Thomas Peyrat — Curriculum Vitae

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My research work focuses on the modeling and analysis of event-driven stochastic systems, with applications to risk analytics, stress testing, and data-driven decision-making in finance and insurance. With a background combining applied mathematics engineering, actuarial science, and industry-oriented R&D, I aim to develop interpretable and computationally tractable tools for understanding emerging risks—such as cyber and climate risks—and for improving decision processes under uncertainty.

Research Interests

Event-Driven Stochastic Modeling – multivariate point processes, self-exciting dynamics, and probabilistic modeling of interacting and rare events.

Malliavin Calculus and Poisson Functionals – chaos expansions, approximating models, and uncertainty quantification for interacting event-driven stochastic systems.

Machine Learning for Stochastic Processes – data-driven calibration, generative models, and simulation-based inference for counting processes with stochastic intensities.

Decision & Risk Analytics – stress testing, scenario design, and data-informed decision-making for emerging risks (mainly cyber and climate).

Education

2023 – 2026 **Ph.D. in Applied Mathematics (Industrial Partnership), ENSAE – Institut Polytechnique de Paris / CREST / IMT**
Thesis: *Risk modeling using endogenous-correlation processes with a selection factor.*

2021 – 2022 **M.Sc. in Actuarial Science, Université Paris Dauphine — PSL**
Thesis: *Cyber risk: modeling silent-cyber accumulation for insurance portfolios.*

2017 – 2022 **INSA Lyon — National Institute of Applied Sciences**
Engineering degree with a specialization in Applied Mathematics, Statistics and Computational Modeling.

Summer Schools

August 2025 **Doctoral Colloquium on Risk Analytics, Ca' Foscari — Venice, Italy**
Session: *New challenges on long-run risks.*

September 2025 **Doctoral Colloquium on Risk Analytics, Ca' Foscari — Venice, Italy**
Session: *AI for Risk.*

Research Publications

1. C. Hillairet, T. Peyrat, and A. Réveillac, *Multivariate self-exciting processes with dependencies*, 2025. URL: arXiv%20preprint%20arXiv:2503.15958.

2. Hillairet, Caroline, Peyrat, Thomas, and Réveillac, Anthony, "A non-compensated clark–ocone formula for functionals of counting processes," *ESAIM: PS*, vol. 29, pp. 158–183, 2025. DOI: 10.1051/ps/2025003.

Ongoing Work

Confidential, contact me for more details.

Relevant Experiences

Work Experience

2023 – **Exiom Partners, Consultant.** Regulatory and risk analytics for insurance clients. Developed data pipelines and calibration tools using SQL, Python, and SAS for large-scale policyholder datasets; built and validated Solvency II internal-model components (Natixis BPCE); designed spatial hail-risk analytics for portfolio and strategic steering (Groupama).

2023 – 2025 **ENSAE Paris, Teaching Assistant.** Introduction to Financial Mathematics; Applied Statistics Project.

2022 **Milliman France, R&D Intern.** Developed a stochastic network-based epidemiological model to quantify silent-cyber accumulation risk for insurance companies.

Applied Projects as Supervisor

2023 – 2024 **Wildfire Analytics.** Modeling wildfires using log-Gaussian Cox processes and Pareto severity distributions to assess climate-change impacts on French regions.

Blockchain Management. Miner–manager model for crypto-pool management and allocation strategies.

Hail Risk. Data analysis and machine-learning modeling of hail risk in insurance portfolios for pricing and underwriting support.

Cyber Analytics. Design of a dynamic cyber-risk framework for insurance risk quantification.

2024 – 2025 **Mortality Modeling.** Regime-switching spatio-temporal mortality model to evaluate the impact of heat waves on mortality in France.

Cyber Risk. Analysis and exploitation of cybersecurity data and threat frameworks to build dynamic insurance risk analytics and management tools.

2025 – 2026 **AI Fairness.** Analytics for fairness-aware insurance pricing algorithms.

Behaviour Analytics. Modeling policyholder behaviour for lapse-risk management and decision support.

Community Involvement

2019 – 2022 **Junior INSA Services, Business Development Manager.** Led business development and client acquisition; built and maintained relationships with industry partners.

2019 – 2021 **Tuteur Ô Talents.** Volunteer tutor providing academic support and career guidance to high-school students from disadvantaged backgrounds in Toulouse.

Conferences

Conferences as a Speaker

April 2026 — **International Conference on Stochastic Control and Games for Risk and Regulation** – Hammamet, Tunisia.

June 2025 — **SIAM Conference on Financial Mathematics and Engineering (FM25)** – Miami, USA.*Session: Jump Models and their Applications in Finance and Control.*

May 2025 — **Perspectives on Actuarial Risks in Talks of Young Researchers (PARTY)** – Liverpool, UK.*Session: Societal Impacts of Actuarial Research.*

March 2025 — **Hawkes Seminar** – Paris, France.*Séminaire Hawkes.*

Bachelier Doctoral Seminar – Paris, France.*Séminaire doctorants.*

February 2025 — **Les probabilités de demain** – Paris, France.*Une exploration dans la modélisation actuarielle.*

January 2025 — **New Advances on Hawkes Processes for a Better Risk Quantification** – Padova, Italy.*Contributed talk.*

October 2024 — **International Conference on Stochastic Control and Games for Risk and Regulation** – Hammamet, Tunisia.*Contributed talk.*

June 2024 — **Cyber Risk and Insurance France–Berkeley Conference** – Berkeley IEOR, Berkeley, USA.*Contributed talk.*

April 2024 — **Non-Life Insurance Days** – Rouen, France.*Adapting to an inflationary and increasingly risky environment.*

Conferences as an Organizer

November 2026 — **International Conference: Mathematical Advances on Emerging Risks** – Mérida, Mexico.*Co-organizer.*

Personal Experiences

Music

2016 – Present — **Music Production.** Electronic and acoustic piano compositions; ongoing personal projects and collaborative productions.

2010 – 2016 — **Les chanteurs du Lycée.** Performed in international tours (Eastern Europe, Italy, Switzerland) and major cultural events including diplomatic receptions and Carmina Burana performances.

Athletics

2024 – Present — **Triathlon.** Competitor in amateur triathlon races (M category).

Personal Experiences (continued)

2016 – 2019 **University Rugby (France).** National University Champion with INSA Lyon; scrum-half in 15s and 10s teams.

2016 **Endurance Expedition.** Crossed the Pyrenees (GR10/HRP) on foot: 800 km in 23 days.

2013 – 2016 **Rugby (Mexico).** Two-time National Olympiad Champion with the State of Mexico Rugby 7s team; scrum-half for Tasmania U19.

Skills

Languages	French (native), Spanish (native), English (fluent), Portuguese (basic).
Programming	Python, R, Java, C++, SQL, SAS, LaTeX.
Analytics & Modeling	Point-process modeling (Hawkes, Cox, MSPD), risk analytics, statistical learning.
Tools	Git, Docker, Linux, TensorFlow/Keras, PyTorch, Scikit-learn.