

# AFIR-ERM CALL FOR PAPERS & RESEARCH GRANTS

## THE CALL & RESEARCH OBJECTIVES

Innovation enabled by digital technology is rampant and omnipresent. With a growing awareness of its potential in the industry, insurance companies increasingly adopt digital agendas in their business activities, but they are also subject to emerging risks, such as cyber risk. Technological advancement impacts the industry across a broad spectrum and thus requires actuaries to extend their knowledge base in this direction. The AFIR-ERM Section of the International Actuarial Association has as its primary objective the promotion of actuarial research in enterprise *risk management* and particularly *financial risk fields*, to push forward the boundaries of actuarial knowledge and to promote and facilitate an international exchange of views, advice, research and practical information among actuaries and other experts involved in these fields. The AFIR-ERM Section is thus pleased to announce paper prizes for current unpublished research papers and research grants to fund new original research leading to a research paper on innovations in this field in general and particularly on digital innovation in actuarial science. The research questions and objectives can comprise, but are not limited to the following topics:

- Actuarial data science in enterprise risk management: Models and applications of techniques such as artificial intelligence or machine learning in risk management.
- Cyber and technology risk: Managing exposures, possibilities and pricing of new cyber risk insurance products.
- Sustainability: Approaches for sustainable value creation and finance.
- Longevity risk: Innovations to manage longevity risks.
- Extreme events: Monitoring, modeling, and mitigation to expand risk coverage.
- Model governance: Toolkit of actuarial models is extensive, but which models should be used in what way, e.g., for predictions and constructing risk-return profiles (with a focus, e.g., on the own risk and solvency assessment (ORSA) under Solvency II)
- Asset-Liability Management 2.0: Asset portfolio composition in relation with aggregate risk margins in a scientific and systematic way.
- Innovative product design as an insurer's risk management action.

Note again that the above list is not meant to be exhaustive but represents examples of possible topics that might be of interest in the AFIR-ERM field.

All papers and research projects are expected to either be accompanied by tools or code that allows the techniques discussed to be implemented or include links to open source software and code for this purpose.

## SUBMISSION & GUIDELINES

The AFIR-ERM Section of the International Actuarial Association is pleased to award a research paper prize of CAD \$5,000 each to the two best selected research papers and research grants of CAD \$10,000 each for three selected research grant proposals.

## CALL FOR PAPERS & RESEARCH GRANTS

### SUBMISSION & GUIDELINES

Qualifying research papers are only original full theoretical or empirical papers that are developed for this research program and have not been published (in whole or in part). Submissions are due by **October 1, 2019** and must be submitted in the English language including (1) a separate cover page containing the paper title, author(s) affiliation, contact information and (2) a full paper excluding the author information. Acceptance of submissions: By **December 1, 2019**, the committee will make a decision on all papers and will contact authors accordingly. Selected papers will be presented at the annual AFIR-ERM Colloquium.

Only full papers based on rigorous analysis and empirical strategies will be accepted for review and consideration. The paper must be original research; the paper cannot be currently under consideration or accepted by any other journal; cannot have been already published, in whole or in part.

### RESEARCH GRANTS

Proposal submissions are due by **March 1, 2019** and must be submitted in English. Authors should submit proposals, including the title, a short description of the topic(s) to be addressed, and the approach that will be taken (e.g. literature search, model, etc.), emphasizing issues that require special consideration. Lead authors have to be members of the AFIR-ERM Section and funded research projects will be presented at the annual AFIR-ERM Colloquium. Details should be given regarding the techniques to be used, collateral material to be consulted, and possible limitations of the analysis. Each proposal should be accompanied by the resumes of the author(s), indicating how their background, education, and experience bear on their qualifications to undertake the project. A list of the authors' publications, along with authors' contact information, should be included with the proposal. Furthermore, a schedule for completion of the research should be provided, identifying key dates or time frames for research completion and report submissions. Acceptance of proposals: By **June 1, 2019**, the committee will make a decision on all proposals and will contact authors accordingly.

