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Witnessing the Formation of Galaxies from their Origins to the Present

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In 1977, Steven Weinberg stated that "the formation of galaxies is one of the great outstanding problems of astrophysics". This statement remains valid 30 years later, although we have made significant progress. One of the great triumphs of astrophysics is that we are able to predict the growth of dark-matter structures in our Universe with high accuracy. I will discuss how we use observations of galaxies trace these dark matter structures, and how we use observations of some of the most distant galaxies to measure directly the properties of galaxies as they evolve. I focus on results from very deep surveys from telescopes centered around imaging in the Infrared (beyond 1 micron), including data from the Magellan Observatory in Chile, the Hubble Space Telescope, and the Spitzer Space Telescope and Herschel Space Observatory. With data from these telescopes we have measured the star-formation history, stellar-mass assembly, and structural formation of galaxies like the Milky Way Galaxy over the past 10 billion years of history. I will discuss ongoing and future research to understand the "formation epochs" of galaxies, where the ultimate goal is to form a coherent physical theory for galaxy formation.