

Epidemics on networks: the risky and the at-risk

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Which nodes are most vulnerable to an epidemic spreading through a network, and which carry the highest risk of causing a major outbreak if they are the source of the infection? In this talk I will show how these questions can be answered to good approximation using the cavity method. Several curious properties of node vulnerability and risk are explored: some nodes are more vulnerable than others to weaker infections, yet less vulnerable to stronger ones; a node is always more likely to be caught in an outbreak than it is to start one, except when the disease has a deterministic lifetime; the rank order of node risk depends on the details of the distribution of infectious periods.