LUKE HAGAR

lmhagar.github.io ✉ l.hagar@uq.edu.au

*Please see the final page of this CV for a list of acronyms

RESEARCH INTERESTS

Experimental Design, Bayesian Methods, Computational Inference, Prior Elicitation, Dependence Modeling

CURRENT POSITION

Research Officer (09/2025 – present)
The University of Queensland, Clinical Trials Capability (ULTRA), Brisbane, Australia (Advisor: Prof. Andrew Martin)

PAST ACADEMIC POSITIONS

Postdoctoral Scholar (09/2024 – 08/2025)
McGill University, Department of Epidemiology, Biostatistics & Occupational Health, Montréal, Canada (Advisor: Prof. Shirin Golchi)

EDUCATION

University of Waterloo, Waterloo, Canada

PhD in Statistics, Department of Statistics & Actuarial Science 09/2021 – 08/2024

- Thesis: *Design with Sampling Distribution Segments*
- Advisor: Prof. Nathaniel Stevens

MMATH in Statistics, Dept. of Statistics & Actuarial Science 09/2020 – 08/2021

- Master's Research Paper: *A More Comprehensive Framework for Binary Response Experiments Using Comparative Probability Metrics*

BMATH in Mathematical Optimization & Statistics (Co-op) 09/2015 – 04/2020

PEER-REVIEWED PUBLICATIONS

Published & Accepted

13. S. Kaminskaïa and **L. Hagar**. (2025+). Acquisition of temporal aspects of speech by Canadian English learners of French with previous core vs. immersion backgrounds. Accepted to *Canadian Journal of Applied Linguistics*.
12. **L. Hagar** and N.T. Stevens. (2025+). Design of Bayesian A/B tests controlling false discovery rates and power. Accepted to *Journal of Business and Economic Statistics*. arXiv.
11. **L. Hagar** and N.T. Stevens. (2025+). Posterior ramifications of prior dependence structures. *Statistical Science*, in press. Advanced publication. arXiv.
10. **L. Hagar** and N.T. Stevens. (2024+). Fast power curve approximation for posterior analyses. *Bayesian Analysis*, in press. DOI.
9. **L. Hagar** and N.T. Stevens. (2025). An economical approach to design posterior analyses. *Journal of the American Statistical Association 120*(552), 2559–2568. DOI.
8. S. Kaminskaïa and **L. Hagar**. (2025). A complex approach to rhythm in a minority French community. *LACUS Forum 50*(3), 1–14. DOI.
7. W. Cichocki, S. Kaminskaïa, and **L. Hagar**. (2025). The relationship between articulation rate and utterance length in varieties of Canadian French. *LACUS Forum 50*(1), 13–26. DOI.
6. S. Kaminskaïa, **L. Hagar**, N. Gadbois, and J.C. Van Leeuwen. (2025). It doesn't sound French, or does it? In *15th Annual PSSLT Proceedings*, 1–11. DOI.
5. **L. Hagar** and N.T. Stevens. (2025). Bioequivalence design with sampling distribution segments. *Statistics in Medicine 44*(3-4), e10321. DOI. R Package.
4. A. Deng, **L. Hagar**, N.T. Stevens, T. Xifara, and A.K. Gandhi. (2024). Metric decomposition in A/B tests. In *Proceedings of the 30th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, 4885–4895. DOI.
3. W. Cichocki, S. Kaminskaïa, and **L. Hagar**. (2024). Regional variation in articulation rate in French spoken in Canada. *Journal of the International Phonetics Association 54*(1), 126–145. DOI.

2. N.T. Stevens and **L. Hagar**. (2022). Comparative probability metrics: Using posterior probabilities to account for practical equivalence in A/B tests. *The American Statistician 76*(3), 224–237. DOI. R Shiny App 1, R Shiny App 2.
1. L. Lu, C.M. Anderson-Cook, N.T. Stevens, and **L. Hagar**. (2022). Using a baseline with the probability of agreement to compare distribution characteristics. *Quality Engineering 34*(3), 322–343. DOI. R Shiny App.

