

Curriculum Vitae

Géza Tóth

PERSONAL INFORMATION

Birth Date: August 12, 1968
Citizenship: Hungarian
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EDUCATION, EMPLOYMENT

2001- **Hungarian Academy of Sciences**
Senior Research Fellow at the Rényi Institute of Mathematics

2001- **Technical University, Budapest**
Associate Professor, Department of Comput. Sci. and Information Theory

2010 Habilitation, Technical University, Budapest

2008 Doctor of Science, Hungarian Academy of Sciences

1998-2001 **Massachusetts Institute of Technology**
Applied Mathematics Instructor

1997-1998 **DIMACS Center, Rutgers University**
Postdoctoral Fellow

1993-1997 **Courant Institute of Mathematical Sciences, New York University**
Ph.D. in Mathematics (May 1997), Advisor: Professor János Pach
Title of thesis: *Ramsey-type theorems in geometry and related extremal problems*

1992-1993 **Hungarian Academy of Sciences**
Research Fellow at the Institute of Mathematics

1991-1992 **University of Gent, Belgium**
Graduate Studies

1986-1991 **Eötvös University, Budapest, Hungary**
M.Sc. in Mathematics, 1991

TEACHING EXPERIENCE

- 2002- **Eötvös University, Budapest**
Combinatorial Geometry, Computational Geometry
- 2001- **Technical University, Budapest**
Introduction to the theory of computation, Discrete mathematics
Combinatorics, Graph Theory, Combinatorial Geometry, Computational Geometry
- 1998-2001 **Massachusetts Institute of Technology**
Recitations in Calculus, Lecture in Analysis
- 1993-1997 **Courant Institute of Mathematical Sciences**
Recitations in Business Calculus, Calculus I.
Lectures in Basic Mathematics, Discrete Mathematics
- 1990-1991 **Eötvös University, Budapest, Hungary**
Lectures in Discrete Mathematics

PRIZES

- 2010 Rényi Prize, Rényi Institute
- 2008 Erdős Prize, Hungarian Academy of Sciences
- 2003 Young Researcher's Prize, Hungarian Academy of Sciences
- 1998 Kurt O. Friedrichs Prize, Courant Institute, New York University
- 1996 Grünwald Prize, Bolyai Mathematical Society, Budapest
- 1989 I. Prize, F. Riesz National Math. Competition for University Students
- 1986 II. Prize, International Mathematical Olympiade, Warsaw

FELLOWSHIPS, AWARDS

- 2005-2008 Bolyai Fellowship, Hungarian Academy of Sciences
- 2001-2004 Bolyai Fellowship, Hungarian Academy of Sciences
- 1999-2001 NSF Grant DMS 99-70071, with Prof. D. J. Kleitman
- 1997-1998 DIMACS Postdoctoral Fellowship
- 1997-1998 Margaret and Herman Sokol Postdoctoral Award
- 1996-1997 Alfred P. Sloan Dissertation Fellowship
- 1993-1996 Graduate Assistantship at the Courant Institute
- 1992-1993 Research Fellowship at the Hungarian Academy of Sciences
- 1991-1992 Research Fellowship at the University of Gent by the TEMPUS Program
- 1989-1991 Special Research Program for Outstanding Students
Eötvös University, Budapest, Hungary

