



Contribution ID: 13

Type: **Invited talk**

Random walks with stochastic resetting: a discrete time approach

Friday, 25 September 2026 10:00 (30 minutes)

We consider a discrete-time random walk with resets on a connected undirected network. The resets, in which the walker is relocated to randomly chosen nodes, are governed by an independent discrete-time renewal process (we consider both light- and fat-tailed inter-reset distributions). Some nodes of the network are target nodes, and we focus on the statistics of first hitting of these nodes. We derive the propagator matrix in terms of discrete backward recurrence time PDFs and in the light-tailed case we show the existence of a non-equilibrium steady state. In the non-Markov scenario, we derive a defective propagator matrix which describes an auxiliary walk characterized by killing the walker as soon as it hits target nodes. This propagator provides the information on the mean first passage statistics to the target nodes. We apply all these results to study the mean first passage times for Markovian and non-Markovian (Sibuya) renewal resetting protocols in realizations of Watts-Strogatz and Barabási-Albert random graphs. We show non trivial behavior of the dependence of the mean first passage time on the proportions of the relocation nodes, target nodes and of the resetting rates.

The talk is based on joint works with Thomas M. Michelitsch, Federico Polito and Alejandro P. Riascos.

Primary author: D'ONOFRIO, Giuseppe (Politecnico di Torino)

Presenter: D'ONOFRIO, Giuseppe (Politecnico di Torino)

Session Classification: Session 7