中国科学技术大学
University of Science and Technology of China

Workshop on Combinatorics and Graph Theory

会|议|手|册

2026年6月12日-14日
安徽·合肥

Workshop on Combinatorics and Graph Theory

会议时间：2026 年6 月 12 日—6 月 14 日

报到地点：合肥皇冠假日酒店一层大厅

会议地点：合肥皇冠假日酒店翠海 2 厅

酒店地址：合肥市黄山路 598 号A座

会议组织者（按姓氏字母序）：

侯新民、Jack H. Koolen、刘世平、刘西之、马杰、Tuan Tran、张先得

主办单位：中国科学技术大学数学科学学院

会议资助：

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会务组：杨成蹊 杨笛龙 杨宇昂

会议日程

6 月 12 日（星期五） 全天	
报到 地点： 合肥皇冠假日酒店一层大厅（黄山路 598 号 A 座）	
18:00-20:30	晚餐 地点： 一层中餐厅木兰 & 金盏厅
6 月 13 日（星期六）上午 地点： 一层翠海 2 厅	
时间	**报 告**
09:00-09:15	**毛亚平** Some Open Problems in Integer Ramsey Theory
09:15-09:30	**王周宁馨** Reconfiguration of nowhere-zero flows
09:30-09:45	**谢天颖** Saturation numbers for 3-uniform Berge-K_4
09:45-10:00	**刘 猛** Ramsey goodness of large books
10:00-10:30	**休 息**
10:30-10:45	**李永涛** Some problems in spectral extremal graph theory
10:45-11:00	**张文韬** Maximum in-general-position set in a random subset of F_q^d
11:00-11:15	**Thomas Karam** The projection problem for the ranks of tensors
11:15-11:30	**李 平** Multicolor Turán number of cycles
11:30-11:40	**合 影**
11:40-14:30	**午餐 地点：一层翠海 1 厅**

6 月 13 日（星期六） 下午 地点：一层翠海 2 厅	
时间	**报 告**
14:30-14:45	**张 韬** Codegree density of $PG_m(q)$
14:45-15:00	**江素云** Ramsey-Turán density of Hypergraphs
15:00-15:15	**高国荣** Counting cliques in hypergraph
15:15-15:30	**丁来浩** On 3-graphs with zero codegree Turán density
15:30-16:00	**休 息**
16:00-16:15	**徐子翔** Erdős–Kleitman conjecture on saturated families
16:15-16:30	**艾江东** A cubic refinement of Jackson's Chvátal–Erdős condition for Hamilton cycles in digraphs
16:30-16:45	**宁 博**
16:45-17:00	**Ben Lund** A Higher-Dimensional Generalization of a Classical Problem on Red and Blue Points
17:30-20:00	**晚餐 地点：一层翠海 1 厅**
6 月 13 日（星期日） 全天	
自由讨论	

报告

Some Open Problems in Integer Ramsey Theory

毛亚平 (Yaping Mao)
青海师范大学

Abstract: Integer Ramsey theory traces its origins to Hilbert's 1892 theorem on monochromatic progressions. In this talk, we first present a concise historical overview of van der Waerden numbers and Hales-Jewett theory, two cornerstones of the field. We then discuss several important open problems and recent partial results related to these topics.

Reconfiguration of nowhere-zero flows

王周宁馨 (Zhouningxin Wang)
南开大学

Abstract: Fix an abelian group A, a graph G, and two nowhere-zero A-flows f' and f'' on G. Two such flows f' and f'' are *A-flow-adjacent* if they differ only on the edges of some cycle C in G; they are *A-flow-equivalent* if there exists a sequence of flows connecting them by successive adjacency steps. A graph G is *A-flow-connected* if every pair of nowhere-zero A-flows on G is A-flow-equivalent. These concepts were introduced by L. Esperet, A. Lagoutte, and M. Marseloo, who proved （together with K. Hendrey, S. Norin, and R. Steiner）, among other results, that every 2-edge-connected graph is A-flow-connected either when $A = \mathbb{Z}_2^8$ or when $|A| \geq 1.15 \times 10^{694}$. In this talk, we share new results and open problems.

