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Annual Report

ASTIN is a well-established worldwide leading forum of risk and actuarial professionals of non-life insurance industry. Created as the first Section of the International Actuarial Association (IAA) in 1957, ASTIN stands for 'ACTUARIAL STUDIES IN NON-LIFE INSURANCE'.

> Whilst adhering to the highest standards of the actuarial profession maintained by the IAA, ASTIN's mission is to generate value for its members. This is achieved by helping them develop their professional skills, and also by engaging with academia and industry to drive innovation and promote meaningful, quality research in the field of economics and mathematics of non-life insurance, and their applications to quantitative risk management.

> As a well-established global professional forum, we draw upon the values of ASTIN brand. Our intellectual base and wealth of knowledge have been developed across decades, and have resulted in ground-breaking research. In our quest for excellence, we consistently demonstrate an uncompromising pursuit of knowledge and understanding.

Our vision is for ASTIN to serve the non-life insurance industry globally by ensuring that, when it comes to providing insight and finding solutions to quantitative risk management issues, our members are trusted and therefore in demand for their valued professional skills.



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INTRODUCTION



Dear fellow ASTIN members,

This is my first time addressing you as ASTIN Chairman, and I am delighted and honoured to have been appointed to chair ASTIN at such an important time for us. I would like to thank my predecessor Éric Dal Moro for his lucid leadership and the great contributions he made to ASTIN over the past three years.

I am happy with the results we achieved in 2017/2018, which was another productive and eventful year for ASTIN. To name a few, we held a successful colloquium in Panama, introduced a series of specialised workshops and webinars, and formed three new working parties, with the aim of bridging the gap between academia and industry by fostering meaningful research.

We have also carefully reviewed our strategy in order to refresh the values that underpin ASTIN's goals. The strategy sets out our vision to serve the worldwide actuarial community by continuing to advance our profession, solve important problems, foster innovation and promote applied actuarial research.

I believe that some of the decisions made by the AS-TIN Committee will further strengthen the ASTIN values and will have a long-lasting effect. I am confident that we are on the right track.

Whilst some matters can be planned, there will always be some that are beyond our control. This year, we sadly lost two outstanding members and friends of our ASTIN community, Gunnar Benktander and Marc Goovaerts. They were great minds in the history of ASTIN and the actuarial profession, and they will be greatly missed.

Lastly, let me take this opportunity to thank you, ASTIN members, for your engagement and contributions. It is due to your collective effort that ASTIN continues to grow from strength to strength. I look forward to greeting many of you soon at the ICA in Berlin.

Kind regards,

Frank CUYPERS, ASTIN Chairman

INTRODUCTION



Dear members and friends of ASTIN,

I feel privileged to be appointed to serve as ASTIN Secretary, a role served for five years by my predecessor Louise Francis. On behalf of the committee, I would like to thank Louise and acknowledge her tireless work.

As I look back and reflect on what we started and what was achieved over the last year, I feel a mixed sense of pride and increased responsibility.

We believe it is the role of ASTIN Committee to take important steps and ensure that even a well-established professional forum with sixty years of history like ASTIN is prepared to effectively adapt to change to not just remain relevant but also to continue its leadership. And we have already started to take these steps. Last year, as part of this effort, we reviewed our practices, particularly the ways we engage and communicate with ASTIN members, our stakeholders within the IAA and also the wider community of risk and non-life insurance professionals outside the IAA.

One noticeable change is this new annual report. It is the first formal edition of its kind, and sets the example of the type of communication we would like in the future. Here, we take this opportunity to present ASTIN, outline its history and achievements and explain its values. We also want to bring us, the committee members, closer to you by introducing ourselves and explaining what we do, and what we are striving to achieve in the future.

Another initiative we put a great deal of effort into is the new ASTIN website. It has been redesigned to accommodate the changes required to ensure it is relevant and appealing to our membership.

As part of our campaign used to raise ASTIN brand awareness, we have also produced a promotional video about ASTIN which will be released and presented at the ICA in Berlin.

Looking ahead, I see the committee focusing on further increasing the ASTIN profile and adding more value to membership. Among the new initiatives in the pipeline there are a few of note: Expert Helpline – an online facility used to address members' queries; and ASTIN Masterclasses – a series of online professional education courses on different risk and non-life actuarial topics.

Finally, I would like to take this opportunity to express appreciation to our members for their work and contributions throughout the year. Personally, I believe that we have a promising future, and look forward to updating you on progress with our new initiatives throughout the year.

With kind regards,

Yuriy KRVAVYCH, ASTIN Secretary

ASTIN OVERVIEW



OVERVIEW

ASTIN

ASTIN is the first and oldest section of the International Actuarial Association (IAA). It was founded on October 16, 1957 in New York City. Its inception is indebted to the conditions that prevailed in the first half of the 20th century – an era associated with

- pre-war advances in science, and especially in the field of probability theory and statistics,

- World War II and scientific and technological innovations that originated from it; and

- post-war world and the rapid economic growth and favourable social and political developments.

Having once attempted become an independent actuarial organisation to serve the non-life insurance industry, ASTIN was destined to eventually become a part of one global united actuarial profession. Throughout its history ASTIN has evolved and broadened its boundaries to areas ranging from the well-established Ratemaking and Reserving to more contemporary Risk and Capital Management, and newly emerging Data Science and Machine Learning.

All these achievements would not be possible without a number of ASTIN's prominent figures. Those who laid the foundations of the classical risk theory, those who founded ASTIN, and those who further developed its intellectual base.

We are now in our 7th decade and still going strong. Today, being a well-established global professional forum, we draw upon the values of the ASTIN brand.



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OUR HISTORY

EARLY SCIENTIFIC FOUNDATIONS 1900-1939

This period was dominated by Scandinavians. In particular, the two prominent figures associated with those times are Filip Lundberg and Harald Cramér. In 1903 in his PhD thesis, and also later in 1909 at the International Congress of Actuaries in Vienna, Filip Lundberg was first to mathematise the insurance operation by considering it as a stochastic process. Somewhat similar to the work of Louis Bachelier, who at the time used stochastic processes to describe the movements in stock prices, Lundberg's ground-breaking proposition was revolutionary and well ahead of its time, as the formal mathematical apparatus of stochastic processes would only appear later in 1930s with the work of Harald Cramér and also prominent Russian probabilists A.N. Kolmogorov, A. Khinchin and B.V. Gnedenko.

Harald Cramér continued Lundberg's work, and in 1930 formalised it into the so called 'Collective Risk Theory'. Its practical importance was only really understood and appreciated after WWII.

NON-LIFE ACTUARIES: THE BIRTH OF 'THE ACTUARY OF THE SECOND KIND' 1914-1957

Actuarial science, from its early times when it was formed as a separate mathematical discipline at the end of the 17th century until the beginning of the 20th century, was solely devoted to solving life assurance problems associated with finding accurate quantitative methods for evaluating premiums and reserves for annuities, pure endowment and whole life assurance. These problems were deterministic in principle, and were solved by life-insurance actuaries – the 'actuaries of the first kind', as Hans Bühlmann described in his ASTIN Bulletin editorial from 1989 titled Actuaries of the Third Kind? (Volume 19, Issue S1, 1989).

The emergence of the 'actuaries of the second kind', non-life insurance actuaries, is mainly associated with the introduction of probabilistic and statistical methods to the non-life insurance industry. Unlike their peers of the first kind, who were focusing mainly on deterministic methods, non-life actuaries had to master the new skills of probabilistic thinking.

The early generation of non-life actuaries emerged in North America with the creation of the Casualty Actuarial Society (CAS). Over time, they evolved and matured professionally and by the late 1940s had gained an important status in the industry for promoting scientific methods for non-life insurance ratemaking and reserving. In particular, they were famous for developing significant expertise in non-life statistics, e.g. Credibility, or so called 'American Credibility' (Albert W. Whitney, 1918). The list of prominent figures and great contributors form that early generation include Arthur Bailey, Francis S. Perryman and L.H. Longley-Cook.

Later, the second wave of non-life actuaries emerged in Europe after WWII. Many of them, being actuaries and/or mathematicians, served their countries in the army in specialised units during the war and developed a completely new set of mathematical skills associated with the application of probability and statistics in the development of effective military defence systems and strategies. Examples included such areas as Game Theory, Cryptology, Linear Programming and Operations Research, and also Sequential Statistical Learning.

