



THE UNIVERSITY OF  
MELBOURNE

FACULTY OF  
BUSINESS &  
ECONOMICS



# Centre for Actuarial Studies

*Annual Report 2019*

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# THE YEAR IN REVIEW

## INTRODUCTION

The Centre for Actuarial Studies is a teaching and research unit located within the Department of Economics. The majority of undergraduate and Masters students study to become actuaries, but a number of our students find employment in the banking or investment sector. Our PhD students have research topics in risk theory, investment models, survival analysis, financial mathematics, derivative pricing and applied probability. The Centre attracts high achieving students; many of the faculty's participants in the prestigious Chancellor's Scholars Program (admission to which is based on university entrance score) are students majoring in actuarial studies.

The Centre for Actuarial Studies is fully accredited by the Actuaries Institute, meaning that its students can obtain exemptions from all of Parts I and II of the Institute's examinations. With regards to research, members of the Centre are experts in their fields and are internationally recognised for their work in actuarial science, financial mathematics, probability and statistics. The Centre has nine full-time academic positions and several part-time lecturers from the Melbourne actuarial community (the complete list is at the end of this report).

The Centre for Actuarial Studies continues to be the focal point for actuarial education in Victoria. It has the support of the actuarial profession in Australia and produces research of high quality. It also maintains strong international links and contributes to the local actuarial community.

In December 2015, the Society of Actuaries (SOA) recognised the University of Melbourne's actuarial studies program as a SOA Center of Actuarial Excellence (CAE). Actuarial science school programs must meet eight rigorous criteria and specific CAE requirements to qualify for the CAE designation. These criteria involve the degree, curriculum, graduate count, faculty composition, graduate quality, appropriate integration, and connection to industry and research/scholarships. Only 33 colleges and universities around the world have attained the CAE designation. The CAE designation for the Centre was renewed successfully for 2016, 2017, 2018 and 2019.

Centre staff publish in top journals and present their research at seminars and conferences in Australia and overseas. Details of publications can be found later in this report, as well as a list of conference and seminar presentations.

The 10<sup>th</sup> Australasian Actuarial Education and Research Symposium (AAERS) was hosted by the Centre on 28-29 November 2019. The theme of the symposium was "Actuarial Knowledge: From Theory to Practice". More than 80 participants from 8 countries attended the symposium. The Centre for Actuarial Studies would like to thank the members of the organizing committee Professor Johnny Li (Co-chairman), Associate Professor Shuanming Li (Co-chairman), Professor David Dickson, Dr Enrique Calderin, Dr Ping Chen, Dr Kevin Fergusson, Dr Zhuo Jin, Dr Xueyuan Wu, Dr Rui Zhou, Ms Courtney Marriner and Ms Nicole Scott, for making this event a success.

After 28 years of respectable contribution and leadership, Professor David Dickson retired on 31<sup>st</sup> December 2020. In 1993 David joined the Centre for Actuarial Studies as a Senior Lecturer. He was one of the three initial appointees to the Centre, and served as the Director of the Centre from July 1999 to December 2008, and again in 2014. He also served as Head of the Department of Economics for the second half of 2012, and for the three years 2016-2018. David has had a distinguished career in academia and of service to the actuarial profession. He has published in excess of 70 articles in refereed academic journals and has been recognised for the quality and impact of many of these articles. To celebrate the career of Professor David Dickson and his many contributions to actuarial education and research, a conference called “Now We  $r_{60}$ ” was held on December 5-6 at the Melbourne Business School. More than 60 participants from 8 countries attended the conference. The Centre for Actuarial Studies would like to thank the members of the organising committee Professor Johnny Li (Co-chairman), Associate Professor Shuanming Li (Co-chairman), Dr Enrique Calderin, Dr Ping Chen, Dr Kevin Fergusson, Dr Zhuo Jin, Dr Xueyuan Wu, Dr Rui Zhou, Ms Courtney Marriner and Ms Nicole Scott, for making this event a success.

## **STAFF NEWS, RESEARCH AND GRANTS**

Professor David Dickson retired on 31 December 2019. He was awarded the honorary position of Emeritus Professor, to take effect immediately after retirement.

Professor Benjamin Avanzi accepted the position at the Centre and will join from 1 February 2020.

