

EAA Seminar  
**Stochastic Modeling – Theory and  
Reality from an Actuarial Perspective**

8-10 May 2019 | Copenhagen, Denmark



Organised by the EAA – European Actuarial Academy GmbH in cooperation with Den Danske Aktuarforening.

SPONSOR of this seminar:



### Introduction

As recently as the mid-1990s, most models used in financial analysis of insurance were deterministic. Based on sets of static parameters and assumptions, these models largely ignored random fluctuations that were likely to occur. Sensitivity analyses were performed but were generally limited to a fixed number of defined scenarios. This deterministic approach is rapidly being replaced by stochastic modeling that can better inform insurers on pricing, financial planning, and capital assessment strategies. Huge advancements in computing power have made it possible for actuaries and financial planners to better understand the increasingly complex risk profiles of insurers' evolving product design.

This seminar is based on the book from the International Actuarial Association "Stochastic Modeling – Theory and Reality from an Actuarial Perspective" (copyright © 2010 International Actuarial Association) which intends to provide actuaries with a comprehensive resource that details current stochastic methods, provides background on the stochastic technique as well as their advantages and disadvantages.

## Participants

The seminar is suited for actuaries, actuarial students and other professionals involved and interested in actuarial modeling in life and non-life.

Attendees are encouraged to bring a laptop computer with Microsoft Excel installed.

## Purpose and Nature

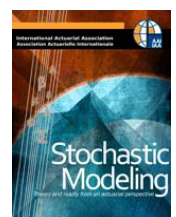
The seminar will cover a wide range of topics presented in the book “Stochastic Modeling – Theory and Reality from an Actuarial Perspective”. The first day of the seminar will focus on risk management and actuarial modeling issues. The day will start with an introduction to stochastic modeling, including a practical discussion of when stochastic models are appropriate or necessary and when they may not be. The day continues with a case study designed to be of interest to actuaries in all practice areas.

The second day (and the morning of the third day) of the seminar will be split into two separate sessions, one that will focus on life actuarial issues and the other will focus on non-life actuarial issues. In the life session, the lecturers will present stochastic models for interest rates, mortality and morbidity, among other risk factors, and will demonstrate how these models can be developed, calibrated, implemented and reviewed. This will also involve detailed case studies illustrating the use of stochastic models in life insurance business.

In the non-life sessions, the lecturers will present an overview of stochastic models, including triangle based, frequency / severity, catastrophe financial and dynamic risk models, and will demonstrate how these models can be developed, calibrated, implemented and reviewed. Building on this overview, the lecturers will then take you through a deeper look at the Mack and ODP Bootstrap models and discuss the calculation of one-year reserving risk. As with the life session, the early sessions will focus on the technical aspects of stochastic models and the later sessions will be a case study format intended to demonstrate the practical application of these models.

The third day will continue the separate life and non-life sessions in the first session. In the second session, we will again have a joint session to discuss a concluding case study focusing on senior management perspective.

All participants will receive a copy of the book “Stochastic Modeling – Theory and Reality from an Actuarial Perspective” which is presented by the International Actuarial Association (IAA) in collaboration with Milliman. A guide for practitioners interested in understanding this important emerging field, this book presents the mathematical and statistical framework necessary to develop stochastic models in any setting (insurance or otherwise). Sufficient mathematical detail is presented but no advanced background in mathematics or statistics is required.



## Language

The language of the seminar will be English.

## Lecturers

### Dominic Clark

Dominic is a Principal with Milliman's Milan office. He is qualified as a Fellow of the UK Institute of Actuaries, and has over 25 years' industry experience as a consulting actuary. He has significant experience in the areas of Solvency II, economic capital, financial reporting, valuations, and actuarial modeling. He is also a published author on the topic of dynamic policyholder behaviour. Dominic holds a BSc (with Honours) in Mathematics and Computer Science from the University of Birmingham, UK and a Masters in Financial Management and Control from the IE Business School in Madrid.

