AKTUARVEREINIGUNG
ÖSTERREICHS

UNIVERSITÄT
SALZBURG

ÖSTERREICHISCHE GESELLSCHAFT
FÜR VERSICHERUNGSFACHWISSEN

Salzburg Institute of Actuarial Studies
5020 Salzburg, Hellbrunner Straße 34

Invitation to a Course on
Fundamental Statistical Methods in Actuarial Data Science

25th to 28th September 2019
Salzburg University

Lecturers:

Andreas Döring
Head of Experience Analysis Life Business
SCOR Reinsurance Germany, Cologne
Actuary DAV (German Association of Actuaries)
Keynote Speaker

Prof. Dr. Marcus Hudec
Faculty of Computer Science, Vienna University
Director of Data Technology, Vienna
Visiting professor at Salzburg University

Dr. Michael Schlögl
Head Actuary and Actuarial Function Non-Life
Wiener Städtische Versicherung AG – Vienna Insurance Group, Vienna
Actuary AVÖ (Actuarial Association of Austria)
Visiting professor at Salzburg University

Andreas Missbauer
Deputy Actuarial Function Non-Life
Wiener Städtische Versicherung AG – Vienna Insurance Group, Vienna
Actuary AVÖ (Actuarial Association of Austria)
Visiting professor at Salzburg University

Dates:

Wednesday,	25th September 2019,	9.00 – 17.30
Thursday,	26th September 2019,	9.00 – 17.30
Friday,	27th September 2019,	9.00 – 17.30
Saturday,	28th September 2019,	9.00 – 12.30

Contents:

Against the background of digital transformation and new technological possibilities, the insurance industry and especially actuaries face the challenge of successfully integrating analytical procedures and methods of data science into existing business models or developing new innovative business models.

Data science is used as a collective term for methods and approaches that are of relevance in the transformation towards a data-centred enterprise.

The still young occupational profile of data scientists requires a broad analytical-methodical basic knowledge of the fields of statistics and information technology as well as specific knowledge of the application domain. Accordingly, in addition to imparting the necessary knowledge of stochastics, computational aspects are also dealt with and emphasis is put on application scenarios in the insurance industry. The discussion of important computational tools provides an introduction to the subject matter and should encourage participants to study new data technologies.

The keynote speech by a renowned expert from a major reinsurance company highlights the practical relevance of data science in today's insurance industry and the importance of adapting. Various application examples will be presented as well as the possibility of successfully embedding data science in insurance companies.

The course covers all aspects of fundamental statistical methods in insurance required to become a fully qualified actuary according to the education syllabus of the International Actuarial Association and the core syllabus of the Actuarial Association of Europe as well as according to the regulations of the Actuarial Association of Austria (AVÖ). The course also meets the requirements by the Austrian Financial Market Authority with respect to the (deputy) responsible actuary (§§ 114 – 116 Austrian Insurance Supervision Act), the (deputy) head of the actuarial function (§ 113) and the (deputy) head of the risk management function (§ 112). For continuing professional development (CPD) the course counts as 21 hours. The course is designed not only for actuarial students, but also addresses experienced actuaries. The emphasis will be on a practical and data-oriented approach. A basic stochastic knowledge is sufficient. Please find the structure of the course below.

Course fees: € 666 (incl. VAT) without hotel accommodation, € 1,138 (incl. VAT) with accommodation from Tuesday to Saturday (4 nights) in the Arcotel Castellani including breakfast. Lunches and coffee breaks are included in the fees for all participants.

Information: For further information, please contact Sarah Lederer by e-mail (sarah.lederer@sbg.ac.at) with your telephone number. Your questions will be answered as soon as possible.

Registration: Please send the attached registration form by post or by e-mail (sarah.lederer@sbg.ac.at), and arrange for the amount to be transferred (at no cost to the recipient) to the following account before 23rd August 2019. After this date registration with hotel accommodation is only possible upon request. The registration and payment deadline for participants who do not need accommodation is 6th September 2019.

Salzburg Institute of Actuarial Studies (SIAS)
IBAN: AT79 2040 4000 0001 2021 BIC: SBGSAT2S

Location: Faculty of Science, Lecture Hall 402
5020 Salzburg, Hellbrunner Straße 34

Course Structure

1 Keynote speech: Data science applications in the insurance industry *(A. Döring)*

a. Overview of areas of data science application
b. Successful integration of data science in insurance companies
c. Specific use cases

2 Introduction: Foundations of machine learning and data science

a. Types of machine learning
b. Basic concepts of machine learning
c. What is data science?
d. Process model for data science
e. Model selection and overfitting
f. Applications in the insurance industry

3 Overview of the basics of probability theory

a. Fundamental concepts and theorems of probability theory
b. Stochastic independence and measures of dependency
c. Concept of discrete random variables
d. Concept of continuous random variables
e. Applications for Solvency II calculations and risk modelling in the context of IFRS 17
f. Exercises and applications

4 Actuarial tasks in an insurance industry undergoing a radical change

a. New technological possibilities and the associated change in business models
b. Terms and key figures
c. Important techniques

5 Stochastic risk modelling

a. Empirical data and theoretical models
b. Probability distributions with specific relevance to insurance (claim count and claim size distributions)
c. Parameter estimation and confidence intervals
d. Hypotheses testing with applications
e. Central aspects of machine learning algorithms demonstrated with decision trees
f. Applications (rate making, risk modelling in the internal model)
g. Exercises and applications

6 Computational aspects of data science

a. Basic knowledge of databases (SQL and more)
b. Basic concepts of data warehouses, data lakes and big data technologies
c. Elements of a data strategy (data governance, data quality)
d. Scripting languages as tools for data science (R and Python)

7 Simulation techniques

a. Generation of random numbers
b. Monte Carlo method: concept/idea and applications under Solvency II
c. Bootstrap techniques
d. Markov processes and bonus-malus systems
e. What are the costs of a ‘claim for free’ or a ‘bonus saver’?
f. Exercises and applications