Saturation numbers for 3-uniform Berge-K_4

谢天颖 (Tianying Xie)
福州大学

Abstract: The saturation number $\mathrm{sat}_r(n, \mathcal{F})$ is the minimum number of hyperedges in an r-uniform $\mathcal{F}$-saturated hypergraph on n vertices. In this talk, I will present joint work with Yihan Chen and Jialin He on the saturation number of 3-uniform Berge-K_4 hypergraphs. We prove that $\mathrm{sat}_3(n, \text{Berge-}K_4) = n$ for $n = 5, 7, 8$ and $n \geq 96$, while $\mathrm{sat}_3(6, \text{Berge-}K_4) = 5$. This resolves a problem posed by English, Kritschgau, Nahvi, and Sprangel for large n. Using a computer search, we determine all extremal hypergraphs for $5 \leq n \leq 8$. For $n \geq 96$, we further show the existence of many non-isomorphic extremal families. Our approach combines structural analysis with computational methods.

Ramsey goodness of large books

刘猛 (Meng Liu)
安徽大学

Abstract: Let G be a graph and H a connected graph. Then H is said to be G-good if the Ramsey number $r(G,H)$ is equal to the general lower bound $(\chi(G)-1)(|H|-1)+s(G)$, where $\chi(G)$ and $s(G)$ are the chromatic number and the chromatic surplus of G, respectively. We shall give a brief introduction for the Ramsey goodness of large books.

Some problems in spectral extremal graph theory

李永涛 (Yongtao Li)
清华大学

Abstract: In this talk, I will introduce some open problems in spectral extremal graph theory. Let G be a simple graph on n vertices with m edges. We denote by $\lambda(G)$ the adjacency spectral radius of G. The following statements are listed as open problems.

- An edge is called triangular if it is contained in a triangle. If G is a graph with m edges and $\lambda(G)\geq\sqrt{m}$, then G contains at least $\sqrt{m}$ triangular edges, unless G is a complete bipartite graph. (Li–Feng–Peng, 2025, JGT)
- If G is an m-edge graph with $\lambda(G)>\sqrt{m}$, and there is no vertex contained in all triangles of G, then G has at least $\sqrt{m}-O(1)$ triangles. (Li–Feng–Peng, 2025, EUJC)
- If G is a graph with m edges and $\lambda(G)>\sqrt{m}$, then G contains a book of size greater than $\frac{1}{3}\sqrt{m}$. (Li–Liu–Zhang, 2026, JCTB)
- If G is an n-vertex graph with $\lambda(G)>\lambda(T_{n,2})$, is it true that G contains a book of size greater than $\frac{n}{6}$? (Zhai–Lin, 2023, JGT)
- Determine the maximum constant c such that: for every $\varepsilon>0$ and sufficiently large n, every graph G of order n satisfying $\lambda(G)>\lambda(T_{n,2})$ contains cycles C_ℓ of all lengths $\ell\leq(c-\varepsilon)n$. (Nikiforov, 2008, LAA)
- Let F be a color-critical graph with $\chi(F)=r+1\geq 4$. If G is an F-free graph, then for every $\ell\geq 1$ and sufficiently large $w_\ell(G)$, we have $\lambda^\ell(G)\leq\left(1-\frac{1}{r}\right)w_\ell(G)$. This conjecture will be added to the new version of (Li–Liu–Zhang, 2025, arXiv:2511.15431)

- For fixed $t \geq 2$, the split graph $S_{t,m}$ is the edge-spectral extremal construction for forbidding C_{2t+1}. The natural supersaturation problem is to determine the sharp asymptotic constant

$$\inf_{\lambda(G)>\lambda(S_{t,m})} \frac{\#C_{2t+1}(G)}{m^t}$$

as $m \to \infty$. (Li–Lin–Liu–Zhang, 2026, arXiv:2605.26614)

