Curriculum Vitae
Ilia Binder
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I. Biographical information

Personal

Office	Home
Department of Mathematics	16 Thorndale Cres
University of Toronto	Toronto, ON M8X2S8
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Degrees

Ph.D., Mathematics   June 1997
  California Institute of Technology
  Thesis: "Rotational spectrum of planar domains"
  Advisor: **Dr. Nikolai G. Makarov**
B.Sc., M.S., Mathematics (with honours)   August 1992
  St. Petersburg State University
  Thesis: "A theorem on correction up to gradients of harmonic functions."
  Advisor: **Dr. Alexei B. Aleksandrov**

Employment and visiting positions

- Professor, University of Toronto   July 2015 – present
- Visiting Professor, Simons Center for
 Geometry and Physics, SUNY at Stony Brook   January-May, 2013
- Associate Professor, University of Toronto   July 2009 – July 2015
- Member, PCMI   July 2007
- Senior Core Scientist, IPAM   March – June, 2007
- Member, Kavli Institute for Theoretical Physics   August 2006
- Member, ESI, Vienna   July 2005
- Assistant Professor, University of Toronto   July 2004 – July 2009
- Visiting Assistant Professor, Yale   September 2002 – May 2003
- Member, Institut Mittag-Leffler   January-June 2002
- Assistant Professor,
 University of Illinois at Urbana-Champaign   August 2001 – August 2005
- Benjamin Peirce Assistant Professor,
 Harvard University   July 1997 – August 2001
- Member, Institute for Advanced Study   September 1998 – July 1999

Honours

- Alfred P. Sloan Foundation Fellowship   1996 - 1997
- Special Institute Fellowship, Caltech   Summers, 1993, 1996
- Tchebyshev Fellowship, St. Petersburg State University   1989-92
- All-Soviet Mathematical Olympiad for college students, Special Prize   1988
- International Mathematical Olympiad, Silver Medal   1987

Professional Activities

1. Organizer (with D. Beliaev, M. Russkikh, S. Smirnov) "Topics in Geometric Function Theory", Les Diablerets, Switzerland, February 11-16, 2018
2. Organizer (with I. Markina) "Connections Between Complex, Harmonic, and Stochastic Analysis", Fields Institute, Toronto, January 10-12, 2018
3. External peer reviewer for Ministry of Education and Science of the Russian Federation
4. Organizer (with L. Addario-Berry, B. Virag) "Random Growth Problems and Random Matrices", CRM, Montreal, September 2-6, 2016
5. Organizer (with N.-G. Kang, A. Poltoratski, S. Smirnov) "Everything is Complex", Saas-Fee, Switzerland, March 6-11, 2016.
6. Organizer (with J. Cardy, K. Khanin, G. Lawler, G, Slade, B, Virag, W. Werner), 2015 Fields Medal Symposium "Complex Analysis meets Statistical Physics. In honour of Stanislav Smirnov", Toronto, October 19-22, 2015
7. Organizer (with D. Zhan), Special Session on Conformal Geometry and Statistical Physics, AMS Sectional Meeting at Michigan State University in East Lansing, March 2015
8. External peer reviewer for European Research Council.
9. Organizer (with M. Yampolsky), Special Session in Holomorphic Dynamics and related topics, CMS Winter Meeting, December 2013
10. Organizer (with J. Cardy, A. Okounkov, P. Wiegmann), "Conformal Geometry Program", Simons Center for Geometry and Physics, January – May 2013
11. Organizer (with A. Abanov, E. Bettelheim, I. Gruzberg, S.-Y. Lee, A. Okounkov, and R. Teodorescu) of "Facets of Integrability" workshop, Simons Center for Geometry and Physics, January 21-27, 2013
12. Editor (with D. Kreimer), "Universality and Renormalization: From Stochastic Evolution to Renormalization of Quantum Fields", 404 pages, Fields Institute Communications (Book 50), AMS, 2007
13. Organizer (with S. Rohde) of ``Percolation, SLE, and related topics" workshop, Fields Institute, September 20 - 24, 2005
14. Organizer (with P. Jones, S. Rohde, M. Yampolsky) of "Dynamics, Probability, and Conformal Invariance" workshop, Banff, 2005
15. External peer reviewer for Finnish Academy of Sciences.
16. Peer reviewer for "Acta Matematika", "Advances in Mathematics", "Analysis and Mathematical Physics", "Annales Henri Poincaré", "Annals of

Probability", "Canadian Mathematical Journal", "Communications in Mathematical Physics", "Computational Methods and Function Theory", "International Math. Research Notices", "Duke Mathematical Journal", "Mathematische Annalen", "Memoirs of AMS", "Nonlinearity", "Physics A", "Potential Theory", "Transactions of AMS".