### Jeff Courchene

Jeff's area of expertise is international property and casualty insurance: particularly reserving, reinsurance analysis, mergers and acquisitions (M&A) activity, advanced pricing techniques, and dynamic financial modeling. Jeff has extensive experience in matters related to both personal and commercial lines of business in the United States, United Kingdom, Middle East, and continental Europe. His experience includes leading the review of reserves of various European (re)insurers as part of due diligence assignments, leading dynamic financial modeling projects both in the United States and Europe, and contributing to Milliman internal Solvency II working party as an author and presenter. Jeff is a Fellow of the Casualty Actuarial Society and a Member of the American Academy of Actuaries.

### Andrew H. Dalton

Andrew is a Principal and Consulting Actuary in Milliman's Philadelphia office and a primary author contributing to Life sections of the book "Stochastic Modeling – Theory and Reality from an Actuarial Perspective". Andrew's professional experience includes work on actuarial appraisals for mergers and acquisitions, asset and liability analysis, cash flow testing, and economic capital for life and health companies. Andrew is a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries. He holds a Masters Degree in Business Administration, concentrating in Finance and Statistics, from the Leonard N. Stern School of Business of New York University.

### Steven Hooghwerff

Steven is a consulting actuary in the Amsterdam office of Milliman. He has worked in the financial and consulting industry for more than 10 years. Steven's specialty is in the area of life insurance and risk management, and he also advises P&C insurers. His main focus is advising insurers and other financial institutions on developing and using risk models, such as Asset Liability Management (ALM), Economic Capital and Solvency II in their strategic decision making.

### Job Prince

Job is a consultant in Milliman's Amsterdam office. He has worked in the financial and consulting industry for more than 7 years. Job's main area of expertise is financial risk management and valuation. Over the past years he has developed strong quantitative skills in the market risk

domain. His main focus is developing models for ALM and Economic Capital and assisting financial institutions to incorporate this into day to day decision-making.

### Mark Shapland

Mark is a Principal and Consulting Actuary in Milliman's Dubai office and a primary author contributing to Non-Life sections of the book. Mark's area of expertise is non-life insurance, particularly pricing (personal and commercial lines), reserving (including reserve variability and asbestos liabilities), individual risk and association-type dividend plans and premium rates for large accounts, reinsurance, data management, and dynamic risk modeling. Mark has international experience, having worked in Europe for four years, as well as shorter assignments in many other countries. He also has extensive experience in the development of actuarial software tools and was the lead actuary for the Milliman Arius® software development team. Mark is a Fellow of the Casualty Actuarial Society, a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries.

## **Preliminary Programme**

### Wednesday, 8 May 2019

#### **Joint Session** (Andrew Dalton)

12.00 – 12.15	Registration
12.15 – 13.00	Lunch
13.00 – 13.15	Welcome and opening (EAA)
13.15 – 15.00	Introduction to Stochastic Modeling – when should it be used? Technical Background for Stochastic Modeling: Stochastic Techniques Monte Carlo Simulation Binomial Models
15.00 – 15.15	Coffee break
15.15 – 17.00	Stochastic Pricing Case Study Selection of model assumptions Calibrating the model Generating the scenarios Developing projection output Pricing the product <i>Participants will work on Excel-based examples</i>
approx. 18.30	Dinner

### Thursday, 9 May 2019

#### **Life Session** (Andrew Dalton, Dominic Clark, Steven Hooghwerff, Job Prince)

08.45	Opening of day 2
08.45 – 10.45	Theoretical background of Mortality models Introduction to Mortality models Case Study 1: Construction of a stochastic mortality model Theoretical background on lapse models Introduction to stochastic lapse models
10.45 – 11.00	Coffee Break
11.00 – 12.00	Decision Tree Models for Life & Health Business

	Classification and Regression Trees
	Random Forests
	Case Study 2: Classification Trees and Random Forests
12.00 – 12.45	Introduction to Dynamic Policyholder Behaviour
12.45 – 13.45	Lunch
13.45 – 15.00	Case Study 3: Dynamic Policyholder Behaviour
	Introduction to Perspectives on Economic Capital
15.00 – 15.15	Coffee break
15.15 – 16.45	Case Study 4: Perspectives on Economic Capital

