Nathan Phelps

Email nphelps3@uwo.ca
Phone +1 (519) 670-6406
Nationality Canadian
City London, ON

EDUCATION

PhD, Statistics, University of Western Ontario 2022 – 2026 (Expected)
Grade: 95.0%
Supervisor: Dr. Dan Lizotte, Dr. Doug Woolford

MSc, Computer Science (Collaborative Specialization in AI), University of Western Ontario 2018 – 2020
Grade: 95.3%
Supervisor: Dr. Dan Lizotte

Honours BSc, Actuarial Science and Data Science, University of Western Ontario 2014 – 2018
Grade: 93.6%

SELECTED SCHOLARSHIPS AND AWARDS

Natural Sciences and Engineering Research Council of Canada (NSERC)
Postgraduate Scholarship – Doctoral (converted to Canada Graduate Scholarship): $82,000 2022 – 2025
Alexander Graham Bell Canada Graduate Scholarship – Master's: $17,500 2018 – 2019
Undergraduate Student Research Award: $4,500 2018

University of Western Ontario
Ontario Graduate Scholarship: $15,000 2025 – 2026
PhD Student Conference Travel Award: $500 2025
Ontario Graduate Scholarship: $15,000 (Declined) 2022 – 2023
Ontario Graduate Scholarship: $15,000 (Declined) 2018 – 2019
Gold Medal – Major in Data Science 2018
Gold Medal – Major in Actuarial Science 2018
John A. Mereu Book Prize for top grade in Life Contingency courses 2018
Dean's Honour List 2015 – 2018
London Life Actuarial Career Scholarship, Three Year Continuing: $15,000 2015 – 2018
Ross and Jean Clark Continuing Scholarship: $3,000 2015 – 2018
Continuing Admission Scholarship: $10,000 2014 – 2018

Canadian Statistical Sciences Institute (CANSSI) Ontario
Member of Student PhD and Research Network (SPARK): $2,000 2024 – 2026

Statistical Society of Canada (SSC)
Student Research Oral Presentation Award – General Section: $500 2025
Student Research Oral Presentation Award – Data Science and Analytics Section: $250 2024
Annual Meeting Student Grant: $250 2024

RESEARCH POSITIONS

Data Engineer, University of Western Ontario April 2021 – Present
Supervisor: Dr. Adam Metzler

- Analyzing financial data (primarily survey data) using statistical and machine learning approaches. I transitioned to a part-time role as a Graduate Student Assistant when I started my PhD studies.

Data Analyst (Research Coordinator), St. Joseph's Health Care London Sept 2020 – Aug 2022
Supervisor: Dr. Dalton Wolfe

- Involved in work aiming to make treatment of spinal cord injuries more data-driven through the use of visualizations and reinforcement learning.

Research Associate, University of Alberta Sept 2020 – March 2021
Supervisor: Dr. Jen Beverly

- Cleaned and filtered a large vegetation database created by the Alberta Wildland Fuels Inventory Program (AWFIP), calculated a variety of fuel loadings and other attributes using this database, and used clustering to identify forest stands with similar crown fire behaviour.

Research Assistant, University of Western Ontario May 2018 – Aug 2019, May 2020 – Aug 2020
Supervisor: Dr. Doug Woolford

- Modelled wildland fire occurrences using generalized linear models, generalized additive models, and machine learning techniques. Critically analyzed past studies that have compared different models for wildland fire occurrence prediction (FOP), leading to the development of a methodology for effective model evaluation and comparison for FOP. Performed a comparison of statistical and machine learning methods for FOP.

PROFESSIONAL POSITIONS

Consultant in Data Science and Statistics, Deep Breathe, London, Ontario Sept 2025 – Present

- My role has involved writing code to analyze data from a multi-reader multi-case study designed to show that clinicians can better detect the absence of pleural line motion from a lung ultrasound when using Deep Breathe's AI tool.

Actuarial Intern, Canada Life, London, Ontario May 2017 – Aug 2017

- Reconciled cash flows from actuarial software in order to perform an in-depth review of the calculations in the models. Performed value of new business calculations. Presented on clustering, with a focus on its application in the insurance industry.

