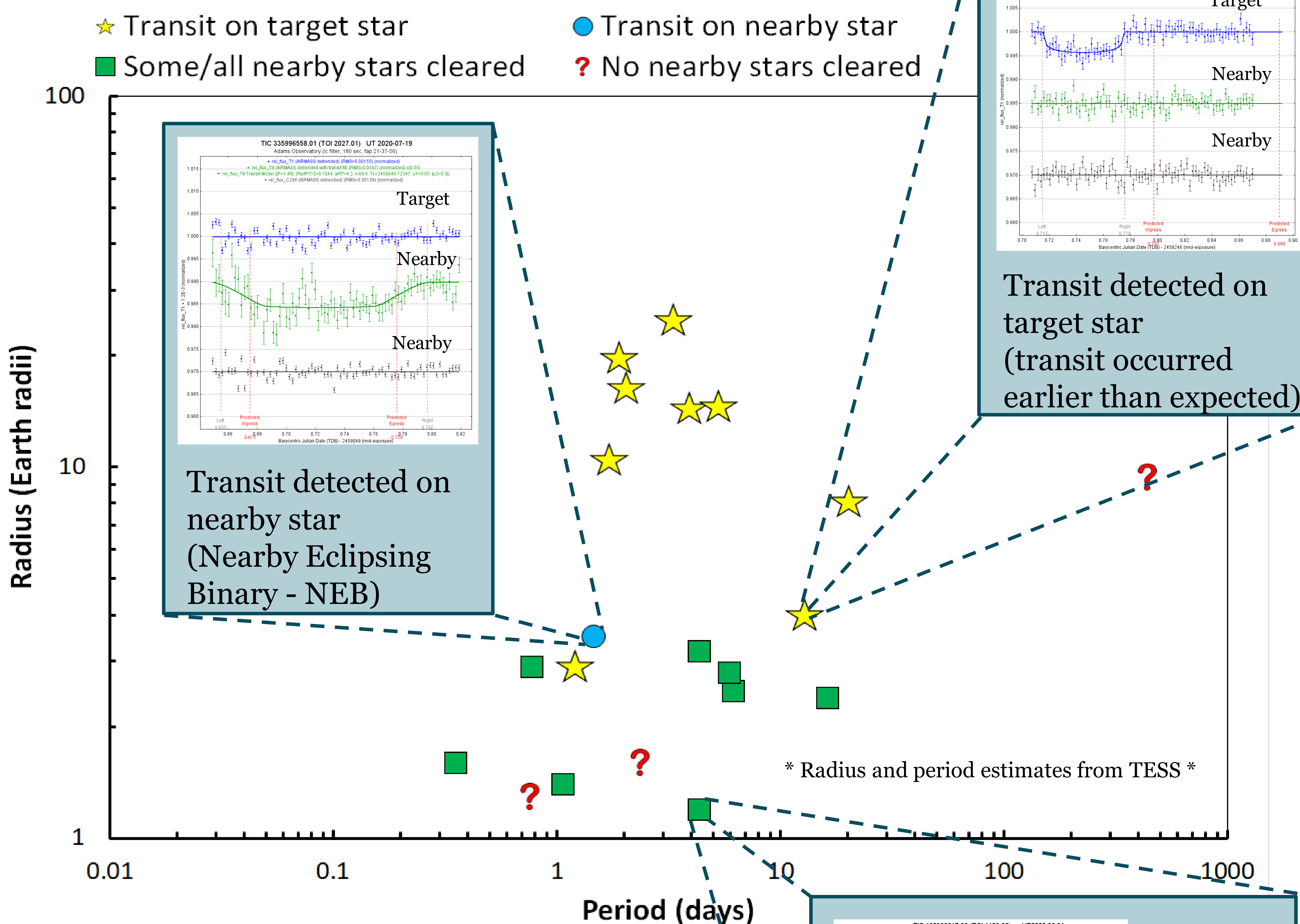


Undergraduate Research in the Time of COVID: TESS Follow-Up Observations at Austin College's Adams Observatory

David Baker, Neil Cutting, Lindy Luker, Tanner O'Dwyer, Chloe Schnaible, Brett Skinner

In 2020-21, we observed planetary candidate transits on nine target stars, detected one nearby eclipsing binary (NEB), and cleared some nearby stars of false positives for another eight objects of interest using photometric observations at the Adams Observatory.

