Youssef Handi
Canadian citizen

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Research Interests

- Dependence modeling with copulas
- Robust regression and asymmetric regression models
- Spatio-temporal statistics
- Bayesian statistics
- Machine learning, statistical learning

Education

Ph.D. in Mathematics and Statistics 2021–2025
Université du Québec à Montréal (UQAM)
Supervisors: Prof. Karim Oualkacha & Prof. Mhamed Mesfioui
GPA: 4.00/4.3
Thesis: Copula-based Regression Frameworks for Multivariate Binary Outcomes
Research Areas: Dependence Modeling, Quantile Regression, Mixed Data Analysis

M.Sc. in Computer Science and Applied Mathematics 2019–2021
Université du Québec à Trois-Rivières
Supervisor: Prof. Mhamed Mesfoui
GPA: 4.03/4.3
Thesis: Combining Expert Opinions in Reliability using Bayesian Methods

Research Experience

Doctoral Researcher 2021–Present
Statistical Modeling, UQAM

- Developed novel copula-based regression framework for multivariate binary outcomes
- Created quantile/expectile inference techniques based on copulas in binary regression
- Extended models to accommodate mixed continuous-discrete variables
- Designed extremile regression approach using copula dependence structures

Research Assistant 2019–2021
Hydro-Québec Research Institute (IREQ), Montréal

- Research topic: Combining expert opinions in reliability into a single prior function. The goal was to estimate system reliability by combining expert opinions and observed machine performance data.
- Developed Bayesian framework integrating expert opinions with data measurement.
- Implemented MCMC simulations for system failure prediction
- Applied copula functions for dependence modeling in reliability engineering

- *Methodologies:* Bayesian Inference, Decision Theory, Dependence Modeling (Copulas), MCMC simulation techniques

Publications

Submitted Manuscripts:

- Handi, Y., Oualkacha, K., & Mesfoui, M. (2025). *On Multivariate Binary Outcomes Copulas-Regression Problem*. Japanese Journal of Statistics and Data Science (Published)
- Handi, Y., Oualkacha, K., & Mesfoui, M. (2025). *Inference based on copulas for quantile and expectile in binary regression*. Journal of Statistical Theory and Practice (Revise & Resubmit)

Working Papers:

- Handi, Y.,& Oualkacha, K., & Mesfoui, M. (2025) *Extension of multivariate binary outcomes copula regression to mixed variables* (Complete - Preparing for submission)
- Handi, Y., *Extremile regression Based on copula* (80% Complete)
- Handi, Y., *Spatial Linear Multi-Factor Mixing Model* (90% Complete)

Conference Presentations

- **Invited Talk:** University of Sherbrooke, Department of Mathematics (July-2025)
  "Multivariate Binary Outcomes Copulas-Regression Framework"
- **UQAM Statistics Seminar**, Montréal, Canada (May-2025)
  "Multivariate Binary Outcomes Copulas-Regression Framework"
- **Francophone Interfaculty Research Colloquium in Biostatistics**, Montréal, Canada (July-2024)
  "Advances in Copula Regression for Discrete Data"

Teaching Experience

Université du Québec à Trois-Rivières 2019–2021

Teaching Assistant

- STT-1030: Introduction to Regression (Undergraduate)
- STT-1001: Probability Theory (Undergraduate)
- STT-1040: Analysis of Variance (Undergraduate)
- STT-1028: Time Series Analysis (Undergraduate)
- MPU-1058: Measure and Integration (Undergraduate)

Université du Québec à Montréal 2022–Present

Teaching Assistant

- MAT-1700: Probability (Undergraduate)
- STT-2120: Regression Analysis (Undergraduate)
- STT-1000: Statistics I (Undergraduate)

Lecture

- MAT-4681 Statistics for science(Undergraduate) Summer 2025

Professional Experience

Data Scientist 2021–2024

National Bank of Canada, Montréal

- Designed ML algorithms for credit risk classification (20,000+ cardholders)
- Developed stress testing models simulating market collapse scenarios
- Built data ingestion pipelines from Kafka, JSON, and SQL sources
- Implemented data quality controls for analytical platforms

Research Grants & Awards

- **Institut des Sciences Mathématiques Scholarship** 2022–2025
  Awarded for academic excellence in mathematics research
- **Hydro-Québec Master's Research Grant** 2019–2021
  Funded research on Bayesian reliability methods

Technical Skills

- **R**: **VineCopula**, **rvinecopulib** (vine–copula modelling); **copula**, **MASS** (multivariate analysis); **Matrix**, **RSpectra**, **RcppArmadillo** (sparse matrices, SVD & other spectral decompositions); **e1071** (support–vector machines); **pracma** / base `solve` (LU, QR, Cholesky).
- **Python**: **NumPy**, **SciPy.linalg** (dense/sparse linear algebra– SVD, LU, Cholesky, eigendecomposition); **PyTorch**, **TensorFlow**/**Keras**, **PyTorch Lightning** (deep neural networks– DnCNN, FFDNet, DRUNet); **filterpy**, **pykalman** (Kalman filtering); **copulas**, **vinecopulib** (copula and vine-copula estimation); **scikit-learn**, **pyamg** (machine-learning pipelines, iterative solvers).
- **Parallel & Distributed Computing**: multicore & cluster workflows (**future**, **parallel**, **Dask**), GPU acceleration (CUDA).
- **Workflow Automation & DevOps**: reproducible pipelines (**drake**/**targets**, **Snakemake**, `make`); containerisation (Docker, Singularity); CI/CD (GitHub Actions).

Languages

- **French:** Native Proficiency
- **English:** Professional Proficiency (Read, written, spoken)

References

- **Prof. Karim Oualkacha**
  Professor of Statistics
  Université du Québec à Montréal
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- **Prof. Mhamed Mesfoui**
  Professor of Statistics
  Université du Québec à Trois-Rivières
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