

Ben Mingbin Feng

Department of Statistics and Actuarial Science

✉ ben.feng@uwaterloo.ca
🏠 <http://www.math.uwaterloo.ca/~mbfeng/>

📍 M3 3016, University of Waterloo
200 University Ave W, Waterloo, ON, N2L 3G1

PROFESSIONAL QUALIFICATIONS

- | | | |
|------------------|---|-------------------------------|
| 📅 2013 – present | Associate of the Society of Actuaries (ASA) | 🏛️ Society of Actuaries (SOA) |
| 📅 2022 – present | Certified Analytics Professional (CAP) | 🏛️ INFORMS |

DEGREES

- | | |
|--|---|
| Ph.D. in Industrial Engineering
📅 2011 – 2016 | 🏛️ Northwestern University, USA
» Co-supervised by Dr. Jeremy Staum and Dr. Andreas Waechter
» Thesis: <i>Green Simulation: Reusing the Output of Simulation Experiment</i> |
| M.Sc. in Industrial Engineering
📅 2011 – 2012 | 🏛️ Northwestern University, USA |
| M.Math. in Actuarial Science
📅 2010 – 2011 | 🏛️ University of Waterloo, Canada
» Supervised by Dr. Ken Seng Tan
» Master's thesis: <i>Coherent Distortion Risk Measures in Portfolio Selection</i> |
| B.Math. in Actuarial Science
📅 2007 – 2010 | 🏛️ University of Waterloo, Canada
» Actuarial Science & Operations Research double majors, Statistics minor
» Graduate With Distinction, Dean's Honours List |

EXPERIENCE

- | | |
|--|--|
| Program Director
📅 Jul 2024 - present | 🏛️ Master of Actuarial Science (MActSc)
Dept. of Statistics and Actuarial Science, U. Waterloo, Canada |
| Associate Professor
📅 Jul 2024 – present | 🏛️ Department of Statistics and Actuarial Science
University of Waterloo, Canada |
| Assistant Professor
📅 Jul 2016 – Jun 2024 | 🏛️ Department of Statistics and Actuarial Science
University of Waterloo, Canada |
| Visiting Postgraduate
📅 May 2014 – Aug 2014 | 🏛️ Department of Industrial Engineering and Logistics Management
Hong Kong University of Science and Technology (HKUST) |
| Actuarial Intern
📅 May 2012 – Aug 2012 | 🏛️ AXIS Capital Inc., New York, NY
Implemented in-house reinsurance portfolio optimization tool |

AWARDS & HONOURS

- | | | |
|---------------|---|-------------------------------|
| 📅 2020 – 2022 | Distinguished Service Award | 🏛️ Winter Sim. Conf. (WSC) |
| 📅 2022 | SAS Department Teaching Award | 🏛️ University of Waterloo |
| 📅 2020 | JFIG Paper Competition (honorable mention) | 🏛️ INFORMS |
| 📅 2017 | Instructor of the Year (honorable mention) | 🏛️ University of Waterloo |
| 📅 2015 | Royal E. Cabell Terminal Year Fellowship | 🏛️ Northwestern University |
| 📅 2012 – 2015 | Hickman Scholarship | 🏛️ Society of Actuaries (SOA) |
| 📅 2012 | Arthur P. Hurter Award | 🏛️ Northwestern University |
| 📅 2011 | Ph.D. Entrance Scholarship in Financial Engineering | 🏛️ Northwestern University |

RESEARCH AND SCHOLARSHIP

§. Research expertise and interest

- Efficient nested simulation designs for pricing and hedging variable annuities
- Machine learning and AI in actuarial and quantitative finance applications
- Monte Carlo computer simulation experiment design and analysis
- Portfolio optimization under climate change uncertainties

§. Research Publications

	Accepted/Published	Working paper/Submitted	Total
Journal articles	11	5	16
Conference proceedings	17	2	19
Software packages	1	0	1
Total	29	7	36

