Current position:

Since September 2013, I am Associate Professor (*Maître de Conférences*) at Université Jean Monnet (UJM), in Institut Camille Jordan (ICJ: maths laboratory at Saint-Étienne and Lyon) and my teaching is at Télécom Saint-Étienne (TSE). I have been promoted *Hors Classe* (by CNU) in 2022.

Personal data:

Julian TUGAUT,

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Educational record:

2015: Habilitation degree in applied mathematics, UJM, *Hydrodynamical limits and applications.* (defended 01.12.2015). Referees: A. Guillin, P. Imkeller and T. Lelièvre.

2010: PhD in applied mathematics, Université Henri Poincaré (Now: Université de Lorraine), *Self-stabilizing processes in multi-wells landscapes* (defended 06.07.2010). Advisors: S. Herrmann and B. Roynette.

2005: Master at Université Paris 6 (Now: Sorbonne University).

2002–2006: Fellow at École Normale Supérieure de Cachan.

Research interests:

Kinetic systems, Granular media equation, Propagation of chaos, Functionnal inequalities, Large deviations, Optimization algorithms, Kalman filters, Reflected diffusions, chemotaxis...

Visiting positions:

2024: One weeks in United Kingdom. Invited by H. Duong.

2024: Two weeks in United States of America. Invited by L. Koralov.

2023: One week in United Kingdom. Invited by G. Pavliotis.

2022: Two weeks in Japan due to success to SAKURA program.

2021: Two weeks in Japan due to success to SAKURA program. *Canceled due to pandemie*.

2021: One week at Oslo and Trondheim (Norway) due to success to Asgard program 2019.

2018: Two weeks at MFO Oberwolfach (Germany) with M. Maurelli and G. dos Reis.

2017: Two weeks at Valparaiso (Chile). Invited by J.F. Jabir.

2016: One week at Edinburgh. Invited by M. Ottobre, G. dos Reis and L. Szpruch.

2010 – 2013: Post-doctoral position at the Bielefeld University.

PhD Students advising:

R. RAVAILLE (*reflected non-linear diffusions*, co-supervision with O. Alata). Defended 07/07/2021.

A. ALEKSIAN, since September 2020 (*metastability for self-interacting diffusions*, co-supervision with A. Kurtzmann). Defense planned on 20/11/2023.

H. AHNI, from November 2023 (*Limit properties of Langevin models and applications to cooperative multi-agent dynamics*, co-supervision with J.F. Jabir).

Editorial activities:

Associate Editor for Applicable Analysis.

PhD committee member:

L. MAURIN, referee (*Adaptive biasing algorithms: mathematical analysis and applications in molecular dynamics*, co-supervision between T. Lelièvre, P. Monmarché and J.-P. Piquemal). Defended 16/12/2021.

Other advising:

Two advising of engineer as apprentices, fourteen advising of engineer internships, two master internships, one research project internship, two internships of engineers at ICJ.

Awards:

RIPEC C3 (not automatic): 2023–2026.

Sabbatical (not automatic) of 96 hours in 2021–2022.

PEDR (Prime d'Encadrement Doctoral et de Recherche): ranked A, 2019 – 2023.

Sabbatical (not automatic) of 44 hours in 2017–2018.

Sabbatical (not automatic) of 44 hours in 2016–2017.

Organizations:

Organizer of the working group in Probability and Statistics at Saint-Étienne between September 2014 and February 2020. Let us emphasize that computer scientists were participating in this working group.

Main organizer of a workshop on *Gaussian Processes*, Saint-Étienne, November 2017.

Main organizer of a workshop on *Gaussian Processes*, Saint-Étienne, October 2018.

Main organizer of a workshop on *Non-linear processes*, Saint-Étienne, July 2019.

Co-organizer of a workshop on *Metastability* (common meeting between two ANR projects), Saint-Étienne, November 2020. *Postponed to May 2022 due to pandemie*.

Co-organizer of a workshop on *Metastability, non-linear processes and Artificial Intelligence*, Saint-Étienne, July 2021. *Canceled due to pandemie*.

Co-organizer of a workshop on *Chemotaxis*, Sendai, October 2022.

Co-organizer of a workshop on *Stochastic processes and metastability*, Nancy, June 2023.

