Curriculum Vitae

Personal information

Name / Surname	**Cremaschi, Andrea**
Address	30 Medical Dr, Singapore 117609.
Telephone	+65 82498932
Personal Email	cremaschia@sics.a-star.edu.sg
Nationality	Italian
Date of birth	Nov 20th 1987

Current Position

Apr 2023 – Now
Research Scientist

Sep 2020 – Apr 2023
Senior Research Fellow
Singapore Institute for Clinical Sciences (SICS), A*STAR, Singapore.

Feb 2023 – Now
Assistant Professor (Adjunct)
Department of Paediatrics, National University of Singapore (NUS), Singapore.

Previous Positions

Aug 2019 – Aug 2020
PostDoc
Yale-NUS College, Singapore.

Oct 2016 – July 2019
PostDoc
Department of Cancer Immunology, Institute of Cancer Research, Oslo University Hospital, Oslo (Norway) and
Oslo Centre for Biostatistics and Epidemiology (OCBE), University of Oslo, Oslo (Norway)

Education

Sep 2012 – Sep 2016
Ph.D. in Statistics, School of Mathematics, Statistics and Actuarial Science (SMSAS), University of Kent, Canterbury, Kent (UK)
Thesis title: "*Comparing computational approaches to the analysis of high-frequency trading data using Bayesian methods*"
Supervisors: Prof. J. E. Griffin and Dr. A. Kume

Sep 2009 - Apr 2012
Master Degree in Mathematical Engineering (Laurea Magistrale in Ingegneria Matematica), Politecnico di Milano, Milan (Italy)
Dissertation: "*Model-based clustering via Bayesian nonparametric mixture models*"
Supervisors: Prof. A. Guglielmi and Dr. R. Argiento

Sep 2006 - Sep 2009
Bachelor Degree in Mathematical Engineering (Laurea Triennale in Ingegneria Matematica), Politecnico di Milano, Milan (Italy)
Dissertation: *"On the problem of dataset record-linkage: a probabilistic approach*"
Supervisors: Prof. A. M. Paganoni and Dr. F. Ieva

Sep 2001 - Sep 2006
Maturitá scientifica. Ist. Giuseppe Peano, Cinisello B.mo, Milan (Italy)

Research Interests

My research interests include both methodological and applied aspects of Statistics, particularly within the Bayesian framework. One of my main interests is Bayesian nonparametrics, and the use of flexible models for inference in scenarios where the data present peculiar features. Recently, I have focused on modelling data presenting deviations from standard assumptions (e.g., normality, homogeneity) with sparse dependency structure and group-specific dependencies, aiming at the flexible inclusion of mixed-type covariates into the analysis. These features are often encountered in biomedical studies, which are one of the main application areas of my research, due to the complex phenomena typically investigated in this field.
The work I am conducting at the Singapore Institute of Clinical Sciences (SICS, A*STAR) focuses on such applications and sees the implementation of advanced, often semi-parametric, Bayesian models. In particular, I am involved in the study of large longitudinal cohorts (e.g., GUSTO, S-PRESTO) involving mother/child pairs, providing a wealth of information. The statistical analyses are often characterised by two main aspects: on the one hand, the focus is on the development of novel statistical methodologies to accommodate the features of the data structures to be analysed; on the other hand, the aim is to explore the dependence between different aspects of the cohorts, allowing for the inclusion of diverse data types simultaneously. In recent work with other members of SICS, we developed a novel methodology for the joint analysis of data of different structural type, namely longitudinal biomarkers of growth and metabolic pathways, as well as the joint modelling of longitudinal questionnaires in the context of translational neuroscience.
During my first Postdoctoral experience at the University of Oslo (Norway), I increased my knowledge on Biostatistics and biomedical applications, and often had the possibility to contribute to the research environment by providing useful analytic insights on the data. In close collaboration with the Institute for Cancer Research and the Norwegian Centre for Molecular Medicine (NCMM), I focused on the analysis of dose-response data derived from cancer patients. In particular, my projects focused on the study of drug combination experiments, i.e. in-vitro assays in which multiple drugs are tested simultaneously. The aim of the study is to quantify the differential effect (synergistic or antagonistic) emerging from such experiments via the specification of suitable statistical models.

Publications and Conference Proceedings (in chronological order)

Cremaschi A, Argiento R, De Iorio M, Shirong C, Chong YS, Meaney MJ, Kee MZ (2022) Seemingly Unrelated Multi-State processes: a Bayesian semiparametric approach. *Bayesian Analysis*, 1(1), pp.1-23.

