

RESUME

Name: Richard John Gardner.

Current position: Professor.

Current address: Department of Mathematics
Western Washington University
Bellingham
WA 98225-9063

Telephone: Work: 360-650-7760 Fax: 360-650-7788

E-mail: Richard.Gardner@wwu.edu

Web Page: <http://www.ac.wwu.edu/~gardner/>

Highest degree: D. Sc., University of London, 1988.

Other degrees: Ph. D., University College London, 1974.
B. Sc. (First class honours), University College London, 1971.

Awards:

Filon Prize (half share), University College London, 1969-70.

Science Faculty medal, University College London, 1970-1.

Sherbrooke Studentship, University of London, 1970-1.

1988 Distinguished Teacher Award, College of Sciences, King Fahd University of Petroleum and Minerals (KFUPM).

1995 Paul J. Olscamp Outstanding Research Award, Western Washington University.

Research Grants:

National Science Foundation Grant DMS-9201508. Three years, beginning July 1, 1992.

National Science Foundation Grant DMS-9501289. Three years, beginning July 1, 1995.

National Science Foundation Grant DMS-9802388. Three years, beginning July 1, 1998.

National Science Foundation Grant DMS-0203527. Four years, beginning April 1, 2002.

National Science Foundation Grant DMS-0603307. Five years, beginning July 1, 2006.

Previous positions:

1974-5, Lecturer, Imperial College, London.

1975-6, Lecturer, Westfield College, London.

1976-7, Assistant Professor, Auburn University, U.S.A.

1977-8, Assistant Professor, UC Davis, U.S.A.

1978-9, Senior Research Officer, CSIR, South Africa.

1979-80, Assistant Professor, Auburn University, U.S.A.

1980-1, Assistant Professor, North Texas State University, U.S.A.

1981-5, Associate Professor, KFUPM, Saudi Arabia.

1985-9, Professor, KFUPM, Saudi Arabia.

September 1989 - February 1990, Visiting Professor, Istituto Analisi Globale e Applicazioni, Florence, Italy.

March 1990 - August 1990, von Humboldt Research Fellow, West Germany.

1990-1, Visiting Professor, UC Davis, U.S.A.

1991-present, Professor, Western Washington University, U.S.A.

Visits (one month or more):

July - August 1980, Monash University, Australia.

June - July 1985, May - June 2000, and June 2002, Università degli Studi di Trieste, Italy.

1986-7, UC Davis, U.S.A.

July 1995, April 2000, April 2002, and April 2004, Istituto Analisi Globale e Applicazioni (now Istituto per le Applicazioni del Calcolo) Florence, Italy.

September 1995, Université de Marne-la-Vallée, Paris, France.

January 1997, Universität Trier, Trier, Germany.

February - June 1997, University of Crete, Heraklion, Crete, Greece.

July 1997, Technische Universität München, Munich, Germany.

May 2002, 2004, and 2006, University of Aarhus, Denmark.

Memberships: London Mathematical Society, American Mathematical Society.

Reviewing: Reviewer for Mathematical Reviews and the National Science Foundation.

Conferences organized: Meeting on the Mathematics of Discrete Tomography, Oberwolfach, December 2000 (with P. Gritzmann).

Special session on Analytical Aspects of Convex Geometry, joint AMS-UMI meeting in Pisa, Italy, June 2002 (with E. Lutwak, S. Campi, and A. Volčič).

Conferences (invited):

April, 1980: AMS special session on Topological Measure Theory, UC Davis, U.S.A.

June 1981, June 1983, March 1990: Conference on Measure Theory, Oberwolfach, West Germany.

July 1982, 1984, 1986, 1988, 1990, 1993, December 1997, April 2000, and December 2006: Conference on Convex Geometry, Oberwolfach, West Germany.

September 1988 and September 1992: Conference on Real Analysis and Measure Theory, Capri, Italy. (Main speaker.)

October 1989: Conference on Measure Theory, Cortona, Italy. (Main speaker.)

August 1990: Conference on Mathematical Methods in Tomography, Oberwolfach, West Germany.

January 1992: Conference on Applied and Computational Convexity, Oberwolfach, West Germany.