Associate Professor Shuanming Li was the Director of the Centre for Actuarial Studies for 2019. He was promoted to Professor effective from 1 January 2020.

Dr Xueyuan Wu was promoted to Associate Professor effective from 1 January 2020.

In 2019, Professor David Dickson served as an Editor of ASTIN Bulletin, an Associate Editor of Annals of Actuarial Science, and a member of the Editorial board of Insurance: Mathematics & Economics and North American Actuarial Journal, an Adjunct Professor at the University of Waterloo. David stepped down from these roles at different points during the year.

Professor Johnny Li is a Co-Editor of the North American Actuarial Journal.

Professor Shuanming Li is a member of the Editorial board for the Journal of Insurance Markets and Companies, a Reviewer for American Mathematical Reviews (AMR), a guest Editor for the Special Issue “Stochastic Process Theory and Its Applications” for the journal Mathematical Problems in Engineering. In 2019 he acted as an external referee for a promotion application at Macquarie University.

Dr Zhuo Jin is a member of the editorial board of Journal of Systems Science and Complexity and a reviewer for Mathematical Reviews.

Dr Enrique Calderin is a member of the editor board of Spanish Journal of Statistics: An Official Journal of The National Statistics Institute of Spain, INE. In 2019, he was a Member of the Risk Analysis Group - Spanish Society of Statistics and Operations Research (SEIO).

Professor Johnny Li and Associate Professor Shuanming Li co-chaired the organising committee for the 10<sup>th</sup> AAERS and Now We  $r_{60}$ .

Professor David Dickson was an external reviewer of a grant application for the Swiss National Science Foundation.

Dr Xueyuan Wu was an external reviewer for the Postgraduate Research Scholarship Fund at Xi'an Jiaotong-Liverpool University (XJTLU).

Dr Rui Zhou was an external examiner for a doctoral thesis at Chinese University of Hong Kong and an external examiner for a Master thesis at Macquarie University.

Professor Johnny Li and Dr Kenneth Zhou from Arizona State University was awarded Redington Prize from Society of Actuaries for their paper entitled "Dynamic Longevity Hedging in the Presence of Population Basis Risk: A Feasibility Analysis from Technical and Economic Perspectives".

Colleges and universities that have attained CAE status are eligible to compete for SOA-sponsored grants. These grants would allow universities to make significant investments in their programs, research and the profession. In 2019, a team comprised of all the staff members from the Centre for Actuarial Studies, Associate Professor Todd Lane, Dr Andrew King and Dr Claire Vincent from the School of Earth Sciences took part in the 2019 CAE Grant Competition to support the advancement of knowledge in actuarial science. Dr Rui Zhou was the Principal Investigator. The project was entitled "The Impact of Climate Change on the Insurance Industry: A Global Perspective".

Professor Johnny Li and Dr Rui Zhou were co-investigators for a research grant from the Australian Government Department of Agriculture and Water Resources (AUD90,000, 01/2019/06/2019) for their project entitled "Biosecurity Risk Insurance".

Dr Enrique and Professor Diego Gallardo from the University of Atacama (Chile) were co-investigators for "CONICYT Program" (11,100,000 Chilean pesos) from the National Commission for Scientific and Technological Research of Government of Chile.

# TEACHING

Overall enrolments dropped slightly from the level in previous years; in particular, the enrolment in Introduction to Actuarial Studies (ACTL10001) dropped from 213 to 208. There were 7 enrolments in the 1.5-year M.Com. (Actuarial Studies) degree. The M.Com. (Actuarial Studies) degree has a ‘practice’ pathway, which focuses on advanced professional training, and a ‘research’ pathway, which prepares students for a PhD in Actuarial Studies. Enrolments at Honours level increased from 8 in 2018 to 10 in 2019 as a result.

The degree of the Master of Actuarial Science (Extended) was created aiming to provide university graduates who have a bachelor’s degree that includes a strong mathematical component with a two-year program that prepare them for a future career in the actuarial profession. The degree of the Master of Actuarial Science (Enhanced) was created aiming to provide university graduates who have a bachelor’s degree that includes strong mathematical, probability and statistics components with a two-year program that prepare them for a future career in the actuarial profession. Graduates of the new degrees will be well placed to undertake further graduate work in actuarial studies or to enter the actuarial profession. The Master of Actuarial Science (Extended and Enhanced) course provides the fastest graduate pathway to the actuarial profession and enables students to gain exemptions from Part I (Foundation) and half of the Part II (Associateship) professional exams with sufficiently good performance in subjects taken in the degrees.

