

**Name of speaker**

Professor Andy Alderson

**Title of lecture**

Negative reactions: Auxetics and related materials which do the opposite of what you expect, quite laterally!

**Abstract**

“Negative Poisson’s ratio” is the technical term used to describe a material which, rather than becoming longer and thinner when stretched lengthwise (think of an elastic band), actually becomes longer and thicker. Professor Alderson will take you on a journey through time (historical perspective and future prospects) and space (from the nanoscale to the macroscale) for these fascinating and counterintuitive, so-called *auxetic*, materials. He will explain how such materials occur naturally, how they provide a route to extreme values of other useful properties, and how to design, make and test man-made examples to the point that commercial applications are now appearing. He will discuss similarities and differences with other “negative” materials displaying negative thermal expansion (contract when heated) and negative stiffness (become shorter when stretched) and showcase the recent development of a mechanical metamaterial combining both negative Poisson’s ratio and negative stiffness properties.

**Brief biography**

Andy is Professor of Smart Materials and Structures in the Materials and Engineering Research Institute at Sheffield Hallam University. He has worked in the field of auxetics and related materials for 25 years. Prior to joining MERI in 2013, Andy was Director of the Institute for Materials Research and Innovation, Head of Sciences and Professor of Materials Physics at the University of Bolton. He has also worked in the nuclear industry (BNFL), held directorships with two companies, and played leading roles with industry-facing collaborative research centres, consortia and networks. He is co-inventor on 15 patent applications and is listed amongst the top 5 authors in the world for 'auxetic' papers. He has made multiple appearances on BBC TV and Radio, and his work has been exhibited in the Science Museum (London). Awards include the Kenneth Harris James prize of the Aerospace Industries Divisional Board of the IMechE. He supports Leeds United Football Club.