Michael Rubinstein, CV

Citizenship: Canadian. Born: 1971, Montreal.

Degrees

Ph.D.	Mathematics, Princeton University, June 1998. Peter Sarnak, advisor.
M.A.	Mathematics, Princeton University, June 1996.
B.A.	Mathematics, Princeton University, June 1994.

Appointments

2015–	Professor, University of Waterloo.
2008–2015	Associate Professor, University of Waterloo.
2003–2008	Assistant Professor, University of Waterloo.
2001–2003	Postdoc, American Institute of Mathematics, Palo Alto, California.
1999–2001	R.H. Bing Instructor, The University of Texas at Austin.
1998–1999	Postdoc, MSRI, Berkeley, California.
1998–1999	Postdoc, Hewlett-Packard, Palo Alto, California.
1994	Intern (summer), AT&T Bell Laboratories, Morgan Hill, New Jersey.

Institute Appointments

2013	Research Fellow (spring), ICERM, Providence, Rhode Island.
2011	Visiting Researcher (fall), CRM, Montreal.
2011	Lead organizer and Member (winter/spring), MSRI, Berkeley, California.
2009-2010	Member, Institute for Advanced Study, Princeton.
2004	Senior Visiting Fellow (winter/spring), Isaac Newton Institute, Cambridge, UK.

Organization (as co-organizer unless otherwise specified)

Program Organization

2015	Semester long program on Computational Aspects of the Langlands Program, ICERM.
2011	Lead organizer, half year program on Arithmetic Statistics, MSRI.

Conference/Workshop Organization

2015-11	Workshop on Computational Aspects of L-functions, ICERM.
2014-12	Lead organizer, conference on Analysis, Spectra, and Number Theory, Princeton, NJ.
2012-03	LMFDB workshop, U. of Bristol.
2011-09	FRG Data and Software Gathering III, U. of Bristol.
2011-04	Research conference on Arithmetic Statistics, MSRI.
2011-02	Organizer, FRG Data and Software Gathering II, MSRI.
2010-10	FRG Data and Software Gathering, Université de Paris 7.
2010-03	Workshop on Computational Aspects of L-functions and Automorphic Forms, CRM.
2009-07	Computation of Higher Degree L-functions, Benasque, Spain.
2009-02	Lead organizer, L-functions and Modular Forms III, Key West, Florida.
2008-07	Canadian Number Theory Association - Tenth Meeting, Waterloo.
2008-06	L-functions and Modular Forms II, University of Washington.
2007-08	L-functions and Modular Forms, American Institute of Mathematics.
2007-07	L-functions, Ranks of Elliptic Curves, and Random Matrix Theory, Banff.
2005-06	CMS session on Number Theory, University of Waterloo.
2005-06	Organizer, workshop on Number Theory and Random Matrix Theory, U. of Waterloo.
2003-10	AMS session on Computational Number Theory, Boulder, Colorado.

School Organization

2012-06 Lead organizer, Mathematical Research Community (for 40 students/postdocs) on Arithmetic Statistics, Snow Bird, Utah.
2011-01 Introductory workshop on Arithmetic Statistics, MSRI.
2009-06 Lead organizer, school (for 70 students/postdocs) on L-functions and Automorphic Forms: Computational Aspects, CRM.
2008-06 FRG school and coding sprint, University of Washington.

