Alexis Bellot

Machine Learning Research Scientist

RESEARCH INTERESTS

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

I am interested in better understanding how to guarantee valid and robust predictions in the context of heterogeneous data from multiple different environments, for applications in reinforcement learning, treatment effect estimation, and broadly the safety of AI algorithms.

EMPLOYMENT HISTORY

Research Scientist

Google DeepMind
May 2022 – Present, London, UK.

- Research on causality and its applications.
- Visiting Researcher, Imperial College London (May 2023 - May 2024).

Postdoctoral Research Scientist

Columbia University
June 2021 – May 2022, New York, USA.

- Topic: Causal inference.
- Advisor: Prof. Elias Bareinboim.

EDUCATION

Ph.D. Applied Mathematics

University of Cambridge / Alan Turing Institute
Sept. 2017 – May 2021, Cambridge, UK.

- Thesis title: Hypothesis Testing and Causal Inference with Heterogeneous Medical Data.
- Advisor: Prof. Mihaela van der Schaar.

M.Sc. Applied Statistics

University of Oxford
Sept. 2016 – Sept. 2017, Oxford, UK.

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

B.Sc. Mathematics

Imperial College London
Sept. 2013 – June. 2016, London, UK.

- Grade: First Class Honours.
- Foundational courses in all areas of Mathematics with a specialization in Statistics.

Last updated Sept. 16th 2023

alexis.b11@hotmail.com

Social

github
personal website
linkedin
google scholar

Languages

Spanish (native)
French (native)
Luxembourgish (native)
English (native)
German (conversational)

CONFERENCE ORGANIZATION AND PRESENTATIONS

Workshop organization

- AAAI 2023 Bridge Program on Continual Causality – Co-organizer
- NeurIPS 2022 workshop "A Causal View on Dynamical Systems" – Co-organizer
- NeurIPS 2021 Workshop "Causal Inference & Machine Learning: Why now?" (WHY-21) – Member of logistics committee

Courses

- Imperial College London – *Course on Foundations of Causal Inference and Modern Topics* – 2023

Seminars

- The Mathematics of Machine Learning, Imperial College London – *An Introduction to Causality* – 2023
- Msc Mathematical Finance, Imperial College London – *An Introduction to Transportability* – 2022
- CCAIM summer school, Cambridge University – *Lecture on Transfer Learning and Causality* – 2022
- DataSig, Imperial College London – *Causal discovery in dynamical systems* – 2022
- Rice ECE Speaker Series Seminar, Rice University – *Policy Analysis using Synthetic Controls in Continuous-time* – 2022
- Inspiration exchange, Cambridge University *MIRACLE: Missing data imputation using causal insights* – 2021
- Ellis Health Foundation – *Accounting for unobserved confounding in domain generalization* – 2019
- Microsoft Research – *Conditional Independence Testing using Generative Adversarial Networks* – 2019
- GlaxoSmithKline – *Conditional Independence Testing using Generative Adversarial Networks* – 2018

PUBLICATIONS

1. **A Bellot**, E Bareinboim, "*Partial transportability for domain generalization*", Tech report, 2023.
2. L. Gultchin, V. Aglietti, **A. Bellot**, S Chiappa, "*Functional Causal Bayesian Optimization*", UAI, 2023.
3. **A. Bellot**, J. Zhang, E. Bareinboim, "*Scores for Learning Discrete Causal Graphs with Unobserved Confounders*", Tech report, 2022.
4. **A Bellot***, A Dhir*, G Prando, "*Generalization bounds and algorithms for estimating conditional average treatment effect of dosage*", arxiv, 2022.
5. N. Seedat, F. Imrie, **A. Bellot**, Z. Qian, M. van der Schaar "*Continuous-time modeling of counterfactual outcomes using neural controlled differential equations*", ICML, 2022.
6. **A. Bellot**, M. van der Schaar, "*Scoring DAGs with Dense Unobserved Confounding*", Tech report, 2022
7. **A. Bellot**, M. van der Schaar, "*Consistency of mechanistic causality in continuous-time using Neural ODEs*", ICLR, 2022.
8. **A. Bellot**, M. van der Schaar, "*Accounting for Unobserved Confounding in Domain Generalization*", arxiv, 2022.
9. T. Kyono, Y. Zhang, **A. Bellot**, M. van der Schaar, "*MIRACLE: Causal Structure Learning and Exploitation for Imputing Missing Data*", NeurIPS, 2021.
10. **A. Bellot**, M. van der Schaar, "*Policy Analysis using Synthetic Controls in Continuous-time*", ICML, 2021.
11. **A. Bellot**, M. van der Schaar, "*Application of Kernel Hypothesis Testing on Set-valued Data*", UAI, 2021.
12. **A. Bellot**, M. van der Schaar, "*A Kernel Two-Sample Test with Selection Bias*", UAI, 2021.
13. **A. Bellot**, R. A. Floto, M. van der Schaar, "*AI-based Hypothesis Testing in Individuals with CF*", Pediatric Pulmonology (Abstract), 2020.
14. Y. Zhang, **A. Bellot**, M. van der Schaar, "*Learning Overlapping Representations for the Estimation of Individualized Treatment Effects*", AISTATS, 2020.
15. Z. Qian, A. Alaa, **A. Bellot**, M. van der Schaar, "*Learning Dynamic and Personalized Comorbidity Networks from Event Data using Deep Diffusion Processes*", AISTATS, 2020.
16. 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
17. 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.

18. Y. Ruan, **A. Bellot**, and others. "*Predicting the Risk of Inpatient Hypoglycemia With Machine Learning Using Electronic Health Records*", Diabetes Care, 2020.
19. **A. Bellot**, M. van der Schaar, "*A Bayesian Approach to Modelling Longitudinal data*", ACM Computing for Healthcare, 2020.
20. **A. Bellot**, M. van der Schaar, "*Conditional Independence Testing using Generative Adversarial Networks*", NeurIPS, 2019.
21. **A. Bellot**, M. van der Schaar, "*Boosting Transfer Learning with Survival Data from Heterogenous Domains*", AISTATS, 2019.
22. **A. Bellot**, M. van der Schaar, "*Multitask Boosting for Survival Analysis with Competing Risks*", NeurIPS, 2018.
23. **A. Bellot**, M. van der Schaar, "*Boosted Trees for Risk Prognosis*", Machine Learning for Healthcare Conference (MLHC), 2018.
24. **A. Bellot**, M. van der Schaar, "*Tree-based Bayesian Mixture Model for Competing Risks*", AISTATS, 2018.
25. **A. Bellot**, M. van der Schaar, "*A Hierarchical Bayesian Model for Personalized Survival Predictions*", IEEE J. BHI, 2018.