

# Xavier MILHAUD

33 years old, french

Assistant Professor at ISFA, University of Lyon (France)

Ph.D. in Applied Mathematics, Fully Qualified Actuary

@ Address: xavier.milhaud@univ-lyon1.fr

Website: <http://xaviermilhaud.fr/en/index-en.html>

☎ Mobile: +33 6 64 98 65 89

☎ Job: +33 1 41 17 58 09

Board member of the European Actuarial Journal Association.

Board member of the french Institute of Actuaries (IA). Jury member at IA.

Current research position: affiliated to the Finance and Insurance research lab at ISFA (University of Lyon 1).

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## RESEARCH

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### Published papers:

- ◆ X. Milhaud, V. Poncelet, C. Saillard, *Operational choices for risk aggregation in insurance: PSDization and SCR sensitivity*, Risks (2018), pp.1-30, accepted;
- ◆ X. Milhaud, C. Dutang, *Lapse tables for lapse risk management in insurance: a competing risk approach*, European Actuarial Journal (2018), pp.1-30, doi: <https://doi.org/10.1007/s13385-018-0165-7>;
- ◆ O. Lopez, X. Milhaud, P. Therond, *Tree-based censored regression with applications in insurance*, Electronic Journal of Statistics (2016), **10** (2), pp.2685-2716;
- ◆ F. Barsotti, X. Milhaud, Y. Salhi, *Lapse risk in life insurance: correlation and contagion effects among policyholders' behaviors*, Insurance: Mathematics and Economics (2016), **71**, pp.317-331;
- ◆ Milhaud X., *Exogenous and endogenous risk factors management to predict surrender behaviours*, ASTIN Bulletin (2013) **43** (3), pp.373-398, doi: 10.1017/asb.2013.2;
- ◆ Loisel S., Milhaud X., *From deterministic to stochastic surrender risk models: impact of correlation crises on economic capital*, European Journal of Operational Research (2011), **214** (2), pp.348-357;
- ◆ Milhaud X., Maume V., Loisel S., *Surrender triggers in Life Insurance: what main features affect the surrender behavior in a classical economic context?*, Bull. Français d'Actuariat (2011), **11** (22), pp.5-48;
- ◆ Milhaud X., Gonon M-P. and Loisel S., *Les comportements de rachat en Assurance Vie en régime de croisière et en période de crise*, Risques (2010), **83**, pp.75-80.

### Working papers:

- ◆ (2018) X. Milhaud, D. Pommeret, Y. Salhi, P. Vandekerckhove, *Comparison of Mixture Components*;
- ◆ (2017) O. Lopez, X. Milhaud, P. Therond, *Tree-based stochastic reserving in insurance*;
- ◆ (2017) C. Genest, X. Milhaud, *Aggregating correlated loss triangles, a credibility approach*;
- ◆ (2016) O. Lopez, X. Milhaud, *Medical malpractice in US*.

### Main talks:

- ◆ *Lapse tables for lapse risk management in insurance*, ANR LoLitA Conference (Paris), 01/2018;
- ◆ *Microlevel-reserving with Machine Learning, a comparison*, Colloquium AAI (Barcelone), 10/2017;
- ◆ *Experimental lapse tables for lapse risk management*, ASTIN Colloquium (Panama City), 08/2017;
- ◆ *Weighted decision trees applied to reserving in insurance*, EAJ Conference (Lyon), 09/2016;
- ◆ *Tree-based estimators for incomplete observations and insurance*, 12th ICOR (La Havana), 03/2016;
- ◆ *Stress tests for lapse risk: correlation and contagion*, CIRM Colloquium (Marseille), 02/2016;
- ◆ *Prediction of lifetimes by tree-based estimators*, Longevity 11 Conference (Lyon), 09/2015;
- ◆ *Surrenders in insurance and Solvency II*, Association of Asset & Liabilities Management, 03/2015;
- ◆ *Mass lapse scenario, a dynamic contagion process*, Chaire Risques Systémiques (ACPR), 01/2015;
- ◆ *Surrenders: risk factors and modelling*, ACPR (french regulator for bank/insurance sectors), 11/2014;
- ◆ *Tree estimators in censored regression: application to reserving*, EAJ Conference (Vienna), 09/2014;
- ◆ *Selection of GLM mixtures with a clustering approach*, MBC<sup>2</sup> Workshop (Catania), 09/2014;
- ◆ *Regression trees and duration models*, summer school of the Institute of Actuaries (Paris), 07/2014;
- ◆ *Clustering with mixtures of GLM*, 46<sup>th</sup> meeting of french statisticians, SFdS (Rennes) 06/2014;
- ◆ *Whole life contract lifetime: prediction of lapses*, IME conference (Copenhagen) 07/2013;
- ◆ *Surrenders in a competing risks framework, application with the [FG99] model*, AFIR seminar, 06/2013;
- ◆ *Modelling the heterogeneity of surrender behaviours by using GLM mixtures*, AFIR/ASTIN/IAALS Colloquia (Mexico), 10/2012.
- ◆ *GLM Mixture to manage the surrender's behaviour modelling*, IME conference (Trieste), 06/2011.
- ◆ *Surrenders in life insurance, copycat behaviours*, Summer School of the Institute of Actuaries, 06/2010.
- ◆ *Predictions of surrenders in saving business*, SFdS meeting (french association in statistics), 05/2010.

