CAL POLY
SAN LUIS OBISPO

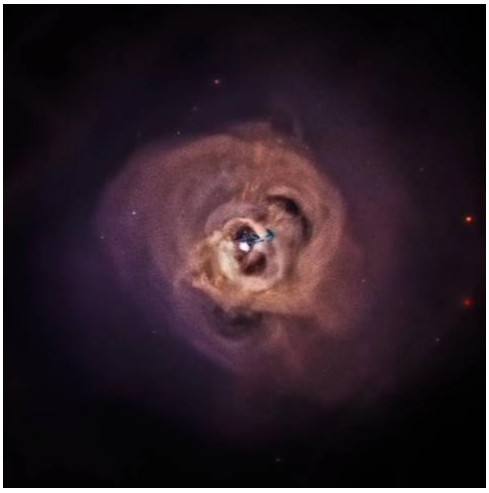
Physics Department

College of Science & Mathematics

Galaxy Classification in the Perseus Cluster With a Convolutional Neural Network

Jason Pruitt

MS Physics Graduate
San José State University



Thursday, November 14, 2024
11:10 am - 12:00 Noon
Building 53, Room 215
Pizza will be served!

Abstract: Studying galaxy features affords astronomers valuable insight to understanding physics and matter on all scales, investigating both how galaxies' constituent parts behave and were formed. While the red sequence provides a good way to determine galaxy cluster membership, it is difficult to apply to galaxies that either do not fall on the sequence or are incredibly faint. In this project, we apply the deep learning architecture ResNet-50 trained on web scraped Sloan Digital Sky Survey image thumbnails labeled from a combination of bright ($r < 19.4$) tagged Perseus Cluster data and existing spectroscopic data ($0.01 < z < 0.033$) to classify galaxies based off of cluster membership. On an independent test set we find that our method achieves promising results on relevant classification metrics.

Bio: Jason Pruitt is a recent MS Physics graduate from San José State University, specializing in scientific computing with an emphasis on integrating machine learning and physics. A Cal Poly alumnus, Jason has developed tools supporting collaborations in solid-state physics, particle physics, and astrophysics. He is currently interested in developing machine learning and AI solutions for practical and impactful challenges.