Mozdzen A, **Cremaschi A**, Cadonna A, Guglielmi A, Kastner G (2022) Bayesian modeling and clustering for spatio-temporal areal data: an application to Italian unemployment (*accepted*). *Spatial Statistics*.

Franzolini B, **Cremaschi A**, Boom WvD and De Iorio M (2022) Bayesian clustering of multiple zero-inflated outcomes. "Bayesian Inference: Challenges, Perspective, and Prospects" issue of *Philosophical Transactions of the Royal Society A*, guest edited by Professor Michael Jordan, Professor Christian Robert and Professor Judith Rousseau.

Molinari M, **Cremaschi A**, De Iorio M, Chaturvedi N, Hughes AD, Tillin T (2022) Bayesian Dynamic Network Modelling: an application to metabolic associations in cardiovascular diseases. *Journal of Applied Statistics*, pp.1-25.

Molinari M, **Cremaschi A**, De Iorio M, Chaturvedi N, Hughes AD, Tillin T (2022) Bayesian nonparametric modelling of multiple graphs with an application to ethnic metabolic differences. *Journal of the Royal Statistical Society: Series C (Applied Statistics)*, in press.

Giliberto M, Thimiri Govinda Raj DB, **Cremaschi A**, Skånland SS, Gade A, Tjønnfjord GE, Schjesvold F, Munthe LA and Taskén K (2022) Ex vivo drug sensitivity screening in multiple myeloma identifies drug combinations that act synergistically. *Molecular Oncology*, 16(6), pp.1241-1258.

Cremaschi A, De Iorio M, Chong YS, Meaney MJ, Kee MZ (2021) A Bayesian nonparametric approach to dynamic item-response modelling: an application to the GUSTO cohort study. *Statistics in Medicine*, 40(27), pp.6021-6037.

Rønneberg L, **Cremaschi A**, Hanes R, Enserink J, Zucknick M (2021) bayesynergy: flexible Bayesian modelling of synergistic interaction effects in in-vitro drug combination experiments. *Briefings inBbioinformatics*, 22(6), p.bbab251.

Wade S, Piccarreta R, **Cremaschi A**, Antoniano-Villalobos I (2021) Colombian Women's Life Patterns: A Multivariate Density Regression Approach. *Bayesian Analysis*, 17(2), pp.405-433.

Argiento R, **Cremaschi A**, Vannucci M (2019) Hierarchical Normalized Completely Random Measures to Cluster Grouped Data. *Journal of the American Statistical Association*, 1-43.

Cremaschi A, Argiento R, Shoemaker K, Peterson C, Vannucci M (2019) Hierarchical Normalized Completely Random Measures for Robust Graphical Modeling. *Bayesian Analysis* (honourable mention in Lindley prize 2019), 1-31.

Cadonna A, **Cremaschi A**, Guglielmi A (2019) Bayesian modeling for large spatio-temporal data: an application to mobile networks. Contributed paper to *SIS 2019 – Smart Statistics for Smart Applications*.

Skånland S, **Cremaschi A**, Bendiksen H, Hermansen JU, Raj D, Munthe LA, Tjønnfjord GGE and Taskén K (2019) An in vitro assay for biomarker discovery and dose prediction applied to ibrutinib plus venetoclax treatment of CLL. *Leukemia*.

Skånland S, **Cremaschi A**, Bendiksen H, Hermansen JU, Raj D, Munthe LA, Tjønnfjord GE and Taskén K (2019) Ibrutinib plus Venetoclax synergistically reduces signaling and viability in CLL: implications for niomarker discovery: PB1870. *HemaSphere*, 3, 852.

Raj D, **Cremaschi A**, Skånland S, Gade A, Schjesvold F, Tjønnfjord GE, Geir E, Munthe LA and Taskén K (2019) In-vitro drug sensitivity screening in chronic lymphocytic leukemia (CLL) patient samples identifies drug candidates for precision cancer therapy: PF360. *HemaSphere*, 3, 132.

Raj D, **Cremaschi A**, Skånland S, Gade A, Schjesvold FH, Tjønnfjord GE, Geir E, Munthe LA and Taskén K (2018) In-vitro drug sensitivity screening in chronic lymphocytic leukemia (CLL) primary patient samples identifies drug candidates for precision cancer therapy. *Blood*, 132(Supplement 1), 4676-4676.

Cremaschi A (2018) Stephen W. Looney, Joseph L. Hagan. Analysis of Biomarker Data: a Practical Guide. *Biometrical Journal* (book review).