August 1993: AMS special session on Discrete Geometry and Convexity, Vancouver, Canada.

April 1994: AMS special session on Geometric Convexity, Brooklyn, New York, U.S.A.

September 1994: International Conference on Convexity, Paris, France. (Main speaker.)

June 1995 (main speaker), May 1999, June 2003, and June 2007: Conference on Convex Geometry - Analytic Aspects, Cortona, Italy.

March 1996: Convex Geometry Program, MSRI, Berkeley, U.S.A.

July 1996: Conference on Affine Geometry of Convex Bodies, Halifax, Nova Scotia, Canada.

September 1996: Conference on Stochastic Geometry, Convex Bodies, and Empirical Measures, Agrigento, Italy.

January 1997: Conference on Geometry in Present Day Science, Aarhus, Denmark.

January 1997: Conference on Discrete Tomography, Dagstuhl, Germany.

April 1998: 24th Annual New York State Regional Graduate Mathematics Conference, Syracuse, New York, U.S.A. (Opening talk.)

June 1998: CMS special session on Convex Geometry, Saint John, New Brunswick, Canada.

March 1999: International Workshop on Discrete Tomography and Related Problems, Thionville, France.

September 1999 and 2001: Workshop on Real Analysis and Measure Theory, Gorizia and Grado, Italy.

May 2000 and June 2002: Summer Workshop on Local Stereology and Geometric Tomography, Sandbjerg, Denmark.

September 2000 and August 2002: Conference on Convex and Discrete Geometry, Beijing, China.

June 2001: Conference on Applied Inverse Problems, Montecatini, Italy.

August 2003: Introductory Workshop on Discrete and Computational Geometry, MSRI, Berkeley, USA. (Main speaker.)

October, 2004: Workshop on Geometric Tomography, Alicante, Spain. (Main speaker.)

May, 2005: Workshop on Geometric Inequalities, Florence, Italy. (Main speaker.)

June, 2005: Workshop on Discrete Tomography and Its Applications, New York.

August, 2007: Workshop on Fourier Analytic Methods in Convex Geometry, American Institute of Mathematics, Palo Alto, CA.

March, 2008: Workshop on Geometric Tomography and Applications to Image Processing, Politecnico Milano, Milan, Italy.

PUBLICATIONS

Book: R. J. Gardner, *Geometric Tomography*, Cambridge University Press, New York, 1995. Second edition, 2006.

Papers:

1. R. J. Gardner, Approximating sequences and Hausdorff measure, *Proc. Cambridge Philos. Soc.* **76** (1974), 161–72.
2. R. J. Gardner, The measure of boundary sets of families of compact sets, *J. London Math. Soc.* (2) **9** (1974), 317–27.
3. R. J. Gardner, The regularity of Borel measures and Borel measure-compactness, *Proc. London Math. Soc.* (3) **30** (1975), 95–113.
4. R. J. Gardner and J. Hawkes, Majorizing sequences and approximation, *Ark. Mat.* **14** (1976), 197–211.
5. G. Gruenhage and R. J. Gardner, Completeness and weak covering properties, and measure-compactness, *J. London Math. Soc.* (2) **18** (1978), 316–24.
6. R. J. Gardner, On concentrated sets, *Fund. Math.* **102** (1979), 45–53.
7. Jack B. Brown and R. J. Gardner, Generalized Lusin sets and the Baire order problem, *Bull. Acad. Polon. Sci. Sér. Sci. Math.* **27** (1979), 745–50.
8. R. J. Gardner and W. F. Pfeffer, Are diffused, regular, Radon measures σ -finite?, *J. London Math. Soc.* (2) **20** (1979), 485–94.
9. R. J. Gardner and W. F. Pfeffer, Some undecidability results concerning Radon measures, *Trans. Amer. Math. Soc.* **259** (1980), 65–74. (Translated into Russian in *Trudy Mat. Inst. Steklov* **154** (1983), 71–80.)
10. R. J. Gardner and W. F. Pfeffer, Interrelation between the regularity and σ -finiteness of Radon measures, (in Russian), *Uspekhi Mat. Nauk.* **35** (3(213)) (1980), 31–6. (Translated in *Russian Math. Surveys* **35**:3 (1980), 35–40.)
11. R. J. Gardner and P. McMullen, On Hammer’s X-ray problem, *J. London Math. Soc.* (2) **21** (1980), 171–5.
12. R. J. Gardner, Results and conjectures on covering metric spaces, *Quaestiones Math.* **4** (1980), 55–80.
13. D. H. Martin, R. J. Gardner, and G. Watkins, Indicating cones and the intersection principle for tangential approximants in abstract multiplier rules, *J. Optim. Theory Appl.* **33** (1981), 515–37.
14. R. J. Gardner and G. Gruenhage, Finite Borel measures on spaces of cardinality less than c , *Proc. Amer. Math. Soc.* **81** (1981), 624–8.

