Martin Loebl · Jaroslav Nešetřil
Robin Thomas   *Editors*

A Journey Through Discrete Mathematics

A Tribute to Jiří Matoušek

Springer

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Introduction

Professor Jiří Matoušek passed away in March 2015 on the eve of his 52nd birthday. He left behind a large body of work, including over 170 research articles, eight books, and numerous unpublished lecture notes. This book is a celebration of his mathematical, pedagogical, and personal legacy.

Jirka was an excellent researcher whose work transcended individual boundaries of particular areas of mathematics and theoretical computer science. He excelled in every subject in which he was active. The book's content demonstrates Jirka's broad interests and influence. We hope that the carefully selected papers of this volume show the beauty and relevance of his scientific contribution in shaping mathematics and theoretical computer science research of today.

Jirka was an exceptional teacher as many of his colleagues and students can confirm. Over the years, he taught and shaped most of the basic courses offered by his home Department of Applied Mathematics, Charles University, Prague, and later also at ETH Zurich. Several of Jirka's courses, spiced with his particular sense of humor, were the basis of his excellent textbooks and monographs, which became the standard of scientific writing around the world. We tried to reflect the qualities of Jirka's style in this book.

Jirka was a great humanist. He used to say that mathematicians are useful for the society through their wisdom. We hope that this book bears a testimony of the kind wisdom of Jirka Matoušek. We believe that his legacy will be here for many years to come.

Prague, Czech Republic — Martin Loebl
Prague, Czech Republic — Jaroslav Nešetřil
Atlanta, GA, USA — Robin Thomas

Photo courtesy of ETH Zurich, Giulia Marthaler

Curriculum Vitae of Jiří Matoušek

March 10, 1963–March 9, 2015 Prague, Czechoslovakia/Czech Republic.

Academic History

- Charles University, Prague, Faculty of Mathematics and Physics, 1981–1986, Diploma, RNDr. degree (analogue of master's degree).
- CSc. degree (analogue of Ph.D.): Charles University, Prague, 1991.
- Habilitation ("docent" at Charles University) 1995.
- Dr.Sc. (higher doctorate) degree in mathematics, 1996.
- Professor at Charles University, 2000.
- Professor (35% position) at ETH Zurich, 2012.

Employment Record

Charles University, Prague 1986–2015 (1986–1997 doctoral study, 1987–1995 assistant professor of mathematics, 1995–2000 associate professor (docent), 2000–2015 full professor).
ETH Zurich 2012–2015 full professor (35 %).

Visiting Positions

- 1991, visiting assistant professor, Georgia Institute of Technology, 6 months.
- 1992, Humboldt research fellow, Freie Universität Berlin, 12 months.
- 1996–2011, ETH Zurich, visiting position every year, 3–4 months each year (6 months in 2011).

Other Longer Visits

Freie Universität Berlin 1989 (1 month), 1990 (7 weeks), and 1994 (7 weeks); DIMACS Center, Rutgers University, and Princeton University, 1989 (6 weeks), 1990 (2 weeks), 1993 (3 weeks), and 1994 (3 weeks); Macquarie University, Sydney, 1994 (3 weeks); Tel Aviv University, 1995 (2 months); University College London, 2001 (1 month); Univ. Santiago de Chile, 2003 (5 weeks); and Japanese Advanced Institute of Science and Technology, 2005 (5 weeks).

Publications

Published eight books (four of them with co-authors), over 170 original research papers, and several surveys.

Honors and Awards

- Several prizes in high-school and university mathematical competitions.
- Prize of the Czechoslovak Academy of Sciences (1986) for a joint paper with M. Loebl.
- Prize of the Second European Mathematical Congress for young mathematicians (Budapest, 1996).
- Prize of the Czech Learned Society for Young Scientists (2000).
- Elected member of the Czech Learned Society in 2006.
- The book *Thirty-Three Miniatures* published by the AMS was included among the "Outstanding Academic Titles 2011" of the journal *Choice*.
- Best paper award of the ACM-SIAM Symposium on Discrete Algorithms (2012) for a joint paper with M. Čadek, M. Krčál, F. Sergeraert, L. Vokřínek, and U. Wagner.
- Computational Geometry: Theory and Application 2016 Test of Time Award for *Reporting Points in Halfspaces*, Comput. Geom. 2: 169–186 (1992).