Submissions should be sent via e-mail to the AFIR-ERM Section of the IAA:  
AFIR.research@actuaries.org

Sincerely,

Michael Sherris.  
*AFIR-ERM Chair*



**AFIR-ERM**  
Finance, Investment & ERM



**IAA Section AAI Colloquium 2019**

THE MODERN ACTUARY - CHALLENGE • INFLUENCE • LEAD  
**ASTIN • IAAHS • IAALS • IACA • PBSS**



## IAA Colloquium 2019 in Cape Town!

We have previously announced that the next IAA Colloquium will take place in beautiful Cape Town from 2 – 5 April 2019.

This Colloquium represents a joint collaboration of five IAA Sections namely, International Association of Consulting Actuaries (IACA), Pension Benefits and Social Security Section (PBSS), IAA Health Section (IAAHS), IAA Life section (IAALS), and IAA Non-Life Insurance (ASTIN). It uniquely combines the local annual practice area seminars with an international event. Therefore, it gives the South African delegates the opportunity to be exposed to developments abroad, whilst the international delegates can experience a truly local flavor.

The theme of the Colloquium is "The Modern Actuary – Challenge, Influence, Lead". The program will include plenary sessions with formal addresses by invited keynote speakers, topical presentations by subject-matter experts and parallel sessions at which submitted papers from actuaries

from around the world will be presented.

We are excited to send an update on the progress with the arrangements, including information regarding the very exciting topics to be discussed. We have received so many abstracts, that the scientific committee has had to decline some offers for papers. The quality of the papers that will be presented will therefore be of exceptional quality. It is not possible to give a list of all the papers in this announcement; there are simply too many and it would be wrong to highlight specific individual papers. Themes covered across the practice areas are wide ranging and include AI and machine learning, big data, pricing, reserving, capital modeling, underwriting, public healthcare systems, plus some wider area themes like diversity, whistle-blowing and sustainable development. We are also working on securing the time of a prominent ex-politician and very well known business person – more on this once we have finalised the negotiations

In addition to these very exciting themes, we have secured the services of a couple of prominent South African speakers to deliver keynote addresses. The confirmed speakers are:



For a detailed draft programme with topics, papers and names of authors, please visit the "programme" part of the Colloquium website.

Remember that early bird discounts apply for all bookings and payments made before 31 December 2018.

Looking forward to welcoming you in Cape Town

Marius duToit  
Chair: LOC



### Colloquium Topics include:

- AI and machine learning
  - Capital Modelling
  - Public Healthcare systems and the actuary's role
  - Pre-funding of retirement healthcare benefits
  - Anti-selection
  - AI and machine learning
  - Management of chronic diseases
  - Diversity in the actuarial profession
  - Sustainable Development
  - Whistle blowing
- And many more...

### FIND OUT MORE

For more information about the 2019 Colloquium please visit our website

[www.colloquium2019.org.za](http://www.colloquium2019.org.za)

#### Register:

<http://www.colloquium2019.org.za/registration/>

#### View Programme:

<http://www.colloquium2019.org.za/programme-outline/>

#### Accommodation:

<http://www.colloquium2019.org.za/accommodation/>

#### Airport Transfers:

[https://www.qualitytouringservices.co.za/bookings\\_colloquium2019-airport.php](https://www.qualitytouringservices.co.za/bookings_colloquium2019-airport.php)

#### Tours:

<https://www.qualitytouringservices.co.za/colloquium2019.php>

Hosted by



[www.colloquium2019.org.za](http://www.colloquium2019.org.za)

Project Manager: Carolyn Melnick – [caro@soafrica.com](mailto:caro@soafrica.com)

Abstracts: Tansy Goosen – [tansy@soafrica.com](mailto:tansy@soafrica.com)

Secretariat: Scatterlings Conference & Events

Registration: Simone Solomons – [simone@soafrica.com](mailto:simone@soafrica.com)

Sponsorship & Exhibition: Mandy Godfrey – [mandy@soafrica.com](mailto:mandy@soafrica.com)

Tel: +27 (0)21 422 2402



# Section Colloquium 2019



THE MODERN ACTUARY - CHALLENGE • INFLUENCE • LEAD  
ASTIN • IAAHS • IAALS • IACA • PBSS



## Welcome to the 2019 IAA Colloquium in Cape Town!

**REGISTRATION OPEN!**

link to: <http://www.colloquium2019.org.za/registration/>

**REGISTER NOW!**

Book and pay by **31 December 2018** to benefit from the *Early Bird discounted registration fees:*

