Christopher Blier-Wong, Ph.D.

Personal information

Department of Statistics and Actuarial Science
University of Waterloo
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Citizenship

Canadian

Employment and education

Postdoctoral researcher (2023-)
Statistics and Actuarial Science, University of Waterloo

- Supervisor: Ruodu Wang

Ph.D. Actuarial science (2023, Honor Roll)
École d'actuariat, Université Laval

- Thesis title: Investigating High-Dimensional Problems in Actuarial Science, Dependence Modelling, and Quantitative Risk Management
- Supervisors: Etienne Marceau (main), Hélène Cossette and Luc Lamontagne

M.Sc. Computer science - Artificial intelligence (2019, Honor Roll)
Département d'informatique et de génie logiciel, Université Laval

- Thesis title: Modeling Spatial Actuarial Risks with Machine Learning

M.Sc. Actuarial science (2018, Honor Roll)
École d'actuariat, Université Laval

- Thesis title: Correction of Ratemaking Errors in Presence of Spatial Dependence
- Supervisors: Etienne Marceau and Thierry Duchesne

B.Sc. Actuarial science (2017)
École d'actuariat, Université Laval

Research experience

Research interests

Actuarial science	Risk theory, loss models, risk measures, risk sharing, risk aggregation, capital allocation
Statistics	Dependence modelling, copulas, e-values, selective inference, model and parameter uncertainty, spatial statistics
Computer science	Unstructured data (images, text, spatial), machine learning in actuarial science, deep learning

Research affiliations

2020–2023	**Institute Intelligence and Data (Data science research institute)** Université Laval
2019–2023	**GRAAL (AI research group)** Département d'informatique et de génie logiciel, Université Laval
2017–2023	**ACT&RISK (Actuarial science research lab)** École d'actuariat, Université Laval
2017–2023	**Quantact (Actuarial science research lab)** Centre de recherches mathématiques, Université de Montréal
2017–2023	**BDRC (Big data research center)** Département d'informatique et de génie logiciel, Université Laval

2017–2018	**Laboratoire de statistiques** Centre de recherches mathématiques, Université de Montréal

Research visits (2+ weeks)

Jun 2023–Sep 2023	**Statistics and Actuarial Science** University of Waterloo, Waterloo, Canada
May 2023	**School of Risk and Actuarial Studies** University of New South Wales, Sydney, Australia
Mar 2023 – April 2023	**RiskLab** ETH Zurich, Zurich, Switzerland
Feb 2022–April 2022 Aug 2022–Sep 2023 Nov 2022–Feb 2023	**Center for Research in Economics and Statistics (CREST)** ENSAE Paris, Institut polytechnique. Palaiseau, France

Peer-review service

Annals of Actuarial Science, ASTIN Bulletin, European Actuarial Journal, Insurance: Mathematics and Economics, North American Actuarial Journal, Scandinavian Actuarial Journal, Statistics and Probability Letters (18 reviews)

Organization of research activities

2022-2023	2023 Canadian Statistics Student Conference
2022	Quantact SummerDay, Chair of the organizing committee

Training of Highly Qualified Personnel

Undergrad	Randy Lefebvre (2022-2023), now MSc student at Université Laval William Tremblay (2022), now actuarial analyst Sebastien Legros (2022), now MSc student at HEC Montréal

