

Curriculum Vitae  
**BORIS SOLOMYAK**  
August 3, 2017

**BORN:** April 1, 1959, in St. Petersburg, Russia.

**ADDRESS:** Department of Mathematics, Bar-Ilan University, Ramat-Gan, 5290002 Israel

**EDUCATION:**

Ph.D., St. Petersburg State University (Russia), 1986. Advisor: Nikolai Nikol'ski.

M.S. (with Honors), St. Petersburg State University (Russia), 1981.

**PROFESSIONAL EXPERIENCE:**

*Professor of Mathematics*, Bar-Ilan University, 2014–

*Professor of Mathematics*, University of Washington, 2001– 2015 (on leave 2014/15).

*Associate Professor of Mathematics*, University of Washington, 1997–2001

*Assistant Professor of Mathematics*, University of Washington, 1992–1997

*Visiting Assistant Professor*, University of Washington, 1990–1992

*Research Associate*, St. Petersburg Electrotechnical University, 1986–1989

**PH.D. STUDENTS SUPERVISED:**

Alan Bartlett, Ph.D. 2015.

Ilgar Eroğlu, Ph.D. 2007.

Pablo Shmerkin, Ph.D. 2006.

Christopher Hillman, Ph.D. 1998.

Michael Hollander, Ph.D. 1996.

**POST-DOCS SUPERVISED:**

Yuki Takahashi, 2017–2019.

Artemi Berlinkov, 2015–2017.

Richard Báłka, 2013–2014.

Jeong-Yup Lee, 2004–5.

**HONORS AND AWARDS:**

Inaugural Fellow of the American Mathematical Society, 2013.

University of Washington Math Department Excellence Award, 2001/02.

Fulbright Award: Research Scholar at the Hebrew University of Jerusalem, 1998–99.

**VISITING POSITIONS and INSTITUTE MEMBERSHIPS:**

2012/13, The Hebrew University of Jerusalem, Forschheimer Visiting Professor.

July 2009, Max Planck Institute for Mathematics, Bonn, Member.

2005/06, Weizmann Institute of Science, Rosi and Max Varon Visiting Professor.

1998/99, The Hebrew University of Jerusalem, Visiting Professor.

June 1994, University of Paris 6, Visiting Professor.

Autumn 1992, MSRI, Berkeley, Member.

## **SELECTED INVITED LECTURES 2010–PRESENT**

1. Memorial Conference on Spectral Theory of PDE's, June 2017.
2. “Action Now” Workshop, Tel-Aviv University, January 2017.
3. Colloquium, Brown University, March 2016.
4. Workshop on Ergodic, Algebraic and Combinatorial Methods in Dimension Theory, ICERM, Brown University, February 2016.
5. Colloquium, Technion, Haifa, April 2015.
6. Workshop on Crystals, Quasicrystals, and Random Networks, ICERM, Brown University, February 2015.
7. Colloquium, Ben-Gurion University, Beer-Sheva, December 2014.
8. Colloquium, Bar-Ilan University, Ramat-Gan, November 2014.
9. Mini-course, ICTP workshop on Geometry and Dynamics, Trieste, June 2013.
10. Colloquium, Hebrew University of Jerusalem, April 2013.
11. AMS Eastern Sectional Meeting, Invited Address, George Washington University, March 17-18, 2012.
12. Workshop on rigidity of self-similar tilings, RIMS, Kyoto, December 2011.
13. CBMS Conference “Ergodic theory of fractals,” Kent State University, June 2011.
14. International conference “Fractals and related fields,” Porquerolles, France, June 2011.
15. Colloquium, Rice University, April 2011.

## **GRANTS**

Individual Israeli Science Foundation Grant: ISF-396/15, October 2015 – September 2019.

Individual NSF Grant DMS-1361424: July 15, 2014–July 14, 2017 (terminated early by mutual agreement on September 15, 2015).

Individual NSF Grant DMS-0968879: August 1, 2010–July 31, 2014.

Individual NSF Grants 1992–1994 and 1995–June 30, 2011.

## **SELECTED PROFESSIONAL SERVICE**

Spring 2016, Semester Program in “Dimension and Dynamics” at ICERM, Brown University, Co-organizer.

