

MANUELA GIROTTI

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Status Italy - citizen, **Canada** - permanent resident, **United States** - H1-B visa worker.

Current positions Department of Mathematics

Colorado State University, Fort Collins, CO
Postdoctoral Fellow 01/2017–now

Department of Mathematics and Statistics

Concordia University, Montréal, Québec, Canada
Affiliate Assistant Professor 10/2017–now

Past position Institut de Recherche en Mathématique et Physique

Université Catholique de Louvain, Louvain-la-neuve, Belgium
Postdoctoral Fellow / Assistante de recherche 11/2014–10/2016

Education

Concordia University, Montréal, Québec, Canada 2010–2014

Ph.D. in Mathematics, supervisor Prof. Marco Bertola

Thesis title: “*Riemann-Hilbert approach to Gap Probabilities of Determinantal Point Processes*”.

External examiner: Prof. Alexander R. Its (IUPUI). Thesis ranking: excellent.

Università degli Studi di Milano, Milan, Italy 2008–2010

Laurea Magistrale (M.Sc.) in Mathematics, supervisor Prof. Elisabetta Rocca

Thesis title: “*Time relaxation of a phase-field model with entropy balance*”.

Thesis grade: 110/110 *cum laude**.

Università degli Studi di Milano, Milan, Italy 2005–2008

Laurea Triennale (B.Sc.) in Mathematics, supervisor Prof. Dietmar Klemm

Thesis title: “*Dirac’s magnetic monopole*”.

Thesis grade: 110/110 *cum laude**.

Publications

- “Vanishing time-relaxation for a phase-field model with entropy balance”, *Adv. Math. Sci. Appl.*, **22**(2), 553-575, 2012.
- “Riemann-Hilbert approach to gap probabilities for the Generalized Bessel process”, *Math. Phys. Anal. Geom.* **17** (1), 183-211, 2014.
- “Asymptotics of the Tacnode process: a transition between the gap probabilities from the Tacnode to the Airy process”, *Nonlinearity* **27**, 1937-1968, 2014.
- “Riemann-Hilbert approach to gap probabilities for the Bessel process”, *Phys. D*, 295-296C, 103-121, 2015.
- “Large gap asymptotics at the hard edge for product random matrices and Muttalib-Borodin ensembles”, *Internat. Math. Res. Notices*, rnx202, 2017 (with T. Claeys and D. Stivigny).

*Performance in the final examination is graded from 66 to 110. A *cum laude* can be added to the maximum grade as a special distinction.

- “Rigorous asymptotics of a KdV soliton gas”, submitted, 2018 (with T. Grava and K. McLaughlin).
- “On Fredholm Determinant solutions of the Painlevé II hierarchy”, in preparation, 2018 (with T. Claeys and M. Cafasso).

Scholarships and awards

High school

- Borsa di studio SKF (high school scholarship), SKF Industrie S.p.A., 2000–2005.
- 2nd qualified for Certamen Taurinense (Latin literature competition), May 2005.

Università degli Studi di Milano

- Fondo per il sostegno dei giovani e per favorire la mobilità degli studenti (partial tuition waiver), 2005–2008.

Concordia University

- Faculty of Arts&Science Graduate Fellowship, 2010–2013.
- Concordia University Partial Tuition Graduate Scholarship for International Students, 2010–2011.
- ISM Scholarship, Institut des Sciences Mathématiques (ISM, Montréal), 2011–2012.
- ISM Travel Scholarship, Institut des Sciences Mathématiques (ISM, Montréal), June 2011;
- Exemption des frais de scolarité supplémentaires (MEQ), Ministère de l’Éducation, du Loisir et du Sport du Québec, 2011–2013.
- Concordia Merit Scholarship, 2012–2013.
- Campaign for a New Millennium Graduate Scholarship - Faculty of Arts&Science, 2013–2014.
- Concordia Accelerator Award, 2014.

