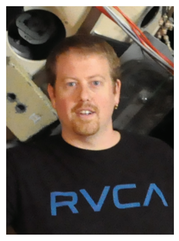
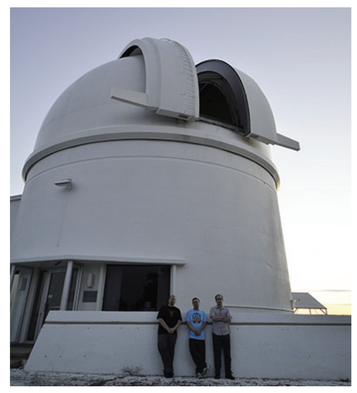
Visible-light laser-adaptive-optics imaging of thousands of exoplanet hosts with



Robo-AO

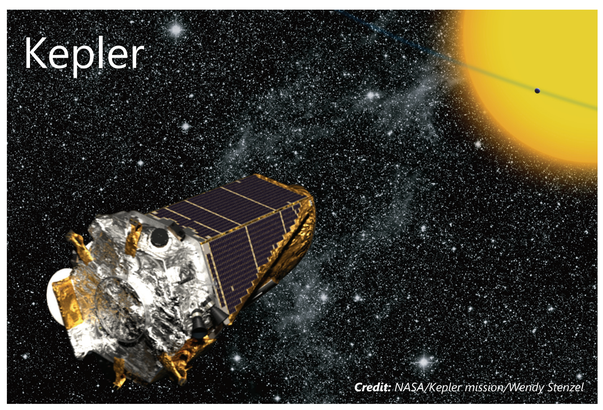


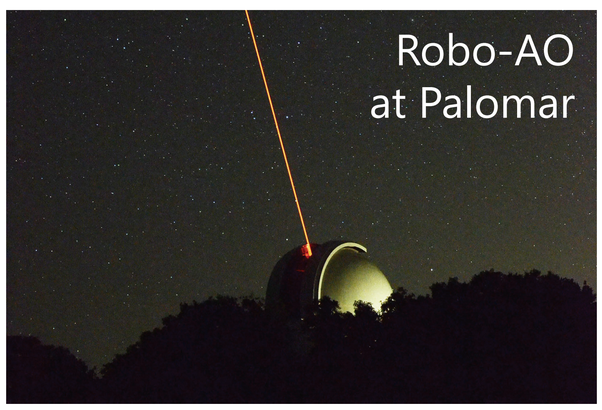
Christoph Baranec (Hawai'i), **Reed Riddle** (Caltech), **Nicholas Law** (UNC Chapel Hill)

The Robo-AO KOI Survey

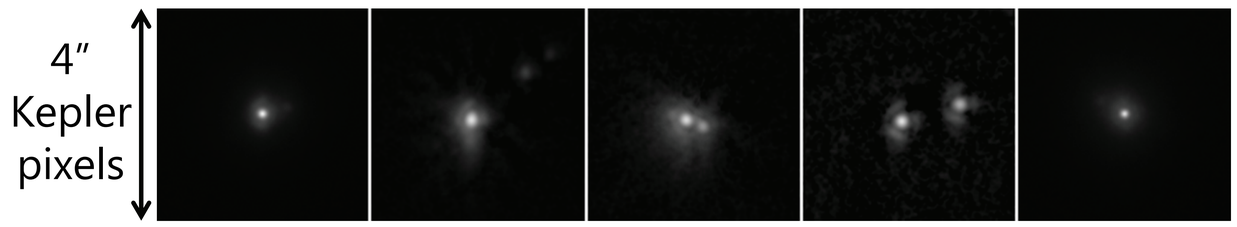
Of ~156,000 stars, Kepler has so far identified 2,697 possible exoplanet hosts.

Robo-AO has imaged ~1,800 KOIs to date.