Teaching was supported by external lecturers including Mr David Heath, Mr Andrew Brown, Mr Donald Campbell, Mr Richard Cooney and Mr Andrew Gale (Actuarial Practice and Control I and II, and General Insurance Practice).

## ENGAGEMENT AND PROFESSIONAL ACTIVITIES

Professor Johnny Li serves as an Associate Director of the Actuarial Research Centre (ARC) of the Institute and Faculty of Actuaries in the UK. In his role as Associate Director of the ARC, Johnny oversees progress and delivery of the ARC’s research programmes, provides quality assurance of research, and strengthen the ARC’s research network by attracting the best actuarial consortia.

Dr Kevin Fergusson attended the Institute event: "FASEA regime: Implications for Actuaries", presented by Matthew Burgess and Tim Jenkins on behalf of the Superannuation Practice Committee, KPMG Melbourne in August.

Dr Rui Zhou was on Business Practicum Interview Panel as a supervisor at the University of Melbourne in August. As the Accreditation Actuary for the Centre, she also attended several routine meetings held by the Institute with discussions on Accreditation policy, Exemption policy, Interaction between research and industry and Professional exam syllabus.

## VISITORS AND SEMINARS

Mr Pintao Lyu from Tilberg University gave a talk on 25 January entitled “Coherent mortality forecasting for less developed countries”.

Dr Xiaobai Zhu from Southwest University of Finance and Economics gave a talk on 22 March entitled “Hybrid pension design: a case study of intergenerational risk sharing plan”.

Professor Hansjoerg Albrecher from University of Lausanne visited the Centre from 4 December to 10 December.

Professor Mary Hardy from the University of Waterloo visited the Centre from February to April to work with Professor David Dickson on the 3<sup>rd</sup> edition of Actuarial Mathematics for Life Contingent Risks.

Mr Guo Liu gave a talk on 9 August entitled “Asset allocation, consumption, and life insurance purchase with stochastic income over the life cycle in a contagious market”.

## TEACHING

### UNDERGRADUATE AND HONOURS CLASS SIZES

Subject Name	2016	2017	2018	2019
ACTL10001 Introduction to Actuarial Studies	267	224	213	208
ACTL20001 Financial Mathematics I	165	189	144	133
ACTL20002 Financial Mathematics II	122	144	122	116
ACTL30001 Actuarial Modelling I	90	112	128	111
ACTL30002 Actuarial Modelling II	88	110	122	104
ACTL30003 Contingencies	77	80	77	75
ACTL30004 Actuarial Statistics	78	83	106	87
ACTL30005 Models for Insurance and Finance	77	66	66	77
ACTL30006 Financial Mathematics III	81	103	107	92
ACTL40001 Actuarial Studies Research Essay	3	0	0	3
ACTL40002 Risk Theory I	19	5	9	12
ACTL40003 Risk Theory II	11	2	2	3
ACTL40004 Advanced Financial Mathematics I	15	4	9	12
ACTL40010 Actuarial Studies Projects (previous ACTL40005)	12	4	8	7
ACTL40006 Actuarial Practice and Control I	13	4	9	11
ACTL40007 Actuarial Practice and Control II	10	4	8	10
ACTL40008 Advanced Financial Mathematics II	7	0	0	0
ACTL40009 Actuarial Practice and Control III	7	7	9	9
<b>Total Enrolments</b>	<b>1142</b>	<b>1141</b>	<b>1139</b>	<b>1070</b>

## HONOURS GRADE DISTRIBUTION OVER THE LAST FIVE YEARS

	H1	H2A	H2B	H3	N	Total
2015	2	7	12	3	4	28
2016	4	3	4	3	1	15
2017	2	1	1	0	0	4
2018	2	4	2	0	0	8
2019	2	3	3	2	0	10