March 17–18, 2012, Special Session “Tilings, substitutions, and Bratteli-Vershik transformations,” AMS Eastern Sectional Meeting, Co-organizer.

May 29–June 3, 2004, BIRS Workshop on Aperiodic Order: Dynamical Systems, Combinatorics, and Operators, Co-organizer.

June 28–July 3, 2003, BIRS Workshop on Joint Dynamics, Co-organizer.

## PUBLICATIONS of Boris Solomyak

1. Complete extensions of compact operators with preservation of class, *Functional Analysis and its Applications* **14** (1980), no.3, 244–245 (1981).
2. The existence of invariant subspaces for operators with nonsymmetric growth of resolvent, *Journal of Soviet Math.* **36** (1987), no.3, 423–426 (Russian original in 1982).
3. Calculuses, annihilators and invariant subspaces, *Journal of Operator Theory* **9** (1983), 341–370.
4. Spectral multiplicity of analytic Toeplitz operators, *Soviet Math. Dokl.* **33** (1986), no.1, 286–289.
5. A dynamical system with a discrete spectrum, *Russian Math. Surveys* **41** (1986), no.2, 219–220.
6. Cyclic families of functions for analytic Toeplitz operators, *Journal of Soviet Math.* **44** (1989), no.6, 809–819 (Russian original in 1987).
7. (with A. Volberg) Multiplicity of the spectrum of Toeplitz operators, weighted cocycles, and the vector Riemann problem, *Functional Analysis and its Applications* **21** (1987), no.3, 175–183 (1988).
8. Multiplicity, calculuses and multiplication operators, *Siberian Math. Journal*, November (1988), 293–300.
9. (with A. Volberg) Multiplicity of the operator of multiplication by analytic operator-valued function, *Functional Analysis and its Applications* **23** (1989), no.3, 215–216 (1990).
10. (with A. Volberg) Multiplicity of analytic Toeplitz operators, in: *Operator Theory: Advances and Applications* **42** (1989), 87–192, Birkhäuser.
11. (with A. Volberg) Operator of multiplication by analytic matrix-valued function in: *Operator Theory: Advances and Applications* **42** (1989), 193–207, Birkhäuser.
12. Functional model for dissipative operators. A coordinate-free approach, *Journal of Soviet Math.* **61** (1992), no.2, 1981–2002 (Russian original in 1989).
13. Scattering theory for almost unitary operators, and a functional model, *Journal of Soviet Math.* **61** (1992), no.2, 2002–2018 (Russian original in 1989).
14. On the valence structure of analytic functions, *Michigan Math. Journal* **39:1** (1992), 91–98.
15. On the spectral theory of adic transformations, in: *Advances of Soviet Mathematics* **9** (1992), 217–230.
16. Substitutions, adic transformations and beta-expansions, in: *Symbolic Dynamics and its Applications, Contemporary Mathematics* **135** (1992), 361–372.
17. (with C. Frougny) Finite beta-expansions, *Ergodic Theory and Dynamical Systems* **12** (1992), 713–723.

