# Xavier MILHAUD

41 years old, 3 children, born in Aix-en-Provence, French

## PhD in Applied Mathematics, Fully Qualified Actuary

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*Current position*: Associate Professor at Aix-Marseille University (CNU section 26, Applied Mathematics). Researcher at the *Institute of Mathematics of Marseille* (I2M).

## RESEARCH

**Current statistical topics:**

✦ Statistical Learning Algorithms and Atypical Data;
✦ Machine Learning and Applications in Insurance and Oceanography;
✦ Mixture Models and Contamination Models;
✦ Regression Models and Survival Analysis in Actuarial Science.

**Published papers (18):**

✦ T. Garcia, L. Oms, A. Doglioli, X. Milhaud, D. Pommeret, M. Messié, P. Vandekerkhove, C. Lacour, G. Gregori, *A statistical approach to unveil phytoplankton adaptation to ocean fronts*, **Advances in Statistical Climatology, Meteorology and Oceanography** (2026);
✦ X. Milhaud, D. Pommeret, Y. Salhi, P. Vanderkerkhove, *Contamination-source based K-sample clustering*, **Journal of Machine Learning Research** (2024), **25**, p.1-32;
✦ X. Milhaud, D. Pommeret, Y. Salhi, P. Vanderkerkhove, *Two-sample contamination model test*, **Bernoulli** (2024), **30** (1), p.170-197;
✦ M. Valla, X. Milhaud, *Including individual Customer Lifetime Value and competing risks in tree-based lapse management strategy*, **European Actuarial Journal** (2024), **14**, p.99-144;
✦ P. Chatelain, X. Milhaud, *Estimation and prediction with data quality indexes in linear regressions*, **Computational Statistics** (2024), **39**, p.3373-3404;
✦ X. Milhaud, D. Pommeret, Y. Salhi, P. Vanderkerkhove, *Semiparametric two-sample admixture components comparison test: the symmetric case*, **Journal of Statistical Planning and Inference** (2022), **216**, p.135-150;
✦ X. Milhaud, *Unobservable heterogeneity, limited volume and pooling*, **L'Actuariel** (2021), **39**, p.42-44;
✦ O. Lopez, X. Milhaud, *Individual reserving and nonparametric estimation of claim amounts subject to large reporting delays*, **Scandinavian Actuarial Journal** (2021), **49** pp.35-53;
✦ O. Lopez, X. Milhaud, P.-E. Therond, *A tree-based algorithm adapted to microlevel reserving and long-development claims* , **ASTIN Bulletin** (2019), **49** (3), pp.741-762;
✦ X. Milhaud, V. Poncelet, C. Saillard, *Operational choices for risk aggregation in insurance: PSDization and SCR sensitivity*, **Risks** (2018), **6** (36), pp.1-22;
✦ X. Milhaud, C. Dutang, *Lapse tables for lapse risk management in insurance: a competing risk approach*, **European Actuarial Journal** (2018), **8** (1), pp.97-126;
✦ 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;
✦ X. Milhaud, *Classification and regression trees*, **L'Actuariel** (2015), **15**, pp.42-44;
✦ X. Milhaud, *Exogenous and endogenous risk factors management to predict surrender behaviours*, **ASTIN Bulletin** (2013), **43** (3), pp.373-398;
✦ S. Loisel, X. Milhaud, *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;
✦ X. Milhaud, V. Maume-Deschamps, S. Loisel, *Surrender triggers in Life Insurance: what main features affect the surrender behavior in a classical economic context?*, **Bulletin Français d'Actuariat** (2011), **11** (22), pp. 5-48;
✦ X. Milhaud, M.-P. Gonon et S. Loisel, *Surrender behaviors in Life Insurance under cruising regime and during crisis periods*, **Risques** (2010), **83**, pp. 76-81.

