# Jack Storror Carter

Dipartimento di Matematica, Università di Genova, jack.carter@dima.unige.it
jackstorrorcarter.github.io

## Research positions

### Postdoctoral researcher, Dipartimento di Matematica, Università di Genova (2022 - present)

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

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

**Carter JS**, Leonelli M, Riccomagno E, Varando G (2024). Learning staged trees from incomplete data. (Submitted to the International Conference on Probabilistic Graphical Models, preprint available on arXiv).

**Carter JS**, Leonelli M, Riccomagno E (2024). Staged trees for discrete longitudinal data. (Submitted to Metrika, 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.

## Awards

– 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

| | |
|---|---|
| 2019-2020 | Bayesian Statistics and Decision Theory.<br>Three tutorial sessions; 1 group of 40 students. |
| 2018-2019 | Introduction to Mathematical Statistics and Mathematical Statistics B.<br>Fortnightly problem classes with marking; 2 groups of 15 students. |
| 2017-2018 | Mathematical Statistics A & B.<br>Fortnightly problem classes with marking; 2 groups of 15 students. |
| 2015-2016 | Mathematical Techniques.<br>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.

## Programming

Extensive experience using R and Latex. Initial experience using Python.

## Presentations and posters

| | |
|---|---|
| 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*. |
| 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.