
Earths In Other Solar Systems: The Formation of Habitable Zone Earth-Like Planets With Biocritical Ingredients

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Abstract

The past decade has opened our eyes on the unexpected and dramatic diversity of the physical properties of exoplanetary systems. The different planetary architectures and physical planet properties argue for formation pathways that are in many ways different from the Solar System's formation. The physical differences also foreshadow possible major compositional and dynamical differences between our own planetary system and those in which we will search for biosignatures.

In this talk I will briefly introduce evidence for the different planetary architectures and formation histories between sun-like stars and low-mass stars, some of which are host stars of relatively easily accessible habitable zone earth-sized planets. I will argue that the assumption that habitable zone earth-sized planets are identical around stars of different masses is probably incorrect.

I will introduce a major NASA-funded 5 yr-long project, Earths in Other Solar Systems, that coordinates the interdisciplinary research of fourteen teams addressing the compositional diversity and range of volatiles and organics budgets of earth-sized planets around different host stars. I will describe the goals and first results from our team and place this project in the endeavor to identify the most promising nearby stars for future atmospheric biosignature surveys.

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