

DMITRY CHELKAK – CURRICULUM VITAE

• **General:**

- Name: **Dmitry Chelkak**
- Birthday/place: Jan 1979/St. Petersburg (former Leningrad), Russian Federation
- Citizenship: Russian Federation
- Family status: married, two children: Aleksandra(2006), Mikhail(2017)
- Languages: Russian (native), English (fluent), French (intermediate)
- E-mail address: **dmitry.chelkak@ens.fr**, **dchelkak@pdmi.ras.ru**
- Postal address: Département de Mathématiques et Applications
École Normale Supérieure, 45 rue d’Ulm
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• **Employment:**

- 2016/17 [–2020/21]: professor, ENS-MHI Chaire, École Normale Supérieure (Paris)
- 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
- 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:**

- 2018 International Congress of Mathematicians, Rio de Janeiro, August 2018:
invited talk “*Planar Ising model at criticality: state-of-the-art and perspectives*”
 (“Analysis and Operator Algebras” & “Probability and Statistics” sections)
- 7th European Congress of Mathematics, Berlin, July 2016:
invited talk “*2D Ising model: correlations via boundary value problems*”
 (“Applied Mathematics and Probability” section);
- “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”*;

• **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’ program of the Russian Federation Government, project leader: 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.

• **Research grants:**

- Paris 2019–2022: member of the ANR project DIMERS (Paris–Lyon, PI: C. Boutillier)
- St. Petersburg 2010–2012: principal member of the ‘megagrant’ 11.G34.31.0026 of the Russian Federation Government (~1M\$ per year, project leader: S. Smirnov).
- St. Petersburg 2008–2012: several starting grants: MK-4306.2008.1, MK-7656.2010.1, Pierre Deligne Contest Award (research scholarship for 2009-2011).

• **Selected papers:**

- Dmitry Chelkak, Planar Ising model at criticality: state-of-the-art and perspectives. In *Proceedings of the International Congress of Mathematicians 2018 (ICM 2018)*, Vol. 3, pages 2789–2816. World Scientific Publishing Company Inc., 2019
- 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) Mikhail Basok, Dmitry Chelkak, Tau-functions à la Dubédat and probabilities of cylindrical events for double-dimers and CLE(4). [arXiv:1809.00690](#).
- (2) Dmitry Chelkak, Alexander Glazman, Stanislav Smirnov, Discrete stress-energy tensor in the loop $O(n)$ model. [arXiv:1604.06339](#).

• **Published:**

- (3) Dmitry Chelkak, Planar Ising model at criticality: state-of-the-art and perspectives. In *Proceedings of the International Congress of Mathematicians 2018 (ICM 2018), Vol. 3*, pages 2789–2816. World Scientific Publishing Company Inc., 2019
- (4) Dmitry Chelkak, 2D Ising model: correlation functions at criticality via Riemann-type boundary value problems. In *European Congress of Mathematics: Berlin, 18-22 July, 2016*, pages 235–256. European Mathematical Society, Zürich, 2018.
- (5) Dmitry Chelkak, David Cimasoni, Adrien Kassel, Revisiting the combinatorics of the 2D Ising model, *Ann. Inst. Henri Poincaré D* 4 (2017), no. 3, 309–385.
- (6) Dmitry Chelkak, Robust discrete complex analysis: a toolbox, *Ann. Probab.* 44 (2016), no. 1, 628–683.
- (7) 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.
- (8) Dmitry Chelkak, Clément Hongler, Konstantin Izyurov, Conformal invariance of spin correlations in the planar Ising model, *Ann. Math.* 181 (2015), no. 3, 1087–1138.
- (9) 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.
- (10) Dmitry Chelkak, Konstantin Izyurov, Holomorphic spinor observables in the critical Ising model, *Comm. Math. Phys.* 322 (2013), no. 2, 303–332.
- (11) Dmitry Chelkak, Stanislav Smirnov, Universality in the 2D Ising model and conformal invariance of fermionic observables, *Invent. Math.*, 189 (2012), no. 3, 515–580.
- (12) Dmitry Chelkak, Stanislav Smirnov, Discrete complex analysis on isoradial graphs, *Advances in Mathematics*, 228 (2011), no. 3, 1590–1630.
- (13) 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.
- (14) 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.
- (15) 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.
- (16) 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.
- (17) Parametrization of the isospectral set for the vector-valued Sturm-Liouville problem. Chelkak, D.; Korotyaev, E.: *Journal of Functional Analysis* 241 (2006), 359–373.

