Stanford University
Departments of Mathematics and Statistics

Probability Seminar

4pm, Monday, February 24, 2020
Sequoia Hall Room 200

Refreshments served at 3:30pm in the Lounge.

Speaker: Lisa Sauermann, *Stanford Mathematics*

Title: On the edge-statistics conjecture

Abstract:

Suppose we are given integers $k \geq 1$ and $0 < \ell < \binom{k}{2}$. When sampling a k-vertex subset uniformly at random from a (very large) n-vertex graph G, how large can the probability be that there are exactly ℓ edges within the sampled k-vertex subset? Let $\mathrm{ind}(k, \ell)$ be the limit of this maximum possible probability as n goes to infinity. Alon, Hefetz, Krivelevich and Tyomkyn conjectured that $\mathrm{ind}(k, \ell) \leq e^{-1} + o(1)$ for all $k \geq 1$ and $0 < \ell < \binom{k}{2}$. The constant e^{-1} in this conjecture is best-possible, since for $\ell = 1$ and $\ell = k-1$ one can easily show that $\mathrm{ind}(k, \ell) \geq e^{-1} - o(1)$.

Kwan, Sudakov and Tran proved the conjecture in the case $\Omega(k) \leq \ell \leq \binom{k}{2} - \Omega(k)$. In joint work with Jacob Fox, we solved the remaining cases of the conjecture. This talk will discuss our results, as well as our proof for the case $\ell = 1$ (which is one of the cases in which the conjecture is tight).