Taehan Bae

Mathematics and Statistics
University of Regina
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EDUCATION

Doctor of Philosophy, Statistics
University of Western Ontario (UWO), London, Ontario, Canada, Aug. 2008
Dissertation : "Stochastic Models for Corporate Exit and Credit Rating Migration"
Supervisor: Reg J. Kulperger

Master of Science, Actuarial Science
University of Iowa, Iowa City, Iowa, USA, Dec. 2003
Supervisor: Elias S.W. Shiu

Bachelor of Science, Mathematics
Seoul National University, Seoul, Korea, Feb. 1999

PROFESSIONAL DESIGNATIONS

Associate members of Society of Actuaries (ASA) and Canadian Institute of Actuaries (ACIA)

RESEARCH INTERESTS

- Actuarial risk analysis
- Extreme value analysis
- Simulations and computational methods
- Spatio-temporal extremes
- Dependence modelling

EMPLOYMENT

- **University of Regina**, *Professor (tenured)*, **Jul. 2025 – present**
- **University of Regina**, *Associate Professor (tenured)*, **Jul. 2015 – Jun 2025**
- **University of Regina**, *Assistant Professor (tenure track)*, **Jul. 2011 – Jun. 2015**
- **Algorithmics Inc.**, Toronto, Canada, *Senior Mathematician/ NSERC Industrial R&D Fellow*, **Sep. 2008 – Jun. 2011**
- **Samsung Life Insurance**, Seoul, Korea, *Actuarial Analyst*, **Jan. 1999 – Jan. 2001**

TEACHING & MENTORING

- **Teaching**

– MATH 103 (Fall 2025): Applied Calculus I
– STAT 160 (Fall 2020/2017/2016/2015, Winter 2013): Introductory Statistics
– STAT/MATH 251 (Fall 2021/2013): Introduction to Probability
– ACSC 216 (Winter 2021/2020): Mathematics of Finance II
– ACSC/STAT 300 (Winter 2026/2024/2022/2018/2016): Statistical learning and predictive modeling
– ACSC 318 (Winter 2024/2023/2022/2014/2013/2012): Actuarial Models II
– ACSC 416 (Fall 2024): Introduction to Financial Enterprise Risk Management
– ACSC 417 (Fall 2023/2022/2021/2020/2019/2011): Introduction to Casualty Insurance and Credibility
– ACSC 418 (Fall 2018/2016/2014/2013, Winter/Fall 2012): Time Series Analysis and Forecasting
– ACSC 419 (Winter 2026/2023/2018/2017/2016/2015/2014): Estimation and Selection of Actuarial Models
– ACSC/STAT 456 (Winter 2021/2020): Applied Stochastic Processes
– STAT 855 (Graduate course, Fall 2019/2018/2017): Generalized Linear Models
– STAT 858 (Graduate course, Winter 2022): Statistical modelling of dependence and extremes
– STAT 862 (Graduate course, Winter 2021/2020, cross-listed STAT456): Stochastic Processes
– STAT 890AR (Graduate course, Spring/Summer 2024, Winter 2017/2015, Fall 2012): Stochastic Differential Equations for Finance
– STAT 890AF (Graduate course, Spring/Summer 2021/2015): Readings in Stochastic Processes

- **Supervision & Mentoring**

– PhD: Naznin Akhi (Jan. 2024 – present, jointly with Prof. A. Shoukat), Talha Farooq (Sep. 2024 – present), Maral Mazjini (Completed, 2020)
– MSc: Hanson Dela Quarshie (Completed, 2023), Jingwen Liu (Completed, 2019, jointly with Prof. A. Volodin), Xiaohua Liu (Completed, 2019), Jingjiao Chen (Completed, 2016), George Teye (Completed., 2013, jointly with Prof. A. Volodin)
– Research Associate (post doctoral): Shanoja Naik (Jan. 2014 – Jun. 2015)
– Undergraduate research students: Bosede Roseline Ogunrinde (Fall 2022 – Present), Saeid Hooshyar (Summer intern 2022), Huong Vu (Summer intern 2022)
– Visiting researchers: Jihyun Park (2026), Jieun Kim (2026/2025), ZhenLei Wang (2017 – 2018), Song Qin (2017 – 2018)
– Graduate student thesis exam committee: Chengjun Shi (PhD), Mahsa Moosavi (PhD), Jin Qin (PhD), Xiaoqing Zhang (PhD), Michael Tsz-Chun Chiu (PhD 2025, external), David Luke Thiessen (PhD 2023), MohanaGowri Arumugam (PhD 2021, external), Boquan Cheng (PhD 2021, external), Chengjun Shi (MSc 2020, external), Abdul Mannan (PhD 2016, external), Shu Wang (MSc 2015, external), Wei Tang (PhD 2014), Ruili Li (MSc 2014), Meng Liu (PhD 2013)

