

The University of Texas at San Antonio

UTSA Physics and Astronomy



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Friday, October 26th, 2018

FLN 2.02.06

3:00 PM

The Future for Exoplanet

The future for exoplanet science is dependent not only on successful missions such as TESS, WFIRST, and JWST, but also on building bridges to the geology, planetary science, and data science communities. It is by using the resources and experiences from these other disciplines that we can uncover more subtle trends within exoplanetary data and establish a holistic connection between stars and planets. As part of my interdisciplinary research, I study the patterns in stellar abundances using the Hypatia Catalog, the largest elemental abundance dataset for stars near to the Sun. Because stars and planets are formed at the same time, meaningful connections can be made between the chemical properties of stars and their orbiting planets. I will discuss how stellar abundances may be used to determine planetary structure and mineralogy, which impacts the crustal composition, tectonic processes, and other planetary geochemical cycles which directly influence the overall habitability. Using more data driven techniques, I will describe a Netflix-esque recommendation algorithm to determine which stars in the solar neighborhood are likely to host to-date undetected giant exoplanets, based on the abundances of specific elements within stars. Finally, I will outline the steps needed in the near future to fully understand both the physical and chemical relationship between stars and planets.

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