

Curriculum vitae

Laure Marêché

Born in 1994, single

Postal address: Institut de Recherche Mathématique Avancée
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POSITION

2020-: Tenured assistant professor at the Institut de Recherche Mathématique Avancée, Université de Strasbourg.

FORMATION

2016-2019: PhD in Mathematics at the Laboratoire de Probabilités, Statistique et Modélisation, ex Laboratoire de Probabilités et Modèles Aléatoires, Université Paris Diderot, under the supervision of Cristina Toninelli, “*Modèles avec contraintes cinétiques : convergence vers l’équilibre et résultats d’universalité*” (Kinetically constrained models: relaxation to equilibrium and universality results).

2012-2016: Student at the École Normale Supérieure de Lyon.

2015-2016: Master’s Degree in Mathematics, Probabilities Course – *Magna cum laude*.

2014-2015: Agrégation externe de mathématiques (national competitive exam allowing to become teacher of Mathematics in French secondary education) – *Rank 5*.

Master’s Degree in Teaching of Mathematics.

2013-2014: First year of Master’s Degree in Mathematics – *Magna cum laude*.

2012-2013: Bachelor's Degree in Mathematics – *Cum laude*.

2010-2012: - Diplôme d’Études Universitaires Générales (DEUG) de mathématiques (first and second year of Bachelor's Degree in Mathematics), Université de Lorraine – *Magna cum laude*.

- Diplôme Universitaire de Classe Préparatoire Universitaire (DU CPU) de mathématiques et physique (two years of intensive course in Mathematics and Physics preparing for the competitive entrance examinations to French leading institutions of higher education), Université de Lorraine – *Magna cum laude*.

2009-2010: Baccalauréat scientifique (high school diploma in Sciences), Lycée Saint Sigisbert, Nancy – *Magna cum laude*.

POSTDOCTORAL POSITION

2019-2020: Postdoctoral researcher at the Chaire de processus stochastiques of École Polytechnique Fédérale de Lausanne, under the supervision of Thomas Mountford.

RESEARCH INTERESTS

- Interacting particle systems: kinetically constrained spin models, bootstrap percolation, spectral gap.
- Self-interacting random walks.
- Probabilistic cellular automata.
- Glauber dynamics on Catalan structures.

AWARD

Alfred and Valentine Wallach Scientific Award of the Alsace Academy for Sciences, Humanities and Arts, 2023.

PUBLICATIONS

Research articles:

- *Fixation for U-Ising and U-voter dynamics with frozen vertices*, Laure Marêché, [arXiv:2402.07807](https://arxiv.org/abs/2402.07807).
- *Limit theorems for the trajectory of the self-repelling random walk with directed edges*, Laure Marêché, Thomas Mountford, [arXiv:2306.04320](https://arxiv.org/abs/2306.04320).
- *Fluctuations of the local times of the self-repelling random walk with directed edges*, Laure Marêché, *Advances in Applied Probability*, to appear, [arXiv:2211.00475](https://arxiv.org/abs/2211.00475).
- *Refined universality for critical KCM: lower bounds*, Ivailo Hartarsky, Laure Marêché, *Combinatorics, Probability and Computing* 31, no. 5, 879-906 (2022), [arXiv:2011.06952](https://arxiv.org/abs/2011.06952).
- *Exponential convergence to equilibrium in supercritical kinetically constrained models at high temperature*, Laure Marêché, *Markov Processes and Related Fields* 26, no. 5, 861-884 (2020), [arXiv:1907.05844](https://arxiv.org/abs/1907.05844).
- *Universality for critical KCM: infinite number of stable directions*, Ivailo Hartarsky, Laure Marêché, Cristina Toninelli, *Probability Theory and Related Fields* 178, no. 1, 289-326 (2020), [arXiv:1904.09145](https://arxiv.org/abs/1904.09145).
- *Exact asymptotics for Duarte and supercritical rooted kinetically constrained models*, Laure Marêché, Fabio Martinelli, Cristina Toninelli, *The Annals of Probability* 48, no. 1, 317-342 (2020), [arXiv:1807.07519](https://arxiv.org/abs/1807.07519).
- *Combinatorics for general kinetically constrained spin models*, Laure Marêché, *SIAM Journal on Discrete Mathematics* 34, no. 1, 370-384 (2020), [arXiv:1707.06924](https://arxiv.org/abs/1707.06924).
- *Exponential convergence to equilibrium for the d-dimensional East model*, Laure Marêché, *Electronic Communications in Probability* 24, no. 55, 1-10 (2019), [arXiv:1905.00765](https://arxiv.org/abs/1905.00765).