PUBLICATIONS

[1] **T. Bae**, J. Kim and J.Y. Ahn. (2026) Mixed size-biased log-normal distribution with truncated normal prior and its application in insurance ratemaking. *Risks*, 14 (3), https://doi.org/10.3390/risks14030072

[2] **T. Bae**. (2025) On the computation of quantiles of finite mixtures with stochastically ordered components. To appear in *Lobachevskii Journal of Mathematics*.

[3] **T. Bae**, O.R. Bosede*, B.O. Oludare, K. Oshinubi, and F.S. Emmanuel. (2025) Characterization of a One-Step Computational Method based on Transcendental Functions and its Applications in Solving Physical Models. Submitted to *Contemporary Mathematics*.

[4] **T. Bae** and H. Quarsie*. (2024) A bivariate extension of Type II generalized crack distribution for modelling heavy-tailed losses. *Mathematics*, Special Issue Actuarial Statistical Modeling and Applications, 12(23), https://doi.org/10.3390/math12233718.

[5] **T. Bae** (2024) Rejection sampling for generating random numbers from weighted distributions. *Communications in Statistics - Simulation and Computation*, 1–12. https://doi.org/10.1080/03610918.2024.2425701

[6] **T. Bae** and T. Miljkovic. (2024) Loss modeling with the size-biased Lognormal mixture and the entropy regularized EM algorithm. *Insurance Mathematics and Economics*, 117: 182 – 195.

[7] M. Mazjini* and **T. Bae**. (2023) Statistical modelling of precipitation data in Canadian Prairies with a dynamic mixture structure, *Theoretical and Applied Climatology*, 153: 173 – 192.

[8] **T. Bae** and A. Volodin. (2022) Type-II generalized crack distribution with application to heavy-tailed data modeling. *Journal of Statistical Theory and Practice*, 16 (53)DOI: 10.1007/s42519-022-00281-9.

[9] **T. Bae**. (2022) Robust minimum bias iteration algorithms for classification ratemaking and loss reserving, *Lobachevskii Journal of Mathematics*, 43 (9): 2387 – 2396.

[10] **T. Bae** and Y. Choi. (2021) A bivariate extension of three-parameter generalized crack distribution for loss severity modelling. *Journal of the Korean Statistical Society*, 51: 378 – 402.

[11] **T. Bae** and B. Ko. (2020) On the mixtures of length-biased Weibull distributions for loss severity modelling, *Journal of the Korean Statistical Society*, 49: 422 – 438.

[12] **T. Bae** and M. Mazjini*. (2019) Backward simulation of correlated negative binomial Lévy process, *Mathematics and Statistics*, 7 (5): 191 – 196.

[13] **T. Bae** and R. Kulperger. (2018) Poisson limits for sequential multivariate multinomial Data. *Lobachevskii Journal of Mathematics*, 39 (3): 321 – 330.

[14] **T. Bae** and J. Chen*. (2017) On heavy-tailed crack distributions for loss severity modeling. *International Journal of Statistics and Probability*, 6 (6): 92 – 110.

[15] J. Kim, **T. Bae** and S. Kim. (2017) Application of the phase-type mortality law to life contingencies and risk management. *Applied Stochastic Models in Business and Industry*, 33: 184 – 212.

[16] **T. Bae** and A. Kreinin. (2017) A backward construction and simulation of correlated Poisson processes. *Journal of Statistical Computation and Simulation*, 87 (8): 1593 –1607.

[17] **T. Bae** and B. Ko. (2016) On weighted infinite sums of dependent random variables with regularly varying tails. *Journal of the Korean Statistical Society*, 46 (3): 321 - 327.

[18] **T. Bae** and C. Kim. (2016) Options and swaps on motor claims. *Insurance and Risk Management*, 83 (1-2): 45 – 69.