18. Conjugates of beta-numbers and the zero-free domain for a class of analytic functions, *Proc. London Math. Soc.* **68** (1994), 477–498.
19. (with M. Keane and M. Smorodinsky) On the morphology of  $\gamma$ -expansions with deleted digits, *Transactions Amer. Math. Soc.* **347:3** (1995), 955–966.
20. On the random series  $\sum \pm \lambda^i$  (an Erdős problem), *Annals of Math.* **142** (1995), 611–625.
21. (with C. Frougny) On representation of integers in linear numeration systems, in: *Ergodic Theory of  $\mathbf{Z}^d$ -actions*, *LMS Lecture Note Series* **228** (1996), 345–368, Cambridge University Press.
22. (with Y. Peres) Absolute continuity of Bernoulli convolutions, a simple proof, *Mathematical Research Letters* **3** (1996), 231–239.
23. (with K. Dajani and C. Kraaikamp) The natural extension of the beta-transformation, *Acta Mathematica Hungarica* **73 (1-2)** (1996), 97–109.
24. On the measure of arithmetic sums of Cantor sets, *Indagationes Mathematicae, N.S.* **8(1)** (1997), 133–141.
25. Dynamics of self-similar tilings, *Ergodic Theory and Dynamical Systems* **17** (1997), 695–738.
26. (with K. Simon) Correlation dimension for self-similar Cantor sets with overlaps, *Fundamenta Mathematicae* **155** (1998), no. 3, 293–300.
27. (with Y. Peres) Self-similar measures and intersections of Cantor sets, *Transactions Amer. Math. Soc.* **350** (1998), no.10, 4065–4087.
28. Measure and dimension for some fractal families, *Math. Proc. Cambridge Philos. Soc.* **124** (1998), no. 3, 531–546.
29. Nonperiodicity implies unique composition for self-similar translationally finite tilings, *Discrete and Computational Geometry* **20** (1998), no. 2, 265–279.
30. Spectrum of dynamical systems arising from Delone sets, in *Quasicrystals and Discrete Geometry*, The Fields Institute for Research in Mathematical Sciences Monograph Series **10** (1998), 265–275, AMS.
31. Non-linear IFS with overlaps, *Periodica Math. Hungarica* **37 (1-3)**, (1998), 127–141.
32. (with K. Simon) Hausdorff dimension for horseshoes in  $\mathbf{R}^3$ , *Ergodic Theory and Dynamical Systems* **19** (1999), 1343–1363.
33. (with C. Frougny) On the context-freeness of the  $\theta$ -expansions of the integers, *International Journal of Algebra and Computation* **9**, nos. 3 & 4 (1999), 347–350.
34. (with Y. Peres and K. Simon) Self-similar sets of zero Hausdorff measure and positive packing measure, *Israel J. of Math.* **117** (2000), 353–379.
35. (with Y. Peres) Approximation by polynomials with coefficients  $\pm 1$ , *J. of Number Theory* **84** (2000), 185–198.

36. (with Y. Peres) Existence of  $L^q$  dimensions and entropy dimension for self-conformal measures, *Indiana Univ. Math. J.* **49** (2000), 1603–1621.
37. (with Y. Peres and W. Schlag) Sixty years of Bernoulli convolutions, *Fractals and Stochastics II*, (C. Bandt, S. Graf and M. Zähle, eds.), *Progress in Probability* **46**, 39–65. Birkhäuser, 2000.
38. (with Y. Peres) Problems on self-similar sets and self-affine sets: an update, *Fractals and Stochastics II*, (C. Bandt, S. Graf and M. Zähle, eds.), *Progress in Probability* **46**, 95–106. Birkhäuser, 2000.
39. (with Y. Peres, M. Rams and K. Simon) Equivalence of positive Hausdorff measure and the open set condition for self-conformal sets, *Proc. Amer. Math. Soc.* **129** (2001), 2689–2699.
40. (with K. Simon and M. Urbański) Invariant measures for parabolic IFS with overlaps and random continued fractions, *Trans. Amer. Math. Soc.* **353** (2001), 5145–5164.
41. (with N. Priebe) Characterization of planar pseudo-self-similar tilings, *Discrete and Computational Geometry* **26** (2001), 289–306.
42. (with K. Simon and M. Urbański) Hausdorff dimension of limit sets for parabolic IFS with overlaps, *Pacific J. Math.* **201** (2001), 441–478.
43. (with M. Urbański)  $L^q$  densities for measures associated with parabolic IFS with overlaps, *Indiana Univ. Math. J.* **50** (2001), 1845–1866.
44. (with Y. Peres) How likely is Buffon’s needle to fall near a planar Cantor set, *Pacific J. Math.* **204** (2002), 473–496.
45. (with D. Damanik) Some high-complexity Hamiltonians with purely singular continuous spectrum, *Annales Henri Poincaré* **3** (2002), 99–105.
46. (with K. Simon) On the dimension of self-similar sets, *Fractals* **10** (2002), 59–65.
47. (with J.-Y. Lee and R. V. Moody) Pure point dynamical and diffraction spectra, *Annales Henri Poincaré* **3** (2002), 1003–1018.
48. (with V. F. Sirvent) Pure discrete spectrum for one-dimensional substitutions of Pisot type, *Canadian Math. Bulletin* **45** (2002), no. 4, 697–710.
49. (with J.-Y. Lee and R. V. Moody) Consequences of pure point diffraction spectra for multiset substitution systems, *Discrete and Computational Geometry* **29** (2003), 525–560.
50. (with M. Hollander) Two-symbol Pisot substitutions have pure discrete spectrum, *Ergodic Theory and Dynamical Systems* **23** (2003), 533–540.
51. (with Y. Peres and K. Simon) Fractals in the plane with positive length and zero Buffon needle probability, *American Mathematical Monthly* **110** (2003), 314–325.
52. (with H. Xu) On the “Mandelbrot set” for a pair of linear maps and complex Bernoulli convolutions, *Nonlinearity* **16** (2003), 1733–1749.