¶. Journal articles

- [J.14] 2024⁺ Zheng, H.* , Xie, W., & **Feng, M.B.** “Variance Reduction Based Experience Replay for Policy Optimization”.
Submitted to Journal of Machine Learning Research (JMLR) in 2022. Archived at <https://arxiv.org/abs/2110.08902>.
- [J.13] 2024⁺ Zhang, K.* , **Feng, M.B.**, Liu, G.W., & Wang, S.Y. “Sample Recycling for Nested Simulation With Application in Portfolio Risk Measurement”.
Submitted to Operations Research in 2021. Archived at <https://arxiv.org/abs/2203.15929>.
- [J.12] 2024 **Feng, M.B.** & Song, E. “Optimal Nested Simulation Experiment Design via Likelihood Ratio Method”.
Accepted by INFORMS Journal on Computing (IJOC) in May 2024. Available at <https://doi.org/10.1287/ijoc.2022.0392>.
- [J.11] 2023 Dang, O.* , **Feng, M.B.**, & Hardy, M.R. “Two-Stage Nested Simulation of Tail Risk Measurement: A Likelihood Ratio Approach”.
Insurance: Mathematics and Economics (IME), Volume 108, pp. 1-24.
- [J.10] 2022 **Feng, M.B.**, Li, J.S-H., & Zhou, K.Q. “Green Nested Simulation via Likelihood Ratio: Applications to Longevity Risk Management”.
Insurance: Mathematics and Economics (IME), Volume 106, pp 285-301.
- [J.9] 2022 Dang, O.* , **Feng, M.B.**, & Hardy, M.R. “Dynamic Importance Allocated Nested Simulation for Variable Annuity Risk Measurement”.
Annals of Actuarial Science, Volume 16, Issue 2, pp. 319-348.
- [J.8] 2021 **Feng, M.B.** & Staum, J. “Green Simulation With Database Monte Carlo”.
ACM Transactions on Modeling and Computer Simulation (TOMACS), Volume 31, No. 1, pp. 1-26.
- [J.7] 2020 Dang, O.* , **Feng, M.B.**, & Hardy, M.R. “Efficient Nested Simulation for Conditional Tail Expectation of Variable Annuities”.
North American Actuarial Journal (NAAJ), Volume 24, Issue 2: Predictive Analytics, pp. 187-210.
- [J.6] 2020 **Feng, M.B.**, Tan, Z.* , & Zheng, J.* “Efficient Simulation Designs for Valuation of Large Variable Annuity Portfolios”.
North American Actuarial Journal (NAAJ), Volume 24, Issue 2: Predictive Analytics, pp. 275-289.
- [J.5] 2018 **Feng, M.B.**, Mitchell, J.J., Pang, J.S., Shen, X., Waechter, A. “Complementarity Formulations of ℓ_0 -Norm Optimization”.
Pacific Journal of Optimization, Volume 14, Issue 2, pp. 273-305.

- [J.4] 2017 **Feng, M.B.** & Staum, J. “Green Simulation: Reusing the Output of Repeated Experiments”. *ACM Transactions on Modeling and Computer Simulation (TOMACS)*, Vol. 27, No. 4, pp. 1-28.
- [J.3] 2016 Staum, J., **Feng, M.B.**, & Liu, M. “Systemic Risk Components in a Network Model of Contagion”. *IIE Transactions*, Vol. 48, Issue 6: *Operations Engineering & Analytics*, pp. 501-510.
- [J.2] 2015 **Feng, M.B.**, Waechter, A., & Staum, J. “Practical Algorithms for Value-At-Risk Portfolio Optimization Problems”. *Quantitative Finance Letters*, Vol. 3, Issue 1, pp. 1-9.
- [J.1] 2012 **Feng, M.B.** & Tan K.S. “Coherent Distortion Risk Measures in Portfolio Selection”. *Systems Engineering Procedia*, Volume 4, pp. 25-34.