## MASTERS CLASS SIZES

Subject Name	2016	2017	2018	2019
ACTL90001 Mathematics of Finance I	15	14	20	11
ACTL90002 Mathematics of Finance II	11	14	17	8
ACTL90003 Mathematics of Finance III	22	23	29	36
ACTL90004 Insurance Risk Models	25	30	37	37
ACTL90005 Life Contingencies	7	14	11	18
ACTL90006 Life Insurance Models 1	16	10	19	12
ACTL90007 Life Insurance Models 2	13	9	15	11
ACTL90008 Statistical Techniques in Insurance	6	16	12	19
ACTL90009 Actuarial Practice and Control III	2	12	10	40
ACTL90010 Actuarial Practice and Control I	18	14	20	25
ACTL90011 Actuarial Practice and Control II	13	15	19	23
ACTL90016 and ACTL90017 Actuarial Science Research Report (the previous ACTL90012 Actuarial Studies Research Report)	1	3	3	2
ACTL90013 Actuarial Studies Projects	7	1	2	2
ACTL90014 Insurance Risk models II	8	9	14	16
ACTL90015 Mathematics of Finance IV	3	9	0	0
ACTL90018 General Insurance Practice	0	0	6	15
<b>Total Enrolments</b>	<b>167</b>	<b>193</b>	<b>234</b>	<b>275</b>



## ESSAY AND PROJECT TOPICS

There were 10 students who successfully completed a Bachelor of Commerce (Honours) with a specialisation in Actuarial Studies. In 2019, 7 students completed three research projects:

- Mean-Variance Investment Analysis;
- Index-based Weather Insurance;
- Longevity Risk Modelling.

A research essay has about 10,000 words and counts for 25% of the final assessment for a student's Honours grade or Masters grade. Three Honours and two Masters students wrote an essay in 2019, and the topics were:

- Modeling and Forecasting the Australian Mortality Using a Hidden Markov Model;
- On the Application and Comparison of GLM and GAM in Modelling Claim Frequency and Severity of Autoinsurance;
- Cyber Risk Management by Machine Learning Technique;
- Estimation of Expected Ruin Times Using Simulation for Risk Models with Various Dependence Structures;
- Insurability of Biosecurity Risks.

# STUDENT PRIZE WINNERS

## **Unisuper Prize**

for Introduction to Actuarial Studies

*Lintao Wang*

## **Deloitte Actuaries & Consulting Prize**

for Actuarial Practice and Control I and II

*Fu Yuan Tan*

## **Honours Medal in Actuarial Studies**

*Billy Liemantoro*

## **KPMG Prize**

for Financial Mathematics I and II

*Rongyi Zhu*

## **KPMG Prize**

for Second Year Actuarial Studies

*Rongyi Zhu*

## **Martin Jilovsky Prize**

for best third year results by an Australian student

*John Crowley*

## **Mark Joshi Memorial Prize**

for Financial Mathematics III and Advanced Financial Mathematics I/Mathematics of Finance III

*Han Li*

# PhD STUDENTS AND RESEARCH TOPICS

**Suyuan He**

Pooled annuity underpin design

**Giovanni Gracianti**

Weather risk management in the renewable energy sector

**Guo Liu**

On Optimal Insurance Strategies in a Contagious Market

**Ming Qiu**

Optimal Reinsurance and Dividend Strategies for a Multiline Insurance Group

**Dhiti Osatakul**

Discrete-time risk models with dependence between premiums and claims

**Jiannan Zhang**

Time-consistent Mean-variance Portfolio Selection

**Pengcheng Zhang**

Non-life insurance modelling with multivariate dependence

Suyuan He, Giovanni Gracianti and Ming Qiu joined the Centre as new PhD students.

Joan Nakato joined the University of Warwick as a senior teaching fellow at the Department of Statistics.

# PUBLICATIONS AND OTHER RESEARCH ACTIVITIES

## REFEREED JOURNAL ARTICLES

Bhati, D., **Calderin, E.**, Gomez, E., Meenakshi, M., A new heavy tailed class of distributions which includes the Pareto. *Risks*, 7(4), 99.

Bui, T., Cheng, X., **Jin, Z.**, Yin, G, Approximation of a class of non-zero-sum investment and reinsurance games for regime-switching jump-diffusion models. *Nonlinear Analysis: Hybrid Systems*, 32, 276-293.

