

Earth/Space Sciences

Contract #	Term	Course	Contract Title	Contract Description
217011	Fall 2014	ASTR-3105	Martian Geology: Possible Evidence for Plate Tectonics on Mars	The lithosphere of Mars has long been thought to be stationary- a single plate that covers the entire planet, in part due to the great height of shield volcanoes such as Olympus Mons. Without evidence for plate tectonics it was believed that granitic igneous rocks, which are formed as surface rocks are recycled through subduction, would not be present on the surface. However, findings from the Curiosity rover show that Mars' lithosphere may in fact show signs of ancient or very slow plate tectonics similar to those present on early Earth. Recent research provides evidence for localized plate subduction, large scale strike-slip faulting, recent quakes, and feldspar-rich granitic rocks. The goal of this project is to gain a larger understanding of new information. Locations will be selected and analyzed to determine if additional evidence for Martian plate tectonics may be found.
221022	Fall 2014	ASTR-3105	Orbit Refinement of Small Solar System Bodies	For this project, I will act as an asteroid researcher under the advisement, supervision, and guidance of Dr. Andy Puckett. Our focus will be on orbit refinement of small solar system bodies. Even with modern technology, many of the orbits of bodies in our solar system have a sizeable amount of uncertainty. The only true way to narrow down this uncertainty is to simply observe them! By remotely using the 40-inch reflecting telescope at the Yerkes Observatory in Williams Bay, Wisconsin (with other possible partners located in Australia and South America), we will take images, and thus take data, of an asteroid in orbit. Using the physics demonstrated in Astronomy 3105, along with some professional techniques and software (Astrometrica and Find_Orb to name a few), we will calculate several potential orbits the body may have. Upon completion of the project, Dr. Puckett and I will submit our research to the Minor Planet Center. If our research goes well, we may even be published.
231012	Fall 2014	GEOL-4535	Using Radiometric Techniques to Determine Zircon Concentrations Prior to Extraction	In this project, I will assist graduate student Jeremy Miller in using a geiger counter to measure the radiation given off by pure zircon sand relative to that given off by pure quartz sand. We will then establish a method of determining the relative amounts of zircon sand to quartz sand in several mixed samples, and use our data to determine the zircon concentrations in four felsic and intermediate igneous samples. We will then extract zircons from these samples to test the accuracy of our new method of determining zircon concentrations in samples prior to zircon extraction.