¶. Conference proceedings

- [C.17] 2023 Chen, Q*, **Feng, M.B.** “Generalized Importance Sampling for Nested Simulation”. *Proceedings of 2023 Winter Simulation Conference (WSC)*, San Antonio, TX, pp. 409–420.
- [C.16] 2023 He, L.* , **Feng, M.B.**, Song, E. “Efficient Input Uncertainty Quantification for Regenerative Simulation”. *Proceedings of 2023 Winter Simulation Conference (WSC)*, San Antonio, TX, pp. 385–396.
- [C.15] 2023 Li, X.* , **Feng, M.B.** “Cutting Through the Noise: Machine Learning Proxies for High Dimensional Nested Simulation”. *Proceedings of 2023 Winter Simulation Conference (WSC)*, San Antonio, TX, pp. 3002–3013.
- [C.14] 2022 **Feng, M.B.**, Liu, G.W., & Zhang, K. “Portfolio Risk Measurement via Stochastic Mesh With Average Weight”. *Proceedings of 2022 Winter Simulation Conference (WSC)*, Singapore, 2022, pp. 903-914.
- [C.13] 2022 Dang, O.* & **Feng, M.B.** “Sequential Nested Simulation for Estimating Expected Shortfall”. *Proceedings of 2022 Winter Simulation Conference (WSC)*, Singapore, 2022, pp. 927-938.
- [C.12] 2022 Xie, W., Wang, K.* , Zheng, H.* , & **Feng, M.B.** “Sequential Importance Sampling for Hybrid Model Bayesian Inference to Support Bioprocess Mechanism Learning and Robust Control”. *Proceedings of 2022 Winter Simulation Conference (WSC)*, Singapore, 2022, pp. 2282-2293.
- [C.11] 2020 **Feng, M.B.** & Jiang, G. “Reusing Simulation Outputs of Repeated Experiments via Likelihood Ratio Regression”. *Proceedings of 2020 Winter Simulation Conference (WSC)*, Virtual, 2020, pp. 325-336.
- [C.10] 2020 Zheng, H.* , Xie, W., & **Feng, M.B.** “Green Simulation Assisted Reinforcement Learning With Model Risk for Biomanufacturing Learning and Control”. *Proceedings of 2020 Winter Simulation Conference (WSC)*, Virtual, 2020, pp. 337–348.
- [C.9] 2020 **Feng, M.B.** & Liu, K. “Path Generation Methods for Valuation of Large Variable Annuities Portfolio Using Quasi-Monte Carlo Simulation”. *Proceedings of 2020 Winter Simulation Conference (WSC)*, Virtual, 2020, pp. 481-491.
- [C.8] 2019 Dang, O.* , **Feng, M.B.**, & Hardy, M.R. “Efficient Nested Simulation of Tail Risk Measures”. *Proceedings of 2019 Winter Simulation Conference (WSC)*, National Harbor, MD, USA, 2019, pp. 938-949.
- [C.7] 2019 **Feng, M.B.** & Song, E. “Efficient Input Uncertainty Quantification via Green Simulation Using Sample Path Likelihood Ratios”. *Proceedings of 2019 Winter Simulation Conference (WSC)*, National Harbor, MD, USA, 2019, pp. 3693-3704.
- [C.6] 2018 **Feng, M.B.**, Maggiar A., Staum J., & Waechter A. “Uniform Convergence of Sample Average Approximation With Adaptive Multiple Importance Sampling”. *Proceedings of 2018 Winter Simulation Conference (WSC)*, Gothenburg, Sweden, 2018, pp. 1646-1657.
- [C.5] 2018 Dong, J., **Feng, M.B.**, & Nelson B.L. “Unbiased Metamodeling via Likelihood Ratios”. *Proceedings of 2018 Winter Simulation Conference (WSC)*, Gothenburg, Sweden, 2018, pp. 1778-1789.

- [C.4] 2018 Eckman D.J. & **Feng, M.B.** “Green Simulation Optimization Using Likelihood Ratio Estimators”. *Proceedings of 2018 Winter Simulation Conference (WSC), Gothenburg, Sweden, 2018, pp. 2049-2060.*
- [C.3] 2018 Dang, O.* & **Feng, M.B.** “Using Concomitant and Nested Simulation for Tail Risk Measure Estimation”. *Proceedings of the 2018 Joint Statistical Meetings (JSM).*
- [C.2] 2016 **Feng, M.B.** & Staum, J. “Green Simulation With Database Monte Carlo”. *Proceedings of 2016 Winter Simulation Conference (WSC), Washington, DC, USA, 2016, pp. 1108-1118.*
- [C.1] 2015 **Feng, M.B.** & Staum, J. “Green Simulation Designs for Repeated Experiments”. *Proceedings of 2015 Winter Simulation Conference (WSC), Huntington Beach, CA, USA, 2015, pp. 403-413.*













¶. Working papers

- [J.15] 2024+ Eckman D.J., **Feng, M.B.**, Liu, T., & Zhou, E. “Stochastic Gradient Descent With Green Gradient Estimators”. *Working paper to be submitted for journal publication.*
- [J.16] 2024+ Fan W., **Feng, M.B.**, Hong, J.L., & Zhang L. “Value of Data: A Robust Linear Programming Perspective”. *Working paper to be submitted for journal publication.*
- [C.18] 2024+ **Feng, M.B.** “Nested Simulation With Maximum Effective Sample Size”. *Working paper to be submitted for conference proceedings publication.*
- [C.19] 2024+ **Feng, M.B.**, Li, H., Zhou, K. “Pricing of Guaranteed Minimum Withdrawal Benefit via Nested Simulation”. *Working paper to be submitted for conference proceedings publication.*

¶. Software packages

- [S.1] 2020 Li, H*, **Feng M.B.**, Jiang M.*, Gan G. “vanc: A Monte Carlo Valuation Framework for Variable Annuities”. *R library. Available on CRAN <https://cran.r-project.org/web/packages/vanc/index.html>.*

§. Research grants

-  MITACS
 2020 Research Training Award (\$6,000)
» *Efficient Nested Simulation for Pricing and Risk Management for Exotic Options and Variable Annuities*
-  NSERC
 2018 – present Discovery Grant (sole PI, \$16,000/year)
» *Efficiently Reusing Monte Carlo Simulation Output in Repeated Experiments for Financial and Actuarial Applications*
-  NSERC
 2018 – 2020 Discovery Launch Supplements (sole PI, \$12,500)
» *Efficiently Reusing Monte Carlo Simulation Output in Repeated Experiments for Financial and Actuarial Applications*
-  Society of Actuaries
 2018 – 2021 CAE Grant (one of 13 Co-PIs, \$297,000 USD)
» *Maintaining Financial Stability in an Era of Changing Climate and Demographics*
-  MITACS
 2018 Mitacs Accelerate (\$15,000)
» *Accessible Data Platform for Dynamic Experience Study of Lifestyle Underwriting*
-  U. Waterloo
 2016 – 2023 Start-up grant (\$50,000)

