Nina Gantert
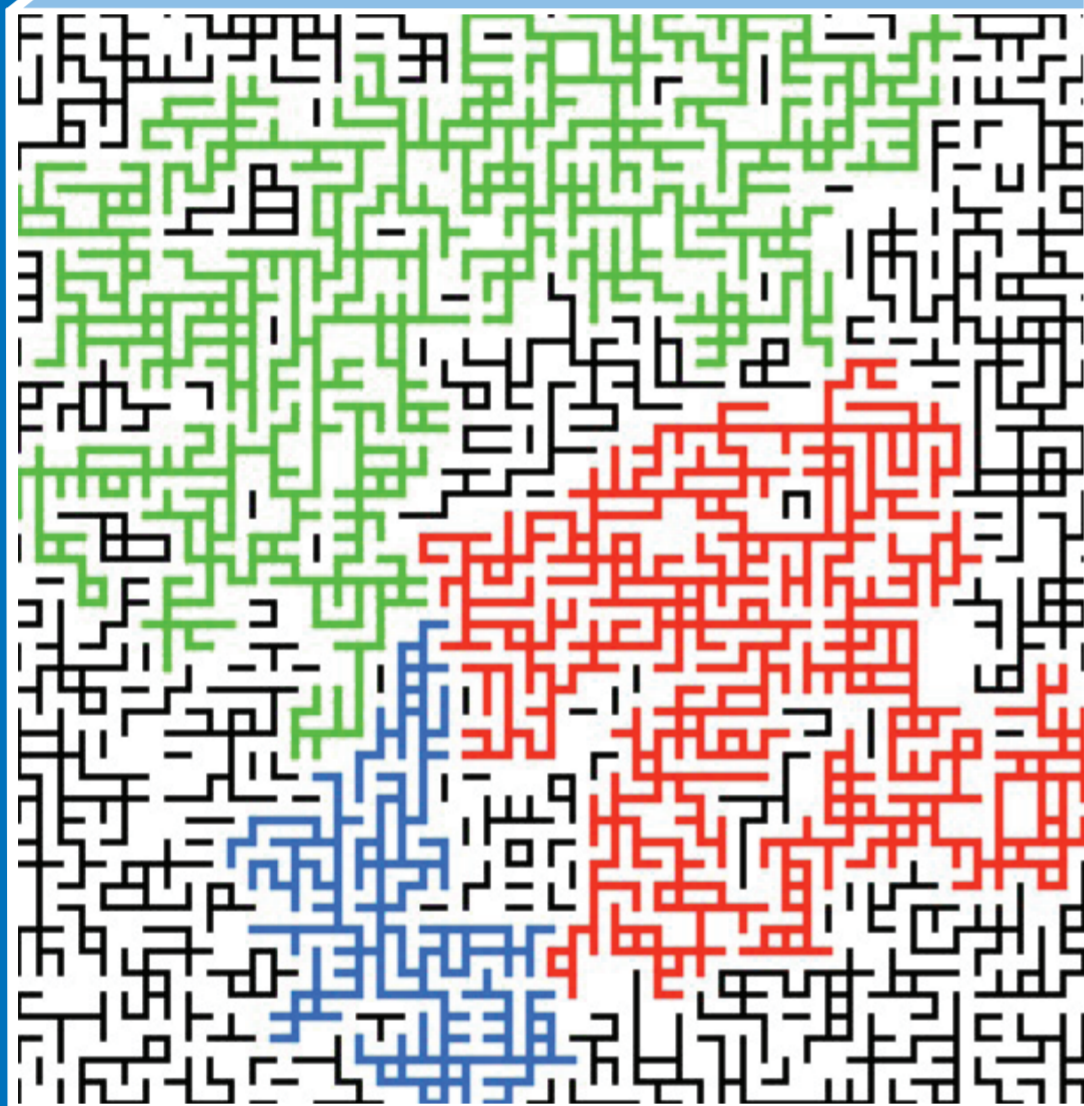*(TUM, Munich)*

© Nico Bednorz and Alexander Zeilmann

Random media and percolation

Many applications, such as porous media or composite materials, involve heterogeneous media which are modeled by random fields. These media are locally irregular, but are "statistically homogeneous" in the sense that their law has homogeneity properties. Considering random motions (random walks or diffusions) in such a random medium, it often turns out (but not always!) that they can be described by deterministic, effective parameters. This means that there is a deterministic medium, the effective medium, such that the properties of the random motion are close to its properties in the random medium when measured on long space-time scales. In other words, the local irregularities of the random medium average out over large space-time scales, and the random motion is characterized by the "macroscopic" parameters of the effective medium. How do these macroscopic parameters depend on the law of the random medium?

In her talk, Gantert will consider both the effective diffusivity of a random walk among random conductances and the effective velocity of a biased random walk on a percolation cluster, as examples.

Nina Gantert has been a professor of mathematics at TUM, Munich since 2011. She studied at ETH Zurich and completed her doctorate at U Bonn. After several research stays in Switzerland, Israel and France, she habilitated at TU Berlin. Her research interest is probability theory, especially stochastic processes. She is also interested in applications in mathematical physics as well as biology.