

DMITRY CHELKAK – CURRICULUM VITAE

• **General:**

- Name: **Dmitry Chelkak**
- Birthday/place: Jan 1979/St. Petersburg (former Leningrad), Russian Federation
- Citizenship: Russian Federation
- Languages: Russian (native), English (fluent), French (intermediate)
- E-mail address: **dmitry.chelkak@ens.fr**, **dchelkak@pdmi.ras.ru**
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École Normale Supérieure, 45 rue d’Ulm
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• **Employment:**

- 2016/17–... : professor, ENS-MHI Chaire, École Normale Supérieure (Paris, France)
- 2015/16 : visiting professor, University of Geneva
- 2014/15 : senior fellow, Institute for Theoretical Studies, ETH Zürich
- 2009 – ... : [on leave since 2014] senior researcher, Mathematical Analysis Laboratory
at St. Petersburg Department of Steklov Institute (PDMI RAS)
- 2010–2014: Chebyshev Laboratory at St. Petersburg State University (SPbSU)
- 2006/07 : senior research assistant (group of S. Smirnov), University of Geneva
- 2004–2010 : docent (associate prof.), SPbSU, Department of Mathematical Analysis

• **Education:**

- Dec 2003: PhD (PDMI RAS, St. Petersburg, co-advisors: P. Kargaev & E. Korotyaev)
Title: “*Inverse problem for harmonic oscillator perturbed by potential*”
- 2000 – 2003: Post-graduate (SPbSU & Potsdam University, Germany)
- 1995 – 2000: SPbSU (St. Petersburg State University), *diploma with honors*

• **Awards:**

- 2014: Salem Prize
- 2013: Independent University of Moscow Award (research grant for 2013)
- 2008: Pierre Deligne Contest Award (research scholarship for 2009–2011)
- 2004: “Young Mathematician” Prize of the St. Petersburg Math. Society
- 2000: Euler scholarship, SPbSU & Heidelberg University
- 1995: Gold Medal of IMO (36th Int. Math. Olympiad of schoolpupils)

• **Selected Talks and Mini-Courses:**

- 39th Conference on Stochastic Processes and Their Applications, Moscow, July 2017:
plenary talk “*2D Ising model: correlations, interfaces and a priori estimates*”
- 7th European Congress of Mathematics, Berlin, July 2016:
invited talk “*2D Ising model: correlations via boundary value problems*”
- “Conformal geometry” program at SCGP, Stony Brook, Spring 2013:
mini-course “Spin correlations in the planar Ising model via fermionic observables”;
- Young European Probabilists 2012 Workshop “Two-dimensional statistical mechanics”,
Eindhoven: *mini-course “Discrete complex analysis on the microscopic level”*;
- IMS 2010 (Institute of Mathematical Statistics 73rd Annual Meeting, Gothenburg):
invited session talk “*Critical 2D Ising model: convergence of interfaces and universality*”

• **Research Interests:** Analysis, Mathematical Physics, Probability (especially in 2D)

• **Research Visits (one month and more):**

- Mar/Apr 2014: ETH, Zurich
- Feb–Mar 2013: SCGP, Stony Brook (“Conformal geometry” program)
- Oct–Nov 2012: University of Geneva
- May 2011 : CRM, Barcelona (“Complex analysis and spectral problems” term)
- Sep–Oct 2010: IHES, Bures-sur-Yvette
- Jul–Aug 2008: MFO, Oberwolfach (Oberwolfach-Leibniz-Fellowship)
- Jan & Jul 2006: Humboldt University, Berlin
- Oct–Dec 2005: Mittag-Leffler Institute, Djursholm (“Wave motion” term)

• **Administrative Activity:**

- *Chebyshev Lab at SPbSU* (established in Dec 2010 under the “megagrant” project of the Russian Federation Government, principal investigator: Prof. Stanislav Smirnov):
Spring 2011: vice head, Fall 2011: acting head.

• **Other Services to the Community:**

- 2012: Summer School “*St. Petersburg School in Probability and Statistical Physics*”, member of the Organizing Committee (June 18–29, 2012, 150+ participants);
- 2009–2014: member of the St. Petersburg Mathematical Society Council;
- reviewer for a number of mathematical and physical journals.