Submitted for Publication († denotes co-first authorship)

7. **L. Hagar** and A.J. Martin. (2025+). An efficient framework for robust sample size determination. Submitted to *Biometrics*, 12/2025. arXiv.
6. S. Kaminskaïa and **L. Hagar**. (2025+). Variation et changement dans le rythme phonétique en français ontarien minoritaire. Revision invited at *Linx*, 12/2025.
5. **L. Hagar**, S. Golchi, and M.B. Klein. (2025+). Group sequential design with posterior and posterior predictive probabilities. Resubmitted to *Journal of the American Statistical Association*, 11/2025. arXiv.
4. S. Golchi and **L. Hagar**. (2025+). Bayesian design of experiments in the presence of nuisance parameters. Submitted to *The American Statistician*, 11/2025. arXiv.
3. **L. Hagar** and N.T. Stevens. (2025+). An economical approach to design with precision criteria. Submitted to *Biometrika*, 11/2025. arXiv.
2. **L. Hagar** and S. Golchi. (2025+). Design of Bayesian clinical trials with clustered data. Revision submitted to *Statistics in Medicine*, 11/2025. arXiv.
1. **L. Hagar**†, L. Maleyeff†, S. Golchi, and D. Menzies. (2025+). An efficient approach to design Bayesian platform trials. Submitted to *Journal of the Royal Statistical Society (Series C)*, 10/2025. arXiv.

Other Publications

Conference Proceedings

1. W. Cichocki, **L. Hagar**, and Y. Perreault. (2023). Variation in articulation rate in New Brunswick French. *Canadian Acoustics 51*(3), 200–201. DOI.

Research Funding As PI

$14,773	AusTriM Seed Funding Grant (2026)
	• Co-investigators: Prof. Andrew Martin, Prof. Ian Marschner, Prof. Rajeny Thomas, Dr. Min Zhang
$140,000	NSERC Postdoctoral Fellowship (Currently Paused, 2024 – 2025)
$42,000	CRM StatLab - CANSSI Postdoctoral Fellowship (Declined, 2024 – 2025)
$63,000	NSERC Postgraduate Scholarship – Doctoral (2021 – 2024)
$15,000	Ontario Graduate Scholarship (Declined, 2021 – 2022)
$17,500	NSERC Canada Graduate Scholarship – Master's (2020 – 2021)
$4,500	NSERC Undergraduate Student Research Award (2019)

Scholarships & Awards

$1,000	UW Mathematics Doctoral Prize - Second Place (2025)
	• This award recognizes graduating doctoral students in UW's Faculty of Mathematics. Each department nominates one student.
$7,500	ASQ Ellis R. Ott Scholarship for Applied Statistics & Quality (2024)
	• This award and the next recognize excellence in academics, teaching, and leadership in the applied statistics community.
$3,500	ASA Mary G. and Joseph Natrella Scholarship (2024)
$3,000	UW SAS Scotiabank Scholarship
	• This award recognized course coordination efforts when teaching STAT 341.
$45,000	UW President's Graduate Scholarship (2020 – 2024)
$1,000	UW SAS Chair's Award (2021 – 2024, $\times$ 5)

\$1,000 UW SAS Sprott Scholarship (2023)

- This award recognizes PhD students in UW's SAS Department who show particular promise in research prior to their thesis defence.

\$500 UW SAS Teaching Assistant Award (2023)

- This award recognizes teaching assistants whose contributions result in an improvement of the student academic experience.

\$1,000 UW SAS Comprehensive Exam Award (2022)

- This award recognizes top performance on the PhD comprehensive exam in UW's SAS Department.

\$5,000 UW SAS Doctoral Entrance Award (2021 – 2022)

- This award is for new PhD students with top academic standing.

\$1,000 UW SAS Outstanding Academic Performance Award (2021)

- This award is presented to the student(s) with the highest academic performance in the first two terms of their MMath program.

\$5,000 UW President's Scholarship of Distinction (2015 – 2020)

\$500 UW Scott Kelsey Fevreau Memorial Award (2017)

- This student award is given based on high academic achievement, extracurricular activities, and personal characteristics.

\$1,500 St. Jerome's University Robert & Margaret Forwell Scholarship (2016)

- This award recognizes a student involved in the St. Jerome's community who demonstrates academic and leadership excellence.

PRESENTATIONS

Invited Seminars and Conference Presentations

16. [Upcoming] *Bayesian Design with False Discovery Rates and Power*. SSC Annual Meeting, 06/2026.
15. [Upcoming] *Efficient and Robust Sample Size Determination*. Spring Research Conference, Clemson (USA), 05/2026.
14. *Economical Design with Posterior Probabilities*. Queensland University of Technology, Brisbane (Australia), 11/2025.
13. *Group Sequential Design with Posterior and Posterior Predictive Probabilities*. AusTriM Webinar, Hosted from Melbourne (Australia), 10/2025.
12. *Design of Bayesian Clinical Trials with Clustered Data*. Canadian Society for Epidemiology and Biostatistics Conference, 08/2025.
11. *Economical Computer Experiments for Sequential Design*. Quality and Productivity Research Conference, Seattle (USA), 06/2025.
10. *Economical Design of Sequential Bayesian Analyses*. SSC Annual Meeting, 05/2025.
9. *An Economical Approach to Design Posterior Analyses*. York University, 02/2025.
8. *Sample Size Determination in Bayesian Clinical Trials with Clustered Data*. McGill University, 02/2025.
7. *Design of Bayesian Clinical Trials with Clustered Data and Multiple Endpoints*. Canadian Network for Bayesian Adaptive Trials Webinar, 01/2025.
6. *Design of Posterior Analyses with Sampling Distribution Segments*. Computational and Methodological (CM)Statistics, London (UK), 12/2024.
5. *Scalable Bayesian Design for Business Innovation*. HEC Montréal, 11/2024.
4. *Scalable Design with Posterior-Based Operating Characteristics*. Joint Research Conference, 06/2024.
3. *A Bayesian Approach to Experimentation*. Airbnb AirAcademy Webinar Series. Hosted from San Francisco (USA), 11/2023.
2. *Targeted Sampling for Scalable Experimental Design*. ASQ CPID Webinar. Hosted from Milwaukee (USA), 11/2023.

