Inhomogeneous random graphs

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The 'classical' random graph models, in particular $G(n,p)$, are 'homogeneous', in the sense that the degrees (for example) tend to be concentrated around a typical value. Many graphs arising in the real world do not have this property, having, for example, power-law degree distributions. Thus there has been a lot of recent interest in defining and studying 'inhomogeneous' random graph models.

In a very long paper that has just been completed, Svante Janson, Oliver Riordan and I introduced a very general model of an inhomogeneous random graph with (conditional) independence between the edges, which scales so that the number of edges is linear in the number of vertices. This scaling corresponds to the $p = c/n$ scaling for $G(n,p)$ used to study the phase transition; also, it seems to be a property of many large real-world graphs. Our model includes as special cases many models previously studied. In the talk I shall describe some of the results concerning our general model.