Refereed publications

1. **Blier-Wong, C.**, Lamontagne, L., & Marceau, E. (2024). A representation-learning approach for insurance pricing with images. Forthcoming in the ASTIN Bulletin: The Journal of the IAA.
2. **Blier-Wong, C.**, Cossette, H., Legros, S., and Marceau, E. (2023) On copulas constructed with Bernoulli and Coxian-2 distributions. Journal of Multivariate Analysis.
3. **Blier-Wong, C.**, Cossette, H., and Marceau, E. (2023). Risk aggregation with FGM copulas. Insurance: Mathematics and Economics.
4. **Blier-Wong, C.**, Cossette, H., and Marceau, E. (2023). Exchangeable FGM copulas. Advances in Applied Probability.
5. **Blier-Wong, C.**, Cossette, H., and Marceau, E. (2022). Stochastic representation of FGM copulas using multivariate Bernoulli random variables. Computational Statistics & Data Analysis.
6. **Blier-Wong, C.**, Cossette, H., Lamontagne, L., & Marceau, E. (2022). Geographic ratemaking with spatial embeddings. ASTIN Bulletin: The Journal of the IAA.
7. **Blier-Wong, C.**, Cossette, H., Lamontagne , L. and Marceau, E. (2021). Machine Learning in P&C Insurance: A Review for Pricing and Reserving. Risks.
8. **Blier-Wong, C.**, Baillargeon, J.-T., Cossette, H., Lamontagne , L. and Marceau, E. (2020). Encoding Neighbor Information into Geographical Embeddings using

Convolutional Neural Networks. FLAIRS 2020.

WORKING PAPERS

- **Blier-Wong, C.**, Cossette, H., and Marceau, E. (2022+). Collective risk models with FGM copulas. Under revision.
- **Blier-Wong, C.**, Cossette, H., and Marceau, E. (2022+). Generating function methods for the efficient computation of expected allocations. Submitted.
- **Blier-Wong, C.**, Baillargeon, J.-T., Cossette, H., Lamontagne , L. and Marceau, E. (2021). *Rethinking Representations in P&C Actuarial Science with Deep Neural Networks. arXiv preprint arXiv:2102.05784.*

DISSERTATIONS

1. **Blier-Wong, C.** (2023) *Investigating High-Dimensional Problems in Actuarial Science, Dependence Modelling, and Quantitative Risk Management.* PhD thesis, Actuarial Science, Université Laval.
2. **Blier-Wong, C.** (2019) *Modeling Spatial Actuarial Risks with Machine Learning.* Master's thesis, Computer Science, Université Laval.
3. **Blier-Wong, C.** (2018) *Correction of Ratemaking Errors in the Presence of Spatial Dependence.* Master's thesis, Actuarial Science, Université Laval.

INVITED TALKS / SEMINARS

1. *A representation-learning approach for insurance pricing with images*, ASTIN reading group, online event(October 2023)
2. *A representation-learning approach for insurance pricing with images*, Intact internal seminar, online event (September 2023)
3. *FGM copulas, generalizations and actuarial applications*, Weekly Seminars on Risk Management and Actuarial Science, University of Waterloo, Canada (September 2023)
4. *FGM copulas, generalizations and actuarial applications*, School of Risk and Actuarial Studies, UNSW, Sydney, Australia (May 2023)
5. *Generating function methods for computing conditional means*, Post/Doctoral Seminar in Mathematical Finance, ETH Zurich, Zurich, Switzerland (April 2023)
6. *FGM copulas, generalizations and actuarial applications*, UNIL, Lausanne, Switzerland (March 2023)
7. *Generating function methods for computing conditional means*, AFI seminars, KU Leuven, Belgium (December 2022)
8. *FGM copulas and actuarial applications*, Séminaire de statistique de l'Université de Sherbrooke (October 2022)
9. *Geographic ratemaking with spatial embeddings*, ASTIN Webinar, International Association of Actuaries, online event (September 2022)
10. *Risk aggregation with FGM dependence*, Statistical Society of Canada, online event (May 2022)
11. *FGM copulas and actuarial applications*, Finance PhD Seminar, CREST-ENSAE, Palaiseau, France (April 2022)
12. *Copules FGM et applications actuarielles*, Séminaire CIMMUL, online event (March 2022)
13. *Rethinking Actuarial Representations used in Machine Learning*, SOA webcast, Society of Actuaries, online event (October 2021)
14. *Réseaux de neurones Bayésiens pour la tarification en assurance IARD*, Séminaire d'été d'actuariat et de statistique de l'UQAM, online event (August 2021)

