

Overview of motivating papers:

Topic A: Harmonic Analysis

- (A.1) Wang H, Wu S. Restriction estimates using decoupling theorems and two-ends Furstenberg inequalities. arXiv preprint arXiv:2411.08871, 2024.
- (A.2) Guth L, Maldague D, Oh C. ℓ^2 decoupling theorem for surfaces in $\mathbb{R}^3$. arXiv preprint arXiv:2403.18431, 2024.
- (A.3) Li X, Wu S. On almost everywhere convergence of planar Bochner-Riesz mean. arXiv preprint arXiv:2407.20887, 2024.
- (A.4) Guo S, Wang H, Zhang R. A dichotomy for Hörmander-type oscillatory integral operators. *Inventiones mathematicae*, 2024, 238(2): 503-584.
- (A.5) Basu S, Guo S, Zhang R, et al. A stationary set method for estimating oscillatory integrals. *Journal of the European Mathematical Society*, 2024.
- (A.6) Carbery T, Iliopoulou M, Wang H. Some sharp inequalities of Mizohata--Takeuchi-type. *Revista Matemática Iberoamericana*, 2023.
- (A.7) Kiyohara D. Lattice points on a curve via ℓ^2 decoupling. arXiv preprint arXiv:2205.08206, 2022.
- (A.8) Christ M, Li X, Tao T, Thiele, C. On multilinear oscillatory integrals, nonsingular and singular. *Duke Math. J.* 130 (2005)(2), 321–351.
- (A.9) Li X. Bilinear Hilbert transforms along curves, I: the monomial case. *Analysis & PDE*, 2013, 6(1): 197-220.
- (A.10) Dasu S, Jung H, Li Z K, et al. Mixed Norm ℓ^2 Decoupling for Paraboloids. *International Mathematics Research Notices*, 2023, 2023(20): 17972-18000.
- (A.11) Bourgain J, Demeter C. The proof of the ℓ^2 decoupling conjecture. *Annals of mathematics*, 2015: 351-389.
- (A.12) Chen X, Guo Z, Shen M, et al. On smoothing estimates for Schrödinger equations on product spaces $\mathbb{T}^m \times \mathbb{R}^n$. *Journal of Functional Analysis*, 2024, 286(4): 110262.
- (A.13) Wang H, Zhang L. Refinements of the 2-dimensional Strichartz estimate on the maximum wave packet. arXiv preprint arXiv:1611.10275, 2016.
- (A.14) Demeter C. Level set estimates for the periodic Schrödinger maximal function on $\mathbb{T}^1$. arXiv preprint arXiv:2402.01099, 2024.
- (A.15) Christ M. On trilinear oscillatory integral inequalities and related topics. arXiv preprint arXiv:2007.12753
- (A.16) Christ M. On implicitly oscillatory quadrilinear integrals. arXiv preprint arXiv:2204.03780
- (A.17) Christ M, Zhou Z. A class of singular bilinear maximal functions. *Journal of Functional Analysis*, 2024, 287(8):110572.
- (A. 18) Hu B, Lie V. On the curved trilinear Hilbert transform. arXiv preprint arXiv:2308.10706.

Topic B: Geometric Measure Theory

- (B.1) Wang H, Zahl J. Volume estimates for unions of convex sets, and the Kakeya set conjecture in three dimensions. arXiv preprint arXiv:2502.17655v1, 2025.
- (B.2) Fu Y, Ren K. Incidence estimates for α -dimensional tubes and β -dimensional balls in $\mathbb{R}^2$. *Journal of Fractal Geometry*, 2024, 11.

- (B.3) Guth L, Solomon N, Wang H. Incidence estimates for well spaced tubes. *Geometric and Functional Analysis*, 2019, 29(6): 1844-1863.
- (B.4) Arsovski B. The p -adic Kakeya conjecture. *Journal of the American Mathematical Society*, 2024, 37(1): 69-80.
- (B.5) Gan S, Guo S, Guth L, et al. On restricted projections to planes in $\mathbb{R}^3$. *arXiv preprint arXiv:2207.13844*, 2022.
- (B.6) Orponen T, Shmerkin P. On the Hausdorff dimension of Furstenberg sets and orthogonal projections in the plane. *Duke Mathematical Journal*, 2023, 172(18): 3559-3632.
- (B.7) Orponen T, Shmerkin P. Projections, Furstenberg sets, and the ABC sum-product problem. *arXiv preprint arXiv:2301.10199*, 2023.
- (B.8) Orponen T. On the projections of Ahlfors regular sets in the plane. *arXiv preprint arXiv:2410.06872*, 2024.
- (B.9) Guth L, Iosevich A, Ou Y, et al. On Falconer's distance set problem in the plane. *Inventiones mathematicae*, 2020, 219(3): 779-830.
- (B.10) Du X, Ou Y, Ren K, et al. New improvement to Falconer distance set problem in higher dimensions. *arXiv preprint arXiv:2309.04103*, 2023.
- (B.11) Fraser J M, Orponen T, Sahlsten T. On Fourier analytic properties of graphs. *International Mathematics Research Notices*, 2014, 2014(10): 2730-2745.

Topic C: Dynamics

- (C.1) Venkatesh A. Sparse equidistribution problems, period bounds and subconvexity. *Annals of Mathematics*, 2010: 989-1094.
- (C.2) Flaminio L, Forni G, Tanis J. Effective equidistribution of twisted horocycle flows and horocycle maps. *Geometric and Functional Analysis*, 2016, 26(5): 1359-1448.
- (C.3) Lindenstrauss E, Mohammadi A, Wang Z. Effective equidistribution for some one parameter unipotent flows. *arXiv preprint arXiv:2211.11099*, 2022.
- (C.4) Sarnak P, Ubis A. The horocycle flow at prime times. *Journal de mathématiques pures et appliquées*, 2015, 103(2): 575-618.
- (C.5) Forni G, Kanigowski A, Radziwiłł M. Horocycle flow at product of two primes. *arXiv preprint arXiv:2409.16687*, 2024.
- (C.6) Kosz D, Mirek M, Peluse S, Wright J. The multilinear circle method and a question of Bergelson. *arXiv preprint arXiv:2411.09478*