Grants/Awards

2014-12 Conference on Analysis, Spectra, and Number Theory, Princeton. Grants from: AIM, CMI, Fields Institute, NSF, Number Theory Foundation. $85,000 USD.
2013–2019 EPSRC L-functions and Modular Forms grant, project partner.
2014–2019 NSERC Discovery Grant. $90,000.
2009–2014 NSERC Discovery Grant. $80,000.
2008–2012 NSF Focused Research Group Grant, co-PI and project manager. $1,200,000 USD.
2008–2011 NSF SCREMS equipment grant, co-PI. $100,000 USD.
2009 Summer School on Computational Aspects of L-functions and Automorphic Forms, CRM. Grants from: CRM, ISM (UQAM), Fields Inst., NSF, U. of Waterloo. $90,000.
2004–2009 NSERC Discovery Grant. $75,000.
2008 Canadian Number Theory Association - Tenth Meeting. $15,000 USD from the NSF.
2005–2009 CFI and Ontario Innovation Trust, equipment grant, co-PI. $1,576,077.
2005 Workshop on Number Theory and Random Matrix Theory, University of Waterloo. Grants from: Fields Institute, Dean's Office, PIMS, Perimeter Institute. $18,000.
2002–2005 NSF DMS Grant. $69,000 USD.
1999–2001 Bing Fellowship at UT Austin.
1998–1999 Hewlett-Packard Fellowship at the MSRI.
1996–1998 NSERC PGS B Scholarship.
1994 Senior Thesis Prize.

Talks (* indicates a talk given as an organizer, at the request of co-organizers.)

2015-12 The Legacy of Bernhard Riemann After One Hundred and Fifty Years, TSIMF, Sanya, China.
2015-06 International Conference in Number Theory and Physics, IMPA.
2015-06 AMMCS session on Computational Number Theory, Waterloo, Ontario.
2014-12 Workshop on Families of Automorphic Forms and the Trace Formula, Banff.
2014-11 Colloquium, Tulane University, New Orleans, LA.
2014-09 Workshop on L-functions and Modular Forms, ICTP, Trieste, Italy.
2014-07 Challenges in 21st Century Experimental Mathematical Computation, ICERM, Providence, RI.
2014-06 Canadian Number Theory Association meeting, Ottawa, Ontario.
2014-05 Number Fields and Function Fields, Royal Society at Chicheley Hall, UK.
2014-05 Number theory seminar, Princeton University/IAS, Princeton, NJ.
2014-04 Colloquium, Morgan Stanley, Montreal.
2014-04 Number theory seminar, Ohio State University, Columbus, OH.
2013-11 Colloquium, York University, Toronto.
2013-09 Chaos and Chance: From Physics to Number Theory, University of Bristol, UK.
2013-06 Number theory session, CMS meeting, Halifax.
2013-05 CEDAR conference, UIC, Chicago, Illinois.
2013-04 Multiple Dirichlet Series seminar, ICERM, Providence, RI.

2013-01 Session on L-functions, AMS meeting, San Diego, CA.
2012-12 Analytic Number theory session, CMS meeting, Montreal.
2012-10 Colloquium, Ohio State University, Columbus, OH.
2012-09 Number theory session, AMS meeting, Rochester, NY.
2012-06 Canadian Number Theory Association meeting, Lethbridge, Alberta.
2011-12 Number theory session, CMS meeting, Toronto
2011-11 Minicourse (7.5 hours of lecture) on Number Theory and Random Matrix Theory, CRM.
2011-10 INRIA seminar, Bordeaux.
2011-01 Introductory workshop, MSRI.*
2011-06 Analytic Aspects of L-functions and Applications to Number Theory, U. of Calgary.
2010-03 Members' seminar, IAS.
2010-03 Workshop on Computational aspects of L-functions and automorphic forms, CRM.*
2009-07 Computation of Higher Degree L-functions, Benasque, Spain.*
2009-06 School: L-functions and Automorphic Forms: Computational Aspects (3 lectures), CRM.*
2008-12 Number theory session, CMS meeting, Ottawa.
2008-11 SAGE days 11, Austin.
2008-10 Quebec-Vermont Number theory seminar, Montreal.
2008-10 Colloquium, Université de Montréal.
2008-05 Journées Numération, Doppler Institute, Prague.
2008-03 Computing Arithmetic Spectra, AIM, Palo Alto, CA.
2007-10 Colloquim, Uppsala University, Sweden.
2007-10 Colloquium, University of Toronto.
2007-10 Number theory seminar, University of Oxford, UK.
2007-10 Number theory seminar, University of Bristol, UK.
2007-05 Applied Math seminar, Charles University, Prague.
2006-12 Probabilistic Methods in Analysis and Algebra, CMS meeting, Toronto.
2006-11 Mathematical Physics seminar, University of Bristol, UK.
2006-11 Number theory seminar, University of Ottawa.
2006-07 Canadian Number Theory Association - Ninth Meeting, Vancouver.
2006-06 Number Theory and Random Matrix Theory (four lectures), University of Rochester.
2006-05 Applications of Probability to Number Theory, Paris, France.
2006-02 L-functions and Related Themes, CRM.
2005-11 Probability seminar, University of Toronto.
2005-07 Foundations of Computational Mathematics, Santander, Spain.
2005-04 Number theory seminar, University of British Columbia.
2005-03 Number theory seminar, University of Toronto.
2004-12 Number theory session, CMS meeting, McGill University.
2004-11 Number theory seminar, John Hopkins University.
2004-07 Matrix Ensembles and L-Functions, Newton Institute, Cambridge, UK.
2004-04 Recent Perspectives in Random Matrix Theory and Number Theory (3 lectures), Newton Institute, Cambridge.
2004-02 Number theory seminar, University of Oxford, UK.
2004-02 Mathematical physics seminar, University of Bristol, UK.
2004-02 Workshop on Ranks of Elliptic Curves, Newton Institute, Cambridge.
2004-02 Spitalfields Day, Cambridge, UK.
2003-07 Explicit Methods in Number Theory, Oberwolfach, Germany.
2003-04 Quebec-Vermont Number theory seminar, Montreal.

