# Identifying binary transneptunian objects using model PSFs

*Denise C. Stephens (Brigham Young University), Keith S.Noll (Space Telescope Science Institute)*

Observations taken of TNOs using the Hubble Space Telescope (HST) have revealed several new binary systems. These discoveries show some apparently real differences in the frequency and types of binaries within each dynamical class. However, the significance of these results is limited by the small number of known binaries in each class, and the uncertainty in the binary frequency. This uncertainty is due to our inability to visually resolve binaries with small angular separations and/or faint companions. As a result the true binary frequency in any sample could be significantly larger. To identify additional unresolved binaries and improve the determination of the binary frequency requires that we either obtain higher resolution observations of each object or do a more careful analysis of the existing data to find partially resolved binaries using PSF-fitting.

In this poster we will describe how to use PSF-fitting to find partially resolved binary systems in existing HST data. Although this poster deals specifically with HST, the ideas and principles could be applied to other datasets. The advantage of working with HST data is that the point-spread function is stable throughout the duration of the observations. This stability means that with PSF-fitting we can identify binaries by the changes they induce in the combined PSF at separations considerably smaller than those defined by the Rayleigh limit. In this poster we will show how this technique has already been used to identify six new binary systems, and how we can apply it to other HST observations to better determine the binary fraction for each of these datasets.