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DEPARTMENT OF APPLIED MATHEMATICS APPLIED SEMINAR SERIES 2007

The Seminar Series of the Department of Applied Mathematics, UNSW, Sydney is dedicated to the announcement, dissemination and discussion of research in mathematics and its applications. A fundamental aim of the Seminar Series is to feature lectures that inform in a manner that makes the subject accessible to the audience, including non-specialists.

SPEAKER: Professor Philip Hall, Department of Mathematics, Imperial College, London. phil.hall@imperial.ac.uk

TITLE: Hydrodynamic Instability Theory and Geomorphology.

Abstract: Our concern is with the fluid mechanics of sediment-carrying rivers. In particular we concentrate on the case where sediment is carried as bedload in a turbulent river. We discuss the types of instability which the flow can support and the bed patterns determined by these instabilities. Previous work on rivers of finite width is shown to be asymptotically inconsistent and a new self-consistent theory is given. We find remarkable agreement between theory and observations. The nonlinear stages of the instabilities are discussed and it is found that highly nonlinear structures can be described analytically in a variety of situations. A variety of new nonlinear evolution equations are found. We show that in general 'shocks' develop in the solutions and we show how these relate to bar patterns observed by geomorphologists.

TIME AND VENUE: 2pm, 19 April 2007, Room 4082, Red Centre.



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