PUBLICATIONS

1. G. Csizmadia, G. Tóth: *Note on a Ramsey-Type problem in Geometry*, Journal of Combinatorial Theory, Series A **65** (1994), 302-306.
2. M. Bóna, G. Tóth: *A Ramsey-type problem on right-angled triangles in space*, Discrete Mathematics **150** (1996), 61-67.
3. J. Pach, G. Tóth: *On the Independence Number of Coin Graphs*, Geombinatorics **6**, Issue 1 (1996), 30-33.
4. G. Tóth: *A Ramsey-type bound for rectangles*, Journal of Graph Theory **23** (1996), 53-56.
5. G. Tóth: *The shortest distance among points in general position*, Computational Geometry: Theory and Applications **8/1** (1997), 33-38.
6. G. Károlyi, J. Pach, G. Tóth: *Ramsey-Type Results for Geometric Graphs. I*, Proceedings of the 12th Annual ACM Symposium on Computational Geometry 1996, 359-365. Also in: Discrete and Computational Geometry **18** (1997), 247-255.
7. G. Károlyi, J. Pach, G. Tardos, G. Tóth: *An algorithm for finding many disjoint monochromatic edges in a complete 2-colored geometric graph*, in: Intuitive Geometry, (I. Bárány, K. Böröczky, eds.), Bolyai Soc. Math. Studies **6**, J. Bolyai Math. Society, Budapest, 1997, 367-372.
8. J. Pach, G. Tóth: *Graphs drawn with few crossings per edge*, Lecture Notes in Computer Science **1190**, Springer-Verlag, 1997, 345-354. Also in: Combinatorica **17** (1997), 427-439.
9. G. Károlyi, J. Pach, G. Tóth, P. Valtr: *Ramsey-Type Results for Geometric Graphs. II*, Proceedings of the 13th Annual ACM Symposium on Computational Geometry 1997, 94-103. Also in: Discrete and Computational Geometry **20** (1998) 375-388.
10. G. Csizmadia, G. Tóth: *Note on an Art Gallery Problem*, Computational Geometry: Theory and Applications **10/1** (1998), 47-55.
11. J. Pach, T. Thiele, G. Tóth: *Three-dimensional grid drawings of graphs*, Lecture Notes in Computer Science **1353**, Springer-Verlag, 1998, 47-51. Also in: Advances in Discrete and Computational Geometry, B. Chazelle, J. E. Goodman, R. Pollack, eds.), Contemporary Mathematics, (1998) AMS, Providence, 251-255.
12. J. Pach, G. Tóth: *A generalization of the Erdős-Szekeres theorem to disjoint convex sets*, Discrete and Computational Geometry **19** (1998), 437-445.
13. G. Tóth, P. Valtr: *Note on the Erdős-Szekeres theorem*, Discrete and Computational Geometry **19** (1998), 457-459.
14. G. Tóth, P. Valtr: *Geometric graphs with few disjoint edges*, Proceedings of the 14th Annual ACM Symposium on Computational Geometry 1998, 184-191. Also in: Discrete and Computational Geometry **22** (1999) 633-642.
15. J. Pach, G. Tóth: *Erdős-Szekeres-type theorems for segments and non-crossing convex sets*, Geometriae Dedicata **81** (2000) 1-12.
16. G. Tóth: *Finding convex sets in convex position*, Combinatorica **20** (2000) 589-596.
17. J. Pach, G. Tóth: *Which crossing number is it anyway?* Proceedings of the 39th Annual Symposium on Foundations of Computer Science, 1998, 617-626. Also in: Journal of Combinatorial Theory, Series B **80** (2000), 225-246.

18. J. Pach, J. Spencer, G. Tóth: *New bounds for crossing numbers*, Proceedings of the 15th Annual ACM Symposium on Computational Geometry 1999, 124-133. Also in: Discrete and Computational Geometry **24** (2000), 623-644.
19. G. Tóth: *Note on geometric graphs*, Journal of Combinatorial Theory, Series A **89** (2000) 126-132.
20. A. Dumitrescu, G. Tóth: *Ramsey-type results for unions of comparability graphs*, Proceedings of the 11th Canadian Conference on Computational Geometry, 1999, 178-181. Also in: Graphs and Combinatorics **18** (2002) 245-251.
21. G. Tóth: *Point sets with many k -sets*, Proceedings of the 16th Annual ACM Symposium on Computational Geometry 2000, 37-42. Also in: Discrete and Computational Geometry **26** (2001), 187-194.
22. D. J. Kleitman, A. Gyárfás, G. Tóth: *Convex sets in the plane with three of every four meeting*, Combinatorica **21** (2001), 221-232.
23. J. Pach, G. Tóth: *Thirteen problems on crossing numbers*, Geombinatorics **9** (2000), 194-207.
24. G. Károlyi, G. Tóth: *An Erdős-Szekeres type problem in the plane*, Periodica Mathematica Hungarica **39** (1999), 153-159.
25. G. Károlyi, J. Pach, G. Tóth: *A modular version of the Erdős-Szekeres theorem*, Studia Mathematica Hungarica **38** (2001), 245-259.
26. J. Pach, J. Solymosi, G. Tóth: *Unavoidable configurations in complete topological graphs*, Lecture Notes in Computer Science **1984** Springer-Verlag, 2001, 328-337. Also in: Discrete and Computational Geometry **30** (2003) 311-320.
27. R. Radoičić, G. Tóth: *Monotone paths in line arrangements*, Proceedings of the 16th Annual ACM Symposium on Computational Geometry 2001, 312-314. Also in: Computational Geometry: Theory and Applications **24** (2003), 129-134.
28. J. Pach, G. Tóth: *Recognizing string graphs is decidable*, Lecture Notes in Computer Science **2265**, (2001), 247-260. Also in: Discrete and Computational Geometry **28** (2002), 593-606.
29. R. Radoičić, G. Tóth: *Note on the chromatic number of the space*, in: Discrete and Computational Geometry (S. Basu et al., eds.), Algorithms and Combinatorics **25**, Springer-Verlag, Berlin, 2003, 695-698.
30. J. Spencer, G. Tóth: *Crossing numbers of random graphs*, Random Structures and Algorithms **21** (2002), 347-358.
31. J. Pach, G. Tóth: *How many ways can one draw a graph?* in Graph Drawing (G. Liotta, ed.), Lecture Notes in Computer Science **2912**, Springer-Verlag, Berlin, 2004, 47-58. Also in: Combinatorica **26** (2006), 559-576.
32. J. Pach, G. Tóth: *Monotone drawings of planar graphs*, Algorithms and Computation (P. Bose, P. Morin, eds.) Lecture Notes in Computer Science **2518**, Springer-Verlag, Berlin, 2002, 647-653. Also in: Journal of Graph Theory **46**, (2004), 39-47.
33. J. Pach, R. Pinchasi, G. Tardos, G. Tóth: *Geometric graphs with no self-intersecting path of length three*, Graph Drawing (M. T. Goodrich, S. G. Kobourov, eds.), Lecture Notes in Computer Science **2528**, Springer-Verlag, Berlin, 2002, 295-311. Also in: European Journal of Combinatorics **25** (2004), 793-811.

