

Curriculum Vitae of Dmitrii Zakharov

Full Name Dmitrii Andreevich Zakharov

Born 18 June 2000, Nizhny Novgorod, Russia

Citizenship Russian Federation

Employment

- Researcher Assistant at Laboratory of Advanced Combinatorics and Network Applications, MIPT, April 2019 - December 2019.
- Research Assistant at Laboratory of Algebraic Geometry and its Applications, HSE, January 2021 - December 2021.
- Researcher at Laboratory of Combinatorial and Geometric structures, MIPT, January 2020 - August 2022.

Education

- September 2007 to May 2011, Lyceum №40 in Nizhny Novgorod.
- September 2011 to May 2013, Gymnasium №710 in Moscow.
- September 2013 to May 2018, School №179 in Moscow.
- September 2018 to July 2022, HSE University, Faculty of Mathematics, bachelor program “Mathematics”. Advisor: Michael Finkelberg
- September 2022 to present, PhD program at MIT, Department of Mathematics. Advisor: Lisa Sauermann (2022-23), Larry Guth (2023-24)

Fields of Interest Extremal and Additive Combinatorics, Discrete Geometry and Harmonic Analysis.

Teaching Mentor at high school math research program for Ukrainian students “Yulia’s Dream”, summer of 2022.

Summer Undergraduate Math Research at Yale (2021), mentor of the project “Hypergraph Containers” (with C. Pohoata).

Teaching assistant on the course "Analysis II" at HSE, Fall 2020.

Fellowships. Jane Street Graduate Research Fellowship (2023-2024)

Press.

- N plus 1 article (2017, in Russian):

<https://nplus1.ru/news/2017/05/05/10-grade-math>

- Quanta Magazine article (2023):

<https://www.quantamagazine.org/the-biggest-smallest-triangle-just-got-smaller-20230908/>

Talks

2017.

- First Russian-Hungarian workshop on discrete mathematics “Acute angles” (April 21-23)

2021.

- Young Researchers in Extremal and Probabilistic Combinatorics at IBS “Zero subsums in vector spaces over finite fields” (October 22)

2022.

- Arnold Stipendant Lecture HSE “Additive Combinatorics and Convex Geometry” (June 14)
- MIT/Harvard Combinatorics seminar “Convex polytopes from fewer points” (September 7)
- Budapest Big Combinatorics and Geometry Seminar “Convex polytopes from fewer points” (September 22)

2023.

- Princeton Discrete Mathematics seminar “Recent progress on the Erdos-Ginzburg-Ziv problem” (April 27)
- EXCILL IV workshop at UIUC “A new upper bound for the Heilbronn triangle problem” (May 28) joint talk with Cosmin Pohoata
- UIUC Summer School in algebraic methods in combinatorics. I gave several lectures: “Hypergraph Zarankiewicz”, “Szemerédi-Trotter III”, “Slice rank I” (May 29-June 2)
- IMPA Combinatorics Seminar “A new upper bound for the Heilbronn triangle problem” (June 21)
- MIT Combinatorics Reading group “New bounds for the same type lemma” (October 6)
- MIT/Harvard Combinatorics seminar, “A new upper bound for Heilbronn’s triangle problem and connections to projection theory” (October 13) joint talk with Alex Cohen
- Rutgers Discrete Math seminar “Erdős–Ginzburg–Ziv problem in large dimension” (November 6)

2024.

- Oberwolfach Discrete Geometry workshop, “Lower bounds for incidences” (January 22)
- Budapest Big Combinatorics + Geometry Seminar, “Lower bounds for incidences” (April 5)
- AiM Workshop on High-dimensional phenomena in discrete analysis, “Zero-sum free sets over finite fields” (May 17)
- Stanford Combinatorics workshop “Induced matchings in the point-tube incidence graphs” (May 23)
- Stanford Combinatorics reading group, “Arithmetic Kakeya” (May 24)
- IMPA Combinatorics Seminar “Spherical sets avoiding orthonormal bases” (June 14)
- MIT/Harvard Combinatorics seminar “Lower bounds for incidences” (September 5)