Those who survived the war and returned from military services were eager to make use of their new skills developed whilst serving in the army. They started to work outside life insurance, gradually focusing on non-life insurance problems and applying the new techniques of mathematical statistics, stochastic modelling of insurance process and decision-making analysis (Game Theory). By early 1950s various groups of non-life actuarial enthusiasts were informally appearing in Europe, gravitating mainly to Scandinavia:

Scandinavia: Harald Cramér, C.-O. Segerdahl, Paul Johansen, L.-G. Benckert, C. Philipson, Ingvar Sternberg, Gunnar Benktander, Teivo Pentikäinen, Petrus Mattson, Ove Lundberg (son of Filip Lundberg), Sparre Andersen, and L. Wilhelmson France: J. Dubourdieu, Pierre Depoid

Italy: F.P. Cantelli, Bruno de Finetti and G. Ottaviani

Important singletons: Bobby Beard (UK), Hans Ammeter (Switzerland) and Edouard Franckx (Belgium)

ASTIN CREATION – FIRST ATTEMPT 1953-54

An idea of forming a new international organisation of non-life actuaries was first mooted in November 1953 under the initiative of a small group of enthusiasts, a preparatory committee, consisting of

- Hans Ammeter (Switzerland),
- Bruno de Finetti (Italy),
- B.H. de Jongh (The Netherlands),
- Boleslaw Monic (Poland-UK),
- Jean Sousselier (France); and
- Stefan Vajda (Austria-UK).

The plan was to have the inaugural ASTIN meeting at the forthcoming International Congress of Actuaries (ICA) in Madrid scheduled for June 1954.

In addition to becoming an independent organisation, ASTIN also wanted complete freedom to publish a bulletin and hold its own scientific colloquia, which required unconditional financial independence.

However, after having a preliminary discussion with the Comité Permanent (the predecessor of the IAA), the permission to form such independent organisation was not granted. The Comité Permanent was willing to give ASTIN freedom for publishing a bulletin and hold its colloquia, but could not agree in principle with the idea of forming an independent international organisation. The Comité Permanent was insisting that ASTIN should not aim to become an independent organisation, but rather work towards becoming a subsection of the ICA, and proposed to change the statute accordingly. The formation of ASTIN was therefore postponed until the next ICA.

ASTIN OVERVIEW

ASTIN CREATION INAUGURAL MEETING 1957

After holding a series of talks and discussions, the final agreement between the ASTIN preparatory committee and the Comité Permanent to form the ASTIN Section was reached. The deal was brokered by Comité Permanent's representative, Sir George Maddex (UK).

The ASTIN Inaugural Meeting took place on October 16, 1957 in the Hotel Commodore at the ICA in New York. The agenda of that meeting, attended by 46 ASTIN members, consisted of the following two items:

- adoption of the ASTIN section rules proposed by the Comité Permanent; and
- election of the first committee of ASTIN.

The meeting agenda was successfully fulfilled, and ASTIN was officially formed as a first Section of the Comité Permanent (IAA). The ASTIN first committee was elected and consisted of

- Bobby Beard (UK)
- Edouard Franckx (Belgium)
- Paul Johansen (Denmark)
- Boleslaw Monic (UK)
- Francis Perryman (USA)
- Carl Philipson (Sweden)
- Sir George Maddex (UK), representative of the Comité Permanent

In this first committee meeting straight after inauguration the first ASTIN officers were chosen as follows:

- Chairman: Paul Johansen
- Secretary: Robert Beard
- ASTIN Bulletin Editor: Edouard Franckx
- Treasurer: Boleslaw Monic





ASTIN became the trademark of new scientific inputs from mathematics and economics into the actuarial profession.

Hans Bühlmann

ASTIN BRAND 1957-TODAY

Since its creation ASTIN has been playing an important role within the IAA. It has become the trademark of scientific advances in insurance mathematics and economics. ASTIN has benefited from the freedom and independence it was provided by the IAA in having been able to carry out fruitful ground-breaking research. Over decades, the new generation of non-life actuaries was raised — the generation that further developed ASTIN, significantly contributed to its intellectual base, and made a positive impact on the actuarial profession.

In our quest for excellence, we consistently demonstrate an uncompromising pursuit of knowledge and understanding. In essence, this is what defines our brand.

ASTIN is like ROLEX. Only insiders know the origin of the name, but most do know what the label stands for.

Hans Gerber

ACHIEVEMENTS AND PROMINENT FIGURES

ASTIN's main achievements consist in developing new research areas, introducing them to the actuarial profession and finding their meaningful practical application in the industry. The range of areas of focus is guite wide, stretching from classical risk theory, ratemaking and reserving to more contemporary quantitative risk and capital managements and newly emerging data science and machine learning. All these achievements would not be possible without a number of ASTIN's prominent figures who make a significant contribution to the development of intellectual base of ASTIN at different times and epochs.

This section provides a brief description of each of the areas of focus as well as a short biography of the prominent figures involved.



Filip LUNDBERG



Harald CRAMÉR



Ingvar

STERNBERG

1900 - 1980s



Gunnar BENKTANDER



Taivo PENTIKÄINEN



Paul JOHANSEN



Bobby

BEARD



Edouard FRANCKX



Bruno de FINETTI



Hans AMMETER

1960s - today



Karl BORCH

Harry

PANJER





EMBRECHTS



Hans GERBER



Thomas MACK



Jean LEMAIRE



Grea TAYLOR



Marc GOOVAERTS



VENTER



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ASTIN OVERVIEW

RISK THEORY

The theory of risk is the bedrock of actuarial science, and non-life actuarial science in particular. Its origin traces back to 1903, the year Swedish mathematician Filip Lundberg published his PhD thesis on Approximations of the Probability Function / Reinsurance of Collective Risks. In it, Filip Lundberg utilised the results of central limit theorem that was earlier formally stated and proved by Russian mathematician A. Lyapunov, and introduced the notion of Compound Poisson. This seminal work was ahead of its time and required another 30 years to be fully understood, appreciated and further developed to a complete theory.

Later, in the 1930s, another great mathematical mind from Sweden Professor Harald Cramér further developed Lundberg's ideas by formalising them into 'Collective Risk Theory' and also linking them to the then emerging theory of stochastic processes. The Cramér-Lundberg's new Collective Risk Theory focuses mainly on the following two problems:

• Finding the distribution of total claims cost at a fixed time; and • Computing the ruin probability of the insurance company with the stochastic process of surplus.

The concept of defining stability of insurance process through the level of ruin probability resonates with the principles underlying the reliability theory that is often used in engineering science.

An alternative view of insurance risk, taking a more economic view of profitability and pragmatic firm value, was later proposed by Italian mathematician and actuary Bruno de Finetti, and further developed by others. Bruno de Finetti defines the value of insurance company as the present value of future discounted dividends up to the ruin time and suggests maximising it. His idea was first presented in 1957 at the ICA in New York. This new way of thinking created a big shift in the paradigm, so big that the actuarial community was not ready to fully embrace it.

Later, Karl Borch and Hans Gerber, and other scholars, further developed de Finetti's ideas and applied them to solving practical problems of risk theory. In particular, Karl Borch fully exploited de Finetti's ideas in insurance economics, Hans Gerber further contributed by solving the problems of finding an optimal dividend pay-out and the distribution of surplus at ruin in the presence of dividends.

Today, various quantitative risk management methods of risk and capital optimisation are based on maximising the de Finetti's value of the firm subject to solvency constraints. These type optimisations serve as dual optimisation problems to the minimisation of ruin probability subject to profitability. In such a way one could relate the de Finetti's concept of pragmatic value of the firm to the engineers view of risk process and managing its stability via controlling the probability of ruin.

Further refinements of Cramér-Lundeberg's Collective Risk Theory are associated with the research work of the following well known individuals of the ASTIN community:

• Ove Lundberg (son of Filip Lundberg) and Hans Ammeter were independently advocating for flexing the frequency parameter in Compound Poisson loss, Poisson parameter, by making it random. Their approach gained popularity among practitioners. They could much easier adjust the risk model to the real data of

What is Risk Theory?

Read Dubourdieu peu à peu. Read Beard et alia's text. And what comes next? The many references appeal in this book by Hilary Seal. Hans Bühlmann, my thesis advisor, will make you even wiser. John Beekman's first process concerns the risky business. John Wooddy in his notes from many sources quotes. Reading Borch's tracts will not be futility to anyone who believes in utility. It should be stated that Wolff's book is related. Is your probability sound? See Feller for background.

Hans Gerber

an insurance company. This approach was propagated under the name Fluctuating Basic Probabilities.

