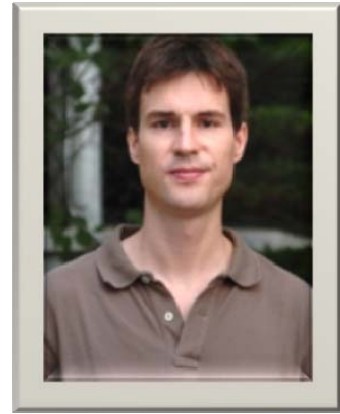


**Discrete Version of Atiyah - Singer Index
Theory from Lattice Gauge Theory**

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Date : 25 March 2009 (Wednesday)
Time : 11 am – 12 pm
Venue: SPMS-Executive Classroom 1, MAS-03-06
School of Physical and Mathematical Sciences

The Atiyah-Singer index theorem relates analytic and topological data associated with certain types of partial differential equations (PDEs). It is one of the deepest and most celebrated results in modern mathematics, and is also of major importance in quantum gauge field theories of theoretical particle physics for understanding topological phenomena of these theories. Recent developments in the lattice formulation of quantum gauge theories provide a framework and tools for developing a discrete version of Atiyah-Singer index theory. I will describe my research program on this topic, discussing what has already been achieved and the challenges that remain. The challenges involve capturing topological data in the discrete setting and dealing with additional spurious solutions of the discretized PDE. The latter is of independent interest in connection with numerical approaches to solving PDEs.

Speaker Biography

David Adams studied mathematics and physics to Masters level at Aarhus University (Denmark) and went on to gain a PhD in the School of Mathematics, University of Dublin (Trinity College) in 1997. He then had postdoctoral stints at Adelaide U. (Australia), Duke U. (USA), Leiden U. (Netherlands), and Florida International U. (USA) before joining Seoul National University (Korea) as a research professor in 2006. Currently he also has a visiting appointment in Taiwan at the National Center for Theoretical Sciences at National Taiwan University. His research is at the interface of mathematics and theoretical physics, focusing in particular on mathematical aspects of lattice gauge theories. He is a previous recipient of two competitive postdoctoral fellowships: an ARC Fellowship from the Australian Research Council and a Marie Curie Individual Fellowship from the European Commission.

Host: Prof. Chee Yeow Meng, Head, Division of Mathematical Sciences, School of Physical and Mathematical Sciences

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