The Jones polynomial, Khovanov homology and Khovanov homotopy

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In the early 1980’s, Jones introduced a new knot invariant, now called the Jones polynomial. Roughly ten years ago, Khovanov gave a refinement – or categorification – of the Jones polynomial; this refinement is now called Khovanov homology. In this talk we will sketch definitions of the Jones polynomial and Khovanov homology, and mention some of their most spectacular applications. We will then discuss a recent space-level refinement of Khovanov homology, and some applications of it; this refinement is joint work with S. Sarkar.