§. Invited seminars and university visits

- 📅 Jun 2024 🏛️ Sun Yat-Sen University, CHINA, PRC
» *Generalized Importance Sampling for Nested Simulation*
- 📅 Jun 2024 🏛️ Institute of Statistics and Big Data (virtual), Renmin University of China, CHINA, PRC
» *Generalized Importance Sampling for Nested Simulation*
- 📅 Mar 2024 🏛️ Gordon S. Lang School of Business and Economics, Guelph University, CANADA
» *Generalized Importance Sampling for Nested Simulation*
- 📅 Oct 2023 🏛️ Maurice R. Greenberg School of Risk Science, Georgia State University (GSU), USA
» *Generalized Importance Sampling for Nested Simulation*
- 📅 Apr 2022 🏛️ Actuarial Science Seminar Series (virtual), University of Connecticut, USA
» *Optimal Nested Simulation Design via the Likelihood Ratio Method*
- 📅 May 2021 🏛️ China Institute for Actuarial Sciences (virtual), Central University of Finance and Economics (CUFE), CHINA, PRC
» *Optimal Nested Simulation Design via the Likelihood Ratio Method*
- 📅 Jun 2020 🏛️ Institute of Statistics and Big Data (virtual), Renmin University of China, CHINA, PRC
» *Dynamic Importance Allocated Nested Simulation for Variable Annuity Risk Measurement*
- 📅 Feb 2020 🏛️ Industrial and Manufacturing Engineering Colloquium, Penn State University (PSU), USA
» *Optimal Nested Simulation Design via the Likelihood Ratio Method*
- 📅 Mar 2019 🏛️ Risk Management and Insurance (RMI) seminar series, Georgia State University (GSU), USA
» *Efficient Nested Simulation of Tail Risk Measures*
- 📅 Jul 2018 🏛️ Sun Yat-Sen University, CHINA, PRC
» *Efficient Simulation Design for Risk Management of Large Variable Annuity Portfolios*

§. Invited conference talks

- 📅 Jun 2024 🏛️ International Conference on Insurance and Actuarial Science 📍 Nankai University, Tianjin, CHINA, PRC
» *Generalized Importance Sampling for Nested Simulation*
- 📅 Dec 2023 🏛️ 2023 Winter Simulation Conference (WSC) 📍 San Antonio, USA
» *Generalized Importance Sampling for Nested Simulation*
- 📅 Oct 2023 🏛️ 2023 INFORMS Annual Meeting 📍 Phoenix, USA
» *Generalized Importance Sampling for Nested Simulation*
- 📅 May 2023 🏛️ Actuarial Science Workshop, 2023 SSC Annual Meeting 📍 Ottawa, CANADA
» *Machine Learning and Data Mining in Insurance and Finance*
- 📅 Dec 2022 🏛️ 2022 Winter Simulation Conference (WSC) 📍 Singapore
» *Sequential Nested Simulation for Estimating Expected Shortfall*
- 📅 Oct 2022 🏛️ 2022 INFORMS Annual Meeting 📍 Indianapolis, USA
» *Nested Simulation in Financial Engineering: A Review*
- 📅 Oct 2020 🏛️ 2020 INFORMS Annual Meeting 📍 Virtual
» *Stochastic Mesh Approach for Portfolio Risk Measurement*
- 📅 Dec 2019 🏛️ 2019 Winter Simulation Conference (WSC) 📍 National Harbor, USA
» *Efficient Nested Simulation of Tail Risk Measures*
- 📅 Dec 2019 🏛️ 2019 Winter Simulation Conference (WSC) 📍 National Harbor, USA
» *Efficient Input Uncertainty Quantification via Green Simulation Using Sample Path Likelihood Ratios*
- 📅 Oct 2019 🏛️ 2020 INFORMS Annual Meeting 📍 Seattle, USA
» *Efficient Input Uncertainty Quantification via Green Simulation Using Sample Path Likelihood Ratios*