• Bobby Beard, Teivo Pentikäinen, Erkki Pesonen and Chris Daykin – were the first to generalise the insurance risk process by introducing experience rating and interest rate. With that generalisation the analytical mathematics reached its limits fairly quickly. The ideas of using computer simulations to perform dynamic financial analysis (DFA) of insurance risk process was born. This approach can be applied to any generalised (realistic) risk process. Today, computer simulation based DFA approach is used in risk and capital modelling to support the management in their strategic decision making.

• Harry Panjer – finding the analytical way of computing the distribution of total (compound) loss in Cramér-Lundeberg's model was a formidable task. It was Harry Panjer who in 1980 showed how the problem could be solved by recursion. He triggered a whole new branch of practical research, the so called 'risk theory numerics'. Thanks to this discovery, actuaries also learned from numerical analysts that another practical way of computing the distribution of total compound loss was to use the Fast Fourier Transform.

• Hans Gerber — in 1973 he introduced martingales in risk theory. This was a remarkable initiative. Transforming the risk process into a martingale builds a direct link to mathematical finance.

INSURANCE ECONOMICS

This area is mainly associated with **Professor Karl Borch**, the great scholar and contributor to the intellectual base of ASTIN. Karl Borch taught us the theory of economics of uncertainty, 'utility theory', that was formulated in his famous book The Economics of Uncertainty. He introduced the economic concept of risk exchange (Fundamental Theorem of Borch) – his pioneering work on Pareto-optimal risk exchange in reinsurance opened a new area in actuarial science. He was also a big promoter of de Finetti's ideas of maximising the value of the firm.

Karl Borch has never served on ASTIN Committee, but he was one of the most enthusiastic and influential members of ASTIN. No single person has contributed more to the columns of ASTIN Bulletin.

Karl Borch was also active in other professional insurance forums which activities are relevant to the work we do at ASTIN. In particular, he was a long-serving and active member of The Geneva Association – he was a driving force behind the maturation of this group.

OTHER AREAS

CREDIBILITY THEORY

The statistical concept of credibility has its origin in North America and traces back to 1918, the year when the seminal paper of **A.W. Whitney** on 'credibility theory and its application to experience rating' was published in the Proceedings of the Casualty Actuarial Society. The concept of credibility introduced by Whitney is often referred to as American credibility.

In Europe, Hans Bühlmann further developed this concept and introduced the new model, Bühlmann model or alternatively 'variance component model', which can be used to determine the

appropriate premium for a group of insurance contracts. This model was further developed and evolved to the so called Büh-Imann-Straub model, as the result of subsequent work done by **Erwin Straub** (PhD student of Hans Bühlmann).

Hans Bühlmann is a long-serving member of ASTIN and a great contributor. He was elected Honorary Chairman of ASTIN in 1995, after serving on the ASTIN Committee as Chairman (1973-74), Vice-Chairman (1971-72) and Chief Editor of ASTIN Bulletin (1985-1995).

The list of other great contributors to this area includes L.H. Longley-Cook (CAS) and Alois Gisler.

RISK MEASURES

AND PREMIUM CALCULATION PRINCIPLES

This area is associated with many interesting contributors, one individual who stands out is **Marc Goovaerts**. Marc Goovaerts was the first who systemised the principles of premium calculations in his book Insurance Premiums: Theory and Applications. He was also an authority in such areas as risk measures and their applications in risk and capital modelling.

Marc was an active member of ASTIN and one of the main contributors to the columns of ASTIN Bulletin.

He was also active in other professional actuarial forums. Along with Hans Gerber and Jean Haezendonck, he founded the Insurance: Mathematics and Economics (IME) - the forum of actuarial academics with research interest in risk theory and insurance mathematics and economics. For many years, he was the Chief Editor of the IME Journal.

BONUS-MALUS

Jean Lemaire - the name we are all familiar with when it comes to bonus-malus systems in automobile insurance. His research interests also extend to the areas of insurance economics and game theory.

He was elected Honorary Chairman of ASTIN in 2008, after serving ASTIN as Treasurer (1982-1997), Vice-Chairman (1998-2007) and Chairman (1985-1990 and 2002). His books on bonus-malus theory won book-of-the-year awards in Europe (The Geneva Association) and in the USA (American Risk and Insurance Association), and have been translated into French, Spanish, Russian, Korean, Japanese, and Mandarin. He has lectured in 86 countries.

INSURANCE SOLVENCY

The risk theoretical concepts of insurance solvency and their practical applications were developed and introduced to actuarial profession in the late 1980s through the series of working groups and conferences on insurance solvency.

The main contributors to these developments at the time from ASTIN's side were:

- Finland: Teivo Pentikäinen, Erkki Pesonen and Jukka Rantala;
- Denmark: H. Ramlau-Hansen;
- UK: Chris Daykin;
- Australia: Greg Taylor.

Among those from outside ASTIN who made significant contribution were the following renowned insurance economists: Neil Doherty, H. Schlesinger, David Cummins and Richard Derrig. Much later in 2000s with the emergence of Solvency II a lot of work was carried out to bring the theoretical concepts of insurance solvency into real applications. One individual from the ASTIN community of note is **Arne Sandströme.** Arne is an active member of ASTIN. He was the first to systemise the concepts and quantitative methods of insurance solvency in his book titled 'Handbook of Solvency for Actuaries and Risk Managers'.

RESERVING

This area resonates with a few prominent figures that are well known to ASTIN community and the wider non-life actuarial audience:

• Thomas Mack – developed the famous 'Mack model' that is used to derive the non-parametric statistical estimate of reserve variability. Thomas is an active member of ASTIN and a great contributor to the columns of ASTIN Bulletin.

• Greg Taylor – active member of ASTIN and a great contributor to the columns of ASTIN Bulletin. His research mainly focuses on the problems of stochastic reserving. He has published a book on actuarial methods of loss reserving.

Glenn Meyers – active member of ASTIN and a regular contributor to the columns of ASTIN Bulletin. He served on ASTIN Committee. In his research he has been mainly focussing on the problems of stochastic reserving, including those that are based on Markov Chain Monte Carlo Chain Ladder methods.

• Gary Venter – active member of ASTIN and a regular contributor to the columns of ASTIN Bulletin. In his research one of his main areas of focus is stochastic reserving. He has also been active in doing research in reinsurance, dependence modelling, risk measures and capital allocation.

• Mario Wüthrich – active member of ASTIN, currently serves as Chief Editor of ASTIN Bulletin. His research mainly focusses on the problems of stochastic reserving. He has recently developed the so called Merz-Wüthrich model for estimating the reserve risk over a one-year time horizon. This model has gained much popularity, especially after the implementation of Solvency II regime in Europe and the UK.

QUANTITATIVE RISK MANAGEMENT (QRM)

This is the large contemporary area of actuarial science comprising the following concepts and techniques:

- Risk measures
- Financial time series
- Multivariate modelling: Copulas and Dependence
- Risk aggregation
- Operational risk modelling
- Extreme Value Theory and catastrophe modelling
- Model risk
- Advanced Insurance Analytics

The driving force behind the QRM advances in actuarial profession is **Paul Embrechts.** Paul is Professor at ETH, Zurich and also the founder and leader of the well-known risk and actuarial think-tank RiskLab. He is an active member of ASTIN and its great contributor and has been regularly addressing at ASTIN colloquia as a keynote speaker. Paul served as Chief Editor of ASTIN Bulletin [1996-2005]. He is well known for his extensive research publications and also for his books on Quantitative Risk Management and Extreme Value Theory.

PRESENT AND FUTURE

WHAT WE DO

Today ASTIN has over 1,300 members in nearly 30 countries. ASTIN Colloquia are held each year. ASTIN regularly (at least twice a year) publishes its ASTIN Bulletin – the internationally renowned, refereed scientific journal of the actuarial profession. ASTIN also organises Working Parties and Webinars and provides training and bursaries to young researchers in developing economies.

MEMBERSHIP

Membership is open to all members of the IAA. To join AS-TIN, please visit our 'Membership' web page on the IAA website www.actuaries.org and apply by completing the online application form.

OUR PLANS FOR THE FUTURE

Our vision is for ASTIN to serve the non-life insurance industry globally by ensuring that when it comes to providing insight and finding solutions to quantitative risk management issues, our members are trusted and in demand for their valued professional skills. To realise this, we envisage continuing our fruitful activities in the long-term, and also expand them further by adding more value-adding activities.

