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Windows on Our Universe: Breakthroughs in Observational Cosmology

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Clusters and Cosmology with the South Pole Telescope
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The Formation of Galaxies
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Cosmology from the Sloan Digital Sky Survey
David Weinberg, The Ohio State University

In the past decade, the study of our Universe has entered a data- driven era. Indeed, observational advances indicate that cosmologists can understand the evolution of our Universe in exquisite detail and use our Universe as a laboratory with which to make profound statements about the laws of physics. Cosmologists have mapped out the relic radiation from the big bang itself and have succeeded in enormous projects to map the patterns of galaxies and the evolution of galaxies over ten billion years. Researchers are beginning to understand how the initial conditions depicted in the relic radiation evolve to form such rich galactic structure. And of course, with new data new mysteries have arisen that strike at the heart of fundamental physics and drive another generation of ambitious observational projects. The three speakers will discuss recent breakthroughs in observational cosmology: what has been learned about our Universe, the mysteries that have been uncovered, and what they see for the future.