Debra Fischer, Yale University

The Search for 100 Earths

Abstract: The search for exoplanets is motivated by the question of whether life exists elsewhere. This drives our interest in the detection of planets that are similar to our own world: rocky planets with the potential for liquid surface water and plate tectonics; worlds that might harbor life that we can recognize. Importantly, we will need to discover not just a few, but hundreds of these worlds to eventually gain a statistical understanding of whether life is rare, common, or ubiquitous and ground-based telescopes offer an ideal platform for carrying out decade-long surveys. It is critical for follow-up studies (imaging, atmospheric studies) that these planets orbit nearby stars. In this talk, I will discuss how we plan to take what we've learned and push on to the next frontier: our plans for a next generation spectrograph, EXPRES, to carry out a search 100 Earths with the Discovery Channel Telescope.

Debra Fischer, Sigma Xi Distinguished Lecturer and professor of astronomy and geology and geophysics at Yale University, began hunting for exoplanets in 1997 by measuring Doppler shifts in the spectra of stars. She has discovered hundreds of extrasolar planets with this technique, including the first known multiple planet system in 1999. Fischer’s analysis of stellar spectra demonstrated that gas giant planets were more likely to form around stars with a higher abundance of heavy elements and she quantified the now well-known “planet-metallicity” correlation. Fischer led an international consortium in 2003–08 to carry out a search for hot Jupiters orbiting metal-rich stars; that project alone detected more than 30 new extrasolar planets. Some of these planets transit in front of their host stars, enabling a measurement of the radius and mean density of the planets and permitting an observation of the atmosphere with transmission spectroscopy.

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Complimentary refreshments available at 3:30 PM and after the lecture