• **Selected papers:**

- Dmitry Chelkak, Robust discrete complex analysis: a toolbox, *Ann. Probab.* 44 (2016), no. 1, 628–683.
- Dmitry Chelkak, Clément Hongler, Konstantin Izyurov, Conformal invariance of spin correlations in the planar Ising model, *Ann. Math.* 181 (2015), no. 3, 1087–1138.
- Dmitry Chelkak, Stanislav Smirnov, Universality in the 2D Ising model and conformal invariance of fermionic observables, *Invent. Math.*, 189 (2012), no. 3, 515–580.
- Weyl-Titchmarsh functions of vector-valued Sturm-Liouville operators on the unit interval. Chelkak, D.; Korotyaev, E.: *J. Funct. Anal.* 257 (2009), 1546–1588.
- Inverse problem for harmonic oscillator perturbed by potential, characterization. Chelkak, D.; Kargaev, P.; Korotyaev, E.: *Comm. Math. Phys.* 249 (2004), no. 1, 133–196.

DMITRY CHELKAK – LIST OF PUBLICATIONS

• **Preprints:**

- (1) Dmitry Chelkak, 2D Ising model: correlation functions at criticality via Riemann-type boundary value problems. [arXiv:1605.09035](#), prepared for *Proceedings of the 7ECM*
- (2) Dmitry Chelkak, Alexander Glazman, Stanislav Smirnov, Discrete stress-energy tensor in the loop $O(n)$ model. [arXiv:1604.06339](#)
- (3) Dmitry Chelkak, David Cimasoni, Adrien Kassel, Revisiting the combinatorics of the 2D Ising model. [arXiv:1507.08242](#), to appear in *Annales de l'Institut Henri Poincaré D, Combinatorics, Physics and their Interactions*

• **Published:**

- (4) Dmitry Chelkak, Robust discrete complex analysis: a toolbox, *Ann. Probab.* 44 (2016), no. 1, 628–683.
- (5) Dmitry Chelkak, Hugo Duminil-Copin, Clément Hongler, Crossing probabilities in topological rectangles for the critical planar FK Ising model, *Electron. J. Probab.*, 21 (2016), paper no. 5, 28pp.
- (6) Dmitry Chelkak, Clément Hongler, Konstantin Izyurov, Conformal invariance of spin correlations in the planar Ising model, *Ann. Math.* 181 (2015), no. 3, 1087–1138.
- (7) Dmitry Chelkak, Hugo Duminil-Copin, Clément Hongler, Antti Kemppainen, Stanislav Smirnov, Convergence of Ising interfaces to Schramm's SLE curves, *C. R. Acad. Sci. Paris, Ser. I* 352 (2014), 157–161.
- (8) Dmitry Chelkak, Konstantin Izyurov, Holomorphic spinor observables in the critical Ising model, *Comm. Math. Phys.* 322 (2013), no. 2, 303–332.
- (9) Dmitry Chelkak, Stanislav Smirnov, Universality in the 2D Ising model and conformal invariance of fermionic observables, *Invent. Math.*, 189 (2012), no. 3, 515–580.
- (10) Dmitry Chelkak, Stanislav Smirnov, Discrete complex analysis on isoradial graphs, *Advances in Mathematics*, 228 (2011), no. 3, 1590–1630.
- (11) An application of the fixed point theorem to the inverse Sturm-Liouville problem. Chelkak, D.: *Записки научных семинаров ПОМИ*, 370 (2009), 203–218.
English translation: *J. Math. Sci.* 166 (2010), no. 1, 118–126.
- (12) Обратная задача Штурма-Лиувилля со смешанными краевыми условиями, Е. Л. Коротяев, Д. С. Челкак: *Алгебра и анализ*, 21 (2009), no. 5, 114–137.
English translation: *St. Petersburg Math. J.* 21 (2010), no. 5, 761–778.
- (13) Weyl-Titchmarsh functions of vector-valued Sturm-Liouville operators on the unit interval. Chelkak, D.; Korotyaev, E.: *Journal of Functional Analysis* 257 (2009), 1546–1588.
- (14) The inverse problem for perturbed harmonic oscillator on the half-line with a Dirichlet boundary condition. Chelkak, D.; Korotyaev, E.: *Ann. Henri Poincaré* 8 (2007), no. 6, 1115–1150.
- (15) Parametrization of the isospectral set for the vector-valued Sturm-Liouville problem. Chelkak, D.; Korotyaev, E.: *Journal of Functional Analysis* 241 (2006), 359–373.
- (16) Spectral estimates for Schrodinger operator with periodic matrix potential on the real line. Chelkak, D.; Korotyaev, E.: *Int. Math. Res. Not.*, 2006, Article ID 60314, 1–41.