15. S. Gallivan and R. J. Gardner, A counterexample to a “Simplex algorithm” for convex bodies, *Geom. Dedicata* **11** (1981), 475–88.
16. R. J. Gardner, S. Kwapien, and D. Laurie, Some inequalities related to planar convex sets, *Canad. Math. Bull.* **25** (1982), 302–10.
17. S. Zlobec, R. J. Gardner, and A. Ben-Israel, Regions of stability for perturbed convex programs, in: *Mathematical Programming with Data Perturbations*, Lecture Notes in Applied Mathematics **73**, Marcel Dekker, 1982, 66–89.
18. R. J. Gardner, A note on conditional distributions and orthogonal measures, *Ann. Probab.* **10** (1982), 877–8.
19. R. J. Gardner, The regularity of Borel measures, in: *Proceedings of the Conference on Measure Theory*, Oberwolfach, 1981, Lecture Notes in Mathematics **945**, Springer-Verlag, 1982, 42–100.
20. R. J. Gardner and R. D. Mauldin, On the Hausdorff dimension of a set of complex continued fractions, *Illinois J. Math.* **27** (1983), 334–45.
21. R. J. Gardner, Symmetrals and X-rays of planar convex bodies, *Arch. Math. (Basel)* **41** (1983), 181–9.
22. R. J. Gardner and W. F. Pfeffer, Decomposability of Radon measures, *Trans. Amer. Math. Soc.* **283** (1984), 283–93.
23. R. J. Gardner and W. F. Pfeffer, Borel measures, in: *Handbook of Set-Theoretic Topology*, ed. by K. Kunen and J. Vaughan, North-Holland, Amsterdam, 1984, 961–1043.
24. R. J. Gardner and W. F. Pfeffer, Conditions that imply a space is Radon, in: *Proceedings of the Conference in Measure Theory*, Oberwolfach, 1983, Lecture Notes in Mathematics **1089**, Springer-Verlag, 1984, 11–22.
25. R. J. Gardner, A problem of Sallee on equidecomposable convex bodies, *Proc. Amer. Math. Soc.* **94** (1985), 329–32.
26. R. J. Gardner, Convex bodies equidecomposable by locally discrete groups of isometries, *Mathematika*, **32** (1985) 1–9.
27. R. J. Gardner, Corson compacts and Radon spaces, *Houston J. Math.* **13** (1987), 37–46.
28. R. J. Gardner, Chord functions of convex bodies, *J. London Math. Soc. (2)* **36**(1987), 314–26.
29. R. J. Gardner and R. D. Mauldin, Bijections of \mathbb{R}^n onto itself, *Geom. Dedicata* **26** (1988), 323–32.
30. R. J. Gardner, Relative width measures and the plank problem, *Pacific J. Math.* **135** (1988), 299–312.