DESCRIPTION	EARLY BIRD (by 31 December)	STANDARD (after 1 January)
<b>IAA SECTION / ASSA MEMBERS:</b>		
3 Day Section Colloquium	<b>R10,000</b>	R11,000
4 Day Full Colloquium	<b>R11,750</b>	R12,750
<b>NON-MEMBERS:</b>		
3 Day Section Colloquium	<b>R11,500</b>	R12,500
4 Day Full Colloquium	<b>R13,500</b>	R14,500
<b>FULL TIME ACADEMIC (includes students)</b>		
3 Day Section Colloquium	<b>R8,000</b>	R8,800
4 Day Full Colloquium	<b>R9,750</b>	R10,550
<b>ASSA 1 DAY SEMINARS:</b>		
ASSA Member	<b>R1,750</b>	R1,750
Non-Member	<b>R2,000</b>	R2,000

**NOTE: All prices listed include VAT @ 15%  
COLLOQUIUM FEES INCLUDE:**

<b>3 DAY COLLOQUIUM:</b> Access to all colloquium sessions for the sections selected Delegate pack 2 x Tea / Coffee breaks per day Lunch Welcome Cocktail Party Social Afternoon Gala Dinner Access to the exhibition hall for the duration of the colloquium Includes the ASSA Seminar	<b>4 DAY COLLOQUIUM:</b> All of the inclusions in the 3 day colloquium PLUS the additional colloquium day not included (see the final page of the individual section programmes for details)	<b>ASSA 1 DAY SEMINARS:</b> Access to the seminar on the day selected Seminar programme 2 x Tea / Coffee breaks on the day selected Lunch on the day selected Access to the exhibition hall on the day selected NOTE: No social events are included – you are welcome to purchase tickets.
--	---	--

*Additional Social Events Tickets  
Tickets are available for purchase on the registration form:*

EVENT	DATE	ADDITIONAL TICKET
Welcome Reception (IACA / PBSS / IAALS)	1 April 2019	<b>R250</b>
Welcome Reception (ASTIN / IAAHS)	2 April 2019	<b>R250</b>
Gala Dinner (All Sections)	3 April 2019	<b>R750</b>

*Each social event ticket includes:  
Meal, Entertainment, Limited bar – cash bar available for spirits and when limit has been reached*

**Colloquium Secretariat:  
Scatterlings Conference & Events**



**Project Manager:** Carolyn Melnick  
Tel: +27 (0)21 422 2402  
[caro@soafrica.com](mailto:caro@soafrica.com)

**Registrations:** Simone Solomons  
Tel: +27 (0)21 422 2402  
[simone@soafrica.com](mailto:simone@soafrica.com)

**Abstracts:** Tany's Goosen  
Tel: +27 (0)11 463 5085  
[tany@soafrica.com](mailto:tany@soafrica.com)

**Sponsorship / Exhibition:** Mandy Godfrey  
Tel: +27 (0)21 422 2402  
[mandy@soafrica.com](mailto:mandy@soafrica.com)

[WWW.COLLOQUIUM2019.ORG.ZA](http://WWW.COLLOQUIUM2019.ORG.ZA)







**AFIR-ERM**  
Finance, Investment & ERM



Istituto Italiano degli Attuari  
*and* Ordine degli Attuari (ISOA)  
*and the* AFIR/ERM Section

*are very pleased to invite you to the*

AFIR/ERM  
**COLLOQUIUM 2019**  
INNOVATING  
ACTUARIAL  
RESEARCH ON  
FINANCIAL RISK  
AND ERM



*that will be held from 21 to 24 May 2019 in* **Florence**, Italy

# SHARING KNOWLEDGE

This is a “must” for the International Actuarial Association Scientific Sections. The AFIR/ERM Section mission focuses on actuarial and financial research on Finance, Investment and Enterprise Risk Management fields.

Over the last years these scientific fields are increasingly innovating their contents and consequently the dynamics of the actuarial profession are rapidly changing.

The Colloquium offers the best chance for calling on academics, actuaries and other experts and for sharing ideas and experiences, discussing new key issues, creating a global network of researchers dedicated to advance the Actuarial Science also with the aim of delivering a “sustainable” future for the actuarial profession.