**Calderin, E.**, Gomez, E., The multivariate negative binomial-Lindley distribution. Properties and new representation for the univariate case. *Journal of Computational and Applied Mathematics*, 347, 36-48.

**Calderin, E.**, Gomez, E., Barranco, I., Modelling zero-inflated count data with a special case of the generalized Poisson distribution. *ASTIN Bulletin*, 49(3), 689-707.

Chen, Z., Wang, L., **Chen, P.**, Yao, H., Continuous-time mean-variance optimization for defined contribution pension funds with regime-switching. *International Journal of Theoretical and Applied Finance*, 22(6), 1950029.

**Dickson, D.** An identity based on the generalised negative binomial distribution with applications in ruin theory. *Annals of Actuarial Science*, **13**, 308-319.

**Fergusson, K.** Asymptotics of bond yields and volatilities for extended CIR models under the real-world measure. *Scandinavian Actuarial Journal*, 10, 1-36.

**Fergusson, K.** Forecasting inflation using univariate continuous-time stochastic models. *Journal of Forecasting*, 39(1), 37-46.

Gomez, E., Iriarte, Y., **Calderin, E.**, Gomez, H., Modified power-symmetric distribution. *Symmetry*, 11(11), 1410.

Gomez, E., Sarabia, J., **Calderin, E.**, Ruin probability functions and severity of ruin as a statistical decision problem. *Risks*, 7(2), 68.

Gomez, E., Sarabia, J., **Calderin, E.**, The geometric ArcTan distribution with applications to model demand for health services. *Communications in Statistics-Simulation and Computation*, 48(4), 1101-1120.

Ji, M., **Zhou, R.** A general semi-Markov model for coupled lifetimes. *North American Actuarial Journal*, 23, 98-119.

**Jin, Z.**, Yang, Z., Yuan, Q., A genetic algorithm for investment-consumption optimization with value-at-risk constraint and information processing cost. *Risks*, 7(1), 32.

Kwong, K., Chan, W., **Li, J.S.-H.**, Actuarial modelling and analysis of the Hong Kong life annuity scheme. *Asia-Pacific Journal of Risk and Insurance*, 14 (1), <https://doi.org/10.1515/apjri-2018-0013>.

Li, J., Tickle, L. Tan, C., **Li, J.S.-H.**, Assessing basis risk in index-based longevity swap transactions. *Annals of Actuarial Science*, 13(1), 166-197.

**Li, J.S.-H.**, Zhou, K., Zhu, X., Chan, W., Chan, F., A Bayesian approach to developing a stochastic mortality model for China. *Journal of the Royal Statistical Society Series A*, 182(4), 1523-1560.

**Li, S.**, Lu, Y., Sendova, K., The expected discounted penalty function: from infinite time to finite time. *Scandinavian Actuarial Journal*, 4, 336-354.

Mei, Y., Boyle, P., **Li, J.S.-H.**, Improving risk sharing and borrower incentives in mortgage design. *North American Actuarial Journal*, 23, 485-511.

Wang, N., Zhang, N., **Jin, Z.**, Qian, L., Robust non-zero-sum investment and reinsurance game with default risk, *Insurance: Mathematics and Economics*, 84, 115-132.

Wang, T., **Jin, Z.**, Wei, J., Mean-variance portfolio selection under a non-Markovian regime-switching model: time-consistent solutions, *SIAM Journal on Control and Optimization*, 57(5), 3249-3271.

Wang, Y., Zhang, N., **Jin, Z.**, Ho, T., Pricing longevity linked derivatives using a stochastic mortality model. *Communications in Statistics-Theory and Methods*, 48(24), 5923-5942.

Wei, J., **Jin, Z.**, Yang, H., Optimal dividend policy with liability constraint under a hidden Markov regime-switching model. *Journal of Industrial and Management Optimization*, 15(4), 1965-1993.

**Wu, X.**, Lo, C., Yip, P. A projection of future hospitalization needs in a rapidly ageing society: A Hong Kong experience, *International Journal of Environmental Research and Public Health*, 16, 473

Zhang, N., **Jin, Z.**, Qian, L., Fan, K. Stochastic differential reinsurance games with capital injections, *Insurance: Mathematics and Economics*, 88, 7-18.