📅 Oct 2019	🏛️ 2020 INFORMS Annual Meeting » <i>Uniform Convergence of Sample Average Approximation with Adaptive Multiple Importance Sampling</i>	📍 Seattle, USA
📅 Jun 2019	🏛️ 3rd Annual Workshop on Simulation and Applications, Chinese University of Hong Kong » <i>Efficient Tail Risk Estimation via Importance Allocated Nested Simulation</i>	📍 Shenzhen, CHINA
📅 Dec 2018	🏛️ 2018 Winter Simulation Conference (WSC) » <i>Uniform Convergence Of Sample Average Approximation With Adaptive Multiple Importance Sampling</i>	📍 Gothenburg, SWEDEN
📅 Dec 2018	🏛️ 2018 Joint Statistical Meetings » <i>Using Concomitant and Nested Simulation for Tail Risk Measure Estimation</i>	📍 Vancouver, CANADA
📅 Jun 2018	🏛️ 2018 INFORMS International Conference » <i>Efficient Simulation Design for Risk Management of Large Variable Annuity Portfolios</i>	📍 Taiwan, CHINA
📅 Dec 2016	🏛️ 2016 Winter Simulation Conference (WSC) » <i>Green Simulation with Database Monte Carlo</i>	📍 Washington D.C., USA
📅 Aug 2016	🏛️ The 12th International Conference on Monte Carlo and Quasi-Monte Carlo Methods in Scientific Computing (MCQMC 2016) » <i>Green Simulation for Repeated Experiments</i>	📍 Stanford, USA
📅 Feb 2016	🏛️ University of Montreal » <i>Green Simulation for Repeated Experiments</i>	📍 Montreal, CANADA
📅 Jan 2016	🏛️ University of Waterloo » <i>Green Simulation for Repeated Experiments</i>	📍 Waterloo, CANADA
📅 Dec 2015	🏛️ 2015 Winter Simulation Conference (WSC) » <i>Green Simulation Designs for Repeated Experiments</i>	📍 Huntington Beach, USA
📅 Dec 2015	🏛️ PhD Colloquium, 2015 Winter Simulation Conference (WSC) » <i>Green Simulation Designs for Repeated Experiments</i>	📍 Huntington Beach, USA
📅 Oct 2015	🏛️ 2015 INFORMS Annual Meeting » <i>Green Simulation Designs for Repeated Experiments</i>	📍 Philadelphia, USA
📅 Oct 2013	🏛️ 2013 INFORMS Annual Meeting » <i>Nonlinear Programming Formulations of ℓ_0-norm Optimization Problems</i>	📍 Minneapolis, USA
📅 Aug 2011	🏛️ 46th Actuarial Research Conference (ARC) » <i>Coherent Distortion Risk Measures in Portfolio Selection</i>	📍 Storrs, USA

TEACHING ACTIVITIES

§. Courses taught in the past 5 years

Term/Year	Title	Student level	Class size
Winter 2024	ACTSC 621: Financial Mathematics II	Grad	11
Fall 2021	ACTSC 372: Investment Science & Corporate Finance	Undergrad	190
Winter 2021	ACTSC 621: Financial Mathematics II	Grad	15
Jan 2021	READI Project: Predictive Analytics and Big Data	Lecturers/Gov'n't Officials	73
Spring 2020	ACTSC 973/CO 778: Portfolio Optimization	Grad	9
Winter 2020	ACTSC 372: Investment Science & Corporate Finance	Undergrad	104
Winter 2020	ACTSC 621: Financial Mathematics II	Grad	12
Fall 2019	ACTSC 372: Corporate Finance II	Undergrad	135
Winter 2019	ACTSC 621: Financial Mathematics II	Grad	17
Fall 2018	ACTSC 372: Corporate Finance II	Undergrad	172
Winter 2018	ACTSC 372: Corporate Finance II	Undergrad	183
Winter 2017	ACTSC 372: Corporate Finance II	Undergrad	131

§. Curriculum development

📖 ACTSC 372: Investment Science & Corporate Finance (formerly Corporate Finance II).

- ⊕ Major curriculum update in ACTSC 372 in 2019:
 - * Retired ACTSC 371.
 - * Updated syllabus and course title for ACTSC 372.
 - * Revised actuarial science degree requirements in university academic calendar.
- ⊕ Joint efforts by the Actuarial Science and the Math & Business units.
 - * Effective communications with unit heads.
 - * Steady progress with changes completed within set time limit.
 - * New curriculum addressed different units' needs and constraints.

📖 ACTSC 970/ CO 778: Portfolio Optimization.

- ⊕ Developed cross-listed course curriculum from blank slate.
- ⊕ Syllabus include quadratic optimization, modern portfolio theory, etc.
- ⊕ Balanced rigorous theoretical derivations and hands-on practical projects.
- ⊕ Suitable for students with different technical backgrounds and learning objectives.

📖 READI project short course: Predictive Analytics and Big Data.

- ⊕ Developed 12-hours fast-track course on short notice.
- ⊕ Diverse audiences including university lecturers, government officials and regulators, financial practitioners.
- ⊕ Course designed to engage participants with hands-on exercises and real-life actuarial case studies.

