# Anna Ly

Niagara Falls, ON
(289) 783-2812
annahuynh.ly@utoronto.ca
Google Scholar | LinkedIn | GitHub

## Research Interests

Computational statistics and open-source statistical software. Interested in Bayesian computation, reliable approximate inference, and developing methods to solve applied problems in areas such as healthcare and ecology.

## Education

**McMaster University** — Hamilton, ON
M.Sc in Statistics (CGPA: **12/12**) — September 2024 – October 2025

- Thesis: *Pitman Closeness of Maximum Likelihood Estimators Under Type-II Hybrid Censoring With Exponential Lifetimes*, supervised by Dr. Katherine Davies

**University of Toronto** — Mississauga, ON
H.B.Sc in Applied Statistics and Mathematical Sciences (CGPA: **3.92/4.0**) — September 2019 – June 2024

## Research Experience

**McMaster University Department of Mathematics & Statistics** — Hamilton, ON
Software Developer (Research Assistant) — June 2025 – June 2026

- Contributed 35+ merged pull requests and 170+ commits to `lme4`, a widely used `R` package for mixed-effects modelling (**47.7+ million downloads**, **690+ GitHub stars**).
- Engineered numerical features including **internal auto-scaling** for estimation stability and **MLE initialization** for large-scale data, reducing computation time and improving convergence for high-dimensional research models.
- Fixed bugs in core functions, including a matrix-subsetting error that produced inaccurate standard errors.

**University of Toronto Department of Statistical Sciences** — Toronto, ON
Statistical Web Application Developer (Research Assistant) — November 2022 – August 2024

- Built and deployed a full-stack `R shiny` application implementing Bayesian ROC/AUC analysis from a published research paper, enabling researchers to run relative belief ratio inference across multiple diagnostic models and sampling regimes (GitHub).

## Publications

### Statistical Methodology and Computing

1. **Ly, A.**, Christensen, R. H. B., Bates, D., Mächler, M., & Bolker, B. M. (Under review). Fitting generalized linear mixed-effects models using lme4. *Journal of Statistical Software*. arXiv preprint arXiv:2607.12184. https://arxiv.org/abs/2607.12184
2. **Ly, A.**, & Davies, K. (2026). Pitman closeness of maximum likelihood estimators under type-II hybrid censoring with exponential lifetimes. *Journal of Statistical Computation and Simulation*, 1–32. https://doi.org/10.1080/00949655.2026.2692001
3. Al-Labadi, L., Fazeli-Asl, F., & **Ly, A.** (2024). Evaluating model fit for type II censored data: A Bayesian non-parametric approach based on the Kullback-Leibler divergence estimation. *Communications in Statistics-Simulation and Computation*, 1–15. https://doi.org/10.1080/03610918.2024.2417808
4. Al-Labadi, L., & **Ly, A.** (2024). A short note on generating a random sample from finite mixture distributions. *Axioms*, 13(5), 307. https://doi.org/10.3390/axioms13050307
5. Al-Labadi, L., Hamlili, M., & **Ly, A.** (2023). Bayesian estimation of variance-based information measures and their application to testing uniformity. *Axioms*, 12(9), 887. https://doi.org/10.3390/axioms12090887

### Statistics Education

6. Al-Labadi, L., & **Ly, A.** (Under review). Students' experiences with R Shiny development and AI tools in undergraduate computational statistics. *Journal of Statistics and Data Science Education*.
7. Al-Labadi, L., **Ly, A.**, & Kirusheva, S. (2026). Student perceptions of AI and virtual populations in a project-based experimental design course. *Teaching Statistics*, 1–16. https://doi.org/10.1002/test.70043
8. Al-Labadi, L., & **Ly, A.** (2025). Enhancing statistics education through project-based learning (PBL) and the emergence of ChatGPT. *Teaching Statistics*. https://doi.org/10.1111/test.12405

### Computer Science Education

9. Zhu, T., Engineer, R., Prempeh, X., **Ly, A.**, Craig, M., & Petersen, A. (2025). Comparing physical analogue and traditional videos for learning and emotional engagement. *Discover Education*, 4(1), 71. https://doi.org/10.1007/s44217-025-00454-1

10. **Ly, A.**, Zhu, T., & Petersen, A. (2024). Evaluating storytelling videos using YouTube analytics. In *Proceedings of the 55th ACM Technical Symposium on Computer Science Education V. 2* (pp. 1730–1731). https://doi.org/10.1145/3626253.3635503

11. Liut, M., **Ly, A.**, Xu, J. J. N., Banson, J., Vrbik, P., & Hardin, C. D. (2024, March). "I didn't know": Examining student understanding of academic dishonesty in computer science. In *Proceedings of the 55th ACM Technical Symposium on Computer Science Education V. 1* (pp. 757–763). https://doi.org/10.1145/3626252.3630753

12. Zavaleta Bernuy, A., **Ly, A.**, Harrington, B., Liut, M., Sharmin, S., Zhang, L., & Petersen, A. (2023, June). "I am not enough": Impostor phenomenon experiences of university students. In *Proceedings of the 2023 Conference on Innovation and Technology in Computer Science Education V. 1* (pp. 313–319). https://dl.acm.org/doi/abs/10.1145/3587102.3588779

13. Zavaleta Bernuy, A., **Ly, A.**, Harrington, B., Liut, M., Petersen, A., Sharmin, S., & Zhang, L. (2022). Additional evidence for the prevalence of the impostor phenomenon in computing. In *Proceedings of the 53rd ACM Technical Symposium on Computer Science Education V. 1* (pp. 654–660). https://dl.acm.org/doi/10.1145/3478431.3499282

