




# Marielle Simon




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*Married with two children, born in 2018 and 2020*

## Employment History



- 2022-today  **Full Professor (Professeure des Universités)**. Université Lyon 1, France.
- 2021-2022  **Researcher** (part-time). Gran Sasso Science Institute, L'Aquila, Italy.
- 2016-2022  **Researcher (Chargée de recherches)**. Inria, Lille Nord Europe, France.

## Education





- 2019  **Habilitation Diploma**, Université de Lille, France  
Thesis title: *Microscopic derivation of degenerated diffusion phenomena*
- 2014-2015  **Post-doc** at PUC Rio de Janeiro (CAPES fellowship).
- 2011-2014  **PhD** in Mathematics, École Normale Supérieure de Lyon.
- 2008-2011  **Student** at École Normale Supérieure de Lyon

## Miscellaneous




### Awards

- 2019-2023  **PEDR ("Prime d'Encadrement Doctoral et de Recherche")**
- 2013  **For Women In Science**, L'Oréal France-UNESCO Program for PhD students.

### Coordination of research grants

- 2020-2022  **FEDER "Tremplin ERC"** (94 000€) Région Hauts de France and European Union.  
Title: *Description microscopique des transitions de phase.*
- 2020-2024  **ANR JCJC** (132 000€) French national grant for young researchers.  
Title: *Microscopic derivation of moving interfaces.*
- 2019-2020  **FAPESP-CNRS PRC grant** (20 000€) Cooperation France-Brazil.  
Title: *Approximation of partial differential equations by stochastic particle systems with weak and moderate interaction.*  
Partner: C. Oliveira (UNICAMP, Campinas)
- 2016  **PEPS Jeunes Chercheurs** (8 000€) CNRS, France.  
Title: *Mathematical derivation of the porous medium equation.*

### Supervision of research students

- M2 thesis  **Hugo Da Cunha** (2023).  
**Sonia Velasco** (2020).
- PhD  **Gabriel Nahum** (2020-2024). Cosupervision with P. Gonçalves.
- Post-doc  **Lu Xu** (2022).  
**Linjie Zhao** (2020-2022).

## Miscellaneous (continued)

### Organisation of conferences

- 2024 📌 **Probability/PDE Interactions: functional inequalities, optimal transport and particle systems**, CIRM Marseille. <https://conferences.cirm-math.fr/2988.html>
- 2023 📌 **Invited session at 43rd Conference on Stochastic Processes and their Applications**, Lisbonne, Portugal. <https://www.spa2023.org/>
- 2022 📌 **Asymmetry in interacting particle systems: microscopic and macroscopic effects**, Inria Lille. <https://project.inria.fr/asymmetryinlille/>
- 📌 **Probability/PDE Interactions: Interface Models and Particle Systems**, CIRM Marseille. <https://conferences.cirm-math.fr/2557.html>
- 📌 **Online conference on random graphs and interacting particle systems**. <https://www.math.univ-paris13.fr/~mallein/graphsandparticles2021/>

### Responsibilities

- 2023-today 📌 **Elected member** of CNU (*Conseil National des Universités*), section 26, collège A
- 📌 **Associate editor** for *Confluentes Mathematici* : <https://cml.centre-mersenne.org/>
- 📌 **Member of the Science Faculty Council** (*Conseil de la Faculté des Sciences*), Université Lyon 1.
- 2022-today 📌 **Member of the scientific committee** of the GDR (Groupement de Recherche) “Math-GeoPhy”, CNRS INSMI: <https://mathgeophy.math.cnrs.fr/>.
- 2020-2023 📌 **Appointed member of the CNU** (Comité National des Universités), Section 26.
- 2015-2019 📌 **Member of the jury of “Agrégation de Mathématiques”** (National competitive exam).


## Research Publications

Total number: 20 publications. 5 conference proceedings. 3 preprints.


### Online preprints

- 1 G. Barraquand, O. Blondel, and **M. Simon**. “Weakly asymmetric facilitated exclusion process.” ArXiv: math/2301.04689. (2023).
- 2 P. Gonçalves, G. Nahum, and **M. Simon**. “From exclusion to slow and fast diffusion.” ArXiv: math/2301.06585. (2023).
- 3 C. Erignoux, **M. Simon**, and L. Zhao. “Mapping hydrodynamics for the facilitated exclusion and zero-range processes.” Accepted for publication in *Annals of Applied Probability*. ArXiv: math/2202.04469. (2022).

