Kentaro Yamamoto

Title: *Order expansions of finite Heyting algebras*

Abstract:
Structural Ramsey theory makes the most sense with rigid structures,and thus the first step in a Ramsey-theoretic study of a class K of finite structures is to find a good class K* of totally ordered structures each of which expands members of K. In this talk, I introduce such expansions for K = the class of finite Heyting algebras, which mildly generalize Boolean algebras. It will by shown that K and K* satisfy a favorable property called reasonablity. An application of this ordering to the problem of amenability of a topological group defined from K will be described. Other related problems will be discussed such as the Ramsey property of K*.

Giulio Zucal

Title: *"Action convergence: from graph to hypergraph limits"*

Abstract:
The theory of graph limits considers the convergence of sequences of graphs with a diverging number of vertices. From an applied perspective, it aims to represent very large networks conveniently. Until recently, however, particular cases for graph limits have been investigated separately, while hypergraph limits are even less well-developed. In this talk I will give a brief introduction to action convergence, a recent unified approach to graph limits based on functional analysis and measure theory. Moreover, I will present some work in progress on the extension of action convergence to hypergraphs.

Benjamin Moore

Title: *A counterexample to a conjecture of Galvin and Rodl*

Abstract:
We show that there exists a class of graphs such that all graphs in this class have no complete graph on 4 vertices, arbitrarily high chromatic number, and such that every triangle-free induced subgraph has chromatic number at most 4.

Joint work with Patrick Hompe, Alvaro Cabanero, and Sophie Spirkl.

Pierfrancesco Dionigi

Title: *Spectral Breaking of Ensemble Equivalence*

Abstract:
In this talk we will revise the concept of Breaking of Ensemble Equivalence (BEE) and its consequences. We will go through the main definitions of the concept of BEE and its connections with large deviations theory and graph theory. We then introduce random matrix theory and its role in detecting BEE through the spectrum of the adjacency matrix of random graphs.

Zsolt Bartha

Title: *Weakly saturated random graphs*

Abstract:
A graph G is weakly H-saturated if the complete graph is obtained by iteratively completing copies of H minus an edge. We identify the threshold p_c at which the Erdős-Rényi graph G_{n,p} is likely to be weakly H-saturated, for all H such that H \ e is 2-balanced for every edge e of H. We also establish a general asymptotic lower bound for p_c, which holds for all graphs H. Our results apply for instance when H=K_r, solving a problem of Balogh, Bollobás and Morris.

Joint work with Brett Kolesnik (Oxford).

Claire Hilaire

Title: *Structure of graphs with no independent cycle*

Abstract:
A graph is Ok-free if it does not contain k pairwise vertex-disjoint and non-adjacent cycles. We show that sparse (here, not containing large complete bipartite graphs as sub-graphs) Ok-free graphs have treewidth (even, feedback vertex set number) at most logarithmic in the number of vertices. This is proven sharp as there is an infinite family of O2-free graphs without K3,3-subgraph and whose treewidth is (at least) logarithmic. This result implies that most of the central NP-complete problems can be solved in polynomial time in sparse Ok-free graphs, and that deciding the Ok-freeness of sparse graphs is polynomial time solvable.

This is a joint work with Marthe Bonamy, Édouard Bonnet, Hugues Déprés, Louis Esperet, Colin Geniet, Stéphan Thomassé, and Alexandra Wesolek.

George Kontogeorgiou

Title: *Trees of Intermediate Uniform Growth*

Abtract:
Trees of exponential uniform growth have been known since the dawn of time. Trees of polynomial uniform growth have been known since 2000, which is when Benjamini and Schramm constructed them. Both the former and the latter include examples of unimodular trees. In this talk I will explain why (very many) unimodular trees of intermediate uniform growth exist. This is joint work with Martin Winter, and answers a question by Itai Benjamini.

Johanna Steinmeyer

Title: *Lattice polytopes, unimodality, and combinatorial Hodge Theory*

Abstract:
One of the fundamental questions of the theory of lattice polytopes lies in characterizing the possible h^*-polynomials. Given a Gorenstein lattice polytope with the integer decomposition property, Hibi and Ohsugi conjectured that the coefficients of the h^*-polynomial are always unimodal. I will give an introduction to the topic and an overview of our proof of the conjecture which establishes a generic strong Lefschetz property on an associated semigroup algebra.

Adam arras

Title *: Existence of absolutely continuous spectrum for Galton-Watson trees.*

Abstract:
The Lebesgue decomposition (into absolutely continuous, singular continuous and pure point parts) of a self-adjoint operator is an important notion. In quantum mechanics, this decomposition governs the long-time behavior of the system via a generalization of the Rieman-Lebesgue lemma. We will study the case of supercritical Galton-Watson trees, which appears for example as the local limit of the constant-degree Erdős-Rényi model. We will show a quantitative criterion on the relative variance of the law of reproduction which ensures the presence of an absolutely continuous part of the spectrum.

Pegah Pournajafi

Title: *Small classes of intersection graphs with unbounded chromatic number*

Abstract:
Can triangle-free intersection graphs of line segments have arbitrarily large chromatic number? It is in 1970 that Erdős asked this question, but it is not before 2012 that a construction answering it positively was (re)discovered. Since then, much research has been conducted on finding smaller classes of intersection graphs with unbounded chromatic number. After reviewing some of the previous works and the motivation behind them, I will introduce the class of constrained S-graphs, for any family of sets S in the plane (satisfying some simple conditions). This geometric class of graphs is equal to the well-known class of Burling graphs which has several applications in chi-boundedness thanks to its ``smallness". I will also explain how defining constrained S-graphs tightly improves some of the previous works.

Konrad wrobel

Title: *Measure Equivalence and Wreath Product Groups*

Abstract:

Measure equivalence is an equivalence relation on the space of groups that was defined by Gromov in the 90's as an analytic analogue of quasi-isometry. Let F be a nonabelian free group. We show that if L_1 and L_2 are measure equivalent groups, then the wreath products $L_1\wr F$ and $L_2\wr F$ are measure equivalent with index 1. This is joint work with Robin Tucker-Drob.

Mohamed Ali Belloum

Title: *Extreme values of reducible multype branching Brownian motion*

Abstract:
A branching Brownian motion can be described as a particle system on the real line in which particles move independently as Brownian motion, while splitting at rate 1 into two daughter particles. We take interest in a multitype version of this process, in which the diffusion constant of the displacement and the branching rate are both influenced by the type. When the process is reducible (e.g. when particles of type 1 can give birth to particles of type 2, but not reciprocally), an anomalous spreading phenomenon may occur, in which the speed of the multitype process is strictly larger than the speed of each" pure" process. We take interest in the asymptotic behavior of extremal particles in this setting, showing the convergence in law of the extremal process centered around the median of the maximal displacement.

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