Dr Mélodie Monod

CONTACT DETAILS

Email: melodie.monod@ndm.ox.ac.uk
Website: https://melodiemonod.github.io/

EDUCATION

Imperial College London, London, United Kingdom — Oct 2019 - Dec 2022
PhD in Modern Statistics and Statistical Machine Learning
Fully funded by EPSRC. First student to complete the program among all cohorts.
Supervisors: Dr. Oliver Ratmann, Prof. Samir Bhatt
Thesis title: *Bayesian models and methods to estimate age-specific infectious disease transmission dynamics: integrating disease surveillance time series, mobility, and vaccination data.*

Imperial College London, London, United Kingdom — Sep 2018 - Sep 2019
Master of Science in Statistics
Final Grade: Distinction.

University of Geneva, Geneva, Switzerland — Sep 2015 - Jun 2018
Bachelor of Science in Economics and Management
Major in Economics, Minor in Statistics.
Final Grade: 5.71/6, **Class Rank:** First out of $>$ 100 students.

EXPERIENCE

University of Oxford, Oxford, United Kingdom — Since June 2025
Senior Postdoctoral Researcher
Conducting research on Statistical Machine Learning and Deep Generative Modelling.

Imperial College London, London, United Kingdom — Oct 2024 - May 2025
Research Associate (Postdoctoral Researcher)
Conducted research on Bayesian deep learning and diffusion models.

Novartis, Dublin, Ireland — Jan 2023 - Sep 2024
Principal Biostatistician
Developed original statistical methods for pharmaceutical applications, specializing in deep causal analysis and deep survival analysis.

Imperial College London, London, United Kingdom — Apr 2023 - Sep 2024
Honorary Research Associate
Engaged in research collaborations with academic faculty, PhD, and MSc students on projects involving Bayesian statistics, phylodynamics, and mathematical models of infectious disease dynamics alongside Dr. Oliver Ratmann.

Novartis, Basel, Switzerland — Jun 2021 - Sep 2021
Advanced Explanatory Analysis Intern
Supervisor: Dr. Sebastian Weber
Developed survival analysis methods for assessing safety events in phase I oncology trials accounting for incomplete PK data.

PROGRAMMING SKILLS

Highly proficient in Python, R and Stan.

Open source code:

- Deep Reinforcement Learning for Online Optimal Execution Strategies associated with [3]
- `TorchSurv`, a package for deep survival analysis associated with [4]
- Analysis of age- and time-specific HIV transmission dynamics associated with [5]
- Regularised B-splines Projected Gaussian Process Priors associated with [6]
- Model for characterizing COVID-19 spread associated with [14, 15, 16]

SELECTED PUBLICATIONS

[1] Mélodie Monod, Alessandro Micheli, and Samir Bhatt. "NeuralSurv: Deep Survival Analysis with Bayesian Uncertainty Quantification". In: *arXiv* (2025).

[2] Mélodie Monod, Alessandro Micheli, and Samir Bhatt. "Diffusion Models for Inverse Problems in the Exponential Family". In: *arXiv* (2025). eprint: arXiv:2502.05994.

[3] Mélodie Monod and Alessandro Micheli. "Deep Reinforcement Learning for Online Optimal Execution Strategies". In: *arXiv* (2024). eprint: arXiv:2410.13493.

[4] Mélodie Monod, Peter Krusche, Qian Cao, Berkman Sahiner, Nicholas Petrick, David Ohlssen, and Thibaud Coroller. "TorchSurv: A Lightweight Package for Deep Survival Analysis". In: *Journal of Open Source Software* 9.104 (2024), p. 7341. DOI: 10.21105/joss.07341.

[5] Mélodie Monod, Andrea Brizzi, Ronald M. Galiwango, Robert Ssekubugu, Yu Chen, Xiaoyue Xi, Edward Nelson Kankaka, Victor Ssempijja, Lucie Abeler-Dörner, Adam Akullian, Alexandra Blenkinsop, David Bonsall, et al. "Longitudinal population-level HIV epidemiologic and genomic surveillance highlights growing gender disparity of HIV transmission in Uganda". In: *Nature Microbiology* 9.1 (2024), pp. 35–54. ISSN: 2058-5276. DOI: 10.1038/s41564-023-01530-8.

