The Static and Stochastic Ising Models

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The Ising model, one of the most studied models in mathematical physics, was introduced in 1925 to model ferromagnetism. Over the last three decades, significant effort has been dedicated to the analysis of stochastic dynamical systems that both model the evolution of the Ising model and provide efficient methods for sampling from it. In this talk I will survey the rich interplay between the behaviors of the static and the dynamical models as they both undergo a phase transition at the critical temperature. In particular I will discuss a fundamental problem on the dynamical model introduced by Glauber in 1963, which we recently settled in joint work with Allan Sly. The talk will not assume any prior knowledge on the Ising model and its critical phenomena.