

# Francesca Romana Crucinio

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<https://francescacrucinio.github.io/>

## Research Interests

Computational statistics, in particular: interacting particle methods, sequential Monte Carlo, Markov chain Monte Carlo, optimal transport applications to sampling.

## Academic Positions

Feb 2024 –	Lecturer, King’s College London.
Jan 2023 – Dec 2023	CREST Postdoctoral Fellow, ENSAE Paris.
May 2021 – Dec 2022	Research Fellow, Department of Statistics, University of Warwick.

## Education

2017 – 2021	<b>Ph.D. in Statistical Science</b> , University of Warwick and University of Oxford (UK). Supervisors: Arnaud Doucet and Adam M. Johansen. Thesis: <i>Some interacting particle methods with non-standard interactions</i> . Awarded the John Copas Award for the best PhD thesis in the Department of Statistics.
2015	<b>Erasmus+ Student Exchange Program</b> , Queen Mary University of London (UK).
2014 – 2016	<b>M.Sc. in Mathematical Engineering</b> , Politecnico di Torino (Italy). Grade: 110/110 cum laude Supervisor: Roberto Fontana. Thesis: <i>MCMC algorithms to test for difference in means of two samples</i> .
2011 – 2014	<b>B.Sc. in Mathematics for Engineering</b> , Politecnico di Torino (Italy). Grade: 110/110 cum laude

## Awards

Sep 2022	John Copas Award for the best PhD thesis in the Department of Statistics, University of Warwick.
Dec 2021	Teaching Excellence Award, Warwick Business School.
Mar 2019	STEM for Britain Bronze Award, Houses of Parliament, London.

## Publications

### ▷ PREPRINTS

1. Chopin N., **Crucinio F.R.**, Korba A. *A connection between Tempering and Entropic Mirror Descent*, arXiv pre-print: 2310.11914
2. Akyildiz Ö. D., **Crucinio F.R.**, Girolami M., Johnston T., Sabanis S. *On Interacting Particle Systems for Expectation Maximization*, arXiv pre-print: 2303.13429
3. **Crucinio F.R.**, Durmus A., Jiménez P., Roberts, G. O. *Optimal Scaling Results for a Wide Class of Proximal MALA Algorithms*, arXiv pre-print: 2301.02446
4. **Crucinio F.R.**, De Bortoli V., Doucet A., Johansen, A.M. *Solving Fredholm Equations of the First Kind via Wasserstein Gradient Flows*, arXiv pre-print: 2209.09936

### ▷ PEER-REVIEWED JOURNALS

1. Kuntz J., **Crucinio F.R.**, Johansen, A.M. *The divide-and-conquer sequential Monte Carlo algorithm: theoretical properties and limit theorems*, Annals of Applied Probability, 34(1B): 1469-1523

2. **Crucinio F.R.**, Johansen, A.M. *A divide and conquer sequential Monte Carlo approach to high dimensional filtering*, Statistica Sinica, Volume 34, Online Special Issue I, 2024
3. **Crucinio F.R.**, Johansen, A.M. *Properties of Marginal Sequential Monte Carlo Methods*, Statistics and Probability Letters, Volume 203, 109914, 2023
4. **Crucinio F.R.**, Doucet A., Johansen, A.M. *A Particle Method for Solving Fredholm Equations of the First Kind*. Journal of the American Statistical Association, 118:542, 937-947, 2023
5. Kuntz J., **Crucinio F.R.**, and Johansen A.M. *Product-form estimators: exploiting independence to scale up Monte Carlo*. Statistics and Computing 32, 12, 2022
6. Fontana R., **Crucinio F. R.**, *Orbit-based conditional tests. A link between permutations and Markov bases*. Journal of Statistical Planning and Inference 205:(23-33), 2020

▷ CONFERENCE PROCEEDINGS AND BOOK CHAPTERS

1. **Crucinio F.R.**, Fontana R., *Speeding up algebraic-based sampling via permutations*. In: La Rocca M., Liseo B., Salmaso L. (eds) Nonparametric Statistics. ISNPS 2018. Springer Proceedings in Mathematics & Statistics 339(145-155), 2020
2. Fontana R., **Crucinio F.R.**, *Comparison of conditional tests on Poisson data*. Statistics and Data Science: new challenges, new generations. SIS 2017 Proceedings, Firenze University Press, 2017