17. Consultant for *Revlon*, 2000

II. Academic History

Research Interests

My main interest is the application of the methods of the Geometric Function Theory to problems in Statistical Physics, the Theory of Probability, the Theory of Computational Complexity, and Dynamical Systems. More specifically, I am interested in the fine properties of the harmonic measure, Multifractal Analysis, Stochastic Loewner Evolution, and the critical models of Statistical Physics. I am also interested in computational properties of Riemann mappings and Dynamical Systems. Also, I am working on questions related to the quasi-periodic discrete Shroedinger and Jacobi operators.

Research Awards
- Project Fund for North America, Senter for internasjonalisering av utdanning (SIU), Norway, PNA-2015/10044 (193,000 NOK)   2016-2018
- NSERC DISCOVERY grant 5810-2014-06586 ($115,000) 2014-2019
- NSERC DISCOVERY grant 5810-2009-298433($80,000) 2009-2014
- Connaught New Faculty Matching Grant ($30,000)   2006
- NSERC DISCOVERY grant 5810-2004-298433($60,000) 2004-2009
- Research Board grant, UIUC   2001
- NSF grant DMS-9970283   1999-2002
- Clark and Cooke grants, Harvard   1997, 2000
- Tozier grant, Harvard   1997
- Bohnenblust Travel Prize, Caltech   1993 – 1995

III. Scholarly and Professional Work

Publications

Papers in refereed journals – published.

[1] (with D. Damanik, M. Lukic, and T. VandenBoom) "Almost Periodicity in Time of Solutions of the Toda Lattice". *C. R. Math. Rep. Acad. Sci. Canada* Vol. 40 (1) 2018, pp. 1-28.

[2] (with D. Kinzebulatov and M. Voda) "Non-Perturbative Localization with Quasiperiodic Potential in Continuous Time". *Communications in Mathematical Physics*, 2017, Volume 351, Issue 3, pp. 1149-1175.

[3] (with M. Goldstein and M. Voda) "On the Sum of the Non-Negative Lyapunov Exponents for Some Cocycles Related to the Anderson Model", *Ergodic Theory and Dynamical Systems*, 2017, Volume 37, Issue 2, pp. 369-388

[4] (with T. Alberts and F. Viklund) "A Dimension Spectrum for SLE Boundary Collisions", *Communications in Mathematical Physics,* 2016, Volume 343, Issue 1, pp 273-298.

[5] (with M. Goldstein and M. Voda) "On fluctuations and localization length for the Anderson model on a strip", *Journal of Spectral Theory,* Volume 5, Issue 1, 2015, pp. 193–225.

[6] (with L. Chayes and H. K. Lei) "On the Rate of Convergence for Critical Crossing Probabilities", *Annales de l'Institut Henri Poincaré - Probabilités et Statistiques*, 2015, Vol. 51, No. 2, 672–715

[7] (with C. Rojas and M. Yampolsky) "Non-Computable impressions of computable external rays of quadratic polynomials", *Communications in Mathematical Physics.* Volume 335, Issue 2 (2015), Page 739-757.

[8] (with C. Rojas and M. Yampolsky) "Computable Caratheodory Theory", *Advances in Mathematics,* Volume 265, 10, November 2014, Pages 280–312.

[9] (with M. Voda) "On Optimal Separation of Eigenvalues for a Quasiperiodic Jacobi Matrix", *Communications in Mathematical Physics,* 2014, Volume 325, Number 3, Pages 1063-1106.

[10] (with M. Voda) "An Estimate on the Number of Eigenvalues of a Quasiperiodic Jacobi Matrix of Size n Contained in an Interval of Size n^{-C}", Journal *of Spectral Theory,* pp. 1-45*,* Volume 3, Issue 1, 2013.

[11] (with M. Braverman) "The rate of convergence of the Walk on Spheres Algorithm", *Geometric and Functional Analysis.* Volume 22, Issue 3 (2012), Page 558-587.

[12] (with M. Braverman, C. Rojas, M. Yampolsky)" Computability of Brolin-Lyubich Measure", *Communications in Mathematical Physics,* 2011, Volume 308, Number 3, Pages 743-771.

[13]   (with L. Chayes and H. K. Lei)" On Convergence to SLE_6 II: Discrete Approximations and Extraction of Cardy's Formula for General Domains", *Journal of Statistical Physics,* 141 (2010), no. 2, 359–390.

