

# Runhuan Feng

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## Education

Ph.D. Actuarial Science, University of Waterloo, 2008.  
M.Sc. Actuarial Mathematics, Concordia University, 2005.  
B.Sc. Statistics, B. Econ. Insurance, Nankai University, 2003.

## Professional designations

Fellow of the Society of Actuaries, since 2012.  
Chartered Enterprise Risk Analyst, CERA Global Association, since 2012.

## Experience

### **Universith of Illinois at Urbana-Champaign, United States**

State Farm Companies Foundation Scholar in Actuarial Science, 2017-Present.  
Helen P. Petit Professorial Scholar, College of Liberal Arts and Sciences, 2016-2017.  
Director of Actuarial Science, Department of Mathematics, 2017- Present.  
Interim Director, Actuarial Science Program, Department of Mathematics, 2016-2017.  
Associate Professor, Math, Statistics, Industrial & Enterprise Systems Engineering, 2016- 2020.  
Assistant Professor, Mathematics, 2013-2016.  
Affiliate faculty, Computer Science and Engineering Program, 2013-Present.

### **Stanford University, United States**

Visiting Professor, Institute for Computing and Mathematical Engineering, 2020.

### **University of New South Wales, Australia**

Visiting Professor, ARC Centre of Excellence in Population Ageing Research, 2019.

### **Technical University of Munich, Germany**

Bavarian State Ministry for Science, Research & the Arts Visiting Professor, 2019.

### **University of Wisconsin-Milwaukee, United States**

Assistant Professor, Dept. of Mathematical Sciences, 2008-2012.

## Publications

### Journal Articles

29. R. Feng, B. Yi. (2019) Quantitative modeling of risk management strategies: stochastic reserving and dynamic hedging of variable annuity guaranteed benefits. *Insurance: Mathematics and Economics*, 14, 50–73.
28. E.C.K. Cheung, R. Feng. (2019) Potential measures and expected present value of operating costs until ruin in renewal risk models with general interclaim times. *Scandinavian Actuarial Journal*, 5, 355–386.
27. R. Feng, A. Kuznestov, F. Yang. (2019) Exponential functionals of Levy processes and variable annuity guaranteed benefits. *Stochastic Processes and their Applications*, 129 (2), 604–625.
26. Z. Cui, R. Feng, A. MacKay. (2017) Variable annuities with VIX-linked fee structure under a Heston-type stochastic volatility model. *North American Actuarial Journal*, 21(3), 458–483.
25. R. Feng, X. Jing, J. Dhaene. (2017) Comonotonic approximations of risk measures for variable annuity guaranteed benefits with dynamic policyholder behavior. *Journal of Computational and Applied Mathematics*, 311, 272–292.
24. R. Feng, J. Vecer. (2017) Risk-based capital requirements for guaranteed minimum withdrawal benefit. *Quantitative Finance*, 17(3), 471–478.
23. R. Feng, X. Jing. (2016) Analytical valuation and hedging of variable annuity guaranteed lifetime withdrawal benefits. *Insurance: Mathematics and Economics*, 72, 36–48.
22. R. Feng, Y. Shimizu. (2016) Applications of central limit theorems for equity-linked insurance. *Insurance: Mathematics and Economics*, 69, 138–148.
21. R. Feng, A. Kuznestov, F. Yang. (2016) A short proof of duality relations for hypergeometric functions. *Journal of Mathematical Analysis and Applications*, 443(1), 116–122.
20. R. Feng, H. Huang. (2016) Statutory financial reporting for variable annuity guaranteed death benefits: Market practice, mathematical modeling and computation. *Insurance: Mathematics and Economics*, 67, 54–64.
19. R. Feng. (2016) Stochastic integral representations of the extrema of time-homogeneous diffusion processes. *Methodology and Computing in Applied Probability*, 18(3), 691–715.
18. R. Feng, H.W. Volkmer. (2016) An identity of hitting times and its application to the valuation of guaranteed minimum withdrawal benefit. *Mathematics and Financial Economics*, 10(2), 127–149.
17. R. Feng, H.W. Volkmer. (2015) Conditional Asian options. *International Journal of Theoretical and Applied Finance*, 18 (6), 1550040.
16. R. Feng, H.W. Volkmer, S. Zhang, C. Zhu. (2015) Optimal dividend policies for piecewise-deterministic compound Poisson risk models, *Scandinavian Actuarial Journal*, 2015 (5), 423–454.
15. R. Feng, Y. Shimizu. (2014) Potential measures of spectrally negative Markov additive processes with applications to ruin theory. *Insurance: Mathematics and Economics*, 59, 11–26.
14. R. Feng, H.W. Volkmer. (2014) Spectral methods for the calculation of risk measures for variable annuity guaranteed benefits. *ASTIN Bulletin*, 44 (3), 653–681.