Teaching Activity

- Teaching regularly since 1987, courses given in Prague, Zurich, and Atlanta; many subjects in mathematics and computer science including basic undergraduate courses (discrete mathematics, linear algebra), graduate courses (discrete and computational geometry, programming languages, program construction and verification, data structures, algorithms, probabilistic method), and advanced

courses on more special topics (topological methods in combinatorics and geometry, metric embeddings, semidefinite programming and approximation algorithms, advanced topics in discrete geometry).

- With J. Nešetřil developed the introductory course of discrete mathematics in Prague and wrote a successful textbook based on the course (so far published in six languages). With E. Welzl developed a course "Algorithms, Probability, Computing" at the ETH Zurich. Wrote books based on several other courses taught in Prague and/or Zurich.
- Taught two intensive block courses for Ph.D. students ("Topological Methods in Combinatorics and Geometry," ETH Zurich, 2001; "Metric embeddings," Univ. Autonoma de Barcelona, 2009).
- Supervised ten Ph.D. students (seven of them have finished successfully) and numerous M.Sc. and B.Sc. theses.
- Led research seminars for undergraduate students (combinatorics) and a reading seminar for Ph.D. students for many years.

Lecture Activities

- Invited speaker at the International Congress of Mathematicians in Berlin (1998) and European Congress of Mathematics (Budapest, 1996).
- Invited tutorial at the 39th IEEE Symposium on Foundations of Computer Science (FOCS), 1998.
- Invited lectures at several other conferences (e.g., Random Structures & Algorithms, Eurocomb, Graph Drawing, MFCS).
- Erdős Memorial Lectures at the Hebrew University of Jerusalem (2000).
- Plenary lecture at the annual meeting of the London Mathematical Society (1999).
- Plenary lecture at the joint meeting of the German Mathematical Society and the German Society for Mathematical Education (Berlin, 2007).
- Colloquia and invited lectures at numerous universities and research centers over the world, e.g., Institute for Advanced Study in Princeton, Princeton Univ., Univ. of Tokyo, Univ. College London, Cambridge Univ., Oxford Univ., ETH Zurich, Courant Institute of Math. Sciences in New York, University of California at Berkeley, EPFL Lausanne, Rutgers Univ., Tel Aviv Univ., Techn. Univ. Berlin, Freie Universität Berlin, IBM Tokyo, and Xerox Parc in Palo Alto. Several invited lectures every year.
- For other conference contributions (IEEE Symposium on Foundations of Comput. Sci., ACM Sympos. Theor. Comput., ACM Symposium on Comput. Geom., and others), see publications list.

Organization, Program Committees, and Refereeing

- Member of the program committee of the Int. Congress of Mathematicians (Section Combinatorics) 2006 and member of program committees of over ten conferences in computer science (STOC, ESA, ICALP, SODA, Eurocomb, LATIN, MFCS).
- Member of editorial boards of several journals (*Order, Discrete Computational Geometry, Random Structures and Algorithms, Theory of Computing, Contributions to Discrete Mathematics, Comment. Math. Univ. Carolinae, Comput. Geom. Theor. Appl., SIAM J. Discrete Math.*).
- Co-organized several conferences, including three Oberwolfach seminars on "Discrete Geometry" (2005, 2008, 2011).
- Co-organized with J. Nešetřil three intensive 3-month international programs for Ph.D. students in Prague "DocCourse"(2004–2006).

Research Interests

Discrete geometry, algorithms, combinatorics, topological methods, metric embeddings, and combinatorial optimization.

Professional Orientation and Summary of Major Results

Main Areas of Interest: Combinatorics and combinatorial geometry, geometric discrepancy, computer science (design and analysis of algorithms mainly computational geometry), topology, and some aspects of metric space theory.

Most of the papers belong to the fields of discrete and computational geometry. Series of works built efficient tools for removing randomization from geometric algorithms. Other works give new solutions to simplex and halfspace range searching problems, which have been investigated by many researchers for more than 10 years, and investigate various bounds on complexity of geometric configurations, geometric discrepancy, linear programming algorithms, motion planning, etc.

Works on geometric discrepancy developed new techniques for proving upper bounds. Asymptotically tight bounds were obtained in some long open cases, such as for the discrepancy of point sets with respect to halfspaces.

