Dr. Barbara Dembin

Place and Date of Birth:	France — 2 November 1993
Address:	HG E65-2, Rämistrasse 101, 8092 Zürich, Switzerland
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Education, Research position

2020 - ... Postdoc, **ETH Zürich**, Switzerland
— Advisor: Prof. Vincent Tassion

2017 - 2020 Ph.D. in Mathematics, **LPSM, Université Paris Diderot**, France
Thesis: "Percolation and first passage percolation:
time constant, flow constant, isoperimetric constant"
— Advisor: Prof. Marie Théret
—Defended on July 8 2020.

2016 - 2017 Master in Probability, **Université Paris Sud**, France
— Final Grade: 16,76/20

2013 - 2017 Bachelor and Master of Science **École Polytechnique**, France
— Specialized in Probability and Statistics

Visiting Internships

Mar 2018 - Sep 2018 | Visiting Raphaël Cerf at **École Normale Supérieure**, France
Work on first passage percolation using methods developed for the study of the Wulff crystal in Ising model

Apr 2017 - Jul 2017 | Master thesis under the supervision of Marie Théret at **Université Paris Diderot**, France
Work on the regularity of the time constant in Bernoulli percolation

Mar 2016 - Jul 2016 | Visiting R. Srikant at **University of Illinois Urbana-Champaign**, USA
Theoretic improvement of an existing algorithm. The aim was to cluster users based upon pairwise comparisons of items users have made. Numerical simulation of the model using Python.

Research interest

Theme:	Probability theory, statistical mechanics.
Keywords:	Bernoulli bond percolation (time constant, isoperimetry), First passage percolation (maximal flow, minimal cutset, maximal stream), Boolean percolation
Project:	Member of the project ANR PPPP (Percolation et Percolation de Premier Passage)

Publications

Published/accepted papers

[1] Dembin B. "Regularity of the time constant for a supercritical Bernoulli percolation", accepted for publication in ESAIM Probability and Statistics, available on https://arxiv.org/abs/1803.03141, 27 pages, 2021.

[2] Dembin B. "Existence of the anchored isoperimetric profile in supercritical bond percolation in dimension two and higher", *ALEA*, 17:205252, 2020.

[3] Dembin B., Théret M. "Size of a minimal cutset in supercritical first passage percolation", *Annales de l'Institut Henri Poincaré : Probabilités et statistiques*,56(2):14191439, 05 2020.

[4] Dembin B. "The maximal flow from a compact convex subset to infinity in first passage percolation on $\mathbb{Z}^d$", *Annals of Probability*, 48(2):622645, 03 2020.

[5] Cerf R., Dembin B. "Vanishing of the Anchored isoperimetric profile in bond percolation at p_c", *Electronic Communications in Probability*, 25:7 pp., 2020.

[6] Dembin B. "Anchored isoperimetric profile of the infinite cluster in supercritical bond percolation is Lipschitz continuous",*Electronic Communications in Probability*, 25:13 pp., 2020

Preprints

[7] Dembin B., Thret M. "Large deviation principle for the cutsets and lower large deviation principle for the maximal flow in first passage percolation", available on https://arxiv.org/pdf/2102.11601.pdf, 65 pages, 2021.

[8] Dembin B., Thret M. "Large deviation principle for the streams and the maximal flow in first passage percolation", available on https://arxiv.org/pdf/2010.05526.pdf, 99 pages, 2020.

[9] Cerf R., Dembin B. "The time constant is Lipschitz continuous strictly above p_c", available on https://hal.archives-ouvertes.fr/hal-03123392, 36 pages, 2021.

Conferences, workshops and seminars

Apr 2021	Munster proability seminar *Talk: Large deviation principle for the streams and the maximal flow in first passage percolation*
Apr 2021	Mathematical Physics seminar Geneva *Talk: Large deviation principle for the streams and the maximal flow in first passage percolation*
Mar 2021	Invited speaker at ICTS - "Probalistics method in negative curvature" *Talk : Maximal flows and minimal cutsets in first passage percolation in $\mathbb{Z}^d$*
Feb 2021	Percolation Today online seminar *Talk : The time constant for Bernoulli percolation is Lipschitz continuous strictly above p_c*
Jan 2021	Joint Israeli Probability Seminar (JIPS) *Talk : Large deviation principle for the streams and the maximal flow in first passage percolation*
Jan 2021	Séminaire des doctorants Rennes *Talk : Regularity of the time constant in first passage percolation*
Aug 2020	Invited speaker at ICTS - "First-Passage Percolation and Related Models" (postponed due to Covid-19)
Jul 2020	Northwestern online probability seminar *Talk : Existence of the anchored isoperimetric profile in supercritical bond percolation in dimension two and higher*
Jun 2020	Invited speaker at the conference "Random networks and interacting particle systems" (Paris, France) (postponed due to Covid-19)
Mar 2020	Les probabilités du vendredi (Jussieu)