[19] **T. Bae** and I. Iscoe. (2016) On the limit of conditional Spearman rho under the common factor model. *Extremes*, 19 (1): 51 – 78.

[20] **T. Bae**, Huong and B. Ko. (2015) On the valuation of GMDB options using a combination of exponentials. *The Journal of Risk Management*, 26 (3): 71 – 99.

[21] B. Ko. and **T. Bae**. (2015) Pricing GMDB under the phase-type law of mortality. *Lobachevskii Journal of Mathematics*, 36 (2): 199–208.

[22] **T. Bae**, I. Iscoe and C. Kim. (2015) Valuing retail credit tranches with structural, double mixture models. *Journal of Futures Markets*, 35 (9): 849 – 867.

[23] **T. Bae** and I. Iscoe. (2014) Sum of Bernoulli mixtures: beyond conditional independence. *Journal of Probability and Statistics*, Volume 2014, Article ID 838625.

[24] **T. Bae** and B. Ko. (2013) Pricing maturity guarantee under a refracted Brownian motion. *Lobachevskii Journal of Mathematics*, 34 (3): 234 –247.

[25] **T. Bae** and I. Iscoe. (2012) Sovereign correlation in recent recessions. *International Review of Applied Financial Issues and Economics*, 4(1): 11-21.

[26] **T. Bae** and I. Iscoe. (2012) Large-sample confidence intervals for risk measures of location-scale families. *Journal of Statistical Planning and Inference*, 142: 2032–2046.

[27] **T. Bae** and R.J. Kulperger. (2011) Smooth baseline hazard modeling for corporate exits, *International Review of Applied Financial Issues and Economics*, 3(2): 392–427.

[28] N. Horbenko, P. Ruckdeschel and **T. Bae**. (2011) Robust estimation of operational risk. *Journal of Operational Risk*, 6 (2): 3–30.

[29] **T. Bae** and C. Kim. (2010) Motor Insurance-Linked Securities: An Area of Financial Innovation, *Journal of Actuarial Science*, 2(1): 3–32.

[30] **T. Bae** and B. Ko. (2010) On pricing equity-linked investment products with a threshold expense structure. *The Korean Journal of Applied Statistics*, 23(4): 621–633.

[31] **T. Bae** and I. Iscoe. (2010) Correlations under stress. *International Review of Applied Financial Issues and Economics*, 2(2): 248–271.

[32] **T. Bae**, C. Kim and R.J. Kulperger. (2009) Securitization of motor insurance loss rate risks. *Insurance Mathematics and Economics*, 44(1): 48–58.

[33] **T. Bae.** (2008) Stochastic models for corporate exit and credit rating migration. Ph.D thesis, *University of Western Ontario*, Aug. 2008.

(HQP are identified by an asterisk.)

TECHNICAL DOCUMENTS

[1] K. Fraser, D. Garand, C. Zaluski, D. Swiderek, S. Swenarchuk, M. Worden and **T. Bae** (2018) Predictive Analytic Models for Canadian Group Disability Termination Experience, Research Council - Experience Research Committee, Canadian Institute of Actuaries.

[2] S. Naik* and **T. Bae** (2015) Sovereign credit risk modeling with Wishart process and its calibration. Technical report, University of Regina.

[3] **T. Bae** and I. Iscoe (2010) Credit Correlation Data. Research Methodology Paper, Algorithmics Inc.

[4] **T. Bae** and I. Iscoe (2010) Sovereign Creditworthiness Indexes and CDS-implied Correlations in Portfolio Credit Risk Management. Research Methodology Paper, Algorithmics Inc.

[5] **T. Bae** and I. Iscoe (2010) Correlated Defaults for SME Pools in Portfolio Credit Risk Management. Research Methodology Paper, Algorithmics Inc.

[6] **T. Bae**, I. Iscoe and S. Verma. (2009) Statistical Analysis of Multifactor Modeled Asset Correlations. Research Paper Series ARPS 09-02, Algorithmics Inc.

[7] **T. Bae**, I. Iscoe and S. Verma. (2009) Algo Credit Correlation: Infrastructure and Data, Algorithmics Inc.

CONFERENCE/WORKSHP PRESENTATIONS

[1] A multivariate extension of size-biased mixtures and its estimation using a penalized EM algorithm. *The 14th High Dimensional Data Analysis Workshop*, Central Michigan University, MI, Aug. 2025.