Actuarial Intern, Canada Life, London, Ontario May 2016 – Aug 2016

- Reconciled cash flows from actuarial software in order to perform an in-depth review of the calculations in the models. Presented on the impact of autonomous cars on the insurance industry.

REFEREED PUBLICATIONS

[1] **N. Phelps**. (2025). *Implications of different encodings of binned data when clustering*. Journal of Classification.

[2] **N. Phelps**, D. Lizotte, and D. Woolford. (2025). *Using Platt's scaling for calibration after undersampling – limitations and how to address them*. Transactions on Machine Learning Research.

[3] **N. Phelps**, A. Metzler. (2025). *The effects of financial knowledge, skill, and self-assessed knowledge on financial well-being, behavior, and objective situation*. International Journal of Financial Studies.

[4] **N. Phelps**, A. Metzler. (2024). *An exploratory clustering analysis of the 2016 National Financial Well-Being Survey*. PLOS ONE.

[5] **N. Phelps**, S. Marrocco, S. Cornell, D.L. Wolfe, D.J. Lizotte. (2024). *Reinforcement learning in large, structured action spaces: A simulation study of decision support for spinal cord injury rehabilitation*. Intelligence-Based Medicine.

[6] **N. Phelps**, A. Metzler. (2023). *Enhancing an existing algorithm for small-cardinality constrained portfolio optimisation*. Journal of the Operational Research Society.

[7] **N. Phelps**, J.L. Beverly. (2022). *Classification of forest fuels in fire-prone ecosystems of Alberta, Canada – implications for fire behaviour prediction and fuel management*. Annals of Forest Science.

[8] **N. Phelps**, H.A. Cameron, A.M. Forbes, T. Schiks, D. Schroeder, J.L. Beverly. (2022). *The Alberta Wildland Fuels Inventory Program (AWFIP): Data description and reference tables*. Annals of Forest Science.

[9] **N. Phelps**, D.G. Woolford. (2021). *Comparing calibrated statistical and machine learning methods for wildland fire occurrence prediction: A case study of human-caused fires in Lac La Biche, Alberta, Canada*. International Journal of Wildland Fire.

[10] R. Arntfield, B. VanBerlo, T. Alaifan, **N. Phelps**, M. White, R. Chaudhary, J. Ho, D. Wu. (2021). *Development of a convolutional neural network to differentiate among the etiology of similar appearing pathological B lines on lung ultrasound: A deep learning study*. BMJ Open.

[11] **N. Phelps**, D.G. Woolford. (2021). *Guidelines for effective evaluation and comparison of wildland fire occurrence prediction models*. International Journal of Wildland Fire.

SUBMITTED PUBLICATIONS AND PREPRINTS

[1] **N. Phelps**, D. Lizotte, and D. Woolford. (2025+). *Challenges learning from imbalanced data using tree-based models: Prevalence estimates systematically depend on hyperparameters and can be biased towards the minority class*. Submitted to Journal of Classification.

[2] **N. Phelps**, D. Lizotte, and D. Woolford. (2025+). *Analyzing decision tree bias towards the minority class*. arXiv preprint.

[3] **N. Phelps***, A. Sarta*. (2025+). *Finding pathways to different levels of financial health using Qualitative Comparative Analysis*. Submitted to Journal of Consumer Affairs.

*Equal contribution

NON-REFEREED PUBLICATIONS

[1] **N. Phelps**, J.L. Beverly. (2023). *Classifying forest fuels with fuel inventory data in fire-prone ecosystems of Alberta*. Canadian Wildland Fire and Smoke Newsletter.

