Caroline Hillairet

Title: Hawkes processes, Malliavin calculus, and application to cyber-insurance derivatives.

Abstract: In this talk, we provide an expansion formula for the valuation of reinsurance contracts (such that Stop-Loss contracts) whose payoff depends on a cumulative loss indexed by a Hawkes process. It can be applied to cyber-insurance contracts, as the times of occurrence of cyber-claims exhibit self-exciting behavior. The methodology relies on the Poisson imbedding representation and Malliavin calculus. The expansion formula involves the addition of jumps at deterministic times to the Hawkes process in the spirit of the integration by parts formula for Poisson functional. From the actuarial point of view, these processes can be seen as "stressed" scenarios. From a theoretical point of view, Malliavin calculus is a useful and original tool to provide new results on Hawkes processes.

This talk is based on joint works with Anthony Réveillac and Mathieu Rosenbaum.