

**My Life in Maths**  
**Professor Peter Higgins (University of Essex)**

Learning to think fruitfully about mathematics involves the acceptance of maths on its own terms, a willingness to think things through to their logical conclusion, and a kind of free-wheeling state of mind. At least that is how it seems to me. Even as a child I would sometimes ponder mathematics stripped of any particular application and try to look it square in the eye as it were.

I am an openly pure mathematician, meaning that I am primarily interested in mathematics itself. I will recount some personal episodes that led me to becoming a professional mathematician and then explain something about the kind of research I do.

It turns out that if you discover something new in mathematics it can often lead to new applications. In my own case I will tell the story of my invention of Circular Sudoku in 2006 and how what I knew turned out relate to a topic known as Burrows-Wheeler transformations, which are important in data compression and transmission. Time permitting, I will also invite the audience to join me on a couple of detours along the way.

**Shaping the Brain: The Mathematics of Folding and Connecting**  
**Professor Alain Goriely (University of Oxford)**

The human brain is an organ of extreme complexity, the object of ultimate intellectual egocentrism, and a source of endless scientific challenges. Its intricate folded shape and complicated internal wiring have fascinated generations of scientists but still raise fundamental questions. How do brain convolutions emerge? How is the brain geometry related to its function? How are different parts of the brain connected to each other? What is special about the human brain? In this talk, I will show that by using geometry, scaling laws, modelling, and network topology, we can uncover some of the basic principles at work in the shaping of our brain.