In my presentation I will give a short introduction to the science of extrasolar planets, in particular the technique of transit, eclipse and phase curve spectro-photometry. I will describe my various projects in this emerging field using state of the art spectroscopic and photometric instruments on the largest ground based telescopes, the 'flying telescope' SOFIA (Stratospheric Observatory for Infrared Astronomy) and the Kepler and Hubble space telescopes.