14. **Ly, A.**, Parkinson, J., Cutts, Q., Liut, M., & Petersen, A. (2021, November). Spatial skills and demographic factors in CS1. In *Proceedings of the 21st Koli Calling International Conference on Computing Education Research* (pp. 1–10). https://dl.acm.org/doi/10.1145/3488042.3488049

15. **Ly, A.**, Edwards, J., Liut, M., & Petersen, A. (2021, October). Revisiting syntax exercises in CS1. In *Proceedings of the 22nd Annual Conference on Information Technology Education* (pp. 9–14). https://doi.org/10.1145/3450329.3476855

## Teaching

**University of Toronto Department of Mathematical & Computational Sciences** Mississauga, ON
Sessional Instructor January 2026 – April 2026

- Directed the third-year Computational Statistics (STA380H5) curriculum, achieving an **Institutional Composite Mean (ICM) of 4.4/5.0**, significantly exceeding the departmental (3.9) and divisional (4.0) averages.
- Developed a project-based pedagogy requiring students to engineer production-style `R` **packages** and `shiny` **applications**; improved students' subject-matter understanding and provided meaningful opportunities for skill demonstration.
- Maintained a **4.7/5.0 rating for enthusiasm and instructional clarity**; recognised by students for bridging theoretical-practical gaps through live-coding, step-by-step visualisations, and a positive learning atmosphere.

**University of Toronto Department of Mathematical & Computational Sciences** Mississauga, ON
Teaching Assistant July 2021 – Present

- Led tutorials of approximately 30 students, graded for **500+ students**, held office hours, and supported discussion on Piazza across six courses in calculus, probability, and statistics (MAT136, STA256, STA258, STA260, STA304, STA305).
- Served as the **sole grader for all final course projects** in STA304 (Sampling & Survey Design) and STA305 (Experimental Design), ensuring consistent evaluation across each full cohort.

**McMaster University Department of Mathematics & Statistics** Hamilton, ON
Teaching Assistant September 2024 – December 2025

- Led weekly tutorials of approximately 40 students and ran pre-test review sessions as the full TA for STATS 2D03 (Introduction to Probability); delivered a **guest lecture** to the full class.
- Taught large-format tutorials of **approximately 150 students** as the full TA for MATH 1AA3 (Calculus for Science II) and MATH 1ZB3 (Engineering Mathematics II-B).
- Provided grading support for STATS 3A03 (Applied Regression Analysis with SAS), STATS 3PG3 (Probability and Games of Chance), and MATH 1XX3 (Calculus for Math and Stats II).

## Conferences

- **Statistical Society of Canada (SSC) Annual Meeting** June 2026
  *Poster Presenter: Pitman Closeness of Maximum Likelihood Estimators Under Type-II Hybrid Censoring With Exponential Lifetimes*
- **Incorporating Technologies in Teaching Mathematics (Ada Lovelace Conference)** December 2024
  *Co-authored paper: Enhancing Statistics Education through Project Based Learning and the Emergence of ChatGPT*

- **Joint Statistical Meetings (JSM)** August 2023
  *Panellist: Pedagogical Perspectives on Teaching and Communicating Statistical Sciences Through the Arts*
- **International Association for Statistical Education (IASE)** July 2023
  *Poster Presenter: Thinking Beyond Numbers - Statistical Perceptions of Communicating Statistics Through the Arts*

## Scholarships and Awards

- Ashbaugh Graduate Scholarship 2025
  *The Ashbaugh Graduate Scholarships were established in 1987 by the bequest of F.K. Ashbaugh in memory of Mary Eliza Kingston, to support committed graduate students in their academic pursuits.*
- Milos Novotny Fellowship 2024
  *This award was established as a result of the generosity of Dr. M. Novotny, who received his PhD in Mathematics from McMaster in 1972, and is particularly designed to encourage promising graduate students in analysis.*
- Ontario Graduate Scholarship (OGS) 2024
  *The Ontario Graduate Scholarship (OGS) programs provide funding to full-time students at the master's and doctoral levels with an A- or above average, and are hand-selected from the department.*
- NSERC Undergraduate Student Research Awards (USRA) 2023
  *A scholarship which allows students to obtain valuable research experience to encourage students to consider graduate studies and pursue careers in the natural sciences and engineering.*
- UTM Undergraduate Research Grant 2022
  *These grants are provided for undergraduate student-initiated research projects supervised by UTM faculty members.*
- Dean's List Scholar 2020, 2021, 2022, 2024
  *Conferred only on students who have achieved a cumulative grade point average of 3.50 at the end of each session in which the fifth, tenth, fifteenth or twentieth course has been passed at the University of Toronto.*
- Mathematical and Computational Sciences Honour Roll 2021, 2022
  *Awarded to students for achieving A+ in 5 mathematical sciences courses at the University of Toronto. This award was discontinued in 2023.*
- President's Scholars of Excellence Scholarship 2019
  *Awarded to 150 most qualified students applying to first year of direct-entry at the University of Toronto.*
- Governor General's Academic Bronze Medal 2019
  *Awarded to the student who achieves the highest average in their graduating class in high school.*
- Dr. Angelo Albanese Memorial Scholarship 2019
  *Awarded to a student who best demonstrates a mature approach to academics and a determination to succeed.*