1. *Using a Baseline with the Probability of Agreement to Compare Distribution Characteristics*. INFORMS Conference on Quality, Statistics, and Reliability, Raleigh (USA), 06/2023.

Contributed Presentations

17. *Economical Sample Size Calculations for Complex Designs*. Joint Statistical Meetings, Nashville (USA), 08/2025.
16. *Fast Power Curve Approximation for Posterior Analyses*. Bayesian Young Statisticians Meeting. Hosted from Durham (USA), 04/2025.
15. *Fast Design of Posterior Analyses with Operating Characteristics*. ENAR Spring Meeting, New Orleans (USA), 03/2025.
14. *A Complex Approach to Minority French Rhythm*. LACUS Conference, 07/2024.
13. *The Relationship between Articulation Rate and Utterance Length in Canadian French: Data from Reading Style*. LACUS Conference, 07/2024.
12. *Quantile Estimation for Sampling Distributions of Posterior Probabilities*. SSC Annual Meeting, 06/2024.
    - Biostatistics Section Student Presentation Award Winner
11. *Engaging Assessments with Real Data Analysis in Undergraduate Statistics Courses*. UW Teaching and Learning Conference, 05/2024.
10. *Scalable Power Curve Approximation with Targeted Hypercube Sampling*. CANSSI Showcase, 11/2023.
9. *Scalable Power Curve Approximation with Targeted Hypercube Sampling*. Waterloo Student Conference in Statistics, Actuarial Science & Finance, 10/2023.
    - Presentation Award Winner
8. *Fast Sample Size Determination for Bayesian Equivalence Tests*. Joint Statistical Meetings, 08/2023.
7. *Fast Sample Size Determination for Two-Group Equivalence Tests with Unequal Variances*. ISBIS Conference, 07/2023.
6. *Fast Sample Size Determination for Two-Group Equivalence Tests with Unequal Variances*. SSC Annual Meeting, 05/2023.
5. *Fast Sample Size Determination for Bayesian Equivalence Tests*. University of Toronto Statistics Graduate Student Research Day, 04/2023.
4. *A More Computationally Tractable Approach to Bayesian Interval-Based Sample Size Determination*. SSC Annual Meeting, 05/2022.
3. *A More Computationally Tractable Approach to Bayesian Interval-Based Sample Size Determination*. UW SAS Research Presentation Day, 03/2022.
    - Presentation Award Winner
2. *A Framework for Sample Size Determination with Comparative Probability Metrics*. SSC Annual Meeting, 06/2021.
    - Business & Industrial Statistics Section Student Presentation Award Winner
1. *A More Comprehensive Framework for Binary Response Experiments Using Comparative Probability Metrics*. Canadian Statistics Student Conference, 06/2021.

Workshops

2. *From MAMS to Bayesian Platforms: Bridging Theory and Practice*. HeRA ULTRA Showcase, 11/2025. Google Colab.
1. *Sample Size Calculations for Bayesian Clinical Studies*. University of Toronto Health Data Working Group, 04/2025. GitHub.

Research Experience

Academic Collaborator, Airbnb 09/2023 – present

- Navigated changing priorities to develop methods now applied at Airbnb (see *Paper #4*), leading to an invited talk for Airbnb executives and data scientists.

Consultant, UW Statistical Consulting & Survey Research Unit 01/2022 – 04/2023

- Guided clients on how to leverage sound statistical approaches in their analyses, with active research collaboration in enhanced service projects (see e.g., *Paper #3*).

Teaching Experience

McGill University, Montréal, Canada

Course Lecturer 08/2024 – 12/2024

- BIOS 612: Advanced Generalized Linear Models with 10 graduate students. Co-instructed with Prof. Shirin Golchi.

