Dawn Mission and is now a Dawn Science Team Associate.

Refreshments will be served at 3:15 p.m. in the P. Delaney Gallery, Bethune College.

DATE: **Wednesday, March 04, 2015**
TIME: **3:30 p.m.**
LOCATION: **P. Delaney Gallery, Bethune College**