13. R. Feng. (2014) A comparative study of risk measures for guaranteed minimum maturity benefits by a PDE method. *North American Actuarial Journal*, 18(4), 445–461.
12. R. Feng, Y. Shimizu. (2013) On a generalization from ruin to default in Lévy insurance risk models, *Methodology and Computing in Applied Probability*, 15 (4), 773–802.
11. E.C.K. Cheung, R. Feng. (2013) A unified analysis of claim costs up to ruin in a Markovian arrival risk model. *Insurance: Mathematics and Economics*, 53 (1), 98–109.
10. R. Feng, H.W. Volkmer. (2012) Analytical calculation of risk measures for variable annuity guaranteed benefits, *Insurance: Mathematics and Economics*, 51 (3), 636–648.
9. R. Feng, H.W. Volkmer. (2012) Modeling credit value adjustment with downgrade-triggered termination clause using a ruin theoretic approach, *Insurance: Mathematics and Economics*, 51 (2), 409–421.
8. Feng, R., Zhang, S., and Zhu, C. (2012). Optimal dividend payment problems in piecewise-deterministic compound Poisson risk models. *Proceedings of the 51st IEEE Conference on Decision and Control*, pages 7309–7314.
7. R. Feng. (2011) An operator-based approach to the analysis of ruin-related quantities in jump diffusion risk models, *Insurance: Mathematics and Economics* 48 (2), 304–313.
6. R. Feng, J. Garrido. (2011) Actuarial applications of epidemiological models, *North American Actuarial Journal* 15(1), 112–136.
5. R. Feng. (2009) A matrix operator approach to the analysis of ruin-related quantities in the phase-type renewal risk model, *Schweizerische Aktuarvereinigung Mitteilungen*, 1, 71–87.
4. R. Feng. (2009) On the total operating costs up to default in a renewal risk model, *Insurance: Mathematics and Economics*, 34 (2), 305–314.
3. J. Cai, R. Feng, G.E. Willmot. (2009) On the expectation of total discounted operating costs up to default and its applications, *Advances in Applied Probability*, 41 (2), 495–522.
2. J. Cai, R. Feng, G.E. Willmot. (2009) Analysis of the compound Poisson surplus model with liquid reserves, interest and dividends, *ASTIN Bulletin*, 39 (1): 225–247.
1. J. Cai, R. Feng, G.E. Willmot. (2009) The compound Poisson surplus model with interest and liquid reserves: analysis of the Gerber-Shiu discounted penalty function, *Methodology and Computing in Applied Probability*, 11 (3): 401–423.

### Monographs and books

4. R. Feng. (2018) *An Introduction to Computational Risk Management of Equity-Linked Insurance*, Chapman and Hall/CRC Financial Mathematics Series. <https://www.crcpress.com/An-Introduction-to-Computational-Risk-Management-of-Equity-Linked-Insurance/Feng/p/book/9781498742160>
3. R. Feng, D. Linders, A. Lo. (2018) *ACTEX Study Manual for SOA Exam SRM - Statistics for Risk Modeling*. ACTEX Learning.
2. R. Feng. (2016) 2015 Society of Actuaries survey on nested stochastic modeling, Society of Actuaries. <https://www.soa.org/research/2015-nested-stochastic-modeling.pdf>
1. R. Feng, Z. Cui, P. Li. (2016) Nested stochastic modeling for insurance companies. Society of Actuaries. <https://www.soa.org/research/nested-stochastic-modeling-report.pdf>

### Professional articles

2. R. Feng. (2015) A thought on Fermi problems for actuaries. *The Modeling Platform*, 1: 22–27.
1. R. Feng, S. K. Boddapati. (2018) Undergraduate research in risk and actuarial science at the University of Illinois. *Expanding Horizon*.

### Completed working papers

3. S. Abdikerimova, R. Feng. (2020) Peer-to-peer multi-risk insurance and mutual aid. [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3505646](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3505646)
2. W.F. Chong, R. Feng, L. Jin. (2020) Holistic principle for risk aggregation and capital allocation. [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3544525](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3544525)
1. R. Feng, P. Jiang, H. Volkmer. (2020) The persistence of winning streaks in financial markets. *Global Association of Risk Professionals (GARP) Best Paper Award for Quantitative Methods in Finance 2019*.

