Extremal Graph Theory
(Org: **Penny Haxell** (University of Waterloo))

M. DEVOS, Simon Fraser University
Edge Expansion

Given a simple connected regular graph G, we are interested in finding good lower bounds on the number of edges in the graph G^k. I will discuss tight bounds for the average degree of G^3 and G^4, and an essentially tight bound for G^k when k is congruent to 2 modulo 3. This represents joint work with Stephan Thomasse and with Jessica McDonald and Diego Scheide.

A. KOSTOCHKA, University of Illinois at Urbana-Champaign
Packing hypergraphs with few edges

Two n-vertex hypergraphs G and H pack if there is a bijection $f : V(G) \to V(H)$ such that for every edge $A \in E(G)$, $f(A)$ is not an edge. Our result: If $n \geq 10$ and two n-vertex hypergraphs G and H with no 1-,$(n-1)$-, and n-edges satisfy $|E(G)| \leq |E(H)|$ and $|E(G)| + |E(H)| \leq 2n - 3$, then G and H fail to pack if and only if every vertex of G is incident to a 2-edge, and H has a vertex incident to $n-1$ 2-edges. The result generalizes Bollobás–Eldridge Theorem. This is joint work with C. Stocker and P. Hamburger.

D. MUBAYI, University of Illinois at Chicago
Lower bounds for the independence number of hypergraphs

We use probabilistic methods to improve the known lower bounds for the independence number of locally sparse graphs and hypergraphs. As a consequence, we answer some old questions of Caro and Tuza. This is joint work with K. Dutta and C.R. Subramanian.

O. PIKHURKO, Carnegie Mellon University
Turan function of even cycles

The Turan function $ex(n,F)$ is the maximum number of edges in an F-free graph on n vertices. Let C_k denote the cycle of length k. We prove that if k is fixed and n tends to infinity, then $ex(n, C_{2k}) \leq (k-1-o(1))\, n^{1+1/k}$, improving the previously best known general upper bound of Verstraete (2000) by a factor $8 + o(1)$ when $n \gg k$.

J. VERSTRAETE, University of California San Diego
Recent progress on bipartite Turan numbers

For a family $\mathcal{F}$ of graphs, the Turán number ex$(n, \mathcal{F})$ is the maximum number of edges in an n-vertex graph that has no graph in $\mathcal{F}$ as a subgraph. Determining ex$(n, \mathcal{F})$ when $\mathcal{F}$ contains a bipartite graph is a notoriously difficult problem. We discuss recent progress on several conjectures of Erdős and Simonovits from 1982 about bipartite Turán numbers. (Partly joint with Peter Keevash and Benny Sudakov.)