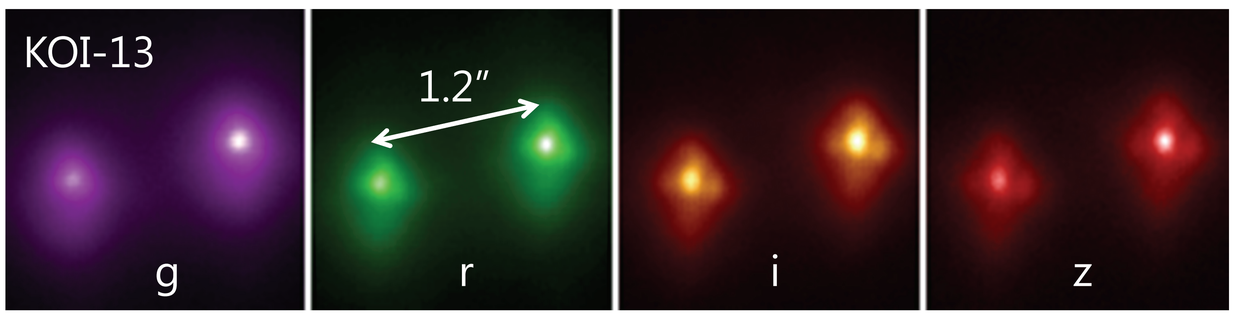




Robo-AO reveals multiple sources contributing to Kepler's light curves.

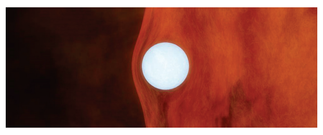


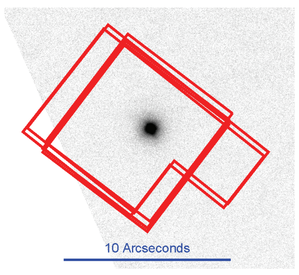
Robo-AO performs diffraction-limited multicolor visible light photometry.

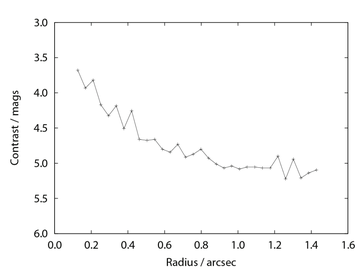


Robo-AO confirms the absence of nearby contaminating stars to KOIs.

E.g., KOI-256,
Muirhead, et al. 2013





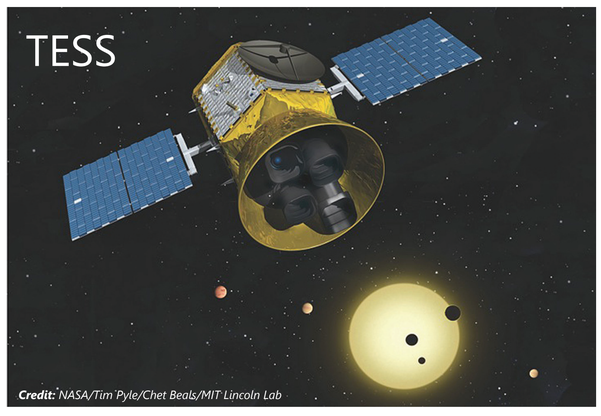


The Robo-AO MK II TESS Survey

TESS will be observing roughly an order of magnitude more stars than Kepler.

A 2nd generation Robo-AO will go to the U. Hawai'i 2.2-m on Mauna Kea and will be used for imaging of TESS exoplanet hosts.

Also looking to put a Robo-AO in the southern hemisphere for all-sky coverage.



The Robo-AO system

The only autonomous laser adaptive optics and science system operating on sky

Visible-light, ~0.1″ angular resolution (40 times sharper than Kepler)