53. (with N. Sidorov) Spectra of Bernoulli convolutions as multipliers in  $L^p$  on the circle, *Duke Math. Journal* **120** (2003), 353–370.
54. (with M. Keane and K. Simon) The dimension of graph directed attractors with overlaps on the line, with an application to a problem in fractal image recognition, *Fundamenta Math.* **180** (2003), no. 3, 279–292.
55. “Mandelbrot set” for a pair of linear maps: the local geometry, *Analysis in Theory and Applications* **20** (2004), no. 2, 149–157.
56. Notes on Bernoulli convolutions, in *Fractal Geometry and Applications: A Jubilee of Benoît Mandelbrot: Analysis, Number Theory, and Dynamical Systems* (M. L. Lapidus and M. van Frankenhuysen, eds.), *Proceedings of Symposia in Pure Mathematics*, AMS, 2004, 207–230.
57. (with Y. Peres) The sharp Hausdorff measure condition for length of projections, *Proc. Amer. Math. Soc.* **133** (2005), no. 11, 3371–3379.
58. On the “Mandelbrot set” for pairs of linear maps: asymptotic self-similarity, *Nonlinearity* **18** (2005), no. 5, 1927–1943.
59. (with R. Kenyon and L. Sadun) Topological mixing for substitutions on two letters, *Ergodic Theory and Dynam. Systems* **25** (2005), no. 6, 1919–1934.
60. Pseudo-self-affine tilings in  $\mathbf{R}^d$ , *Zap. Nauchn. Semin. POMI* **326** (2005), 198–213; translation in *J. Math. Sci. (N.Y.)* **140** (2007), 452–460.
61. (with P. Shmerkin) Zeros of  $\{-1, 0, 1\}$  power series and connectedness loci for self-affine sets, *Experimental Math.* **15** (2006), no. 4, 499–511.
62. (with M. Csörnyei, T. Jordan, D. Preiss, and M. Pollicott) Positive measure self-similar sets without interior, *Ergodic Theory and Dynam. Systems* **26** (2006), no. 3, 755–758.
63. (with Y. Peres and K. Simon) Absolute continuity for random iterated function systems with overlaps, *Journal of the London Math. Soc. (2)* **74** (2006), 739–756.
64. (with K. Simon) Visibility for self-similar sets of dimension one in the plane, *Real Analysis Exchange* **32** (2006/07), no. 1, 67–78.
65. Eigenvalues for substitution tiling systems, in *Advanced Studies in Pure Mathematics* **49** (2007) (*Proceedings of the International Conference on Probability and Number Theory in Kanazawa, Japan, June 2005*), pp. 433–454.
66. (with J.-Y. Lee) Pure point diffractive Delone sets have the Meyer property, *Discrete and Computational Geometry* **39** (2008), 319–338.
67. (with I. Benjamini and O. Gurel-Gurevich) Branching Random Walk with Exponentially Decreasing Steps, and Stochastically Self-Similar Measures, *Transactions of the Amer. Math. Soc.* **361** (2009), 1625–1643.
68. (with I. Benjamini) Spacings and pair correlations for finite Bernoulli convolutions, *Nonlinearity* **22** (2009), 381–393.