Adams Observatory at Austin College 2020-21 Planetary Candidate Observations



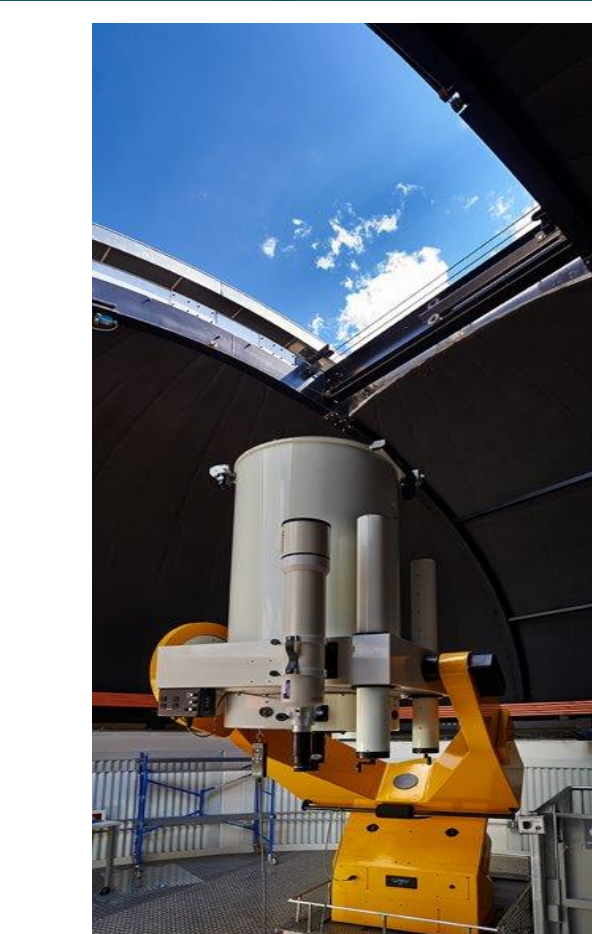
Observed TESS Objects of Interest (TOI)

★	●	■	?
1296.01*	1601.01 ^[5]	2027.01 ⁺	1246.03 1860.01
1410.01	1803.01		1432.01 2260.01
1480.01*	1836.01		1453.02 2092.01
1516.01	3907.01		1611.01 4110.01
1518.01			
* Used multiple filters	⁺ Radius incorrect for NEB	[^] Kepler-460 b	

Adams Observatory and TESS Follow-Up Observing Program^[1]

The Adams Observatory is a member of the TESS Follow-Up Observing Program (TFOP) Sub-Group 1 (SG1) to provide ground-based follow-up photometric observations for the TESS mission.

- Telescope: 0.61m f/8 DFM Ritchey-Chrétien design
- Filters: Johnson-Cousins
- FLI 16803 camera: Field of View 26' x 26', Pixel Scale 0.38"



Determine
Targets in
TESS
Transit Finder
Database^[2]

Observe at
Adams
Observatory

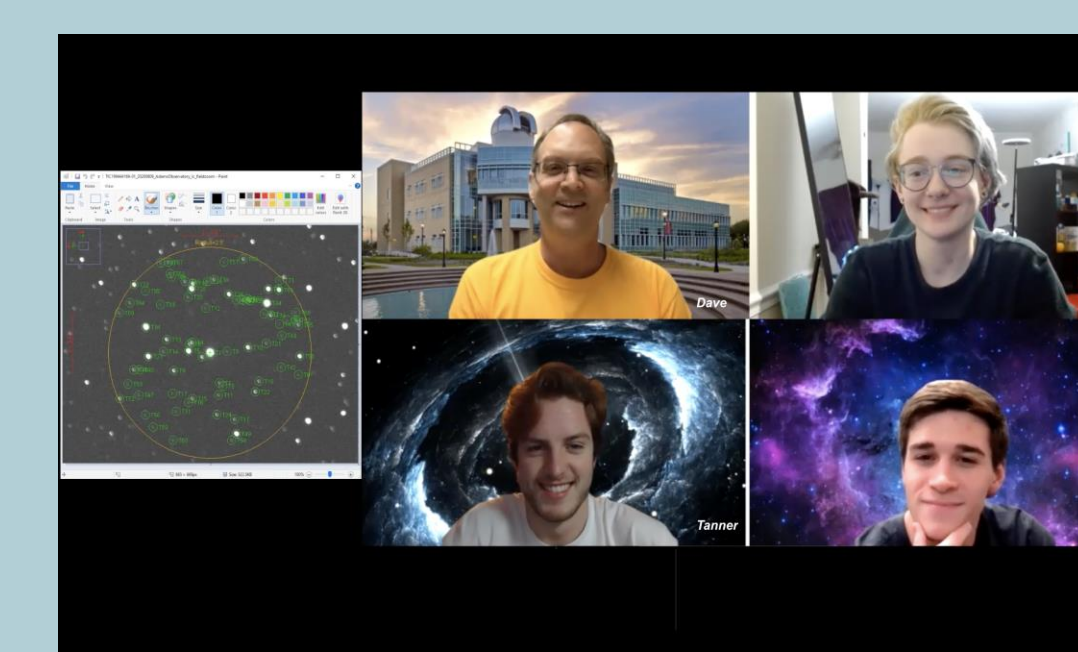
Conduct
Photometry with
AstroImageJ^[3]