Zhang, Z., **Li, S.**, Beta transform and discounted aggregate claims under dependence. *Annals of Actuarial Science*, 13(2), 241-267.

Zhou, K., **Li, J.S.-H.**, Delta hedging longevity risk under the M7-M5 two-population model: The impact of cohort effect and population basis risk. *Insurance: Mathematics and Economics*, 84, 1-21.

**Zhou, R.**, Modelling multi-population mortality dependence with a regime-switching copula. *ASTIN Bulletin: The Journal of the International Actuarial Association*, 49, 373-407.

**Zhou, R.**, Pai, J., **Li, J.S.-H.**, Pricing weather derivatives with a filtered historical simulation approach.

European Journal of Finance, 25, 1462-1484.

**Zhou, R.**, Xing, G., Ji, M. Changes of relation in multi-population morality dependence: An application of threshold VECM, Risks, 7, 14; DOI: [10.3390/risks7010014](https://doi.org/10.3390/risks7010014).

## Other Publications

Chaudhry, A., **Li, J.S.-H.**, **Zhou, R.**, Stoneham, G., Hester, S., Insurability of biosecurity risks. The Australian Government of Agriculture and Water Resources.

Stoneham, G., Hester, S., **Li, J.S.-H.**, **Zhou, R.**, Chaudhry, A., The boundary of the market for biosecurity risk. The Australian Government Department of Agriculture and Water Resources.

**Li, J.S.-H.**, **Zhou, R.**, Zhou, K., The impact of longevity annuity provision on Canadian retirement income planning. Canadian Institute of Actuaries.

**Calderin, E.**, Lopez, G., Analysis of human microbiome data in the process of ageing using GAMLSS models. XVII Spanish Biometric Conference and VII Ibero-American Biometric Meeting-CEB-EIB 2019, Valencia, Spain, 19 June-21 June. Conference number: 17.

## CONFERENCE AND SEMINAR PRESENTATIONS

### Calderín, Enrique

“A survey of composite parametric models with applications in actuarial science and economics”. IMUS, Universidad de Sevilla, Spain.

“A Review of Composite Models with Applications in Actuarial Science and Economics”. Universidad de Las Palmas de GC, Spain.

“A Survey of Composite Models. Applications in Actuarial Statistics and Economics”. Universidad de Antofagasta, Chile.

“Modelling Zero-Inflated Count Data with a Special Case of the Generalized Poisson Distribution”. Universidad de Antofagasta, Chile.

**Chen, Ping**

“Collective Defined Contribution versus Defined Contribution pension plans: A multi-period framework”, Academy of Mathematics and Systems Science, Chinese Academy of Sciences, October.

**Dickson, David**

“35 Years of Ruin Theory”, Now We  $r_{60}$ , Melbourne, December

**Fergusson, Kevin**

“Valuation of Power Blackout Insurance for the Australian Energy Market”, The 23<sup>rd</sup> International Congress on Insurance: Mathematics and Economics, Munich, Germany, July

“Optimal Control of Pension Funds under the Benchmark Approach” and “Inculcating Students with Data Analysis Techniques within University Actuarial Subjects”, The 10<sup>th</sup> Australasian Actuarial Education and Research Symposium, Melbourne, November.

“Optimal Control of Pension Funds under the Benchmark Approach”, Quantitative Methods in Finance 2019 Conference, Sydney, December.

**Li, Johnny**

“The Heat Wave Model for Constructing Two-dimensional Mortality Improvement Scales with Measures of Uncertainty”, The College of Business and Economics, Australian National University, Canberra, August.

**Jin, Zhuo**

“Optimal Consumption and Investment Strategies with Liquidity Risk and Uncertain Lifetime”, Data Science and Finance, Siem Reap, Cambodia, February.

“Optimal Insurance Strategies: A Hybrid Deep Learning Markov Chain Approximation Approach”, seminar talk at The University of Hong Kong, Hong Kong, July.

“Optimal Insurance Strategies: A Hybrid Deep Learning Markov Chain Approximation Approach”, The Seventh Asian Quantitative Finance Conference, Hanoi, Vietnam, July.

“Optimal Consumption and Investment Strategies with Liquidity Risk and Uncertain Lifetime”, The 23<sup>rd</sup> International Congress on Insurance: Mathematics and Economics, Munich, Germany, July

“Optimal Insurance Strategies: A Hybrid Deep Learning Markov Chain Approximation Approach”, Seminar talk at The University of New South Wales, Sydney, August.