DMITRY CHELKAK – LIST OF PUBLICATIONS (CONTINUED)

- (18) 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.
- (19) Inverse problem for harmonic oscillator perturbed by potential, characterization. Chelkak, D.; Kargaev, P.; Korotyaev, E.: *Comm. Math. Phys.* 249 (2004), no. 1, 133–196.
- (20) 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.
- (21) 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.
- (22) 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.
- (23) 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.

Invited mini-courses:

- 2019 (scheduled):
 - Virginia Integrable Probability Summer School;
- 2018:
 - Winter School in Mathematical Physics, Les Diablerets: “*Ising model from combinatorics to CFT: a modern guidebook*”;
- 2013:
 - Summer School “Modern Mathematics”, Dubna: “*Planar random walks and their limits: simple random walk, LERW and SAW*”;
 - Simons Center for Geometry and Physics, Stony Brook, “Conformal geometry” Program: “*Spin correlations in the planar Ising model via fermionic observables*”;
 - Moscow Independent University, Moscow: “*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: “*Discrete complex analysis on the microscopic level: conformal invariants without conformal invariance*”;
- 2009:
 - Tel-Aviv University: “*Conformal invariance in the 2D Ising model*”;
- 2008:
 - “3rd La Pietra School in Probability”, Firenze: joint mini-course with Stanislav Smirnov “*SLE and conformal invariance for critical Ising model*”.

Talks at research conferences, workshops etc:

- 2018:
 - “États de la recherche SMF : mécanique statistique”, Institut Henri Poincaré, Paris;
 - ICM2018 (International Congress of Mathematicians), Rio de Janeiro (invited talk at the “Analysis and Operator Algebras” & “Probability and Statistics” sections);
 - ICMP2018 (International Congress on Mathematical Physics), Montreal (invited talk at the “Equilibrium Statistical Mechanics” session);
 - “Inhomogeneous Random Systems”, Institut Henri Poincaré, Paris;
 - 8ème Séminaire Itzykson, IHÉS, Bures-sur-Yvette;
- 2017:
 - SPA-2017 (39th Conference on Stochastic Processes and Their Applications), Moscow;
 - Les probabilités de demain, l’édition 2017, IHÉS, Bures-sur-Yvette;
- 2016:
 - IESC Workshop “Quantum integrable systems, conformal field theories and stochastic processes”, Cargese;
 - INFN Workshop “Condensed Matter and Critical Phenomena”, Frascati;
 - 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;
 - “25th St.Petersburg Summer Meeting in Mathematical Analysis: Tribute to Victor Havin, 1933-2015”, St. Petersburg;
 - “Inhomogeneous Random Systems”, Institut Henri Poincaré, Paris;

