

## **GSU Summer Student Program in Physics and Astronomy**

**Project:** Galactic Space Motions of the Nearest K Dwarf Stars

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**Abstract:** As part of a comprehensive effort to characterize the nearest stars, the CHIRON echelle spectrograph on the CTIO/SMARTS 1.5m telescope is being used to acquire high resolution ( $R = 80000$ ) spectra of over 1000 K dwarfs within 50 parsecs. These data will be used to estimate critical stellar properties, including age, activity level, effective temperature, metallicity, stellar rotation, and kinematic motion.

**An REU student would determine the kinematic motions of the stars, which includes measuring the systemic gamma velocities of ~400 K dwarfs and determining their UVW space motions through the Milky Way.** When paired with Gaia data, gamma velocities can identify spectroscopic binaries and young and/or active stars, while UVW space motions can isolate members of moving groups with known ages. Depending on the student's scientific interest, they may also work on mini-projects within the RECONS group such as searching for companions around a smaller sample of stars or using existing databases to determine which K dwarfs have planetary companions. Familiarity with popular coding languages will be helpful to begin this project; however, it is not required at the start because training in Python and MATLAB will be provided throughout the summer. Ultimately, this study will target several thousand of the nearest K dwarfs, and provide results that will serve present and future studies of stellar astrophysics and exoplanet habitability.

Results from this work may be presented at scientific conferences and potentially be included in peer-reviewed articles published by members of the RECONS group.