[2] Loss Modeling with the Sized-biased Lognormal mixture and the regularized EM Algorithm. *2024 Statistical Society of Canada annual meeting*, Memorial University, St. John's, NL, Jun. 2024.

[3] Weighted Lognormal mixture as a robust alternative to Erlang mixture for modeling left-truncated loss data. *2023 International Congress on Insurance:Mathematics and Economics*, Heriot-Watt University, Edinburgh, Scotland, Jul. 2023.

[4] A bivariate extension of three-parameter generalized crack distribution for loss severity modelling. *2021 Statistical Society of Canada virtual annual meeting*, May 2021.

[5] Statistical modelling of heavy-tailed stock returns. *PIMS Workshop on Time Series, Spatial Processes and Asymptotic Methods*, UBC Okanagan, BC, May 2019.

[6] Backward simulation of negative binomial Lévy process. *The Canadian Mathematical Society Winter meeting*, Vancouver, BC, Dec. 2018.

[7] On the mixtures of length-biased Weibull distributions for loss severity fitting.
– *2017 Statistical Society of Canada annual meeting*, Winnipeg, MB, Jun. 2017.
– *The 21st International Congress on Insurance: Mathematics and Economics*, TU Wien, Vienna, Austria, July 2017.

[8] On heavy tailed crack distribution for loss severity fitting. *The 10th Conference on Extreme Value Analysis*, Delft, Netherlands, Jun. 2017.

[9] A backward construction and simulation of correlated Poisson processes.
– *The 51st Actuarial Research Conference*, Minneapolis, MN, USA, July 2016.
– *The Statistical Society of Canada meeting*, St. Catharines, ON, Canada, May 2016.

[10] On the limit of conditional Spearman's rho under the common factor model.
– *2016 Canadian Mathematical Society Winter meeting*, Niagara Falls, ON, Dec. 2016.
– *Joint Statistical Meeting*, Seattle, WA, US., Aug. 2015.

[11] A generalization of three parameter crack distribution for loss severity modeling. *The Statistical Society of Canada meeting*, Toronto, ON, Canada, May 2014.

[12] Motor insurance linked securities. Invited talk at *The Statistical Society of Canada meeting*, Edmonton, AB, Canada, May 2013.

[13] Valuing retail credit tranches with structural, double mixture models. *The Statistical Society of Canada meeting*, Edmonton, AB, Canada, May 2013.

[14] Sum of Bernoulli mixtures: beyond conditional independence. – *The 16th International Congress on Insurance:Mathematics and Economics*, University of Hong Kong, China, Jun. 2012.
– *The Statistical Society of Canada meeting*, Guelph, ON, Canada. Jun. 2012.

[15] Large-sample confidence intervals for risk measures of location-scale families. *The 46th Actuarial Research Conference*, University of Connecticut, CT, US., Aug. 2011.

[16] Correlations Under Stress. *The 14th International Congress on Insurance:Mathematics and Economics*, University of Toronto, Toronto, Canada, Jun. 2010.

[17] Securitization of Motor Insurance Losses. *The 44th Actuarial Research Conference*, Madison, WI, US., Jul. 2009.

[18] A model for Corporate Rating Transitions. *The 43rd Actuarial Research Conference*, Regina, SK, Canada, Aug. 2008.

[19] Corporate Exit Prediction with Smooth Baseline Hazards. *The Statistical Society of Canada meeting*, Ottawa, ON, Canada. May 2008.

[20] Competing Risks Model for Corporate Exit Analysis: Extension to Stochastic Frailties.
– *The 42nd Actuarial Research Conference*, Pittsburgh, PA, US. Aug. 2007.
– *Insurance:Mathematics and Economics*, University of Piraeus, Piraeus, Greece, Jul. 2007.
– *Canadian Operational Research Conference*, University of Western Ontario, London, ON, Canada, May 2007.

COLLOQUIUM TALKS

[1] Mixtures of weighted distributions with stochastically ordered components and their quantiles. Department of Statistics Invited Speaker Series, Miami University, OH, Sep. 2024.

[2] Mixtures of weighted distributions with stochastically ordered components and their quantiles. University of Regina, Apr. 2024.

[3] On the mixtures of length-biased Weibull distributions for severity modelling. University of Regina, Jan. 2020.

[4] Backward simulation of correlated Point processes for quantitative risk modelling. University of Western Ontario, Nov. 2019.