§. Research student supervision

Research level	Current	Graduated/Terminated
Post-doctoral fellows	0	1
PhD	5	2
Master's	2	12
Undergraduate RA	0	5
Total	7	20

¶. Postdoctoral fellows (PDFs)

[1] Samuel Lukas
 📅 2019
 READI Project (co-supervised with Ken Seng Tan)
 » Current position: Lecturer at Universitas Pelita Harapan, Indonesia

¶. Ph.D. students

[7] Hao Quan
 📅 2024 – present
 Ph.D. in Actuarial Science

[6] Jisun Choi
 📅 2023 – present
 Ph.D. in Actuarial Science (co-supervised with Ruodu Wang)

[5] Rhoda Dadzie-Dennis
 📅 2021 – present
 Ph.D. in Actuarial Science (co-supervised with Mary Hardy)
 » Thesis proposal (Apr 2024): Portfolio Selection under Climate Change

[4] Xintong (Tony) Li
 📅 2020 – present
 Ph.D. in Actuarial Science (co-supervised with Tony Wirjanto)
 » Thesis proposal (Feb 2023): Efficient Nested Simulation of Tail Risk Measures with Machine Learning Proxies

[3] Jiazhen (Katrina) Chen
 📅 2020 – present
 Ph.D. in Statistics (co-supervised with Tony Wirjanto)
 » Thesis proposal (Apr 2023): Multi-variate Time-Series Anomaly Detection with Graph Forecasting

[2] Hsiao-Cheng Dung
 📅 2020 – 2023
 Ph.D. in Actuarial Science (co-supervised with Fangda Liu)
 » Thesis proposal (Apr 2023): Nested Simulation of Spectral Risk Measures

[1] Ou (Jessica) Dang
 📅 2016 – 2021
 Ph.D. in Actuarial Science (co-supervised with Mary Hardy)
 » PhD Thesis: Efficient Nested Simulation Procedures for Tail Risk Estimations in Variable Annuities
 » 3 journal publications & 2 conference proceedings upon graduation
 » Current position: Director, Strategy and Technology Group, AON Pathwise, Hong Kong, CHINA

¶. Master's students

[14] Hao Quan
 📅 2024
 Master of Mathematics in Actuarial Science
 » Essay: Meta-Modeling for Fair Fee Determination in Registered Index-Linked Annuities (RILAs)

[13] Barbara Reisser
 📅 2024
 Master of Mathematics in Actuarial Science
 » Essay: Application of Expected Utility Theory and Cumulative Prospect Theory to Insurance Products

[12] Ali Raisolsadat
 📅 2023
 Master of Mathematics in Computational Mathematics (Comp. Math.)
 » Essay: Risk Layering - A Loss Classification Approach

[11] Linyin Sun
 📅 2023
 Master of Mathematics in Statistics
 » Essay: Application of K-nearest neighbor regression on variable annuity

[10] Tianyu Wu
 📅 2023
 Master of Quantitative Finance (MQF)
 » Essay: Robust Portfolio Selection Problem
 » Current position: Analyst in Deloitte

- [9] Thomas Gerald Giblin
📅 2023
Master of Quantitative Finance (MQF)
» Essay: The Predictive Power of Social Media Sentiment in Stock Price Movements and Volatility.
» Current position: Research Associate at Periscope Capital
- [8] Qingyuan (Amber) Chen
📅 2022
Master of Quantitative Finance (MQF)
» Essay: Generalized Importance Sampling for Nested Simulation
» Current position: PhD student at Cornell University
- [7] Jinyu Li
📅 2020
Master of Mathematics in Actuarial Science
» Essay: A Neural Network Framework to Price and Hedge Variable Annuity Guarantees
» Current position: Assistant Manager at Deloitte Canada
- [6] Xintong (Tony) Li
📅 2020
Master of Mathematics in Actuarial Science
» Essay: Approximating Nested Simulation Models with Machine Learning Methods
» Current position: PhD student at University of Waterloo
- [5] Jiazhen (Katrina) Chen
📅 2019
Master of Mathematics in Statistics
» Essay: Online Risk Monitoring Using Logistic Regression
» Current position: PhD student at University of Waterloo
- [4] Fan Xia
📅 2018
Master of Mathematics in Computational Mathematics (Comp. Math.)
» Essay: Simulation Modeling and Analytics of Human Decision Process and Segmentation of Population Through Simulated Behavioral Data
» Machine Learning Engineer at Meta
- [3] Yifei Song
📅 2017
Master of Mathematics in Actuarial Science
» Essay: The Optimal Strategy in a Semi-static Model for Pricing Guaranteed Minimum Benefit Riders under Different Withdrawal Rate Assumptions
» Current position: Business Specialist Medior in Ortec Finance
- [2] Zhenni Tan
📅 2017
Master of Mathematics in Actuarial Science
» Essay: The Impact of Clustering Method for Pricing a Large Portfolio of VA Policies
» Current position: PhD student at York University
- [1] Jiayi Zheng
📅 2017
Master of Mathematics in Actuarial Science
» Essay: Efficient Greek Estimation for Variable Annuities using Monte Carlo Simulation
» Current position: Senior Actuarial Analyst, Wawanesa Insurance