## Sample of Consultancy

### *Managing Investment Risks of Insurance/Annuity Contractual Designs*

(Society of Actuaries, 2019-2020)

With the increasing sophistication of contractual designs for insurance and annuity products over the past decade, there is growing interest among practitioners to understand a distinct link between insurance/annuity contractual design and the level of difficulty in managing the investment risks of the contract. This research study offers a computational framework for breaking down contractual designs to mechanical components of risk management techniques and measuring the effect of risk management actions.

### *Design and Feasibility Study of Pension Obligation Bonds*

(State Universities Annuity Association, 2016–2018)

The State of Illinois retirement systems are currently in the worst financial condition in the nation with more than \$130 billion unfunded liabilities. In 2015, the Illinois Supreme Court overthrew pension reforms that aimed to scale back benefits in order to reduce deficit. Lawmakers are limited to policy tools for debt management. The purpose of the research was to design long-term bonding solutions and to provide a quantitative basis for a legislative proposal that resulted from this project.

Samples of local and national media coverage:

<https://dailyillini.com/news/2018/01/29/university-professor-develops-model-address-pension-crisis/>

<https://www.reuters.com/article/illinois-bonds/illinois-pension-mega-bond-sale-idea-gets-legislative-airing-idUSL2N1PP2NA>

### *Nested Stochastic Modeling*

(Society of Actuaries, 2015-2016)

The research was commissioned by the Society of Actuaries to conduct an industry survey on current market practices of nested stochastic modeling and to perform a research study on computational methodologies to accelerate run time and improve efficiency. The study created a resource for financial reporting actuaries to better understand the pros and cons of emerging techniques. The findings of this research are expected to contribute to the development of industrial best practice on nested stochastic modeling.

## Grants

Casualty Actuarial Society Research Grant	2020
Ignacio H. de Larramendi Research Grant	2019-2020
Fundación MAPFRE, Spain. (PI: Runhuan Feng, Co-PI: Alfred Chong, Daniel Linders, Jay Kesan)	
Center of Actuarial Excellence Research Grant	2019-2022
Society of Actuaries. (PI: Runhuan Feng, Co-PI: Alfred Chong, Daniel Linders, Jay Kesan)	
Society of Actuaries Research Grant	2019
SOA Committee on Finance Research and CAS/CIA/SOA Joint Risk Management Section (PI: Runhuan Feng)	
Investment for Growth Grant Competition	2017
University of Illinois. (PI: Matthew Ando, Co-PI: Runhuan Feng)	
State Farm Companies Foundation Scholar (Endowment)	2017-Present
H. P. Petit Professorial Scholar	2016-2017
University of Illinois, College of Liberal Arts and Sciences.	
Overseas academic expert	2016- Present
Insurance Risk Analysis and Decision Science Innovation Center, Central University of Finance and Economics, Plan 111, State Administration of Foreign Experts Affairs, China	
Society of Actuaries Research Grant	2015-2016
Financial Reporting Section (PI: Runhuan Feng)	
Strategic Instructional Innovations Program	2015-16
College of Engineering, UIUC. (PI: Alexandra Chronopoulou, Co-PIs: Runhuan Feng, Doug King, Justin Sirignano, Richard Sowers)	
2015 Individual Grant Competition Award	2015-16
Jointly funded by the Actuarial Foundation and the Committee on Knowledge and Extension Research of the Society of Actuaries. (PI: Runhuan Feng, Co-PIs: Zhenyu Cui and Anne MacKay)	
IMSE Small Grants Program	2013-14
Initiative for Mathematical Sciences and Engineering, UIUC. (PI: Runhuan Feng, Co-PI: Narayana R. Aluru)	
Centers of Actuarial Excellence 2013 Grant Competition	2014-16
Society of Actuaries (PI: Rick Gorvett, Co-PI: Runhuan Feng, Paul Johnson, David Varodayan)	

2013 Individual Grant Competition Award The Actuarial Foundation. (PI: Runhuan Feng)	2013-14
University of Illinois Campus Research Board Award (PI: Runhuan Feng)	2013
2010 Individual Grant Competition Award The Actuarial Foundation. (PI: Runhuan Feng)	2010-11
Institutional Grant, Society of Actuaries. (PI: Runhuan Feng)	2010
SOA/CAS/CIA Doctoral Stipend (Hickman Scholars) Society of Actuaries.	2008
IQFI Research Grant Competition Award Institute of Quantitative Finance & Insurance, University of Waterloo (PIs: Jun Cai, Runhuan Feng)	2007

## Postdoc supervision

Ying Wang, 2016-2018. First destination: East China Normal University.

