

# Francesca Romana Crucinio

francesca.crucinio@gmail.com

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

## Academic Positions

Jan 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

## Research Interest

I am interested in computational statistics and interacting particle methods (e.g. importance sampling, sequential Monte Carlo, Markov chain Monte Carlo, McKean-Vlasov stochastic differential equations) both from a methodological and a theoretical point of view. Most of my work is motivated by problems in engineering and applied mathematics with a particular focus on scalability to high dimensional problems.

I am also interested in optimal transport and its applications to Bayesian statistics.

In the past, I also worked on algebraic statistics, sampling methods for discrete distributions and their connections with permutation-based procedures.

## Publications

### ▷ PREPRINTS

1. Akyildiz Ö. D., **Crucinio F.R.**, Girolami M., Johnston T., Sabanis S. *On Interacting Particle Systems for Expectation Maximization*, arXiv pre-print: 2303.13429
2. **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
3. **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. **Crucinio F.R.**, Johansen, A.M. *Properties of Marginal Sequential Monte Carlo Methods*, arXiv pre-print: 2303.03498, Statistics and Probability Letters, In press
2. Kuntz J., **Crucinio F.R.**, Johansen, A.M. *The divide-and-conquer sequential Monte Carlo algorithm: theoretical properties and limit theorems*, arXiv pre-print: 2110.15782, Annals of Applied Probability, In press

3. **Crucinio F.R.**, Johansen, A.M. *A divide and conquer sequential Monte Carlo approach to high dimensional filtering*, arXiv pre-print: 2211.14201, Statistica Sinica, In press
4. 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
5. **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, 2021
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

## 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.

## 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.
Oct 2017	EPSRC-MRC OxWaSP Ph.D. scholarship (4 years), University of Warwick.
Jan 2015	Erasmus+ Scholarship (6 months), Politecnico di Torino.
2011 – 2014	Merit-based partial tuition waiver, Politecnico di Torino.

## Research Visits

Jul 2023	Sydney Mathematical Research Institute, Sydney, Australia.
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## Seminars, Talks and Posters

### ▷ SEMINARS

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

Sep 2024	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

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

June 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)

## Teaching

- ▷ Tutorial Supervisor, M.Sc. course *Simulations and Monte-Carlo*, ENSAE Paris (2023).

- ▷ Main Instructor, CoSInES+Bayes4Health masterclass on *sequential Monte Carlo methods*, University of Bristol (Mar 2022).
- ▷ Lab Assistant at the Academy for PhD Training in Statistics (2020).
- ▷ Graduate Teaching Assistant, M.Sc. course *Business Statistics*, Warwick Business School (2019, 2020).
- ▷ Graduate Teaching Assistant, B.Sc. courses *Probability*, *Mathematical Techniques*, *Mathematical Statistics* and *Mathematical Methods*, University of Warwick (2018, 2019, 2020, 2021).
- ▷ Tutor, B.Sc. courses *Probability and Statistics* and *Statistical Lab*, Politecnico di Torino (2014, 2015, 2016).

## Editorial work

- ▷ Reviewer for *Journal of Machine Learning Research*, *Statistica Sinica*, *Journal of Computational and Graphical Statistics*, *Statistical Papers*.

## Professional activities

Sep 2022	Organizer of the social activities for the CoSInES+Bayes4Health methodology week, University of Warwick (UK).
Nov 2022	Organizer of the CoSInES+Bayes4Health masterclass on Variational Inference, University of Cambridge (UK).
Apr 2022	Organizer of the CoSInES+Bayes4Health masterclass on sequential Monte Carlo, University of Bristol (UK).
Sep 2020 – Sep 2021	Secretary of the SIAM-IMA Student Chapter, University of Warwick (UK).
Sep 2019 – Sep 2020	Secretary of the Statistics Research Student Staff Liaison Committee, University of Warwick (UK).
Jul 2018	Organizing Committee Member, Young Statisticians' Meeting, University of Oxford (UK).
Jul 2016	Volunteer, European Innovation Academy (Italy).

## 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).