SCIENCE EDUCATION

**Data Mining in Astronomy Using Exoplanet Data from the Space and Ground-based Telescopes**, JOSEPH ERSKINE\*, JORDAN DOWDY, STEPHEN DENNY, DR. M. SALEEM, DR. AKHTAR MAHMOOD, Department of Physics, Bellarmine University, 2001 Newburg Road, Louisville, KY 40205.

At Bellarmine University, we have implemented a data mining lab project in the introductory Astronomy course using exoplanet data from all the space and ground-based telescopes. In the era of Big Data, in this project, students are trained to develop computational and data mining skills to extract useful information from the large exoplanet datasets. We have studied all the exoplanet data collected by the space and ground-based telescopes and have analyzed the various parameters of all the confirmed exoplanets that have been discovered in the past 20 years. These exoplanets were detected using one of the following exoplanet detection methods namely- Radial Velocity, Transit, Microlensing, Imaging, and Timing Variation detection techniques. We have characterized these confirmed exoplanets into five categories- Earth-size, Super-Earth size, Neptune-size, Jupiter-size, and Larger than Jupiter-size. We will present the results of all the confirmed exoplanets in terms of the Exoplanet Radii Relative to Earth Radius vs. Earth Mass, Orbital Period in Earth Days vs. Earth Mass, Orbital Distance from their Host Stars vs. Earth Mass, Exoplanet Radii Relative to Jupiter Radius vs. Jupiter Mass, Orbital Period in Earth Days vs. Jupiter Mass, Orbital Distance from their Host Stars vs. Jupiter Mass, Size (Radius) Relative to Earth vs. Orbital Period in Days, and the Orbital Distances of the Confirmed Exoplanets from their Host Stars, among various other plots. In our plots, we will highlight any exoplanets that are in the habitable zone (HZ) of their host star.