Alfred W. F. Chong, 2017-2018. First destination: University of Illinois at Urbana-Champaign.

## Ph.D. students supervision

Longhao Jin, PhD candidate, 2017-Present.

Samal Abdikerimova, PhD candidate, 2016-Present.

Chongda Liu, PhD candidate, 2016-Present.

Bingji Yi, co-supervised with Dr. Renming Song, graduated in 2017. *On Intrinsic Ultracontractivity of Perturbed Lévy Process and Applications of Lévy Process in Actuarial Mathematics.*

Peng Li, Central University of Finance and Economics, cosupervised with Dr. Ming Zhou, graduated in 2017. *Hedging and Efficient Algorithm of Embedded Options for Variable Annuity.*

## Professional services

### *Editorial board*

Associate Editor, *North American Actuarial Journal*, Taylor & Francis, 2019-Present.

Associate Editor, *Methodology and Computing in Applied Probability*, Springer, 2018-Present.

Associate Editor, *Quantitative Finance and Economics*, AIMS Press, 2016-Present.

Editor, Special issue on "Computational Finance and Insurance", 2017.

*Insurance Markets and Companies*, Business Perspectives, 2016-Present.

*Book review*

ACTEX Publications, 2017.

*Conference organization*

Chair, Scientific Committee, 2022 Actuarial Research Conference, Champaign, June 2022.

Co-Chair, Planning Committee, 2019 Risk Analytics Symposium, Chicago, May 17, 2019.

Scientific Committee. 2019 Actuarial Research Conference, Purdue University.

Scientific Committee. The 6th International Gerber-Shiu Workshop, June 8-9, 2016, Renmin University.

Scientific Committee. 2015 Actuarial Research Conference, University of Toronto.

Organizer. 2014 SIAM Financial Mathematics and Engineering, Minisymposium on Variable Annuities.

*Research grants review*

National Science Foundation, South Africa 2019

Mitacs Accelerate Research Program, Canada 2018

Natural Sciences and Engineering Research Council of Canada, Mathematical, Environmental and Physical Sciences Division 2015

New University Researchers Start-up Program, Fonds de recherche du Québec – Nature et technologies 2016

*External thesis examiner*

Pavan Aroda, PhD Thesis, Department of Mathematics and Statistics, York University. November 2016.

Qian Feng, PhD Thesis, Centrum Wiskunde & Informatica. April 2017.

Nikolay Gudkow, PhD Thesis, University of New South Wales. October 2018.

Fabio Andrés Gómez De Los Ríos, Universidad Nacional de Colombia, Bogotá. November 2019.

*External tenure and promotion reviewer*

University of Minnesota Duluth, 2017.

University of Wisconsin–Milwaukee, 2018.

SOA Center of Actuarial Excellence Evaluation Committee, Faculty Advisor 2018-Present

SOA Education and Research Section Council 2018-2021

The council facilitates expanding the knowledge base of the actuarial profession, promote ties between practitioners and academics, seek ways to support and encourage actuarial education and research.

Vice Chair of the E&R Council, 2019-2020.

Chair, Early Career Award Working Committee, 20019-2020.

## University Services

Search Committee for the Academic Program Specialist Position, 2019.

Senate Committee on Faculty and Academic Staff Benefits, 2018-2020.

Search Committee for the Chair of the Department of Mathematics, 2018.

Chair, Search Committee for Lecturer Position in Actuarial Science, Department of Mathematics, 2018.

Task Force on Quantitative Risk Management, Campus Investment for Growth Program, 2017-2018.

Chair, Search Committee for Faculty Position in Actuarial Science, Departments of Mathematics and Statistics, 2017.

Curriculum Committee, Department of Statistics, 2017.

Graduate Recruiting and Application Screening Committee, Department of Mathematics, 2017-Present.

Search Committee for Academic Program Specialist, Department of Mathematics, 2017.

Search Committee for Director of Center for Risk Management and Insurance Research, Department of Finance, 2017.

Area Chair, Actuarial Science, Department of Mathematics, 2016-Present.

Mathematics in Sciences and Society Chair, Colloquium Committee, Department of Mathematics, 2014-2016.

Search Committee for Academic Advisor, Office of Undergraduate Studies, 2014.

Organizer, Actuarial Science & Financial Mathematics Seminar, 2013-2016.

Co-organizer, Financial Math, Risk and Uncertainty Seminar, 2015-Present. Department of Mathematics and Department of Industrial Enterprise and System Engineering, University of Illinois

Actuarial Science Committee, Social Committee, Department of Mathematical Sciences, University of Wisconsin-Milwaukee, 2008-2012.