General Mathematics Seminar (GMS)

of the University of Luxembourg

in cooperation with the Luxembourg Mathematical Society

Tuesday 16 January 2018, 5 pm **Maison du Nombre, MNO 1.050**

Prof. Dr. Dmitry Belyaev (University of Oxford, UK)

Dmitry Belyaev is an Associate Professor in Analysis at University of Oxford. He has worked on questions from classical complex analysis and potential theory; as well as on the interface of analysis, probability, and mathematical physics. In particular, he did some work on Schramm-Loewner Evolution. Currently, he is mostly interested in geometric properties of Gaussian fields and their connections to percolation.

After his studies in St. Petersburg, and PhD studies in Stockholm, Dmitry Belyaev has worked as a Veblen Research Instructor at Princeton University and the Institute for Advanced Study, and later as an Assistant Professor at Princeton University.

Geometry of Gaussian Fields

Gaussian fields are random functions such that their values have a normal distribution. These functions appear naturally in many areas of mathematics. In this talk, I will be mostly interested in two special cases: the random plane model and the Bargmann-Fock ensemble. Random plane waves are conjectured to be a universal model for high-energy eigenfunctions of the Laplace operator in a generic domain. The Bargmann-Fock ensemble appears in quantum mechanics and is the scaling limit of the Kostlan ensemble, which is a good model for a "typical" projective variety. It is believed that these models, despite very different origins have something in common: they have scaling limits that are described by the critical percolation model. This ties together ideas and methods from many different areas of mathematics: probability, analysis on manifolds, partial differential equation, projective geometry, number theory and mathematical physics. In the talk I will introduce all these models, explain the conjectures relating them, and will talk about recent progress in understanding these conjectures.

Coffee and cookies: 16:40 on the 6th floor of the MNO, in the kitchen corner of maximal distance to the elevator (From the elevator, you can enter only one door, and then you will pass by a small kitchen corner. Please continue until you arrive at a bigger kitchen corner).

Time and place of the talks: 17:00 (5 p.m.) in the Maison du Nombre, MNO 1.050.

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