

## **Announcing the Final Examination of Keanna Jardine for the degree of Master's in Physics**

**Date:** November 2, 2018

**Time:** 2:30 p.m.

**Room:** Research 1 103

**Thesis title:** Asteroid Surfaces: The Importance of Cohesive Forces

### **Abstract:**

Adhesive forces dominate on airless bodies because of weak gravity. Investigating adhesion at the surface of asteroids is vital to understanding their formation and evolution. Sample return mission to asteroids have contributed many high-definition photos and samples of asteroid material to help our understanding of the properties of asteroids. Research has been done to understand the interaction of spheres to planar surfaces and sphere-to-sphere interactions, which are used to develop models of asteroid surfaces. Our investigation uses JSC-1 simulant to experimentally investigate adhesion through AFM force measurements between simulant particles and a plain triangular gold tip and microspheres of sizes 2  $\mu\text{m}$  and 15  $\mu\text{m}$ . The samples of JSC-1 consist of three size ranges: < 45  $\mu\text{m}$ , 75-125  $\mu\text{m}$ , and 125-250  $\mu\text{m}$ . Each sample allowed us to find which size range was more adhesive and how much energy was dissipated through the interactions. Results show that the triangular tip produced larger forces than the spherical tips generally, and the sample that produced larger forces and a larger distribution of those force was the smaller, more powder-like sample with sizes <45  $\mu\text{m}$ .

### **Outline of Studies:**

Major: Physics – Planetary Science Track

### **Educational Career:**

B. S. Adelphi University, 2016

### **Committee in Charge:**

Dr. Adrienne Dove (Chair)

Dr. Laurene Tetard

Dr. Dan Britt

Approved for distribution by Dr. Adrienne Dove, Committee Chair, on October 29, 2018.

The public is welcome to attend.