Colorado State University

- International Presidential Fellow program, 2017–2018.

Visits and research experiences

(for periods going from one to four weeks)

- June 2012, *PIMS-Mprime Summer School in Probability*, University of British Columbia (Canada);
- March 2014, Université catholique de Louvain (Belgium), upon invitation of Prof. Tom Claeys;
- May 2015 and February 2016, Université d’Angers (France), upon invitation of Prof. Mattia Cafasso;
- June 2017, SISSA (Italy), upon invitation of Prof. Marco Bertola and Prof. Tamara Grava;
- May 2018, Université catholique de Louvain (Belgium), upon invitation of Prof. Tom Claeys;
- June 2018, SISSA (Italy), upon invitation of Prof. Tamara Grava.

Participation to research projects

- **2014–2016:** member of Interuniversity Attraction Poles - Dynamics, Geometry and Statistical Physics (DYGEST), Belgium.
- **2014–2016:** team member of the European Research Council project “Critical phenomena in random matrix theory and integrable systems” (CRaMIS), principal investigator Prof. Tom Claeys.
- **2018–now:** team member of the European project “Integrable Partial Differential Equations: Geometry, Asymptotics, and Numerics” (IPaDEGAN).

Institutional responsibilities, membership of scientific societies	<ul style="list-style-type: none"> - president of the Mathematics&Statistics Graduate Students Association (MASGSA), Concordia University, 2011–2013. - Graduate Students Representative, Department of Mathematics and Statistics, Concordia University, 2011–2013. - member of the Departmental Appraisal Committee, Concordia University, 2012–2013. - member of the Scientific Societies: GNAMPA (Mathematical Analysis, Probability and their Applications, Italy; 2010–2011), American Mathematical Society (2010–2014 and 2017–now), Italian Scientific Community in Canada - Québec section (2011–2014).
Qualifications	<p><i>Qualifiée aux fonctions de Maître de Conférence</i> 02/2016–12/2020</p> <p>Section 25 - Mathématiques Ministère de l'Éducation nationale, de l'Enseignement supérieur et de la Recherche, France.</p>
Teaching activities	<ul style="list-style-type: none"> - instructor of MATH 530 - Mathematics for Scientists and Engineers, Colorado State University, Fall 2018; - instructor of MATH 345 - Differential Equations (Honors option), Colorado State University, Spring 2018; - (graduate) lecture course on Determinantal Point Processes and Random Matrices, Colorado State University, Fall 2017; - instructor of MATH 317 - Advanced Calculus of one variable, Colorado State University, Fall 2017; - instructor of MATH 369 - Linear Algebra I, Colorado State University, Spring 2017; - teaching assistant of MATH 201 - Elementary Functions, Concordia University, Fall 2013; - technical assistant of WeBWorK for the courses MATH 200, 201, 202, 203, 204, 205, Concordia University, Fall 2012 - Summer 2014; - instructor of MATH 205 - Differential and Integral Calculus II, Concordia University, Winter 2011 and Fall 2011; - tutor at Math Help Center, Concordia University, Fall 2010 and Fall 2013.
Student supervision	<ul style="list-style-type: none"> - coordinator of one student for a research project in the Honors Option of the course MATH 345, Colorado State University, Spring 2018.
Languages	<p>Italian (native), English (full professional proficiency), French (full professional proficiency), Persian (elementary proficiency), Dutch (elementary proficiency).</p>
Computer Skills	<p><u>Languages:</u> C++, HTML, Python, R, Perl. <u>Software:</u> WebWork, MatLab, Latex, Maple.</p>
Organizational activities	<ul style="list-style-type: none"> - organizer of the Graduate Students Seminar series, Concordia University, 2012–2013. - co-organizer of the Mathematics installations at Exposcience - Stewart Hall Science & Technology Exhibition (Concordia University), Pointe-Claire (QC), 2012–2013. - organizer of seminar series of the Mathematical Physics group, UC Louvain, 2015–2016. - co-organizer of the postdoc seminar series, Colorado State University, 2017–now.

