

## **The Inverse Boundary Crossing Problem for Diffusions**

John Chadam

Department of Mathematics - University of Pittsburgh

### **Abstract / Resumo:**

First crossing problems arise in structural models for credit default. In this talk we will summarize our results on the inverse first crossing problem proposed by Avellaneda and Zhu: given a survival probability, find a boundary so that the first crossing problem for a Brownian motion with this boundary reproduces the given survival probability. We will outline our existence, uniqueness and continuity results as well as a “verification theorem” proving that our viscosity solution, obtained by PDE methods, is the solution of the traditional probabilistic definition of the problem. Analytical estimates for the early time behavior of the boundary will be provided. We will also provide a numerical method, based on non-linear integral equations, for computing the boundary globally. This is joint work with Xinfu Chen (Pittsburgh), Lan Cheng (SUNY Fredonia) and D. Saunders (Waterloo).