

The Weizmann Institute of Science  
Faculty of Mathematics and Computer Science

The Chaim Leib Pekeris Memorial Lecture

Dolfi and Lola Ebner Auditorium  
on Tuesday, March 11, 2014  
at 16:00

James D. Murray  
University of Oxford  
Princeton University

will speak on

**Why there are no 3-headed monsters, resolving some problems with brain tumours,  
divorce prediction and how to save marriages**

Abstract:

Understanding the generation and control of pattern and form is still a challenging and major problem in the biomedical sciences. I shall describe three very different problems. First, I shall briefly describe the development and application of the mechanical theory of morphogenesis and the discovery of morphogenetic laws in limb development and how it was used to move evolution backwards. I shall then describe a surprisingly informative model, now used clinically, for quantifying the growth of brain tumors, enhancing imaging techniques and quantifying individual patient treatment protocols prior to their use. Among other things, it is used to estimate patient life expectancy and explain why some patients live longer than others with the same treatment protocols. Finally, I shall describe an example from the social sciences, which quantifies marital interaction that is used to predict marital stability and divorce. From a large study of newly married couples it had a 94% accuracy.

I shall show how it has helped design a new scientific marital therapy which is currently used in clinical practice.