15. *Introduction à la modélisation mathématique des données non structurées*, Atelier d'été du CIMMUL, Université Laval, online event (June 2021)
16. *Geographic ratemaking with spatial embeddings*, Statistical Society of Canada, online event. Actuarial Science Student Research Presentation Award (June 2021)
17. *Geographic ratemaking with spatial embeddings*, Intact internal seminar, online event (April 2021)
18. *Territorial ratemaking with spatial embeddings*, Intact internal seminar, online event (September 2020)
19. *Spatial embeddings in actuarial science*, Online Quantact Seminar, Canada, online event (June 2020)
20. *Introduction aux graphes de calculs*, ACT&RISK internal seminar, Université Laval, online event (May 2020)
21. *Correction of ratemaking errors in the presence of spatial dependence*, 1er Workshop scientifique Ulaval-Intact, Université Laval (February 2019)
22. *Git practical workshop*, Machine Learning Québec, Université Laval (February 2019)
23. *Local regression and application in homeowners insurance pricing*, Meetup Machine Learning Québec, Université Laval (November 2018)
24. *Smoothing of ratemaking errors to identify spatial auto-correlation*, Statistical Society of Canada, McGill University, Canada (June 2018)

Contributed Talks

1. *Recent advances on collective risk models with full dependence*, Waterloo Student Conference in Statistics, Actuarial Science and Finance, Waterloo, Canada (October 2023)
2. *Risk aggregation with Bernstein copulas*, 26th International Congress on Insurance: Mathematics and Economics (IME 2023), Edinburgh, Scotland (June 2023)
3. *Insurance pricing with deep Bayesian neural networks*, International Congress of Actuaries, Sydney, Australia (May 2023)
4. *Efficient computation of expected allocations*, Perspectives on actuarial risks in talks of young researchers, Valencia, Spain (January 2023)
5. *On copulas constructed with Bernoulli and Coxian-2 distributions*, CMStatistics, London, England (December 2022)
6. *On copulas constructed with Bernoulli and Coxian-2 distributions*, Waterloo Student Conference in Statistics, Actuarial Science and Finance, Waterloo, Canada (October 2022)
7. *Risk aggregation with Bernstein dependence*, Workshop on Dependence Modeling, Agistri, Greece (September 2022)
8. *Micro-level collective risk models under FGM dependence*, European Actuarial Journal Conference, Tartu, Estonia (August 2022)
9. *Exchangeable FGM copulas*, European Actuarial Journal Conference, Tartu, Estonia (August 2022)
10. *Efficient computation of expected allocations*, Actuarial Research Conference 2022, Champaign, Illinois, United States (August 2022)
11. *Risk aggregation with FGM copulas*, 25th International Congress on Insurance: Mathematics and Economics, online event (June 2022)
12. *Insurance ratemaking with images*, Insurance Data Science Conference, Milan, Italy (June 2022)

13. *Efficient computation of expected allocations*, ASTIN AFIR-ERM Colloquia, online event (June 2022)
14. *Deep Bayesian Insurance Pricing*, 24th International Congress on Insurance: Mathematics and Economics, online event (June 2021)
15. *Correction of ratemaking errors in the presence of spatial dependence*, Actuarial Research Conference, Western University, Canada (August 2018)
16. *Automated tests in R - How to maintain code*, R à Québec, Université Laval, Canada. (May 2019)

Teaching experience

Lecturer

Fall	2020	ACT-1003 Complements in Mathematics
Winter	2020	ACT-1003 Complements in Mathematics
Fall	2019	ACT-1003 Complements in Mathematics

Teaching assistant

Prepare pedagogical documents

Winter	2019	GLO-7027 Analysis and Treatment of Big Data
Fall	2018	ACT-3000 Risk Theory
Winter	2018	ACT-2001 Introduction to Actuarial Science II
Fall	2017	ACT-3000 Risk Theory
Fall	2016	ACT-2004 Life Contingencies Actuarial Mathematics I

Assistant instructor

Winter	2019	Winter school in machine learning presented by the Big Data Research Center and IVADO