Invited presentations

Julian Tugaut has delivered talks in more than 50 seminars in universities and research centers in France and abroad (including École Polytechnique, Hausdorff center for mathematics Bonn, Technische Universität Berlin, Weierstrass Institute Berlin, Maxwell Institute Edinburgh, Santiago, Oslo, Imperial College of London). He was invited to give presentations in 14 international conferences and workshops. See http://tugaut.perso.math.cnrs.fr/talks.html for a complete list.

Julian Tugaut has been invited to lecture in the following doctoral school: Sinaïa 2016, 12h-lectures on large deviations, Romania, July 2016.

Past grant

METANOLIN (Metastability for Non-linear processes), Funding Source: ANR (French National Research Agency), **87 696 euros**, Period: October 2019 – March 2024.

Before, during and after the blow-up in the analysis of chemotaxis models: macroscopic and microscopic viewpoints, Funding Source: Programme Hubert Curien SAKURA, **12 000 euros**, Period: 2021–2022.

Non-linear processes, Funding Source: Asgard program, **travel and per diem for one week in Norway**, Period: 2020 (postponed to November 2021 due to pandemie).

Non-linear reflected processes with applications to batteries model (Research In Pairs), Funding Source: MFO (Oberwolfach, Germany), **two weeks of per diem**, Period: June 2018.

Funding for organization of workshops

Metastability, non-linear processes and Artificial Intelligence, Funding Source: INSMI, **3 400 euros**, Period: 2021 (canceled due to pandemie).

Metastability, Funding Source: ICJ, **1 500 euros**, Period: 2020 (canceled due to pandemie).

Non-linear processes, Funding Sources: Fédération MARA (federation of mathematics in Rhône-Alpes-Auvergne region), Labex MiLyon, ICJ, and UJM, **9 100 euros**, Period: 2019.

Random models and applications, Funding Sources: UJM and Labex MiLyon, **7 500 euros**, Period: 2017 and 2018.

Teaching:

2024–2025 at TSE. **252 hours**. Lectures/Tutorials of Probability and Statistics, Signal Processing, some supervising and responsabilities.

2023–2024 at TSE. **214 hours**. Lectures/Tutorials of Probability and Statistics, Signal Processing, some supervising and responsabilities.

2022–2023 at TSE. **234 hours**. Lectures/Tutorials of Probability and Statistics, Signal Processing.

2021–2022 at TSE. **96 hours**. Lectures/Tutorials of Probability and Statistics.

2020–2021 at TSE. **208 hours**. Lectures/Tutorials of Probability and Statistics, Signal Processing.

2019–2020 at TSE. **239 hours**. Lectures/Tutorials of Probability and Statistics, Signal Processing.

2018–2019 at TSE. **227 hours**. Lectures/Tutorials of Probability and Statistics, Signal Processing.

2017–2018 at TSE. **150 hours**. Lectures/Tutorials of Probability and Statistics, Signal Processing.

2016–2017 at TSE. **158 hours**. Lectures/Tutorials of Probability and Statistics, Operational research.

2015–2016 at TSE. **258 hours**. Lectures/Tutorials of Probability and Statistics, Operational research.

2014–2015 at TSE. **297 hours**. Lectures/Tutorials of Probability and Statistics, Signal Processing.

2013–2014 at TSE. **211 hours**. Lectures/Tutorials of Probability and Statistics, Signal Processing.

2009–2010 at UHP. **96 hours**. Tutorials of Algebra, Analysis, Probability, Statistics.

2006–2009 at INPL. **192 hours**. Tutorials of Algebra and Analysis.

Professional and scientific responsibilities:

Responsible of the maths department at TSE (since September 2024).

Member of the site committee of ICJ at Saint-Étienne (since 2016).

Nominated member of the PhD committee of ICJ at Saint-Étienne (2017–2023).

Responsible of evaluation of quality of a teaching block (four courses) at TSE (from September 2014 - except in 2021–2022). Responsible of evaluation of quality of two other teaching blocks (four courses) at TSE (in 2015 and 2016).

Member of jury at TSE (since 2013: discussions about 120 students per year).

Reviewer (about 50 papers) for Annals of Applied Probability, Journal of Functional Analysis, Electronic Communications in Probability, Stochastics, Bernoulli, Journal of Mathematical Physics, European Physical Journal, SIAM Journal on Control and Optimization, Stochastic Processes and their Applications, Potential Analysis, Nonlinearity, Annales de l'Institut Henri Poincaré Probabilités et statistiques, Stochastics and Dynamics, Royal Proceedings Edinburgh, Applied Mathematics and Optimization...