2003-03 Plenary speaker, Number Theory and Combinatorics in Physics, U. of Florida.
2003-03 Colloquium, University of Waterloo.
2003-03 Colloquium, National University of Singapore.
2003-02 Colloquium, University of Pittsburgh.
2003-01 Colloquium, University of Toronto.
2003-01 Colloquium, Queen's University, Kingston.
2002-12 Number theory seminar, NYU.
2002-11 Colloquium, University of Rochester.
2002-10 American Mathematical Society Meeting, Brigham Young University.
2002-08 Foundations of Computational Mathematics, University of Minnesota, Minneapolis.
2002-05 Canadian Number Theory Association - Seventh Meeting, Montreal.
2002 Colloquium, San Jose State University, San Jose.
2002 Number theory seminar, Princeton/IAS.
2002 Number theory seminar, Penn State.
2001 West Coast Number Theory Conference, Asilomar, CA.
2001 Random Matrix theory seminar, Stanford University.
2001 Number theory seminar, University of Michigan.
2001 L-functions and Random Matrix Theory Workshop, American Institute of Math.
2000 Symposium, Tokyo University, Japan.
1999 Random Matrices and their Applications, MSRI, Berkeley, CA.
1999 Number theory seminar, University of Texas at Austin.
1998 Seminar, Keio University, Japan.
1997 Colloquium, Weizmann Institute, Israel.

Courses taught

2015 Complex Analysis, Linear Algebra.
2014 Elementary Number Theory, Applied Complex Analysis.
2013 Complex Analysis, Elementary Number Theory, Analytic Number Theory.
2012 Number Theory and Random Matrices, Elementary Number Theory, Linear Algebra.
2010 Complex Analysis, Rings and Fields, Linear Algebra.
2009 Analytic Number Theory.
2008 Number Theory and Random Matrices, Elem. Number Theory, Classical Algebra.
2007 Analytic Number Theory, Elementary Number Theory.
2006 Algebraic Number Theory, Linear Algebra.
2005 Elementary Number Theory, Classical Algebra.
2004 Rings and Fields, Classical Algebra.
2003 Analytic Number Theory, Classical Algebra.

Postdoc supervision

2008–2011 Ghaith Hiary.
2010–2011 Duc Khiem Huynh.
2011–2012 R. Rishikesh.

