Elizabeth Borucki

**Award:** Laurel Salton Clark Research Fellowship; $5000.00

**Status:** M.S., Geophysics

**Advisor:** Julie Bowles

**Research Topic:** Investigation of the Copper Harbor Conglomerate Paleo-Environment through Magnetic Minerals and their Magnetic Properties

**Abstract:** (First Paragraph of Proposal) Magnetic mineralogy may possess a key to unraveling mysteries about paleo-environmental variations. Environmental magnetism is increasingly being used as a tool to assess variability in climate or local environmental conditions by examining variations in the composition, abundance, and grain size of magnetic minerals in soils and sedimentary sequences (e.g., Liu et al., 2012). The purpose of my research is to utilize environmental magnetism to interpret the conditions under which early life on Earth was established that could eventually provide analog and test parameters for the genesis of life in other parts of the galaxy. The Copper Harbor Conglomerate formation is exposed along the shorelines of Lake Superior and provides an excellent opportunity to test this methodology on ~1.1 Ga Proterozoic sandstones. The sandstone units have been interpreted to contain features of early microbial type life forms, possibly related to the more prominent stromatolites near the base of the Copper Harbor Conglomerate (Noffke, 2009 and Wilmeth et al., 2014). By linking magnetic variations to depositional bed forms and microbial mat presence, we intend to investigate the environmental conditions under which such microbial lifeforms might develop and thrive. By understanding these conditions in early Earth history and how they are reflected in magnetic mineralogy, magnetic tests might be developed that can easily be applied in the search for habitable environments or paleo-environments beyond Earth.

**Biography:** Elizabeth Borucki was first introduced to the geophysical discipline of paleomagnetism in 2014 as an undergraduate researcher. She graduated with her Bachelor of Science in the spring of 2015 from the University of Wisconsin-Milwaukee, and has since returned for her Master of Science. In addition to an undergraduate focus on the reconstruction of plate tectonics, her current research has focused on studying environmental magnetism as an interpretive tool for climatic activity of ancient Earth. This field of paleomagnetism provides insight in relation to the magnetic qualities of a rock unit that were controlled by environmental factors, including transport and deposition of sediment. She hopes to demonstrate a link between magnetic variations that are typical paleo-climate indicators on Earth to establish a reference point for environmental reconstructions conducted on other planets. On her days off she enjoys Earth’s present climate in southeastern Wisconsin as much as possible by spending the warmer months camping and hiking, and occupies the cooler months with travel and the restoration of old furniture. She believes that resourcefulness is the ability to find purpose in what others cannot yet see, and uses that philosophy as a guide for every aspect of her life.

**Congressional District:** 4

**Congressional Representative:** Gwen Moore