## Other academic activities:

- ★ Associate Editor at *Risks*;
- ★ Referee at *Insurance, Mathematics and Economics* (IME); *Risks*; *European Actuarial Journal* (EAJ); *European Journal of Operational Research* (EJOR); *Scandinavian Actuarial Journal*, ...;
- ★ Member of the National Research Project LoLitA (ANR project on Longevity and Lifestyle Adjustments), member of the Research Chair Data Analytics and Models for Insurance (sponsor: BNP ParisBas).

## Distinctions:

- ★ SCOR 2013 Award (best PhD in Actuarial Science);
- ★ Best paper award (IAALS section) in AFIR/ERM-ASTIN/IAALS colloquim (International Actuarial Association conference), Mexico City, october 2012;
- ★ Lloyd's Science of Risk runner-up prize with Stéphane Loisel, november 2011.

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## TEACHING

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### Academic (lectures and tutorials):

- ◆ *Data Science and statistical learning in actuarial science*, 37h, Master 2 in Actuarial Science (ISFA);
- ◆ *Advanced methods for pricing/reserving in non life insurance*, 34h, Master 2 in Actuarial Science (ISFA);
- ◆ *Modelling policyholder's behaviour in life insurance*, 8h, Master 2 in Actuarial Science (ISFA);
- ◆ *Resampling techniques, bootstrap and applications*, 12h, Master 1 in Actuarial Science (ISFA);
- ◆ *Introduction to R language*, 12h, L3 and Master in Econometrics and Statistics (Univ. Lyon 1);
- ◆ *Econometric models for pricing in insurance*, 20h, Master 2 Actuarial Science (ENSEA, Abidjan);
- ◆ *A posteriori VS a priori pricing*, 20h, Master 2 Statistics (Univ. Cheik Anta Diop, Dakar);
- ◆ *Generalized Linear Models in insurance*, 6h, Master 2 in Actuarial Science (ISFA, Univ. Lyon);
- ◆ *Credibility theory and applications*, 20h, Master 2 in Actuarial Science (Intern. Univ. of Rabat, Maroc);
- ◆ *Stochastic reserving in non-life insurance*, 18h, Master 2 IMSA (Univ. Aix-Marseille, Marseille);
- ◆ *Risk theory*, 20h, Master 1 in Finance and Actuarial Science at ENSAE ParisTech (Paris);
- ◆ *Statistical tools to model lapse risk*, 4h; Master 2 MO (hereafter denoted by M2MO, Univ. Paris VII);
- ◆ *Non-parametric and parametric estimation of copulas*; 6h; M2MO (Université Paris VII, Paris);
- ◆ *Statistical inference*, 4h, Master 1 (tutorials at ENSAE ParisTech).

### Work training in actuarial statistics:

- ◆ *Understanding and modelling the operational risk in finance and insurance*, 14h.
- ◆ *Non-life insurance mathematics: pricing and reserving techniques*, 14h.
- ◆ *Statistical tools for analysing Big Data with actuarial applications*, 14h.
- ◆ *Advanced pricing methods in non life insurance*, 16h.
- ◆ *Deterministic and stochastic reserving for aggregated loss triangles*, 16h.
- ◆ *Using the best open-source statistical software: R*, 16h.

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## EDUCATION

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[2013] *Qualification* in CNU sections 26 (applied mathematics) and 06 (management).

