Columbia University
Mathematics Department

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Minerva Lecture Series

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Macdonald processes

Monday, April 21, 2014 and Thursday, April 24, 2014 from 5:30pm - 7pm; Room 507 Math

Our goal is to explain how certain basic representation theoretic ideas and constructions encapsulated in the form of Macdonald processes lead to nontrivial asymptotic results in various `integrable' probabilistic problems. Examples include dimer models, general beta random matrix ensembles, and various members of the (2+1)d anisotropic KPZ and (1+1)d KPZ universality classes, such as growing stepped surfaces, q-TASEP, q-PushASEP, and directed polymers in random media.

Gaussian Free Field in beta ensembles and random surfaces

Friday, April 25, 2014 from 11am - 12pm; School of Social Work, Room 903

The goal of the talk is to argue that the two-dimensional Gaussian Free Field is a universal and unifying object for global fluctuations of spectra of random matrices and random surfaces. This viewpoint leads to natural Gaussian processes on larger spaces which, despite their explicit covariance structure, so far lack conceptual understanding.