31. R. J. Gardner and Stan Wagon, At long last, the circle has been squared, *Notices Amer. Math. Soc.* **36** (1989), 1338–43.
32. R. J. Gardner and M. Laczkovitch, On the Banach-Tarski theorem on polygons, and the cancellation law, *Proc. Amer. Math. Soc.* **109** (1990), 1097–102.
33. R. J. Gardner, Measure theory and some problems in geometry, *Atti. Sem. Mat. Fis. Univ. Modena* **39** (1991), 39–60.
34. R. J. Gardner and W. F. Pfeffer, A note on small and other singular sets, *Atti. Sem. Mat. Fis. Univ. Modena* **39** (1991), 263–70.
35. R. J. Gardner, X-rays of polygons, *Discrete Comput. Geom.* **7** (1992), 281–93.
36. R. J. Gardner, Sets determined by finitely many X-rays, *Geom. Dedicata* **43** (1992), 1–16.
37. R. J. Gardner and M. Kallay, Subdivision algorithms and the kernel of a polyhedron, *Discrete Comput. Geom.* **8** (1992), 417–27.
38. R. J. Gardner and A. Volčič, Determination of convex bodies by their brightness functions, *Mathematika* **40** (1993), 161–8.
39. R. J. Gardner and A. Volčič, Convex bodies with similar projections, *Proc. Amer. Math. Soc.* **121** (1994), 563–8.
40. R. J. Gardner, Intersection bodies and the Busemann-Petty problem, *Trans. Amer. Math. Soc.* **342** (1994), 435–45.
41. R. J. Gardner, On the Busemann-Petty problem, *Bull. Amer. Math. Soc.* **30** (1994), 222–6. (Research Announcement.)
42. R. J. Gardner, A positive answer to the Busemann-Petty problem in three dimensions, *Ann. of Math.* (2) **140** (1994), 435–47. Featured Review MR 95i:52005.
43. R. J. Gardner and A. Volčič, Tomography of convex and star bodies, *Adv. Math.* **108** (1994), 367–99.
44. R. J. Gardner and P. Gritzmann, Successive determination and verification of polytopes by their X-rays, *J. London Math. Soc.* (2) **50** (1994), 375–91.
45. R. J. Gardner, Geometric tomography, *Notices Amer. Math. Soc.* **42** (1995), 422–9.
46. R. J. Gardner, P. Gritzmann, and D. Prangenberg, On the reconstruction of binary images from their discrete Radon transforms, in: *Vision Geometry V*, ed. by R. A. Melter, A. Y. Wu, and L. Latecki, Society of Photo-Optical Instrumentation Engineers Proceedings **2826**, 1996, 121–132.
47. R. J. Gardner and P. Gritzmann, Discrete tomography: Determination of finite sets by X-rays, *Trans. Amer. Math. Soc.* **349** (1997), 2271–95.

48. R. J. Gardner and Gaoyong Zhang, Affine inequalities and radial mean bodies, *Amer. J. Math.* **120** (1998), 493–504.
49. R. J. Gardner and S. Vassallo, Inequalities for dual isoperimetric deficits, *Mathematika* **45** (1998), 269–285.
50. R. J. Gardner, A. Soranzo, and A. Volčič, On the determination of star and convex bodies by section functions, *Discrete Comput. Geom.* **21** (1999), 69–85.
51. R. J. Gardner, Alexander Koldobsky, and Thomas Schlumprecht, An analytic solution to the Busemann-Petty problem, *C. R. Acad. Sci. Paris Sér. I Math.* **328** (1999), 29–34. (Research announcement.)
52. R. J. Gardner, Alexander Koldobsky, and Thomas Schlumprecht, An analytical solution to the Busemann-Petty problem on sections of convex bodies, *Ann. of Math. (2)* **149** (1999), 691–703.
53. R. J. Gardner and S. Vassallo, Stability of inequalities in the dual Brunn-Minkowski theory, *J. Math. Anal. Appl.* **231** (1999), 568–587.
54. R. J. Gardner, P. Grizmann, and D. Prangenberg, On the computational complexity of reconstructing lattice sets from their X-rays, *Discrete Math.* **202** (1999), 45–71.
55. R. J. Gardner, From computerized to geometric and discrete tomography, in: *Proceedings of the Conference on Geometry in Present Day Science*, Aarhus, 1997, ed. by O. E. Barnsdorff-Nielsen and E. B. Vedel Jensen, World Scientific, Singapore, 1999, 97–107.
56. R. J. Gardner and A. A. Giannopoulos, p -Cross-section bodies, *Indiana Univ. Math. J.* **48** (1999), 593–613.
57. R. J. Gardner and P. Grizmann, Uniqueness and complexity in discrete tomography, in: *Discrete Tomography: Foundations, Algorithms and Application*, ed. by G. T. Herman and A. Kuba, Birkhäuser, Boston, 1999, pp. 85–113.
58. R. J. Gardner, P. Grizmann, and D. Prangenberg, On the complexity of determining polyatomic structures by X-rays, *Theoret. Comput. Sci.* **233** (2000), 91–106.
59. R. J. Gardner and S. Vassallo, The Brunn-Minkowski inequality, Minkowski's first inequality, and their duals, *J. Math. Anal. Appl.* **245** (2000), 502–512.
60. R. J. Gardner and Peyman Milanfar, Shape reconstruction from brightness functions, in: *Proceedings of SPIE Conference on Advanced Signal Processing Algorithms, Architectures, and Implementations X*, San Diego, CA, 2001, Proceedings of SPIE **4474**, pp. 234–245.
61. R. J. Gardner and Paolo Gronchi, A Brunn-Minkowski inequality for the integer lattice, *Trans. Amer. Math. Soc.* **353** (2001), 3995–4024.
62. R. J. Gardner, The Brunn-Minkowski inequality, *Bull. Amer. Math. Soc.* **39** (2002), 355–405.