[14] (with L. Chayes and H. K. Lei)" On Convergence to SLE_6 I: Conformal Invariance for Certain Models of the Bond--Triangular Type", *Journal of Statistical Physics,* 141 (2010), no. 2, 391–408.

[15] "Phase transition for the universal bounds on the integral means spectrum", *Nonlinearity,* 22 (2009), 1857-1867

[16] (with B. Duplantier)"*Harmonic* Measure and Winding of Random Conformal Paths: A Coulomb Gas Perspective", *Nuclear Physics B*, Volume **802** (2008), Issue 3, p. 494-513

[17] (with M. Braverman and M.Yampolsky) "On computational complexity of the Riemann mapping", *Arkìv för matematik,* **45** (2007), no. 2, 221—239

[18] (with M. Braverman and M.Yampolsky) "Filled Julia sets with empty interior are computable", *Foundations of Computational Mathematics*, **7** (2007), no. 4, 405--416.

[19] (with M. Braverman and M.Yampolsky) "On computational complexity of Siegel Julia sets", *Communications in Mathematical Physics,* **264** (2006), no. 2, 317--334

[20] (with N. Makarov and S. Smirnov)"Harmonic measure and polynomial Julia sets", *Duke Mathematical Journal* **117** (2003), no. 2, 343--365

[21] (with L. DeMarco) "Dimension of pluriharmonic measure and polynomial endomorphisms of $\mathbf{C}^n$", *International Math Research Notes* **2003:11** (2003) 613 - 625

[22] (with B. Duplantier) "Harmonic Measure and Winding of Conformally Invariant Curves", *Physical Review Letters* **89**, 264101 (2002).

[23] "A theorem on correction up to gradients of harmonic functions." *St.-Petersburg Math. Journal*, 5 (1994), no. 2, 91--107.

[24] "On weak convergence of charges", *Vestnik Leningrad Univ*. Math. **24** (1991), no. 1, 13--18.

Papers in refereed journals – accepted.

[25]   (with C. Rojas and M. Yampolsky) "Caratheodory convergence and harmonic measure", 10 pages. *To appear in Potential Analysis*.

[26] (with D. Damanik, M. Goldstein, and M. Lukic) "Almost periodicity in time of solutions of the KdV equation". 48 pages. *To appear in Duke Mathematical Journal.*

Papers in refereed conference proceedings – published

[27] (with M. Braverman) "The complexity of simulating Brownian Motion". *Proceedings of the Twentieth ACM-SIAM Symposium on Discrete Algorithms,* (2009), p. 58-67.

[28] (with M. Braverman) "Derandomization of Euclidean Random Walks", Lecture Notes in Computer Science, Springer Berlin / Heidelberg, Volume **4627**/2007, Pages 353-365.

Other refereed work
[29] "Rotational spectrum of planar domains", Ph.D. Thesis, 1997.

Books – edited.
[30] (with D. Kreimer, editor) "Universality and Renormalization: From Stochastic Evolution to Renormalization of Quantum Fields", 404 pages, Fields Institute Communications (Book 50), AMS, 2007

Submitted papers
[31]   (with D. Damanik, M. Goldstein, and M. Lukic) "KdV equation with almost periodic initial data". 7 pages. *Submitted.*

Preprints and work in progress
[32] "Harmonic measure and rotation of simply connected planar domains", 24 pages, preprint, 2008. Available at http://www.math.toronto.edu/ilia/Research/sc.pdf.
[33] "Asymptotic expansion for the integral mixed spectrum of the basin of attraction of infinity for the polynomials $z(z+\delta)$", 9 pages, preprint, 2008. Available at http://www.math.toronto.edu/ilia/Research/quadr.pdf.

Recent invited seminar and colloquium talks
[1] Rice University (Colloquium, 1 hour)   2018
[2] University of St. Petersburg, St. Petersburg, Russia
    (Chebyshev Laboratory Seminar, 1.5 hours)   2018
[3] Sirius Center, Sochi, Russia (Seminar, 1.5 hours)   2018
[4] Universite Laval (Analysis Seminar, 1 hour)   2017
[5] KTH Stockholm (Dynamics/Probability Seminar, 1 hour)   2017
[6] Northwestern University (Summer School in Analysis, 4.5 hours) 2017
[7] University of Bergen (Analysis and Probability, mini-course, 8 hours) 2017
[8] University of Toronto (Dynamics Leaning seminar, mini-course, 2 hours) 2017
[9] University of Western Ontario (Analysis Seminar, 1 hour)   2014
[10]   SUNY at Stony Brook (Dynamics Seminar, 1 hour)   2013
[11]   SUNY at Stony Brook (Colloquium, 1 hour)   2013
[12]   University of St. Petersburg, Russia
    (Chebyshev Laboratory Seminar, 1 hour)   2012