DMITRY CHELKAК – LIST OF PUBLICATIONS (CONTINUED)

- (17) Inverse problem for harmonic oscillator perturbed by potential, characterization. Chelkak, D.; Kargaev, P.; Korotyaev, E.: *Comm. Math. Phys.* 249 (2004), no. 1, 133–196.
- (18) Inverse problem for harmonic oscillator perturbed by potential. Chelkak, D.; Kargaev, P.; Korotyaev, E.: Inverse problems and spectral theory, 93–102, *Cont. Math.* 348, AMS, Providence, RI, 2004.
- (19) Асимптотика спектральных данных гармонического осциллятора, возмущенного потенциалом с конечной энергией. Д. С. Челкак: *Зап. Науч. Сем. ПОМИ* 303 (2003) 223–271. English translation: *J. Math. Sci.* 129 (2005), no. 4, 4053–4082.
- (20) Аппроксимация в пространстве спектральных данных возмущенного гармонического осциллятора. Д. С. Челкак: *Проблемы Мат. Анализа* 26 (2003) 287–300. English translation: *J. Math. Sci.* 117 (2003), no. 3, 4260–4269.
- (21) An inverse problem for an harmonic oscillator perturbed by potential: uniqueness. Chelkak, D.; Kargaev, P.; Korotyaev, E.: *Lett. Math. Phys.* 64 (2003), no. 1, 7–21.

Talks at research conferences, workshops etc:

- *2017:*
 - SPA–2017 (39th Conference on Stochastic Processes and Their Applications), Moscow (invited talk);
 - Les probabilités de demain, l'édition 2017, IHÉS, Bures-sur-Yvette;
- *2016:*
 - IESC Workshop “Quantum integrable systems, conformal field theories and stochastic processes”, Cargese (France);
 - INFN Workshop “Condensed Matter and Critical Phenomena”, Frascati (Italy);
 - 7th European Congress of Mathematics, Berlin (invited talk, “Applied Mathematics and Probability” section);
 - “8th St. Petersburg Conference in Spectral Theory (dedicated to the memory of M.Sh.Birman)”, St. Petersburg (Russia);
 - “25th St.Petersburg Summer Meeting in Mathematical Analysis: Tribute to Victor Havin, 1933-2015”, St. Petersburg (Russia);
 - Institut Henri Poincaré Workshop “Inhomogeneous Random Systems”, Paris (France);
- *2015:*
 - Genève–Grenoble–Lyon Probability Day, Grenoble (France);
 - 2015 Fields Medal Symposium “Complex Analysis meets Statistical Physics” in honour of Stanislav Smirnov, Toronto (Canada);
 - 2015 Charles River Lectures on Probability Theory and Related Topics, Cambridge, MA (USA);
 - National Center of Competence in Research SwissMAP annual meeting, Engelberg (Switzerland);
 - Oberwolfach Workshop “Discrete Differential Geometry”, Oberwolfach (Germany);
 - “Topics in Low-Dimensional Statistical Mechanics”, Les Diablerets (Switzerland);
 - INI Workshop “Conformally Invariant Scaling Limits”, Cambridge (UK);
- *2014:*
 - BIRS Workshop “Probability on Trees and Planar Graphs”, Banff (Canada);
 - MAC2 Workshop “Two-Dimensional Random Critical Models”, Paris (France);
 - “6th St. Petersburg Conference in Spectral Theory (dedicated to the memory of M.Sh.Birman)”, St. Petersburg (Russia);
- *2013:*
 - “Russian-Chinese Seminar on Asymptotic Methods in Probability Theory and Mathematical Statistics”, St. Petersburg (Russia);
 - “Two-Dimensional Statistical Mechanics”, Les Diablerets (Switzerland);
- *2012:*
 - Oberwolfach Workshop “Scaling Limits in Models of Statistical Mechanics”, Oberwolfach (Germany);
 - Oberwolfach Workshop “Discrete Differential Geometry”, Oberwolfach (Germany);
 - “Conformal Invariance, Discrete Holomorphicity and Integrability”, Helsinki (Finland);
 - “Statistical Mechanics and Conformal Invariance”, Berkeley (USA);
 - MIAN-PDMI Winter Workshop “Probability and Functional Analysis”, Moscow (Russia);

DMITRY CHELKAK – LIST OF CONFERENCE TALKS, MINI-COURSES ETC (CONTINUED)