Student supervision

2014 Kaiyu Wu, URA (winter).
2012–2013 John Saunders, Master's.
2006–2011 R. Rishikesh, PhD.
2010 Alexander Mangerel, URA (fall).
2009–2010 Matthew Alderson, Master's.
2007–2009 Shuntaro Yamagishi, Master's.

2004–2005 Atul Pokharel, URA (summer), and Ralph Furmaniak, URA (year long).

Thesis examination

2014 External reader for the Phd thesis of Edva Roditty-Gershon, Tel-Aviv University.
2014 Examiner for Wenyong An's PhD thesis, University of Waterloo.
2012 Reader for Cassie Naymie's Masters thesis, University of Waterloo.
2012 Reader for Jennifer Smith's Masters thesis, University of Waterloo.
2012 Reader for Jungbae Nam's Masters thesis, Concordia University.
2010 Examiner for Pascal Molin's PhD thesis, Université Bordeaux I.
2008 Reader for Sourav Sen Gupta's Masters thesis, University of Waterloo.
2008 Reader for Lalit Jain's Masters thesis, University of Waterloo.
2007 External opponent for Helen Avelin's PhD thesis, Uppsala University.
2007 Thesis committee for Shengli Wu's PhD thesis, University of Waterloo.
2006 Thesis committee for Michael Neagu's PhD thesis, University of Waterloo.
2006 Reader for Stephanie Kleven's Masters thesis, University of Waterloo.
2004 Thesis committee for Jason Lucier's PhD thesis, University of Waterloo.
2003 Reader for Dan Wolczuck's Masters thesis, University of Waterloo.

Committees

2013–2016 University of Waterloo, graduate committee member.
2011–2013 University of Waterloo, scholarship committee member.
2004–2009 University of Waterloo, graduate committee member.
2005–2006 University of Waterloo, pure math colloquium chair.
2004–2008 University of Waterloo, computational math. colloquium committee member.
2003–2008 University of Waterloo, computing advisory committee member.

Publications

1. *Moments of zeta functions associated to hyperelliptic curves over finite fields* with Kaiyu Wu, 32 pages, accepted by Philosophical Transactions A of the Royal Society.
2. *The highest lowest zero of general L-functions* with Jonathan Bober, J. Brian Conrey, David W. Farmer, Akio Fujii, Sally Koutsoliotas, Stefan Lemurell, Hiroyuki Yoshida, Journal of Number Theory **147** (2015), 364-373.
3. *Computing the moment polynomials of the zeta function*, with S. Yamagishi, Mathematics of Computation **84** (2015), 425–454.
4. *Elliptic curves of high rank and the Riemann zeta function*, Experimental Mathematics, **22**, No. 4 (2013), 465–480.
5. *Identities for the Hurwitz zeta function, Gamma function, and L-functions*, Ramanujan Journal, Volume 32, Issue 3 (2013), 421–464.
6. *Chebotarev sets*, with H. Kisilevsky, 35 pages, accepted (subject to revision), Acta Arithmetica.
7. *The distribution of solutions to* $XY = N \mod a$ *with an application to factoring integers*, Integers, **13** (2013), A12, 1–13.
8. *Lower order terms for the moments of symplectic and orthogonal families of L-functions*, with I.P. Goulden, D.K. Huynh, and Rishikesh, Journal of Number Theory, **133** (2013), 639–674.
9. *Conjectures and experiments concerning the moments of* $L(1/2, \chi_d)$, with M. Alderson, Experimental Mathematics, **21** (2012), 307–328.
10. *Uniform asymptotics for the full moment conjecture of the Riemann zeta function*, with G.A. Hiary, Journal of Number Theory, **132** (2012), 820–868.
11. *Some identities for the Riemann zeta function*, Ramanujan Journal, (2012) **27** no. 1, 29–42.
12. *Uniform asymptotics of unitary moment polynomial coefficients*, with G. Hiary, Proceedings of the Royal Society A, **467** (2011), no. 2128, 1073–1100.
13. *Lower order terms in the full moment conjecture for the Riemann zeta function*, with J.B.

