# Abstracts

## Can Calculus describe reality?

From the days of their invention, the ideas of differentiation and integration have been very widely used to describe the world around us. Mathematical models based on these ideas are widely accepted without question and are usually considered to be immensely successful. All the same, when ones looks at the mathematical assumptions that are basic to the calculus and compares them with the actual nature of the process that they are attempting to describe, it often turns out that there are fundamental incompatibilities. In this lecture some examples will be looked at, and some consideration will be given to the ways in which the often very different points of view can be reconciled. Most of the discussion will be in fairly general terms, but the specific example of the way in which traffic moves on a road will be considered in rather more mathematical detail. In the process it is hoped to provide some insight into the way in which mathematical models of processes that are of interest in the world around us are constructed.

## The Number Matrix: the Hidden Mathematics of Technology

There are numbers all around us that make our modern lives possible. From rescuing your lost words in text messages to protecting your Facebook profile, we rely on numbers to transmit and protect information – not just numbers, but text, pictures and sound – every day. In this this highly engaging session, your eyes will be opened to the ubiquitous sea of numbers we all live in.

## The Domino Computer

From a very early age we are taught to count and calculate in a denary (base 10) number system, but this is not the only one possible. Modern computers use only two digits in a binary number system. In fact, with their new understanding of binary arithmetic, students will build a basic computer out of only dominoes!

## ALEX THROUGH THE LOOKING-GLASS: How Life Reflects Numbers and Numbers Reflect Life

Former Guardian foreign correspondent Alex Bellos takes us on an exciting and humorous journey into the abstract world of mathematics. He reveals our unexpected emotional, psychological and cultural responses to numbers. He tells the stories of some ancient and modern mathematical thinkers. And he shows how maths may explain the universe.