Invited Conference talks
[1] CMS Summer 2018 meeting, Ergodic Theory, Dynamical systems,
    Fractals and Applications section, 20 minutes   2018
[2] Workshop "Connections Between Complex, Harmonic,
    and Stochastic Analysis", Fields Institute, 1 hour   2018
[3] Workshop on Analysis and Probability, Bozeman, MT, 1 hour   2017
[4] 2017 Global Research Symposium "Geometry, Analysis and Probability",
    Seoul, 45 minutes   2017

[5] CMS Winter meeting 2016, Niagara Falls, ON
    Complex Analysis and Applications Section, 20 minutes   2016
[6] CMS Winter meeting 2016, Niagara Falls, ON
    Fractal Geometry, Analysis, and Applications Section, 20 minutes   2016
[7] World Congress in Probability and Statistics, Toronto, 30 minutes   2016
[8] "Geometric Analysis in Control and Vision Theory",
            Voss, Norway, 50 minutes   2016
[9] "Computation in Dynamics", ICERM, Providence, RI, USA, 35 minutes   2016
[10] Statistical Mechanics Workshop, Diablerets, Switzerland, 1 hour   2016
[11] Banff workshop "Computability, Analysis, and Geometry", 45 minutes   2015
[12] Workshop on Conformal Mating, Bozeman, MT, 3 one-hour talks   2014
[13] XXIII St. Petersburg Summer Meeting in Mathematical Analysis,
    St. Petersburg, Russia; 45 minutes   2014
[14] 2014 Barrett Memorial Lectures, Knoxville, TN, 1 hour   2014
[15] CMS Winter meeting 2013, Ottawa, ON
    Holomorphic Dynamics and related fields Section, 30 minutes   2013
[16] CMS Winter meeting 2013, Ottawa, ON
    Analysis and Geometry Section, 1 hour   2013
[17] Conformal Invariance in Continuous and Discrete Systems,
    Simons Center for Geometry and Physics, Stony Brook, NY, 1 hour   2013
[18] Workshop "Carpets, CLE and Dessins", Seattle, WA, 2 hours   2012
[19] 2012 AMS Central Regional Meeting, Lawrence, KS, 20 minutes   2012
[20] 2011 CMS Winter Meeting, Toronto, ON, 25 minutes   2011
[21] Probabilistic Methods in Geometry and Analysis, UCLA, 2 hours   2011
[22] Second Bavaria-Québec Mathematical Meeting,
    Wuerzburg, Germany, plenary talk, 1 hour   2010
[23] Workshop on Discrete and Complex Analysis, Bozeman, MT, 2 hours   2010
[24] IPAM Random Shapes reunion conference, Arrowhead, CA, 1 hour   2009
[25] 2009 CMS Winter Meeting, Windsor, ON, 25 minutes   2009
[26] Workshop on computational dynamics/geometry/topology,
    Fields Institute, 1 hour   2009
[27] Modern Complex Analysis and Operator Theory and Applications, IV,
    El Escorial, Spain, 1 hour   2009
[28] Workshop "Stochastic Loewner Evolution and Scaling Limits",
    Montreal, QC, 30 minutes   2008
[29] Second Canada-France Congress, Montreal, QC, 1 hour   2008
[30] IPAM Arrowhead conference, Arrowhead, CA, 30 minutes   2007
[31] Random Shapes, Representation Theory, and Conformal Field Theory,
    UCLA, 1 hour   2007
[32] IPAM Random Shapes Tutorials, UCLA, 2 one hour talks   2007
[33] CMS Winter 2006 Meeting, Toronto, ON, 30 minutes   2006
[34] Nonlinear Dynamics, Chaos, and Applications   2006
[35] 1st Joint CMS-SFR Meeting, Montreal, QC   2004

[36] AMS Meeting, Columbus, Ohio   2004

[37] Scaling in Probability and PDE, Strobl, Austria   2002

[38] Probability and Conformal Mappings, Tenerife, Spain   2002

[39] Euroconference in Geometric Function Theory   2000

[40] Barrett Memorial Lectures, University of Tennessee   1998

[41] "Ergodic theory and dynamical systems", Warsaw, Poland   1995

[42] Semi-annual Workshop in Dynamical Systems, Penn State   1995