The Evolution of Random Graphs on Surfaces

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For integers \( g, m \geq 0 \) and \( n > 0 \), let \( S_{n,m}^g \) denote the graph taken uniformly at random from the set of all graphs on \( \{1, 2, \ldots, n\} \) with exactly \( m = m(n) \) edges and with genus at most \( g \). We use counting arguments to investigate the components, subgraphs, maximum degree, and largest face size of \( S_{n,m}^g \), finding that there is often different asymptotic behaviour depending on the ratio \( m/n \).

This is joint work with Mihyun Kang and Philipp Sprüssel.

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