Maximum in-general-position set in a random subset of $\mathbb{F}_q^d$

张文韬 (Wentao Zhang)
清华大学

Abstract: Let $\alpha(\mathbb{F}_q^d, p)$ be the maximum possible size of a point set in general position in a p-random subset of $\mathbb{F}_q^d$. We determine the order of magnitude of $\alpha(\mathbb{F}_q^d, p)$ up to a polylogarithmic factor by proving the balanced supersaturation conjecture of Balogh and Luo. Our result also resolves a conjecture implicitly posed by the first author, Liu, the second author and Zeng. In the course of our proof, we establish a lemma that demonstrates a "structure vs. randomness" phenomenon for point sets in finite-field linear spaces, which may be of independent interest. This is joint work with Yaobin Chen, Jiaxi Nie and Jing Yu.

The projection problem for the ranks of tensors

Thomas Karam
上海交通大学

Abstract: It follows from the elimination algorithm that given a high-rank matrix, most linear combinations of the rows (or columns) of that matrix must have many non-zero entries, a fact that holds uniformly over the choice of base field. In the case of tensors, we can show, still with elementary methods –although this is less straightforward –that whenever an order-3 tensor has high slice rank, its typical order-2 projection –that is, a typical linear combination of its order-2 slices with fixed first coordinate –must have high rank. For higher-order tensors, it is very natural to ask the following more general question: given two integers $k < d$, a notion of rank on order-k tensors and a notion of rank on order-d tensors, is it the case that if an order-d tensor has high rank then its typical order-k projection must have high rank? We shall discuss how we have found an answer to this question for some specific notions of rank, followed by the remaining difficulties standing before a more general answer.

Multicolor Turán number of cycles

李平 (Ping Li)
陕西师范大学

Abstract: The *F-multicolor Turán number* of G, denoted by $\mathrm{ex}_F(n, G)$, is the maximum number of edge-disjoint copies of F in an n-vertex graph such that there is no copy of G whose edges come from distinct copies of F. In this talk, I will present the multicolor Turán number when both F and G are cycles, and list some problems to be solved.

Codegree density of $PG_m(q)$

张韬 (Tao Zhang)
西安电子科技大学

Abstract: In this talk, I will review known results on the codegree density of $PG_m(q)$ and share several open problems in this area.

Ramsey-Turán density of Hypergraphs

江素云 (Suyun Jiang)
江汉大学

Abstract: Let the Turán number $\mathrm{ex}(n, F)$ be the maximum number of edges in an n-vertex F-free r-graph, and let the Ramsey-Turán number $\mathrm{RT}(n, F, \ell)$ be the maximum number of edges in an n-vertex F-free r-graph H with independence number $\alpha(H) < \ell$. In this talk, we investigate the relationship between the Turán density $\pi(F)$ and the Ramsey-Turán density $\varrho(F)$. We also provide sufficient conditions for $\varrho(F) = \pi(F)$ and $\varrho(F) = 0$, respectively, and give some constructions based on high-dimensional complex spheres.

Counting cliques in hypergraph

高国荣 (Guorong Gao)
福州大学

Abstract: By symmetrization method, Zykov proved that the number of cliques of a K_r-free graph is at most that of Turán graph, Moon-Moser showed that the number of maximal cliques of an n-vertex graph is at most $3^{n/3}$. What about the hypergraphs?

On 3-graphs with zero codegree Turán density

丁来浩 (Laihao Ding)
华中师范大学

Abstract: For a k-uniform hypergraph (or simply k-graph) F, the codegree Turán density $\pi_{\mathrm{co}}(F)$ is the supremum over all α such that there exist arbitrarily large n-vertex F-free k-graphs H in which every $(k-1)$-subset of $V(H)$ is contained in at least αn edges. In this talk, I introduce a conjecture we proposed concerning the characterization of 3-graphs with zero codegree Turán density.

