

## CURRICULUM VITAE

### Mark Rudelson

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University of Michigan,  
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### 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, Sankt–Petersburg, Russia

### Appointments:

Current Professor,  
University of Michigan, Ann Arbor, Michigan  
Fall 2005 – Luther Marion Defoe Distinguished Professor  
Spring 2010 of Mathematics, University of Missouri – Columbia  
Columbia, Missouri  
Fall 2003– Associate Professor, University of Missouri – Columbia  
Spring 2005 Columbia, Missouri  
Fall 2000– Assistant Professor, University of Missouri – Columbia  
Spring 2003 Columbia, Missouri  
Fall 1998– Post Doctoral Fellow, University of Missouri – Columbia  
Spring 2000 Columbia, Missouri  
Fall 1996 – Visiting Assistant Professor, Texas A & M University,  
Spring 1998 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:

2021-2024	NSF grant DMS - 2054408, Non-asymptotic random matrix theory and random graphs
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:

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|------|-----------|--|
| 2021 | June,     | Institute Henri Poincaré, Paris, France (5 talks),   |
| 2017 | July,     | Special program on random matrices,<br>PCMI, Utah (4 talks),   |
| 2013 | November, | Annual Meeting of the Dutch Probability<br>and Statistics Society (2 talks),   |
| 2010 | August    | International Congress of Mathematicians, Hyderabad, India<br>sectional talk.  |
| 2008 | December  | Polish Institute of Mathematics,<br>Warsaw, Poland (4 talks).  |
| 2008 | May       | Annual French Mathematical Society conference<br>“Etats de la Recherche” (4 talks).  |
| 2006 | August    | NSF-CBMS Conference:<br>Probabilistic and Combinatorial methods in Analysis<br>Kent State University, Ohio (main speaker, 10 talks). |

## Editorial board:

Journal of Theoretical Probability  
Michigan Mathematical Journal

## Conferences organized and co-organized:

- 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,  
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. A. Barvinok, M. Rudelson, *When a system of real quadratic equations has a solution*, submitted.
2. 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.
3. H. Köing, M. Rudelson, *On the volume of non-central sections of a cube*, Adv. Math. 360 (2020), 106929, 30 pp.
4. 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.
5. M. Rudelson, K. Tikhomirov, *The sparse circular law under minimal assumptions*, Geom. Funct. Anal. 29 (2019), no. 2, 561–637.
6. A. Basak, M. Rudelson, *The circular law for sparse non-Hermitian matrices*, Ann. Probab. 47 (2019), no. 4, 2359–2416.
7. M. Rudelson, *Delocalization of eigenvectors of random matrices*, Random matrices, IAS/Park City Mathematics Series, vol. 26 (2019), 303–340.
8. S. P. Kasiviswanathan, M. Rudelson, *Restricted eigenvalue from stable rank with applications to sparse linear regression*, COLT 2018 (31 Annual Conference on Learning Theory).
9. M. Rudelson, S. Zhou, *Errors-in-variables models with dependent measurements*, Electron. J. Stat. 11 (2017), no. 1, 1699–1797.
10. A. Basak, M. Rudelson, *Invertibility of sparse non-hermitian matrices*, Adv. Math. 310 (2017), 426–483.
11. M. Rudelson, R. Vershynin, *No-gaps delocalization for general random matrices*, Geom. Funct. Anal. 26 (2016), no. 6, 1716–1776.

12. M. Rudelson, A. Samorodnitsky, O. Zeitouni, *Hafnians, perfect matchings and Gaussian matrices*, Ann. Probab. 44 (2016), no. 4, 2858–2888.
13. M. Rudelson, *On the complexity of the set of unconditional convex bodies*, Discrete Comput. Geom. 55 (2016), no. 1, 185–202.
14. M. Rudelson, O. Zeitouni, *Singular values of gaussian matrices and permanent estimators*, Random Structures Algorithms 48 (2016), no. 1, 183–212.
15. M. Rudelson, R. Vershynin, *Small ball probabilities for linear images of high dimensional distributions*, IMRN 2015, no. 19, 9594–9617.
16. 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.
17. M. Rudelson, R. Vershynin, *Delocalization of eigenvectors of random matrices with independent entries*, Duke Math. J. 164 (2015), no. 13, 2507–2538.
18. M. Rudelson, R. Vershynin, *Hanson–Wright inequality and sub-gaussian concentration*, Electron. Commun. Probab. 18 (2013), no. 82, 9 pp.
19. 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.
20. A. Litvak, M. Rudelson, N. Tomczak-Jaegermann, *Approximation by projections of polytopes with few facets*, Israel J. Math. 203 (2014), no. 1, 141–160.
21. M. Rudelson, R. Vershynin, *Invertibility of random matrices: unitary and orthogonal perturbations*, J. Amer. Math. Soc. 27 (2014), no. 2, 293–338.
22. S. Kasiviswanathan, M. Rudelson, A. Smith, *The power of linear reconstruction attacks*, Proceedings of the ACM-SIAM symposium on discrete algorithms (SODA 2013).