[6] Mélodie Monod, Alexandra Blenkinsop, Andrea Brizzi, Yu Chen, Carlos Cardoso Correia Perello, Vidoushee Jogarah, Yuanrong Wang, Seth Flaxman, Samir Bhatt, and Oliver Ratmann. "Regularised B-splines Projected Gaussian Process Priors to Estimate Time-trends in Age-specific COVID-19 Deaths". In: *Bayesian Analysis* 18.3 (2023). ISSN: 1936-0975. DOI: 10.1214/22-ba1334.

[7] Shozen Dan, Yu Chen, Yining Chen, Mélodie Monod, Veronika K. Jaeger, Samir Bhatt, André Karch, and Oliver Ratmann and. "Estimating fine age structure and time trends in human contact patterns from coarse contact data: The Bayesian rate consistency model". In: *PLOS Computational Biology* 19.6 (2023), e1011191. DOI: 10.1371/journal.pcbi.1011191.

[8] T A Mellan, Henrique Hoeltgebaum, Swapnil Mishra, Charles Whittaker, Iwona Hawryluk, Axel Gandy, H Juliette T Unwin, Michaela A C Vollmer, Helen Coupland, Nuno Rodrigues Faria, Juan Vesga, Neil M Ferguson, et al. "Subnational analysis of the initial phase of the COVID-19 epidemic in Brazil". In: *2023 ICLR First Workshop on "Machine Learning & Global Health"* (2023).

[9] Alexandra Blenkinsop, Mélodie Monod, Ard van Sighem, Nikos Pantazis, Daniela Bezemer, Eline Op de Coul, Thijs van de Laar, Christophe Fraser, Maria Prins, Peter Reiss, Godelieve J de Bree, and Oliver Ratmann and. "Estimating the potential to prevent locally acquired HIV infections in a UNAIDS Fast-Track City, Amsterdam". In: *eLife* 11 (2022). DOI: 10.7554/elife.76487.

[10] Andrea Brizzi, Charles Whittaker, Luciana M. S. Servo, Iwona Hawryluk, Carlos A. Prete, William M. de Souza, Renato S. Aguiar, Leonardo J. T. Araujo, Leonardo S. Bastos, Alexandra Blenkinsop, Lewis F. Buss, Darlan Candido, et al. "Spatial and temporal fluctuations in COVID-19 fatality rates in Brazilian hospitals". In: *Nature Medicine* 28.7 (2022), pp. 1476–1485. DOI: 10.1038/s41591-022-01807-1.

[11] Andria Mousa, Peter Winskill, Oliver John Watson, Oliver Ratmann, Mélodie Monod, Marco Ajelli, Aldiouma Diallo, Peter J Dodd, Carlos G Grijalva, Moses Chapa Kiti, Anand Krishnan, Rakesh Kumar, et al. "Social contact patterns and implications for infectious disease transmission – a systematic review and meta-analysis of contact surveys". In: *eLife* 10 (2021). DOI: 10.7554/elife.70294.

[12] Swapnil Mishra, James A. Scott, Daniel J. Laydon, Seth Flaxman, Axel Gandy, Thomas A. Mellan, H. Juliette T. Unwin, Michaela Vollmer, Helen Coupland, Oliver Ratmann, Mélodie Monod, Harrison H. Zhu, et al. "Comparing the responses of the UK, Sweden and Denmark to COVID-19 using counterfactual modelling". In: *Scientific Reports* 11.1 (2021). DOI: 10.1038/s41598-021-95699-9.

[13] Nuno R. Faria, Thomas A. Mellan, Charles Whittaker, Ingra M. Claro, Darlan da S. Candido, Swapnil Mishra, Myuki A. E. Crispim, Flavia C. S. Sales, Iwona Hawryluk, John T. McCrone, Ruben J. G. Hulswit, Lucas A. M. Franco, et al. "Genomics and epidemiology of the P.1 SARS-CoV-2 lineage in Manaus, Brazil". In: *Science* 372.6544 (2021), pp. 815–821. DOI: 10.1126/science.abh2644.

