Oxford University Summer School for Adults

Title: Understanding Space and Time

Dates: Week 5, 8-15 August 2026

Tutor: Marina Debattista

Course Overview

Understanding space and time is more exciting than ever, as scientists continue to detect gravitational signals from merging black holes in distant galaxies, and to debate new evidence concerning the rate of expansion of the universe and the existence of dark energy. Using the minimum amount of mathematics, this course offers a conceptually based introduction to the current scientific understanding of space and time, and a chance to learn about recent developments at the cosmic frontier.

Course Outline

Seminar 1 Sun, 9.00 am –10.30am	Space and time before Einstein
Seminar 2 Sun, 11.00 am –12.30pm	The arrow of time
Seminar 3 Mon, 9.00 am –10.30am	The Special Theory of Relativity
Seminar 4 Mon, 11.00 am –12.30pm	The Special Theory of Relativity
Seminar 5 Tue, 9.00 am –10.30am	Spacetime
Seminar 6 Tue, 11.00 am –12.30pm	Curved space
Seminar 7 Wed, 9.00 am –10.30am	The General Theory of Relativity
Seminar 8 Wed, 11.00 am –12.30pm	The geometry of the universe
Seminar 9 Thu, 9.00 am –10.30am	The big bang and cosmic inflation
Seminar 10 Thu, 11.00 am –12.30pm	Anatomy of a black hole
Seminar 11 Fri, 9.00 am –10.30am	Beyond big bang
Seminar 12 Fri, 11.00 am –12.30pm	Causality, parallel universes and time machines

Tutor

Marina Debattista has a PhD in Physics specialising in quantum field theory and is currently interested in the popularisation of science.

Course Aim

This course aims to provide an introduction to the concepts of space and time and to the basic ideas, principles and applications of Einstein's theory of relativity.

Course Objectives

This course will enable students to:

- Understand the modern scientific conception of space and time.
- Understand the principles of Einstein's special theory of relativity and general theory of relativity, emphasising the conceptual and descriptive content, especially in relation to space and time.
- Understand our current model of the Universe and the evidence on which it is based.

Learning Outcomes

By the end of this course, students will be expected to:

- Understand the basic principles of physical theories of space and time
- Communicate their understanding using the appropriate scientific terminology
- Assess the validity and reliability of relevant scientific information

Recommended Reading

Author(s)	Year	Title	Publisher
Kaku, Michio	2005	*Einstein's cosmos: How Albert Einstein's vision transformed our understanding of space and time*	W.W. Norton
Krauss, Lawrence	2012	*A Universe from Nothing*	Free Press
Rovelli, Carlo	2019	*The Order of Time*	Penguin

Assessment

Students are required to submit pre-course and on-course assignments as follows:

Pre-course assignment (c.1500 words):

Describe your earliest ideas about time and space. For example, did you have any sense about an absolute condition of rest; or about time flowing uniformly, at the same rate for all clocks?

Please note that the submission for the pre-course essay is Monday 8th June 2026 and should be submitted as Word format to oussa@conted.ox.ac.uk.

Also complete the Declaration of Authorship or the Assignment Cover Sheet form and add it at the beginning of your essay.

On-course assignment (c.1000 words):

To be agreed upon with your tutor on arrival.