DONALD A. DAWSON, Carleton University

Random walk, percolation and branching systems on the hierarchical group

Spatial population models have been intensively studied for many years. Classical branching systems are well understood in homogeneous spaces such as $\mathbb{R}^2$ or $\mathbb{Z}^d$. Much less is known about more complex systems such as catalytic branching systems, in particular mutually catalytic systems, even in homogeneous spaces and much less is known in random media. The purpose of this lecture is to explain some recent work in this direction and some conjectures and open problems. As a starting point we introduce the hierarchical group giving some motivation and comparison to the Euclidean group. We then consider branching systems in which the spatial movement is given by a random walk in these spaces and the role of the potential theoretic properties, in particular the degree of transience-recurrence of the random walk. We then consider the question of percolation for a related class of random graphs embedded in these spaces and end with an open problem concerning the properties of branching systems on these percolation clusters serving as a random medium. This talk is based on joint projects with Luis Gorostiza and Andreas Greven.