CONFERENCE PRESENTATIONS

Modelling the probability of a large wildfire using exposure and directional vulnerability in Ontario, Canada
Wildfire Ignition Causes International Conference, Porto, Portugal. Oral (Contributed). November 2025

Platt's scaling for calibration after undersampling – limitations and how to address them
International Conference on Statistics and Data Science, Vancouver, BC. Oral (Contributed). June 2025

Analyzing decision tree bias towards the minority class
SSC Annual Meeting, Saskatoon, Saskatchewan. Oral (Contributed). May 2025

Challenges calibrating machine learning models when predicting rare events, with applications to wildfire occurrence prediction
The International Environmetrics Society Conference, Adelaide, Australia. Oral **(Invited)**. December 2024

Challenges when calibrating random forests for fire occurrence prediction
Wildland Fire Canada Conference, Fredericton, New Brunswick. Oral (Contributed). October 2024

Challenges when calibrating a random forest fit to undersampled data
SSC Annual Meeting, St. John's, Newfoundland and Labrador. Oral (Contributed). June 2024

Comparing statistical and machine learning methods for wildland fire occurrence prediction: Studying human-caused fires in Lac La Biche, Alberta
Wildland Fire Canada Conference, Edmonton, Alberta. Oral (Contributed). November 2022

Classifying forest fuels with fuel inventory data in fire-prone ecosystems of Alberta
Wildland Fire Canada Conference, Edmonton, Alberta. Oral (Contributed). November 2022

The effects of financial knowledge on financial well-being, behavior, and objective situation
Academy of Financial Services Annual Meeting, Virtual. Oral (Contributed). September 2022

The effects of financial knowledge on financial well-being, behavior, and objective situation
CANSII Showcase, Virtual. Poster (Contributed). November 2021

Evaluating and comparing statistical and machine learning methods for fire occurrence prediction
Fire in the Earth System, Virtual. Oral (Contributed). November 2021

Reinforcement learning in large, structured action apaces: A simulation study of decision support for spinal cord injury rehabilitation
Vector Institute Research Symposium, Virtual. Poster (Contributed). February 2021

Wildland fire occurrence prediction: Comparing statistical and machine learning methods
Wildland Fire Canada Conference, Ottawa, Ontario. Poster (Contributed). November 2019

OTHER PRESENTATIONS

Analyzing strategies for saving for emergencies and retirement
Financial Wellness Lab Research Summit, London, Ontario. Oral. April 2025

Wildland fire occurrence prediction for large fires
Wildland Fire Management Science and Research Workshop, Sault Ste. Marie, Ontario. Oral. February 2025

Saving vs investment risk: Different strategies for accumulating retirement savings
Financial Wellness Lab Research Summit, London, Ontario. Oral. December 2024

Challenges calibrating machine learning models when predicting rare events, with applications to wildfire occurrence prediction
Department of Energy, Environment and Climate Action, Melbourne, Australia. Oral **(Invited)**. December 2024

Enhancing an existing algorithm for small-cardinality constrained portfolio optimization
Financial Wellness Lab Research Summit, London, Ontario. Oral. April 2023

TEACHING POSITIONS AND CERTIFICATIONS

Teaching Assistant, University of Western Ontario

DS3000/DS9000: Introduction to Machine Learning	Winter 2025
SS4844/SS9544/MDA9144: Data Analytics Consulting	Winter 2024
MDA9159: Statistical Modeling I	Fall 2023
MDA9159: Statistical Modeling I	Fall 2022
CS4414/CS9114/CS9637: Introduction to Data Science	Winter 2020
CS4414/CS9114/CS9637: Introduction to Data Science	Fall 2019
CS3340: Analysis of Algorithms	Winter 2019
CS4414/CS9114/CS9637: Introduction to Data Science	Fall 2018

Certificate in University Teaching and Learning, University of Western Ontario In Progress

ACADEMIC SERVICE

Reviewer
Conference on Uncertainty in Artificial Intelligence (2024, 2025)
Earth Science Informatics
International Journal of Wildland Fire
One Earth

Moderator and Co-Organizer
CANSSI Ontario Statistics Seminar: Talk by Geoff Pleiss (2025 – 2026)
Multi-Hazard Risk and Resilience Workshop: Wildfire session (2025)
CANSSI Ontario Statistics Seminar: Talk by Frank Harrell (2024 – 2025)

ATHLETICS

University of Western Ontario

Assistant Coach of Men's Varsity Volleyball Team	2021 – 2024
Member of Men's Varsity Volleyball Team	2015 – 2020
Bronze W for three years of significant contribution to a varsity team	2018

U Sports

Academic All-Canadian	2016 – 2020

Ontario University Athletics (OUA)

Men's Volleyball OUA West Second Team All-Star	2019