In papers on embedding finite metric spaces into Banach spaces, new bounds on the required distortion and dimensions were obtained; in particular, a question of Johnson and Lindenstrauss was answered.

The joint work with J. Kratochvíl deals with intersection graphs of planar geometric objects and some aspects of planar drawings of graphs.

Other results concern problems in mathematical analysis, graph algorithms, undecidability of combinatorial statements, Euclidean Ramsey theory, generalized convexity, and numerical taxonomy (with microbiology applications).

Some experience in applied areas was gained while developing computer software (e.g., numerical simulation of daylight conditions in a room, Lisp and Prolog language interpreters, syntax-driven editor).

List of Publications

Jiří Matoušek

Books

1. *Invitation to Discrete Mathematics*
   with Jaroslav Nešetřil
   Oxford University Press, Oxford, 1998, 432 pp.; revised 2nd edition 2008
   Czech version: *Kapitoly z diskrétní matematiky*
   preliminary version KAM Series 95–299, 1995, 218 pp.;
   1st edition Matfyzpress, Praha 1997; 2nd edition Nakladatelství Karolinum,
   Praha 2000, reprinted 2003; revised 3rd edition 2008; revised 4th edition 2009.
   German translation: *Diskrete Mathematik (Eine Entdeckungsreise)*, Springer,
   Heidelberg, 2002; revised 2nd edition 2007.
   Japanese translation: Springer, Tokyo, 2003.
   French translation: Springer, Heidelberg, 2004.
   Spanish translation: Editorial Reverte, 2008.
2. *Geometric Discrepancy. An Illustrated Guide*
   Volume 18 of *Algorithms and Combinatorics*, 288 pp., Springer-Verlag,
   Berlin, etc., 1999.
   Revised second printing 2010.
3. *Lectures on Discrete Geometry*
   Graduate Texts in Mathematics 212, 481 pp., Springer, New York, April 2002.
4. *Using the Borsuk–Ulam theorem. Lectures on topological methods in combi-
   natorics and geometry*
   Universitext, Springer, Berlin, etc., 196 pp., 2003.
   Revised second printing 2008.
5. *Understanding and using linear programming*
   with Bernd Gärtner
   Universitext, Springer, Berlin, etc., 222 pp., 2006.
   A shorter Czech version in *Lineární programování a lineární algebra pro
   informatiky*, ITI Series 2006-311, Charles University, Prague 2006.

6. *Thirty-three miniatures (Mathematical and algorithmic applications of linear algebra)*
   Student Mathematical Library, Amer. Math. Soc., Providence, 182 pp., 2010.
   Japanese translation: Springer, Tokyo, 2014.
7. *Approximation Algorithms and Semidefinite Programming*
   with Bernd Gärtner
   Springer, Berlin, etc., 251 pp., 2012.
8. *Mathematics++ (Selected topics beyond the basic courses)*
   with Ida Kantor and Robert Šámal
   Student Mathematical Library, Amer. Math. Soc., Providence, 343 pp., 2014.

Research Papers in Journals

9. *Approximate symmetric derivative and monotonicity*
   Comment. Math. Univ. Caroline 27,1(1986), 83–86.
10. *Few colored cuts or cycles in edge colored graphs*
    Comment. Math. Univ. Carolinae 29(1988), 227–232.
11. *Line arrangements and range search*
    Information Processing Letters 27(1988), 275–280.
12. *On polynomial-time decidability of induced minor-closed classes*
    with Jaroslav Nešetřil and Robin Thomas
    Comment. Math. Univ. Caroline 29,4(1988), 703–710.
13. *A typical property of the symmetric differential quotient*
    Colloquium Math. 57,2(1989), 339–343.
14. *Selecting a small well-discriminating subset of tests*
    with Jiří Schindler
    Binary 1(1989), 19–28.
15. *On-line computation of convolutions*
    Information Processing Letters 32(1989), 15–16.
16. *NP-hardness results for intersection graphs*
    with Jan Kratochvíl
    Comment. Math. Univ. Carolinae 30,4(1989), 761–773.
17. *Construction of ε-nets*
    Discr. Comput. Geom. 5(1990), 427–448 (invited paper).
    Extended abstract: Proc. 5. ACM Symposium on Computational Geometry 1989, 1–9.
18. *Extension of Lipschitz mappings on metric trees*
    Comment. Math. Univ. Carolinae 31,1(1990), 99–104.
19. *Bi-Lipschitz embeddings into low-dimensional Euclidean spaces*
    Comment. Math. Univ. Carolinae 31,3(1990), 589–600.
20. *Algorithms finding tree-decomposition of graphs*
    with Robin Thomas
    J. Algorithms 12,1(1991), 1–22.