The Scientific Committee, Chairman Ermanno Pitacco, is finalizing the Colloquium 2019 Scientific Program.

With the aim both to grasp the objectives of AFIR/ERM Section and to provide great opportunities for new and emerging research to be shared, the Scientific Committee will propose some forward-looking topics as Sustainable Value Creation, Hedging Extreme Risks, Facing Non-Insurable Risks, Investment in a ESG Framework, Systemic Financial Risks and Enterprise Risk Management in Non-Financial Sectors.

The Speaker Corner for “off” topics is also provided for in the Program. Further details on the topics and formalities to be complied for the submission of the papers will be specified in the Call for Papers.



# SHARING CULTURAL AND ARTISTIC HERITAGE OF FLORENCE AND TUSCANY

Florence was the cradle of the Renaissance. Its artistic heritage is an "open-air" museum.

The Organizing Committee, Chairman Giampaolo Crenca, has defined the format of the Colloquium 2019.

The Opening Ceremony and the Welcome Reception will take place on Tuesday afternoon, May 21, 2019 in Palazzo Vecchio, Salone dei Cinquecento

Two full days, Wednesday May 22 and Friday May 24, will be dedicated to the plenary sessions, with eminent keynote speakers, and to the parallel sessions for discussions and presentations. The working sessions will be held in the Baglioni Palace Hotel.

Half-day guided tours of Florence have been booked for the Accompanying Persons, on Wednesday afternoon and Friday morning.

A full day excursion, from Florence to Siena and San Gimignano, has been organized for Delegates and their Accompanying persons, on Thursday 23.

The Organized Committee has chosen the Siena territory that offers a surprising variety of villages, abbeys, landscapes, where the medieval traditions have survived in the centuries. Siena is famous for its splendid examples of Gothic architecture as the Cathedral in Piazza Duomo and San Gimignano, a small medieval town, is famous for its "home-towers" and the production of DOC wines.

The Colloquium Gala Dinner will be held on the Roof Garden of Baglioni Palace Hotel, where you can enjoy also a fine view of the roofs and cupolas of Florence.

The design of AFIR/ERM Colloquium 2019 program has been two objectives-oriented: sharing knowledge and sharing the cultural and artistic heritage of Florence and Tuscany. But a third objective has to be achieved "Sharing the Colloquium 2019 Program the ISOA is proposing" that needs the cooperation of the international actuarial community.

The submission of a good number of papers and a wide participation of delegates will be the signal that the two-way process for the organization of the Colloquium will be fully completed.

We welcome all our colleagues with deep feelings of friendship and hospitality.

Giampaolo Crenca



Marcello Galeotti



Ermanno Pitacco







# Cambridge Core

The new home of  
Cambridge Journals

[cambridge.org/core](http://cambridge.org/core)

Cambridge **Core**



# Statistics and Probability

Books and Journals from  
Cambridge University Press

Ideas formulated in terms of statistics and probability are uniquely portable across applied modeling and data-driven disciplines.

Cambridge's publishing supports and promotes this central role by keeping statistics and probability in communication with each other, with their mathematical roots, and with the applied disciplines that both motivate and use advances in theory, methods, and computation.

For further details visit:  
[cambridge.org/core-statistics](https://www.cambridge.org/core-statistics)

Cambridge  
Core



CAMBRIDGE  
UNIVERSITY PRESS

# *ASTIN Bulletin: The Journal of the International Actuarial Association*

## NOTES FOR CONTRIBUTORS

### AIMS AND SCOPE

*ASTIN Bulletin* was founded in 1958 as a journal providing an outlet for actuarial studies in non-life insurance. In the late 1980s the journal extended its scope to encompass the study of financial risk in insurance (AFIR). In 2007 the journal was established as the journal of the International Actuarial Association (IAA) and encompasses all of the scientific sections of the IAA.

*ASTIN Bulletin* publishes papers that are relevant to any branch of actuarial science and insurance mathematics. Papers should be quantitative and scientific in nature, and might draw on theory and methods developed in any branch of the mathematical sciences including actuarial mathematics, statistics, probability, financial mathematics and econometrics.

The journal welcomes papers that present significant and original theoretical developments and papers that present significant and original applications of mathematical, statistical or econometric theory to problems arising in insurance, pensions and finance. We especially welcome papers opening up new areas of interest to the international actuarial profession as well as papers that describe open problems that have arisen in practice.

