



# Science on Saturday Lecture 8 February 2014

Uncovering cosmic origins: what we know, what we can know, and what limits we may face

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## **ABSTRACT:**

Understanding the structure and evolution of our Universe has been a human pastime for thousands of years, but prior to the invention of crossword puzzles and fortune cookies, not much of any quantitative progress had been made. I'll discuss some of the remarkable progress that has been made in your lifetime - not only in understanding our Universe but also, remarkably, how it may have started. In doing so, we will identify questions that can be addressed with further data, as well as those that may not.

## **BIOGRAPHY:**

My current research is focused on the measurement of the temperature and polarization anisotropy of the Cosmic Microwave Background Radiation (CMB), with emphasis on large-scale polarization as an observational probe of Inflation. This work is carried out using both orbital and sub-orbital millimeter wavelength polarimeters. Areas of technical expertise include microwave and millimeter - wave instrumentation and optics, numerical analysis of optical systems, numerical modeling and optimization of cryogenic bolometric receivers, sub-Kelvin cryogenics, stratospheric ballooning, systems integration and the analysis of large datasets. Significant contributions include the design and integration of the polarized receivers and optics for Boomerang03, and used in the Planck HFI, Quad and Bicep instruments, the science analysis of the Boomerang03 data set and pioneering the use of large-format planar-antenna coupled arrays for CMB polarimetry. Our group is currently leading the integration of Spider and is heavily involved in the science analysis of the Planck data. I am the PI of Spider, a Planck Scientist and member of the HFI Core Team.