Pilot-safe 12W UV laser guide star and 'all-sky' space-asset avoidance

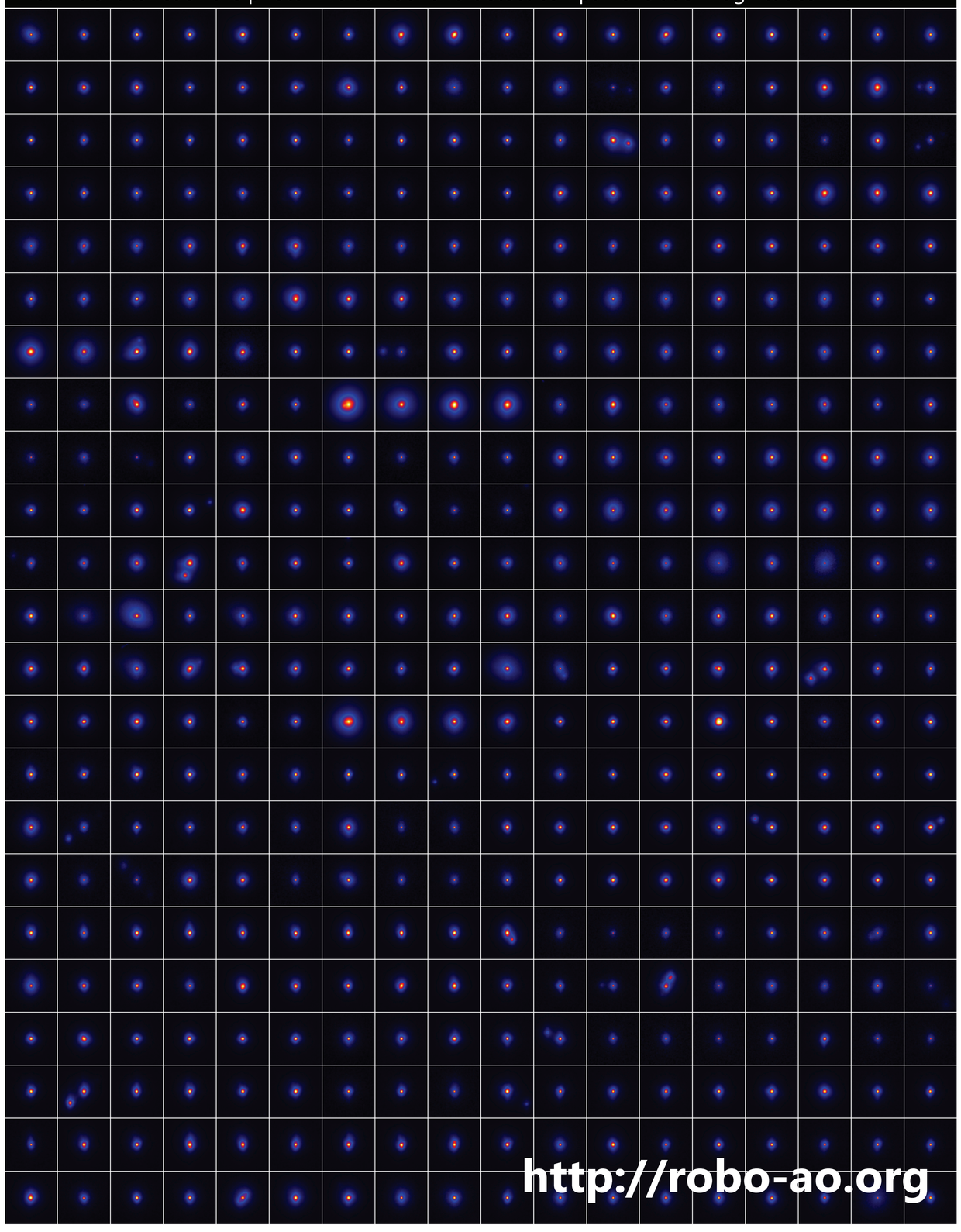
83 nights on sky at the 1.5-m telescope at Palomar Observatory

Target-to-target overheads <90s, typically observing 20 targets per hour

Over 10,000 robotic laser AO observations executed!!!

Infrared wavelength tip-tilt correction and observing available in 2014

414 Robo-AO observations , executed in just 21 hours, of stars in the search for (sub)-stellar companions. Each square represents a 3″ x 3″ area, and 90s of integration in i-band (λ = 765 nm), sufficient to reach the photon noise floor and detect companions at 5-magnitudes within 0.2″.



The Robo-AO project is a collaboration between Caltech Optical Observatories and the Inter-University Centre for Astronomy and Astrophysics. It is partially funded by the National Science Foundation under grants AST-0906060, AST-0960343 and AST-1207891, the Office of Naval Research under grant N00014-11-1-0903, by the Mount Cuba Astronomical Foundation, and by a gift from Samuel Oschin. Second Kepler Science Conference, November 4-8, 2013.