**Wu, Xueyuan**

“On the Type I Multivariate Zero-Truncated Hurdle Model with Applications in Health Insurance”, The 23<sup>rd</sup> International Congress on Insurance: Mathematics and Economics, Munich, Germany, July

**Zhou, Rui**

“Dynamic Vine Copula in Mortality Modelling”, The 15<sup>th</sup> International Longevity Risk and Capital Markets Solutions Conference, Washington, D.C., USA, September.

invited talk at The Australian National University RSFAS Summer Research Camp, Bowral, NSW, November.



## **INVOLVEMENT AS REFEREES**

Staff of the Centre acted as referees for the following journals:

Agricultural Finance Review  
American Journal of Mathematical and Management Sciences  
ASTIN Bulletin  
Applied Mathematical Modelling  
Asia-Pacific Journal of Risk and Insurance  
Chilean Journal of Statistics  
Communications in Statistics-Theory and Methods  
Economic Modelling  
European Actuarial Journal  
European Journal of Operation Research  
Insurance: Mathematics and Economics  
International Journal of Health Policy and Management  
Journal of Applied Statistics  
Journal of Computational and Applied Mathematics  
Journal of Industrial and Management Optimization  
Mathematical Problems in Engineering  
Mathematics  
MathSciNet-American Mathematical Society  
North American Actuarial Journal  
Optimization  
Physica A: Statistical Mechanics and its Applications  
Risks  
Stats  
Scandinavian Actuarial Journal  
Stochastic Process and Their Applications  
Test

# STAFF

## **Director of the Centre for Actuarial Studies**

Associate Professor SHUANMING LI: BSc (Tianjin), MEd (Renmin), PhD (Concordia)  
Research interests: Risk and ruin theory, stochastic modelling in insurance and finance, actuarial science

## **Professors of Actuarial Studies**

DAVID DICKSON: BSc (Hons), PhD (Heriot-Watt), FFA, FIAA  
Research interests: Aggregate claims distributions, renewal risk processes, recursive methods in risk theory.

JOHNNY LI: BSc (Hong Kong), MPhil (Hong Kong), PhD (Waterloo), FSA  
Research interests: Longevity risk securitization; stochastic mortality modeling; financial risk management; law and actuarial science; reverse mortgages.

## **Senior Lecturers in Actuarial Studies**

ENRIQUE CALDERIN: BS, MS (UNED, Spain), PhD (ULPGC, Spain)  
Research interests: Bayesian inference, statistical robustness, distribution theory, actuarial statistics

PING CHEN: BAM (Qufu), MSc (CAS), PhD (Hong Kong), AIAA  
Research interests: Actuarial science, financial mathematics, statistics and information

KEVIN FERGUSSON: BSc (Hons), MSc, PhD, PhD, FIAA, CERA  
Research interests: Stochastic analysis and modelling, valuation and hedging of long-dated derivatives, quantitative modelling of asset and liability portfolios of pension funds and insurers.

ZHUO JIN: BS, MS (HUST), MA, PhD (WSU), ASA  
Research interests: Numerical methods for stochastic systems, mathematical finance, actuarial science

XUEYUAN WU: BS, MS (Nankai), PhD (Hong Kong), AIAA  
Research interests: Risk and ruin theory, discrete-time risk models, phase-type distributions in risk theory

RUI ZHOU: BSc (Remin), MMath (Waterloo), PhD (Waterloo), FSA, ACIA  
Research interest: Longevity/mortality risk measurement and management, mortality modeling and forecasting, longevity annuity, weather derivatives

### **Honorary Senior Fellows**

DAVID HEATH: BEc (Hons) (Monash), FIAA, CPA, FFin

### **External Lecturers**

ANDREW BROWN: BSc, DipEd (Melbourne), FIAA, FFin

DONALD CAMPBELL: BCom (Melbourne), FIAA

ANDREW GALE: BSc (Melbourne), FIAA

### **External Examiners for Part II**

NIKI APPLETON (Actuarial Practice and Control I and II)

MIKE CALLAN in Semester 1 and 2 (Actuarial Practice and Control III)