Oskar Laverny

Maître de Conférences
Actuaire Qualifié IA

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1   Current position

Since 2023   **Maître de Conférences (Assistant professor)**,
UMR 1252 SESSTIM, Aix-Marseille Université, Marseille, France

Research: My researches deal with dependence structures from both thoeretical and applied points of view: estimation, tests, sampling, etc. In particular:

- High dimensional statistics: sparse dependence structures, copulas & factor models.
- Actuarial sciences: survival analysis, Non-life reserving, Dependence modeling & more.
- Biostatistical applications: Relative survival analysis, cancer registries, net survival, etc.

Teaching: Statistics and computer sciences at SESSTIM, in M2 Artificial Intelligence for Public Health (AI4PH) & M2 Quantitative methods for health research (MQERS), in French and English:

- Multivariate exploratory methods: PCA, ICA, PLS regression, ANOVA.
- Regression: Linear models, Logistic models, GLM, Mixed effects models.
- Machine learnings: K-means, SVM, Cart, Random forest, Neural nets.
- Survival analysis: Cox-PH, NA, Kaplan-Meier, Mixed effects.
- Computer science: R, Python.

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2   Academic training

2019 - 2022   **PhD in statistics**,
Institut Camille Jordan, Université Claude Bernard Lyon 1, Lyon, France,
SCOR SE, Paris, France,

Thesis title: Dependences structures and risk aggregation
Advisors: Esterina Masiello, Véronique Maume-Deschamps and Didier Rullière.
Keywords: Dependence structures, Thorin measures, Laguerre basis, copulas, non-parametric estimation, high-dimensional statistics
Earing date: May the 30th, 2022
Funding: Convention industrielle de formation par la recherche (CIFRE), SCOR & Univ. Lyon 1.
Jury:

Pr. Anne-Laure Fougères	Université Lyon 1	Présidente
Pr. Fabrizio Durante	Università del Salento	Rapporteur
Pr. Edward Furman	York University	Rapporteur
Pr. Fabienne Comte	Université Paris Descartes	Examinatrice
Pr. Olivier Lopez	Sorbonne Université	Examinateur
Dr. Esterina Masiello	Université Lyon 1	Directrice de thèse
Pr. Véronique Maume-Deschamps	Université Lyon 1	Directrice de thèse

2015 - 2018   **Diplôme d'actuaire**, *ISFA, Lyon*

Actuarial thesis: Reserving and reserve risk in (french) builder's insurence
Semester abroad: at University of Waterloo, Ontario, Canada
Qualification: Fully qualified actuary of the French Actuarial Institute since 2023.

2012 - 2015   **Bachelor in Mathematics**, *Université de Strasbourg, Strasbourg*

3   Past positions

2022-2023   **Post-doctoral researcher**,
Institut de statistiques, biostatistiques et actuariat, Louvain-La-Neuve, Belgique

Research subject: Penalised semi-parametric density estimation.
Funding: FNRS grant for the ARC "Imperfect Data: From Mathematical foundations to Applications in Life sciences" (IMAL).
Coauthor: Philippe Lambert.

Summer 2022   **Post-doctoral researcher**, *York University, Toronto, Canada*

Research subject: Vulnerability theory and application to survey data around COVID-19.
Length: Three months
Funding: Postodctoral grant from the *Fields Institute*
Coauthors: Edward Furman & Ida Ferara.

2019-2022   **PhD**, *ICJ, Univ Lyon 1 & SCOR SE, Lyon & Paris*

Research subjects: Contributions of patchwork copulas and high dimensional generalized gamma convolutions to the modeling and estimations of dependence structures. See Section 2 for details.

2021-2022   **Lecturer**, *Département d'économie, École normale supérieure, Lyon*

Head of teaching dep.: Sophie Hatte
Lecture topic: Statistical inference, bachelor level.

2020-2022   **Teaching assistant**, *Département de mathématiques, Université Lyon 1, Lyon*

Lecturers: Yoann Dabrowski, Éric Delaygue
Subjects: Probabilities and statistics, bachelor level.