Offer remedial sessions, correct exams and assignments

Fall	2018	ACT-3000 Risk Theory
Fall	2017	ACT-3000 Risk Theory
Winter	2017	ACT-2008 P&C Actuarial Mathematics II
Fall	2015	IFT-1902 Computer Science for Actuaries

Instructor

Fall	2016	Introduction to R, 4h workshop

Awards, Prizes and Scholarships

2023-2025	Postdoctoral Fellowship National Sciences and Engineering Research Council of Canada
2022-2023	Scholarship for a Research Internship in France Centre de Recherches Mathématiques (UdeM)
2022	ARC Graduate Student Presentation Award Society of Actuaries
2022	Canada Graduate Scholarships – Michael Smith Foreign Study Supplements National Sciences and Engineering Research Council of Canada
2021	Modélisation stochastique et simulation des sous-familles de copules FGM à grande dimension Laboratoire Quantact
2021	Actuarial Science Student Research Presentation Award Statistical Society of Canada
2020-2022	Postgraduate Scholarships-Doctoral National Sciences and Engineering Research Council of Canada
2020	Honor Roll - Academic excellence Faculty of graduate studies and postdoctoral internships, UL
2019-2020	Bourse d'excellence Charles Brindamour Charles Brindamour (Intact CEO)

2019-2023	Bourse d'attraction Florent Toureille Chaire d'actuariat de l'Université Laval
2019-2022	Research grant : Big Data Analytics in Insurance Big Data Research Center, Université Laval (UL)
2019-2020	Research grant : Poisson distribution and word embeddings with actuarial applications Chaire d'actuariat de l'Université Laval
2019	National Bank recruiting grant National Bank of Canada
2018	Honor Roll - Academic excellence Faculty of graduate studies and postdoctoral internships, UL
2018-2019	Research grant : Machine learning, natural language processing and big data in actuarial science Chaire d'actuariat de l'Université Laval
2018	Research grant : Big Data Analytics in Insurance Big Data Research Center, UL
2018	Award for best semester project : GLO-7030 Analysis and treatement of big data Département d'informatique et de génie logiciel, UL
2017	Master's program recruiting grant Chaire d'actuariat de l'Université Laval
2017	Research grant : Big data in insurance NSERC
2017	Research grant : Big data in insurance Département d'informatique et de génie logiciel, UL
2017	Research grant : Minimum distance functionals Faculté des science et de génie, UL
2017	National Bank recruiting grant National Bank of Canada
2017	MITACS scholarship MITACS foundation

Profesional exams

CAS / ICA:	Exams 1, 2, 3F, MAS-I, MAS-II, OC1, OC2, 5 and 7 Most recent: OC2 (Summer 2023)

Knowledge of programming

Programming languages:	R, Python, LaTeX
Python libraries:	scikit-learn, numpy, TensorFlow, Keras, PyTorch
Data science:	Trees, neural networks, NLP, computer vision, graphical models
Version control:	Git (GitHub)
Operating systems:	Linux, Windows, macOS
Office:	Excel, VBA, Word

Other Affiliations

2018–2023	Member of the Graduate Program Committee École d'actuariat, Université Laval
2018–2019	Founding member of .Layer (pronounced *dot layer*), a non-profit organization for Education & Research in Data science
2017–2021	Member, Fonds d'investissement étudiant École d'actuariat, Université Laval
2018–2019	Member of the Maching Learning Task Force Casualty Actuarial Society

Other Experiences and implications

2023	Diversity workshop International Actuarial Association
2022	Addressing Conflicts Related to Bias, Privilege, and Identity in the STEM Fields CANSSI workshop
2022	Mentor for the CAS Student Central Summer Program
2020	*Préparer ses premières interventions en enseignement : pédagogie universitaire* University teaching course, Université Laval
2014–	Blood donor 100+ donations, Héma-Québec
August 2017	Summer school in Deep Learning by IVADO (Institute for Data Valorization) and MILA (Quebec Institute of Artificial Intelligence)
2009–2012	Football player: left tackle and left guard Saint Patrick's Fighting Irish Les Cheetahs du CÉGEP Vanier. Division 1 champion, 2012