## Plenary Speakers
## Conférenciers pléniers

**STEVE AWODEY**, Carnegie Mellon University
*Algebraic Set Theory*

Since its introduction by A. Joyal and I. Moerdijk in 1995, algebraic set theory has proven to be a flexible and powerful framework for constructing models of various classical and constructive set theories of a new and fascinating kind. This introductory survey outlines the basic theory and indicates some current research advances.

**JOHN CONWAY**, Princeton

**NICOLE EL KAROUI**, École Polytechnique, Paris, France
*Derivatives Market: Recent developments in pricing, hedging and measuring market risk exposure*

In 1973, Black, Scholes and Merton introduced a revolution in the market risk industry, by stating that the price (for the seller) of a derivatives product is the cost of the hedging strategy. Based on a simple framework they deduced the famous Black–Scholes formula and the associated Delta-hedging strategy.

More sophisticated framework are now used, and a part of the market risk has been transformed into a model risk, given there exists a large family of tractable models allowing to recover observable market data (financial products prices). Risk managers are daily faced with this model risk, in particular in the pricing of exotic products. How to measure it is a challenge of the daily risk management.

Moreover, in more integrated point of view, market authorities now require financial institutions to compute their daily global exposure (Value at Risk) via their own "internal" models. Motivated by this challenge, academic and risk-managers are debating the "best concept" of risk measure (Delbaen *et al.* [?], Foellmer and Schied [?]). The dual representation of these convex functionals yields to a nice interpretation in terms of market tools.

Best adapted than utility maximization criterium, this new tool allows us to develop an unified point of view about pricing and hedging in incomplete markets, including model risk. Classical problems as optimal risk transfer or optimal hedging are studied in this new context, using inf-convolution technics in static or dynamic framework.

### References


[1] P. Artzner, F. Delbaen, J. M. Eber and D. Heath, *Coherent Measures of Risk.* Math. Finance **9**(1999), 203–228.

[2] P. Barrieu and N. El Karoui, *Pricing via minimization of risk measures.* In: Paris–Princeton Lectures, to appear, 2006.

[3] F. Bellini and M. Frittelli, *On the Existence of Minimax Martingale Measures.* Math. Finance **12**(2002), 1–21.

[4] H. Föllmer and A. Schied, *Stochastic finance: an introduction in discrete time.* de Gruyter Studies in Mathematics **27**, Walter de Gruyter & Co., Berlin, 2002.

[5] M. Musiela and T. Zariphopoulou, *An Example of Indifference Prices under Exponential Preferences.* Finance Stoch., to appear, 2004.

**NIGEL KALTON**, University of Missouri
*Extensions of Banach spaces and their applications*

An extension of a Banach space $X$ by a Banach space $Y$ is a short exact sequence $0 \to Y \to Z \to X \to 0$. We discuss two basic problems concerning extensions of Banach spaces which were solved in the 1970's. Our main goal is to show how the solution of these problems has led over the last 30 years to the development of a general theory which has found links with harmonic analysis, operator theory and approximation theory.

**ALEXANDER S. KECHRIS**, California Institute of Technology
*Logic, Ramsey theory and topological dynamics*

In this talk, I will discuss some recently discovered interactions between topological dynamics, concerning the computation of universal minimal flows and extreme amenability, the Fraïssé theory of amalgamation classes and homogeneous structures, and finite Ramsey theory.

**LÁSZLÓ LOVÁSZ**, Microsoft
*Very large graphs*

There are many huge graphs whose structure we want to understand, from the internet to the human brain. What kind of questions are meaningful about these graphs? When should we say that two such graphs are similar? How can we "approximate" such graphs, either by a much smaller graphs or by a continuous object, so that important properties are not lost?

These questions have a rather complete answer in the case of dense graphs, and partial answers for graphs with bounded degrees.

This is a summary of joint work with Jennifer Chayes, Christian Borgs, Vera Sos, Balazs Szegedy and Katalin Vesztergombi.

**DAVE MARKER**, University of Illinois at Chicago
*Model Theory and Exponentiation*

In the 90s model theoretic methods were used by Wilkie to show that sets defined in the real field with exponentiation have many of the good geometric and topological properties of real algebraic varieties. For example, any such set has only finitely many connected components. Complex exponentiation has a very different flavor. The definablility of the integers leads to pathologies, but there is still some hope for a reasonable theory of definable sets. In this lecture I will review some of the older work on the real field and discuss Zilber's program for understanding complex exponentiation.