[14] Mélodie Monod, Alexandra Blenkinsop, Xiaoyue Xi, Daniel Hebert, Sivan Bershan, Simon Tietze, Marc Baguelin, Valerie C. Bradley, Yu Chen, Helen Coupland, Sarah Filippi, Jonathan Ish-Horowicz, et al. "Age groups that sustain resurging COVID-19 epidemics in the United States". In: *Science* 371.6536 (2021). ISSN: 1095-9203. DOI: 10.1126/science.abe8372.

[15] H. Juliette T. Unwin, Swapnil Mishra, Valerie C. Bradley, Axel Gandy, Thomas A. Mellan, Helen Coupland, Jonathan Ish-Horowicz, Michaela A. C. Vollmer, Charles Whittaker, Sarah L. Filippi, Xiaoyue Xi, Mélodie Monod, et al. "State-level tracking of COVID-19 in the United States". In: *Nature Communications* 11.1 (2020). DOI: 10.1038/s41467-020-19652-6.

[16] Seth Flaxman, Swapnil Mishra, Axel Gandy, H. Juliette T. Unwin, Thomas A. Mellan, Helen Coupland, Charles Whittaker, Harrison Zhu, Tresnia Berah, Jeffrey W. Eaton, Mélodie Monod, Pablo N. Perez-Guzman, et al. "Estimating the effects of non-pharmaceutical interventions on COVID-19 in Europe". In: *Nature* 584.7820 (2020), pp. 257–261. ISSN: 1476-4687. DOI: 10.1038/s41586-020-2405-7.

GRANTS

LMS Travel Grant for Early Career Researchers, £500.00 Apr 2025

EPSRC CDT in Modern Statistics and Statistical Machine Learning Scholarship
Imperial College London, London, United Kingdom 2019-2023

The Department of Mathematics Scholarship for the MSc Statistics
Imperial College London, London, United Kingdom 2018
Awarded for academic excellence and ability to continue into a postgraduate research degree.

AWARDS

Savage Award
One of three finalists for the top award in Bayesian statistics for outstanding doctoral dissertations; winner to be announced July 2025. 2025

Highest overall grade average of the Bachelor's Degree in Economics and Management - Major Economics
University of Geneva, Geneva, Switzerland 2018

TEACHING

Graduate Teaching Assistant, Imperial College London Spring 2021
MATH97134 Biomedical Statistics for postgraduate in the MSc of Statistics.
Duties: assisting during computer labs, answering student questions during the in-person sessions.

Senior Graduate Teaching Assistant, Imperial College London Spring 2021
MATH40006 Introduction to computation for first year maths undergraduates
Duties: Oversaw and coordinated all other GTAs involved in computer labs and grading, in addition to fulfilling standard GTA responsibilities.

Graduate Teaching Assistant, Imperial College London Autumn 2020
MATH40006 Introduction to computation for first year maths undergraduates
Duties: assisting during computer labs, answering student questions during the in-person sessions and through the online forum, marking student assignments, and providing feedback.

TALKS	London Geometry and Machine Learning Summer School, project presentation	2025
	Machine Learning for Global Health	2025
	PyTorch TAC Meeting	2025
	Careers in Statistics, Imperial College London	2024
	Computer Science and Machine Learning group, Imperial College London	2022
	ISBA World Meeting	2022
	Banff International Research Station for Mathematical Innovation and Discovery	2021
	COVID-19 Dynamics & Evolution Webinar Series	2020
	StanCon	2020

SUPERVISION	3 **MSc students**: 2 supervised and 1 co-supervised. 1 **intern** in the industry.
SERVICE TO PROFESSION	Reviewer, venues including: BMC Global Health, PLOS Global Public Health. Seminar organisation: Organiser of the "Generative Modelling" seminar at I-X (Department of AI of Imperial College London) in April 2025.