Conference proceeding:

Dynamics of interacting particle systems, Oriane Blondel, Aurélia Deshayes, Cyril Labbé, Laure Marêché, Marielle Simon, as part of the Journées Modélisation Aléatoire et Statistique 2018, ESAIM: Proceedings and Surveys 68, 52-72 (2020).

INVITED TALKS

- Probability and discrete mathematics seminar of the Bernoulli Institute for Mathematics, Computer Science and Artificial Intelligence, online seminar, March 26, 2024.

- Séminaire de probabilités de l'Institut Fourier, Grenoble, January 23, 2024.
- Séminaire MODAL'X, Nanterre, June 8, 2023.
- Séminaire généraliste de l'équipe de Probabilités et Statistiques de l'Institut Élie Cartan de Lorraine, Nancy, June 1, 2023.
- UC Davis probability seminar, online seminar, November 15, 2022.
- Asymmetry in interacting particle systems, microscopic and macroscopic effects, Lille, October 5, 2022.
- Markov Chains with Kinetic Constraints and Applications, Banff, July 4, 2022.
- Journées de Combinatoire de Bordeaux 2022, Bordeaux, June 8, 2022.
- Workshop for the 60th birthday of Tom Mountford, online conference, April 8, 2021.
- Séminaire généraliste de l'équipe de Probabilités et Statistiques de l'Institut Élie Cartan de Lorraine, online seminar, February 4, 2021.
- Séminaire de probabilités et statistique du Laboratoire Paul Painlevé, online seminar, January 20, 2021.
- Séminaire de mathématiques appliquées du Laboratoire de Mathématiques Jean Leray, Nantes, February 20, 2020.
- Séminaire généraliste de l'équipe de Probabilités et Statistiques de l'Institut Élie Cartan de Lorraine, Nancy, January 30, 2020.
- Séminaire de probabilités de l'Institut Fourier, Grenoble, November 27, 2019.
- Seminar at the School of Mathematics of the Georgia Institute of Technology, Atlanta, June 18, 2019.
- Journées Doctorantes en probabilités, Montpellier, March 14, 2019.
- Séminaire de probabilités de l'Institut de recherche mathématique de Rennes, Rennes, October 8, 2018.
- Journées Modélisation Aléatoire et Statistique 2018, Dijon, August 30, 2018.
- Séminaire de probabilités joint entre l'Institut Camille Jordan et l'Unité de Mathématiques Pures et Appliquées, Lyon, May 3, 2018.
- Séminaire doctorant du Laboratoire Amiénois de Mathématique Fondamentale et Appliquée, Amiens, November 8, 2017.
- Rencontres de probabilités 2017, Rouen, September 14, 2017.

OTHER COMMUNICATIONS

- Sem in de l'Institut de Recherche Mathématique Avancée, Strasbourg, February 1, 2024.
- Journées de Probabilités 2023, Angers, June 21, 2023.
- Séminaire de l'Institut Thématique Interdisciplinaire IRMIA++, Strasbourg, June 15, 2023.
- Séminaire de calcul stochastique de l'Institut de Recherche Mathématique Avancée, Strasbourg, April 18, 2023.
- Sem in de l'Institut de Recherche Mathématique Avancée, online seminar, February 18, 2021.
- Séminaire de calcul stochastique de l'Institut de Recherche Mathématique Avancée, Strasbourg, October 15, 2020.
- Bernoulli-IMS One World Symposium 2020, online conference, August 2020.

- Groupe de Travail des Thésards du Laboratoire de Probabilités, Statistique et Modélisation, Paris, November 19, 2018.
- Colloque Jeunes Probabilistes et Statisticiens 2018, Saint-Pierre-d'Oléron, May 17, 2018.
- Groupe de Travail des Thésards du Laboratoire de Probabilités et Modèles Aléatoires, Paris, October 23, 2017.
- Groupe de Travail des Thésards du Laboratoire de Probabilités et Modèles Aléatoires, Paris, November 30, 2016.

