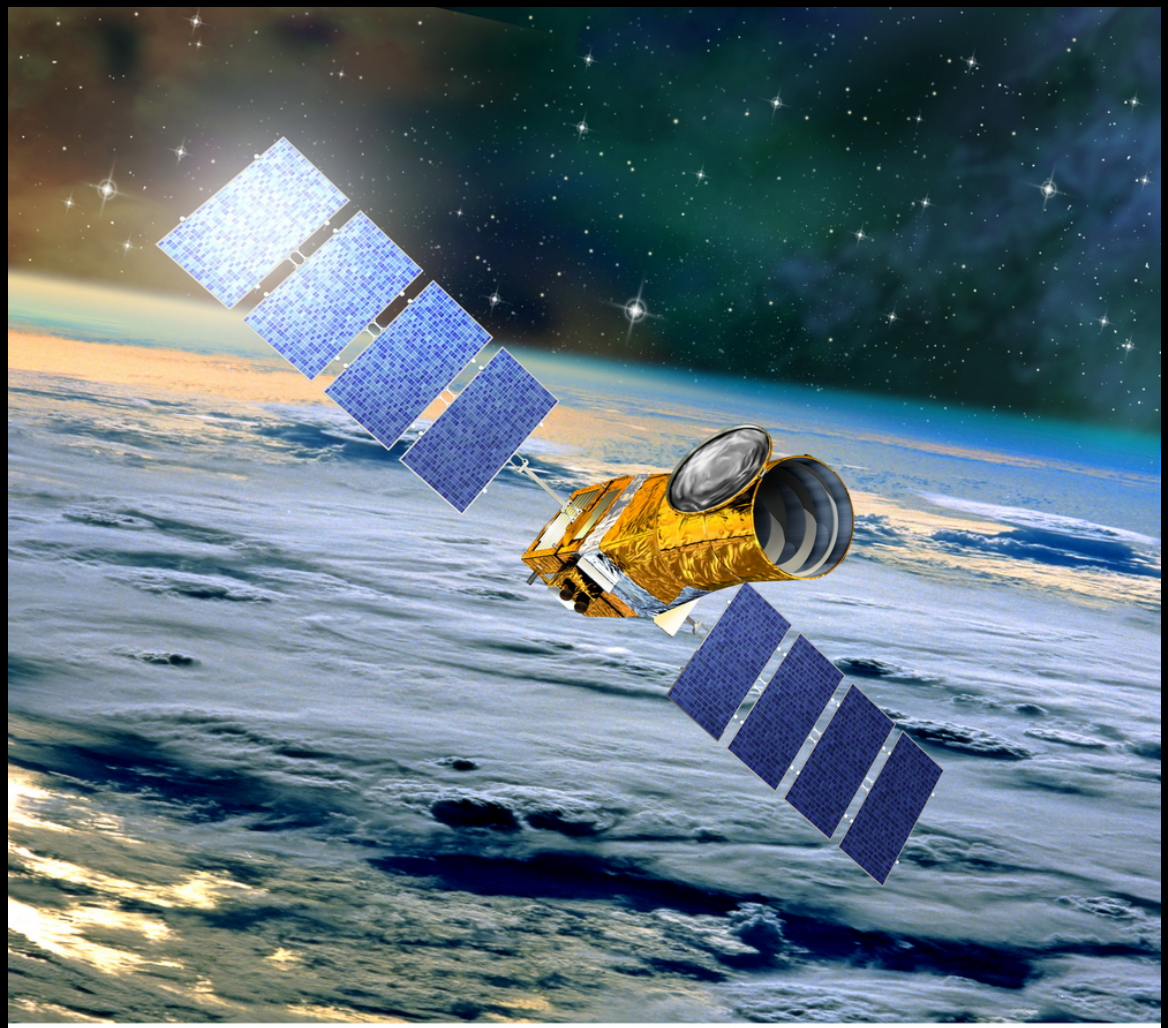
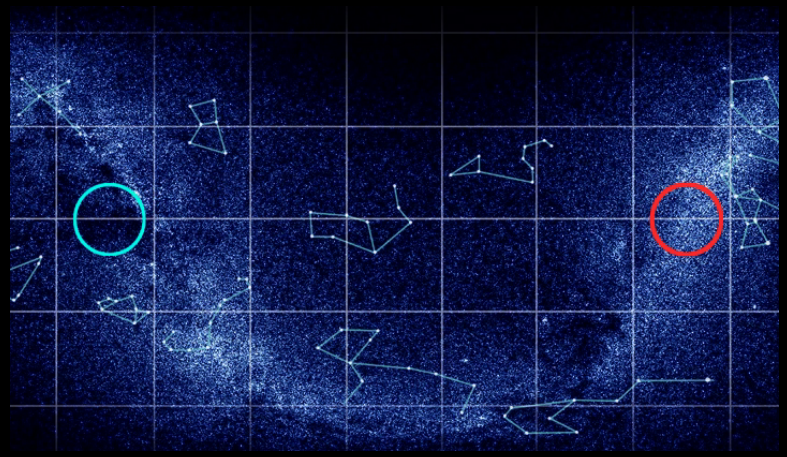
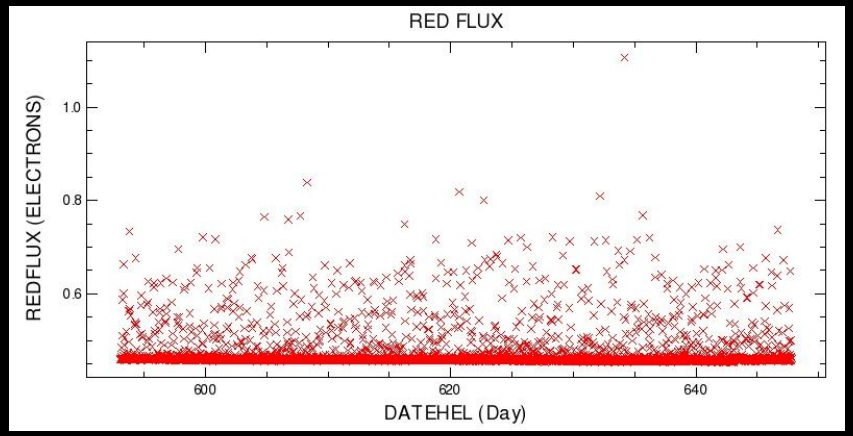
HUNTING FOR PLANETS WITH COROT