- 2011:
 - “Random Processes, Conformal Field Theory and Integrable Systems”, Moscow (Russia);
 - “Geometry Days in Novosibirsk, 2011”, Novosibirsk (Russia);
 - “3rd St. Petersburg Conference in Spectral Theory (dedicated to the memory of M.Sh.Birman)”, St. Petersburg (Russia);
 - “3rd Northern Triangular Seminar”, St. Petersburg (Russia);
- 2010:
 - “73rd Annual Meeting of the Institute of Mathematical Statistics”, Gothenburg (Sweden), invited session “Scaling limits and conformal invariance”;
 - “Conformal Structures and Dynamics” (CODY-2010), Seillac (France);
- 2009:
 - “Conformal Structures and Dynamics” (CODY-2009), Będlewo (Poland);
 - “International Conference in Spectral Theory dedicated to the memory of M.Sh.Birman”, St. Petersburg (Russia);
 - “33rd Conference on Stochastic Processes and Their Applications”, Berlin (Germany), invited special session “Schramm-Loewner Evolution”;
- 2008:
 - “Geometry and Integrability”, Obergurgl (Austria)
 - “Differential equations, Function spaces, Approximation theory” dedicated to the 100th anniversary of the birthday of S.L.Sobolev, Novosibirsk (Russia);
 - “17th St. Petersburg meeting in Mathematical Analysis”, St. Petersburg (Russia);
 - ESF Conference “Operator Theory, Analysis and Mathematical Physics”, Będlewo (Poland);
 - Oberwolfach Workshop “Stochastic Analysis”, Oberwolfach (Germany);
- 2007:
 - Bilateral French-Russian Seminar “Asymptotic methods in spectral theory and applications”, St. Petersburg (Russia);
- 2005:
 - Workshop “Mathematical models of nanostructures: spectral problems and scattering properties”, Berlin (Germany);
- 2003:
 - Workshop “Spectral problems for Schrödinger-type operators II”, Berlin (Germany);
 - “12th St. Petersburg Meeting in Mathematical Analysis”, St. Petersburg (Russia).

Invited mini-courses:

- 2013:
 - Summer School “Modern Mathematics”, Dubna (Russia): “*Planar random walks and their limits: simple random walk, LERW and SAW*”
 - Simons Center for Geometry and Physics, Stony Brook (USA), “Conformal geometry” Program: “*Spin correlations in the planar Ising model via fermionic observables*”;
 - Moscow Independent University, Moscow (Russia): “*Spin correlations in the planar Ising model: fermionic observables and orthogonal polynomials on the unit circle*”, “*Extremal length: classical and discrete setups*”;
- 2012:
 - Young European Probabilists 2012 (YEP IX) Workshop on “Two-dimensional statistical mechanics”, Eindhoven (Netherlands): “*Discrete complex analysis on the microscopic level: conformal invariants without conformal invariance*”;

DMITRY CHELKAK – LIST OF CONFERENCE TALKS, MINI-COURSES ETC (CONTINUED)

- 2009:
 - Tel-Aviv University (Israel): “*Conformal invariance in the 2D Ising model*”;
- 2008:
 - “3rd La Pietra School in Probability”, Firenze (Italy): joint mini-course with Stanislav Smirnov “*SLE and conformal invariance for critical Ising model*”.

Research seminars, colloquia etc:

- 2017:
 - Colloquium de Marne (Université Paris-Est – Marne-la-Vallée, France);
- 2016:
 - University of Helsinki (Finland);
- 2015:
 - ENS, Paris (France); Augsburg Math Colloquium, Augsburg (Germany); Aalto University Math Colloquium, Helsinki (Finland); King’s College, London (UK); University of Oxford, Oxford (UK);
- 2014:
 - ITS Science Colloquium, Zurich (Switzerland); Hypathie seminar, Marseille (France); Technische Universität Berlin (Germany); University of Zurich (Switzerland);
- 2013:
 - University of British Columbia, Vancouver (Canada); Columbia University, New York (USA); University of Helsinki (Finland);
- 2012:
 - University of Helsinki (Finland); NTNU, Trondheim (Norway); Texas A&M University, College Station (USA); Arizona State University, Phoenix (USA);
- 2011:
 - Moscow Independent University: “Globus” Seminar, Moscow (Russia); Sobolev Institute of Mathematics, Novosibirsk (Russia); CRM, Barcelona (Spain);
- 2010:
 - Helsinki University (Finland); Université Paris XIII (France);
- 2009:
 - Université Paris VI, Université de Provence, Marseille (France); Moscow Independent University: “Globus” Seminar (Russia); Moscow Mathematical Society Meeting (Russia); Université de Genève (Switzerland);
- 2008:
 - Humboldt Universität zu Berlin (Germany); Technische Universität Berlin (Germany);
- 2007,2006:
 - Humboldt Universität zu Berlin (Germany);
- 2005:
 - Mittag-Leffler Institute, Djursholm (Sweden); Lund University (Sweden);
- 2004:
 - London Analysis Seminar, Cardiff University, Bristol University, Loughborough University (UK); KTH, Stockholm (Sweden);
- 2002–2003:
 - Potsdam University (Germany).