Publications

1. Kupavskii, A., and Zakharov D.. “Regular bipartite graphs and intersecting families.” *Journal of Combinatorial Theory, Series A* 155 (2018): 180-189. <https://www.sciencedirect.com/science/article/pii/S0097316517301607>
2. Zakharov, D., “Acute sets.” *Discrete & Computational Geometry* 61.1 (2019): 212-217. <https://link.springer.com/article/10.1007/s00454-017-9947-y>
3. Zakharov, D., and A. M. Raigorodskii. “Clique-chromatic numbers of graphs of intersections.” *Math. Notes* 105.1 (2019): 138-140. <http://www.mathnet.ru/eng/mz12097>
4. Zakharov, D. “Chromatic Numbers of Some Distance Graphs.” *Mathematical Notes* 107 (2020). <https://link.springer.com/article/10.1134/S000143462001023X>
5. Zakharov, D., “Chromatic numbers of Kneser-type graphs.” *Journal of Combinatorial Theory, Series A* 172 (2020): 105188. <https://www.sciencedirect.com/science/article/pii/S0097316519301694>
6. Kupavskii, A., and Zakharov D., “The right acute angles problem?” *European Journal of Combinatorics* 89 (2020): 103144. <https://www.sciencedirect.com/science/article/pii/S0195669820300652>
7. Tomon, I., and Zakharov D.. “Turán-type results for intersection graphs of boxes.” *Combinatorics, Probability and Computing* (2020): 1-6. <https://doi.org/10.1017/S0963548321000171>
8. Kupavskii, A., Polyanskii, A., Tomon, I. and Zakharov, D., “The Extremal Number of Surfaces.” *International Mathematics Research Notices*. 2021; rnab099, <https://doi.org/10.1093/imrn/rnab099>
9. D. Conlon, C. Pohoata, D. Zakharov, “Random multilinear maps and the Erdős box problem”, *Discrete Analysis* 2021:17, 8 pp. <https://discreteanalysisjournal.com/article/28336-random-multilinear-maps-and-the-erdos-box-prob>
10. Pohoata, C., and Zakharov D.. “On the trifference problem for linear codes.” *IEEE Transactions on Information Theory* (2022). <https://ieeexplore.ieee.org/abstract/document/9797776>
11. Pohoata C., Zakharov D., “Zero subsums in vector spaces over finite fields”, *Algebra & Number Theory* 16.6 (2022): 1407-1421. <https://msp.org/ant/2022/16-6/p03.xhtml>
12. Zakharov D., “On the size of maximal intersecting families”, *Combinatorics, Probability and Computing* 33.1 (2024): 32-49. <https://arxiv.org/abs/2010.02541>,

13. Pohoata C., Zakharov D., “On the number of high-dimensional partitions.”, Proceedings of the London Mathematical Society 128.2 (2024): e12586
<http://doi.org/10.1112/plms.12586>
14. Zakharov, Dmitrii. “Upper bounds for Heilbronn’s triangle problem in higher dimensions”, Bulletin of the London Mathematical Society, published online
<https://doi.org/10.1112/blms.13020>
15. Kupavskii, Andrey, and Dmitrii Zakharov. “Spread approximations for forbidden intersections problems.” Advances in Mathematics 445 (2024): 109653.
<https://www.sciencedirect.com/science/article/pii/S0001870824001683>
16. Pohoata C., Zakharov D., “Convex polytopes from fewer points”, accepted to Duke
<https://arxiv.org/abs/2208.04878>
17. Lisa Sauermann, Dmitrii Zakharov. “On the Erdős–Ginzburg–Ziv Problem in large dimension.”, accepted to AJM
<https://arxiv.org/abs/2302.14737>
18. Zakharov, Dmitrii. “Most integers are not a sum of two palindromes.” accepted to Cambridge Phil. Soc. Math. Proc.
<https://arxiv.org/abs/2402.10808>

Preprints

1. Zakharov D., “Convex geometry and the Erdős–Ginzburg–Ziv problem”,
<https://arxiv.org/abs/2002.09892>,
2. Pohoata C., Zakharov D., “Norm hypergraphs”,
<https://arxiv.org/abs/2101.00715>.
3. Kupavskii, Andrey, Arsenii Sagdeev, and Dmitrii Zakharov. “Cutting corners.” arXiv preprint arXiv:2211.17150 (2022).
<https://arxiv.org/pdf/2211.17150>
4. Pohoata, Cosmin, Lisa Sauermann, and Dmitrii Zakharov. “Sharp bounds for rainbow matchings in hypergraphs.”
<https://arxiv.org/pdf/2212.07580>
5. Cohen, Alex, Cosmin Pohoata, and Dmitrii Zakharov. “A new upper bound for the Heilbronn triangle problem.”
<https://arxiv.org/abs/2305.18253>
6. Alon, N., Bucić, M., Sauermann, L., Zakharov, D., & Zamir, O. (2023). “Essentially tight bounds for rainbow cycles in proper edge-colourings”.
<https://arxiv.org/abs/2309.04460>

7. Sauermann, Lisa, and Dmitrii Zakharov. “A sharp Ramsey theorem for ordered hypergraph matchings.”
<https://arxiv.org/abs/2309.04813>
8. Zakharov, Dmitrii. “Spherical sets avoiding orthogonal bases.”
<https://arxiv.org/abs/2310.06821>
9. Pohoata, Cosmin, and Dmitrii Zakharov. “On skew corner-free sets.”
<https://arxiv.org/abs/2401.17507>
10. Jain, V., Pham, H. T., Sawhney, M., & Zakharov, D. “An explicit economical additive basis”
<https://arxiv.org/abs/2405.08650>
11. Zakharov, Dmitrii. “On sets of orthogonal exponentials on the disk”
<https://arxiv.org/abs/2405.14063>
12. Izabella Łaba, Dmitrii Zakharov. “On the minimal period of integer tilings”
<https://arxiv.org/abs/2406.14824>
13. Janos Pach, Dmitrii Zakharov. “Ruzsa’s problem on Bi-Sidon sets”
<https://arxiv.org/abs/2409.03128>
14. Alex Cohen, Cosmin Pohoata, Dmitrii Zakharov. “Lower bounds for incidences”
<https://arxiv.org/abs/2409.07658>