

Mapping The Nearest Stars For Habitable Worlds

SARA SEAGER¹

¹seager@mit.edu, Massachusetts Institute of Technology

Thousands of exoplanets are known to orbit nearby stars and small rocky planets are established to be common. The ambitious goal of identifying a habitable or inhabited world is within reach. But how likely are we to succeed? We need to first discover a pool of planets in their host star's "extended" habitable zone and second observe their atmospheres in detail to identify the presence of water vapor, indicative of surface liquid water, a requirement for all life as we know it. Life must not only exist on one of those planets, but the life must produce "biosignature gases" that are spectroscopically active and detectable with ground- and space-based telescopes. We need to be able to sort through a growing list of false-positive scenarios with what is likely to be limited data. What will it take to identify such habitable worlds, amidst a yet unknown range of planetary environments, with the observations and theoretical tools available to us?