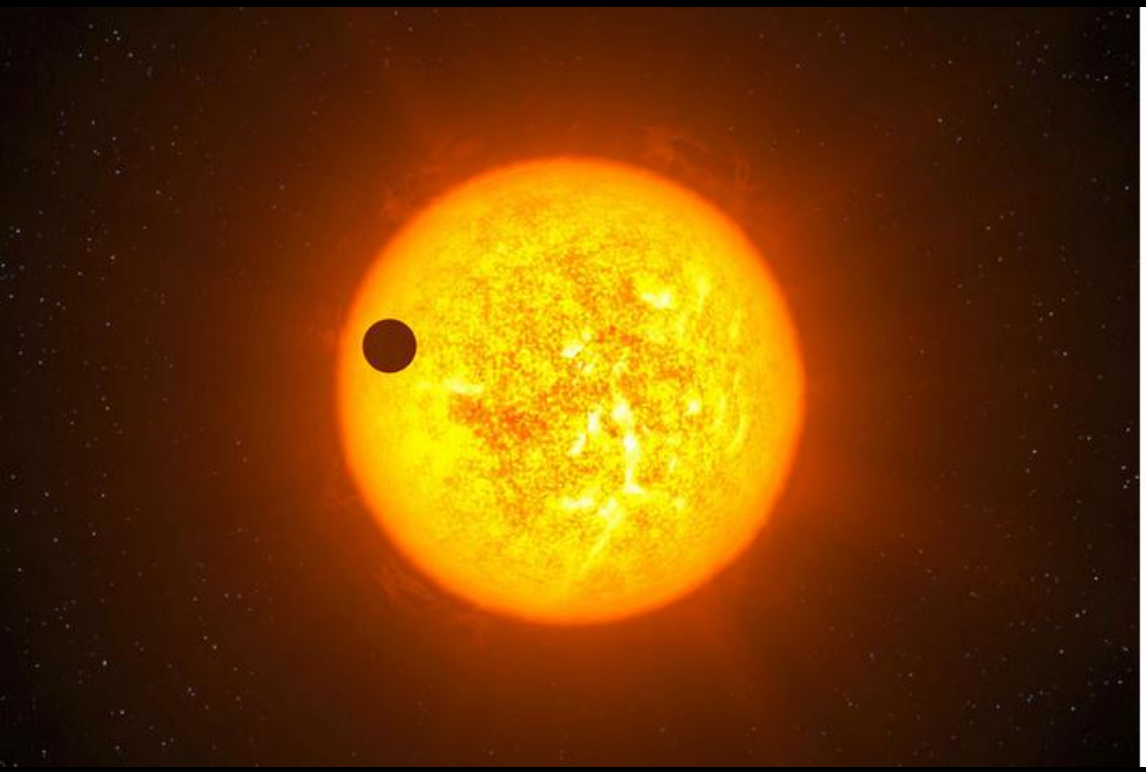
Group Leader:

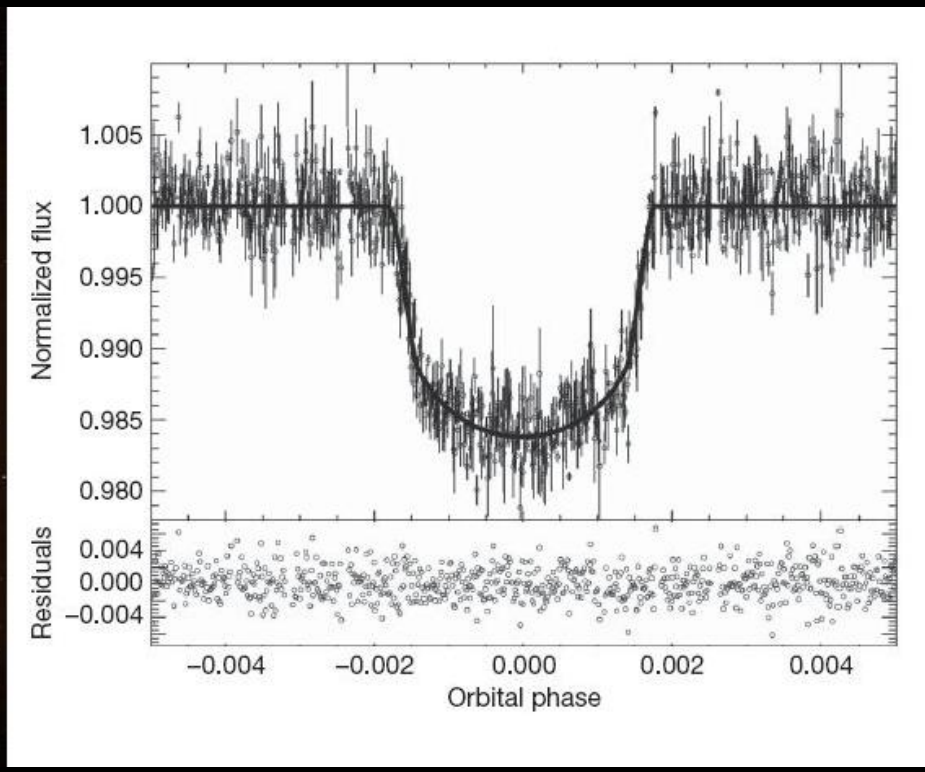
Stephen Kane






RED FLUX
REDFLUX (ELECTRONS)
1.0
0.8
0.6
600
620
640
DATEHEL (Day)




Normalized flux
1.005
1.000
0.995
0.990
0.985
0.980
Residuals
0.004
0.000
−0.004
−0.004
−0.002
0.000
0.002
0.004
Orbital phase

THE CHALLENGE

- The transit method generally involves gathering LARGE datasets of RAW photometry.

- Are there signatures of one or more exoplanets in these data? Yes! But we need to know how to locate them.

- There are many noise sources which can disguise transit signatures. How do we filter these?

- There are astrophysical sources of noise also that can mimic the signature of an exoplanet (blended eclipsing binaries).

- We will simulate the end-to-end process using a subset of CoRoT data.

THE METHOD

- The NASA Star and Exoplanet Database (NStED) serves raw data from the CoRoT mission.

- Become familiar with the CoRoT data products and the noise properties.

- Investigate the light curves using various techniques, including the NStED periodogram service which includes a Box-fitting Least Squares algorithm.

- Identify periodic signatures within the light curves and determine their nature.

- In particular, some of the light curves contain the signature of a transiting exoplanet. Locate these and characterize them (Seager & Mallen-Ornelas, 2003, ApJ, 585, 1038).

NExScI

CALIFORNIA INSTITUTE OF TECHNOLOGY 1891

THE RESULTS

- How to extract survey data from on-line archives.
- How to sift light curves for periodic signatures.
- What is the expected false-alarm rate vs the observed false-alarm rate?
- What kind of features manifest as false-alarms?
- How many transits are expected from a given survey? How many did we actually detect?
- What can we learn from transit light curves about the characteristics of the planet?