Graph Structure and Algorithms
(Org: **Kathie Cameron** (Wilfrid Laurer University) and/et **Shenwei Huang** (Nankai University))

KATHIE CAMERON, Wilfrid Laurer University
Hadwiger's Conjecture for (Cap, Even Hole)-Free Graphs

A minor of a graph G is obtained from a subgraph of G by contracting edges. In 1943, Hadwiger made his famous conjecture (HC): For every integer $t \geq 0$, every graph with no K_{t+1} minor is t-colourable. Hadwiger proved the conjecture for $t = 3$. For $t = 4$, it is equivalent to the Four Colour Theorem. Robertson, Seymour and Thomas proved it for t=5. For $t \geq 6$, it remains open. Chudnovsky and Fradkin proved HC for quasi-line graphs. We prove HC for (cap, even hole)-free graphs, and for some related classes of graphs. This is joint work with Kristina Vušković.

CÉSAR HERNÁNDEZ CRUZ, CINVESTAV Mexico
On the Pancyclicity of k-quasi-transitive Digraphs ofLlarge Diameter

A digraph is k-quasi-transitive if for every uv-directed path of length k in D, the vertices u and v are adjacent. Wang and Zhang proved that, for even k, every k-quasi-transitive digraph of diameter at least $k + 2$ has a Hamiltonian path, and asked whether it is possible to prove the existence of a Hamiltonian cycle under the same assumptions. In this talk we answer this question in the positive, and additionally prove that a digraph with these characteristics is indeed pancyclic.

This is joint work with Manuel Alejandro Juárez-Camacho.

PAVOL HELL, Simon Fraser University
Bipartite Analogues of Comparability and Co-comparability Graphs

I will discuss bigraph analogues of these graph classes. Surprisingly, in the context of bipartite graphs, they turn out to define the same class. I will mention characterizations in terms of orderings, orientations, and forbidden substructures. These definitions, together with some concepts introduced earlier, create a bipartite world in which one can find analogues of traditional results about graph classes. For instance, we find a bipartite analogue of the fact that the class of interval graphs is the intersection of the classes of cocomparability graphs and chordal graphs.

This is joint work with Jing Huang, Jephian Lin, and Ross McConnell.

OWEN MERKEL, University of Waterloo
An optimal χ-Bound for (P_6, diamond)-free graphs

Given two graphs H_1 and H_2, a graph is (H_1, H_2)-free if it contains no induced subgraph isomorphic to H_1 or H_2. Let P_t be the path on t vertices and K_t be the complete graph on t vertices. The diamond is the graph obtained from K_4 by removing an edge. We show that every (P_6, diamond)-free graph G satisfies $\chi(G) \leq \omega(G)+3$, where $\chi(G)$ and $\omega(G)$ are the chromatic number and clique number of G, respectively. This bound is tight and is attained by the complement of the 27-vertex Schläfli graph. This is joint work with Kathie Cameron and Shenwei Huang.

JURAJ STACHO, Google Zurich
3-colorable Subclasses of P_8-free Graphs

We study 3-colorable graphs having no induced 8-vertex path P_8 and no induced cycles C_k of two specific small lengths k. We characterize three such cases. Namely, we show that if no C_3 and no C_4 are allowed, then by way of structural decomposition, all such graphs are 3-colorable. Same holds for the case where no C_3 and no C_5 are allowed. For the case with no C_4 and no C_5, we find all critical graphs.

Joint work with Maria Chudnovsky.