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

- *2015*:
 - Genève–Grenoble–Lyon Probability Day, Grenoble;
 - 2015 Fields Medal Symposium “Complex Analysis meets Statistical Physics” in honour of Stanislav Smirnov, Toronto;
 - 2015 Charles River Lectures on Probability Theory and Related Topics, Cambridge(MA);
 - National Center of Competence in Research SwissMAP annual meeting, Engelberg;
 - Oberwolfach Workshop “Discrete Differential Geometry”, Oberwolfach;
 - “Topics in Low-Dimensional Statistical Mechanics”, Les Diablerets;
 - INI Workshop “Conformally Invariant Scaling Limits”, Cambridge(UK);
- *2014*:
 - BIRS Workshop “Probability on Trees and Planar Graphs”, Banff;
 - MAC2 Workshop “Two-Dimensional Random Critical Models”, Paris;
 - “6th St. Petersburg Conference in Spectral Theory (dedicated to the memory of M.Sh.Birman)”, St. Petersburg;
- *2013*:
 - “Russian-Chinese Seminar on Asymptotic Methods in Probability Theory and Mathematical Statistics”, St. Petersburg;
 - “Two-Dimensional Statistical Mechanics”, Les Diablerets;
- *2012*:
 - Oberwolfach Workshop “Scaling Limits in Models of Statistical Mechanics”, Oberwolfach;
 - Oberwolfach Workshop “Discrete Differential Geometry”, Oberwolfach;
 - “Conformal Invariance, Discrete Holomorphicity and Integrability”, Helsinki;
 - “Statistical Mechanics and Conformal Invariance”, Berkeley;
 - MIAN-PDMI Winter Workshop “Probability and Functional Analysis”, Moscow;
- *2011*:
 - “Random Processes, Conformal Field Theory and Integrable Systems”, Moscow;
 - “Geometry Days in Novosibirsk, 2011”, Novosibirsk;
 - “3rd St. Petersburg Conference in Spectral Theory (dedicated to the memory of M.Sh.Birman)”, St. Petersburg;
 - “3rd Northern Triangular Seminar”, St. Petersburg;
- *2010*:
 - “73rd Annual Meeting of the Institute of Mathematical Statistics”, Gothenburg, invited session “Scaling limits and conformal invariance”;
 - “Conformal Structures and Dynamics” (CODY-2010), Seillac;
- *2009*:
 - “Conformal Structures and Dynamics” (CODY-2009), Będlewo;
 - “International Conference in Spectral Theory dedicated to the memory of M.Sh.Birman”, St. Petersburg;
 - “33rd Conference on Stochastic Processes and Their Applications”, Berlin, invited special session “Schramm-Loewner Evolution”;
- *2008*:
 - “Geometry and Integrability”, Obergurgl;
 - “Differential equations, Function spaces, Approximation theory” dedicated to the 100th anniversary of the birthday of S.L.Sobolev, Novosibirsk;
 - “17th St. Petersburg meeting in Mathematical Analysis”, St. Petersburg;
 - ESF Conference “Operator Theory, Analysis and Mathematical Physics”, Będlewo;
 - Oberwolfach Workshop “Stochastic Analysis”, Oberwolfach;

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- *2007*:
 - Bilateral French-Russian Seminar “Asymptotic methods in spectral theory and applications”, St. Petersburg;
- *2005*:
 - Workshop “Mathematical models of nanostructures: spectral problems and scattering properties”, Berlin;
- *2003*:
 - Workshop “Spectral problems for Schrödinger-type operators II”, Berlin;
 - “12th St. Petersburg Meeting in Mathematical Analysis”, St. Petersburg.

Research seminars, colloquia etc, except seminars at the (current) affiliation city:

- *2018*: University of Helsinki;
- *2017*: Colloquium de Marne (Université Paris-Est); Queen Mary University of London; Lyon probability seminar;
- *2016*: University of Helsinki;
- *2015*: ÉNS, Paris; Augsburg Math Colloquium; Aalto University Math Colloquium, Helsinki; King’s College, London (UK); University of Oxford, Oxford;
- *2014*: ITS Science Colloquium, Zurich; Hypathie seminar, Marseille; Technische Universität Berlin; University of Zurich;
- *2013*: University of British Columbia, Vancouver; Columbia University, New York; University of Helsinki;
- *2012*: University of Helsinki; NTNU, Trondheim; Texas A&M University, College Station; Arizona State University, Phoenix;
- *2011*: Moscow Independent University: “Globus” Seminar, Moscow; Sobolev Institute of Mathematics, Novosibirsk; CRM, Barcelona (Spain);
- *2010*: Helsinki University; Université Paris XIII;
- *2009*: Université Paris VI, Université de Provence, Marseille; Moscow Independent University: “Globus” Seminar; Moscow Mathematical Society Meeting; Université de Genève;
- *2008*: Humboldt Universität zu Berlin; Technische Universität Berlin;
- *2007, 2006*: Humboldt Universität zu Berlin;
- *2005*: Mittag-Leffler Institute, Djursholm; Lund University;
- *2004*: London Analysis Seminar, Cardiff University, Bristol University, Loughborough University; KTH, Stockholm;