Barbara Dembin

Place and Date of Birth:	France — 2 November 1993
Address:	HG E65-2, Rämistrasse 101, 8092 Zürich, Switzerland
email:	barbara.dembin@math.ethz.ch
webpage:	https://n.ethz.ch/ bdembin/home.html

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
2013 - 2017	Bachelor and Master of Science **École Polytechnique**, France
2011 - 2013	Classe préparatoires, **Lycée Louis Pasteur**, France

Research interest

Theme:	Probability theory, statistical mechanics.
Keywords:	Bernoulli bond percolation (chemical distance, Wulff crystal), First passage percolation (maximal flow, minimal cutset, maximal stream, coalescence of geodesics), Boolean percolation (subcritical sharpness)

Awards

2022	Swissmap innovator prize
2020	Prix de thèse Jacques Neveu
2019	Séphora-Berrebi scholarship for Women in Advanced Mathematics

Publications

4.1 Published papers

[1] Cerf R., Dembin B. "The time constant is Lipschitz continuous strictly above p_c", *Annals of Probability*, 50(5) 1781-1812 September 2022.

[2] 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.

[3] Dembin B. "Existence of the anchored isoperimetric profile in supercritical bond percolation in dimension two and higher", *ALEA*, 17:205–252, 2020.

[4] 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):1419–1439, 05 2020.

[5] 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):622–645, 03 2020.

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

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

4.2 Preprint

[8] Dembin B., Garban C., "Superconcentration for minimal surfaces in first passage percolation", available on Arxiv on January, 23 pages, 2023

[9] Dembin B., "Subcritical sharpness for multiscale Boolean percolation ", available on "https://arxiv.org/abs/2211.02605", 8 pages, 2023

[10] Dembin B., Nakajima S., "On the upper tail large deviation rate function for chemical distance in supercritical percolation", available on "https://arxiv.org/abs/2211.02605", 39 pages, 2022

[11] Dembin B., Tassion V., "Almost sharp sharpness for Poisson Boolean percolation", available on "https://arxiv.org/abs/2209.00999", 33 pages, 2022

[12] Dembin B., Elboim D., Peled R., "Coalescence of geodesics and the BKS midpoint problem in planar first-passage percolation", available on "https://arxiv.org/abs/2204.02332" 49 pages, 2022

[13] Dembin B. "The variance of the graph distance in the infinite cluster of percolation is sublinear ", available on https://arxiv.org/abs/2203.01083, 12 pages, 2022

[14] Dembin B., Théret 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.

[15] Dembin B., Théret 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.

Invited talks

2023	Munich probability seminar
2022	IAS Probability seminar
	Courant institute probability seminar
	Lille Days in Point Processes and Stochastic Geometry
	Abu Dhabi Stochastics Seminar (online)
	Geneva Maths Physics Seminar
	SwissMAP Annual General Meeting, speaker as prize recipient
	Journées MAS Rouen, speaker as prize recipient
	First-Passage Percolation and Related Models, ICTS (online)
	International meeting AMS-EMS-SMF, Grenoble, France
	Challenges in statistical mechanics, Haifa, Israel
	Conference Statistical Mechanics, Les Diablerets, Switzerland
	University of Bath probability seminar (online)
2021	Toulouse probability seminar
	Lyon probability seminar
	University of Wisconsin probability seminar (online)
	Rencontre de probabilités, Rouen, France
	ETH seminar on stochastic processes

Conference Random graphs and interacting particle systems (online)
Young researcher symposium ICMP Geneva
Nancy probability seminar (online)
Munster probability seminar (online)
Geneva Maths Physics seminar (online)
Percolation today (online)
Joint Israeli Probability seminar (online)
2020 PhD seminar Rennes, France (online)
Northwestern probability seminar (online)
Les probabilités du vendredi, Jussieu, France
2019 Roma Tre probality seminar
Chengdu University probability seminar, China
Journées de probabilités, France
Orsay probability seminar
PhD probaility seminar of LPSM, France
PEIPS seminar, CMAP, France
Renne probability seminar
Young staticians and probabilists, France
2018 Journées MAS, Dijon, France
Saint-Flour probability summer school, France
PhD probaility seminar of LPSM, France

Academic visits

February 2023	Visiting Piet Lammers at **IHES**, France (1 week)
January 2023	Visiting Johannes Baumler at **TUM**, Germany (1 week)
December 2022	Visiting Ron Peled at **IAS**, US (2 weeks)
June 2022	Visiting Ron Peled at **Tel Aviv University**, Israel (2 weeks) Work on coalescence of geodesics and fluctuation of surface
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

Teaching

ETH Zürich, Switzerland
- 2022-2023 Master class on first passage percolation and large deviations
- 2021-2022 Assistant and tutorials of the course "Ising model" of Vincent Tassion
- 2020-2021 One tutorial session for the meddley course of Wendelin Werner on large deviation

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.

Mentoring

2022 Jonas Wyss, semester project, co-advised with Vincent Tassion.
2022 David Opalic and Ritvik Radhakrishnan, semester paper, co-advised with Franco Severo
2021 Vincent Garot, 2 months bachelor thesis, co-advised with Vincent Tassion.

Scientific responsibilities

Reviewer for PTRF, Annales de l'IHP, RSA, Applied probability journals, Discrete mathematics, SPA, Brazilian Journal of Probability and Statistics

Member of the organizing committee for a junior conference in percolation models to take place in 2023 (precise date to be determined)

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
German: Intermediar