

## 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**
- Postal address: Département de Mathématiques et Applications  
École Normale Supérieure, 45 rue d’Ulm  
F-75230 Paris Cedex 05

### • 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:

- 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” 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, Planar Ising model at criticality: state-of-the-art and perspectives. [arXiv:1712.04192](#), prepared for the *Proceedings of the ICM2018*.
- (2) Dmitry Chelkak, 2D Ising model: correlation functions at criticality via Riemann-type boundary value problems. [arXiv:1605.09035](#), to appear in *Proceedings of the 7ECM*.
- (3) Dmitry Chelkak, Alexander Glazman, Stanislav Smirnov, Discrete stress-energy tensor in the loop  $O(n)$  model. [arXiv:1604.06339](#).

• **Published:**

- (4) 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.
- (5) Dmitry Chelkak, Robust discrete complex analysis: a toolbox, *Ann. Probab.* 44 (2016), no. 1, 628–683.
- (6) 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.
- (7) Dmitry Chelkak, Clément Hongler, Konstantin Izyurov, Conformal invariance of spin correlations in the planar Ising model, *Ann. Math.* 181 (2015), no. 3, 1087–1138.
- (8) 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.
- (9) Dmitry Chelkak, Konstantin Izyurov, Holomorphic spinor observables in the critical Ising model, *Comm. Math. Phys.* 322 (2013), no. 2, 303–332.
- (10) Dmitry Chelkak, Stanislav Smirnov, Universality in the 2D Ising model and conformal invariance of fermionic observables, *Invent. Math.*, 189 (2012), no. 3, 515–580.
- (11) Dmitry Chelkak, Stanislav Smirnov, Discrete complex analysis on isoradial graphs, *Advances in Mathematics*, 228 (2011), no. 3, 1590–1630.
- (12) 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.
- (13) 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.
- (14) 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.
- (15) 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.
- (16) Parametrization of the isospectral set for the vector-valued Sturm-Liouville problem. Chelkak, D.; Korotyaev, E.: *Journal of Functional Analysis* 241 (2006), 359–373.
- (17) 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)

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

- *2018 (scheduled):*
  - 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;
- *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;

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

- 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;
- 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.

**Invited mini-courses:**

- 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”*;

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

- *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*”.

**Research seminars, colloquia etc:**

- *2017*:
  - Colloquium de Marne (Université Paris-Est); Queen Mary University of London;
- *2016*:
  - University of Helsinki;
- *2015*:
  - ÉNS, Paris; Augsburg Math Colloquium, Augsburg; 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;
- *2002–2003*:
  - Potsdam University.