¶. Undergraduate research assistant (URA)

- [5] Mingyi (Iris) Jiang
📅 2020
Honours Statistics & Mathematical Finance Co-op
» President's Research Award (2020) & Mitacs Research Training Award (2020)
» Analyzed convergence properties on Monte Carlo kernel estimators
» Current position: Consultant, Quantitative Risk Modeling, CIBC
- [4] Ziyu (Cheryl) Chi
📅 2020
Honours Mathematical Finance Co-op
» Mean-Variance and Distributionally Robust Optimization
» Current position: PhD at UC Berkeley IEOR
- [3] Jaser Zhu
📅 2019
Honours Combinatorics and Optimization & Statistics Co-op
» Analyzed convergence properties on Monte Carlo kernel estimators for American pricing
» Current position: Back End Developer, IBM
- [2] Hengxin (Hanson) Li
📅 2018
Honours Statistics & Computer Science Minor
» Survey study in Monte Carlo methods for pricing and risk management of variable annuities
» Developed R library "vamc"
» Current position: Analyst at Millennium

[1] Jiaxin (Tony) Liu
📅 2017

Honours Statistics & Financial Analysis and Risk Management Co-op
» Survey study in portfolio optimization
» Current position: Associate, Data Cognition Team at BMO Capital Markets

📅. Ph.D. thesis committees

















📅 Apr 2024	[8] Yuying Huang, Ph.D. in Statistics, U. Waterloo
📅 Aug 2023	[7] Kiefer Joe Burgess, Ph.D. in Management Sciences, U. Waterloo
📅 Jul 2023	[6] Ruihong Jiang, Ph.D. in Actuarial Science, U. Waterloo
📅 Mar 2023	[5] Carlos Andrés Araiza Iturria, Ph.D. in Actuarial Science, U. Waterloo
📅 May 2021	[4] Yumin Wang, Ph.D. in Actuarial Science, U. Waterloo
📅 Nov 2020 (chair)	[3] Gracia Dong, Ph.D. in Actuarial Science, U. Waterloo
📅 Aug 2019	[2] Mingyu Fang, Ph.D. in Actuarial Science, U. Waterloo
📅 Jun 2019	[1] Danqiao Guo, Ph.D. in Statistics, U. Waterloo

📅. Master's essays readers







📅 Jan 2024	[15] Paul Cotturo, Master of Quantitative Finance (MQF), U. Waterloo
📅 Sep 2023	[14] Gavin Orok, Master of Quantitative Finance (MQF), U. Waterloo
📅 Jan 2021	[13] Yifei Deng, Master of Quantitative Finance (MQF), U. Waterloo
📅 Dec 2020	[12] Scarlett (Sijia) Li, M.Math in Actuarial Science (thesis), U. Waterloo
📅 Dec 2020	[11] Zijing Lisa Cui, M.Math in Actuarial Science (thesis), U. Waterloo
📅 Dec 2020	[10] Jing Zhou, M.Math in Actuarial Science, U. Waterloo
📅 Dec 2020	[9] Wanqiu Hu, Master of Quantitative Finance (MQF), U. Waterloo
📅 Jan 2020	[8] Xiaohan Wang, M.Math in Actuarial Science, U. Waterloo
📅 Dec 2018	[7] Zhuoxuan Wu, M.Math in Actuarial Science, U. Waterloo
📅 Aug 2018	[6] Tamrah Aneisha Brown, M.Math in Actuarial Science, U. Waterloo
📅 Aug 2018	[5] Dandan Ma, M.Math in Actuarial Science, U. Waterloo
📅 Dec 2017	[4] Go Felix, M.Math in Actuarial Science, U. Waterloo
📅 Aug 2017	[3] Liuyan Ji, M.Math in Actuarial Science, U. Waterloo
📅 Jan 2017	[2] Raghav Jain, M.Math in Actuarial Science, U. Waterloo
📅 Aug 2016	[1] Ou (Jessica) Dang, M.Math in Actuarial Science, U. Waterloo

SERVICE





§. Department & faculty committees

Director, MACTSC Program	 Dept. Stats & ActSc, U. Waterloo	 2024 – present
MACTSC Admission Committee	 Dept. Stats & ActSc, U. Waterloo	 2023 – 2024
ACTSC 900 Committee	 SAS Department, U. Waterloo	 2021 – 2023
Computational Math Steering Committee	 Math Faculty, U. Waterloo	 2019 – 2021
Actsc/Finance Seminar Committee (Inaugural Co-chair)	 SAS Department, U. Waterloo	 2019 – 2020
MACTSC Admission Committee	 SAS Department, U. Waterloo	 2018 – 2021
SAS Department Seminar Committee	 SAS Department, U. Waterloo	 2018 – 2019
Graduate Student Liaison Committee	 IEMS, Northwestern University	 2011 – 2016

