

# Victor Medina-Olivares

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## Education

- 2022 **PhD Applied Stats (*Distinction*)**, *The University of Edinburgh*, UK.
- 2014 **MSc Stats & OR (*Distinction*)**, *The University of Edinburgh*, UK.
- 2012 **Industrial Engineer (*Distinction*)**, *Universidad de Chile*, Chile.
- 2011 **BSc Physics (*Distinction*)**, *Universidad de Chile*, Chile.

## Research Experience

- 2023–Pres. **Research Assistant**, *TU Dortmund*, Dortmund, Germany.  
My role is divided between teaching, supervising master's students, and researching. Among the research projects I am currently involved in are:
  - Dynamic joint copula models
  - Interpretable deep neural survival networks
  - Semi-structured distributional regressions
- 2021–2023 **Research Assistant**, *Humboldt-University of Berlin*, Berlin, Germany.  
Among the projects in which I participated are:
  - A semi-supervised method for survival clustering
  - Deep neural network for dynamic survival prediction
  - Multi-state delinquency models with neural networks for credit risk applications
- 2019–2021 **Research Assistant**, *The University of Edinburgh*, Edinburgh, UK.  
General research assistance on exploratory data analysis, data wrangling, mathematical modelling and programming for the following projects:
  - Development of a mixture cure model with spatial frailties in a discrete-time setting. Led by Prof. R. Calabrese.
  - Deprivation index for Scotland considering spatial effects. Led by Dr. D. Alem.
  - Spatial dependence in microfinance credit default in China. Led by Prof. R. Calabrese.
  - Open Banking data to address financial vulnerability using Mixed Hidden Markov Models. Led by Prof. R. Calabrese.
  - Modelling extremal dependence (GEV) structure in mortgage default. Led by Prof. R. Calabrese and Prof. F. Lindgren.

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## Teaching Experience

- 2018–Pres. **Instructor & Content developer**, *DataCamp Inc.*, New York, USA.
- Author of the online course Mixture Models in R
- 2023–Pres. **Lecturer**, *TU Dortmund*, Dortmund, Germany.
- Advanced Bayesian Data Analysis (Stan & R). Course aimed at master's students in Data Science, Statistics and Econometrics.
  - Bayesian Causal Inference (Python, Stan & R). Seminar aimed at master's students in Data Science, Statistics and Econometrics.
- 2021–2023 **Lecturer**, *Humboldt-University of Berlin*, Berlin, Germany.
- Applied Predictive Analytics (Python). Seminar aimed at master's students in Information Systems.
  - Advances in Probabilistic Machine Learning (Python). Seminar aimed at master's students in Statistics and Data Science.
  - Information Systems (Python). Seminar aimed at master's students Information Systems.
- 2021–2022 **Teaching Assistant**, *Humboldt-University of Berlin*, Berlin, Germany.
- Advanced Data Analytics for Management Support. Lecturer Prof. S. Lessmann.
- 2019–2020 **Teaching Assistant**, *The University of Edinburgh*, Edinburgh, UK.
- Prescriptive Analytics (GAMS). Lecturer Dr. D. Alem.
  - Mathematical Programming (GAMS). Lecturer Dr. D. Alem.
- 2016–2017 **Lecturer**, *Universidad de Chile*, Santiago, Chile.
- Applied Econometrics (Python & R). Course aimed at students of the School of Economics and Business.
- 2007–2011 **Teaching Assistant**, *Universidad de Chile*, Santiago, Chile.
- Finance II. Lecturer Prof. J. M. Cruz.
  - Electromagnetism. Lecturers Prof. E. Cordaro, Prof. C. Romero and Prof. L. Vargas.
  - Mechanics. Lecturer Prof. H. Arellano.
  - Newtonian Systems. Lecturer Prof. H. Arellano.
  - Dynamical Systems. Lecturer Prof. F. Barra.

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## Work Experience

- 2017–2023 **Statistical Advisor**, *Universidad Central*, Santiago, Chile.
- I served as an external advisor for the Political and Social Networks Observatory at the School of Government and Communications (<https://www.ucestral.cl/equipo-observatorio>). Some of the projects I contributed to include:
- Conducting a study on the evolution of news and public opinion using topic modelling (LDA).
  - Developing text-mining web applications (Shiny) for analysing political discourse on Twitter (now X).
  - Assembling and maintaining database clusters using PostgreSQL.

2015–2018 **Research Analyst**, *Superintendency of Banks and Financial Institutions*, Santiago, Chile.

During my tenure as a researcher in the studies department, I focused on preparing proposals for prudential policies, conducting impact studies on the financial system, and developing quantitative tools to identify and monitor financial risks. Notable projects are:

- Developed a method for Bayesian inference of default correlations, utilizing historical defaults and a model of probabilities of defaults (PD). The inference was executed using Hamiltonian Monte Carlo. This method can be easily incorporated into risk management frameworks based on PD models.
- Contributed to the establishment of internal frameworks for estimating the probability of default for credit loans. This involved integrating individual classifiers, e.g. logistic regression, Elastic-Net, Naive Bayesian, SVM, KNN, NNets, and Ensembles (XGBoost and heterogeneous).
- Created standard loan loss reserve models for the Chilean financial system. These models were built using generalised linear models to fit observations and information theory to discretise continuous attributes.

2011–2013 **Consulting Engineer**, *CL Group Financial Consulting Ltda.*, Santiago, Chile.

I have been involved in several quantitative projects, contributing to the development of statistical tools and providing technical assistance for various financial institutions. Some notable projects include:

- Conducting training sessions to educate CorpBanca’s employees on the fundamentals of expected loss models.
- Evaluating the impact on market risk exposures using the effective maturities approach for mortgage loans at Security Bank. This project involved modelling the maturities through survival analysis.
- Estimating default probabilities for the mortgage portfolio of the Chilean financial system. This study, commissioned by the Association of Banks and Financial Institutions (ABIF), required characterizing debtors through cluster analysis and supervised models.