**Submitted papers (7):**

✦ X. Milhaud, D. Pommeret, Y. Salhi, P. Vanderkerkhove, *admix: an R package for estimation, test and clustering in admixture models*, **submitted**;

✦ J.-L. Gouthon, X. Milhaud, J. Garrido, *Accounting for temporal and spatial dependencies in multi-population forecasts: the Transformers approach*, **submitted**;
✦ M. Valla, X. Milhaud, *Time-penalized trees: consistency results and simulations*, **submitted**;
✦ J. Garrido, X. Milhaud, A. Olympio, *The definition of a French actuarial climate index; one more step towards a European index*, **submitted**;
✦ J.-L. Gouthon, X. Milhaud, *Impact of heat waves on mortality: extension of longevity models to account for global warming*, **submitted**;
✦ M. Dotta, X. Milhaud, D. Pommeret, *Detection of Atypical Behaviors Using Copulas*, **submitted**;
✦ J.-L. Gouthon, X. Milhaud, *A Spatiotemporal Clustering Algorithm Combining Multiple Data Sources: Application to Mortality*, **submitted**.

**Supervision of PhD and postdoc students (current or completed):**

✦ 2025-2028: PhD of Mathias Houegbenou, *Microlevel versus macrolevel reserving in P&C insurance*;
✦ 2025-2027: post-doc of Théo Garcia, *Statistical methods for studying biodiversity through phytoplankton in Mediterranean Sea*;
✦ 2024-2025: post-doc of Mathias Valla, *Climate risk, longitudinal data and machine learning*;
✦ 2023-2026: PhD of Jean-Luc Gouthon, *Deep learning and multipopulation longevity models*;
✦ 2023-2026: PhD of Maxime Dotta, *Fraud detection in Health Insurance via statistical learning*;
✦ 2021-2024: PhD of Mathias Valla, *Time dynamics in tree-based models and applications to life insurance surrender behavior*;
✦ 2020-2023: PhD of Pierre Chatelain, *Address-based pricing in individual home insurance.*

**Research projects:**

✦ 2026-2027: PI of the REAFINEP project, *Fine-scale altimetry reconstruction for phytoplankton study*, funded by CNRS (MITI call);
✦ 2026-2030: member of the research team of the *DIALog* Chair (Digital Insurance and Long-term risks, `https://chaire-dialog.fr`), funded by CNP Assurances and hosted at Institut Louis Bachelier;
✦ 2020-2025: PI and scientific director of the *DIALog* Chair (with K. Antonio, KU Leuven);
✦ 2022-2025: member of the research team of the rODEo project: order and disorder in a turbulent ocean (`https://rodeo-ocean.mio.osupytheas.fr`);
✦ 2015-2019: member of the *Data Analytics and Models for Insurance* Chair, BNP Cardif;
✦ 2013-2017: member of the ANR LoLitA project (Longevity and Lifestyle Adjustments);

**Administrative responsibilities and laboratory participation:**

✦ 2024- : member of the I2M Prospective Commission;
✦ 2022- : member of the I2M IT Commission;
✦ 2023-2024 : member of the I2M Laboratory Council;
✦ 2018-2021 : co-responsible (with Stéphane Loisel) for ISFA continuing education;
✦ 2014-2018 : Board of the Institut des Actuaires: deputy secretary then deputy treasurer;
✦ 2012-2015 : responsible for the specialized Master in Actuarial Science at ENSAE ParisTech.

**Software/library development:**

✦ Creator and maintainer of the R library `ACI` (Actuarial Climate Indexes, forthcoming);
✦ Creator, developer and maintainer of the R library `admix` (`https://CRAN.R-project.org/package=admix` and `https://xaviermilhaud.github.io/admix-Rpackage/`);
✦ Contributor to the R `actuar` package via the Hachemeister model (`https://cran.r-project.org/web/packages/actuar/index.html`).

**Conference participation and event organization:**

✦ MLISTRAL 2 Conference (CIRM, Marseille, 26-28 Nov. 2025): Organizing Committee member;
✦ Statistique Days (JdS, Marseille, June 2025): Organizing Committee member;
✦ MLISTRAL Conference (CIRM, Marseille, 22-25 Sept. 2022): main organizer;
✦ Summer School of the Institut des Actuaires (2014, Paris): main organizer;
✦ Numerous presentations in actuarial and statistics conferences (`xaviermilhaud.fr/en/publications`).