Talk : Constante isopérimétrique ancrée du cluster infini de percolation surcritique

Jan 2020 Roma Tre probability seminar
Talk: Percolation and first passage percolation: time constant, flow constant, isoperimetric constant

Sep 2019 Rencontres de Probabilités Rouen (France)
Talk : Maximal flow from a compact convex set to infinity in first passage percolation

Jul 2019 Chengdu University Probability seminar (China)
Talk : Maximal flow from a compact convex set to infinity in first passage percolation

Jun 2019 Journées de probabilités (France)
Talk : Maximal flow from a compact convex set to infinity in first passage percolation

May 2019 Orsay Probability seminar (France)
Talk : Vanishing of the anchored isoperimetric profile in in percolation at p_c

Apr 2019 Probability Seminar of PhD student of laboratory LPSM (France)
Talk : Vanishing of the anchored isoperimetric profile in in percolation at p_c

Apr 2019 PEIPS Seminar, CMAP (Polytechnique, France)
Talk : Vanishing of the anchored isoperimetric profile in in percolation at p_c

Jan 2019 XX^e Journées Louis Antoine (Rennes, France)

Jan 2019 Rennes Probability seminar (France)
Talk : Maximal flow from a compact convex set to infinity in first passage percolation

Jan 2019 Young Statisticians and Probabilists (IHP, France)
Talk : Anchored isoperimetric constant of the infinite cluster in supercritical Bernoulli percolation

Dec 2018 État de la recherche "Mécanique statistique"(IHP, France)

Aug 2018 Journées MAS, Processus et échantillonage (Dijon, France)
Talk : Maximal flow from a compact convex set to infinity in first passage percolation

Jul 2018 48^{th} Probability summer school Saint-Flour (France)
Talk : Maximal flow from a compact convex set to infinity in first passage percolation

Jun 2018 Universality in Probability Theory and Statistical Mechanics (Ischia, Italy)

Feb 2018 Probability Seminar of PhD student of laboratory LPSM (France)
Talk : Minimal size of a cutset in supercritical first passage percolation

Jul 2017 Spectral properties of large random objects (IHES, France)

Mar 2017 Sharp threshold phenomena in Statistical Physics (IHES, France)

Teaching

Université Paris Diderot, Paris, France
- 2017-2020 Tutorials of the course "Probability" L3 MIASHS
- 2018-2020 Tutorials of the course "Probability" L2 Maths- Info
- 2017-2018 Oral examiner of the course "Linear Algebra and Analysis" L2 Maths- Info

Lycée Louis Pasteur, Neuilly sur seine, France
- 2016-2017 Oral examiner in Mathematics for preparatory class (MPSI)
- 2014-2015 Oral examiner in Mathematics for preparatory class (MPSI)

Association Tremplin, Paris, France
- 2014-2015 Organization of advanced sessions in Mathematics and Physic for students from inner-city high school

Lycée le Corbusier, Aubervilliers, France

Oct 2013- Mar 2014 Six-months internship as a tutor for high school and undergraduate students.

Scholarship, Prize

2020: Prix de thse Jacques Neveu
2019: Séphora-Berrebi scholarship for Women in Advanced Mathematics

Scientific responsibilities

2018-2019: Co-organizer of the PhD student seminar of LPSM .

Popularization of science

2019: Mathpark Seminar : One hour and a half lesson on first passage percolation for undergraduate students. The lesson was recorded and is available on https://youtu.be/6AkaOr6yDik
Oct 2017/ Oct 2018: Participation to "Fête de la science"

Languages

French: Mother tongue
English: Fluent
Mandarin: Scholar knowledge
German: Beginner