21. *Lower bound on the length of monotone paths in arrangements*
    Discr. Comput. Geom. 6,2(1991) 129–134.

22. *Approximate halfplanar range counting*
    KAM Series in Discrete Mathematics 87–59 (tech. report), Charles University, Prague 1987.
    revised in 1989 as *Approximate levels in line arrangements*, SIAM J. Computing 20,2(1991), 222–227.

23. *Spanning trees with low crossing number*
    Informatique théorique et applications 6,25(1991), 103–123.

24. *Computing dominances in E^n*
    Information Processing Letters 38,5(1991), 277–288.

25. *String graphs requiring huge representations*
    with Jan Kratochvíl
    J. Combin. Theory ser. B 31,1(1991), 1–4.

26. *Cutting hyperplane arrangements*
    Discr. Comput. Geom. 6,5(1991), 385–406 (invited paper).
    Extended abstract: Proc. 6. ACM Symposium on Computational Geometry (1990), 1–9.

27. *Randomized optimal slope selection*
    Information Processing Letters 39(1991), 183–187.

28. *Hercules versus Hidden Hydra Helper*
    with Martin Loebl
    Comment. Math. Univ. Carolinae 32,4(1992), 731–741.

29. *Good splitters for counting points in triangles*
    with Emo Welzl
    J. Algorithms 13(1992), 307–319.
    Extended abstract: Proc. 5. ACM Symposium on Computational Geometry (1989), 124–130.

30. *Note on bi-Lipschitz embeddings into normed spaces*
    Comment. Math. Univ. Carolinae 33,1(1992), 51–55.

31. *Relative neighborhood graphs in three dimensions*
    with Pankaj K. Agarwal
    Computational Geometry: Theory and applications 2,1(1992), 1–14.
    Preliminary version: Proc. 3. ACM-SIAM Symposium on Discrete Algorithms (1992), 58–65.

32. *Efficient partition trees*
    Discr. Comput. Geom., 8(1992), 315–334 (invited paper).
    Extended abstract: Proc. 7. ACM Symposium on Computational Geometry (1991), 1–9.

33. *Reporting points in halfspaces*
    Computational Geometry: Theory and Applications 2,3(1992) 169–186.
    Extended abstract: Proc. 32. IEEE Symposium on Foundations of Computer Science (1991), 207–215.

34. *On the complexity of finding iso- and other morphisms for partial k-trees*
    with Robin Thomas
    Discrete Math. 108(1992), 343–364.
35. *Ramsey-like properties for bi-Lipschitz embeddings of finite metric spaces*
    Comment. Math. Univ. Carolinae 33,3(1992), 451–463.
36. *Farthest neighbors, maximum spanning trees and related problems in higher dimensions*
    with Pankaj K. Agarwal and Subhash Suri
    Computational Geometry: Theory and Applications 1,4(1992) 189–201.
    Extended abstract: Proc. 2. Workshop on Algorithms and Data Structures, Lecture Notes in Computer Science 519, 105–116, Springer-Verlag 1991.
37. *On vertical ray shooting in arrangements*
    Computational Geometry: Theory and Applications 2(1993), 279–285.
38. *Linear optimization queries*
    J. Algorithms 14(1993), 432–448
    new version, with Otfried Schwarzkopf:
    Proc. 8. ACM Symposium on Computational Geometry (1992), 16–25.
39. *Ray shooting and parametric search*
    with Pankaj K. Agarwal
    SIAM J. Computing 22,4(1993), 794–806. Extended abstract: Proc. 24. ACM Symposium on Theory of Computing (1992), 517–526.
40. *Range searching with efficient hierarchical cuttings*
    Discr. Comput. Geom. 10,2(1993), 157–182.
    Extended abstract: Proc. 8. ACM Symposium on Computational Geometry (1992), 276–285.
41. *On ray shooting in convex polytopes*
    with Otfried Schwarzkopf
    Discr. Comput. Geom. 10,2(1993), 215–232.
42. *Discrepancy and approximations for bounded VC-dimension*
    with Emo Welzl and Lorenz Wernisch
    Combinatorica, 13(1993), 455–466.
    Extended abstract: Proc. 32. IEEE Symposium on Foundations of Computer Science (1991), 424–430.
43. *On the sum of squares of cell complexities in hyperplane arrangements*
    with Boris Aronov and Micha Sharir
    J. Combin. Theory Ser. A 65(1994), 311–321.
    Extended abstract: Proc. 7. ACM Symposium on Computational Geometry (1991), 307–313.
44. *On range searching with semialgebraic sets*
    with Pankaj K. Agarwal
    Discr. Comput. Geom. 11(1994), 393–418.
    Extended abstract: Proc. 17. Symposium "Mathematical Foundations of Computer Science" (1992), Lecture Notes in Computer Science 629, Springer-Verlag, 1–13.

