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Sourav Chatterjee* (sourav@cims.nyu.edu), 251 Mercer Street, Room 813, New York, NY 10012, and **Srinivasa Varadhan**. *The Large Deviation Principle for the Erdos-Renyi Random Graph*.

What does an Erdos-Renyi graph look like when a rare event happens? I will describe an answer to this question when p is fixed and n tends to infinity by establishing a large deviation principle under an appropriate topology. The formulation and proof of the main result uses the recent development of the theory of graph limits by Lovasz and coauthors and Szemerédi's regularity lemma from graph theory. As a basic application of the general principle, we work out large deviations for the number of triangles in $G(n,p)$. Surprisingly, even this simple example yields an interesting double phase transition. This is based on joint work with S. R. S. Varadhan. (Received August 08, 2010)