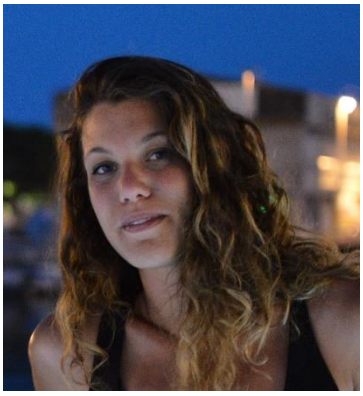

Roberta Chiovoloni
Swansea University
Theoretical Cosmology

PROJECT TITLE

String Theory origin of the Universe and its visualization.

ABOUT ME

I am a Theoretical Physics with a deep interest in the study and understanding of the very early Universe. I completed both my BSc in Physics and MSc in Theoretical Physics with honours at "La Sapienza" University of Rome and I arrived in Swansea, where I am now a PhD student, just after my master graduation last October. In my MPhys project I analyzed the quantum and semiclassical dynamical evolution of a particular cosmological model and this made me become interested in the study of the very early Universe. In my PhD I am working on developing models of inflation in the framework of string theory. Is it possible to build an inflationary model consistently with quantum gravity? This is one of the question I will try to address. The development of numerical techniques to analyse inflationary models is crucial for this project.

I am very excited to be part of the CDT since, after the completition of my PhD, the skills developed would be extremely valuable to approach the world of industry.

RESEARCH AREA

Inflation is a theory of exponential expansion of space in the very early Universe introduced to solve problems related to the Standard Cosmological Model and to explain the origin of large scale structures. However inflationary scenarios in effective field theory have limitations due to the incomplete knowledge of the ultraviolet completition; this leads to the development of inflation models in the framework of supergravity and string theory.

The main aim of my project is the development of theoretically consistent models of string theory inflation and their primordial signatures due to the presence of spectator and dynamical fields, such as scalar and vectors, beyond the inflaton field.

DATA INTENSIVE SKILLS AND INTERESTS

A crucial element of my project is the development of numerical techniques to analyse the inflationary models, which cannot be analysed analytically due to their complexity; in particular I am using *Mathematica* for this purpose.

Being a CDT funded PhD student I had the opportunity to attend lectures about Machine Learning, Data Analysis and Data Visualization and a Summer School in Data Intensive Science which gave me a set of skills transferable to industry related problem.