Khovanov homology and its applications

Abstract:
Khovanov homology, as defined by Mikhail Khovanov based on the representation theory of quantum groups, is a powerful invariant for knots. It categorifies the famous Jones polynomial, meaning that Jones polynomial can be recovered as its Euler characteristic. Despite its simple combinatorial definition, Khovanov homology has deep relation with quantum topology, gauge theory and representation theory. In this talk, I will recall the definition of Khovanov homology and introduce some of its important properties and applications (including Rasmussen’s combinatorial proof of the Milnor conjecture). No previous knowledge on knot theory will be assumed.