Scientific animation:

Participation to the press review of "Image des Mathématiques". https://images.math.cnrs.fr/-Revue-de-presse-.html (participation to 24 papers). From 2014 to 2018.

Participation to Math@Lyon (in High school) in 2017. It consists in going to High School to animate some workshops.

Participation to "stage hippocampe" at UJM in June 2022: it consists in supervising first year students of CPGE during three days.

Participation to Math@Lyon (in High school) in 2024. It consists in going to High School to animate some workshops.

Participation to "stage hippocampe" at UJM in June 2024: it consists in supervising first year students of CPGE during three days.

Publications

Julian Tugaut is the author of 32 published (or to appear) papers in international peer-reviewed journals. He is cited 319 times in the MR Citation Database (MathSciNet).

[P1] S. Herrmann and J. Tugaut, Non-uniqueness of stationary measures for self-stabilizing processes. *Stochastic Process. Appl.*, 120(7):1215–1246, 2010.

[P2] S. Herrmann and J. Tugaut, Stationary measures for self-stabilizing processes: asymptotic analysis in the small noise limit. *Electron. J. Probab.* 15 (2010), no. 69, 2087–2116.

[P3] J. Tugaut, McKean-Vlasov diffusions: from the asynchronization to the synchronization. *C. R. Math. Acad. Sci. Paris* 349 (2011), no. 17-18, 983–986.

[P4] S. Herrmann and J. Tugaut, Self-stabilizing processes: uniqueness problem for stationary measures and convergence rate in the small-noise limit. *ESAIM Probab. Stat.* 16 (2012), 277–305.

[P5] J. Tugaut, Exit problem of McKean-Vlasov diffusions in convex landscapes. *Electron. J. Probab.* 17 (2012), no. 76, 26 pp.

[P6] J. Tugaut, Self-stabilizing processes in multi-wells landscape in $\mathbb{R}^d$ - Convergence. *Stochastic Processes and Their Applications* 123 (2013), no. 5, 1780–1801.

[P7] J. Tugaut, Convergence to the equilibria for self-stabilizing processes in double-well landscape. *Ann. Probab. 41 (2013), no. 3A, 1427–1460*

[P8] J. Tugaut, Self-stabilizing processes in multi-wells landscape in $\mathbb{R}^d$ - Invariant probabilities. *J. Theoret. Probab. 27 (2014), no. 1, 57–79*

[P9] J. Tugaut, Phase transitions of McKean-Vlasov processes in double-wells landscape. *Stochastics* 86 (2014), no. 2, 257–284

[P10] J. Tugaut, Captivity of mean-field particle systems and the related exit problems. *Probab. Math. Statist.* 35 (2015), no. 1, 143–159.

[P11] M. H. Duong, and J. Tugaut, Stationary solutions of the Vlasov-Fokker-Planck equation: existence, characterization and phase-transition. *Appl. Math. Lett.* 52 (2016), 38–45.

[P12] J. Tugaut. A simple proof of a Kramers' type law for self-stabilizing diffusions. *Electron. Commun. Probab.* 21 (2016), Paper No. 11, 7 pp.

[P13] S. Herrmann and J. Tugaut, Mean-field limit versus small-noise limit for some interacting particle systems. *Commun. Stoch. Anal.* 10 (2016), no. 1, Article 4, 39–55.

[P14] P. Del Moral, A. Kurtzmann and J. Tugaut, On the stability and the uniform propagation of chaos of a class of extended ensemble Kalman-Bucy filters. *SIAM J. Control Optim.* 55 (2017), no. 1, 119–155.

[P15] B. Dyda and J. Tugaut, Exponential rate of convergence independent of the dimension in a mean-field system of particles. *Probab. Math. Statist.* 37 (2017), no. 1, 145–161.

[P16] M. H. Duong, and J. Tugaut, The Vlasov-Fokker-Planck equation in non-convex landscapes: convergence to equilibrium. *Electron. Commun. Probab.* 23 (2018), Paper No. 19, 10 pp.

[P17] P. Del Moral and J. Tugaut. On the stability and the uniform propagation of chaos properties of ensemble Kalman-Bucy filters. *Ann. Appl. Probab.*, 28 (2018), no. 2, 790–850.

