Bootstrap percolation and related graph processes

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Bootstrap percolation processes are a family of cellular automata that were originally introduced in 1979 by the physicists Chalupa, Leith and Reich as a model of ferromagnetism. Since then, they have been used throughout a variety of disciplines to model real world phenomena such as the spread of influence in a social network, information processing in neural networks or the spread of a computer virus.

The r-neighbour bootstrap percolation process on a graph G starts with an initial set A of *infected* vertices and, at each step of the process, a *healthy* vertex becomes infected if it has at least r infected neighbours (once a vertex becomes infected, it remains infected forever). If every vertex of the graph eventually becomes infected, we say that A *percolates*.

In this talk I will discuss results concerning this and other related processes, including graph saturation, weak saturation, and rainbow saturation.