ASTIN COMMITTEE



Dr. Frank CUYPERS

Country: Switzerland Qualification: PhD in Theoretical Physics; Fellow of DAV and the Swiss Actuarial Association Experience: Chief Actuary, Prime Re Solutions Main areas of expertise: actuarial engineering



Michiel Van DER WARDT

Country: The Netherlands Qualification: MSc in Actuarial Science; Fellow of the Actuarial Society of the Netherlands Experience: Freelance Senior Non-Life Actuary and Risk Manager Main areas of expertise: enterprise risk management, Solvency II



Dr. Yuriy KRVAVYCH

Country: UK/Australia Qualification: PhD in Mathematics (Kiev), PhD in Actuarial Studies (Sydney) Experience: Senior Actuarial Manager, PwC Main areas of expertise: enterprise risk management, risk and capital modelling, Solvency II



Eberhard MÜLLER

Country: Germany Qualification: Dipl. Math., Aktuar DAV, CERA Experience: Managing Director, Riskmueller Consulting GmbH Main areas of expertise: enterprise risk management, Solvency II, reinsurance



Dr. Agnieszka BERGEL

Member Country: Portugal Qualification: PhD in Actuarial Science; Fellow of the Portuguese and the Polish Institutes of Actuaries Experience: Assistant Professor at ISEG, University of Lisbon Main areas of expertise: risk theory, actuarial education



Éric DAL MORO

Country: Switzerland

Qualification: Engineering Diploma, Qualified Actuary (Institute of Actuaries of France); Fellow of the Swiss Actuarial Association Experience: Head of Group P&C Reserving, SCOR Switzerland Main areas of expertise: reserving, Solvency II, IFRS 17



Adrian Folke ERICSSON

Country: UK Qualification: BSc in Actuarial Science Experience: Director, Dynamo Analytics

Experience Main area

ASTIN OVERVIEW



Dr. Roger M HAYNE

Country: USA Qualification: PhD in Mathematics; Fellow of the Casualty Actuarial Society; Member of the American Academy of Actuaries Experience: Associate Adjunct Professor in the Department of Statistics and Applied Probability at the University of California, Santa Barbara Main areas of expertise: reserving, risk management

Experience: Professor Emeritus of Instituto Tecnológico Autónomo de México; Associate Editor and Co-Editor North American Actuarial Journal



Pierre MIEHE

Member

Country: France Qualification: Certified Actuary (IA and CERA); Fellow of the French Institute of Actuaries Experience: Director, Milliman Main areas of expertise: non-life insurance pricing, reserving and risk modelling



Kirsten SASADY

Kenji SHIRAI

Country: Japan

IAA Delegate Country: Mexico

Country: Denmark Qualification: MSc in Actuarial Mathematics; Fellow of the Danish Actuarial Association Experience: Senior Actuarial Manager, PwC Main areas of expertise: risk management, Solvency II

Qualification: PhD in Statistics; Associate member (ASA) of the Society of Actuaries (SOA);

Qualification: Fellow of the Institute of Actuaries of Japan

Fellow of the International Society for Bayesian Analysis (ISBA)

Experience: Manager, Tokio Marine Group Main areas of expertise: reserving, risk management

Main areas of expertise: actuarial statistics







Dr. Dieter KÖHNLEIN

Dr. Enrique DE ALBA

IAA Delegate Country: Germany Qualification: PhD in Mathematics; Certified Actuary (CERA); Fellow of the German Actuarial Association DAV Experience: Senior Actuarial Manager, Mazars Main areas of expertise: actuarial audit, Solvency II





Dr. Hans BÜHLMANN Honorary Chairman

Country: Switzerland Qualification: PhD in Mathematics; Fellow of the Swiss Actuarial Association Experience: Professor Emeritus, Swiss Federal Institute of Technology (ETH) Main areas of expertise: risk theory, credibility theory, insurance mathematics

Dr. Jean LEMAIRE

Honorary Chairman Country: USA Qualification: PhD in Mathematics; Associate of the Society of Actuaries Experience: Director of the actuarial science program of the Wharton School of the University of Pennsylvania Main areas of expertise: mathematical statistics and probability, bonus-malus systems in automobile insurance

HIGHLIGHTS 2017-2018

June-August 2017

ASTIN Working Party on Risk Adjustments under IFRS 17

The results of the working party were published in a report in June 2017 and also presented at ASTIN Colloquium in Panama in August 2017. This working party was formed to provide a critical peer review of the *Exposure Draft of the IAA Monograph on Risk Adjustments.*

August 2017

ASTIN Colloquium in Panama, August 2017

ASTIN Colloquium was held jointly with AFIR/ERM in Panama City on 21-24 August 2017. Overall, the colloquium was a success. It was well attended with a strong presence of participants from Central and South America. There were 23 ASTIN papers presented at the colloquium. A valuable addition at this year's colloquium was the introduction of educational workshops in addition to a program of scientific papers. There were six ASTIN workshops offered at the colloquium.

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June-August 2017

ASTIN Working Party on Individual Claims Development with Machine Learning

The results of the working party were published in a report in July 2017 and also presented at ASTIN Colloquium in Panama in August 2017. This working party explored the potential use and benefits of machine learning for individual claims reserving.

September 2017

ASTIN Committee changes

The following changes to the committee structure took place in September 2017, straight after the Annual General Meeting of ASTIN in Panama:

 Outgoing members of the committee: Nils Rømer (Treasurer), Louise Francis (Secretary) and Colin Czapiewski;

 Éric Dal Moro accepts a new role within the Nomination Committee of the IAA, and steps down as ASTIN Chairman, but continues serving on the ASTIN Committee.

• New officers elected: Frank Cuypers (Chairman), Yuriy Krvavych (Secretary) and Eberhard Müller (Treasurer)

• New members admitted to the committee: Agnieszka Bergel (Portugal/Poland), Roger Hayne (USA), Kirsten Sasady (Denmark) and Adrian Ericsson (UK).

We welcome the new committee members on board, congratulate the new officers, and say goodbye to outgoing members and thank them for their hard work.

November 2017

Introducing new role: ASTIN Working Parties Coordinator

ASTIN introduces the role of ASTIN Working Parties Coordinator. Professor Emil Valdez from the University of Connecticut (USA) joins us to take this role to facilitate and provide project oversight. Emil will also serve in this role as a liaison person between ASTIN and the academia. We welcome Emil on board and wish him every success in his new role.

January 2018

New Editor of ASTIN Bulletin

Professor Mario Wüthrich (ETH, Zurich) has been recently appointed as the new Editor-in-Chief of ASTIN Bulletin to replace outgoing Editor-in-Chief Professor Andrew Cairns (Heriot-Watt University, Edinburgh), who has served in this role for the past 17 years. We wish Professor Mario Wüthrich every success in his new role, and sadly say goodbye to Professor Andrew Cairns, and would like to thank him for the outstanding contribution to the journal he has made over the past years. He will be greatly missed by the ASTIN community.

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January 2018

ASTIN Webinar: Results of ASTIN Working Party on Risk Adjustments under IFRS 17

The results of the working party were presented at ASTIN Webinar on 23 January 2018. This webinar was presented by our three members *Éric Dal Moro (SCOR, Zurich), Yuriy Krvavych (PwC, UK) and Glenn Meyers (USA)*, and attracted more than 60 participants from around the world.

February 2018

Obituary: Marc Goovaerts

In February this year we sadly lost our longstanding member of ASTIN and dear friend Professor Marc Goovaerts. Marc was one of the main contributors to the columns of ASTIN Bulletin. He was the first who systemised the principles of premium calculations in his book *Insurance Premiums: Theory and Applications.*

Marc was an authority in such areas as risk measures and their applications in risk and capital modelling.

Marc was also active in other professional actuarial forums. Along with Hans Gerber and J. Haezendonck, he founded the Insurance: Mathematics and Economics (IME) - the forum of actuarial academics with research interest in risk theory and insurance mathematics and economics. For many years, he was the Chief Editor of the IME Journal.

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February 2018

Obituary: Gunnar Benktander

It is with great sadness that we learned of the loss of Gunnar Benktander. Gunnar was a founding member of ASTIN and a great contributor to its intellectual base. Having been a part of great Scandinavian school of actuaries, he had the privilege to study under the supervision of Professor Harald Cramér. He became famous in non-life actuarial community for having introduced the parametric distributions, Benktander distributions, to model heavy-tailed losses in non-life insurance. He was a great contributor to the columns of ASTIN Bulletin.

Although only few of us had the privilege to know Gunnar personally, his name is so deeply associated with the foundation of ASTIN and many actuarial achievements that he left a lasting imprint and will be remembered respectfully. He was an outstanding personality and he will be greatly missed.



