CURRICULUM VITAE

Mark Rudelson

Address:	Department of Mathematics, University of Michigan, East Hall, 530 Church Street, Ann Arbor, Michigan 48109.
Tel.:	(734)-763-3138 FAX: (734)-763-0937
E-mail:	*rudelson@umich.edu*

Education:

1997	Ph.D., Hebrew University of Jerusalem, Jerusalem, Israel Thesis: Problems in the Local Theory of Banach Spaces Advisor: Professor Joram Lindenstrauss
1988	M.Sc., Polytechnical Institute, Leningrad, USSR

Appointments:

Current	Professor, University of Michigan, Ann Arbor, Michigan
Fall 2005 – Spring 2010	Luther Marion Defoe Distinguished Professor of Mathematics, University of Missouri – Columbia Columbia, Missouri
Fall 2003– Spring 2005	Associate Professor, University of Missouri – Columbia Columbia, Missouri
Fall 2000– Spring 2003	Assistant Professor, University of Missouri – Columbia Columbia, Missouri
Fall 1998– Spring 2000	Post Doctoral Fellow, University of Missouri – Columbia Columbia, Missouri
Fall 1996 – Spring 1998	Visiting Assistant Professor, Texas A & M University, College Station, Texas
Spring 1996	Post Doctoral Fellow, Mathematical Sciences Research Institute, Berkeley, California
1994-1995	Instructor, The Hebrew University of Jerusalem
1991-1993	Assistant, The Hebrew University of Jerusalem
1988-1990	Programmer, Institute “Lengidrostal”, Sankt–Petersburg, Russia

Grants and awards:

Winter 2023 –	Erna and Jakob Michael Professorship at Weizmann Institute of Science, Israel.
Fall 2022 – Winter 2023	Simons Fellowship
Fall 2022	Research Professorship, ICERM.
2021-2025	NSF grant DMS - 2054408, Non-asymptotic random matrix theory and random graphs
Fall 2020	Research Professorship, Simons Institute (remote because of COVID-19).
December 2019 – January 2020	Simons Visiting Professorship Tata Institute of Fundamental Research, Bangalore, India.
Winter 2018	Rosy and Max Varon Professorship at Weizmann Institute of Science, Israel.
Fall 2017 – Winter 2018	Simons Fellowship
May–June 2018	Research Professorship, IPAM.
Fall 2017	Research Professorship, MSRI.
2018-2021	NSF grant DMS-1807316, Non-asymptotic random matrix theory and geometric functional analysis
2015-2018	NSF grant DMS-1464514, Non-asymptotic approach in random matrix theory
2014-2016	AFOSR grant FA9550-14-1-0009, Probabilistic signal recovery and random matrices
2012-2015	NSF grant DMS-1161372, Random matrices and geometric functional analysis
2008-2011	NSF grant DMS-1111318, Non-asymptotic random matrix theory
2007-2011	NSF FRG grant DMS-0652684, Collaborative Research: Fourier analytic and probabilistic methods in geometric functional analysis and convexity.
2006-2009	NSF grant DMS-0556151, Probabilistic Approach in Geometric Functional Analysis.
2004 August 1–21	Oberwolfach "Research in Pairs" grant, joint with S. Mendelson and R. Vershynin.
2003-2006	NSF grant DMS-024380, Probabilistic Approach in Geometric Functional Analysis.
2000-2003	NSF grant DMS-0070458, Probabilistic Approach in Geometric Functional Analysis.
1997-2000	NSF grant DMS-9706835, Probabilistic Approach in the Local Theory of Banach Spaces and Convex Geometry.
1997	Nessiyahu Prize (Israeli prize for the best Ph. D. of the year in Mathematics)

Research interests:

asymptotic geometric analysis, high-dimensional probability,
convex geometry.

Some talks and lecture series:

2023	January,	Tata Institute of Fundamental Research, Bengaluru, India (4 talks)
2021	June,	Institute Henri Poincaré, Paris, France (10 talks),
2017	July,	Special program on random matrices, PCMI, Utah (4 talks),
2013	November,	Annual Meeting of the Dutch Probability and Statistics Society (2 talks),
2010	August	International Congress of Mathematicians, Hyderabad, India sectional talk.
2008	December	Polish Institute of Mathematics, Warsaw, Poland (4 talks).
2008	May	Annual French Mathematical Society conference "Etats de la Recherche" (4 talks).
2006	August	NSF-CBMS Conference: Probabilistic and Combinatorial methods in Analysis Kent State University, Ohio (main speaker, 10 talks).