Conrey, D.W. Farmer, J.P. Keating, and N.C. Snaith, J. Number Theory, **128** (2008), 1516–1554.
14. *Secondary terms in the number of vanishings of quadratic twists of elliptic curve L-functions*, with J.B. Conrey, A. Pokharel, and M. Watkins, Proc. of Ranks of Elliptic Curves and Random Matrix, Cambridge University Press, 2007, 215–232.
15. *Discretization for odd quadratic twists*, with J.B. Conrey, N.C. Snaith, and M. Watkins, Proceedings of Ranks of Elliptic Curves and Random Matrix, Cambridge Univ. Press, 2007, 201–214.
16. *Random matrix theory and the Fourier coefficients of half-integral weight forms*, with J.B. Conrey, J.P. Keating, and N.C. Snaith, Experimental Mathematics, **15** (2006), no. 1, 67–82.
17. *Moments of the derivative of the Riemann zeta-function and of characteristic polynomials*, with J.B. Conrey, and N.C. Snaith, Communications in Math. Physics, **267** (2006), no. 3, 611–629.
18. *Integral moments of zeta- and L-functions*, with B. Conrey, D.W. Farmer, J.P. Keating, and N.C. Snaith. Proceedings of the London Mathematical Society, **91** (2005), 33–104.
19. *Computational methods and experiments in analytic number theory*. Recent Perspectives in Random Matrix Theory and Number Theory, London Mathematical Society Lecture Note Series **322** (2005), editors, F. Mezzadri and N. C. Snaith, Cambridge University Press, 425–506.
20. *Autocorrelation of Random Matrix Polynomials*, with B. Conrey, D.W. Farmer, J.P. Keating, and N.C. Snaith. Communications in Mathematical Physics **237** (2003), no. 3, 365–395.
21. *On the frequency of vanishing of quadratic twists of modular L-functions*, with J.B. Conrey, J.P. Keating, and N.C. Snaith. Proceedings of the Millennial Conference on Number Theory, editor, B.C. Berndt et al. A.K. Peters, Ltd, Boston **1** (2001), 301–316.
22. *Low lying zeros of L-functions and random matrix theory*, Duke Mathematical Journal **109** (2001), no. 1, 147–181.
23. *Zeros of Dirichlet L-functions near the real axis and Chebyshev's bias*, with C. Bays, K. Ford, R. Hudson. Journal of Number Theory **87** (2001), no. 1, 54–76.
24. *Jumping champions*, with A. Odlyzko, and M. Wolf. Experimental Mathematics **8** (1999), no. 2, 107–118.
25. *On the computation of modular polynomials for elliptic curves*, with I. Blake, J. Csirik, and G. Seroussi. Hewlett-Packard Laboratories technical report, (1999), 12 pages.
26. *The number of intersection points made by the diagonals of a regular polygon*, with B. Poonen. SIAM Journal on Discrete Mathematics **11** (1998), no. 1, 135–156.
27. *Evidence for a spectral interpretation of the zeros of L-functions*. Princeton Ph.D. thesis, (1998).
28. *On a conjecture of Helleseth regarding pairs of binary m-sequences*, with A.R. Calderbank, G. McGuire, and B. Poonen. IEEE Trans. on Information Theory **42** (1996), no. 3, 988–990.
29. *Chebyshev's bias*, with P. Sarnak. Experimental Mathematics **3** (1994), no. 3, 173–197.
30. *A simple heuristic proof of Hardy and Littlewood's conjecture B*, American Mathematical Monthly **100** (1993), no. 5, 456–460.
31. *A formula and a proof of the infinitude of primes*, American Mathematical Monthly **100** (1993), no. 4, 388–392.

Software

1. Author of `lcalc`, the L-function calculator, a `C++` class library and command line interface for computing zeros and values of L-functions.
2. Co-founder and managing editor of `www.lmfdb.org`, the online database of L-functions, modular forms, and related objects.