[P18] J. Tugaut. Exit-problem of McKean-Vlasov diffusions in double-well landscape. *J. Theoret. Probab.* 31 (2018), no. 2, 1013–1023.

[P19] J. Tugaut, Convergence in Wasserstein distance for self-stabilizing diffusion evolving in a double-well landscape. *C. R. Math. Acad. Sci. Paris* 356 (2018), no. 6, 657–660.

[P20] J. Tugaut, Exit-time of granular media equation starting in a local minimum. *Commun. Stoch. Anal.* 12 (2018), no. 1, Art. 3, 31–36.

[P21] P. Del Moral, A. Kurtzmann and J. Tugaut, On the stability and the concentration of extended Kalman-Bucy filters. *Electron. J. Probab.* 23 (2018), Paper No. 91, 30 pp.

[P22] G. dos Reis, W. Salkeld and J. Tugaut, Freidlin-Wentzell LDP in path space for McKean-Vlasov equations and the functional iterated logarithm law. *Ann. Appl. Probab.* 29 (2019), no. 3, 1487–1540.

[P23] J. Tugaut. A simple proof of a Kramers' type law for self-stabilizing diffusions in double-wells landscape. *ALEA Lat. Am. J. Probab. Math. Stat.* 16 (2019), no. 1, 389–398

[P24] J. Tugaut. Finiteness of entropy for granular media equations. *Probab. Math. Statist.* 39 (2019), no. 1, 75–84.

[P25] P. Del Moral and J. Tugaut. Uniform propagation of chaos and creation of chaos for a class of nonlinear diffusions. *Stoch. Anal. Appl.* 37 (2019), no. 6, 909–935.

[P26] M. H. Duong, and J. Tugaut, Coupled McKean-Vlasov diffusions: wellposedness, propagation of chaos and invariant measures. *Stochastics* 92 (2020), no. 6, 900–943.

[P27] J. Tugaut. Exit-time of mean-field particles system. *ESAIM: Probability and Statistics*, 24 (2020) 399–407.

[P28] J. Tugaut. Captivity of the solution to the granular media equation. *Kinetic and Related Models*, 2021, 14 (2) : 199–209.

[P29] D. Adams, R. Ravaille G. dos Reis, W. Salkeld and J. Tugaut, Large Deviations and Exit-times for reflected McKean-Vlasov equations with self-stabilizing terms and superlinear drifts. *Stochastic Processes and Their Applications* 146 (2022), 164–310.

[P30] P.-E. Chaudru de Raynal, H. Duong, P. Monmarché, M. Tomasevic and J. Tugaut, Reducing exit-times of diffusions with repulsive interactions. *ESAIM Probab. Stat.* 27(2023), 723–748.

[P31] A. Aleksian, P. Del Moral, A. Kurtzmann and J. Tugaut, On the convergence and the exit-problem for self-interacting diffusions. *ESAIM Probab. Stat.* 28(2024), 46–61.

[P32] A. Aleksian, A. Kurtzmann and J. Tugaut, Exit-problem for a class of non-Markov processes with path dependency. In revision in *Probability Theory and Related Fields* (48 pages).

[P33] J. Tugaut, Granular media equation with double-wells external landscape: limiting steady state. To appear in *C. R. Math. Acad. Sci. Paris* (4 pages).

[P34] A. Aleksian and J. Tugaut, Measure-dependent non-linear diffusions with superlinear drifts: large deviations principle and asymptotic behavior of the first exit-times. In revision in *Electronic Journal of Probability* (42 pages).

[P35] J. Tugaut, On the steady states for the granular media equation: stability in the small-noise limit and rate of convergence. Submitted (22 pages).

[P36] J.-F. Jabir and J. Tugaut, A Kramers'type law for the first collision-time of two self-stabilizing diffusions and of their particle approximations. Writting in process (42 pages).

[P37] P.-E. Chaudru de Raynal and J. Tugaut, Competition between common noise and idiosyncratic noise in the small-noise limit for Ornstein-Uhlenbeck McKean-Vlasov diffusions: Large deviations principle and first hitting-times. Writting in process (18 pages).

[P38] Hong Duong, Grigorios Pavliotis and J. Tugaut, Coupled McKean-Vlasov diffusions. Writting in process (17 pages).