2017-2018   **Alternant − Chargé d'étude actuarielles**, *L'Auxiliaire, Lyon*

Supervisor: Maxime Lenfant
Research subject: Reserving and reserve risk in (french) builders insurence.
Other activities: Implementation of reserving and risk analysis tools.

Summer 2016   **Intern**, *Diacrisis, Paris*

Supervisor: Olivier Beruyer
Subject: Implementation of economic and financial analysis.

4   Languages and programming languages

Languages   **French** native
English fluent
A few notions of **German** and **Esperanto**.

Programming languages   C++, Julia, R, Python, LaTeX, git, bash, VBA, HTML/CSS/JS/PHP/SQL.

5 Responsabilities

5.1 Editorial work

Since 2023   **Editor** for the Journal of Open Source Software.

5.2 Management

Summer 2024   **M2 Internship** of Rim Alahjal

Topic: Relative survival analysis in Julia. Currently doing a PhD, CNRS/INRIA, Grenoble

5.3 Research stays

June 2024   **Invited scholar**

Invited at University College London by Dr F. Javier Rubio (one week).

5.4 Event organization

July 2024   **Member of the organizing comitee of HEARSTAT2024**

4th Corsican Summer School on Modern Methods in Biostatistics and Epidemiology.

6 Research output

6.1 Currently writting

[W1] O. Laverny, R. Giorgi, and F. J. Rubio, "What are excess hazard and net survival?," 2024+.

[W2] O. Laverny, N. Grafféo, and R. Giorgi, "Relaxing the independence assumption in net survival analysis: A generalized poher-perme estimator," 2024+.

[W3] O. Laverny, I. Ferrara, and E. Furman, "From intention to injection: Insights from canada during covid-19," 2023+.

6.2 Submitted articles

[S1] R. Alhajal and O. Laverny, "NetSurvival.jl: A glimpse into relative survival analysis with Julia," 2024+. DOI: 10.48550/arXiv.2408.15655.

[S2] O. Laverny and P. Lambert, "Local moment matching with erlang mixtures under automatic roughness penalization," 2023+. DOI: 10.48550/arXiv.2402.15866.

[S3] O. Laverny, "Estimation of high dimensional gamma convolutions through random projections," 2022+. DOI: 10.48550/arXiv.2203.13741.

6.3 Published articles

[P1] O. Laverny and S. Jimenez, "Copulas.jl: A fully distributions.jl-compliant copula package," *Journal of Open Source Software*, vol. 9, no. 94, p. 6189, 2024. DOI: 10.21105/joss.06189.

[P2] O. Laverny, E. Masiello, V. Maume-Deschamps, and D. Rullière, "Dependence structure estimation using copula recursive trees," *Journal of Multivariate Analysis*, vol. 185, p. 104 776, 2021, ISSN: 0047-259X. DOI: 10.1016/j.jmva.2021.104776.

[P3] O. Laverny, E. Masiello, V. Maume-Deschamps, and D. Rullière, "Estimation of multivariate generalized gamma convolutions through Laguerre expansions," *Electronic Journal of Statistics*, vol. 15, no. 2, pp. 5158 –5202, 2021. DOI: 10.1214/21-EJS1918.

[P4]   O. Laverny, "Empirical and non-parametric copula models with the cort R package," *Journal of Open Source Software*, vol. 5, no. 56, p. 2653, 2020. DOI: 10.21105/joss.02653.

6.4   Non-peer-reviewed articles (vulgarization)

[V1]   O. Laverny, A. Ferriero, and E. Nisipasu, "Parametric divisibility of stochastic losses," *SCOR Paper, 43*, 2022. DOI: 10.48550/arXiv.2210.06034.

6.5   Open source software packages

[L1]   Julia package `NetSurvival.jl`: A julia package to perform non-parametric net survival estimation, 2024+.

[L2]   Julia package `RateTables.jl`: A julia interface for daily hazard rate tables from census datasets, 2024+.

[L3]   Julia package `Copulas.jl`: A fully Distributions.jl-complient and native copula package, 2022+. DOI: 10.5281/zenodo.7010221.

[L4]   Julia package `ThorinDistributions.jl`: Tools to estimate Thorin measures, 2021+. DOI: 10.5281/zenodo.4644109.

