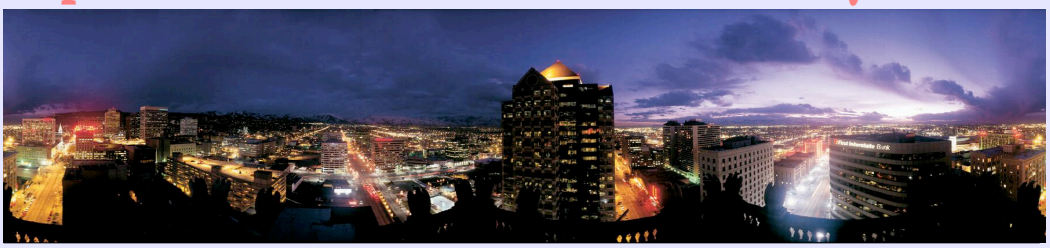
Stochastics Seminar
Department of Mathematics, University of Utah



Gaussian and Non-Gaussian Fields, the Malliavin Calculus, and Applications

Frederi Viens
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Time and Place: Friday April 7, 2006; 3:30–4:25 p.m.; LCB 215

The Malliavin calculus, a stochastic analysis tool typically constructed from a given Gaussian process such as Brownian motion, is most prolific in contemporary probability theory, including in many non-Gaussian situations. Popular areas of application include anticipating stochastic calculus, fractional Brownian motion, financial mathematics, infinite-dimensional stochastic analysis, and many others. We will show how appropriate boundedness of a stochastic process's iterated Malliavin derivatives can be sharply related to sub-Gaussian and non-sub-Gaussian properties, including non-sub-Gaussian concentration and supremum estimation properties which generalize the Borell–Sudakov inequality and the Dudley–Fernique theorem, and open new challenging problems in regularity theory. This is joint work with Purdue Ph.D. student Andrew Vizcarra.

Time permitting, and depending on the interest of the audience, we may cover, in a sub-Gaussian context, Malliavin derivative applications to existence and/or sharp estimation of Lyapunov exponents for stochastic PDEs or polymer measures, and to Maximum Likelihood Estimators for fraction-Brownian-driven stochastic differential equations, while in a pure Gaussian framework, we may indicate how to use Malliavin derivatives to extend (Skorohod) stochastic integration—including Ito's and Tanaka's formulas—to the entire fractional Brownian scale and beyond. These topics represent collaborations with, respectively, Ionut Florescu, Samy Tindel and Sergio Bezerra-Carvalho, Ciprian Tudor, and Oana Mocioalca.