

Roel Verbelen

Statistician

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Profile

Experienced statistician at Finito Consulting with a PhD in business statistics and actuarial science from KU Leuven in Belgium. For the past 5 years at Finito I have utilised statistical and machine learning methods to provide analytical and actuarial advice to a wide range of commercial and governmental clients in Australia. Prior to consulting I worked as a researcher in academia focusing on the use of statistics and data analytics to solve business problems and innovate current practices in the general insurance sector. I have a strong university background in mathematics, statistics, and actuarial science and a passion for data science, technical modelling, and online learning. I regularly keep up to date with current advances in machine learning, the insurance industry, and the R community.

Experience

Jun 2018 **Statistician, Finito Consulting, Sydney, Australia**

- current
 - Customer behaviour modelling involving financial transaction data and call centre data to improve retention rates for personal car loans through targeted customer contact and effective pricing.
 - Building a pricing engine for a novel insurance offering that reflects the risk of not selling a property using historical real estate market data and machine learning algorithms.
 - Developing a claims fraud detection system involving a series of supervised and unsupervised machine learning techniques that identify potential fraudulent claims and triage and prioritise investigations.
 - Pricing telematics motor insurance products using new data sources obtained through telematics technology.
 - Constructing statistical models to analyse the effectiveness of risk management initiatives.
 - Designing, building and maintaining a claims leakage auditing product with interactive analytical dashboards enabling non-technical stakeholders to effectively manage claims costs, to identify root causes of leakage and to continuously improve the claims handling process.
 - Pricing and portfolio management for personal lines, commercial insurers and governmental schemes for various lines of business (e.g. workers' compensation, public liability, professional indemnity, motor and home).
 - Price optimisation involving competitor deconstruction modelling and customer price elasticity modelling.
 - Developing an internal R package for data visualisation, exploratory data analysis, predictive modelling and effective reporting.
 - Designing an indicator dashboard in R Shiny to monitor long tail risk portfolios, reveal market trends and enable proactive pricing, underwriting and portfolio actions.
 - Analytical dashboarding to monitor the performance of predictive models.
 - Organising knowledge sharing sessions within the statistical modelling team and conducting R training sessions.

Jun 2017 **Postdoctoral Researcher in Business Statistics and Actuarial Science, KU Leuven,**
– Mar 2018 Leuven, Belgium

- Conducting research in the field of general insurance, in particular on the use of micro-level, individual claims data for claims reserving.
- Developed the online course on [Valuation of Life Insurance Products with R](#) on the DataCamp platform, an online interactive learning platform on the use of R for data science, with Katrien Antonio (March 2023: 5,821 registered users).

Oct 2013 – Jun 2017 **PhD Researcher in Business Statistics and Actuarial Science**, *KU Leuven*, Leuven, Belgium

- Worked on diverse areas in the domain of general insurance, including:
 - Insurance pricing involving generalised additive models, tree-based machine learning, data driven binning, and sparse penalised regression.
 - Telematics insurance.
 - Claim cost modelling based on censored and truncated heavy-tailed data.
- Engaged with insurance companies in Belgium, the Netherlands and Italy in order to obtain large data sets from actuarial practice which drove the research on telematics pricing and individual claims reserving.
- Published 8 research articles to peer reviewed international journals. Additionally, one working paper is currently under revision.
- Presented at numerous international conferences, seminars and invited talks.
- Delivered workshop at the Institute of Actuaries in Belgium and in-house training at AON Benfield, a reinsurance broker.
- Teaching assistant for undergraduate courses in probability theory and statistics as well as graduate course in general insurance mathematics.
- Supervisor of 11 master thesis students from actuarial science, business engineering and statistics. Two master theses written under my guidance have received awards for their excellence.

Education

2013 – 2017 **PhD in Business Economics**, *KU Leuven*, Leuven, Belgium

Thesis: *Data analytics for insurance loss modeling, telematics pricing and claims reserving*.
Supervisors: Prof. Gerda Claeskens and Prof. Katrien Antonio.

2013 – 2018 **MSc in Financial and Actuarial Engineering**, *KU Leuven*, Leuven, Belgium

Summa cum laude with the congratulations of the Board of Examiners (Average grade: 93.98 %).
Thesis: *A micro-level reserving model to predict the daily IBNR claim counts*.

2013 – 2018 **MSc in Insurance Studies**, *KU Leuven*, Leuven, Belgium

Summa cum laude with the congratulations of the Board of Examiners (Average grade: 91.02 %).
Thesis: *Telematics insurance: Understanding the effect of individual policyholder's driving habits on the accident risk*.

2011 – 2013 **MSc in Statistics**, *KU Leuven*, Leuven, Belgium

Summa cum laude with the congratulations of the Board of Examiners (Average grade: 91.44 %).
Thesis: *Phase-type distributions & mixtures of Erlangs. A study of theoretical concepts, calibration techniques & actuarial applications*.

2008 – 2011 **BSc in Mathematics**, *Ghent University*, Ghent, Belgium

Summa cum laude (Average grade: 95.30 %).
Thesis: *Conditional logistic regression*.

Technical Skills

- Programming ■ Expert knowledge of **R** (co-author of the Relns package on CRAN).
■ Experienced in using **Git** (GitHub and Bitbucket), **Jira** and **Confluence**, **Python**, **SQL**, **SAS** (SAS Certified Base Programmer for SAS9), **Cloud Storage** (AWS and Azure), **RStudio Connect**, **Tableau**, **Microsoft Office** (Word, Excel, Outlook, OneNote, Powerpoint), **LaTeX**, **HTML** and **CSS**.
■ Working knowledge of **Matlab**, **EViews**, **WinBUGS**, **Maple**, **Java** and **High Performance Computing** using **Linux**.
- Modelling ■ H2O, XGBoost, GBM, Random Forests, GLM, Supervised and Unsupervised Learning, Regularisation Methods (Ridge, Lasso, Elastic Net), Mixed Effects Modelling, Time Series, Neural Networks & Deep Learning, Stacked Ensembles, Survival Models.
- Visualisation ■ ggplot2, plotly, leaflet, R Markdown, flexdashboard, shiny, shinydashboard.

