LUKE HAGAR

CONTACT INFORMATION

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RESEARCH INTERESTS

Experimental Design, Sampling Techniques, Hypothesis Testing, Bayesian Methods, Computational Inference

CURRENT POSITION

Postdoctoral Scholar (09/2024 – present)
McGill University, Department of Epidemiology, Biostatistics & Occupational Health, Montréal, Canada (Advisor: 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: Nathaniel Stevens

MMATH in Statistics, Department of Statistics & Actuarial Science (09/2020 – 08/2021)

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

PEER-REVIEWED PUBLICATIONS

Published & Accepted

11. **L. Hagar** and N.T. Stevens. (2025+). Posterior ramifications of prior dependence structures. *Statistical Science*, in press.
10. S. Kaminskaïa, **L. Hagar**, N. Gadbois, and J.C. Van Leeuwen (2025+). It doesn't sound French, or does it? *Proceedings of the 15th Pronunciation in Second Language Learning and Teaching Conference*, in press.
9. **L. Hagar** and N.T. Stevens. (2025+). An economical approach to design posterior analyses. *Journal of the American Statistical Association*, in press.
8. S. Kaminskaïa and **L. Hagar**. (2025+). A complex approach to rhythm in a minority French community. *LACUS Forum*, in press.
7. W. Cichocki, S. Kaminskaïa, and **L. Hagar**. (2025+). The relationship between articulation rate and utterance length in varieties of Canadian French. *LACUS Forum*, in press.
6. **L. Hagar** and N.T. Stevens. (2024+). Fast power curve approximation for posterior analyses. *Bayesian Analysis*, in press.
5. **L. Hagar** and N.T. Stevens. (2025). Bioequivalence design with sampling distribution segments. *Statistics in Medicine 44*(3-4), e10321.
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.
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.
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.
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.

Submitted for Publication († denotes co-first authorship)

6. S. Golchi and **L. Hagar**. Bayesian design of experiments in the presence of nuisance parameters. Submitted to *Bayesian Analysis*, 08/2025. arXiv.
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*, 07/2025. arXiv.
4. **L. Hagar**†, L. Maleyeff†, S. Golchi, and D. Menzies. (2025+). An efficient approach to design Bayesian platform trials. Submitted to *Annals of Applied Statistics*, 07/2025. arXiv.
3. S. Kaminskaïa and **L. Hagar**. (2025+). Acquisition of temporal aspects of speech by Canadian English learners of French having core vs. immersion backgrounds. Revision invited by *Canadian Journal of Applied Linguistics*, 07/2025.
2. **L. Hagar** and N.T. Stevens. (2025+). Design of Bayesian A/B tests controlling false discovery rates and power. Revision submitted to *Journal of Business and Economic Statistics*, 06/2025. arXiv.
1. **L. Hagar** and S. Golchi. (2025+). Design of Bayesian clinical trials with clustered data and multiple endpoints. Submitted to *Statistics in Medicine*, 04/2025. 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.

Research Funding

$140,000	NSERC Postdoctoral Fellowship (2024 – 2026)
$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)
$7,500	ASQ Ellis R. Ott Scholarship for Applied Statistics & Quality (2024)
$3,500	ASA Mary G. and Joseph Natrella Scholarship (2024)
$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)
$500	UW SAS Teaching Assistant Award (2023)
$1,000	UW SAS Comprehensive Exam Award (2022)
$5,000	UW SAS Doctoral Entrance Award (2021 – 2022)
$1,000	UW SAS Outstanding Academic Performance Award (2021)
$5,000	UW President's Scholarship of Distinction (2015 – 2020)
$500	UW Scott Kelsey Fevreau Memorial Award (2017)
$1,500	St. Jerome's University Robert & Margaret Forwell Scholarship (2016)

Presentations

Invited Seminars and Conference Presentations

12. [Upcoming] *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, 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, 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, 11/2023.
2. *Targeted Sampling for Scalable Experimental Design*. ASQ CPID Webinar, 11/2023.
1. *Using a Baseline with the Probability of Agreement to Compare Distribution Characteristics*. INFORMS Conference on Quality, Statistics, and Reliability, 06/2023.

Contributed Conference Presentations

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

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 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-Elect (01/2025 - present)
- 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 (11/2024 – 12/2024)

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 Organization

- *Economical Methods for Experimental Design*, Joint Statistical Meetings *(2025)*
- *Bridging Theory and Practice in Experimental Design*, SSC Annual Meeting *(2025)*

Editorial Activities

Reviewer

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

ACRONYMS

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
UW	University of Waterloo