Myhrvold IK, **Cremaschi A**, Hermansen JU, Tjønnfjord GE, Munthe LA, Taskén K and Skånland S (2018) Single cell profiling of phospho-protein levels in chronic lymphocytic leukemia. *Oncotarget*, 9(10), 9273-9284.

Neufuss J, Humle T, **Cremaschi A**, Kivell TL (2017) Nut-cracking behaviour in wild-born, rehabilitated bonobos (Pan paniscus): a comprehensive study of hand-preference, hand grips and efficiency. *American Journal of Primatology* 79.2: e22589.

Cremaschi A (2017) Comparing computational approaches to the analysis of high-frequency trading data using Bayesian methods. *PhD thesis dissertation*. University of Kent, Canterbury. `https://kar.kent.ac.uk/60839/1/104Thesis_Cremaschi_Final.pdf`

Cremaschi A, Griffin JE (2016) On the Study of Two Models for Integer-Valued High-Frequency Data. *Bayesian Statistics in Action - Proceedings of BAYESM 2016 Conference*, Springer.

Argiento R, **Cremaschi A**, Guglielmi A (2014) A "Density-Based" Algorithm for Cluster Analysis Using Species Sampling Gaussian Mixture Models. *Journal of Computational and Graphical Statistics*, 23(4), 1126-1142. DOI: 10.1080/10618600.2013.856796.

Argiento R, **Cremaschi A**, Guglielmi A (2013) Cluster analysis of curved-shaped data with species-sampling mixture models. *Proceedings of SCo2013 - Complex Data Modeling and Computationally Intensive Statistical Methods for Estimation and Prediction*, ISBN 97888-6493-019-0.

Articles in preparation

Cremaschi A, Yang W, De Iorio M, Evans WE, Yang JJ and Rosner GL. Bayesian modelling of response to therapy and drug-sensitivity in acute lymphoblastic leukemia (*submitted*).

Cremaschi A, De Iorio M, Kothandaraman N, Yap F, Tint MT, Eriksson JG. Joint modelling of association networks and longitudinal biomarkers: an application to childhood obesity (*requested revision*). arXiv preprint https://arxiv.org/abs/2111.06212.

Cremaschi A, Wertz T, De Iorio M. Repulsion, Chaos and Equilibrium in Mixture Models (*submitted*).

Cremaschi A, Franzolini B, De Iorio M, Fogel AM, Eriksson JG. "A joint approach to the analysis of longitudinal growth measures and eating behaviour questionnaires in the GUSTO cohort.".

Thway Tint M, **Cremaschi A**, Leow MKS, Natarajan PP, Beng AS, Lai JS, Yen JCK, Tan KH, Yng CS, Bernard J, Colega MT, Mok A, Gluckman PD, Chong YS, Godfrey KM, Chong MFF, Cameron-Smith D, Mueller-Riemenschneider F, Zhang C, Harvey NC, De Iorio M, Eriksson JG. "Body composition and bone health in women of reproductive age: Differential contributions by lean and fat mass ".

Kee MZ, **Cremaschi A**, De Iorio M, Meaney MJ. Multi-cohort analysis of longitudinal depression scores (*submitted*).

Cremaschi A, De Iorio M, Thway Tint M, Eriksson JG. "Joint analysis of growth indicators, demographic traits and clinical biomarkers via differential network analysis: application to the GUSTO cohort study".

Cremaschi A, Cadonna A, Guglielmi A, Quintana F. "Bayesian nonparametric modelling for large spatio-temporal data with application to population dynamics".

Invited talks

2023 – Dec, 16 — Cremaschi A, Wertz T, De Iorio M *Repulsion, Chaos and Equilibrium in Mixture Models.* 16th International Conference of the ERCIM WG on Computational and Methodological Statistics (CMStatistics 2023). Berlin, Germany.

2023 – Aug, 01 — Cremaschi A, Wertz T, De Iorio M *Repulsion, Chaos and Equilibrium in Mixture Models.* 6th International Conference on Econometrics and Statistics (EcoSta 2023). Tokyo, Japan.

2019 – Mar, 26 — Cremaschi A, Argiento R, Vannucci M. "Hierarchical Normalized Completely Random Measures for Robust Graphical Modeling". Department of Mathematics, University of Oslo, Oslo (Norway).

2019 – Mar, 26 — Cremaschi A, Argiento R, Vannucci M. "Hierarchical Normalized Completely Random Measures for Robust Graphical Modeling". Department of Mathematics, University of Oslo, Oslo (Norway).

