**HOW CAN GROUND-BASED EFFORTS COMPLEMENT JWST FOLLOW-UP OF EXCITING TESS PLANETS?** B. Rackham[1], D. Apai[2], M. López-Morales[3], A. Jordán[4], D. Osip[5], N. Espinoza[4], N. Lewis[6]. [1]Dept. of Astronomy, University of Arizona, 933 North Cherry Ave., Tucson, AZ 85721, USA (brackham@as.arizona.edu); [2]University of Arizona, Tucson, AZ; [3]Harvard-Smithsonian Center for Astrophysics, Cambridge, MA; [4]Pontificia Universidad Católica de Chile, Santiago, Chile; [5]Observatories of the Carnegie Institution for Science, Pasadena, CA; [6]Massachusetts Institute of Technology, Cambridge, MA.

**Introduction: T**he upcoming TESS mission will launch the next revolution in exoplanet studies, discovering thousands of new transiting exoplanets and providing excellent targets for in-depth characterization. Follow-up efforts for the most exciting targets will focus on near-future, space-based facilities like JWST. However, in-depth characterization of a prime target will require a substantial fraction of JWST time [1]. Therefore, with tens of known terrestrial exoplanets in the habitable zones of late-main-sequence stars, the limit on characterization efforts will arise from the available facilities, not the available targets. In light of this we ask the question, "How can currently existing ground-based facilities aid in this effort?"

We argue that the answer comes from turning to optical wavelengths, particularly those that will be not be covered by JWST (<0.6 μm). In this regime, transmission spectra can probe Rayleigh scattering, the signature of which can be used to deduce the atmospheric mean molecular mass and place constraints on mixing ratios of molecular absorbers observed in near-infrared spectra [2]. For hazy atmospheres, optical spectra can efficiently probe haze particle size [3], thereby providing key information to prioritize JWST efforts.

**This Work:** Here we examine how optical spectra obtained by existing ground-based facilities can be used to complement JWST characterization of transiting terrestrial planets in the habitable zones of bright, late-main-sequence stars. We consider hypothetical "best case" planets that will be detected by TESS. Using our recent results for the benchmark exoplanet GJ 1214b from the Arizona-CfA-Católica Exoplanet Spectroscopy Survey (*ACCESS*) [4], we examine the precisions possible for optical spectra of prime TESS targets with Magellan/IMACS, MMT/Binospec, and LBT/MODS. We discuss the time required on these capable spectrographs to 1) detect a Rayleigh scattering slope from a clear atmosphere, and 2) place useful constraints on particle sizes in hazy atmospheres.

**References:** [1] Cowan N. B. et al. (2015) arXiv:1502.00004v1. [2] Benneke B. and Seager S. (2012) *ApJ* 753, 100. [3] Morley C. V. et al. (2013) *ApJ* 775, 33. [4] Rackham B. V. et al. (2015) *in prep*.