



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

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| Name(s) Vidur Sanandan | Project Number S1822 |
| Project Title Structural Parameters and Comparisons of Galaxies and Galactic Field Depths | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals Presented is a study of the structural parameters and model behaviors of galaxies with redshifts 0.8 to 2.0 and solar masses greater than 10^{10}. The goal of this study is to understand the studied galaxies' morphologies and evolutions. Additionally, this project hopes to understand how the depth of image fields affects the quality of the mathematical model fits created.</p> <p>Methods/Materials In order to study these galaxies, I first created mathematical models from images in the Hubble XDF (Extreme Deep Field), which were used to show that for the stated redshifts and masses, galaxies did not have a definitive shape to begin with, and that modern galaxies' shapes are not preexisting, which contrasts the notion that old galaxies are elliptical. Additionally, models created from the XDF were compared to models created from the Goods-South field. Next, I created models from ten simulated fields; the simulated fields were manufactured by using a poisson distribution to add noise.</p> <p>Results Graphs created from those comparisons show no association between the parameter outputs from the various image field depths. Moreover, when looking at only the data from the XDF images, it can be seen that there is an association between redshift and parameter output values.</p> <p>Conclusions/Discussion The field comparisons validate the entire observed field of galaxies, all of which are not nearly as detailed as the XDF, as perfectly useful for mathematical model fitting, and it opens new doors and new possibilities as astronomers are offered a much vaster number of galaxies that can now be modeled, and therefore their parameters understood, in full confidence that these prediction will be almost fully accurate. Moreover, the XDF data shows a definitive trend between the age of a galaxy and the geometries; as a galaxy ages, it gains definition. Thus, astronomers can understand how galaxies evolve.</p> | |
| Summary Statement This project looks at how galaxies evolve and are imaged. | |
| Help Received Mentor gave general help; teacher helped solidify ideas | |