34. G. Tóth: *Ramsey-type theorems and exercises* (in Hungarian), in: New Mathematical Mosaic (A. Hraskó, ed.), Typotex, Budapest, 2002, 211-221.
35. J. Pach, R. Radoičić, G. Tardos, G. Tóth: *Improving the Crossing Lemma by finding more crossings in sparse graphs*, Proceedings of the 19th Annual ACM Symposium on Computational Geometry 2004, 68-75. Also in: Discrete and Computational Geometry **36** (2006), 527-552.
36. J. Pach, G. Tóth: *Note on conflict-free colorings* in: Discrete and Computational Geometry (S. Basu et al., eds.), Algorithms and Combinatorics **25**, Springer-Verlag, Berlin, 2003, 665-672.
37. J. Pach, R. Radoičić, G. Tóth: *Relaxing planarity for topological graphs* in: Discrete and Computational Geometry (J. Akiyama, M. Kano, eds.), Lecture Notes in Computer Science **2866**, Springer-Verlag, Berlin, 2003, 221-232. Also in: More Sets, Graphs and Numbers, (E. Györi, G. O. H. Katona, L. Lovász, eds.), Bolyai Soc. Math. Studies **15**, J. Bolyai Math. Society, Budapest, 2006, 285-300.
38. J. Pach, R. Pinchasi, M. Sharir, G. Tóth: *Topological graphs with no large grids* Special Issue dedicated to Victor Neumann-Lara, Graphs and Combinatorics **21** (2005), 355-364.
39. J. Pach, R. Radoičić, G. Tóth: *A generalization of quasi-planarity* in: Towards a Theory of Geometric Graphs, (J. Pach, ed.), Contemporary Mathematics **342**, AMS, 2004, 177-183.
40. J. Pach, G. Tóth: *Disjoint edges in topological graphs*, Combinatorial Geometry and Graph Theory: Indonesia-Japan Joint Conference, Bandung, Indonesia, 2003, Revised Selected Papers (J. Akiyama, E. T. Baskoro, M. Kano, eds.) Lecture Notes in Computer Science **3330**, Springer-Verlag, Berlin, 2005, 133-140. Also in: Journal of Combinatorics **1** (2010), 335-344.
41. G. Tóth, P. Valtr: *The Erdős-Szekeres theorem, upper bounds and related results* Discrete and Computational Geometry – Papers from the MSRI Special Program (J. E. Goodman, J. Pach, E. Welzl, eds.) MSRI Publications **52** Cambridge University Press, Cambridge (2005), 557-568.
42. G. Tardos, G. Tóth: *Crossing stars in topological graphs*, Japan Conference on Discrete and Computational Geometry 2004, Lecture Notes in Computer Science **3742**, Springer-Verlag, Berlin, 2005, 184-197. Also in: SIAM J. on Discrete Math. (SIDMA) **21** (2007), 737-749.
43. J. Kynčl, J. Pach, G. Tóth: Long alternating paths in bicolored point sets, Graph Drawing (J. Pach, ed.), Graph Drawing 2004, (J. Pach, ed.), Lecture Notes in Computer Science **3383**, Springer-Verlag, Berlin, 2005, 340-348. Also in: Special Volume of Discrete Mathematics Honouring the 60th birthday of M. Simonovits, **308** (2008), 4315-4322.
44. J. Pach, G. Tóth: *Crossing numbers of toroidal graphs*, Graph Drawing 2005, Lecture Notes in Computer Science **3843**, Springer-Verlag, Berlin, 2006, 334-342, Also in: Topics in discrete mathematics, Algorithms Combin., **26**, Springer, Berlin, 2006, 581-590.
45. G. Tardos, G. Tóth: *Multiple coverings of the plane with triangles*, Discrete and Computational Geometry **38** (2007), 443-450. Special issue dedicated to the memory of Laszlo Fejes Tóth (I. Bárány, J. Pach, eds.)
46. A. Dumitrescu, J. Pach, G. Tóth: *The maximum number of empty congruent triangles determined by a point set*, Revue Roumaine de Mathématiques Pures et Appliquées **50**, (2005), 613-618.
47. J. Pach, G. Tóth: *Degenerate crossing numbers*, Proceedings of the 22nd Annual ACM Symposium on Computational Geometry 2006, 255-258. Also in: Discrete and Computational Geometry **41**, (2009), 376-384.

