



Reacfin **Masterclass** (IA|BE CPD eligible)

Non-Life Reserving

Fully Online

About the **masterclass**

As Insurance is being impacted by new and disruptive technology, how will actuarial reserving techniques be impacted? Whilst triangle methods have traditionally been seen as the key methods in the reserving area, this may be challenged in the future by more complex expectations, improving technology, modelling capabilities, etc.

Reserving practices are expected to keep changing, as the influences of big data and regulatory requirements continue to evolve.

The aim of this workshop is to

- Present basic and more advanced actuarial/statistical techniques used in non-life reserving.
- Focus on some practical problems faced by reserving actuaries, by presenting practical examples and running case studies with the participants.
- Introduce more advanced techniques used in non-life reserving in order to open new perspectives on more granular reserving calculation, case estimates, etc.



Subscription is flexible for 1 to 4 modules. The total duration, that includes attending the webinars and the personal assignments, is estimated to 23.5 hours.

The whole training is worth 23.5 Continuous Professional Development (CPD) points at the Institute of Actuaries in Belgium (IA|BE) for the whole program, i.e. the 4 modules.



E-learning

Several e-learning modules or videos to build the foundations



- **Pedagogical** presentation of the concepts with examples
- To be followed by the participants **whenever they want** between the webinars as pre-requisites
- Available on **Reacfin's LMS platform** up to two months after the training



Webinars and case studies

7 webinars to consolidate and expand practical knowledge



- **Complementary** knowledge **topics** covered during the webinars
- Opportunity to **ask questions** through specific Q&A sessions
- Presentation of **practical examples**
- Performance of **case studies allowing to put learning into practice**
- Webinars will be recorded so that you can attend later if you were not available or want to review the material. **Recording** available for 2 months after the training

About the agenda

Module 1– Introduction to R programming language (Optional for R users - Total estimated duration: 5h – 5 CPD pts)

Webinar #1 – length: 2h30

- Fundamentals of R
- Data management
- Basics of R objects
- [Examples and exercises](#)

Pre-requisites:

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Webinar #2 – length: 2h30

- Conditions, loops and lists
- Functions
- Statistics
- [Examples and exercises](#)

Pre-requisites:

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Module 2 – Basics of non-life reserving: triangle methods in Excel (Total estimated duration: 6h – 6 CPD pts)

Webinar #3 – length: 1h30

- Reminder of key concepts and Q&A about E-learning 1
- Need for reserves in Insurance
- BeGaap reserves: IBNR, IBNER, Case Reserves, UPR, URR
- Solvency II best estimates: premium and claims provision
- The reserving process

Pre-requisites:

E-learning #1 – length: 1h30

- Non-life premium and premium provision
- Claims and claims provisions
- An introduction to Solvency II

Webinar #4 – length: 3h

- Most popular triangles methods (CL, BHF, ...)
- Practical considerations: incurred vs paid, attritional vs large, tail factor, smoothing, assumptions check
- [Case study](#): reserving calculation in Excel

Pre-requisites:

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Module 3 – Reserve Risk and Margin (Total estimated duration: 3h30 – 3.5 CPD pts)

Webinar #5 – length: 3h

- Standard Deviation: one-year and ultimate view with analytical formula
- Entire distribution estimate: bootstrap approach
- Premium & reserve risk in Solvency II: SF & USP
- BeGAAP & LAT: margin management
- **Case study:** Reserving with R using triangle data

Pre-requisites:

- Attendance to Module 1 or knowledge of R
- Attendance to Module 2 or **E-learning #2 – length: 30min** : An introduction to Solvency II



Module 4 – Advanced Methods of non-life reserving with R (Total estimated duration: 9h – 9 CPD pts)

Webinar #6 – length: 3h

- GLM models on triangle data: multi-triangles approach
- Best practices: outlier detection, data importance, smoothing, etc.
- GLM models for opening case reserves
- Case study: Reserving with GLM in R using triangle data

Pre-requisites:

E-learning #3 – length: 1h

- Generalized linear models

Webinar #8 – length: 3h

- Available techniques for individual claims reserving
- Visualization & exploration tools for the granular reserving data
- Data handling: from daily to yearly data, from individual claims to (multiple) triangles
- Pros and cons of aggregate versus individual reserving
- Modelling settlement, payment occurrence and payment sizes
- Reserving analytics: GLMs & machine learning methods to model the events in a claim's development
- Choice of an analytic reserving model for a given claims data set.

Pre-requisites:

E-learning #4 – length: 2h

- Supervised Machine Learning (part 1: error measure, decision tree, bagging and random forest)
- Supervised Machine Learning (part 2: gradient boosted methods, neural networks, support vector machine)

About **Reacfin Academy**

Reacfin Academy is the business line of Reacfin dedicated to continuous professional education and training in Finance, Risk Management, Portfolio Management, Actuarial Science and Data Science.



www.reacfinacademy.com

About the **speakers**



Katrien Antonio

Professor in insurance data science at KU Leuven and associate professor at University of Amsterdam

Expert on pricing, reserving and fraud analytics, as well as mortality dynamics. Katrien is co-founder and co-director of LRisk, the Leuven Center for Insurance and Financial Risk Analysis. She serves as program director of KU Leuven's MSc of Actuarial and Financial Engineering and campus vice-dean for education at the Faculty of Economics and Business (Leuven).



Xavier MARECHAL

CEO of Reacfin and IA|BE qualified actuary

Expert in non-life and health insurance (pricing, product development, reserving and risk management), and machine learning.



Samuel MAHY

Head of Reacfin's Non-Life Center of Excellence and director at Reacfin, and IA|BE qualified actuary

Expert in non-life and health insurance (pricing, product development, reserving and risk management), reinsurance and machine learning.



Julie ZIANS

Manager and IA|BE qualified actuary

Expert in non-life and health insurance (pricing, product development, reserving and risk management), and machine learning.