Minerva Lecture Series

Dates, Times, Locations

February 24 - 27, 2014
5:30pm - 7pm
Room 507 Math

February 28, 2014
11am-1pm
School of Social Work
Room 903
(1255 Amsterdam Ave.)

Columbia University
Mathematics Department
2990 Broadway
New York, NY 10027

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Regularity Structures

When considering the large-scale behaviour of physical models arising naturally in statistical mechanics, one is often lead to stochastic partial differential equations that seem to be nonsensical: they are typically nonlinear with nonlinearities involving products of distributions. Examples of such models are the KPZ equation, the dynamical Φ^4_3 model, the continuous parabolic Anderson model, etc.

The theory of regularity structures provides a unified way of interpreting and analysing these equations in a robust way. It also provides a clean separation of the problem into an algebraic, an analytic, and a probabilistic component. I will give an introduction to the main concepts and results of the theory, as well as a number of applications.