



## MODELLING, ANALYTICS AND INSIGHTS FROM DATA

### CROSS PRACTICE WORKING PARTY

#### Terms of Reference

#### Overview

Given the rapid changes in technology and computing power, along with a plethora of website and social media initiative, modern mathematics, operational research and computer science are revolutionising predictive analytics.

The total amount invested in the global financial technology sector rose from just under \$4bn in 2013 to more than \$12bn last year, as record amounts poured into companies developing technologies that promise to turn the financial sector on its head.

Harvard Business Review has called Data Scientist the Sexiest Job of the 21st Century\*.

A recent search of three job titles on LinkedIn yielded the following:

- 40.0k results for “Data Scientist”
- 34.8k results for “Actuary”
- 32.1k results for “Quantitative Analyst”

MAID is a working party aimed at informing the IFoA position and response to these new opportunities.

It has organised itself around 4 work streams:

- 1) Research
- 2) New approaches to current actuarial work
- 3) Possible ideas and solution in new opportunities from actuarial work
- 4) Implications for professional affairs

## Work stream 1: Research

The overarching aim of the Research work stream is to develop an understanding of Thought Leadership opportunities relating to the field of data science and 'Big Data', both in the UK and internationally, that would be of interest and importance to work of an actuary. The specific objectives of the work stream are to:

- engage with the Research and Thought Leadership Committee to maintain awareness of data science and 'Big Data' research being carried out by IFoA and beyond; provide feedback to the working party and help RTALC to identify and promote new research on this topic.
- carry out environmental and horizon scanning as appropriate to identify current and future key trends in the area
- conduct a literature review of existing resources and platforms including textbooks, academic and commercial papers, and other professions' sources
- review international practices to identify learning that is relevant and transferable to the UK, eg. CAS in the US
- identify any relevant conferences and events, actuarial and otherwise

## Work stream 2: New approaches to current actuarial work

### Overview

Work stream 2 focuses on existing and new techniques been applied to existing problem.

Machine learning is a subfield of computer science that evolved from the study of pattern recognition and computational learning theory in artificial intelligence. In 1959, Arthur Samuel defined machine learning as a "Field of study that gives computers the ability to learn without being explicitly programmed". This is one example of a whole new suite of techniques under the umbrella term of an emerging new data science universe.

Can Actuaries keep themselves relevant in this changing world of technology by the use of such techniques?

Can these techniques improve the predictive nature of our models?

### Scope of Work stream 2

Consider how a variety of data science techniques could be applied in a current actuarial context. As a starting point we will consider the following techniques in the existing areas:

	General Insurance	Pension	Life, Health & Care	Investment
Pricing and product design	√		√	
Reserving	√			
Capital Modelling	√		√	
Exposure Management	√			
Scheme Valuation		√		
Valuation & Surplus Distribution			√	
Asset & Liability Modelling				√

Techniques considered will include (but not limited to) Supervised learning, Unsupervised learning, Reinforcement learning, Decision aid, Bayesian and Deep learning.

### **Work stream 3: Possible ideas and solution in new opportunities from actuarial work**

Work stream 3 focuses on existing and new techniques to new problem (GI, Life and Health and Care, Pension, Risk and beyond).

The evolving role of the actuary in a digital world.

As innovative areas of data and analytics transition from 'new and sexy', to 'established and responsible', a clear opportunity exists for Actuaries to take a leading role in applying their professional standards and skills for the benefit of all participants.

#### **The Opportunity**

In this work stream we will consider new business applications and developing areas which may benefit from the insights & knowledge of actuarial professionals:

1. Opportunities opened up by advances in data and analytics, such as Machine-learning, real-time optimisation, customer engagement, data mining, and predicative analytics.
2. New opportunities within the existing practice areas of Life, General Insurance, Pensions and Investments.
3. New areas within the digital economy, and wider areas of business and finance.

## Work stream 4: Implications for professional affairs

The implications for our profession may be wide and this work stream aims to provide a thoughtful set of analyses to help Management Board and Council consider wider implications. The aim is an overview across all practice areas in order to develop a single view. This work stream in particular could be a series of liaison points to all relevant areas within the IFoA.

In particular it will consider

- Exams
- CPD
- Public Interest issues, implications for the society we live in and wider regulatory environment considerations including consultation responses
- Standards – and implications for IFoA regulation and quality (QAS)
- PR and profile consequences
- IFoA Policy implications and linkages
- Implications for IFoA conference agendas
- International opportunities – both for IFoA and for collaboration with other leading actuarial bodies
- How to ensure a truly cross-practice response
- Interaction with members and feedback on IFoA direction
- Possible partnerships, collaboration, interacting with Influencers and lobbying

## **Membership**

**Chair:** **Michael Tripp** (Working Party and Steering Committee Chair)

**Deputy Chair:**

**Steering Committee Members:**

Alberto Chierici, Ben Canagaretna, Alicja Nocon, Alexander Hanks, Alex Panlilio, Matthew Wilson

**Executive Support:** Practice Manager and Practice Coordinator