**February 24th, 2016**
**KAP 414**
**2:00 P.M. – 3:00 P.M.**

# Professor Nizar Touzi

(Ecole Polytechnique, France)

### "Branching Diffusion Representation of Semi-linear PDE's and Monte Carlo Approximation"

**Abstract:** We prove a representation result for the solution of a semilinear PDE with polynomial nonlinearity. The result is obtained by combining standard branching diffusion with the automatic differentiation technique from Malliavin calculus. Our representation is suitable for high dimensional Monte Carlo approximation by standard simulation of independent copies. The error estimate is directly induced by the central limit theorem, and is therefore dimension-independent. The overall complexity is of the order of the squared dimension. Concrete numerical experiments in high dimension confirm the efficiency of the method.