

# Laetitia Colombani

Postdoc in Polytechnique in 2023-2025. I'm interested in several stochastic processes, in particular in ones that can be applied in biology.

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## CURRENT SITUATION

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### Ecole Polytechnique

Postdoctorate

Team PEIPS

Funded by the ERC SINGER obtained by Sylvie Méléard

Palaiseau, France

September 2023 - August 2025

## EXPERIENCE

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### Institute of Mathematical Statistics and Actuarial Science

Postdoctorate

Teams of David Ginsbourger and Riccardo Gatto, with the Department of BioMedical Research of Bern  
Funded by UniBE ID Grant (Interdisciplinary grant of the University of Bern) obtained by Riccardo Gatto.

Bern, Switzerland

September 2022 - August 2023

### Mathematical Institute of Toulouse

PhD student with teaching commitment

Toulouse, France

October 2019 - August 2022

## EDUCATION

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### PhD student in Probabilities

IMT (Institute of Mathematics of Toulouse)

“On asymptotic behaviour of stochastic processes on neuroscience”, supervised by Patrick Cattiaux and Manon Costa.

Defended on July 4th, 2022, in front of François Bolley (Reviewer), Gersende Fort (President of examination board), Eva Löcherbach (Reviewer), Christophe Poquet (Examiner)

Toulouse, France

October 2019 - August 2022

### ENS of Cachan (or Paris-Saclay)

End of bachelor degree, two master degrees.

Cachan, France

2015–2019

- **M2 Mathematics of randomness**, *University Paris-Sud. 2018-2019*  
Internship : Study of Hawkes processes (IMT, Toulouse ; supervised by Manon Costa and Patrick Cattiaux)
- **M2FESUP, Preparation of the “agrégation”** (French competitive exam for high school and university teacher), *ENS of Cachan. 2017-2018.*  
Probability option. Admitted at the 45th rank.
- **M1 Mathematics, Track Jacques Hadamard**, *ENS of Cachan and University Paris-Sud. 2016-2017*  
Internship : Study by simulations of bayesian estimation in non-linear mixed models in PK/PD (IRIS, Suresnes ; supervised by Adrien Tessier)
- **L3 Mathematics**, *ENS of Cachan and University Paris Diderot. 2015-2016*  
Internship : A semi-supervised learning approach to annotate medical data (CMLA, Cachan; supervised by Nicolas Vayatis and Charles Truong)

### CPGE - Preparatory class for “Grandes écoles”

Lycée Champollion, Grenoble. MP\* branch, Informatic option

Grenoble, France

2013–2015

## RESPONSIBILITIES

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- Representative of PhD Students in the Doctorale School EDMITT October 2019 –July 2022
- Co-organisator of workshop *New trends on Hawkes Processes* June 2022
- Organisator of the annual information day for PhD students in IMT November 2021
- Co-organisator of the annual information day for PhD students in IMT October 2020

### Peer-reviews

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- Stochastic Processes and their Applications

## STUDY GROUP

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- Member of the Chair **Mathematics and Biological Modelization** 2023 -
- Participation to **Mathematics, Biology and Health** group November 2021 - August 2022
- Participation to a study group on **Hawkes processes** Spring 2021

## PUBLICATIONS

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### Articles

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- [1] Patrick Cattiaux, Laetitia Colombani, and Manon Costa. “Limit Theorems for Hawkes Processes Including Inhibition”. In: *Stochastic Processes and their Applications* (2022). DOI: 10.1016/j.spa.2022.04.002.
- [2] Patrick Cattiaux, Laetitia Colombani, and Manon Costa. “Asymptotic Deviation Bounds for Cumulative Processes”. In: *Stochastic Processes and their Applications* 163 (2023), pp. 85–105. DOI: 10.1016/j.spa.2023.05.010.
- [3] Laetitia Colombani and Pierre Le Bris. “Propagation of Chaos in Mean Field Networks of FitzHugh-Nagumo Neurons”. In: *Mathematical Neuroscience and Applications* Volume 3 (2023). DOI: 10.46298/mna.9748.

### Submitted preprints

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- [4] Riccardo Turin, Juan Magalang, Javier Aguilar, Laetitia Colombani, Daniel Sanchez-Taltavull, and Riccardo Gatto. *Computation of the Distribution of the Absorption Time of the Drifted Diffusion with Stochastic Resetting and Mixed Boundary Conditions*. Submitted. 2023. arXiv: 2311.03939.

## TALKS

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- **Seminary of Probability**  
*January 2024, Rennes*
- **Poster in “Journées Math Bio Santé” (Math Bio Health Days)** organised by the research group MathSAV and the thematic group Mabiome  
*November 2023, Marne La Vallée*
- **Seminario de Probabilidades de Chile**  
*November 2023, Chile (videoconference)*
- **Seminary of Probability’s group**  
*November 2023, Polytechnique*
- **Seminary of Probability and Statistics**  
*October 2023, Besançon*