[5] On the mixtures of length-biased Weibull distributions for severity modelling. The Stu Clark Speaker Seires, University of Manitoba, Oct. 2019.

[6] Backward simulation of correlated Point processes for quantitative risk modelling. Soongsil University, Jun. 2019.

[7] A backward construction and simulation of correlated Poisson processes. University of Regina, Sep. 2016.

[8] Phase-type law of mortality and its applications. University of Regina, Nov. 2014.

[9] On a generalization of the three parameter crack distribution for loss modeling. University of Regina, Nov. 2013.

[10] Robust Operational Risk Quantification. University of Regina, Nov. 2012.

[11] Robust Estimation of Operational Risk. IBM Risk Analytics, Jun. 2012.

[12] Large-sample confidence intervals for risk measures of location-scale families. University of Regina, Nov. 2011.

RESEARCH GRANTS & AWARD

- NSERC-ANR fund collaborative research projects on AI ($300,000) with Affan Shoukat (PI), 2025 – 2028.
- NSERC Discovery Grant ($18,000/year), 2022 – 2026
- NSERC Discovery Development Grant ($15,000/year), 2019 – 2021
- NSERC Discovery Grant ($15,000/year), 2013 – 2018
- SOA (Society of Actuaries) Educational Institutional Grant, 2012
- ORR Innovation Awards: paper of the year, Journal of Operational Risk, 2012
- NSERC Industrial Research and Development Fellowship, Dec. 2008 – Dec. 2010

ADMINISTRATIVE SERVICES

- Chair, *Council Committee on Undergraduate Admission and Studies*, University of Regina (2024 – 2025)
- Member, *Council Committee on Undergraduate Admission and Studies*, University of Regina (2022 – 2023)
- Member, *Tri-Council CGS Master's Competition Review committee*, University of Regina (2022 – 2023)
- Member, *Executive council*, University of Regina (2012 – 2014)
- Member, *Faculty Review Committee*, Faculty of Science, University of Regina (2023 – 2025)
- Member, *Proxy Member on the Science Lab Instructor Review Committee*, Faculty of Science, University of Regina (2020)
- Chair, *Statistics Subcommittee*, Department of Mathematics & Statistics, University of Regina (2021)
- Member, *Graduate Committee*, Department of Mathematics & Statistics, University of Regina (2016 – 2022)

- Member, *Undergraduate Committee*, Department of Mathematics & Statistics, University of Regina (2011 – 2013, 2024 – 2026)
- Member, *Research Committee*, Department of Mathematics & Statistics, University of Regina (2014 – 2015, 2023)
- Member, *Search Committee*, SGI Assistant Professor in Data Science, Department of Mathematics & Statistics, University of Regina (2023)
- Member, *Search Committee*, Assistant Professor in Statistics, Department of Mathematics & Statistics, University of Regina (2021)
- Member, *Search Committee*, Assistant Professor in Actuarial Science, Department of Mathematics & Statistics, University of Regina (2018)

OTHER ACTIVITIES

- **Associate Editor**: Journal of Statistical Computation and simulation, Oct. 2023 – present
- **Editorial Board Member**: Lobachevskii Journal of Mathematics, May 2024 – present
- **Journal Referee**: Regularly reviewing papers submitted to academic journals including *Risks*, *CAS Publications*, *Insurance: Mathematics and Economics*, *Journal of Statistical Computation and simulation*, *Communications in Statistics*, *The European Journal of Finance*, *Mathematics and Statistics*.
- **NSERC/MITACS grant reviewer**: Regularly reviewing NSERC Discovery grant proposals and MITACS Accelerate Fellowship applications.
- **Executive member**: Section Secretary of SSC (Statistical Society of Canada) Actuarial Science Section, Jun. 2016 – Jun. 2019
- **Conference Section Organizer**: Organized invited sections at 2017 Statistical Society of Canada Annual meeting (U. Manitoba) and 2019 Canadian Mathematical Society Summer Meeting (U. Regina).
- **Committee memberships in professional organizations**: Academic Relations committee (2012 – 2016) and Academic Research subcommittee (2016 – 2017) of the Canadian Institute of Actuaries, Society of Actuaries MLC exam (grading) committee (2013 – 2017)
- **Secretary**: Regina Korean Catholic Community (2019 – 2023)