Jack Storror Carter

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Research positions

EUTOPIA-SIF Marie Sklodowska-Curie COFUND Fellow at Universitat Pompeu Fabra. Statistics group, Department of Economics and Business and Barcelona School of Economics (2024 - present)

Supervised by Prof David Rossell working on separating the concepts of dependence and dispersion in the selection of Gaussian graphical models.

Post-doctoral researcher, Dipartimento di Matematica, Università di Genova (2022 - 2024)

Working with Prof Eva Riccomagno on the development of statistical methodology for staged tree models.

Post-doctoral researcher, Department of Statistics, University of Warwick (2021 - 2022)

Working with Prof Jim Smith and the UK Defence Science and Technology Laboratory on using Bayesian methods and graphical modelling for detecting illicit drug production.

PhD researcher, OxWaSP CDT, Department of Statistics, University of Warwick (2017 – 2021)

Supervised by Prof Jim Smith working on penalised likelihood methods and prior distributions for Gaussian precision matrices with a focus on undirected graphical model selection. Developed the PC-GLASSO penalised likelihood which allows for scale invariant sparse precision matrix estimation.

PhD exchange, Department of Economics and Business, Universitat Pompeu Fabra (Apr - May 2019, Feb - Mar 2020)

Hosted by Prof David Rossell working on topics related to my PhD research with a focus on the use of spike and slab and non-local priors for Gaussian graphical models.

Education

University of Warwick (2017 - 2021)
PhD in Statistics supervised by Prof Jim Smith
Thesis title: *Partial correlation based penalty functions and prior distributions for Gaussian graphical models.*

University of Oxford (2016 - 2017)
Taught year of OxWaSP CDT in Statistics

University of Warwick (2012 - 2016)
MMORSE - First class honours (89%)
Masters dissertation: *Integrating gene expression and clinical measures of rheumatoid arthritis disease activity.*
(Supervised by Dr Julia Brettschneider and Prof Mark Girolami)

The College of Richard Collyer, Horsham (2010 - 2012)
A-levels: Mathematics (A*), Further Mathematics (A*), Economics (A)

Publications

Carter JS, Leonelli M, Riccomagno E, Ugolini A (2025). Staged trees for discrete longitudinal data. Metrika. https://link.springer.com/article/10.1007/s00184-024-00987-9. Open access preprint available on arXiv.

Carter JS, Rossell D, Smith JQ (2024). Partial correlation graphical LASSO. Scandinavian Journal of Statistics, 51(1), 32–63. https://doi.org/10.1111/sjos.12675. Open access.

Carter JS, Leonelli M, Riccomagno E, Varando G (2024). Learning staged trees from incomplete data. International Conference on Probabilistic Graphical Models (PMLR) 246, 231-252. https://proceedings.mlr.press/v246/carter24a.html. Open access.

Carter JS (2024). A note on incorrect inferences in non-binary qualitative probabilistic networks. Artificial intelligence, 335, 104180. https://doi.org/10.1016/j.artint.2024.104180. Open access preprint available on arXiv.

Carter JS, Smith JQ, Westoby PB, Reeman SM (2022). Bayesian modelling of illicit fentanyl production. Official research report for the UK Defence Science and Technology Laboratory (restricted).

Carter JS (2021). Partial correlation based penalty functions and prior distributions for Gaussian graphical models. PhD thesis. University of Warwick.

Software

I developed an R package for calculation of the partial correlation GLASSO. It is publicly available on github.

I also played a minor role in updating and maintaining the cegpy python package for selection, estimation and drawing of staged tree models.

Awards

- Winner of Best Poster Prize at ISBA world meeting (2026)
- Giving to Warwick award for an outstanding contribution by PhD students to the Statistics Department's teaching programme (2018)
- Warwick MORSE Prize for an outstanding overall performance in MORSE/MMORSE (2016)
- Thomas Bayes Prize for outstanding performance in third year examinations of an integrated Masters degree (2015)
- Faculty of Actuaries Prize for the best performance in a third year Actuarial Sciences module (2015)
- Karl Pearson Prize for outstanding performance in second year examinations (2014)
- Academic Excellence Prize for an excellent performance in first year examinations (2013)

Teaching

2026	Introduction to R Programming (Barcelona School of Economics). 10 hours of lectures.
2019-2020	Bayesian Statistics and Decision Theory (University of Warwick). Three tutorial sessions; 1 group of 40 students.
2018-2019	Introduction to Mathematical Statistics and Mathematical Statistics B (University of Warwick). Fortnightly problem classes with marking; 2 groups of 15 students.
2017-2018	Mathematical Statistics A & B (University of Warwick). Fortnightly problem classes with marking; 2 groups of 15 students.
2015-2016	Mathematical Techniques (University of Warwick). Weekly problem classes with marking; 1 group of 15 students.

Additional roles and responsibilities

Organiser of the young researchers meeting in the Statistics department at the University of Warwick for the academic year 2018-2019. Roles include arranging speakers for 30 talks throughout the year and advertising the talks to young researchers throughout the department.

Reviewer for the Journal of Computational and Graphical Statistics, PGM2026, Statistics and Computing, and Computational Statistics.

Presentations and posters

2026	ISBA world meeting. Presented a poster titled *Positive definiteness in separable priors: effects on prior interpretability and inference*. Winner of Best Poster Prize.
2025	Internal statistics seminar (Universitat Pompeu Fabra). Presentation titled *Parameterising Gaussian graphical models.*
2024	ISBA world meeting and the 4th Italian meeting on probability and mathematical statistics. Presented a poster titled *Separable priors for Gaussian graphical model selection*.
2023	Jim Smith 70th birthday conference (University of Warwick). Presentation titled *Continuous time chain event graphs.*
2022	Warwick CEG workshop. Presentation titled *Positive dependence in graphical models.*
2022	Gregynog statistical conference. Presentation titled *Partial correlation graphical lasso.*
2020	Bayes Comp (University of Florida). Presented a poster titled *Designing spike and slab priors for Graphical model selection.*
2019	Young researchers meeting (University of Warwick). Presentation titled *Non-local priors for Gaussian graphical model selection.*

2018 OxWaSP workshop (University of Warwick). Presented a poster titled *Qualitative probabilistic networks.*

Selected workshops and training courses

2018 Amazon study trip. An advanced training course on topics in machine learning and computing for big data analysis hosted at Amazon's research centre in Berlin.

2016-2017 Academy for PhD Training in Statistics (APTS). Four week-long residential courses each with two intensive modules in topics related to statistics and probability.

2015 NIHR statistics group workshop (University of Birmingham). Discussed the clinical and statistical challenges of using ultrasound to diagnose rheumatoid arthritis.

Outreach

- Summer school 2023 and STAGE 2024 in the Department of Mathematics at the University of Genoa. Introductory classes on statistics, correlation and causation for high school students.
- University of Warwick Science Gala 2019 & 2020. Presented a game show introducing the Monty Hall problem for school aged children.
- Big Bang UK Young Scientists and Engineers Fair 2018. Manned the stall for the University of Warwick statistics department for children aged 10-13.