▷ BOOKS

1. Bonino D., **Crucinio F.R.**, Fontana R., Pellerey F., *Elementi di Statistica per l'Ingegneria e l'Architettura. Teoria ed esercizi svolti*. Società Editrice Esculapio, 2017

▷ OTHER

1. **Crucinio F.R.** *Some interacting particle methods with non-standard interactions*, PhD Thesis, University of Warwick, 2021
2. **Crucinio F.R.**, *Microthesis: A Novel Algorithm for Solving Fredholm Integral Equations*, LMS Newsletter (493), 2021

## Teaching & Supervision

▷ TEACHING

2024	Lecturer, M.Sc course <i>Computational Statistics</i> , King's College London
2023	Tutorial Supervisor, M.Sc. course <i>Simulations and Monte-Carlo</i> , ENSAE Paris
2022	Main Instructor, CoSInES+Bayes4Health masterclass on <i>sequential Monte Carlo methods</i> , University of Bristol
2020	Lab Assistant at the Academy for PhD Training in Statistics
2019–2020	Graduate Teaching Assistant, M.Sc. course <i>Business Statistics</i> , Warwick Business School
2018–2021	Graduate Teaching Assistant, B.Sc. courses <i>Probability</i> , <i>Mathematical Techniques</i> , <i>Mathematical Statistics</i> and <i>Mathematical Methods</i> , University of Warwick
2014–2016	Tutor, B.Sc. courses <i>Probability and Statistics</i> and <i>Statistical Lab</i> , Politecnico di Torino

▷ RESEARCH INTERNS

2023	Aryan Kotwal, University of Warwick
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## Funding

Jul 2023	Travel and subsidence grant, SMC Down Under Workshop, Brisbane, Australia.
Mar 2023	Travel grant, BayesComp2023, Levi, Finland.
Jun 2022	Travel and subsidence grant, ATI Workshop on Accelerating generative models and nonconvex optimisation, London, UK.
Dec 2021	Travel and subsidence grant, Heilbronn Workshop on Interaction Mechanisms in Monte Carlo, Bristol, UK.
Jan 2020	Travel grant, BayesComp2020, Gainesville, Florida.
Jun 2018	Travel grant, St Peter's College, University of Oxford, UK.
Oct 2017	EPSRC-MRC OxWaSP Ph.D. scholarship (4 years), University of Warwick, UK.
Jan 2015	Erasmus+ Scholarship (6 months), Politecnico di Torino.

## Research Visits

Jul 2023 | Sydney Mathematical Research Institute, Sydney, Australia.

## Seminars, Talks and Posters

### ▷ SEMINARS

May 2024 | Imperial College London, (London, UK).  
Apr 2024 | Seminar series at Ca' Foscari (Venice, Italy).  
Apr 2024 | Institut de recherche mathématique avancée (Strasbourg, France).  
Jan 2024 | Collegio Carlo Alberto (Torino, Italy).  
Jul 2023 | NIASRA Seminar, University of Wollongong, (Wollongong, Australia).  
May 2023 | Computational Statistics and Machine Learning Reading Group, Lancaster University (virtual).  
Mar 2023 | All About That Bayes Seminar, AgroParisTech (Paris, France).  
Mar 2023 | Séminaire Parisien de Statistique, Institut Henri Poincaré (Paris, France).  
Feb 2023 | CREST-CMAP Statistics Seminar, ENSAE (Paris, France).  
Nov 2022 | Young Researchers Meeting, University of Warwick (Coventry, UK).  
Oct 2022 | Algorithms and Computationally Intensive Statistics Seminar, University of Warwick (Coventry, UK).  
May 2022 | CoSInES+Bayes4Health Seminar (virtual).  
Nov 2021 | Young Researchers Meeting, University of Warwick (Coventry, UK).  
Oct 2021 | EC Bayes Seminar, Queensland University of Technology (Brisbane, Australia).  
May 2021 | CoSInES+Bayes4Health Seminar (virtual).  
Mar 2021 | Department of Mathematics, Newcastle University (Newcastle, UK).  
Feb 2021 | Statistics, Probability, Analysis, Applied Mathematics Seminar, University of Warwick (Coventry, UK).  
May 2020 | SMC Reading Group, University of Warwick (Coventry, UK).  
Mar 2020 | Algorithms and Computationally Intensive Statistics Seminar, University of Warwick (Coventry, UK).  
Feb 2020 | Young Researchers Meeting, University of Warwick (Coventry, UK).  
Oct 2019 | Young Researchers Meeting, University of Warwick (Coventry, UK).

