Berlin Mathematics Research Center MATH+

Berlin Mathematical School BMS

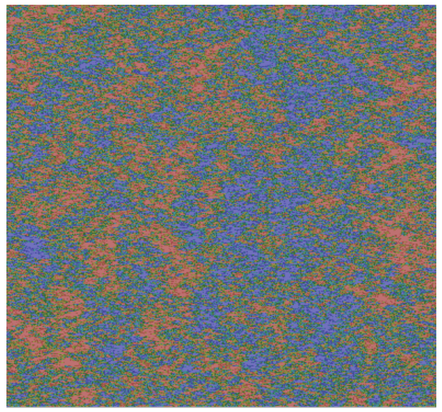
MATH+ Friday Colloquium

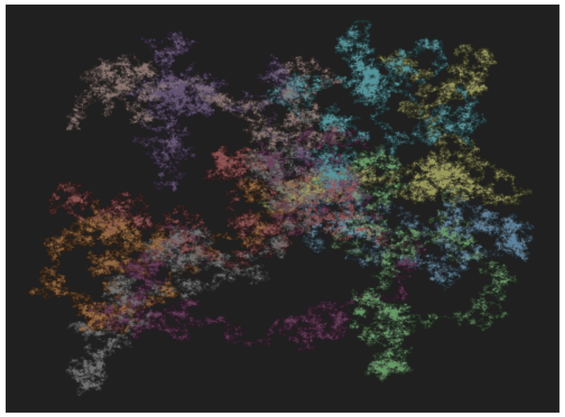
Friday, 10 July 2026 at 14:15

FU Berlin, Computer Science Building, Takustr. 9 , Lecture Hall T9

Tea & Cookies starting at 13:30

followed by the Certificate Ceremony and the Summer Party





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Benjamin Fehrman

(Louisiana State University)

Rare events in particle systems and conservative stochastic PDE

We will introduce some fundamental concepts from probability theory, including central limit fluctuations, large deviation principles, and Brownian motion, beginning with the flip of a coin. We will then introduce interacting particle systems like the symmetric simple exclusion and zero range particle processes. Our goal will be to understand and quantify the probability of rare events in such systems, which will lead us to the study of certain energy critical PDEs and conservative SPDEs. These connections fall broadly under the scope of non-equilibrium statistical mechanics, and specifically fluctuating hydrodynamics and macroscopic fluctuation theory. Until recently, however, they have lacked a precise mathematical meaning for several reasons. We will briefly discuss how these challenges were overcome, and how they were used to characterize the stochastic dynamics of the SPDEs and to obtain a complete characterization of the large deviations of the zero range particle process.

Benjamin Fehrman is an assistant professor at Louisiana State University. He was previously an EPSRC Early Career Fellow and Titchmarsh Research Fellow at the University of Oxford, and a NSF Postdoctoral Fellow at the Max Planck Institute for Mathematics in the Sciences (MPI MIS). He received his PhD from the University of Chicago in 2015.