23. M. Rudelson, S. Zhou, *Reconstruction from anisotropic random measurements*, IEEE Trans. Inform. Theory 59 (2013), no. 6, 3434–3447.
24. M. Rudelson, *Row products of random matrices*, Adv. Math. 231 (2012), no. 6, 3199–3231.
25. M. Rudelson, R. Vershynin, *Non-asymptotic theory of random matrices: extreme singular values*, Proceedings of the International Congress of Mathematicians, Hyderabad, India, 2010,
26. 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).
27. M. Rudelson, R. Vershynin, *The smallest singular value of a random rectangular matrix*, Comm. Pure Appl. Math. 62 (2009), no. 12, 1707–1739.
28. 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.
29. M. Rudelson, R. Vershynin, *The Littlewood-Offord Problem and invertibility of random matrices*, Adv. Math. 218 (2008), no. 2, 600–633.
30. M. Rudelson, R. Vershynin, *On sparse reconstruction from Fourier and Gaussian measurements*, Comm. Pure Appl. Math. 61 (2008), no. 8, 1025–1045.
31. M. Rudelson, *Invertibility of random matrices: norm of the inverse*, Annals of Mathematics 168 (2008), 575–600.
32. O. Guedon, M. Rudelson,  *$L_p$  moments of random vectors via majorizing measures*, Adv. Math. 208 (2007), no. 2, 798–823.
33. M. Rudelson, R. Vershynin, *Sampling from large matrices: an approach through geometric functional analysis*, J. ACM 54 (2007), no. 4, Art. 21, 19 pp.
34. M. Rudelson, *Norm of the inverse of a random matrix*, FOCS 2006 (47th Annual Symposium on Foundations of Computer Science).



35. 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.
36. 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.
37. M. Rudelson, R. Vershynin, *Geometric approach to error correcting codes and signal recovery*, Int. Math. Res. Not. 2005, no. 64, 4019–4041.
38. E. Candes, M. Rudelson, T. Tao, R. Vershynin, *Error correction via linear programming*, FOCS 2005 (46th Annual Symposium on Foundations of Computer Science).
39. M. Rudelson, R. Vershynin, *Combinatorics of random processes and sections of convex bodies*, Annals of Mathematics 164 (2006), 603–648.
40. 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.
41. S. Mendelson, A. Pajor, M. Rudelson, *On the geometry of  $\{+1, -1\}$  polytopes*, Discrete Comput. Geom. 34 (2005), no. 3, 365–379.
42. 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.
43. 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.
44. 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.
45. M. Rudelson, *Extremal distances between sections of convex bodies*, Geom. Funct. Anal. **14** (2004), no. 5, 1063–1088.

46. M. Rudelson, R. Vershynin, *Embeddings of Levy families into Banach spaces*, Geom. Funct. Anal. **12** (2002), no. 1, 183–198.
47. 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.
48. M. Rudelson, *Sections of the difference body*, Discrete and Computational Geometry, **23** (2000), 137–146.
49. M. Rudelson, *Distances between non-symmetric convex bodies and the  $MM^*$  estimate*, Positivity **4** (2000), no. 2, 161–178.
50. M. Rudelson, *Almost orthogonal submatrices of an orthogonal matrix*, Israel J. Math. **111** (1999), 143–155
51. M. Rudelson, *Random vectors in the isotropic position*, J. of Functional Analysis **164** (1999), no. 1, 60–72.
52. M. Rudelson, *Contact points of convex bodies*, Israel J. of Math. **101** (1997), 93–124.
53. 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.
54. M. Rudelson *Approximate John's decompositions*, Operator Theory: Advances and Applications **77** (1995), 245–249.
55. M. Rudelson *Estimates of the weak distance between finite-dimensional Banach spaces*, Israel J. of Math. **89** (1995), 189–204.
56. 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.)