45. *Fat triangles determine linearly many holes*
with János Pach, Micha Sharir, Shmuel Sifrony, and Emo Welzl
SIAM J. Comput. 23(1994), 154–169.
Extended abstract: Proc. 32. IEEE Symposium on Foundations of Computer Science (1991), 49–58.

46. *Lower bound for a subexponential optimization algorithm*
Random Structures & Algorithms 5,4(1994), 591–607.

47. *Ham-sandwich cuts in R^d*
with Chi-Yuan Lo and William Steiger
Discr. Comput. Geom. 11(1994), 433–452.
Extended abstract: Proc. 24. ACM Symposium on Theory of Computing (1992), 539–545.

48. *Intersection graphs of segments*
with Jan Kratochvíl
J. Combin. Theory Ser. B 35,2(1994), 317–339.

49. *Complexity of projected images of convex subdivisions*
with Tomio Hirata, Xue-Hou Tan, and Takeshi Tokuyama
Computational Geometry: Theory and Applications 4,6(1994), 293–308.
Extended abstract: Proc. 4. Canad. Conference on Comput. Geometry (1992).

50. *A Ramsey-type result for planar convex sets*
with David Larman, János Pach, and Jenő Törőcsik
Bull. London Math. Soc. 26(1994), 132–136.

51. *Derandomizing an output-sensitive convex hull algorithm in three dimensions*
with Bernard Chazelle
Comput. Geom.: Theor. Appl. 5,1(1995), 27–32.

52. *On enclosing k points by a circle*
Information Processing Letters 53(1995), 217–221.

53. *Dynamic half-space range reporting and its applications*
with Pankaj K. Agarwal
Algorithmica 13(1995), 325–345.
Extended abstract, including also results of D. Eppstein:
Proc. 33. IEEE Symposium on Foundations of Computer Science (1992), 51–60.

54. *Approximations and optimal geometric divide-and-conquer*
J. of Computer and System Sciences 50,2(1995), 203–208 (invited paper).
Extended abstract: Proc. 23. ACM Symposium on Theory of Computing (1991), 506–511.

55. *On Ramsey sets in spheres*
with Vojtěch Rödl
J. Combin. Theory Ser. A 70,1(1995), 30–44.

56. *Tight upper bounds for the discrepancy of half-spaces*
Discr. Comput. Geom. (L. Fejes Tóth Festschrift) 13(1995), 593–601.

57. *An elementary approach to lower bounds in geometric discrepancy*
with Bernard Chazelle and Micha Sharir
Discr. Comput. Geom. (L. Fejes Tóth Festschrift) 13(1995), 363–381.

58. *Piecewise linear paths among convex obstacles*
    with Mark de Berg and Otfried Schwarzkopf
    Discr. Comput. Geom. 14(1995), 9–29.
    Extended abstract: Proc. 25. ACM Symposium on Theory of Computing
    (1993), 505–514.

59. *On stabbing triangles by lines in 3-space*
    with Boris Aronov
    Comment. Math. Univ. Carolinae 36,1(1995), 109–113.

60. *On vertical decomposition of arrangements of hyperplanes in four dimensions*
    with Leonidas J. Guibas, Dan Halperin, and Micha Sharir
    Discr. Comput. Geom. 14(1995), 113–122.
    Extended abstract: Proc. 5th Canadian Conference on Computational Geometry (1993), 127–132.

61. *Note on the colored Tverberg theorem*
    J. Comb. Theory Ser. B 66(1996), 146–151.