Editorial board:

Journal of Theoretical Probability
Michigan Mathematical Journal

Conferences organized and co-organized:

October 2022	Probabilistic methods in geometry and analysis ICERM, Providence, RI.
August 2017 –	Geometric functional analysis
December 2017	Special Semester program at MSRI.
July 2016	Geometric functional analysis Texas A&M University;
November 2015	Analytic and probabilistic techniques in Modern Convex Geometry, University of Missouri.
October 2013	Informal Analysis and Probability Seminar, University of Michigan.
June 2013	Section on random matrices, Joint Meeting of the AMS and Israeli Math. Union, Tel Aviv, Israel.
May 2011	Workshop on random matrices, geometric functional analysis, and algorithms, Oberwolfach, Germany.
March 2008	Conference on classical convex geometry, University of Missouri.
March 2008	Conference on asymptotic convex geometry, University of Missouri.
August 2008	Workshop on probabilistic methods in convex geometry, Kent State University.

Teaching experience:

University of Michigan

Undegraduate courses:	Probability theory, Advanced Calculus, Multivariable Advanced Calculus.
Graduate courses:	Real Analysis I, Complex Analysis II, Functional Analysis, Probability and random processes, Discrete time random processes, High-dimensional probability, Fourier analysis, Brownian Motion, Measure concentration.

University of Missouri

Undegraduate courses	Finite Mathematics Calculus for Natural Sciences, Calculus II for Engineering Sciences, Advanced Calculus.
Graduate courses	Real Analysis I and II, Functional Analysis I and II, Complex Analysis I and II, Volume of Convex Bodies, Probabilistic Methods in Convex Geometry, Probabilistic and Combinatorial methods in Analysis,
Texas A & M University	Calculus III for engineers, Finite Mathematics, Brief Calculus

Publications

1. H. Huang, M. Rudelson, K. Tikhomirov, *Well-invertible column subsets of sparse matrices are rare*, submitted.

2. S. Chenakkod, M. Derezinski, X. Dong, M. Rudelson, *Well-conditioned oblivious perturbations in linear space*, to appear in SODA 26.

3. H. Huang, M. Rudelson, *Hardness of approximation of centered convex bodies by polytopes*, to appear in Advances in Math.

4. M. Rudelson, *A large deviation inequality for the rank of a random matrix,* Ann. Probab. 52 (2024), no. 5, 1992–2018.

5. S. Chenakkod, M. Derezinski, X. Dong, M. Rudelson, *Optimal embedding dimension for sparse subspace embeddings*, STOC 24, Association for Computing Machinery (ACM), New York, 2024, 1106–1117.

6. X. Dong, M. Rudelson, *Approximately Hadamard matrices and Riesz bases in random frames*, Int. Math. Res. Not. (2024), no. 3, 2044–2065.

7. A. Barvinok, M. Rudelson, *A quick estimate for the volume of a polyhedron*, Israel J. Math. 262 (2024), no. 1, 449–473.

8. C. Mao, M. Rudelson, K. Tikhomirov, *Exact matching of random graphs with constant correlation*, Probab. Theory Related Fields 186 (2023), no. 1-2, 327–389.

9. A. Barvinok, M. Rudelson, *When a system of real quadratic equations has a solution*, Adv. Math. 403 (2022), Paper No. 108391, 38 pp.

10. C. Mao, M. Rudelson, K. Tikhomirov, *Random graph matching with improved noise robustness*, COLT 2021 .

11. A. Basak, M. Rudelson, *Sharp transition of the invertibility of the adjacency matrices of sparse random graphs*, Probab. Theory Related Fields 180 (2021), no. 1–2, 233–308.

12. H. Köing, M. Rudelson, *On the volume of non-central sections of a cube*, Adv. Math. 360 (2020), 106929, 30 pp.

13. H. Huang, M. Rudelson, *Size of nodal domains of the eigenvectors of a $G(n, p)$ graph*, Random Structures Algorithms 57 (2020), no. 2, 393-438.

14. M. Rudelson, K. Tikhomirov, *The sparse circular law under minimal assumptions*, Geom. Funct. Anal. 29 (2019), no. 2, 561–637.

15. A. Basak, M. Rudelson, *The circular law for sparse non-Hermitian matrices*, Ann. Probab. 47 (2019), no. 4, 2359–2416.

16. M. Rudelson, *Delocalization of eigenvectors of random matrices*, Random matrices, IAS/Park City Mathematics Series, vol. 26 (2019), 303–340.