[L5]   R package `cort`: Classes and tools for some empirical and non-parametric copula models, 2020+. DOI: 10.5281/zenodo.4301435.

6.6   Thesis manuscript

[M1]   O. Laverny, "Dependence structures and risk aggregations," Availiable here, Ph.D. dissertation, Université de Lyon, 2022.

6.7   Invited talks

[I1]   Copulas.jl: Implementation of standard copula routines in Julia, CFE-CMStatistics 2023, 2023.

[I2]   Estimation of high dimensional Thorin measures through random projections, Statistics seminar, KU Leuven, 2023.

[I3]   Version control for academics, Young researcher days, ISBA , 2023.

[I4]   Estimation of high dimensional Thorin measures through random projections, Statistics Seminar, ISBA , 2022.

[I5]   (Virtual) Estimation of multivariate GGC through Laguerre expansions, QUANTACT , 2022.

[I6]   Estimation of multivariate generalized gamma convolutions, ASTIN Online Colloquium , 2021.

[I7]   Internal modeling without copula: Thorin classes' beauty, GT Actuariat et Risque Contemporains , 2021.

[I8]   Julia, the unique solution of an optimization problem, 10ème biennale SMAI , 2021.

6.8   Contributed talks

[C1]   Non-parametric estimation of net survival under dependence between death causes, 55èmes Journées de Statistique, Bordeaux , 2024.

[C2]   Non-parametric estimation of net survival under dependence between death causes, 38th International Workshop on Statistical Modelling (IWSM2024), Durham , 2024.

[C3]   Non-parametric estimation of net survival under dependence between death causes, 45th Annual Conference of the International Society for Clinical Biostatistics (ISCB2024), Thesaloniki , 2024.

[C4]   `Netsurvival.jl`: a glimpse into relative survival analysis, JuliaCon 2024, Eindhoven , 2024.

[C5]   `Copulas.jl`: a fully `distributions.jl`-complient copula package, JuliaCon 2023, MIT , 2023.

[C6] `Julia`: the unique solution to an optimisation problem, JuliaCon 2023, MIT , 2023.

[C7] Local moment matching with Gamma mixtures under automatic roughness penalization, 25th International Conference on Computational statistics (COMPSTAT2023), London , 2023.

[C8] Local moment matching with Gamma mixtures under automatic roughness penalization, 26th International Congress on Insurance: Mathematics and Economics (IME2023), Edinburg , 2023.

[C9] Local moment matching with Gamma mixtures under automatic roughness penalization, 37th International Workshop on Statistical Modelling (IWSM2023), Dortmund , 2023.

[C10] Local moment matching with Gamma mixtures under automatic roughness penalization, 54èmes Journées de Statistique, Bruxelles , 2023.

[C11] Parametric divisibility of stochastic losses, 26th International Congress on Insurance: Mathematics and Economics (IME2023), Edinburg , 2023.

[C12] Shine of multiple dispatch: the 'Copulas.jl' case, Journées Julia et Optimisation 2023, Paris, 2023.

[C13] Estimation of High-dimensional Thorin measures, 53èmes Journées de Statistique , 2022.

[C14] Estimation of High-dimensional Thorin measures, 9ème Rencontres Jeunes Statisticiens , 2022.

[C15] Mesure de Thorin et déconvolution en grandes dimensions, Séminaire des doctorants, ICJ , 2022.

[C16] (Virtual) Estimation of High-dimensional Thorin measures, Insurence Data Science , 2022.

[C17] (Covid cancelled) Construction of a copula estimator through recursive partitioning of the unit hypercube, 52èmes Journées de Statistique , 2021.

[C18] Estimation of GGC through Laguerre expansions, Colloque jeunes probabilistes et statisticiens , 2021.

[C19] Estimation of multivariate generalized gamma convolutions, MascotNum , 2021.

[C20] Cort: The Copula Recursive Tree, Actuarial Colloquium Paris , 2020.

[C21] Dependence structure estimation using Copula Recursive Trees, Online International Conference In Actuarial Science, Data Science and Finance , 2020.

[C22] (Virtual) Copula estimation via machine learning, Séminaire des doctorants, ICJ , 2020.