Galaxy Clusters, New Discoveries to Fill in the Gaps

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This study aimed to develop a new method for the searching and identification of galaxy clusters, and then to test the method to find new clusters. Algorithms are often used to search through catalogs to find galaxy clusters, however they often only focus on red clusters, as red clusters make up the majority of overall clusters. There are little to no algorithms focused on blue clusters, therefore many of them go unnoticed. My project searches through the Sloan Digital Sky Survey by hand to uncover undiscovered galaxy clusters. The initial data, which included location, redshift, and color of individual galaxies was split apart by redshift. Then, each slice of sky was looked through in search of clumping. These clumps of galaxies were tested to make sure they were the right color and the right distance to each other to be considered a galaxy cluster. Next, photometric data (data without distance) was looked at to determine what other galaxies could be part of the cluster. The method proved successful at finding galaxy clusters that hadn't been discovered before. I managed to find 8 clusters, with many more in the data yet to be found. This method could be used to uncover many more galaxy clusters, which are used to build the maps we have of the observable universe and study theoretical phenomenon such as dark energy and the shifting of the cosmos. This is also useful astronomical data that a high-schooler can uncover, which is quite rare in the field of astronomy, limited otherwise to pulsar data and exoplanets. My research could be passed on to other high school scientists looking to get into the field of astronomy while staying connected to their research and feeling like they personally made an impact in the field.

Awards Won:
Arizona State University: For the project that applies computer science to further inquiry in a field other than computer science
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