Upload Results
to ExoFOP-
TESS^[4]

Undergraduate Research at Austin College

Undergraduate research at Austin College provides students the opportunity to experience a professional research environment early in their academic careers to help them grow as scientists and engineers.

Summer 2020

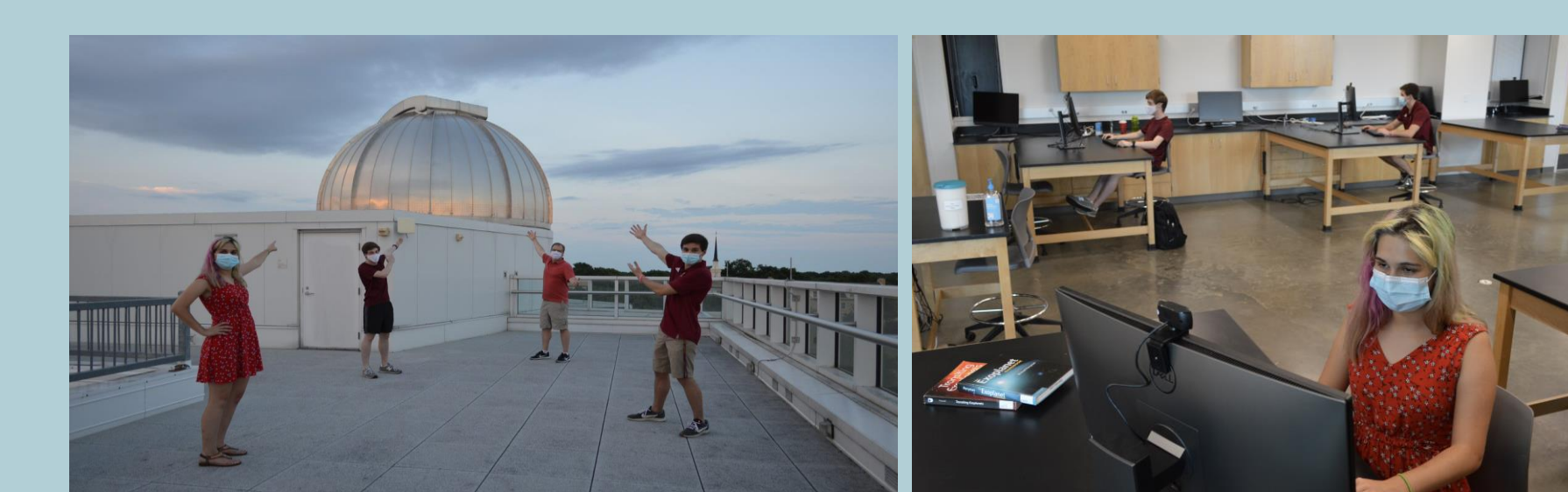


100% remote via
Zoom for 8 hours
per night

- Telescope operated by professor on campus
- Data analyzed by students offsite with identical computers and software to enhance collaboration and consistency

Summer 2021

- Hybrid environment (in-person and Zoom)
- Observations and analysis conducted by students on campus
- COVID safety protocols implemented



Conclusions

- Observed transits on possible mini-Neptune exoplanets and larger
- Detected one NEB (false positive)
- Cleared some or all nearby stars of false positives for possible smaller exoplanets

Future Directions

- Continue TFOP participation through TESS's extended mission and beyond
- Support future exoplanet investigations with the James Webb Space Telescope

References

- [1] Collins K. (2019), AAS Meeting, 2019AAS...23314 005C.
- [2] Jensen E. (2013), ASCL, 2013ascl.soft6007J
- [3] Collins K. et al. (2017), AJ 153:77
- [4] Akeson R. et al. (2019), AAS Meeting, 2019AAS...23314009A.
- [5] Rodriguez J. E. et al. (2021), AJ 161:194

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