April 2018

IAA proposal of new rules governing ASTIN

In order to align with other IAA sections, the IAA proposes the following changes to the rules governing ASTIN:

• The "ASTIN Committee" to be renamed to the "ASTIN Board"; and

• The ASTIN Board member must confirm his/her Ordinary membership in the ASTIN Section each year. If the Board member fails to maintain his/her Ordinary membership, the ASTIN Board may terminate the Board members term automatically.

The proposed changes will be submitted for approval to the IAA Meeting in Berlin in May.

May-June 2018

ASTIN Working Party on Machine Learning and Traditional Methods Synergy in Non-Life Reserving

The results of the working party were published in a report in May 2018 and will also be presented at the ICA in Berlin in June 2018. This project examines the benefits of combining traditional methods and machine learning methods to determine nonlife reserves.

November 2018

ASTIN Working Party on the PAA under IFRS 17

This project explores the Premium Allocation Approach (PAA) in calculating liabilities under the IFRS 17, accounting standards for insurance contracts.

May 2018

New campaign: raising awareness of ASTIN Brand

We have launched our new campaign which aims to showcase ASTIN's importance to actuarial profession and non-life insurance industry, raise its brand awareness and increase its membership base. The main activities of this campaign include:

• production of promotional video about ASTIN,

• launch of new ASTIN website; and also

 other activities aiming to change and improve the way ASTIN communicates with its members and engages with the wider nonlife insurance community outside the IAA.

May-June 2018

ASTIN Working Party on Agent Based Models, Networks and Cellular Automata in Risk Management

The results of the working party will be published in a report and presented at the ICA in Berlin in June 2018. This project aims to describe models and methods in complex systems for measuring and managing risks with a clear focus on the property and casualty insurance industry.



ACTIVITIES

ASTIN

TODAY

Today ASTIN has over 1,300 members in nearly 30 countries. ASTIN Colloquia are held each year. ASTIN regularly (at least twice a year) publishes its ASTIN Bulletin – the internationally renowned, refereed scientific journal of the actuarial profession. ASTIN also organises Working Parties and Webinars and provides training and bursaries to young researchers in developing economies.

> For more information about our activities please visit our ASTIN web page on www.actuaries.org



 ASTIN colloquia are held each year. These are truly international well-attended events that attract risk and actuarial professionals from all over the world. They bring together academics and practitioners and provide an ideal environment for continuing professional development through the exchange of knowledge and expertise among participants from different countries across a wide range of disciplines.

ASTIN colloquia involve keynote speakers and invited lecturers, plenary sessions, parallel sessions, 'practitioner corner' panel discussions and specialised actuarial workshops. All papers submitted are carefully pre-selected by ASTIN Scientific Committee, and distributed to all participants in advance, so that more time can be devoted to the discussion of proposed ideas.

ASTIN Colloquia usually take place in attractive and iconic places, which add a friendly and collaborative atmosphere to the professional stimulation of working sessions through social and cultural activities.

• ASTIN Bulletin was established in 1958. Over decades ASTIN Bulletin has evolved and is now widely regarded as the leading international refereed journal of the actuarial profession covering the full breadth of practical and theoretical work in actuarial science.

 ASTIN promotes and runs its topical Working Parties to foster applied research related to practical and useful non-life insurance topics and extract more value from the intellectual potential of the ASTIN membership.

Each ASTIN Working Party (AWP) is a self-organised group of risk and actuarial experts with a focused applied research goal. The ASTIN Committee provides AWPs with support in the form of governance, appropriate funding and access to the IAA infrastructure.

Over the last five years ASTIN organised and successfully led several working parties.

• ASTIN regularly organises its topical **Webinars**. They are used to share knowledge and expertise among ASTIN members and the wider non-actuarial community.

Over the last five years ASTIN has also produced several webinars.

 A portion of ASTIN income has been always devoted to the development of actuarial science in actuarially emerging countries. In the past, ASTIN donated 18 important actuarial textbooks to 120 universities and actuarial associations across the emerging world. These recipients were also granted free access to ASTIN Bulletin. ASTIN has sponsored seminars in India, Croatia, Latvia, Poland, Zimbabwe, Chile, and Hong Kong.

ASTIN members have taught the principles of loss reserving, experience rating in motor insurance, financial economics in insurance, applications of stochastic processes, and stochastic models for life contingencies to actuarial students and practitioners. Today ASTIN continues to support actuarially emerging countries. One of the examples of this activity is our ongoing Benin Project, which serves to support the development of actuarial education in Benin. Through this project, ASTIN is committed to provide financial resources required to run the newly created actuarial study program.





ASTIN BULLETIN

ASTIN Bulletin was established in 1958. Over decades it has evolved and is now widely regarded as the leading international refereed journal of the actuarial profession, covering the full breadth of practical and theoretical work in actuarial science. ASTIN Bulletin was awarded the Thompson Reuter Impact Factor. It publishes at least two volumes per year, consisting of about 30 articles in total.

It has recently moved to a new publisher, Cambridge University Press, and now fully supports online submission of articles.

RECENT EDITORIAL CHANGES

Professor Mario Wüthrich (ETH, Zurich) has recently been appointed as the new Editor-in-Chief of ASTIN Bulletin to replace outgoing Editor-in-Chief Professor Andrew Cairns (Heriot-Watt University, Edinburgh), who served in this role for the past 17 years. Prior to his new appointment, Professor Mario Wüthrich served on the Board of Editors of ASTIN Bulletin for 7 years. We wish Professor Mario Wüthrich every success in his new role.

We sadly say goodbye to Professor Andrew Cairns, and would like to thank him for the outstanding contribution to the journal he has made over the past years. He will be greatly missed by the ASTIN community.



Professor Mario WÜTHRICH



Professor Andrew CAIRNS

ASTIN WEBINARS

ASTIN regularly organises its topical Webinars. They are used to share knowledge and expertise among ASTIN members and the wider non-actuarial community.

ASTIN webinars are open to ASTIN members only, and are free of charge.

OUR RECENT WEBINARS

23 January 2018. We organised this webinar jointly with the IAA Secretariat. The webinar presentation was based on the results of *ASTIN Working Party on Risk Adjustments under IFRS 17*, which was formed earlier to provide a critical peer review of the *Exposure Draft of the IAA Monograph on Risk Adjustments*.

This webinar was presented by our three members *Éric Dal Moro (SCOR, Zurich), Yuriy Krvavych (PwC, London, UK) and Glenn Meyers (USA),* and attracted more than 60 participants from around the world.

The WebEx recording of the webinar is available for ASTIN members on the IAA website.

OUR PAST WEBINARS

Over the last five years ASTIN organised several webinars. These are:

- 9 September 2016 Results of ASTIN Working Party on Non-Life Reserving Practice
- 29 September 2015 Big Data / Data Analytics
- 30 June 2015 Solvency II Regulation written for Actuaries?
- 16 October 2014 Findings from the IFoA Getting Better Judgment Working Party and an Internal Prediction
- 16 October 2014 Introduction to Bayesian MCMC Models for Actuaries
- 12 June 2014 Extra-terrestrial Influences on Nature's Risks

ACTIVITIES

ASTIN COLLOQUIUM 2017 PANAMA

21-24 August trong presence

The ASTIN Colloquium was held jointly with AFIR/ERM in Panama City on 21-24 August 2017. Overall, the colloquium was a success. It was well attended with a strong presence of participants from Central and South America.

The following keynote presentations where delivered at the colloquium:

- Professor Paul Embrechts (ETH, Zurich): A Darwinian View on Internal Models.
- Dave Ingram (Willis Re, New York): Fat Tails in Risk Models
- Clemente Cabello (Portugal): The Actuary as Leader

There were 23 ASTIN papers presented at the colloquium.

A valuable addition at the colloquium this year was the introduction of educational workshops in addition to a program of scientific papers. There were six ASTIN workshops offered at the colloquium. These are:

- Reserving by Roger Hayne (USA)
- Pricing by Axel Wolfstein (Germany) and Christopher Cooksey (USA)
- Reinsurance by Éric Dal Moro (Switzerland) and Eberhard Müller (Germany)
- Solvency by Frank Cuypers (Switzerland)
- Bonus-Malus Tariffication by Jean Lemaire (USA)
- Introduction to Bayesian MCMC Models by Glenn Meyers (USA)

The colloquium was concluded with a fantastic social program.