### Journal Articles

- 1 C. Erignoux, **M. Simon**, and L. Zhao, “Asymmetric attractive zero-range processes with particle destruction at the origin,” *Stochastic Processes and Applications*, vol. 159, pp. 1–33, 2023.
- 2 T. Komorowski, J. Lebowitz, S. Olla, and **M. Simon**, “On the conversion of work into heat: Microscopic models and macroscopic equations,” *Ensaos Matemáticos, volume dedicated to E. Presutti 80th birthday*, vol. 38, pp. 325–341, 2023.
- 3 R. Ahmed, C. Bernardin, P. Gonçalves, and **M. Simon**, “A microscopic derivation of coupled SPDE’s with a KPZ flavor,” *Annales de l’Institut Henri Poincaré, Probabilités et Statistiques*, vol. 58, no. 2, pp. 890–915, 2022.  DOI: 10.1214/21-AIHP1196.

- 4 O. Blondel, C. Erignoux, and **M. Simon**, “Stefan problem for a nonergodic facilitated exclusion process,” *Probability and Mathematical Physics*, vol. 2, no. 1, pp. 127–178, 2021. [DOI: 10.2140/pmp.2021.2.127](#).
- 5 T. Komorowski, S. Olla, and **M. Simon**, “Hydrodynamic limit for a chain with thermal and mechanical boundary forces,” *Electronic Journal of Probability*, vol. 26, pp. 1–49, 2021.
- 6 F. Flandoli, C. Olivera, and **M. Simon**, “Uniform approximation of 2 dimensional navier–stokes equation by stochastic interacting particle systems,” *SIAM Journal on Mathematical Analysis*, vol. 52, no. 6, pp. 5339–5362, 2020. [DOI: 10.1137/20M1328993](#).
- 7 P. Gonçalves, N. Perkowski, and **M. Simon**, “Derivation of the stochastic Burgers equation with Dirichlet boundary conditions from the WASEP,” *Annales Henri Lebesgue*, vol. 3, pp. 87–167, 2020. [DOI: 10.5802/ahl.28](#).
- 8 T. Komorowski, S. Olla, and **M. Simon**, “An open microscopic model of heat conduction: Evolution and non-equilibrium stationary states,” *Communications in Mathematical Sciences*, vol. 18, pp. 751–780, Jan. 2020. [DOI: 10.4310/CMS.2020.v18.n3.a8](#).
- 9 O. Blondel, C. Erignoux, M. Sasada, and **M. Simon**, “Hydrodynamic limit for a facilitated exclusion process,” *Annales de l’Institut Henri Poincaré, Probabilités et Statistiques*, vol. 56, pp. 667–714, Jan. 2019. [DOI: 10.1214/19-AIHP977](#).
- 10 C. Erignoux and **M. Simon**, “Equilibrium fluctuations for the disordered harmonic chain perturbed by an energy conserving noise,” *Electronic Journal of Probability*, vol. 24, pp. 1–52, 2019. [DOI: 10.1214/19-EJP399](#).
- 11 C. Bernardin, P. Gonçalves, M. Jara, and **M. Simon**, “Nonlinear perturbation of a noisy hamiltonian lattice field model: Universality persistence,” *Communications in Mathematical Electron Physics*, vol. 361, pp. 605–659, Jul. 2018. [DOI: 10.1007/s00220-018-3191-z](#).
- 12 T. Komorowski, S. Olla, and **M. Simon**, “Macroscopic evolution of mechanical and thermal energy in a harmonic chain with random flip of velocities,” *Kinetic and Related Models*, vol. 11, no. 3, pp. 615–645, 2018. [DOI: 10.3934/krm.2018026](#).
- 13 C. Olivera and **M. Simon**, “Non-local conservation law from stochastic particle systems,” *Journal of Dynamics and Differential Equations*, vol. 30, pp. 1661–1682, Dec. 2018. [DOI: 10.1007/s10884-017-9620-4](#).
- 14 P. Gonçalves, M. Jara, and **M. Simon**, “Second order Boltzmann–Gibbs principle for polynomial functions and applications,” *Journal of Statistical Physics*, vol. 166, pp. 90–113, Jan. 2017. [DOI: 10.1007/s10955-016-1686-6](#).
- 15 C. Bernardin, P. Gonçalves, M. Jara, and **M. Simon**, “Interpolation process between standard diffusion and fractional diffusion,” *Annales de l’institut Henri Poincare (B) Probability and Statistics*, vol. 54, pp. 1731–1757, Jul. 2016. [DOI: 10.1214/17-AIHP853](#).
- 16 O. Blondel, P. Gonçalves, and **M. Simon**, “Convergence to the stochastic Burgers equation from a degenerate microscopic dynamics,” *Electronic Journal of Probability*, vol. 21, pp. 1–25, Mar. 2016. [DOI: 10.1214/16-EJP15](#).
- 17 T. Franco, P. Gonçalves, and **M. Simon**, “Crossover to the stochastic Burgers equation for the WASEP with a slow bond,” *Communications in Mathematical Physics*, vol. 346, pp. 801–838, Sep. 2016. [DOI: 10.1007/s00220-016-2607-x](#).
- 18 C. Bernardin, P. Gonçalves, M. Jara, M. Sasada, and **M. Simon**, “From normal diffusion to superdiffusion of energy in the evanescent flip noise limit,” *Journal of Statistical Physics*, vol. 159, pp. 1327–1368, Sep. 2014. [DOI: 10.1007/s10955-015-1235-8](#).
- 19 S. Olla and **M. Simon**, “Microscopic derivation of an adiabatic thermodynamic transformation,” *Brazilian Journal of Probability and Statistics*, vol. 29, pp. 540–564, Sep. 2014. [DOI: 10.1214/14-BJPS275](#).




