Mathematical and Computational Finance Abstracts (Riaz Ahmad)

Day 1 Session 1 Finance Terminology

An understanding of key financial terms is essential for scientists and engineers to be successful in the financial markets. This non-mathematical session introduces the student to the global financial markets and the derivative products traded in them. Important asset classes are also discussed.

Day 2 Session 1 Applied Stochastic Calculus

Asset prices are stochastic processes – families of random variables indexed with time. The normal rules of calculus no longer apply. Stochastic Calculus is required to study differentiation and integration applied to stochastic variables. The necessary framework is developed via construction of Brownian motion, leading on to Stochastic Differential Equations and rules for manipulating them.

Day 3 Session 3 Exotic Options

Beyond the simple plain vanillas is a wide class of options that are traded *over-the-counter* (OTC). These offer investors exciting and bespoke opportunities. In addition, they are more complex to value, thus making them interesting for mathematicians when pricing. Classification features will be discussed as well as an in-depth coverage of 1st generation exotics – barriers, Asians and lookbacks.

Day 4 Session 2 Python Lab

This is a rapid introduction to Python programming applied to Monte Carlo simulations. No prior experience of the language is expected. Python is a wonderfully simple (yet fun) language to learn and use; it is fast becoming the global standard in scientific programming. It's used widely by CERN, NASA, Disney, Formula 1; as well as the financial markets.

Day 5 Session 1 Fixed-Income World

This session introduces the student to the mathematics of fixed-income products. The sheer size of this market adds to the excitement of this asset class. Interest rate modelling forms the core of this topic and the spot rate will be treated as a random variable, thus allowing treatment of stochastic interest rates and allied topics. Both HJM and BGM will be covered and if time permitting KIBOR (Karachi Interbank Offered Rate)