Erdős–Kleitman conjecture on saturated families

徐子翔 (Zixiang Xu)
浙江大学

Abstract: The Erdős–Kleitman conjecture asserts that every maximal family $\mathcal{F} \subseteq 2^{[n]}$ with no matching of size s satisfies

$$|\mathcal{F}| \geq \left(1 - 2^{-(s-1)}\right) 2^n.$$

For decades, the best general lower bound was the trivial 2^{n-1}, until a breakthrough of Bucić, Letzter, Sudakov and Tran proved the bound

$$|\mathcal{F}| \geq \left(1 - \frac{1}{s}\right) 2^n.$$

In this talk, I will present our recent tiny improvement on this result. This is based on joint work with Gennian Ge and Jialuo Wang.

A cubic refinement of Jackson's Chvátal–Erdős condition for Hamilton cycles in digraphs

艾江东 (Jiangdong Ai)
南开大学

Abstract: For a digraph D, let $a_2(D)$ be the largest size of a vertex set no two of whose vertices lie in a common directed 2-cycle. Let $f_2(a)$ be the least integer K such that every K-connected digraph D with $a_2(D) \leq a$ has a Hamilton cycle. In 1987, Jackson proved that $f_2(a) \leq 2^a(a+2)!$ and asked for better bounds, noting that a linear bound might be possible. Kühn and Osthus later observed that even a polynomial bound would be interesting. In this short note, we prove the polynomial bound $f_2(a) \leq 2a^3 + 2$.

A Higher-Dimensional Generalization of a Classical Problem on Red and Blue Points

Ben Lund
西安电子科技大学

Abstract: Suppose that there are n blue points and t red points in the real plane, that the blue points are not contained in a single line, and that every line containing at least two points of any color also contains at least one red point. How large can n be as a function of t? This question was first asked by Motzkin in 1951, and later independently by Grünbaum in 1975 and by Erdős and Purdy in 1978. I will discuss a higher-dimensional generalization of this problem that I recently introduced in joint work with Campbell and Kroeker, along with some initial results and open problems.

参会名单

序号	姓名	拼音	单位
1	Le Quang Ham		Vietnam Institute of Educational Sciences
2	范益政	Yizheng Fan	安徽大学
3	彭兴	Xing Peng	安徽大学
4	刘猛	Meng Liu	安徽大学
5	谢天颖	Tianying Xie	福州大学
6	高国荣	Guorong Gao	福州大学
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21	Thomas Karam		上海交通大学
22	田安源	Anyuan Tian	上海交通大学
23	Ben Lund		西安电子科技大学
24	张韬	Tao Zhang	西安电子科技大学
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Communications in Mathematics and Statistics 数学与统计通讯(英文)

Communications in Mathematics and Statistics《数学与统计通讯(英文)》是由中国科学技术大学主办，中国科大数学科学学院承办，由德国施普林格出版社负责出版和全球发行的综合性数学与统计方向的英文SCI国际期刊。主要发表基础数学、应用数学、计算数学、概率与统计等领域的高水平原创性研究论文(包括高水平的综述文章)。期刊致力于为中国数学研究各领域的工作者构建交流和共享的平台，帮助相关领域学者在世界范围内发出自己的声音并获取前沿信息，其宗旨是反映全球研究院所、高等院校等机构在数学与统计学科各研究领域的最新研究成果和动态。期刊于2013年3月正式出版发行。

2019 年 8 月, Communications in Mathematics and Statistics《数学与统计通讯(英文)》被SCI正式收录，在国内外同行中已有一定的知名度和影响力。通过借助施普林格强大的网络出版平台和先进的服务，本刊目前有非常良好的国内外发行推广渠道。《Communications in Mathematics and Statistics》(中国数学会T1期刊)，2019年获中国科技期刊卓越行动计划高起点新刊项目资助，2024年获中国科技期刊卓越行动计划二期英文梯队项目资助。

期刊主编马志明，为中国科学院院士，第三世界科学院院士，中国科学院数学与系统科学研究院学术委员会主任。

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会议记录页

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