ACTIVITIES





Professor Emil VALDEZ ASTIN Working Parties Coordinator

Emiliano A. Valdez is a Professor of actuarial science at the University of Connecticut, USA, He is a Fellow of the Society of Actuaries, holds a Ph.D. from the University of Wisconsin, and is the interim director of the graduate programs in actuarial science at Connecticut. He held academic posts at Nanyang Business School in Singapore and the University of New South Wales in Australia. From 2013 to 2015, he was the Director of the actuarial program at Michigan State University. He has received the Edward A. Lew Award, the Halmstad Memorial Prize, and the Hachemeister Prize, in recognition for his research work. He also has years of industry experience working as an actuary. For the ASTIN Committee, he is the coordinator of the ASTIN working parties where he facilitates and provides project oversight. He also acts as the liaison between the working parties and members of the committee. ASTIN Committee encourages and supports applied research through its program called ASTIN Working Parties (AWP). It involves a self-organised group of experts with a clearly defined scope of applied research that is expected to be completed within a reasonable timeframe. The research topics fall within the purview of non-life insurance, are to be useful in practice, provide added value to ASTIN membership, and are generally timely. Apart from fostering applied research, the AWP also aims to tap the intellectual potential of ASTIN membership.

Over the last three years we have successfully completed four AWPs and recently formed another three AWPs that are currently in progress and scheduled to be completed soon. These results of these working groups will be used to benefit non-life insurers in pricing, reserving, and risk management.

The final reports of completed projects are fully accessible to ASTIN members and can be downloaded from our 'Working Parties' web page on the IAA website www.actuaries.org

NON-LIFE RESERVING PRACTICES

Project Leader: Pierre Miehe, Milliman (France) Project period: Dec 2015 – June 2016 Summary

This work provides a summary report of the reserving methods used by 42 participating countries accounting for 87% of World-wide Non-Life premiums. There were 535 insurance companies participating in the survey.

The results of the survey provide member with an overview of current practices to determine the level of non-life reserves, with a particular emphasis on what new methods are being employed.

In particular, the report shows that Chain Ladder and Bornhuetter Ferguson top deterministic reserving methods, whereas Bootstrap and Mack are the most popular among the methods used in stochastic reserving.

BIG DATA/DATA ANALYTICS

Project Leader: Louise Francis, CAS (USA) Project period: Sep 2014 – April 2015, Dec 2017 – May 2018

Summary

This project consisted of two phases. Phase 1 provides guidelines for current trends in data analytics, as well as references and resources to enable these trends to be advanced and used in practice. Phase 2 expands the details of these methods and techniques for big data and predictive analytics. The following are the techniques covered in this research:

Supervised learning

Some of the most popular non-GLM supervised learning methods are: Trees, Ensemble Trees (randomForest), neural

networks, and Multivariate Adaptive Regression Splines (MARS). In this project, Trees, including randomForest, and MARS were introduced. GLMs were used as a benchmark.

Unsupervised learning

The unsupervised learning techniques used are: Clustering, K means Clustering, Hierarchical Clustering and Principal Components Analysis.

In addition to practical data analytics tools developed in R, the project also provides the data set used (free downloadable insurance data from the 2000 COIL Data Analytics Competition) along with R code that can be used by actuaries to practice the covered methods.

RISK ADJUSTMENTS UNDER IFRS 17

Project Leader: Éric Dal Moro, SCOR (Switzerland) Project period: Feb 2017 – Aug 2017 Summary

This working party was formed to provide a critical peer review of the Exposure Draft of the IAA Monograph on Risk Adjustments. In particular, the focus was on the scope of the monograph and conceptual soundness of methods and techniques used therein for quantifying risk adjustments in reserving. This research added value in many aspects by providing valuable comments and suggestions, which were further used by the IAA specialised taskforce group to enhance and improve the content of the monograph. Examples of valuable contributions of note made by this AWP include:

1) Revision of Section 9.1 of the monograph on Quantification and Disclosure of Confidence Level of Risk Margins. The new practical methods for quantifying confidence level (probability of sufficiency) of reserve risk margins were proposed and linked to the recent research paper on this topic written by two members of this AWP, Éric Dal Moro, SCOR (Switzerland) and Yuriy Krvavych, PwC (UK):

Probability of Sufficiency of Solvency II Reserve Risk Margins: Practical Approximations, ASTIN Bulletin, Vol 47(3), Cambridge University Press, 2017

2) Addition of study cases developed by one member of this AWP, Glenn Meyers, CAS (USA)

The results of this AWP were presented at ATIN Colloquium in Panama in August 2017 and also at ASTIN Webinar in January 2018.

INDIVIDUAL CLAIM DEVELOPMENT WITH MACHINE LEARNING

Project Leader: Bor Harej (Slovenia) Project period: Nov 2016 – Aug 2017 Summary

The working party explored the potential use and benefits of machine learning for individual claims reserving. This project managed to test one machine learning technique for individual claim development and for reserve estimation. Artificial Neural Networks (ANNs) were implemented in a cascading triangular way similar to triangular reserving methods, and the prediction results were compared with results achieved by classical reserving methods.

The findings offer a better understanding of possible complexity of the nature of the claims, point out some weaknesses that traditional methods might have, and indicate a strong potential for machine learning algorithms.

The results of this AWP were also presented ATIN Colloquium in Panama in August 2017.

MACHINE LEARNING AND TRADITIONAL METHODS SYNERGY IN NON-LIFE RESERVING

Project Leader: Salma Jamal, KPMG Paris (France) Project period: Nov 2017 – May 2018 Summary

This project examines the benefits of combining traditional methods and machine learning methods to determine non-life reserves. Different approaches to estimate claims reserves are calibrated using real data on the claims experience of a professional liability line of business. The results provide guidelines for practically choosing the methods that might be most suitable.

THE PAA UNDER IFRS 17

Project Leader: Kirsten Sasady, PwC (Denmark) Project period: Nov 2017 – Nov 2018 Summary

This project explores the Premium Allocation Approach (PAA) in calculating liabilities under the IFRS 17, accounting standards for insurance contracts. It also aims to review the literature and supporting past research on this PAA method. The work will also provide a useful discussion of the principles underlying the risk adjustments and requirements of IFRS 17.

AGENT-BASED MODELS, NETWORKS AND CELLULAR AUTOMATA IN RISK MANAGEMENT

Project Leader: Magda Schiegl, Hochschule Landshut (Germany)

Project period: Nov 2017 – June 2018 Summary

This project aims to describe models and methods in complex systems for measuring and managing risks with a clear focus on the property and casualty insurance industry. The research will include an overview of recent scientific contributions on this subject and a subsequent evaluation of the practical applicability of these concepts in risk evaluation and risk management. The work has identified applications in risk aggregation for Solvency II, credit risk analysis, and the evaluation of pandemic and other operational risks.



PRIZES, AWARDS & GRANTS

ASTIN

PRIZES

Each year the Hachemeister Prize is awarded to the best paper presented at the ASTIN colloquium. The prize was established in 1993 in recognition of Charles A. Hachemeister's many contributions to Actuarial Studies in Non-Life Insurance (ASTIN) and his efforts to establish a closer relationship between the Casualty Actuarial Society (CAS) and ASTIN.

The 2017 Hachemeister Prize was awarded to the paper titled "Correlations Between Insurance Lines of Business: An Illusion or a Real Phenomenon?" by Benjamin Avanzi, Greg Taylor and Bernard Wong from School of Risk and Actuarial Studies, University of New South Wales, Sydney, Australia.

The paper provides a simple theoretical framework that can be efficiently used in practice in the validation of dependence structures. The new framework provides valuable insight and objective challenges to dependence calibration processes.

The Hachemeister Prize was received by Greg Taylor at ASTIN Colloquium (AGM) in Panama in August 2017.



AWARDS

ASTIN also provides 'ASTIN Best Paper Award' to the best papers written and presented by young actuarial researchers.

ASTIN Best Paper Award – ICA 2018, Berlin

This year, 110 papers were initially submitted to the ASTIN Section for the presentation at the International Congress of Actuaries (ICA) in Berlin. Following the first round of selection by the ICA Organising Committee, 17 papers were selected for the ICA in Berlin. The ASTIN Committee then chose the two best papers. These are:

1. "The impact of Insurance Premium Taxation" by Anna-Maria Hamm, Moritz Hildebrandt and Stefan Weber.

2. "The transition towards semi-autonomous vehicle insurance: the contribution of Usage- Based data" by Montserrat Guillen and Ana M. Pérez-Marín.