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## Honors and Awards

Feb 2024 **TU Dortmund Young Academy**. Program supporting scientists during the qualification phase to successfully acquire external research funding. TU Dortmund.

Apr 2020 **Seed Funding Centre for Statistics**. Small “pump-priming” grant (circa £10,000) aimed at fostering the advancement of substantial interdisciplinary research initiatives. Joint project with Prof. Calabrese and Prof. Lindgren. Centre for Statistics, The University of Edinburgh.

Jul 2018 **Becas Chile Scholarship (3YF, Declined)** for studies abroad, covering PhD tuition fees as well as an annual stipend of \$21,792. CONICYT, Chilean Government.

Apr 2018 **Edinburgh Global Research Scholarship (3YF)** for covering the difference between the overseas student tuition fee and the home/EU student tuition fee (the difference was £13,740 in 2018). 34 out of 878 were awarded. The University of Edinburgh.

Mar 2018 **Principal's Career Development Scholarship (3YF)** for fees at the UK/EU rate as well as an annual stipend of £15,000. 2 out of 38 were awarded (at School level). The University of Edinburgh.

Jul 2013 **Becas Chile Scholarship** for studies abroad, covering MSc tuition fees as well as an annual stipend of \$21,792. CONICYT, Chilean Government.

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## Research Talks

Aug 2023 The deep promotion time cure model. Credit Scoring and Credit Control XVIII Conference. Edinburgh, UK.

Dec 2020 Joint model of longitudinal and spatio-temporal survival data (**Invited Speaker**). CFE 2020. London, UK.

Oct 2020 Spatial dependence in microfinance credit default. Credit Scoring & Credit Rating Conference. Chengdu, China.

Dec 2019 Joint model of multivariate longitudinal outcomes and discrete-time survival data estimated with INLA (**Invited Speaker**). CFE 2019. London, UK.

Oct 2019 Joint models for longitudinal and survival data in credit scoring: incorporating autoregressive terms in discrete-time setting. Joint Modelling Workshop. Lancaster, UK.

Aug 2019 Joint models for longitudinal and survival data in credit scoring. Credit Scoring and Credit Control XVI Conference. Edinburgh, UK.

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## Technical Skills

**Programming Language.** Python, R, Stan, SQL, Bash, GAMS, Stata.

**Markup Languages.**  $\text{\LaTeX}$ , Markdown, Quarto, HTML.

**Version Control.** Git+Git(hub|lab).

**Tools.** DigitalOcean, Docker, Shiny, AWS, HPC (SGE and SLURM).

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## Languages

**Spanish.** Mother tongue.

**English.** Proficient.

**German.** Intermediate.

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## Publications

1. Medina-Olivares, V., Calabrese, R., Crook, J., & Lindgren, F. (2023). Joint models for longitudinal and discrete survival data in credit scoring. *European Journal of Operational Research*, 307(3), 1457–1473.
2. Medina-Olivares, V., Lindgren, F., Calabrese, R., & Crook, J. (2023). Joint models of multivariate longitudinal outcomes and discrete survival data with INLA: An application to credit repayment behaviour. *European Journal of Operational Research*, 310(2), 860–873.
3. Medina-Olivares, V., Lessmann, S., & Klein, N. (2023). The deep promotion time cure model. *arXiv Preprint arXiv:2305.11575*.

4. Medina-Olivares, V., Lindgren, F., Calabrese, R., & Crook, J. (2023). Joint model for longitudinal and spatio-temporal survival data. *arXiv Preprint arXiv:2311.04008*.
5. Medina-Olivares, V., & Calabrese, R. (2023). Detecting consumers' financial vulnerability using open banking data: Evidence from UK payday loans. *arXiv Preprint arXiv:2306.01749*.
6. Medina-Olivares, V., Calabrese, R., Dong, Y., & Shi, B. (2022). Spatial dependence in microfinance credit default. *International Journal of Forecasting*, 38(3), 1071–1085.
7. Medina-Olivares, V., & Biron, M. (2018). *Benchmarking classification algorithms for credit default probability: An application to the Chilean banking system*. SBIF (Working Paper in Spanish). [https://www.cmfchile.cl/portal/publicaciones/610/articles-29852\\_doc\\_pdf.pdf](https://www.cmfchile.cl/portal/publicaciones/610/articles-29852_doc_pdf.pdf)
8. Forteza, J., & Medina-Olivares, V. (2018). *Historial de morosidad y riesgo de crédito: Implicancias de prohibir el uso de registros históricos de datos comerciales caducos*. SBIF (Working Paper in Spanish). [https://www.cmfchile.cl/portal/publicaciones/610/articles-29853\\_doc\\_pdf.pdf](https://www.cmfchile.cl/portal/publicaciones/610/articles-29853_doc_pdf.pdf)
9. Forteza, J., Medina-Olivares, V., & Pulgar, C. (2018). *Marco general para el diseño de métodos estándar de provisiones por riesgo de crédito*. SBIF (Working Paper in Spanish). [https://www.cmfchile.cl/portal/publicaciones/610/articles-38847\\_doc\\_pdf.pdf](https://www.cmfchile.cl/portal/publicaciones/610/articles-38847_doc_pdf.pdf)
10. Biron, M., & Medina-Olivares, V. (2017). *Leveraging probability of default models for Bayesian inference of default correlations*. Paper presented at 3rd Conference on Banking Development, Stability, and Sustainability, Santiago, Chile. <https://www.sbif.cl/sbifweb/servlet/ConozcaSBIF?indice=C.D.A&idContenido=16698>