*Fully qualified* actuary and *fellow* of the International Actuarial Association (IAA);

[2009-2012] *Ph.D. thesis in applied mathematics* at University Lyon 1 and AXA Global Life (AGL) (french partnership named "convention CIFRE"). Title: *Model selection in GLM mixtures: an application to surrender risk in life insurance*. Defended on 7/06/2012, members of the jury: Hansjoerg Albrecher (president), Bernard Garel and Denys Pommeret (referees), Stéphane Loisel and Véronique Maume-Deschamps (supervisors), Vincent Lepez (examinator).

[2009-2011] *Actuary diploma and Master in actuarial and financial sciences* at Institut de Science Financière et d'Assurances (ISFA, University Lyon 1).

[2005-2008] *ENSIMAG engineer* (graduate level school of engineering in computer science and applied mathematics at INP Grenoble) + *Research Master* (finance and actuarial sciences, at ISFA Lyon).

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## EXPERIENCE AND PROJECTS

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[2016-today] **Assistant Professor at ISFA:** Institute of Finance and Actuarial Science, located at University Lyon 1, University of Lyon (France).

[2014-today] **Coordinator - Master in Actuarial Science at ENSEA:** selection, follow-up and teaching at ENSEA Abidjan, a well-known engineering school in Economics and Statistics.

[2015-2016] **Lecturer at ISFA (University of Lyon)** . Also member of the Research Chair Data Analytics and Models for Insurance (DAMI, sponsored by BNP ParisBas).

[2011-2015] **Responsible for the actuarial department at ENSAE ParisTech.** Various tasks:

- ◆ teaching, research and supervision of actuarial memoirs;
- ◆ management of the department, in charge of hiring teachers and selecting students, agenda;
- ◆ organization of actuarial seminars on current hot topics (longevity, long term care, Solvency II, ...);
- ◆ organizing and taking part into Master defenses (member of IA jury, member of ENSAE jury);
- ◆ go-between ENSAE ParisTech and the french Institute of Actuaries, as well as ENSAE ParisTech and insurance companies or banks offering actuarial internships (discuss and validate actuarial works).

[2008-2011] **Ph.D. thesis** : in the actuarial department of AXA Global Life. Implemented an RExcel IT tool to model lapse behaviours in saving business (endowments, general account, unit-linked contracts), integrated the impact of financial markets on policyholders' decisions in Switzerland, USA, Spain.

[2008] **Research memoir**: at University Laval (Québec, Canada); April-September. *Including temporal trends in credibility models* (Bühlmann-Straub, Hachemeister); contribution to the development of the R package *actuar*. Supervisor: Professor Vincent Goulet.

**Global**: various skills from AXA Global Life experience on different topics in modelling life insurance risks: *long term care, longevity, critical illness, disability, CAT reinsurance* and *Solvency II* (pillars 1 and 2).

**Many projects in finance and insurance** around the modelling of financial (jump diffusion processes, greeks) and insurance risks (P&C and Life), dealing with correlation effects and their impact on economic capital. *See my personal webpage for more details*: ✉ <http://www.xaviermilhaud.fr/en/projects.html>.

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## MATHEMATICS, FINANCE AND IT SKILLS

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**Statistics and Probability**: univariate and multivariate descriptive statistics, inferential statistics, tests, *statistics for finance and insurance*. Probability theory and applications. *Stochastic calculus* and applications, brownian motion, Ito formula. *Correlation* (copulas and common shock models). *Current research interests*: discriminant analysis and clustering, survival analysis, generalized linear models, finite mixture models, model selection, hidden Markov models.

**Finance, Insurance**: *financial markets; financial theory; corporate finance; risk management* in finance and insurance; accounting principles; ruin theory; stochastic models in *life* and *non life* insurance, *reinsurance* theory. Solvency II principles, pillar 1 and pillar 2 (ORSA).

**Numerical methods**: finite differences methods, partial derivatives equations, *numerical approximations* (Euler, Crank-Nicolson, Runge-Kutta, ...).

**OS / IT languages**: Unix, MacOS X, Windows / R, RExcel, VBA, C, Java, SQL, Matlab/Scilab, SAS, L<sup>A</sup>T<sub>E</sub>X.

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## OTHERS

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**Languages**: english, spanish and italian (good level), french (mother tongue).

**Sports**: tennis (best ranking 2/6), football, rugby, badminton, ping-pong, sailing and water-skiing.

**Travels**: lived 13 years in Africa, lots of trips in Europe and South America.