## DEPARTMENT OF MATHEMATICS AND APPLIED MATHEMATICS UNIVERSITY OF PRETORIA

# INTERDISCIPLINARY COLLOQUIUM ON MATHEMATICS, ECONOMICS, FINANCE AND ACTUARIAL SCIENCE

You are cordially invited to attend the following lecture:

#### Modelling Systemic Risk in Banking Ecosystems

by

**Conrad Beyers** (Department of Actuarial Science)

on Wednesday 30 July 2014

at 15:00

in

### Botany 2-23 Department of Mathematics and Applied Mathematics Tel (012) 420-2520

**Description:** Interdisciplinary meeting forum on mathematical models in economics, finance and insurance and their theoretical and computational analysis. Typical areas of interest include foundational issues in asset pricing, financial markets equilibrium, insurance models, portfolio management, quantitative risk management, intertemporal economics, uncertainty and information in finance models. Researchers and students who work on development and application of mathematical and computational tools to the study of phenomena in this broadly defined area are invited to attend. Four meetings are planned per semester.

#### Abstract:

The 2007-2008 economic crisis, together with its long drawn-out aftermath, emphasized the need for a more fundamental understanding of systemic risk – the risk of failure of an entire system even though its individual constituents may operate in an (selfishly) optimal way. In interconnected financial networks, systemic events can lead to domino-effects or loss cascades that may lead to disproportionately large system-wide shocks. The study of systemic risk is a multidisciplinary field involving (at least) economics, mathematics and statistics and is of considerable interest to banking regulators (such as Reserve Banks) as well as the financial industry in general. Interesting modelling parallels also exist in a range of other areas, including epidemiology, ecology and engineering. The propagation of financial "contagion" may exhibit characteristics similar to those seen in, for example, epidemic outbreaks (such as SARS), the interactions between species in ecosystems as well as major electrical grid failures. In the talk, some current challenges in the modelling of systemic risk are discussed, including the development of:

- mathematically sound and useful measures of systemic risk;
- dynamic models that describe the structure and workings of typical financial networks;

proposals for regulatory interventions that are optimal in terms of the minimization of systemic risks while not burdening the industry with overly costly constraints.

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