INVITATIONS IN OTHER LABORATORIES

- School of Mathematics, Georgia Institute of Technology, Atlanta, June 17-21, 2019.
- Dipartimento di Matematica e Fisica, Università Roma Tre, Rome, October 22-26, 2018.

ORGANIZATION OF EVENTS

- Co-organizer of the workshop Automates cellulaires, systèmes de particules, et auto-organisation at the Laboratoire de Mathématiques Raphaël Salem, Rouen, November 16, 2023.
- Co-organizer of the Journées de Probabilités 2022, Orbey, May 30 - June 2, 2022.
- Co-organizer of the Groupe de Travail des Thésards (students' seminar) of the Laboratoire de Probabilités et Modèles Aléatoires, which became the Groupe de Travail des Thésards of the Laboratoire de Probabilités, Statistique et Modélisation, 2017-2018.

TEACHING

2022-2023, 2023-2024:

- *Probability* in first year of Master's degree of Mathematics and Applications, at Université de Strasbourg.
- *Algebra II* in first year of Bachelor's degree of Sciences for Health, mathematics course, at Université de Strasbourg.
- *Texts of Option A (Probabilities and Statistics)* in the preparation to agrégation externe de mathématiques at Université de Strasbourg.
- *Analysis I* in first year of Bachelor's degree of Sciences for Health, mathematics course, at Université de Strasbourg.
- *Modeling - Probability* in the preparation to agrégation externe de mathématiques at Université de Strasbourg.

2021-2022:

- *Algebra II* in first year of Bachelor's degree of Sciences for Health, mathematics course, at Université de Strasbourg.
- *Texts of Option A (Probabilities and Statistics)* in the preparation to agrégation externe de mathématiques at Université de Strasbourg.
- *Analysis I* in first year of Bachelor's degree of Sciences for Health, mathematics course, at Université de Strasbourg.
- *Modeling - Probability* in the preparation to agrégation externe de mathématiques at Université de Strasbourg.

2020-2021:

- *Algebra II* in first year of Bachelor's degree of Sciences for Health, mathematics course, at Université de Strasbourg.
- Teaching assistant in *Probabilities and Statistics* in second year of Bachelor's degree of Extended Mathematics and Physics at Université de Strasbourg.
- *Texts of Option A (Probabilities and Statistics)* in the preparation to agrégation externe de mathématiques at Université de Strasbourg.
- *Analysis I* in first year of Bachelor's degree of Sciences for Health, mathematics course, at Université de Strasbourg.
- Teaching assistant in *Modeling - Probability* in the preparation to agrégation externe de mathématiques at Université de Strasbourg.

2019-2020:

- Teaching assistant in *Probability Theory* in Master's Degree at École Polytechnique Fédérale de Lausanne.

2018-2019:

- Teaching assistant in *Introduction to Probability* in second year of Bachelor's Degree in Mathematics-Computer Science at Université Paris Diderot.
- Teaching assistant in *Remedial Lecture in Mathematics* in first year of Bachelor's Degree in Biology at Université Paris Diderot.

2017-2018:

- Teaching assistant in *Introduction to Probability* in second year of Bachelor's Degree in Mathematics-Computer Science at Université Paris Diderot.
- Teaching assistant in *Remedial Lecture in Mathematics* in first year of Bachelor's Degree in Biology at Université Paris Diderot.

2016-2017:

- Teaching assistant in *Introduction to Probability* in second year of Bachelor's Degree in Mathematics at Université Paris Diderot.
- Teaching assistant in *Introduction to Mathematical Reasoning* in first year of Bachelor's Degree in Mathematics-Computer Science at Université Paris Diderot.

COLLECTIVE RESPONSIBILITIES

2022-: Member of the council board of the Faculty of Mathematics and Computer Science of Université de Strasbourg.

SCIENTIFIC DIFFUSION

- Co-organizer of "Sciences, un métier de femmes" in Strasbourg, a scientific diffusion event targeted at female high school students, 2024-.
- Talk at the award ceremony of the 51th Rallye Mathématique d'Alsace, June 28, 2023.
- Talk at the award ceremony of the Wallach Award of the Alsace Academy, May 2, 2023.

- Rendez-vous des Jeunes Mathématiciennes et Informatiennes de Strasbourg, participation in the speed-meeting between female high school students and mathematicians, April 19, 2023.