§. University services











E.D.I. Working Group	 Games Institute, U. Waterloo	 2021 – 2023
Actuarial Mentorship Program	 Games Institute, U. Waterloo	 2016 – present
Ph.D. Mathematics Bootcamp	 IEMS, Northwestern University	 2012

§. Affiliated center and institute memberships





 2017 – 2019	Waterloo Research Institute in Insurance, Securities and Quantitative Finance (WatRISQ), University of Waterloo
 2017 – present	Centre for Computational Mathematics (CM), University of Waterloo
 2017 – present	Waterloo Artificial Intelligence Institute, University of Waterloo
 2020 – present	The Games Institute, University of Waterloo

PROFESSIONAL ACTIVITIES











































§. Professional society memberships

Member	 Society of Actuaries (SOA)	 2008 – present
Member	 The Institute for Operations Research and Management Sciences (INFORMS)	 2014 – present
Member	 Simulation Society of INFORMS	 2015 – present
Member	 American Academy of Actuaries (MAAA)	 2016 – 2018
Member	 INFORMS Junior Faculty Interest Group	 2019 – present

§. Editorial positions

Lead editor	 Winter Simulation Conference Proceedings	 2022
Co-editor	 Winter Simulation Conference Proceedings	 2020 – 2021

§. Conference organization

Organizing Committee  2024	 The 16th International Conference on Monte Carlo and Quasi-Monte Carlo Methods in Scientific Computing (MCQMC 2024)	 Waterloo, Canada
Organizing Committee  2024	 Publicity Co-Chair, 2024 Winter Simulation Conference (WSC)	 Orlando, USA
Organizing Committee  2022	 Lead Editor, 2022 Winter Simulation Conference (WSC)	 Singapore
Organizing Committee  2021	 Co-Editor, 2021 Winter Simulation Conference (WSC)	 Phoenix, USA & Virtual
Organizing Committee  2020	 Co-Editor, 2020 Winter Simulation Conference (WSC)	 Virtual
Organizing Committee  2019	 1st Waterloo Conference in Statistics, Actuarial Science & Finance (WatSAF)	 Waterloo, Canada
Cluster Chair  2022	 Simulation Cluster, INFORMS/CORS International Conference	 Vancouver, Canada
Track Chair  2023	 Analysis Methodology Track, 2023 Winter Simulation Conference (WSC)	 San Antonio, USA
Track Chair  2022	 Financial Engineering Track, 2022 Winter Simulation Conference (WSC)	 Singapore
Track Chair  2021	 Using Simulation to Innovate Track, 2021 Winter Simulation Conference (WSC)	 Phoenix, USA & Virtual
Track Chair  2020	 Using Simulation to Innovate Track, 2020 Winter Simulation Conference (WSC)	 Virtual
Track Chair  2019	 Analysis Methodology Track, 2019 Winter Simulation Conference (WSC)	 National Harbor, USA
Session Chair  2022	 2022 INFORMS Annual Meeting	 Indianapolis, USA
Session Chair  2022	 2022 Winter Simulation Conference (WSC)	 Singapore

Session Chair 📅 2022	🏛️ 2020 INFORMS Annual Meeting	📍 Virtual
Session Chair 📅 2019	🏛️ 2019 Winter Simulation Conference (WSC)	📍 National Harbor, USA
Session Chair 📅 2018	🏛️ 2018 Winter Simulation Conference (WSC)	📍 Gothenburg, Sweden
Session Chair 📅 2018	🏛️ 2018 Joint Statistical Meetings	📍 Vancouver

§. Research manuscripts reviewed

- 📖 North American Actuarial Journal (NAAJ) – 10
- 📖 Annals of Actuarial Science (AAS) – 1
- 📖 Insurance: Mathematics & Economics (IME) – 1
- 📖 Finance and Stochastics – 2
- 📖 Operations Research (OR) – 4
- 📖 Management Science (MS) – 2
- 📖 Mathematics of Operations Research (MOR) – 1
- 📖 ACM Transactions on Modeling and Computer Simulation (TOMACS) – 5
- 📖 INFORMS Journal on Computing (JOC) – 9
- 📖 Naval Research Logistics (NRL) – 2
- 📖 Journal of the Operations Research Society of China – 2
- 📖 Winter Simulation Conference (WSC) Proceedings – 17

§. Grant proposals reviewed

- 📖 Mitacs (Canada) – 1
- 📖 Research Grants Council (RGC) (Hong Kong) – 7