



## Applied stochastic modelling for structured physical processes

*By Professor Valerie Isham*

Date: Thurs 5th April 2018

Time: 2.30 pm to 3.30 pm

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Mechanistic stochastic models aim to represent an underlying physical process (albeit in highly idealised form, and using stochastic components to reflect uncertainty) via an analytically tractable model, in which interpretable parameters relate directly to physical phenomena. They contrast with highly detailed deterministic models that seek exactly to describe the evolution of a process from fixed initial conditions with no allowance for uncertainty. Both classes of models contribute understanding of the process dynamics and can be used to develop control strategies. In this talk, Valerie will consider some general approaches to modelling physical processes, in both time and space-time, beginning with the purposes of modelling, some questions to be addressed and choices to be made. She will describe some useful stochastic model components and their properties, and ways of modelling population structure, including the use of random networks. She will illustrate these ideas by showing how model components can be combined to build temporal and spatial-temporal models of rainfall, and of soil moisture, for hydrological applications.

Valerie Isham is Professor of Probability and Statistics in the Department of Statistical Science at University College London (UCL). She has a PhD in Statistics from the University of London (Imperial College) for a thesis on multidimensional point processes. She joined UCL in 1978 and has been a professor since 1992. She was previously Head of Department from 1996-2002 and again from 2010-2011. She was President of the Royal Statistical Society (RSS) in 2011 and 2012, and has represented the RSS on the Council for Mathematical Sciences since 2010. She currently chairs the Scientific Steering Committee of the Isaac Newton Institute for Mathematical Sciences in Cambridge, and the Biometrika Board of Trustees.

Her research interests lie in applied probability: broadly, the development and application of stochastic models. Particular fields of application include models for spatial and spatio-temporal processes arising in the physical sciences, and especially in hydrology, and in the life and medical sciences.

*All are welcome!*