Speaker: Jonathan P. Gardner, NASA's Goddard Space Flight Center

Title: The Beginning and End of the Universe

Abstract:
Cosmology is the scientific study of how the Universe began more than 13 billion years ago, how its properties have changed from that time to the present, and what its eventual fate might be. Observational cosmology uses telescopes like the Hubble to reach back in time to find the faint echoes of the Big Bang. In this lecture, I will give an overview of cosmology, highlighting the very rapid progress this field has made in the last decade, and the role that NASA space telescopes have played and will continue to play in the years to come. I will then focus on two of the most intriguing of those recent discoveries: inflation and dark energy. Our universe began in an extremely rapid accelerated expansion, called inflation, which removed all traces anything that may have existed before, flattened the geometry of space-time, and turned microscopic quantum fluctuations into the largest structures in the universe. At the present time, more than 70% of the mass-energy in the Universe consists of a mysterious substance called dark energy. The dark energy causes the expansion of the Universe to accelerate, and he will discuss the ways that we might be able to measure that acceleration more accurately, revealing the nature of the dark energy and learning the eventual fate of the Universe.