Taehan Bae

Mathematics and Statistics
University of Regina
Regina, SK, S4S 0A2
Office (306) 585-4353
E-mail: taehan.bae@uregina.ca

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

AWARDS & GRANTS

NSERC (Natural Science and Engineering Research Council of Canada) Discovery Grant ($18,000/year), 2022 – 2026

NSERC (Natural Science and Engineering Research Council of Canada) Discovery Development Grant ($15,000/year), 2019 – 2021

NSERC (Natural Science and Engineering Research Council of Canada) Discovery Grant ($15,000/year), 2013 – 2018

ORR Innovation Awards: paper of the year, Journal of Operational Risk, 2012

NSERC Industrial Research and Development Fellowship, Dec. 2008 – Dec. 2010

Graduate Thesis Research Award, UWO, 2007/2008

Faculty of Science Graduate Student Teaching Award, UWO, 2007

The Robert Taylor/Lloyd Knowler Award for Life Contingencies, U. of Iowa, 2003

Towers Perrin Scholarship, U. of Iowa, 2003

Korean Agricultural Association Scholarship, Seoul National Univ., 1997

ACADEMIC EXPERIENCE

University of Regina, *Associate Professor (tenured)*, **Jul. 2015 – present**

University of Regina, *Assistant Professor (tenure track)*, **Jul. 2011 – Jun. 2015**

– **Teaching**

∗ ACSC 216 (Winter 2021/2020): Mathematics of Finance II

∗ ACSC/STAT 456 (Winter 2020): Applied Stochastic Processes

* STAT 160 (Winter 2013, Fall 2020/2017/2016/2015): Introductory Statistics
* STAT 300 (Winter 2022/2018/2016): Statistical learning and predictive modeling
* ACSC 419 (Winter 2023/2018/2017/2016/2015/2014): Estimation and Selection of Actuarial Models
* ACSC 418 (Fall 2018/2016/2014/2013, Winter/Fall 2012): Econometric Models & Forecasts
* ACSC 318 (Winter 2023/2022/2014/2013/2012): Actuarial Models II
* ACSC 417 (Fall 2023/2022/2021/2020/2019/2011): Introduction to Casualty Insurance and Credibility
* STAT/MATH 251 (Fall 2021/2013): Introduction to Probability
* 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, Fall 2012, Winter 2017/2015): Stochastic Differential Equations for Finance
* STAT 890AF (Graduate course, Spring/Summer 2021/2015): Readings in Stochastic Processes

  – **Supervision of highly qualified personnel**

* PhD: Maral Mazjini (Completed in Dec. 2020)
* MSc: Hanson Dela Quarshie (Completed in May 2023), Jingwen Liu (Completed in Nov. 2019, jointly with Prof. A. Volodin), Xiaohua Liu (Completed in Jun. 2019), Jingjiao Chen (Completed in Dec. 2016), George Teye (Completed in Dec. 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 2022), Huong Vu (Summer 2022)
* Visiting professors: ZhenLei Wang (2017 – 2018), Song Qin (2017 – 2018)
* Graduate student thesis exam committee: David Luke Thiessen (Ph.D. 2023), MohanaGowri Arumugam (Ph.D. 2021, external), Boquan Cheng (Ph.D. 2021, external), Chengjun Shi (MSc. 2020, external), Abdul Mannan (Ph.D. 2016, external), Shu Wang (MSc. 2015, external), Wei Tang (Ph.D. 2014), Ruili Li (MSc. 2014), Meng Liu (Ph.D. 2013)

PROFESSIONAL EXPERIENCE

Algorithmics Inc., Toronto, Canada, *Senior Mathematician/NSERC IRDF*, **Sep. 2008 – Jun. 2011**

Quantitative Researches on Credit and Operational risks for financial institutions. Statistical analysis of global equities, Selection of proper credit drivers to grouped counter-parties, Estimation of representative asset correlations, Development of country specific asset correlation models, Advisory project for FreddieMac: Incorporation of external data to internal operational losses.

Samsung Life Insurance, Seoul, Korea, *Actuarial Analyst*, **Jan. 1999 – Jan. 2001**
Designed and valuated accidental and health, whole life, traditional life insurance and annuity products. Programmed profit and loss modeling package for accidental and health insurance products. Designed and programmed a reserve system for interest sensitive insurance products.

PUBLICATIONS

[1] **T. Bae** and T. Miljkovic. (2023) Loss modeling with the size-biased Lognormal mixture and the entropy regularized EM algorithm. Submitted to *Insurance Mathematics and Economics*.

[2] 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.

[3] **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.

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

[5] **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.

[6] **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.

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

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

[9] **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.

[10] 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.

[11] **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.

[12] **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.

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

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

[15] **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.

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

[17] **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.

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

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

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

[21] **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.

[22] **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.

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

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

[25] **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.

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

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

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

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] 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.

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

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

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

[5] 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.

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

[7] 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.

[8] 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.

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

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

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

[12] 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.

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

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

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

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

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

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

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

[3] On the mixtures of length-biased Weibull distributions for severity modelling. University of Manitoba, Oct. 2019.

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

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

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

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

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

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

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

OTHER ACTIVITIES

Section Secretary: Executive member of Statistical Society of Canada Actuarial Science Section, **Jun. 2016 – Jun. 2019**.

Journal Referee: Regularly reviewing papers submitted academic journals including *Insurance: Mathematics and Economics*, *Journal of Statistical Computation and simulation*, *Communications in Statistics*, *The European Journal of Finance*, *Journal of Futures Markets* and *International Journal of Statistics and Probability*.

Committee member: Council Committee on Undergraduate Admission and Studies (2022 –), Executive council of University of Regina (2012 – 2014), 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).

PROFESSIONAL DESIGNATIONS

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