Raphaël Morsomme

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https://rmorsomme.github.io/

Education

Academic interests: statistics, Bayesian inference, Markov Chain Monte Carlo, high-dimensional data augmentation, conformal prediction, stochastic epidemic models, breast cancer models, high-dimensional dynamic models, semi-Markov processes.

2019 – present: **Ph.D. candidate in statistical science**,
Duke University Department of Statistical Science.
Supervisor: Prof. Jason Xu.
Thesis: Efficient Markov chain Monte Carlo samplers for high-dimensional latent data.

2014 – 2018: **Double B.S. degree in *Liberal Arts and Sciences***,
University College Maastricht, The Netherlands; University College Freiburg, Germany.
Honors program, *Summa cum Laude*.

Publications

Huang, J., **Morsomme, R.**, Dunson, D., & Xu, J. (2022). Detecting Changes in the Transmission Rate of a Stochastic Epidemic Model. arXiv preprint arXiv:2211.14691.

Morsomme, R., & Xu, J. (2022). Uniformly Ergodic Data-Augmented MCMC for Fitting the General Stochastic Epidemic Model to Incidence Data. arXiv preprint arXiv:2201.09722.

Morsomme, R., & Smirnov, E. (2020). Valid Prediction Intervals for Course Grades with Conformal Prediction. In 2020 19th IEEE International Conference on Machine Learning and Applications (ICMLA) (pp. 936-941). IEEE.

Morsomme, R., & Smirnov, E. (2019). Conformal Prediction for Students' Grades in a Course Recommender System. *Conformal and Probabilistic Prediction and Applications* (pp. 196-213).

Morsomme, R., & Alferez, S. V. (2019). Content-based course recommender system for liberal arts education. In *Proceedings of The 12th International Conference on Educational Data Mining (EDM 2019)* (Vol. 748, p. 753).

Morsomme, R. (2018). Embryonic and mitochondrial modeling in the context of *in-vitro* fertilization. Bachelor Thesis, Maastricht University, Department of Clinical Genetics.

Morsomme, R. (2017). Financial instability forecasting based on an anomaly analysis of soft content. Bachelor Thesis, Freiburg University, Information System Research Institute.

Awards and grants

2023: Travel award, Summer Institute in Statistics and Modeling in Infectious Diseases, University of Washington.

2022: Outstanding Mentor of Undergraduate Research Award, Department of Statistical Science, Duke University.

2022: Summer Course Development Grant, Duke University.

2022: Full scholarship, Summer Institute in Statistics and Modeling in Infectious Diseases, University of Washington.

2021: Young Investigator Award, ASA Section on Statistics in Epidemiology.

Teaching and Mentoring

Teaching assistant

2023: STA561 Probabilistic Machine Learning (masters), Department of Statistical Science, Duke University.

2022: STA310 Generalized Linear Models (undergraduate), Department of Statistical Science, Duke University.

2021: STA723 Case Studies in Bayesian Statistics (Ph.D.), Department of Statistical Science, Duke University.

2020: STA540 Case Studies in Statistical and Data Science (masters), Department of Statistical Science, Duke University.

2019: STA440 Case Studies in the Practice of Statistics (undergraduate), Department of Statistical Science, Duke University.

2017: Introduction to Statistics and Data Analysis (undergraduate), University College Freiburg, Freiburg University.

Instructor of record

2022: STA101 Data Analysis and Statistical Inference, Department of Statistical Science, Duke University.

2021: STA101 Data Analysis and Statistical Inference, Department of Statistical Science, Duke University.

Tutoring and mentoring

2023: Thesis writer's mentoring workshop, Department of Statistical Science, Duke University.

2023 – current: Academic mentor of M. Chen, Duke University, Masters in Statistical Science.

2021 – 2023: Academic mentor of J. Huang, Duke University, major in Statistical Science.

2021 – 2023: Academic tutor,
SPIRE Fellows Program, Duke University.

2020 – 2021: Research mentor,
Lumiere Research Scholar Program.

Professional Experience

2023: Research assistant,
Biostatistics Research Branch, Division of Clinical Research, National Institute of Allergy and Infectious Diseases, National Institutes of Health.
Task: develop a Julia package for maximum likelihood estimation of semi-Markovian multistate models to panel data via the MCEM algorithm.

2022 – 2023: Statistical consultant,
MetLife Investment Management, New York.
Task: implement a scalable dynamic Bayesian system for long-term forecasting of high-dimensional macroeconomic time series.

2020: Programming consultant,
Children's Environmental Health Initiative, Rice University.
Task: review code for a spatial analysis of racial and political disparity

2019: Statistical Consultant,
Future Earth, Paris.
Task: implement a topic model of open-ended survey questions.

2018 – 2019: Junior Data Scientist,
University College Maastricht.
Task: topic modeling of course content, conformal prediction of course grade and development of a course recommender system for Liberal Arts students.

2017: Research Assistant,
The Information System Research Institute, Freiburg.
Task: trading decision support system based on a sentiment analysis of financial news.

Outreach

2023: Chair of the invited session Stochastic processes for a dynamic world at the Joint Statistical Meeting,
American Statistical Association.

2023: Coordinator for the DataFest,
American Statistical Association.

2018 – 2022: Semi-annual workshop: Introduction to *R*,
University College Maastricht.

2021: Judge for the DataFest,
American Statistical Association.

2016: Organizer of the Global Order Project Conference: Mobility and Identity in a Globalizing World,
University College Maastricht.

Programming skills

Proficiency in **R**, **Julia**, **MATLAB**, **LaTeX**, **Git**, **Quarto**, **STAN**.

Working knowledge of Python, SAS, SQL, Tableau, Weka, C++.

Volunteering and interests

2016 – present:	Run marathons.
2015:	Represented Belgium at the final of the *Euromath Cup* – 3rd place.
2014 – 2019:	Volunteer at the Red Cross.
2005:	International finalist of the *Championship of Math & Logic Games*.