**Non-Life Session** (*Jeff Courchene, Mark Shapland*)

08.45	Opening of day 2
08.45 – 10.45	Introduction to Non-Life Stochastic Models
	Non-Life Claims Models
	Triangle-based Models
	Frequency/Severity Models
	Catastrophe Models
	Non-Life Financial Models
	Non-Life Dynamic Risk Models
10.45 – 11.00	Coffee break
11.00 – 12.45	A Deeper Look / Hands On Approach (ODP Bootstrap)
12.45 – 13.45	Lunch
13.45 – 15.00	Applications of Stochastic Modeling (Non-Life Insurance)
	Case Study 1: Reserve Variability
15.00 – 15.15	Coffee break
15.15 – 16.45	Applications of Stochastic Modeling (Non-Life Insurance)
	Case Study 2: GLM Bootstrap
	Case Study 3: Solvency II
approx. 17.30	Social Event

Friday, 10 May 2019

**Life Session** (*TBD*)

08.45	Opening of day 3
08.45 – 10.15	Risk Neutral Economic Scenario Generators: introduction to the concepts and notations
10.15 – 10.30	Coffee Break
10.30 – 12.00	Dynamics and calibration of interest rate models Excel examples
12.00 – 13.00	Lunch

**Non-Life Session** (*Jeff Courchene, Mark Shapland*)

08.45	Opening of day 3
08.45 – 10.15	Applications of Stochastic Modeling (Non-Life Insurance)
	Case Study 4: Back-testing and Validation
10.15 – 10.30	Coffee Break
10.30 – 12.00	Applications of Stochastic Modeling (Non-Life Insurance)
	Case Study 5: Predictive Modeling & Pricing

12.00 – 13.00 Lunch

**Joint Session (TBD)**

13.00 – 14.45 Joint Life/Non-Life session focusing on senior management perspective

14.45 – 15.00 Concluding remarks, closing of seminar (EAA)

## Fees & Registration

Please register for the seminar as soon as possible because of the expected demand. If there are more persons interested in this seminar than places available we will give priority to the registrations received first. Please send your registration as soon as possible by using our online registration form at [www.actuarial-academy.com](http://www.actuarial-academy.com).

Your registration is binding. Cancellation is only possible up to 4 weeks before the first day of seminar. If you cancel at a later date, the full seminar fee is due. You may appoint someone to take your place, but must notify us in advance. EAA has the right to cancel the event if the minimum number of participants is not reached.

Please always give your invoice number when you effect payment. All bank charges are to be borne by the participant. We will send you an invoice, please allow a few days for handling.

Your early-bird registration fee is € 940.00 plus 25% VAT until 8 March 2019. After this date the fee will be € 1,090.00 plus 25% VAT.

## Venue & Accommodation

The seminar will take place at the

Comwell Conference Center Copenhagen

Center Boulevard 5

2300 Copenhagen S, Denmark

Phone: +45 32 47 30 30

[Hotel website](#)

We have arranged special prices for accommodation at the **AC Hotel Bella Sky Copenhagen, Center Boulevard 5, 2300 Copenhagen S, Denmark**. The special rate is 1,495 DKK (single room, including breakfast and VAT). It is valid for bookings by 16 April 2019 out of our allotment "EAA Seminar". Our allotment includes a limited number of rooms. Kindly book your accommodation directly with the hotel using this [booking link](#) and note the hotel's cancellation policy.

## CPD

For this seminar, the following CPD points are available under the CPD scheme of the relevant national actuarial association:

Austria:	15 points
Belgium:	15 points
Bulgaria:	12 points
Croatia:	15 hours
Czechia:	2-3 points (individual accreditation)
Estonia:	15.25 hours
Finland:	9.75 points
Germany:	16 hours
Hungary:	16 hours
Ireland:	15.25 hours
Italy:	5 credits (GdLA individual accreditation)
Latvia:	15 hours
Netherlands:	approx. 15 PE-Points (individual accreditation)
Portugal:	15.25 hours
Russia:	40 points
Slovakia:	8 points
Slovenia:	50 points
Spain:	15 points (CAC), 15 hours (IAE)
Switzerland:	15 points

No responsibility is taken for the accuracy of this information.