

Austin Brown | C.V.

✉ ad.brown@utoronto.ca • 🌐 austindavidbrown.github.io
in linkedin.com/in/austindavidbrown/ • 🔄 austindavidbrown

Research interests

My main research focus is on the design, reliability, and computational efficiency of Markov chain Monte Carlo algorithms by studying their convergence properties with optimal transportation. Creating reliable, computationally efficient Markov chain Monte Carlo algorithms in high dimensions for practitioners is a central motivation for my research. Additionally, I am interested in applications of Markov chain Monte Carlo to Bayesian error-in-variable models for machine learning, astrophysics, and epidemiology. My other research interests are in applications of optimal transport to stochastic processes, and I am also interested in combining optimal transport and theory for Markov chain Monte Carlo to study generative A.I. models in the future.

My dissertation "Some Convergence Results for Metropolis-Hastings Algorithms" is available online <https://conservancy.umn.edu/handle/11299/243073>.

Education

University of Minnesota - Twin Cities

Ph.D. in Statistics

Dissertation: "Some Convergence Results for Metropolis-Hastings Algorithms"

Advisor: Galin L. Jones

Committee: Charles Geyer, Qian Qin, Wei-Kuo Chen

Minneapolis, MN

August 2022

University of Florida

B.S. in Mathematics

Major in Mathematics and minor in Statistics

Gainesville, FL

July 2017

Appointments

University of Toronto - St George

Postdoctoral Fellow

Advisor: Jeffrey S. Rosenthal

Toronto, Ontario

July 2023–July 2025

University of Warwick

Research Fellow

Advisor: Krzysztof Łatuszynski

Coventry, England

September 2022–June 2023

Publications and preprints

- [1] A. Brown and J. S. Rosenthal, "Weak convergence of adaptive Markov chain Monte Carlo," *Journal of Applied Probability*, to appear, 2025.
- [2] A. Brown and G. L. Jones, "Lower bounds on the rate of convergence for accept-reject-based Markov chains in Wasserstein and total variation distances," *Bernoulli*, to appear, 2025.
- [3] A. Brown and J. S. Rosenthal, "Upper and lower bounds on the subgeometric convergence of adaptive Markov chain Monte Carlo," *Preprint, submitted*, 2024.
- [4] S. Sixta, J. S. Rosenthal, and A. Brown, "Bounding and estimating MCMC convergence rates using common random number simulations," *Preprint, in peer review at Stochastic Models*, 2024.
- [5] A. Brown, "A non-asymptotic error analysis for parallel Monte Carlo estimation from many short Markov chains," *Preprint, In peer review at Statistics and Computing*, 2024.
- [6] A. Brown and G. L. Jones, "Exact convergence analysis for Metropolis–Hastings independence samplers in Wasserstein distances," *Journal of Applied Probability*, vol. 61, no. 1, p. 33–54, 2024.
- [7] A. Brown, "Geometric ergodicity of Gibbs samplers for Bayesian error-in-variable regression," *Electronic Journal of Statistics*, vol. 18, no. 1, pp. 1495–1516, 2024.
- [8] A. Brown and G. L. Jones, "Convergence rates of Metropolis–Hastings algorithms," *WIREs Computational Statistics*, vol. 16, no. 5, p. e70002, 2024.
- [9] A. Brown, K. Łatuszyński, and G. Roberts, "Adaptive pseudo-marginal Metropolis–Hastings," *In progress*, 2023.

Seminar talks and conference posters

University of Florida

University of Florida Statistics Seminar

Talk Title: Lower Bounds for Metropolis-Hastings in Wasserstein distances

Slides: <https://austindavidbrown.github.io/talk/uf2023.pdf>

Gainesville, FL

September 2023

University of Warwick

Algorithms and Computationally Intensive Inference Seminar

Talk Title: Lower Bounds on the Rate of Convergence for Accept-Reject-Based Markov Chains

Slides: <https://austindavidbrown.github.io/talk/warwick2023.pdf>

Coventry, United Kingdom

January 2023

University of Oxford

Bioinference 2023

Poster Title: Geometric ergodicity of Gibbs samplers for Bayesian error-in-variable regression

Poster: <https://austindavidbrown.github.io/poster/bioinference2023.pdf>

England, United Kingdom

June 2023

University of Warwick

Wales, United Kingdom

University of Warwick Departmental Conference 2023

April 2023

Talk Title: Exact convergence for independence samplers in Wasserstein distance.

Slides: <https://austindavidbrown.github.io/talk/warwickdepartmental2023.pdf>

Teaching experience

University of Toronto - St. George

Toronto, Canada

Instructor (~ 300 students)

Fall 2024

Methods of Data Analysis 1 (STA 302)

University of Toronto - St. George

Toronto, Canada

Instructor (~ 250 students)

Fall 2023

Methods of Data Analysis 1 (STA 302)

University of Minnesota - Twin Cities

Minneapolis, MN

Instructor (~ 80 students)

Spring 2021

Introduction to Statistical Analysis (STAT 3011)

University of Minnesota - Twin Cities

Minneapolis, MN

Instructor (~ 70 students)

Spring 2020

Regression and Correlated Data (STAT 3032)

Academic service

I have refereed 6 articles for statistics and applied probability journals including Bayesian Analysis, Journal of Computational and Graphical Statistics, PLOS ONE, Advances in Applied Probability, Journal of Applied Probability, and Sankhya, Series B. I have also assisted in editing *An Introduction to Envelopes* by Dennis Cook.

I have a have taken part in the following committees and organizations:

University of Toronto Brown Bag Departmental Seminar (Co-organizer) Sept. 2023–Present

American Statistical Association LGBTQ+ Advocacy Committee Aug. 2023–Aug. 2024

University of Warwick Stonewall Self-Assessment (LGBTQ+ Inclusion) Sept. 2022–June 2023

University of Warwick Statistics Department IT Committee Sept. 2022–June 2023

University of Warwick ACII Seminar (Organizer) Jan. 2023–June 2023

Organizations and memberships

Institute of Mathematical Statistics

Funding, scholarships, and awards

Beverly and Richard Fink Fellowship (\$56000+Tuition)

2017–2022

Lynn Lin Fellowship (\$2000)
First Year Scholarship (\$2500)

2019–2019
2017–2017

Mentorships

University of Toronto - St George

Toronto, Canada
2024

I have acted as a mentor to 2 PhD students and 1 undergraduate student on their own individual research projects

Extracurricular activities

- Markov Chain Monte Carlo Group (2019–2022)
Discussion of the state of the art MCMC literature

Statistical software

cmhi: A Python package for the centered Metropolis-Hastings independence algorithm. github.com/austindavidbrown/Centered-Metropolis-Hastings

mhlb: A Python implementation to estimate lower bounds on the geometric convergence rate for RWM Metropolis-Hastings. <https://github.com/austindavidbrown/lower-bounds-for-Metropolis-Hastings>

Programming language proficiency

Python: Pytorch, Autograd, Numpy, Matplotlib

Expert

R: Rmarkdown

Expert

C++: C++14 specification and above

Intermediate

Languages

- English (native)
- Spanish (novice)
- French (novice)

References

- Galin Jones. University of Minnesota - Twin Cities. Email: galin@umn.edu
- Jeffrey S. Rosenthal. University of Toronto. Email: jeff@math.toronto.edu
- Qian Qin. University of Minnesota - Twin Cities. Email: qqin@umn.edu
- Krzysztof Latuszynski. University of Warwick. Email: K.G.Latuszynski@warwick.ac.uk