17. S. P. Kasiviswanathan, M. Rudelson, *Restricted eigenvalue from stable rank with applications to sparse linear regression*, COLT 2018 (31 Annual Conference on Learning Theory).

18. M. Rudelson, S. Zhou, *Errors-in-variables models with dependent measurements*, Electron. J. Stat. 11 (2017), no. 1, 1699–1797.

19. A. Basak, M. Rudelson, *Invertibility of sparse non-hermitian matrices*, Adv. Math. 310 (2017), 426–483.

20. M. Rudelson, R. Vershynin, *No-gaps delocalization for general random matrices*, Geom. Funct. Anal. 26 (2016), no. 6, 1716–1776.

21. M. Rudelson, A. Samorodnitsky, O. Zeitouni, *Hafnians, perfect matchings and Gaussian matrices*, Ann. Probab. 44 (2016), no. 4, 2858–2888.

22. M. Rudelson, *On the complexity of the set of unconditional convex bodies*, Discrete Comput. Geom. 55 (2016), no. 1, 185–202.

23. M. Rudelson, O. Zeitouni, *Singular values of gaussian matrices and permanent estimators*, Random Structures Algorithms 48 (2016), no. 1, 183–212.

24. M. Rudelson, R. Vershynin, *Small ball probabilities for linear images of high dimensional distributions*, IMRN 2015, no. 19, 9594–9617.

25. S. P. Kasiviswanathan, M. Rudelson, *Spectral norm of random kernel matrices with applications to privacy*, Approximation, randomization, and combinatorial optimization. Algorithms and techniques, 898–914, LIPIcs. Leibniz International Proceedings in Informatics , 2015.

26. M. Rudelson, R. Vershynin, *Delocalization of eigenvectors of random matrices with independent entries*, Duke Math. J. 164 (2015), no. 13, 2507–2538.

27. M. Rudelson, R. Vershynin, *Hanson–Wright inequality and sub-gaussian concentration*, Electron. Commun. Probab. 18 (2013), no. 82, 9 pp.

28. M. Rudelson, *Recent developments in non-asymptotic theory of random matrices*, Modern Aspects of Random Matrix Theory – AMS Proceedings of Symposia in Applied Mathematics - AMS, 2014, p. 83–121.

29. A. Litvak, M. Rudelson, N. Tomczak-Jaegermann, *Approximation by progections of polytopes with few facets*, Israel J. Math. 203 (2014), no. 1, 141–160.

30. M. Rudelson, R. Vershynin, *Invertibility of random matrices: unitary and orthogonal perturbations*, J. Amer. Math. Soc. 27 (2014), no. 2, 293–338.

31. S. Kasiviswanathan, M. Rudelson, A. Smith, *The power of linear reconstruction attacks*, Proceedings of the ACM-SIAM symposium on discrete algorithms (SODA 2013).

32. M. Rudelson, S. Zhou, *Reconstruction from anisotropic random measurements*, IEEE Trans. Inform. Theory 59 (2013), no. 6, 3434–3447.

33. M. Rudelson, *Row products of random matrices*, Adv. Math. 231 (2012), no. 6, 3199–3231.

34. M. Rudelson, R. Vershynin, *Non-asymptotic theory of random matrices: extreme singular values*, Proceedings of the International Congress of Mathematicians, Hyderabad, India, 2010,

35. S. Kasiviswanathan, M. Rudelson, A. Smith, J. Ullmann, *The price of privately releasing contingency tables and the spectra of random matrices with correlated rows*, STOC 2010 (42nd ACM Symposium on Theory of Computing).

36. M. Rudelson, R. Vershynin, *The smallest singular value of a random rectangular matrix*, Comm. Pure Appl. Math. 62 (2009), no. 12, 1707–1739.

37. M. Rudelson, R. Vershynin, *The least singular value of a random square matrix is* $O(n^{-1/2})$, Comptes Rendus de l'Académie des sciences - Mathématique, C. R. Math. Acad. Sci. Paris 346 (2008), no. 15-16, 893–896.

38. M.Rudelson, R.Vershynin, *The Littlewood-Offord Problem and invertibility of random matrices*, Adv. Math. 218 (2008), no. 2, 600–633.

39. M.Rudelson, R.Vershynin, *On sparse reconstruction from Fourier and Gaussian measurements*, Comm. Pure Appl. Math. 61 (2008), no. 8, 1025–1045.

40. M. Rudelson, *Invertibility of random matrices: norm of the inverse*, Annals of Mathematics 168 (2008), 575–600.

41. O. Guedon, M. Rudelson, L_p *moments of random vectors via majorizing measures*, Adv. Math. 208 (2007), no. 2, 798–823.