### SUBMISSIONS

Papers for possible publication in the *ASTIN Bulletin* – The Journal of the International Actuarial Association should be submitted online at: <http://mc.manuscriptcentral.com/astin>. Submission of a paper is held to imply that it contains original unpublished work and is not being submitted for publication elsewhere. Receipt of the paper will be confirmed and followed by a refereeing process which will be handled by one of the editors. The editors aim to complete the refereeing of a submission in around three months. The role of a referee is to assess the quality of the academic content of the paper. If a paper is sufficiently badly written to an extent that prevents a referee from forming a proper view of the paper's scientific content, then the paper will be returned to the author unrefereed.

### TEXT AND MANUSCRIPT PREPARATION REFERENCING

Before a manuscript can be published it must conform to the style of *ASTIN Bulletin*, a summary of the key points of which is listed below. The comprehensive Notes of Contributors document can be obtained from <http://journals.cambridge.org/asb/contributors>.

- The basic elements of the journal's style have been agreed by the Editors and the publisher and should be clear from checking a recent issue of *ASTIN Bulletin*. If variations are felt necessary, this should be discussed with the editor handling the paper.
- Papers should be written in English or French. It is not the job of the editors, the referees or the publisher to improve the use of English or French in the paper; it is up to the authors to ensure that the language, spelling and grammar are of a high quality prior to submission.
- Authors intending to submit longer papers (e.g. exceeding 30 pages) are advised to consider splitting their contribution into two or more shorter contributions.
- The first page of each paper should start with the title, the name(s) of the author(s), an abstract and a list of keywords. An institutional affiliation can be placed between the name(s) of the author(s) and the abstract.
- Footnotes should be avoided as far as possible.

### AUTHOR AND CONTACT INFORMATION

On the title page, please provide the full name, affiliation, email and postal address of at least one author. Where the family name may be ambiguous (e.g. a double name), please indicate this clearly. For joint authored papers, please indicate the lead corresponding author and provide a contact telephone number.

### REFERENCING

References should be arranged alphabetically, and for the same author chronologically. Use a, b, c etc. to separate publications of the same author in the same year. For journal references give author(s), year, title, journal (in italics), volume (in boldface), and pages. For book references give author(s), year, title (in italics), publisher, and city.

## CONTENTS

### Editorial

Yes, We Can!

MARIO V. WÜTHRICH AND MICHAEL MERZ 1

### Articles

Tonuity: A Novel Individual-Oriented Retirement Plan

AN CHEN, PETER HIEBER AND JAKOB K. KLEIN 5

Valuation of Contingent Guarantees Using Least-Squares Monte Carlo

T. BIENEK AND M. SCHERER 31

How Functional Data Can Enhance the Estimation of Health Expectancy: The Case of Disabled Spanish Population

IRENE ALBARRÁN, PABLO J. ALONSO-GONZÁLEZ, ANA ARRIBAS-GIL AND AUREA GRANÉ 57

Personal Non-Life Insurance Decisions and the Welfare Loss From Flat Deductibles

MOGENS STEFFENSEN AND JULIE THØGERSEN 85

Frequentist Inference in Insurance Ratemaking Models Adjusting for Misrepresentation

REXFORD M. AKAKPO, MICHELLE XIA AND ALAN M. POLANSKY 117

Deriving Robust Bayesian Premiums Under Bands of Prior Distributions with Applications

M. SÁNCHEZ-SÁNCHEZ, M. A. SORDÓ, A. SUÁREZ-LLORENS AND E. GÓMEZ-DÉNIZ 147

New Results on the Distribution of Discounted Compound Poisson Sums

ZHEHAO ZHANG 169

Aggregate Claim Estimation Using Bivariate Hidden Markov Model

ZARINA NUKESHTAYEVA OFLAZ, CEYLAN YOZGATLIGIL AND A. SEVTAP SELCUK-KESTEL 189

A Conditional Equity Risk Model for Regulatory Assessment

A. FLORYSZCZAK, J. LÉVY VÉHEL AND M. MAJRI 217

On the Optimality of a Straight Deductible Under Belief Heterogeneity

YICHUN CHI 243