- **Potsdam Research Seminar in Probability Theory**  
*April 2023, Potsdam (Germany)*
- **Seminary of Probability and Statistics**  
*November 2022, Nice (France)*
- **Workshop of the project ANR EFI**  
*November 2022, Lyon (France)*
- **Seminary of Probability and Statistics**  
*November 2022, Nancy (France)*
- **MAS Days** organised by the MAS group (Stochastic modelisation and Statistic) of the SMAI (Société de Mathématiques Appliquées et Industrielles) - session Limit Theorems  
*August 2022, Rouen (France)*
- **Potsdam Research Seminar in Probability Theory** organised by Probability Theory Chaire  
*June 2022, Potsdam (Germany) (videoconference)*
- **Ecole d'été d'Aussois** organised by the chaire MMB (Mathematical Modelling and Biodiversity)  
*June 2022, Aussois (France)*
- **Workshop New trends on Hawkes Processes** organised by Anthony Réveillac, Mahmoud Khabou and I  
*June 2022, Mathematical Institute of Toulouse (France)*
- **Workshop Metastability, mean-field particle systems and non linear processes** organised by the ANR projects METANOLIN and QuAMPprocs  
*May 2022, St-Etienne (France)*
- **Workshop** organised by Statistics teams of Bern and IMT  
*May 2022, Bern (Switzerland)*
- **Mathematic, Biology and Health Group**  
*January 2022, Mathematical Institute of Toulouse (France)*
- **PhD day of team Probabilities**  
*January 2022, Mathematical Institute of Toulouse (France)*
- **Forum des jeunes mathématicien.ne.s (Young mathematicians fair)** organised by the association Femmes et Mathématiques (Women and Mathematics association)  
*December 2021, Besançon (France)*
- **Stochastic processes and statistical machine learning, III** organised by the Collège Doctoral Franco-Allemand (French-German Doctoral College)  
*November 2021, Potsdam (Germany)*
- **Colloque Jeunes Probabilistes et Statisticiens (Young Probabilists and Statisticians colloquium)** organised by the group MAS of the SMAI  
*October 2021, Ile d'Oléron (France)*
- **Seminary of SAMM: Statistics, Analysis and Multidisciplinary Modelisation**  
*October 2021, University Paris 1 Panthéon-Sorbonne 1*
- **Journées de travail sur les processus de Hawkes (Workshop on Hawkes processes)** organised by Arnaud Le Ny from LAMA  
*July 2021, IHP (Paris)*
- **Journées de Probabilité (Probability Days)** organised by University of Rennes  
*June 2021, Lorient*
- **PhD day of team Probabilities**  
*February 2021, Mathematical Institute of Toulouse*
- **Seminary of PhD students**  
*January 2021, Laboratory of Mathematics Jean Leray in Nantes (videoconference)*
- **Seminary of young mathematicians**  
*June 2020, Mathematical Institute of Orsay (videoconference)*
- **PhD and Post-doc day of team ESP**  
*November 2019, Mathematical Institute of Toulouse*

## Participation to workshops

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- **Probability meets Biology II**  
*June 2023, University of Bath*

## TEACHING

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### Ecole Polytechnique

Palaiseau, 2023 –2024

- In charge with Mao Fabrice Djete of the course **Mathematical Modeling** for 1st year of Bachelor (L1) (around 20h)  
*Taught in English. Probability. ODE. Applications in biology, biochemistry, economy.*

### University Paul Sabatier

Toulouse, 2021 –2022

- **Lectures and tutorials of Introduction to Statistics** for a class of L3 Biology (18h)  
*Basic facts in Probability. Estimation, confidence intervals. Statistical tests.*
- **Practical work on Tools for Discrete Maths** for two classes of L1 (2 x 6h)  
*(Python 3) Euclidean algorithm, exponentiation by squaring, congruences.*
- **Lectures and tutorials of Introduction to Statistics** for a class of L2 Biology (18h + 2h Pratical Work)  
*Basic facts in Probability. Estimation, confidence intervals. Statistical tests.*

### University Paul Sabatier

Toulouse, 2020 –2021

- **Tutorials of Mathematics** for two classes of L1 Biology (2 x 32h)  
*Probability, sequences, usual functions, derivation, integration, ODE*

### University Paul Sabatier

Toulouse, 2019 –2020

- **Tutorials of Mathematics** for a class of L1 Biology (32h)  
*Probability, sequences, usual functions, derivation, integration, ODE*
- **Practical work on Stochastic Modelisation** for M1 MAPI3 (Applied Mathematics for Engineering, Industry and Innovation) (around 32h)  
*(Python 3). Monte-Carlo Method, Gaussian Model, Branching process, Poisson process, etc.*

## POPULARIZATION, ETC.

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- Participation to the Budding math days, for L3 mathematics students, organized by the Fondation Mathématique Jacques Hadamar January 2024
- Participation to 2 scientific online speed meetings, for middle and high school girls, organized by the association Femmes et Mathématiques April and May 2023
- Talk about May 12 and Matilda effect, in the PhD student seminar of IMT 12th May 2022
- Scientific “speed dating” at the “Quai des savoirs” - cultural center dedicated to science and knowledge (Toulouse) to explain mathematical research to general public March 2022
- Mentoring of teenagers (around 15 years old) during their job shadowing for some days 2019 - 2022

## COURSES

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- **First aid course** (PSC1 in France)
- **Teaching:** How to help dyslexic students, Teaching in higher education, Didactic theatre...

## LANGUAGES

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- **French:** Native speaker
- **English:** Advanced
- **Spanish:** Intermediate

## INFORMATIC

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- **Python:** Usual practice
- **R, C++, Caml, Scilab:** Good knowledge