

curriculum vitae of
Alin Morariu

COMPUTATIONAL EPIDEMIOLOGY · BAYESIAN INFERENCE & STATE TRANSITION MODELS · GPU COMPUTING
BIO-STATS · PROBABILITY & STATISTICS · MACHINE LEARNING

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 Google Scholar  LinkedIn  Research Gate

EDUCATION

- Oct. 2021 – Sept. 2025 **Ph.D.** Statistics LANCASTER UNIVERSITY
Thesis: Computationally intensive inference methods for stochastic epidemic models
Supervisor: Dr Christopher Jewell, Professor Paul Fearnhead
- Sept. 2019 – July 2021 **M.Sc** Applied Mathematics TORONTO METROPOLITAN UNIVERSITY
Thesis: Financial Bandits - Development of Thompson Sampling for Financial Data
Supervisor: Professor You Liang
- Sept. 2014 - June 2019 **Honours B.Sc.** Statistics Specialists, Mathematics Minor UNIVERSITY OF TORONTO
Capstone Project: Bayesian model comparisons via numerical summaries of Probability Integral Transforms
Supervisor: Professor Daniel Simpson

PUBLICATIONS

Publications marked with † are in pre-print.

CONFERENCE AND JOURNAL PUBLICATIONS

1. Kamal Rai, Patrick Brown, Alin Morariu, Hwashin Hyun Shin. (2021)
Detection of Temporal Trends in Association between Air Pollution and Public Health †
Submitted to the Biometrics Journal of the International Biometrics Society
2. Ethan Johnson-Skinner, You Liang, Na Yu, Alin Morariu (2021)
A Novel Algorithmic Trading Strategy using Hidden Markov Model for Kalman Filtering Innovations
2021 IEEE 45th Annual Computers, Software, and Applications Conference (COMPSAC)

HONORS

- 2019-2021 Ryerson Graduate Fellowship TORONTO METROPOLITAN UNIVERSITY
Department of Mathematics
- 2019-2021 Graduate Development Award (GDA) TORONTO METROPOLITAN UNIVERSITY
Department of Mathematics
- 2019-2021 Mathematics Graduate Award TORONTO METROPOLITAN UNIVERSITY
Department of Mathematics
- 2014-2019 Trails Dion Bursary for Post Secondary School TRAILS YOUTH INITIATIVES

ACADEMIC EXPERIENCE

TEACHING ASSISTANT

- Sept. 2019 – present Department of Mathematics RYERSON UNIVERSITY
Courses: MTH110 (Discrete Mathematics I), MTH380 (Probability and Statistics I), MTH410 (Statistics)
- Jan. 2018 – June 2019 Department of Statistics UNIVERSITY OF TORONTO
Courses: STA130 (An Introduction to Statistical Reasoning and Data Science), STA302 (Methods of Data Analysis I), STA314 (Statistical Methods for Machine Learning I)

RESEARCH ASSISTANT

- May 2019 - Aug. 2019 Summer Research Student ST. MICHAEL'S HOSPITAL
- Authored R package `psmplr` to perform posterior distributions sampling of random effects in spatio-temporal air pollution models
 - Construct global envelopes for time-varying predictive intervals of pollutant random effect
- Jan. 2018 - May 2019 Research Assistant - Department of Statistics UNIVERSITY OF TORONTO
- Evaluate effectiveness of the university's statistics program and course offerings to update curriculum
- Jan. 2018 - May 2018 Research Assistant - Risk Lab UNIVERSITY OF TORONTO
- Develop quantitative methodology to construct a financial index for cryptocurrencies to monitor asset class performance

PROFESSIONAL EXPERIENCE

- May 2020 - Dec 2021 Data Science Intern ONTARIO TEACHER'S PENSION PLAN
- Implemented machine learning models to forecasting trading costs for futures contracts and options
 - Provided detailed reports of historical trade performance on futures contracts and options trades
- Sept. 2017 - Dec 2017 Actuarial Analyst - Consumer Market Pricing MANULIFE FINANCIAL
- Standardized pricing models across health, dental, and travel products to eliminate need of per-product updates when repricing
 - Revitalized travel pricing methodology using fundamental machine learning techniques to predict claims and highlight risk factors
- May 2017 - Aug. 2017 Investment Consulting Analyst MERCER (CANADA) LIMITED
- Monitored quarterly performance of funds with a keen focus on past results in order to optimize asset allocation of institutional clients
 - Automated daily data entry process with VBA Macros to half run time of asset reconciliation
- Jan. 2016 - May 2016 Pension Consulting Analyst MERCER (CANADA) LIMITED
- Performed funding valuation to determine updated liabilities resulting in savings of \$100,000 annually
 - Linearized single benefit and PSPA calculations with the creation of an Excel-based calculator to reduce manual calculations by 90%

SKILLS

Programming:

- **R** (packages include tidyverse, tidybayes, INLA, timeseries, TSA, Matrix)
- **Python** (packages include numpy, pandas, scikit-learn, statsmodels, scipy, plotly)
- **Stan** (probabilistic programming language for Bayesian inference with MCMC sampling)

Languages:

- English (native proficiency), Romanian (native proficiency)

EXTRACURRICULAR ACTIVITIES

- 2019 - Present R Workshop for STEM Students RYERSON UNIVERSITY
- 2017 - Present Mentor and Guest Speaker TRAILS YOUTH INITIATIVES

2017-2019	President & External Relations Executive, Romanian Student Club	UNIVERSITY OF TORONTO
2013-2016	Volleyball Coach	VICTORIA PARK C.I.

SELECTED COURSES AND SEMINARS

Graduate

Advanced Numerical Analysis
 Applied Statistical Methods

Analysis and Probability
 Principles and Techniques in Applied
 Mathematics

Topics in Machine Learning (Fields Institute)

Undergraduate

Real analysis
 Methods for Data Analysis
 Surveys, Sampling and Observational Data
 Statistical Computation
 Statistical Methods for Machine Learning
 Methods of Applied Statistics
 Mathematical Statistics

Advance Linear Algebra
 Probability
 Theory of Statistical Practice
 Time Series Analysis
 Methods for Multivariate Data
 Stochastic Processes
 Theory and Methods for Complex Spatial
 Data