Languages

Dutch	Mother tongue	German	Elementary proficiency
English	Full professional proficiency	Estonian	Elementary proficiency
French	Limited working proficiency		

Grants

- Spring 2017 **FWO Grant for a long stay abroad** at the Institute of Mathematics and Statistics at the University of Tartu, Estonia.
- Dec 2013 **IWT Doctoral Grant** for Strategic Basic Research for the project *Innovative pricing and reserving for non-life insurance* (no. 131173), from Jan. 2014 until Dec. 2017. IWT is the government agency for Innovation by Science and Technology. The grant provides salary plus working budget.

Awards

- August 2023 **Patrick Brockett & Arnold Shapiro Actuarial Award** awarded by the American Risk and Insurance Association (ARIA) for writing the best risk management and insurance article printed in an actuarial journal.
- April 2023 **NAAJ Annual Prize** awarded by the Society of Actuaries (SOA) for writing the best eligible paper published in the North American Actuarial Journal (NAAJ).
- February 2018 **Best Pitch Prize** awarded at the KU Leuven Datathon 2018, a data mining competition in Leuven, Belgium.
- May 2016 **Samos 2016 Presentation Prize** awarded for the 2nd best contribution during the 9th Samos Conference in Actuarial Science & Finance in Samos, Greece.
- Aug 2015 **ARC 2015 Presentation Prize** awarded by the Society of Actuaries (SOA) at the Actuarial Research Conference 2015 in Toronto, Canada.
- Apr 2015 **IBS Channel 2015 PhD Student Award** for best PhD student oral presentation at the 2015 Channel Network Conference of the International Biometric Society (IBS) in Nijmegen, the Netherlands.
- Mar 2014 **IA—BE Thesis Prize** awarded by the Institute of Actuaries in Belgium (IA—BE) for the best MSc thesis in actuarial science.

Awards for MSc & PhD papers written under my guidance

- 2017 Runner-up best presentation award during PARTY (Perspectives on Actuarial Risks in Talks of Young researchers) for Roel Henckaerts, presenting *Using risk factors in P&C insurance pricing: a data driven strategy with GAMs, regression trees and GLMs* by Henckaerts, Antonio, Clijsters & Verbelen.
- 2016 Adviser of the MSc thesis of Roel Henckaerts (titled: *Risk factors in P&C insurance pricing. A data driven strategy with GAMs, regression trees and GLMs*) which received the IA—BE thesis prize.
- 2015 Adviser of the MSc thesis of Maxime Clijsters (titled: *Dealing with continuous variables and geographical information in non-life insurance ratemaking. Practical solutions applied to a car insurance data set*) which received the Johan de Witt prize awarded by the Dutch actuarial association (AG-AI), the IA—BE thesis prize and the Belfius thesis prize for the best master thesis in actuarial and financial engineering.

Publications

In international journals, with peer review

- (9) Verbelen, R., Antonio, K., Claeskens, G. and Crevecoeur, J. (2022). Modeling the occurrence of events subject to a reporting delay via an EM algorithm. *Statistical Science*. 37(3), 394–410.
- (8) Devriendt, S., Antonio, K., Frees, E. W. and Verbelen, R. (2021). Sparse regression with multi-type regularized feature modeling. *Insurance: Mathematics and Economics*. 91, 248–261.
- (7) Henckaerts, R., Antonio, K., Côté, M.-P., and Verbelen, R. (2020). Boosting insights in insurance tariff plans with tree-based machine learning methods. *North American Actuarial Journal*, Published Online.
- (6) Crevecoeur, J., Antonio, K., and Verbelen, R. (2019). Modeling the number of hidden events subject to observation delay. *European Journal of Operational Research*, 277(3), 930–944.
- (5) Verbelen, R., Antonio, K., and Claeskens, G. (2018). Unraveling the predictive power of telematics data in car insurance pricing. *Journal of the Royal Statistical Society: Series C (Applied Statistics)*, 67(5), 1275–1304
- (4) Henckaerts, R., Antonio, K., Clijsters, M. and Verbelen, R. (2018). A data driven binning strategy for the construction of insurance tariff classes, *Scandinavian Actuarial Journal*, (8), 681–705
- (3) Reynkens, T., Verbelen, R., Beirlant, J. and Antonio, K. (2017). Modeling censored losses using splicing: a global fit strategy with mixed Erlang and extreme value distributions, *Insurance: Mathematics and Economics*, 77, 65–77.
- (2) Verbelen, R., Antonio, K., and Claeskens, G. (2016). Multivariate mixtures of Erlangs for density estimation under censoring and truncation. *Lifetime Data Analysis*, 22(3), 429–455.
- (1) Verbelen, R., Gong, L., Antonio, K., Badescu, A., and Sheldon, L. (2015). Fitting mixtures of Erlangs to censored and truncated data using the EM algorithm. *Astin Bulletin*, 45(3), 729–758.

In professional journals

- (2) Antonio, K. and Verbelen, R. (2015). Loss modeling using mixtures of Erlangs. *De Actuaris*, May 2015, 42–44.
- (1) Verbelen, R. (2015). Telematics insurance: the safer you drive, the less you pay. *ECONnect*, Faculty of Economics and Business KU Leuven, Dec. 2014 Jan. Feb. 2015, 44–45.