**Invited talks:**

✦ Invited speaker at the 9th Workshop on Pensions and Insurance (Univ. Barcelona), 11/2024;
✦ Research stay at the University of Barcelona, 11/2024;
✦ Invited speaker at the 11th Actuarial Science and Finance Conference, Samos, 05/2022;
✦ Invited speaker at CASS Business School, London (UK), 01/2020.

**Editorial activity - reviewer:**

✦ 2017-.: editorial board member of *Risks*;
✦ Statistics: reviewer for Electronic Journal of Statistics, Advances in Data Analysis and Clustering, Journal of Statistical Software, Scandinavian Journal of Statistics;
✦ Probability: reviewer for Journal of Applied Probability, European Journal of Operational Research;
✦ Actuarial: reviewer for Scandinavian Actuarial Journal, Insurance: Mathematics and Economics, ASTIN Bulletin, Risks, European Actuarial Journal, Annals of Actuarial Science.

**Awards:**

✦ SCOR Thesis Award (2013): best thesis in actuarial sciences;
✦ Best paper - IAALS section of the AFIR/ERM-ASTIN/IAALS conference (Mexico, Oct. 2012);
✦ Lloyd's Science of Risk runner-up prize (Nov. 2011), London (UK), with Stéphane Loisel.

## TEACHING

**Academic (lectures, tutorials and practicals):**

✦ *Statistics* (course in English), 56h, M1 MAS (Aix-Marseille University);
✦ *Machine Learning for Actuarial Science*, 30h, M1 MAS (Aix-Marseille University);
✦ *Non-life stochastic reserving*, 20h, M2 IMSA (Aix-Marseille University);
✦ *Duration models*, 30h, M2 MASS POP (Aix-Marseille University);
✦ *Statistics*, 56h, M1 MAS (Aix-Marseille University);
✦ *Introduction to R*, 30h, M1 DS+IMSA (Aix-Marseille University);
✦ *Probability and Statistics 2*, 60h, L3 MI (Aix-Marseille University);
✦ *Data Science in Actuarial Science*, 37h, M2 Actuarial (ISFA, Univ. Lyon);
✦ *Advanced pricing and reserving practices*, 34h, M2 Actuarial (ISFA);
✦ *Behavioral modeling in life insurance*, 8h, M2 Actuarial (ISFA, Univ. Lyon);
✦ *Resampling: bootstrap and applications*, 12h, M1 Actuarial (ISFA, Univ. Lyon);
✦ *Econometrics for pricing*, 20h, M2 Finance-Actuarial (ENSEA Abidjan);
✦ *A priori and a posteriori pricing*, 20h, M2 Mathematics (Univ. Cheik Anta Diop, Dakar);
✦ *GLM and IARD pricing supplements*, 6h, M2 Actuarial (ISFA, Univ. Lyon);
✦ *Credibility and Bayesian approaches*, 20h, M2 Actuarial (Intern. Univ. of Rabat, Morocco);
✦ *IARD reserving techniques*, 20h, M1 Actuarial (ISFA, Univ. Lyon);
✦ *Risk theory*, 20h, M1 (ENSAE ParisTech, Paris);
✦ *Surrender risk modeling*, 4h, M2 MO (Univ. Paris VII);
✦ *Parametric and non-parametric copula estimation*, 6h, M2 MO (Univ. Paris VII);
✦ *Inferential statistics*, 4h, M1 (ENSAE ParisTech, Paris).

**Professional training in statistics and/or actuarial science:**

✦ *Non-life insurance pricing using machine learning algorithms*, 14h;
✦ *Zonier and R implementation*, 14h;
✦ *IARD pricing models and applications*, 14h;
✦ *Non-life stochastic reserving*, 14h;
✦ *Operational risk quantification and management techniques in insurance*, 14h;
✦ *Excess-of-loss reinsurance treaty quotation*, 14h;
✦ *GLM pricing of construction insurance coverage*, 14h.

