Stochastic processes associated with resistance forms

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The connections between random walks and electrical networks are well-known. In this talk, I will describe some recent work in this direction that underlines how the notion of a resistance form, as introduced by Kigami to analyse stochastic processes on fractals, is useful for understanding the scaling limits of various models of random walks on graphs, and their time-changes. If time permits, I will also discuss some of the detailed properties of particular examples, such as heat kernel estimates for the Fontes–Isopi–Newman diffusion, which arises as one possible scaling limit of the random conductance model. This is partly joint with Ben Hambly (Oxford) and Takashi Kumagai (Kyoto).