69. (with A. Vershik) The adic realization of the Morse transformation and the extension of its action to the solenoid, *J. Math. Sci. (N.Y.)* **158** (2009), 809–818.
70. (with P. Móra and K. Simon) The Lebesgue measure of the algebraic difference of two random Cantor sets, *Indag. Math. (N.S.)* **20** (2009), 131–149.
71. (with R. Kenyon) On the characterization of expansion maps for self-affine tilings, *Discrete Comput. Geom.* **43** (2010), 577–593.
72. (with S. Bezuglyi, J. Kwiatkowski, K. Medynets) Invariant measures on stationary Bratteli diagrams, *Ergod. Th. & Dynam. Sys.* **30** (2010), 973–1007.
73. (with K. I. Eroğlu and S. Rohde) Quasisymmetric conjugacy between quadratic dynamics and iterated function systems, *Ergod. Th. & Dynam. Sys.* **30** (2010), 1665–1684.
74. (with N. Sidorov) On the topology of sums in powers of an algebraic number, *Acta Arithmetica* **149** (2011), no. 4, 337–346.
75. (with R. Kenyon and Y. Peres) Hausdorff dimension of the multiplicative golden mean shift, *C. R. Math. Acad. Sci. Paris* **349** (2011), 625–628.
76. (with T. Jordan and P. Shmerkin) Multifractal structure of Bernoulli convolutions, *Cambridge Univ. Math. Proc.* **151** (2011), 521–539.
77. (with M. I. Cortez) Invariant measures for non-primitive tiling substitutions, *J. D’Analyse Math.* **115** (2011), 293–341.
78. (with J.-Y. Lee) Pisot family self-affine tilings, discrete spectrum, and the Meyer property, *Discrete and Continuous Dynam. Sys.* **32** (2012), 935–959.
79. (with R. Kenyon and Y. Peres) Hausdorff dimension for fractals invariant under the multiplicative integers, *Ergod. Th. & Dynam. Sys.* **32** (2012), 1567–1584.
80. (with Y. Peres) Dimension spectrum for a nonconventional ergodic average, *Real Analysis Exchange* **37**(2) (2011/12), 375–388.
81. (with S. Bezuglyi, J. Kwiatkowski, K. Medynets) Invariant Measures on Stationary Bratteli Diagrams, *Transactions of the American Mathematical Society* **365** (2013), 2637–2679.
82. (with Y. Peres) The multiplicative golden mean shift has infinite Hausdorff measure, in *Further developments in fractals and related fields*, 193–212, Trends Math., Birkhäuser/Springer, New York, 2013.
83. (with A. Bufetov) Limit theorems for self-similar tilings, *Communications of Mathematical Physics* **319** (2013), no. 3, 761–789.
84. (with Y. Peres, J. Schmeling, S. Seuret) Dimensions of some fractals defined via the semi-group generated by 2 and 3, *Israel J. Math.* **199** (2014), no. 2, 687–709.
85. (with A. Bufetov) On the modulus of continuity for spectral measures in substitution dynamics, *Advances in Math.* **260** (2014), 84–129.

86. (with K. Medynets) Second order ergodic theorem for self-similar tiling systems, *Ergod. Th. & Dynam. Sys.* **34** (2014), no. 6, 2018–2053.
87. (with D. Damanik and A. Gorodetski) Absolutely continuous convolutions of singular measures and an application to the square Fibonacci Hamiltonian, *Duke Math. J.* **164** (2015), no. 8, 1603–1640.
88. Connectedness locus for pairs of affine maps and zeros of power series, *Journal of Fractal Geometry* **2** (2015), no. 3, 281–308.
89. (with P. Shmerkin) Absolute continuity of self-similar measures, their projections and convolutions, *Transactions of the American Math. Society* **368** (2016), 5125–5151.
90. (with P. Shmerkin) Absolute continuity of complex Bernoulli convolutions, *Math. Proc. Cambridge Philos. Soc.* **161** (2016), no. 3, 435–453.
91. (with A. Bufetov) The Hoelder property for the spectrum of translation flows in genus two, *Israel J. Math.*, to appear; arXiv:1501.05150.
92. (with M. Hochman) On the dimension of Furstenberg measure for  $SL_2(\mathbf{R})$ , *Inventiones Math.*, to appear; arXiv:1610.02641.
93. (with A. Bufetov) On ergodic averages for parabolic product flows, *Bulletin Société Mathématique de France*, to appear; arXiv:1612.09142.
94. (with A. Berlinkov) Singular substitutions of constant length, submitted; arXiv:1705.00899.