48. J. Pach, G. Tardos, G. Tóth: *Indecomposable coverings*, in: Discrete Geometry, Combinatorics and Graph Theory, The China–Japan Joint Conference (CJCDGCGT 2005), Lecture Notes in Computer Science **4381**, Springer-Verlag, Berlin, 2007, 135-148. Also in: Canadian Mathematical Bulletin **52** (2009), 451-463.
49. J. Pach, G. Tóth: *Comment on Fox News*, Geombinatorics **15**, (2006), 150-154.
50. K. Böröczky, J. Pach, G. Tóth: *Crossing number of graphs embeddable in another surface*, International Journal of Foundations of Computer Science, Special Issue on Graph Drawing **17**, (2006), 1005-1017.
51. B. Keszegh, J. Pach, D. Pálvölgyi, G. Tóth: *Drawing cubic graphs with at most five slopes*, Computational Geometry: Theory and Applications **40**, (2008), 138-147. Also in: Graph Drawing 2006, Lecture Notes in Computer Science **4372**, Springer-Verlag, Berlin, 2007, 114-125.
52. G. Tóth: *Note on the pair-crossing number and the odd-crossing number*, Discrete and Computational Geometry **39**, (2008), 791-799. Also in: Proceedings of the 19th Canadian Conference on Computational Geometry, Ottawa, Canada, 2007.
53. J. Pach, G. Tóth: *Decomposition of multiple coverings into many parts*, Computational Geometry: Theory and Applications **42** (2009), 127-133. Also in: Proceedings of the 23rd Annual Symposium on Computational Geometry, Gyeongju, South-Korea, 2007, 133-137, ACM Press, New York.
54. J. Černý, J. Kynčl, G. Tóth: *Improvement on the decay of crossing numbers*, Graphs and Combinatorics **29** (2013), 365-371. Also in: Graph Drawing 2007, Lecture Notes in Computer Science **4875**, Springer-Verlag, Berlin, 2008, 25-30.
55. J. Pach, G. Tóth: *Families of convex sets not representable by points*, Indian Statistical Institute Platinum Jubilee Commemorative Volume—Architecture and Algorithms, Vol. 3, World Scientific, Singapore, 2009, 43-53.
56. R. Radoičić, G. Tóth: The discharging method in combinatorial geometry and the Pach–Sharir conjecture, Proceedings of the Joint Summer Research Conference on Discrete and Computational Geometry, (J. E. Goodman, J. Pach, J. Pollack, eds.), Contemporary Mathematics, AMS **453**, (2008), 319-342.
57. J. Pach, G. Tóth: Monochromatic empty triangles in two-colored point sets, In: Geometry, Games, Graphs and Education: the Joe Malkevitch Festschrift (S. Garfunkel, R. Nath, eds.), COMAP, Bedford, MA, 2008, 195-198. Also in: Discrete and Applied Mathematics **161** (2013), 1259-1261.
58. B. Keszegh, J. Pach, D. Pálvölgyi, G. Tóth: *Cubic graphs have bounded slope parameter*, Journal of Graph Algorithms and Applications, **14** (2010), 5-17. Also in: Graph Drawing 2008, Lecture Notes in Computer Science **5417** (2009), 50–60.
59. D. Pálvölgyi, G. Tóth: Convex polygons are cover-decomposable, Discrete and Computational Geometry, **43** (2010), 483-496.
60. A. Dumitrescu, J. Pach, G. Tóth: Drawing Hamiltonian cycles with no large angles, Graph Drawing 2009, Lecture Notes in Computer Science **5849** Springer-Verlag, Berlin, 2010, 3–14. Also in: Electronic Journal of Combinatorics **19/2** (2012) P31, 13 pp.
61. A. Dumitrescu, J. Pach, G. Tóth: A note on blocking visibilities between points, Geombinatorics **19** (2009), 67-73.
62. J. Barát, G. Tóth: Towards the Albertson conjecture, Electronic Journal of Combinatorics, **17** (1) (2010), R73.