Outreach

- journalist for the high-school magazine “Il Salice”, Torino, 2000–2005.
- volunteer at the event amfAR Milano 2009, amfAR - The Foundation for AIDS research, 2009.
- volunteer for the project “Test di usabilità sulla Biblioteca Digitale dell’Università degli Studi di Milano” (test of usability of the university Digital Library), Università degli Studi di Milano, 2010.
- part of the following choirs as alto singer: Schola Gregoriana Mediolanensis (Milano, Italy; 2009–2010), Concordia University Choir (2011–2014), Stella Matutina (Bruxelles, Belgium; 2014–2016).
- volunteer at the events Café Scientifique 2012 and Café Scientifique 2013 (sponsored by CIHR – McGill University Health Center; organized by Comunità Scientifica Italiana in Canada), Montréal, 2012–2013.
- volunteer for Math Day 2017 and Math Day 2018, Colorado State University, 2017–2018.
- volunteer at the nonprofit restaurant FoCo Cafe, Fort Collins (CO), 2017–now.
- organizer of a public screening of the Math documentary “The Discreet Charm of Geometry” (by Ekaterina Eremenko), Colorado State University, 2018 (in progress).

Other interests

sailing (Passeport Voile - Niveau 3 Croisière, Fédération Française de Voile, 2018), singing, skiing, cooking.

Invited talks

- *Time relaxation of a phase-field model with entropy balance*, Concordia University, 2011.
- *A Peek into the Math world: from abstraction to applications*, Institut Italien de Culture de Montréal, 2012.
- *Gap probabilities for the Generalized Bessel process: a Riemann-Hilbert approach*, Concordia University, 2013.
- *Gap probabilities and Isomonodromic τ -function: from integrable systems to non-intersecting Brownian motion*, Università degli Studi Milano-Bicocca, Milan (Italy).
- *Gap Probabilities of the Tacnode process*, Centre de Recherche Mathématiques (CRM), Montréal.
- *Riemann-Hilbert approach to Gap Probabilities of Determinantal Point Processes*, KU Leuven (Belgium), 2015.
- *Smallest singular value distribution and large gap asymptotics for products of random matrices*, at the conference “Six-vertex model, dimers, shapes, and all that”, Simons Center for Geometry and Physics, Stony Brook University (NY).
- *“Integrable” gap probabilities for the Generalized Bessel process*, at the conference “Painlevé Equations and Discrete Dynamics”, Banff International Research Station (BIRS).
- *Smallest singular value distribution and large gap asymptotics for products of random matrices*, University of Michigan (MI), 2017.
- *Smallest singular value distribution and large gap asymptotics for products of random matrices*, at the 14th International Symposium on Orthogonal Polynomials, Special Functions and Applications (OPSFA14), University of Kent (UK).
- *Integrable gap probabilities for the Generalized Bessel process*, at the conference “Painlevé Equations and Applications: A Workshop in Memory of A. A. Kapaev”, Michigan Center for Applied and Interdisciplinary Mathematics (MCAIM), Ann Arbor (MI), 2017.
- *Asymptotics of gap probabilities via Riemann-Hilbert approach*, at the AMS Joint Mathematics Meeting, San Diego (CA), 2018.
- *Rigorous asymptotics of the soliton gas*, at the AMS Spring Meeting, Vanderbilt University, Nashville (TN, USA), 2018.

- *Rigorous asymptotics of a KdV soliton gas*, at the conference “Hamiltonian systems & applications”, Università degli Studi Milano-Bicocca, Milano (Italy), 2018.
- *A KdV soliton gas: asymptotic analysis via Riemann–Hilbert problems*, at the Midwestern Workshop on Asymptotic Analysis, Indiana University, Bloomington, IN, 2018.