Contribution ID: **42** Type: **Oral contribution**

Simulating and Observing the First Galaxies

Thursday 12 September 2019 09:00 (30 minutes)

JWST will uncover a vast population of low-luminosity galaxies at Cosmic Dawn that is responsible for most of reionization. We present predictions on this high-redshift population, focusing on their physical properties and role during reionization. We use two suites of high-resolution cosmological simulations – the Renaissance Simulations and the Tempest Simulations – that sample different large-scale environments. Using a sample of over 3,000 resolved galaxies along with the formation of 10,000 massive Population III stars, we show that the luminosity function flattens above a UV magnitude of -14, and the faintest galaxies may be the ancestors of ultra-faint dwarfs. Metals from Population III supernova are the primary source of metals in a fraction of the most metal-poor galaxies. Star formation in low-luminosity galaxies is extremely bursty as the gas reservoir is easily disrupted by internal feedback, resulting in a large spread in galaxy relationships, such as the mass-metallicity, SFR-stellar mass, and stellar mass-halo mass relations. This inefficient star formation ultimately leads to high mass-to-light ratios, similar to local ultra-faint dwarfs, even at high redshifts.

Author: Prof. WISE, John (Georgia Institute of Technology)

Presenter: Prof. WISE, John (Georgia Institute of Technology)

Session Classification: THEORETICAL APPROACH TO CEMP STARS, FIRST STARS, AND FIRST GALAXIES