Both articles focus on different and important practical problems in today's insurance industry. The first paper deals with the taxation on insurance premium and its effect on the cost on insurance, its demand, fiscal revenues and profitability of insurers. The second paper studies the importance of telematics in driving positive policyholder behaviour that leads to better risk selection and control of moral hazard in motor insurance.

They both deserve in fact a special mention and recognition for their contribution

ASTIN Best Paper Award - ASTIN 2017, Panama

Last year, 40 papers were submitted to ASTIN Colloquium in Lisbon, Portugal. The following two papers received the reward: 1. "An approach to the individual claims reserving method" by Eugenio V. Rodriguez and Agnieszka I. Bergel.

2. "Pricing cyber securities insurance using copulas" by Jacquelyn Rees-Ulmer, Rahul Parsa and Ramona Lee.

GRANTS AND ASSISTANCE

ASTIN provides financial assistance to support actuarially emerging countries. One example of this activity is our ongoing Benin Project, which serves to support the development of actuarial education in Benin. Through this project, ASTIN is committed to provide financial resources required to run the newly created actuarial study program.

Each year, ASTIN also provides two types of financial assistance: • ASTIN Working Party (AWP) Travel Grants for valuable contribution to AWP research work; and

• ASTIN Bursaries for researchers from developing economies.

Below provides the list of recipients of financial assistance and grants from ASTIN over the last two years.

2018 AWP TRAVEL GRANTS RECIPIENTS

• Salma Jamal, KPMG (France) – AWP Machine Learning and Traditional Methods Synergy in Non-Life Reserving

• Lorenzo Invernizzi, Zurich (Italy) – AWP Machine Learning and Traditional Methods Synergy in Non-Life Reserving

• Rasa Varanka McKean (USA) – AWP Agent Based Models, Networks and Cellular Automata in Risk Management

2017 AWP TRAVEL GRANTS RECIPIENTS

• Bor Harej (Slovenia) – AWP Individual Claim Development with Machine Learning

2018 ASTIN BURSARIES (ICA, BERLIN)

• Gayane Arsenyan (Armenia) – ICA paper title: Earthquake Catastrophe Risk Management

• Ahsanul Haq (Bangladesh) – ICA paper title: Actuarial profession in Bangladesh is more challenging than ever

• Cristina Mano (Brazil) – ICA paper title: Generation Actuarial 2.0

• Nikhil Asnani (Jamaica) - ICA paper title: The young actuary's toolkit

• Aneta Gacovska-Barandovska (Macedonia) – ICA paper title: Randomly indexed central order statistics through examples and application

• Roshan Prasad Gyawali (Nepal) – ICA paper title: Actuarial prospectus in the growing Nepalese insurance industry

2017 ASTIN BURSARIES (ASTIN COLLOQUIUM, PANAMA)

• Ezgi Nevruz (Turkey), Basak Bulut (Turkey) and Farid Flici (Algeria)

BENIN PROJECT

Since 2010, ASTIN has funded the actuarial study program at the Department of Actuarial Sciences and Financial Mathematics from Ecole Supérieure d'Actuariat ISM-Adonaï of Cotonou, Benin. This initiative is a joint effort of ASTIN together with the Seminar for Finance and Econometrics of the Ludwig-Maximilian-University (LMU) Munich Germany, the State University of Benin (UAC) and also the private Business School ISM-Adonaï in Benin. From July 2013 to December 2016, this initiative was also financed by the German government.

The program attracts actuarial students from all over the sub-region including lvory Coast, Togo, Cameroun, Congo, Centrafrique, Senegal and, of course Benin.

The project suffered a setback in 2014 due to Ebola outbreak in West Africa.

ASTIN funding is used to pay travel and lodging expenses for teachers from Europe. It is expected that the need for teachers from abroad will reduce over time as one graduate student is currently finishing PhD in Johannesburg. This PhD student is most likely to return to Benin to give more advanced courses. In addition there are other students from Johannesburg that may be able to teach in Benin. These local resources are growing in number and will reduce the need for European teachers and hence the need for ASTIN funding.

For some years the Benin project will continue benefit from AS-TIN funding. In the future, part of the funding will also be used to support the junior teacher as well as the PhD student to lecture in Benin. In addition some money will be used to develop tutorials.



with actuarial students, Benin.





FIGURES

ASTIN

MESSAGE FROM THE TREASURER

The full year 2017 unaudited accounts for ASTIN were received from the IAA on 28th February 2018 and the audited accounts are expected to be available and reviewed for the treasurers meeting in Berlin in June.

2017 Year End accounts: 16,766 CAD deficit well within the (adjusted) budgeted deficit of 19,650 CAD

Overall, the 2016 ASTIN accounts showed a deficit of 16,766 CAD (2016 a deficit of 36,541 CAD, originally budgeted for 2017: 31,550 CAD deficit). Revenues amounted to 91,192 CAD primarily driven by membership dues = 67,300 CAD (2016: 68,150 CAD) from 1340 members (2016: 1352 members), 16,988 CAD (2016: 9,650 CAD) in interest earned and 6,456 CAD from book sales and other revenue. As the revenue budget of 70,000 CAD did neither contain expectations from interest income nor from book sales and other revenues (until 2015 netted with the ASTIN bulletin expenses), there was an exceedance of the budgeted income figure by 21,192 CAD! On the other hand, expenses were incurred of 94,173 CAD (2016: 105,722 CAD) of which the primary costs are 32,987 CAD (down from 36,470 CAD) in IAA section admin, 14,474 CAD for the ASTIN Bulletin and 24,719 CAD for bursaries (substantially less than the 32,464 CAD in the 2016 accounts and also less than the budgeted figure of 28,500 CAD).

Unfortunately, there were again unrealised losses from the investment portfolio of 13,786 CAD vs. budgeted gains of 10,000 CAD after the substantial losses of 15,959 CAD in 2016. This nearly wiped out the interest earned of 16,988 CAD (see above). Without this recurring burden the bottom line would have been nearly breakeven.

Overall the result of 2017 stayed quite well within the (adjusted) budget which was supported by a planned expense amount of 11,500 CAD for "initiatives" in 2017 that did not materialise. The budget was adjusted after it turned out that the Panama Colloquium would be an economic success. Finally there was an excess of 4,884 CAD for ASTIN that was netted with the agreed ASTIN expenses for Panama (especially travel expenses for invited speakers, 3 bursaries and 2 best paper awards), limiting the bottom line contribution from ASTIN for the Panama event to 8,557 CAD!

Annual report - 2017 / 2018

FIGURES

The decline in membership numbers continued but at a far lower rate than in previous years. In 2018 it is expected that various initiatives, especially in the context of ICA2018, will help raise membership numbers.

The section treasurer supports the approval of the 2017 accounts.

BUDGET 2018

Budget 2018: 75,380 CAD deficit as submitted on 30. November 2017. Included in this figure are the agreed ICA2018 contributions, mainly 15,000 EUR for ICA Bursaries and another 15,000 EUR for the VICA. In addition we agreed to support the Benin project with another 15,000 CAD. Further 15,000 CAD were budgeted for continued unrealised losses from investments, which hopefully will not materialise. This may balance recent decision for the video (6,000 EUR) and the report (EUR 8,000).

An updated Budget for 2018 will be provided after the ICA2018 event.