62. *On geometric optimization with few violated constraints*
    Discr. Comput. Geom. (invited paper) 14(1995), 365–384.
    Extended abstract: Proc. 10. ACM Symposium on Comput. Geom. (1994), 312–321.

63. *Discrepancy in arithmetic progressions*
    with Joel Spencer
    J. Amer. Math. Soc. 9,1(1996), 195–204.

64. *On the distortion required for embedding finite metric spaces into normed spaces*
    Israel J. Math. 93(1996), 333–344.

65. *A deterministic algorithm for the three-dimensional diameter problem*
    with Otfried Schwarzkopf
    Comput. Geom. Theor. Appl. 6(1996), 253–262.
    Extended abstract: Proc. 25. ACM Symposium on Theory of Computing
    (1993), 478–484.

66. *On linear-time deterministic algorithms for optimization problems in fixed dimension*
    with Bernard Chazelle
    J. Algorithms 21(1996), 116–132.
    Extended abstract: Proc. 4. SIAM-ACM Symposium on Discrete Algorithms
    (1993), 281–290.

67. *Improved upper bounds for approximation by zonotopes*
    Acta Mathematica 177(1996), 55–73.

68. *A subexponential bound for linear programming*
    with Micha Sharir and Emo Welzl
    Algorithmica 16(1996), 498–516.
    Extended abstract: Proc. 8. ACM Symposium on Computational Geometry
    (1992), 1–8.

69. *On discrepancy bounds via dual shatter function*
    Mathematika 44(1997), 42–49.

70. *A Helly-type theorem for unions of convex sets*
    Discr. Comput. Geom. 18(1997), 1–12.
    Extended abstract: Proc. 11. ACM Symposium on Comput. Geom. (1995),
    138–145.

71. *On embedding expanders into ℓ_p spaces*
    Israel J. Math. 102(1997), 189–197.

72. *On functional separately convex hulls*
    with Petr Plecháč
    Discr. Comput. Geom. 19(1998), 105–130.

73. *An L_p-version of the Beck–Fiala conjecture*
    European J. Combinatorics 19(1998), 175–182.

74. *Guarding galleries where every point sees a large area*
    with Gil Kalai
    Israel J. Math. 101(1997), 125–140.

75. *Computing many faces in arrangements of lines and segments*
    with Pankaj K. Agarwal and Otfried Schwarzkopf
    SIAM J. Comput. 27,2(1998), 491–505.
    Extended abstract: 10. ACM Symposium on Comput. Geom. (1994), 76–84.

76. *Constructing levels in arrangements and higher order Voronoi diagrams*
    with Pankaj K. Agarwal, Mark de Berg, and Otfried Schwarzkopf
    SIAM J. Comput. 27,3(1998), 654–667.
    Extended abstract: 10. ACM Symposium on Comput. Geom. (1994), 67–75.

77. *An $O(n \log n)$ randomized algorithm for the repeated median line estimator*
    with David M. Mount and Nathan S. Netanyahu
    Algorithmica 20,2(1998), 136–150.
    Extended abstract: Proc. 4. SIAM-ACM Symposium on Discrete Algorithms
    (1993), 74–82.

78. *On the L_2-discrepancy for anchored boxes*
    J. of Compexity 14(1998), 527–556.

79. *The exponent of discrepancy is at least 1.0669*
    J. of Compexity 14(1998), 448–453.

80. *On constants for cuttings in the plane*
    Discr. Comput. Geom. 20(1998), 427–448.

81. *On the discrepancy for boxes and polytopes*
    Monatsh. Math. 127(1999), 325–336.

82. *Almost-tiling the plane with ellipses*
    with Krystyna Kuperberg, Wlodzimierz Kuperberg, and Pavel Valtr
    Discr. Comput. Geom. 22(1999), 367–375.

83. *A highly non-smooth norm on Hilbert space*
    with Eva Matoušková
    Israel J. Math. 112(1999), 1–27.

84. *Visibility and covering by convex sets*
    with Pavel Valtr
    Israel J. Math. 113(1999), 341–379.

85. *Product range spaces, sensitive sampling and derandomization*
    with Hervé Brönnimann and Bernard Chazelle
    SIAM J. Comput. 28,5(1999), 1552–1575.
    Extended abstract: Proc. 34. IEEE Symposium on Foundations of Computer
    Science (1993), 400–409.

