Starchive: The Open Access, Open Source Stellar Database

Angelle Tanner[1], Demitri Muna[2], Brett Addison[1], Farzaneh Zohrabi[1], Claire Geneser[1], Randy Niffenegger[1], [1] Mississippi State University (355 Lee Blvd, MSU, MS 39762, at876@msstate.edu), [2] The Ohio State University (57 Halsey St Apt 4, Brooklyn, NY 11216, demitri@scicoder.org).

Introduction: The past two decades have witnessed the golden age for exoplanet discoveries. In addition to discovering new exoplanets, astronomers are also carrying out follow-up observations of them to understand their physical properties and orbits, formation and migration histories, bulk and atmospheric compositions, and potential habitability. With these endeavors it has also become clear that we must know as much as possible about the host star(s) in order to calculate some of the planets physical properties, determine habitability and even the best methods for finding the planets in the first place.

However, both the initial target sample development and follow-up science is challenging due to limited time on large telescopes. Therefore, it is crucial to identify the most fruitful host stars for both the discovery and follow-up phases of exoplanet exploration. Archives such as SIMBAD, VizieR, the Washington Double Star Catalog, and various exoplanet databases used by the astronomical community currently lack comprehensive lists of stellar properties for candidate host stars to be properly vetted. This is especially true given the wide variety of exoplanet detection and characterization methods from direct imaging to transit timing variations to microlensing. This is where the Starchive database will fill in the void and be a major asset to the community.

The Starchive: The Starchive (under construction at starchive.org) is an open source, open access stellar database. It will host observable, physical, and derived properties of stars and planets as well as observational data such as direct imaging (AO and seeing limited), spectra, light curves, and other time series data sets.

Initially, Starchive will consist of stars from four populations: (1) stars within 30pc, (2) young nearby stars, (3) brown dwarfs, and (4) debris disk hosts. Once we have completed the database for these stellar populations, we plan on expanding its content with the help from the community. The database will host a pallet of plotting tools to help the community investigate and present these complex datasets.

While we are gathering a large collection of metadata to be present in the Starchive upon its release, it will be designed so that the community will be able to put data into the database themselves. To make sure that the integrity of the quality of the data is upheld, we will utilize a committee of volunteer astronomers to curate the content as its added to the database. To encourage the community to contribute to the database, we will send out a monthly newsletter highlighting the papers which are associated with new datasets and include relevant plots made with those datasets. We intend for the Starchive to be the go to site for assembling all future exoplanet search target lists as well as a new model for big data assembly, sifting, vetting, distribution and visualization. It will also be a significant resource for determining habitability as users will be able to easily assemble all known observational and physical parameters of the host star for each new exoplanet discovery.

During my presentation, I will highlight the current state of Starchive, its content, usability and the many different ways it will benefit the exoplanet community.