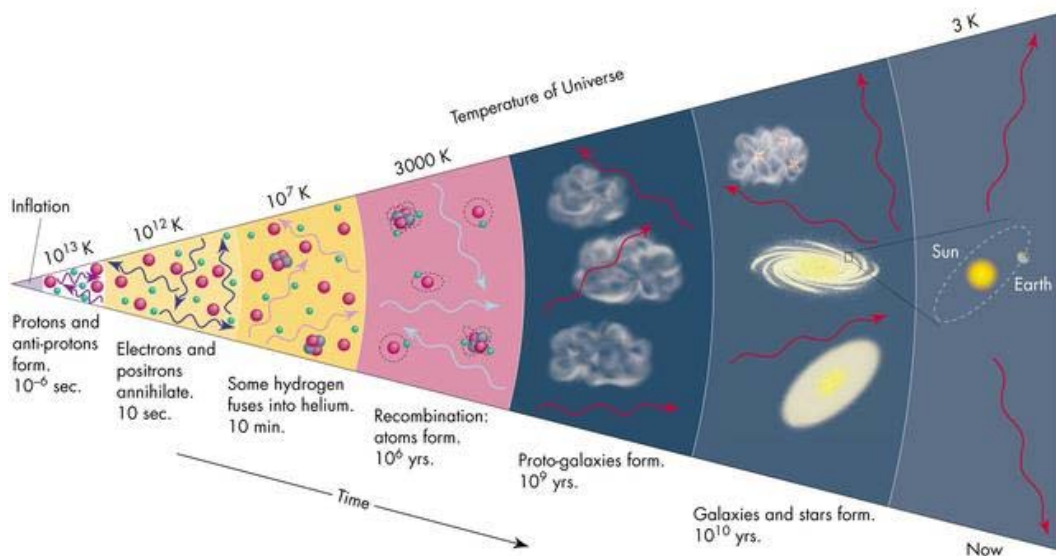


Sam Drake - Biography

Sam Drake is a senior research scientist in the Defence Science and Technology Organisation (DSTO). He obtained his honours degree in physics from the University of Melbourne, and went on to do a PhD in mathematical physics (General Relativity) at the University of Adelaide. Following a post-doctoral position at the Universita di Padova, Italy, he joined the Navigation Systems group of DSTO in 1999 working on the operational analysis of the global positioning system (GPS). In 2002 Sam was chosen to represent Australia at the International Cooperative Program for the Promotion of Operations Research held in Tokyo, Japan. Since starting at DSTO Sam has worked on a variety of projects ranging from GPS, communication networks to autonomous control of unmanned aerial vehicles (UAVs). Sam's current work involves the use of tensor calculus in various aspects of geolocation. Sam is also an adjunct associate lecturer at the University of Adelaide.



Abstract – ‘The Big Bang theory’:

In this talk I will attempt to give a brief introduction into the evolution of the universe, popularly known as big bang theory. Evidence for the “Big Bang” comes from measurements of the Hubble “constant” (which varies with time) and the cosmic microwave background radiation (CMBR). I will explain how cosmology (which is the study of how the universe evolves using the Einstein’s theory of general relativity) predicts the existence of the Hubble’s constant and the CMBR. While the standard cosmological model is an incredibly successful theory there are inconsistencies between it and observations. To remove these apparent anomalies concepts like inflation, dark matter and the cosmological constant are introduced. Recent satellite measurements of the CMBR by the cosmic background explorer (COBE) and the Wilkinson Microwave Anisotropy Probe (WMAP) have led us to a more consistent view of the composition and curvature of the universe. I will endeavour to explain what the current “standard model” of cosmology is and how it fits in with the recent observations. Lastly I would like to point out that our understanding of the beginning, evolution and end of the universe is by no means complete. I will finish my talk with a discussion of some of the open questions in cosmology.