

# Alexis Bellot

## Machine Learning Research Scientist

### RESEARCH INTERESTS

My research spans algorithms, theory and applications of statistical inference and machine learning.

- **Machine learning for healthcare applications:** Survival analysis with competing risks and in dynamic settings, modelling of electronic health records for prediction problems.
- **Causal inference and discovery:** Causal discovery in dynamic and high-dimensional settings, treatment effect estimation.
- **Hypothesis testing** with a focus on high-dimensional feature spaces, time series and biased data.

alexis.b11@hotmail.com

### Social

[github](#)

[personal website](#)

[linkedin](#)

[google scholar](#)

### Software

Python, R, HTML, LATEX

### CURRENT POSITION

#### Postdoctoral Research Scientist

Columbia University

Jun 2021 - Present, New York, U.S.A.

- Advisor: Prof. Elias Bareinboim

### EDUCATION

#### Ph.D. Applied Mathematics

University of Cambridge / Alan Turing Institute

2017 - 2021, Cambridge, UK

- Thesis title: Hypothesis Testing and Causal Inference with Heterogeneous Medical Data.
- Advisor: Prof. Mihaela van der Schaar.
- Developed independent research projects, advised junior students, gave presentations and tutorials, and lead collaborations with medical researchers that resulted in 3 interdisciplinary research papers.

#### M.Sc. Applied Statistics

University of Oxford

2016 - 2017, Oxford, UK

- Grade: Distinction.
- Gained expertise in Graphical Models, Applied Statistics, Foundations of Statistical Inference, Bayes Methods, Computational Statistics.

#### B.Sc. Mathematics

Imperial College London

2013 - 2016, London, UK

- Grade: First Class Honours.
- Gained foundational knowledge in all areas of Mathematics with a specialization in Statistics.

### Industry knowledge

Analysis of time series and high-dimensional data, especially electronic health records. Familiarity with most ML canonical problems: prediction, survival analysis, feature selection, graphical modelling, clustering.

### Awards

Best Abstract AIMED conference (2019). G-Research PhD Competition Prize (2019), PhD studentship Alan Turing Institute (2018).

### Languages

Spanish (native)

French (native)

Luxembourgish (native)

English (native)

German (conversational)

## PUBLICATIONS

### All available at [google scholar](#)

#### Working papers

- **A. Bellot**, M. van der Schaar, "Consistency of mechanistic causality in continuous-time using Neural ODEs".
- **A. Bellot**, M. van der Schaar, "Scoring DAGs with Dense Unobserved Confounding".
- **A. Bellot**, M. van der Schaar, "Accounting for Unobserved Confounding in Domain Generalization".

#### Conference papers

- T. Kyono, Y. Zhang, **A. Bellot**, M. van der Schaar, "MIRACLE: Causal Structure Learning and Exploitation for Imputing Missing Data", NeurIPS, 2021.
- **A. Bellot**, M. van der Schaar, "Policy Analysis using Synthetic Controls in Continuous-time", ICML, 2021.
- **A. Bellot**, M. van der Schaar, "Application of Kernel Hypothesis Testing on Set-valued Data", UAI, 2021
- **A. Bellot**, M. van der Schaar, "A Kernel Two-Sample Test with Selection Bias", UAI, 2021.
- **A. Bellot**, R. A. Floto, M. van der Schaar, "AI-based Hypothesis Testing in Individuals with CF", Pediatric Pulmonology (Abstract), 2020.
- Y. Zhang, **A. Bellot**, M. van der Schaar, "Learning Overlapping Representations for the Estimation of Individualized Treatment Effects", AISTATS, 2020.
- Z. Qian, A. Alaa, **A. Bellot**, M. van der Schaar, "Learning Dynamic and Personalized Comorbidity Networks from Event Data using DeepDiffusion Processes", AISTATS, 2020.
- **A. Bellot**, M. van der Schaar, "Conditional Independence Testing using Generative Adversarial Networks", NeurIPS, 2019.
- **A. Bellot**, M. van der Schaar, "Boosting Transfer Learning with Survival Data from Heterogenous Domains", AISTATS, 2019.
- **A. Bellot**, M. van der Schaar, "Multitask Boosting for Survival Analysis with Competing Risks", NeurIPS, 2018.
- **A. Bellot**, M. van der Schaar, "Boosted Trees for Risk Prognosis", Machine Learning for Healthcare Conference (MLHC), 2018.
- **A. Bellot**, M. van der Schaar, "Tree-based Bayesian Mixture Model for Competing Risks", AISTATS, 2018.

#### Journal papers

- T. Cowling, D. Cromwell, **A. Bellot**, and others. "Logistic regression and machine learning predicted patient mortality from large sets of diagnosis codes comparably", Journal of Clinical Epidemiology, 2020.
- T. Cowling, **A. Bellot**, and others. "One-year mortality of colorectal cancer patients: development and validation of a prediction model using linked national electronic data", British Journal of Cancer, 2020.
- Y. Ruan, **A. Bellot**, and others. "Predicting the Risk of Inpatient Hypoglycemia With Machine Learning Using Electronic Health Records", Diabetes Care, 2020.
- **A. Bellot**, M. van der Schaar, "A Bayesian Approach to Modelling Longitudinal data", ACM Computing for Healthcare, 2020.
- **A. Bellot**, M. van der Schaar, "A Hierarchical Bayesian Model for Personalized Survival Predictions", IEEE J. BHI, 2018.