86. *On the signed domination in graphs*
    Combinatorica 20,1(2000), 103–108.

87. *On embedding trees into uniformly convex Banach spaces*
    Israel J. Math. 114(1999), 221–237.

88. *On the linear and hereditary discrepancies*
    European J. Combin. 21(2000), 519–521.

89. *Discrepancy of point sequences on fractal sets*
    with Hansjörg Albrecher and Robert Tichy
    Publicationes Mathematicae Debrecen (spec. volume dedicated to K. Győry)
    56(2000), 233–249.

90. *On approximate geometric k-clustering*
    Discr. Comput. Geom. 24(2000), 61–84.

91. *On the discrepancy for Cartesian products*
    J. London Math. Soc. 61(2000), 737–747.

92. *Simultaneous partitions of measures by k-fans*
    with Imre Bárány
    Discr. Comput. Geom. 25,3(2001), 317–334.

93. *On directional convexity*
    Discr. Comput. Geom. 25,3(2001), 389–405.

94. *Lower bound on the minus-domination number*
    Discr. Math. 233(2001), 361–370.

95. *On dominated ℓ_1 metrics*
    with Yuri Rabinovich
    Israel J. Math. 123(2001), 285–301.

96. *A lower bound for families of Natarajan dimension d*
    with Paul Fischer
    J. Combin. Theory Ser. A 95(2001), 198–195.

97. *Lower bounds on the transversal numbers of d-intervals*
    Discr. Comput. Geom. 26(2001), 283–287.

98. *Random lifts of graphs III: independence and chromatic number*
    with Alon Amit and Nathan Linial
    Rand. Struct. Algo. 20(2002), 1–22.
    Extended abstract appeared as a part of "A. Amit, N. Linial, J. Matoušek, E.
    Rozenman: *Random lifts of graphs*, Proc. 12th annual ACM-SIAM Sympo-
    sium on Discrete Algorithms, 883–894, 2001."

99. *Separating an object from its cast*
    with Hee-Kap Ahn, Mark de Berg, Prosenjit Bose, Siu-Wing Cheng, Dan
    Halperin, and Otfried Schwarzkopf
    Computer-Aided Design 34(2002), 547–559.

Extended abstract: Proc. 12th ACM Symposium on Computational Geometry, 1997.

100. *Equipartition of two measures by a 4-fan*
     with Imre Bárány
     Discr. Comput. Geom. 27(2002), 293–302.

101. *On the chromatic number of Kneser hypergraphs*
     Proc. Amer. Math. Soc. 130 (2002), 2509–2514.

102. *Transversal numbers for hypergraphs arising in geometry*
     with Noga Alon, Gil Kalai, and Roy Meshulam
     Adv. Appl. Math. 130,9(2002), 2509–2514.

103. *A lower bound for weak epsilon-nets in high dimension*
     Discr. Comput. Geom. 28(2002), 45–48.

104. *A lower bound on the size of Lipschitz subsets in dimension 3*
     Combin. Probab. Comput. 12(2003), 427–430.

105. *A fractional Helly theorem for convex lattice sets*
     with Imre Bárány
     Adv. Math. 174(2003), 227–235.

106. *On restricted min-wise independence of permutations*
     with Miloš Stojaković
     Random Structures and Algorithms 23,4(2003), 397–408.
     Extended abstract: Proc. of Eurocomb 2003.

107. *Low-distortion embeddings of trees*
     with Robert Babilon, Jana Maxová, and Pavel Valtr
     J. Graph Algorithms Appl. 7(2003), 399–409.
     Extended abstract: Proc. Graph Drawing, 2001 (Lecture Notes in Computer Science 2265), 2002, 343–351.

108. *The one-round Voronoi game*
     with Otfried Cheong, Sariel Har-Peled, and Nathan Linial
     Discrete Comput. Geom. 31(2004), 125–138.
     Extended abstract: Proc. 18th ACM Sympos. Comput. Geom. 2002.

109. *No Helly theorem for stabbing translates by lines in R^3*
     with Andreas Holmsen
     Discr. Comput. Geom. 31,3(2004), 405–410.

110. *Bounded VC-dimension implies a fractional Helly theorem*
     Discr. Comput. Geom., 31,2(2004), 251–255.

111. *Topological lower bounds for the chromatic number: A hierarchy*
     with Günter M. Ziegler
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