- 20 **M. Simon**, “Hydrodynamic limit for the velocity-flip model,” *Stochastic Processes and their Applications*, vol. 123, no. 10, pp. 3623–3662, 2013.  DOI: 10.1016/j.spa.2013.05.005.

## Conference Proceedings








- 1 O. Blondel, A. Deshayes, C. Labbé, L. Maréché, and **M. Simon**, “Dynamics of interacting particle systems,” in *Journées MAS 2018 - Sampling and Processes*, ser. ESAIM: Proceedings and Surveys, vol. 68, 2020, pp. 52–72.
- 2 M. Fathi and **M. Simon**, “The gradient flow approach to hydrodynamic limits for the simple exclusion process,” in *From Particle Systems to Partial Differential Equations III*, Springer, Ed., ser. Springer Proceedings in Mathematics & Statistics, vol. 162, 2016, pp. 167–184.
- 3 F. Legoll, W. Minvielle, A. Obliger, and **M. Simon**, “A parameter identification problem in stochastic homogenization,” in *CEMRACS 2013 - Modelling and simulation of complex systems: stochastic and deterministic*, ser. ESAIM Proceedings, vol. 48, 2015, pp. 190–214.
- 4 **M. Simon**, “On the diffusion coefficient for the disordered harmonic chain perturbed by an energy conserving noise,” in *From Particle Systems to Partial Differential Equations II*, Springer, Ed., ser. Springer Proceedings in Mathematics & Statistics, vol. 129, 2015, pp. 355–370.
- 5 **M. Simon**, “Hydrodynamic limit for the velocity-flip model,” in *From Particle Systems to Partial Differential Equations*, Springer, Ed., ser. Springer Proceedings in Mathematics & Statistics, vol. 75, 2014, pp. 269–284.

## Short selection of invited talks

### Overview seminars and mini-courses

- 2023  **Séminaire Bourbaki du vendredi**. IHP Paris.  
Title: *Quelques propriétés d'invariance du mouvement brownien plan*.
- 2022  **Mini-school of GDR research group 'MathGeoPhy'**. IHP Paris.  
Title: *Équations hydrodynamiques comme limites de systèmes de particules stochastiques*.
-  **Forum Jeunes Mathématiciens et Mathématiciennes**. Université de Besançon.  
Title: *Limites hydrodynamiques de systèmes de particules soumises à des contraintes cinétiques*





### Research invited talks

- 2023  **21st Symposium: “Stochastic Analysis on Large Scale Interacting Systems”**. RIMS Kyoto, Japan.
-  **27th Rencontres Itzykson: “Fluctuations far from equilibrium”**. CEA Saclay.
- 2022  **Interacting Particle Systems and Hydrodynamic Limits**, CRM Montreal. (*online*)
- 2019  **Interactions PDE/Probability: particle systems, hyperbolic conservation laws**, CIRM Marseille.
-  **1st SFB International Workshop “Taming Complexity in Partial Differential Systems”**, University of Vienna, Austria.
- 2018  **Particle Systems and PDEs, 7th edition**, Palermo, Italy.
-  **Workshop of the Simons Semester “PDE/SPDEs, Functional Inequalities”**, Bedlewo Center, Poznan, Poland.
- 2016  **Oberwolfach Workshop: “Large scale stochastic dynamics”**, Oberwolfach, Germany.

## Short selection of invited talks (continued)

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### Diffusion and vulgarisation to large audience

- 2023     **Festival Image Sonore.** Caravane des Sciences, Boulot.  
Title: *Le hasard expliqué par les mathématiques.*
-  **Soirées Mathématiques de Lyon et Intervention en classes préparatoires de Reims.**  
Title: *Beaucoup de particules et un peu de hasard.*
- 2022     **Congrès Maths en Jeans.** Université de Dijon.  
Title: *Quelques caprices du hasard.*
- 2018-2023     **Intervention en collèges et lycées.** Dans le cadre de la *Fête de la Science, Programme Chercheurs Itinérants et Semaine égalité filles-garçons.*  
Around Lille, Dijon and Lyon.