### ▷ INVITED PRESENTATIONS

Jul 2024 | ISBA 2024 (Venice, Italy).  
May 2024 | 6th Workshop on Sequential Monte Carlo Methods (Edinburgh, UK).  
Dec 2023 | Gradient Flows For Sampling, Inference, and Learning (RSS London, UK).  
Sep 2023 | 23rd European Young Statisticians Meeting (virtual, Ljubljana, Slovenia).  
Jul 2023 | SMC Down Under: AMSI-AustMS Workshop on Sequential Monte Carlo (Brisbane, Australia).  
Mar 2023 | ATI Closing Workshop on Accelerating generative models and nonconvex optimization (London, UK).  
Mar 2023 | BayesComp 2023 (Levi, Finland).  
Jun 2022 | Third Italian Meeting on Probability and Mathematical Statistics (Bologna, Italy).  
Dec 2021 | Heilbronn Workshop on Interaction Mechanisms in Monte Carlo: Beyond Resampling (Bristol, UK).  
Oct 2021 | OxWaSP Annual Workshop (virtual).  
Sep 2019 | 10th International Workshop on Simulation and Statistics (Salzburg, Austria).  
Jun 2018 | 4th Conference of the International Society for Non-Parametric Statistics (Salerno, Italy).

### ▷ CONTRIBUTED PRESENTATIONS

Jun 2024 | 4th Italian Meeting on Probability and Mathematical Statistics (Rome, Italy).  
Feb 2024 | SIAM Uncertainty Quantification (Trieste, Italy).  
Oct 2023 | Bayes at CIRM (Marseille, France).  
Sep 2022 | Warwick Statistics 50th Anniversary Conference (Coventry, UK).  
Jul 2022 | 15th International Conference on Monte Carlo and Quasi-Monte Carlo Methods (Linz, Austria).  
Apr 2022 | Warwick Statistics Conference (Gregynog, UK).  
Sep 2021 | Bayesian Young Statisticians Meeting (virtual).  
Jul 2021 | SIAM Student Conference, (Coventry, UK).  
May 2021 | ENBIS 2021 Online Spring Meeting: Data Science in Process Industries (virtual).

▷ POSTERS

Jun 2023	14th International Conference on Monte Carlo methods and Applications (Paris, France).
May 2022	5th workshop on sequential Monte Carlo (Madrid, Spain).
Jan 2020	BayesComp 2020 (Gainesville, Florida).
Aug 2019	Greek Stochastics (Corfu, Greece)
May 2019	Warwick Statistics Conference (Gregynog, Wales)
Mar 2019	Amazon OxWaSP Workshop (Berlin, Germany)
Mar 2019	STEM for Britain (London, UK)

## Professional Activities

▷ EDITORIAL WORK

Reviewer for *Journal of Machine Learning Research*, *Statistica Sinica*, *Journal of Computational and Graphical Statistics*, *Statistical Papers*, *Mathematics and Computers in Simulation*.

▷ PHD EXAMINER

Imke Botha (QUT, 2024).

▷ ORGANIZING COMMITTEE MEMBER

Nov 2022	CoSInES+Bayes4Health masterclass on Variational Inference, University of Cambridge (UK).
Apr 2022	CoSInES+Bayes4Health masterclass on sequential Monte Carlo, University of Bristol (UK).
Jul 2018	Young Statisticians' Meeting, University of Oxford (UK).

▷ SESSIONS ORGANIZER

Jun 2024	4th Italian Meeting on Probability and Mathematical Statistics, Rome, Italy.
Feb 2024	Minisymposium at SIAM Conference on Uncertainty Quantification, Trieste, Italy.

▷ SOCIETIES

Sep 2020 – Sep 2021 | Secretary of the SIAM-IMA Student Chapter, University of Warwick (UK).

## Outreach

- ▷ Panellist at Warwick Women in Maths, University of Warwick (2021).
- ▷ Panellist at A Statistician's Job, University of Genova (2021).
- ▷ STEM for Britain poster competition, Houses of Parliament, London (2019).
- ▷ Mathematical tour guide at Oxford Maths festival, University of Oxford (2018).