## MAIN EXPERIENCES

**[2021-]** Associate Professor at Aix-Marseille University (AMU), affiliated with I2M (*Marseille Institute of Mathematics*);

**[2020-2025]** Co-PI and scientific director of the DIALog Research Chair, funded by CNP Assurances and hosted at Institut Louis Bachelier (Fondation du Risque, Paris), with Katrien Antonio (KU Leuven);

**[2016-2021]** Associate Professor at the Institute of Financial and Insurance Sciences (ISFA, University Lyon 1), affiliated with the Actuarial and Financial Sciences Lab (LSAF);

**[2018-2021]** Co-responsible for ISFA continuing education (with Stéphane Loisel);

**[2016-2021]** Creation, supervision and coordination of joint-degree training agreements in Master in Actuarial Science, in Sub-Saharan Africa for University Lyon 1:
- at the International Insurance Institute (IIA, Yaoundé) since 2019;
- at the National School of Statistics and Applied Economics (ENSEA Abidjan) since 2016.

**[2016-2018]** Co-director of studies at the Centre for Actuarial Studies (Paris), continuing education in actuarial science. Supervision of actuarial theses, among others;

**[2016-2018]** Vice-president of the Steering Committee of the European Actuarial Journal Association (representing France);

**[2014-2018]** Board of the Institut des Actuaires (Paris), deputy general secretary then deputy treasurer;

**[Sept. 2015 - Aug. 2016]** : Associate Professor at ISFA. Teaching, supervision of students (final year projects, M1 theses), and research within the DAMI Chair (Fondation du Risque, Paris);

**[Sept. 2011 - Aug. 2015]** Responsible for M2 Actuarial at ENSAE ParisTech. Tasks:
✦ teaching, tutoring of actuarial and research theses ($\simeq$ 50 supervised);
✦ organization of insurance seminars on current topics (4 per year);
✦ organization and participation in juries (Actuarial jury and ENSAE jury, $\simeq$ 30/year);
✦ liaison between ENSAE and Institut des Actuaires, and internship contact.

**[Nov. 2008 - Aug. 2011]** CIFRE PhD. Supervised by V. Maume-Deschamps and S. Loisel (University Lyon 1). Thesis: Mixtures of GLM and number of components: application to life insurance surrender risk. Thesis within the *R&D* department of AXA Global Life (AGL), supervised by S. Coriat then V. Lepez. Developed an RExcel tool for modeling surrender behavior in different countries (Spain, USA, Belgium, Switzerland). Integrated policyholders' cyclical behaviors into structural surrender laws.

**[Apr. 2008 - Oct. 2008]** Research internship. Actuarial School, Laval University (Canada), supervised by Prof. V. Goulet. *Credibility models and regression at the barycenter of time* (Hachemeister model).

## EDUCATION

**2013** *Qualification* in CNU sections 26 (Applied Mathematics) and 06 (Management).

**2009-2012** *PhD in Applied Mathematics*, Doctoral School of Economics and Management, University Lyon 1, CIFRE with AXA Global Life. Title: *Mixtures of GLM and number of components: application to life insurance surrender risk*. Defended on 06/07/2012 before a committee: Hansjoerg Albrecher (chair), Bernard Garel and Denys Pommeret (reviewers), Stéphane Loisel and Véronique Maume-Deschamps (supervisors), Vincent Lepez (examiner).

**2009-2011** *Actuarial diploma* and *Professional Master* in Actuarial and Financial Sciences at ISFA Lyon (University Lyon 1).

**2005-2008** *Engineer ENSIMAG* (INPG), *Research Master* (Finance, Actuarial Science) at ISFA.

## OTHER INFORMATION

**Languages**: English (professional level), Spanish, and Italian (intermediate), French (native).
**Sports**: Tennis (highest ranking 2/6), scuba diving (level 2), kitesurf, surfing, water skiing, football.
**Travel**: 13 years living in Africa, and numerous trips in Europe and South America.