42. M. Rudelson, R. Vershynin, *Sampling from large matrices: an approach through geometric functional analysis*, J. ACM 54 (2007), no. 4, Art. 21, 19 pp.

43. M. Rudelson, *Norm of the inverse of a random matrix*, FOCS 2006 (47th Annual Symposium on Foundations of Computer Science).

44. M.Rudelson, R.Vershynin, *Sparse reconstruction by convex relaxation: Fourier and Gaussian measurements*, CISS 2006 (40th Annual Conference on Information Sciences and Systems), invited paper.

45. M. Rudelson, *Lower estimates for the singular values of random matrices*, Compt. Rendus Math. de L'Academie des Sciences 342 (2006), no. 4, 247–252.

46. M. Rudelson, R. Vershynin, *Geometric approach to error correcting codes and signal recovery*, Int. Math. Res. Not. 2005, no. 64, 4019–4041.

47. E. Candes, M. Rudelson, T. Tao, R. Vershynin, *Error correction via linear programming*, FOCS 2005 (46th Annual Symposium on Foundations of Computer Science).

48. M. Rudelson, R. Vershynin, *Combinatorics of random processes and sections of convex bodies*, Annals of Mathematics 164 (2006), 603–648.

49. M. Rudelson, R. Vershynin, *Isoperimetry of waists and local versus global convex geometries*, appendix to a paper of R. Vershynin, Duke Math. J. 131 (2006), no. 1, 14–16.

50. S. Mendelson, A. Pajor, M. Rudelson, *On the geometry of* $\{+1, -1\}$ *polytopes*, Discrete Comput. Geom. 34 (2005), no. 3, 365–379.

51. A. Litvak, A. Pajor, M. Rudelson, N. Tomczak-Jaegermann, *Smallest singular value of random matrices and geometry of random polytopes*, Adv. Math. 195 (2005), no. 2, 491–523.

52. A. Litvak, A. Pajor, M. Rudelson, N. Tomczak-Jaegermann, R. Vershynin, *Random Euclidean embeddings in spaces of bounded volume ratio*, C. R. Math. Acad. Sci. Paris 339 (2004), no. 1, 33–38.

53. A. Litvak, A. Pajor, M. Rudelson, N. Tomczak-Jaegermann, R. Vershynin, *Euclidean embeddings in spaces of finite volume ratio via random matrices*, J. Reine Angew. Math. 589 (2005), 1–19.

54. M. Rudelson, *Extremal distances between sections of convex bodies*, Geom. Funct. Anal. **14** (2004), no. 5, 1063–1088.

55. M. Rudelson, R. Vershynin, *Embeddings of Levy families into Banach spaces*, Geom. Funct. Anal. **12** (2002), no. 1, 183–198.

56. A. A. Giannopoulos, V. D. Milman and M. Rudelson, *Convex bodies with minimal mean width*, Geometric aspects of functional analysis, 81–93, Lecture Notes in Math., **1745**, Springer, Berlin, 2001.

57. M. Rudelson, *Sections of the difference body*, Discrete and Computational Geometry, **23** (2000), 137–146.

58. M. Rudelson, *Distances between non–symmetric convex bodies and the* MM^* *estimate*, Positivity **4** (2000), no. 2, 161–178.

59. M. Rudelson, *Almost orthogonal submatrices of an orthogonal matrix*, Israel J. Math. **111** (1999), 143–155

60. M. Rudelson, *Random vectors in the isotropic position*, J. of Functional Analysis **164** (1999), no. 1, 60–72.

61. M. Rudelson, *Contact points of convex bodies*, Israel J. of Math. **101** (1997), 93–124.

62. M. Avellaneda, A. V. Cherkaev, L. V. Gibiansky, G. W. Milton, M. Rudelson, *A complete characterization of the possible bulk and shear moduli of planar polycrystals*, J. Mech. Phys. Solids. **44**(1996) 1179–1218.

63. M. Rudelson *Approximate John's decompositions*, Operator Theory: Advances and Applications **77** (1995), 245–249.

64. M. Rudelson *Estimates of the weak distance between finite–dimensional Banach spaces*, Israel J. of Math. **89** (1995), 189–204.

65. M. Rudelson *A characterization of 2–trivial Banach spaces with an unconditional basis*, Zap. Nauchn. Sem. LOMI **157** (1987), 76–87, Russian; (English translation in: Journal of Soviet Math., **44**, N 6, 800-808.)