Eberhard MÜLLER ASTIN Treasurer, Hannover May 17th, 2018*

Lilles



ASTIN MEMBERS

+ 150	150 > 100	100 > 50	50 > 40	40 > 30	30 > 1

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>10 1	0 > 0
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Portugal	8
Singapore	8
Mexico	7
Austria	7
Belgique	6
Lebanon	4
Czech Republic	3
Greece	3
South Korea	2
Peru	2
Chile	2
Bahrain	2
New Zealand	2
Guernsey	2
Estonia	2
Nigeria	2
Côte D`Ivoire	2
Panama	1
Brazil	1
Macedonia	1
Mauritius	1

Chinese Taipei	1
Trinidad and Tobago	1
Belgium	1
Republic of the Congo	1
Argentina	1
Hungary	1
Namibia	1
Kenya	1
Turkey	1
China	1
Philippines	1
Poland	1
Jamaica	1
Gabon	1
India	1
Cayman Islands	1
Suriname	1
Colombia	1
Slovakia	1

FIGURES

ASTIN STATEMENT OF FINANCIAL POSITION As at December 31, 2017

ASSETS	3	B1 DEC 2017	3	1 DEC 2016
Current Assets				
<u>Criequing/Savings</u> Cash in bank accounts	\$	18 380	\$	9 922
Cash in investment accounts	Ψ	1 008	Ψ	1 392
Short-term Investments		369 148		379 716
Total Chequing/Savings		388 536		391 030
Other Current Assets				
Other receivables		6 033		6 303
Prepaid Expenses		111		107
Total Other Current Assets		6 144		6 411
Total Current Assets		394 680		397 441
Other Assets				
Long-term investments - Bonds		446 327		461 404
Total Other Assets	_	446 327		461 404
TOTAL ASSETS	\$	841 007	\$	858 845
LIABILITIES & NET ASSETS				
Liabilities				
Current Liabilities				
Other Current Liabilities				
Deferred revenue	\$	2 200	\$	100
Other payables & accruals		2 507		5 679
Total Other Current Liabilities		4 707		5 779
Total Current Liabilities		4 707		5 779
Total Liabilities		4 707		5 779
Net Assets		050.000		
Unrestricted surplus		853 066		889 607
Excess (Deticiency) of Revenue over Expense	S	(16766)		(36 541)
Total Net Assets		836 300		853 066
TOTAL LIABILITIES & NET ASSETS	\$	841 007	\$	858 845

FIGURES

ASTIN STATEMENT OF REVENUE & EXPENSES - ACTUALS VS. BUDGET

For the twelve months ended December 31, 2017

31-Dec-17 Annual Budget \$ Variance % Variance 31 ORDINARY INCOME/EXPENSE Income 5 5 100% 5 5 100% 5 16 898 100% 5 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 10%	-Dec-16
ORDINARY INCOME/EXPENSE Income \$ 6456 \$ - 6456 100% \$ Book sales & other revenue 16 898 16 898 100% Interest & investment revenue 16 898 16 898 100% Membership dues - Full 67 300 70 000 (2 700) (4%) IAA Section Fund Income 539 539 100% Total Income 91 192 70 000 21 192 30% Expense 411 100 (311) (311%) Bulletins 14 474 12 500 (1 974) (16%) Bursaries 24 719 28 500 3 781 13% Initiatives - 12 500 12 500 100% Loss(gain) on foreign exchange 1 387 - (1 387) (100%) Meetings - colloquia 8 557 5 500 (3 057) (56%)	
Income \$ 6 456 \$ - 6 456 100% \$ Book sales & other revenue 16 898 16 898 100% \$ 16 898 100% \$ Interest & investment revenue 16 898 70 000 (2 700) (4%) \$ Membership dues - Full 67 300 70 000 (2 700) (4%) \$ IAA Section Fund Income 539 539 100% \$ \$ Total Income 91 192 70 000 21 192 30% \$ Expense 14 474 12 500 (1 974) (16%) Bursaries 24 719 28 500 3 781 13% Initiatives - 12 500 100% \$ Loss(gain) on foreign exchange 1 387 - (1 387) (100%) Meetings - colloquia 8 557 5 500 (3 057) (56%)	
Book sales & other revenue \$ 6 456 \$ - 6 456 100% \$ Interest & investment revenue 16 898 16 898 100% Membership dues - Full 67 300 70 000 (2 700) (4%) IAA Section Fund Income 539 539 100% Total Income 91 192 70 000 21 192 30% Expense 8 411 100 (311) (311%) Bulletins 14 474 12 500 (1 974) (16%) Bursaries 24 719 28 500 3 781 13% Initiatives - 12 500 100% 4557 Loss(gain) on foreign exchange 1 387 - (1 387) (100%) Meetings - colloquia 8 557 5 500 (3 057) (56%)	
Interest & investment revenue 16 898 16 898 100% Membership dues - Full 67 300 70 000 (2 700) (4%) IAA Section Fund Income 539 539 100% Total Income 91 192 70 000 21 192 30% Expense 8ank charges & service fees 411 100 (311) (311%) Bulletins 14 474 12 500 (1 974) (16%) Bursaries 24 719 28 500 3 781 13% Initiatives - 12 500 12 500 100% Loss(gain) on foreign exchange 1 387 - (1 387) (100%) Meetings - colloquia 8 557 5 500 (3 057) (56%)	6 030
Membership dues - Full 67 300 70 000 (2 700) (4%) IAA Section Fund Income 539 539 100% Total Income 91 192 70 000 21 192 30% Expense 411 100 (311) (311%) Bulletins 14 474 12 500 (1 974) (16%) Bursaries 24 719 28 500 3 781 13% Initiatives - 12 500 12 500 100% Loss(gain) on foreign exchange 1 387 - (1 387) (100%) Meetings - colloquia 8 557 5 500 (3 057) (56%)	9 650
IAA Section Fund Income 539 539 100% Total Income 91 192 70 000 21 192 30% Expense 30% 30% 30% Bank charges & service fees 411 100 (311) (311%) 30%	68 150
Total Income 91 192 70 000 21 192 30% Expense - - - - - - - - - - 10% - - 10% -	1 310
Expense 411 100 (311) (311%) Bank charges & service fees 411 100 (311) (311%) Bulletins 14 474 12 500 (1 974) (16%) Bursaries 24 719 28 500 3 781 13% Initiatives - 12 500 12 500 100% Loss(gain) on foreign exchange 1 387 - (1 387) (100%) Meetings - colloquia 8 557 5 500 (3 057) (56%)	85 140
Bank charges & service fees411100(311)(311%)Bulletins14 47412 500(1 974)(16%)Bursaries24 71928 5003 78113%Initiatives-12 50012 500100%Loss(gain) on foreign exchange1 387-(1 387)(100%)Meetings - colloquia8 5575 500(3 057)(56%)	
Bulletins14 47412 500(1 974)(16%)Bursaries24 71928 5003 78113%Initiatives-12 50012 500100%Loss(gain) on foreign exchange1 387-(1 387)(100%)Meetings - colloquia8 5575 500(3 057)(56%)	25
Bursaries 24 719 28 500 3 781 13% Initiatives - 12 500 12 500 100% Loss(gain) on foreign exchange 1 387 - (1 387) (100%) Meetings - colloquia 8 557 5 500 (3 057) (56%)	29 855
Initiatives - 12 500 12 500 100% Loss(gain) on foreign exchange 1 387 - (1 387) (100%) Meetings - colloquia 8 557 5 500 (3 057) (56%)	32 464
Loss(gain) on foreign exchange 1 387 - (1 387) (100%) Meetings - colloquia 8 557 5 500 (3 057) (56%)	-
Meetings - colloquia 8 557 5 500 (3 057) (56%)	(2 740)
	2 566
Office & overhead 106 100 (6) (6%)	-
Printing 31 250 219 88%	11
Professional services 4 063 2 500 (1 563) (63%)	2 872
Telephone, fax & teleconference 1 380 - (1 380) (100%)	1 312
Travel - general 5 791 3 000 (2 791) (93%)	2 656
Web seminar expense 267 1 100 833 76%	231
Total Expense 61 186 66 050 4 864 7%	69 252
NET ORDINARY INCOME 30 006 3 950 26 056 660%	15 888
OTHER INCOME/EXPENSE	
Unrealized gain/loss-investment (13 786) 10 000 (23 786) (238%)	(15 959)
Section Administration (32 987) (33 600) 613 2%	(36 470)
NET OTHER INCOME/EXPENSE (46 773) (23 600) (23 173) (98%)	(52 429)
EXCESS (DEFICIENCY) OF REVENUES OVER EXPENSES \$ (16 766) \$ (19 650) \$ 2 884 15% \$	(36 541)



PERSPECTIVE

ASTIN

VISION 2020

Our vision is for ASTIN to serve the non-life insurance industry globally by ensuring that, when it comes to providing insight and finding solutions to quantitative risk management issues, our members are trusted and in demand for their valued professional skills. To realise this, we envisage continuing our current fruitful activities in the long run, and to also expand them in the near future by adding the following activities:

 \bullet Develop and launch the 'Expert Helpline' – an online facility used to address members' queries.

• Develop and launch the 'ASTIN Masterclasses' – a series of online professional education courses on different risk and nonlife actuarial topics. It is envisaged that this will involve ASTIN active prominent figures.

• Establish collaboration with other professional forums of risk and insurance professionals. The idea is to increase our presence in those professional activities outside the IAA that are still very much relevant to ASTIN's mission and vision, and also to the work we do. Examples of relevant professional forums we would like to partner with in the future include Insurance: Mathematics and Economics, The Geneva Association, Reinsurance Rendez-Vous and American Risk and Insurance Association.



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