University of Waterloo, Waterloo, Canada

Sessional Lecturer 01/2024 – 04/2024

- STAT 341: Computational Statistics & Data Analysis with 125 undergraduates. Coordinated two sections with 250 students and managed 6 teaching assistants.

TA Workshop Facilitator 01/2023 – 04/2024

- Facilitated and developed interdisciplinary teaching workshops for graduate students with UW's Centre for Teaching Excellence.

TA Coordinator 09/2023 – 12/2023

- Co-developed a practicum component of the teaching assistant development program for the SAS department and conducted teaching observations for TAs.

Teaching Assistant 01/2017 – 08/2023

- STAT 938: Statistical Consulting (Spring 2023)
- STAT 430: Experimental Design (Spring 2021)
- STAT 341: Computational Statistics & Data Analysis (Winter 2021)
- COMM 421: Financial Statement Analysis (Winter 2021)
- STAT 443: Forecasting (Fall 2020)
- MATH 137: Calculus I (Fall 2017)
- MATH 138: Calculus II (Winter 2017)

Professional Development

Fellowships

- FDA-OCE-ASA Oncology Fellowship (2024 – 2025)

Certificates

- UW Certificate in University Teaching (2022 – 2023)
- UW New Instructor Foundations Program (2023)
- UW University Mathematics Teaching Techniques (2023)
- UW Fundamentals of University Teaching (2021)

Service Profile

External Roles

ASQ CPID Leadership Team

- Chair (01/2026 - present)
- Chair-Elect (01/2025 - 12/2025)
- Secretary/Treasurer (01/2024 – 12/2024)
- Fall Technical Conference Publicity Chair (01/2023 – 12/2024)

SSC Community Connections Initiative

- Co-Organizer (12/2024 – present)

SSC Student and Recent Graduate Committee

- Past Chair (07/2024 – 06/2025)
- Chair (07/2023 – 06/2024)
  - Led a team of 10 members to host community-building and professional events for statistics students and recent graduates in Canada.
- Member (07/2022 – 06/2023)

ASA Section on Bayesian Statistical Science

- Student Paper Competition Judge (12/2024, 12/2025)

SSC Canadian Student Statistics Conference

- Judge (03/2024 – 06/2024)
- Co-chair (07/2022 – 06/2023)
  - Co-supervised a committee of 15 students to organize a national conference at Carleton University with 170 participants.
- Scientific Program Co-coordinator (09/2021 – 06/2022)

Internal Roles

McGill (Bio)Statistics Research and Career Day

- Judge (05/2025)

UW Statistical Workshops and Applications Group

- Executive Team Member (06/2022 – 08/2023)

UW Math Faculty Graduate Studies Committee

- Elected Graduate Student Representative (05/2021 – 08/2023)

UW Math Faculty-Level Student Course Perceptions Working Group

- Graduate Student Representative (03/2022 – 03/2023)

St. Jerome's University Student Leadership Team

- Peer Academic Leader (09/2015 – 04/2017)

Conference Session Organizer

Invited Sessions

- *Bayesian Clinical Trials: Innovative Methods for Real-World Challenges*, International Biometric Conference (2026)
- *Bridging Theory and Practice in Experimental Design*, SSC Annual Meeting (2025)

Topic-Contributed Sessions

- *Economical Methods for Experimental Design*, Joint Statistical Meetings (2025)

Conference Session Chair

- Canadian Statistics Student Conference (2023), Joint Research Conference (2024), LACUS Conference (2024), Quality and Productivity Research Conference (2025), SSC Annual Meeting (2022, 2023, 2025)

Editorial Activities

Reviewer

- *Banff International Research Station*, *Biometrics* (x2), *BMC Medical Research Methodology*, *Canadian Journal of Statistics* (x2), *Computational Statistics* (x2), *Journal of Statistical Theory and Practice*, *Statistical Methods in Medical Research*, *The American Statistician*, *Xenobiotica*

ACRONYMS

AusTriM	Australian Trials Methodology Research Network
ASA	American Statistical Association
ASQ	American Society for Quality
CANSSI	Canadian Statistical Sciences Institute
CPID	Chemical and Process Industries Division
CRM	Centre de recherches mathématiques
FDA	U.S. Food & Drug Administration
ENAR	Eastern North American Region (International Biometric Society)
INFORMS	Institute for Operations Research and the Management Sciences
ISBIS	International Society for Business and Industrial Statistics
LACUS	Linguistic Association of Canada and the United States
NSERC	Natural Sciences and Engineering Research Council
OCE	Oncology Center of Excellence
SAS	Statistics & Actuarial Science
SSC	Statistical Society of Canada
ULTRA	The University of Queensland's cLincial TRials cApability
UW	University of Waterloo