63. Aryn Poonawala, Peyman Milanfar, and R. J. Gardner, A statistical analysis of shape reconstruction from areas of shadows, in: *Proceedings of the 36th Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, 2002, pp. 916–920.
64. R. J. Gardner and Peyman Milanfar, Reconstruction of convex bodies from brightness functions, *Discrete Comput. Geom.* **29** (2003), 279–303.
65. R. J. Gardner, Eva B. Vedel Jensen, and A. Volčič, Geometric tomography and local stereology, *Adv. in Appl. Math.* **30** (2003), 397–423.
66. Aryn Poonawala, Peyman Milanfar, and R. J. Gardner, On the uncertainty analysis of shape reconstruction from areas of silhouettes, in: *Advances in Pattern Recognition ICAPR 2003*, ed. by D. P. Mukherjee and S. Pal, Allied Publishers Pvt. Ltd., 2003, pp. 200–203.
67. R. J. Gardner, A. Hobolth, E. B. Vedel Jensen, and F. B. Sørensen, Shape discrimination by total curvature, with a view to cancer diagnostics, *J. Microsc.* **217** (2005), 49–59.
68. R. J. Gardner, Marco Longinetti, and Luca Sgheri, Reconstruction of orientations of a moving protein domain from paramagnetic data, *Inverse Problems* **21** (2005), 879–898.
69. R. J. Gardner, Paolo Gronchi, and Chuanming Zong, Sums, projections, and sections of lattice sets, and the discrete covariogram, *Discrete Comput. Geom.* **34** (2005), 391–409.
70. Paolo Dulio, R. J. Gardner, and Carla Peri, Discrete point X-rays, *SIAM J. Discrete Math.* **20** (2006), 171–188.
71. Aryn Poonawala, Peyman Milanfar, and R. J. Gardner, Shape estimation from support and diameter functions, *J. Math. Imaging Vision* **24** (2006), 229–244.
72. R. J. Gardner, Markus Kiderlen, and Peyman Milanfar, Convergence of algorithms for reconstructing convex bodies and directional measures, *Ann. Statist.* **34** (2006), 1331–1374.
73. R. J. Gardner and Markus Kiderlen, A solution to Hammer’s X-ray reconstruction problem, *Adv. Math.* **214** (2007), 323–343.
74. R. J. Gardner, The dual Brunn-Minkowski theory for bounded Borel sets: Dual affine quermassintegrals and inequalities, *Adv. Math.* **216** (2007), 358–386.
75. R. J. Gardner and Markus Kiderlen, A new algorithm for 3D reconstruction from support functions, *IEEE Trans. Pattern Anal. Machine Intell.*, accepted.
76. R. J. Gardner and Artem Zvavitch, Gaussian Brunn-Minkowski inequalities, *Trans. Amer. Math. Soc.*, accepted.
77. R. J. Gardner and David Hartenstine, Capacities, surface area, and radial sums, *Adv. Math.*, accepted.