63. P. Cheilaris, G. Tóth: Graph unique-maximum and conflict-free colorings In: Proceedings of the 7th International Conference on Algorithms and Complexity (CIAC), Lecture Notes in Computer Science **6078** Springer-Verlag, Berlin, 2010, 143-154. Also in: Journal of Discrete Algorithms **9** (2011), 241–251.
64. J. Pach, G. Tóth: Monotone crossing number, 19th International Symposium on Graph Drawing (GD '11), Technische Universiteit Eindhoven, 2011, (Marc van Kreveld and Bettina Speckmann, eds.) Lecture Notes in Computer Science **7034** (2012), 278-289, Also in: Moscow Journal of Combinatorics and Number Theory **2** (2012), 18-33.
65. G. Tóth: A better bound for the pair-crossing number, Proceedings of the Hungarian-Japanese Symposium on Discrete Mathematics and Its Applications, Kyoto 2011, 473-477. Also in: 30 Essays in Geometric Graph Theory (J. Pach, ed.), Springer, New York, 2013, 563-567.
66. Gy. Károlyi, G. Tóth: Erdős–Szekeres theorem for point sets with forbidden subconfigurations, Discrete and Computational Geometry **48** (2012), 441-452.
67. D. Pálvölgyi, J. Pach, G. Tóth: Survey on the decomposition of multiple coverings, Geometry–Intuitive, Discrete and Convex, Bolyai Math. Soc. Studies, I. Bárány et al, eds, **24** 2013, 219–259.
68. J. Pach, R. Radoičić, G. Tóth: Tangled thrackles, XIV Spanish Meeting on Computational Geometry, EGC 2011, Dedicated to Ferran Hurtado’s 60th Birthday, Lecture Notes in Computer Science **7579** (2012), 45-53. Also in: Geombinatorics **21** (2012), no. 4.
69. D. Gerbner, G. Tóth: Separating families of convex sets, Computational Geometry: Theory and Applications **46** (2013), 1056-1058.
70. E. Ackerman, J. Pach, R. Pinchasi, R. Radoičić, G. Tóth: A note on coloring line arrangements, Electronic Journal of Combinatorics **21** (2014), P2.23.
71. J. Kynčl, J. Pach, R. Radoičić, G. Tóth: Saturated simple and k -simple topological graphs Computational Geometry: Theory and Applications **48** (2015), 295-310.
72. I. Bárány, E. Roldán-Pensado, G. Tóth: Erdős - Szekeres Theorem for Lines, Discrete and Computational Geometry **54** (2015), 669-685.
73. I. Kovács, G. Tóth: Multiple coverings with closed polygons, Electronic Journal of Combinatorics **22** (2015), P 1.18.
74. L. Székely, J. Pach, C. D. Tóth, G. Tóth: Note on the k -planar crossing numbers, Computational Geometry: Theory and Applications, Ferran Hurtado Memorial Issue, accepted
75. Zs. Lángi, M. Naszódi, J. Pach, G. Tardos, G. Tóth: Separation with restricted families of sets *J. Combinatorial Theory Ser. A* **144** (2016), 292-305.
76. J. Barát, G. Tóth: Improvements on the density of maximal 1-planar graphs, Journal of Graph Theory, to appear
77. J. Pach, G. Tardos, G. Tóth: Disjointness graphs of segments, Proc. 33rd Annual Symposium on Computational Geometry (SoCG 2017, July 4-7, 2017, Brisbane, Australia) LIPIcs **77** 59:1-15.
78. I. Kovács, G. Tóth: Dense point sets with many halving lines, submitted
79. M. Ausserhofer, S. Dann, Zs. Lángi, G. Tóth: An algorithm to find maximum area polygons circumscribed about a convex polygon, submitted

80. I. Bárány, E. Csóka, Gy. Károlyi, G. Tóth: Block partitions: an extended view, *Periodica Math. Discrete Geometry Fest* volume honoring the 70th birthday of Bisztriczky, Fejes Tóth, Makai, to appear
81. J. Pach, G. Tóth: Many touchings force many crossings,
82. J. Pach, G. Tóth: Crossing lemma for multigraphs, submitted
83. G. Tardos, G. Tóth: Áttörés az Erdős-Szekeres problémában, *Érintő*, 2018.