2018 – Dec, 14 — Cremaschi A, Skånland S, Taskén K, Zucknick M. "Gaussian graphical models for the analysis of phospho-flow cytometry data from drug combination experiments". CFE-CMStatistics 2018, Pisa (Italy).

Jul, 19 — Cremaschi A, Frigessi A, Taskén K, Zucknick M. "A Bayesian model for the Study of Drug-Drug Interactions". Dept. of Mathematics, Politecnico di Milano, Milan (Italy).

2017 – Dec, 18 — Argiento R, Cremaschi A, Vannucci M. "A Hierarchical Nonparametric Approach for Robust Graphical Modelling". CFE-CMStatistics 2017, London (UK).

Jul, 4 — Cremaschi A, Frigessi A, Taskén K, Zucknick M. "A Bayesian approach to modelling drug interactions. An application to ovarian cancer data". Institute for Molecular Medicine Finland (FIMM), Helsinki (Finland).

2016 – Dec, 9 — Cremaschi A, Griffin JE. "Bayesian inference and prediction for high-frequency data using Particle Filtering". CFE-CMStatistics 2016, Seville (Spain).

Jan — Cremaschi A, Griffin JE. "Bayesian analysis of high-frequency financial data". Dept. of Mathematics, Politecnico di Milano, Milan (Italy).

2014 – May — Cremaschi A, Griffin JE. "Bayesian inference for integer-valued Lévy processes with non-Gaussian Ornstein-Uhlenbeck volatility modelling" Dept. of Engineering, Cambridge University, Cambridge (UK).

2012 – Dec — Argiento R, Cremaschi A, Guglielmi A. "A "Density-Based" Algorithm for Cluster Analysis Using Species Sampling Gaussian Mixture Models". CNR - IMATI, Milano, (Italy).

Contributed talks

2023 – Dec, 16 — Cremaschi A, Wertz T, De Iorio M *Repulsion, Chaos and Equilibrium in Mixture Models.* CMStatistics 2023, Berlin.

2023 – Aug, 01 — Cremaschi A, Wertz T, De Iorio M *Repulsion, Chaos and Equilibrium in Mixture Models.* EcoSta 2023, Japan.

2022 – Oct, 24 — Cremaschi A, Wertz T, De Iorio M *Repulsion, Chaos and Equilibrium in Mixture Models.* BNP13 2022, Chile.

2021 – June, 28 — Cremaschi A, Argiento R, De Iorio M, Shirong C, Chong YS, Meaney MJ, Kee MZ (2021) *Seemingly Unrelated Multi-State processes: a Bayesian semiparametric approach.* ISBA 2021 (held online).

2017 – Aug, 29 — Cremaschi A, Frigessi A, Taskén K, Zucknick M. *A Bayesian model for the study of drug interactions. An application to ovarian cancer data.* ISBS 2017, Vienna (Austria).

Jul, 10 — Cremaschi A, Frigessi A, Taskén K, Zucknick M. *A Bayesian model for the study of drug interactions. An application to ovarian cancer data.* ISCB 2017, Vigo (Spain).

2016 – Jun, 19 — Cremaschi A, Griffin JE. "Bayesian inference for high-frequency data using particle filtering". 3rd Bayesian Young Statisticians Meeting (BAYSM), Florence (Italy).

2014 – Apr, 28 — Cremaschi A, Griffin JE. "Bayesian inference for integer-valued Lévy processes with non-Gaussian Ornstein-Uhlenbeck subordinator". Research Student Conference (RSC) meeting, University of Nottingham, Nottingham (UK).

Scientific Awards

2021 — SICS Emerging Principal Investigator award. Awarded by the Singapore Institute for Clinical Sciences (SICS), ASTAR.

2019 — Lindley prize honourable mention for the paper "Hierarchical Normalized Completely Random Measures for Robust Graphical Modeling", published in Bayesian Analysis, 14(4), 1271-1301, 2019.

Scientific Activities

Since 2023 — Referee for the peer-reviewed journal *Bayesian Analysis*, *Computational Statistics (COST)*.

Since 2022 — Organizer of the three-session track "Bayesian semi- and nonparametric modelling" for CM-Statistics, the International Conference of the ERCIM WG on Computational and Methodological Statistics. Joint with:

- 2022: B. Nipoti (University of Milan Bicocca) and F. Barrientos (University of Florida)
- 2023 - Now: F. Barrientos (University of Florida) and Guillaume Kon-Kam-King (INRAE, National Research Institute for Agriculture, Food and Environment, France)

2022-2023 — Session Organiser for the International Conference on Econometrics and Statistics (EcoSta), Japan.

Since 2022 — Referee for the peer-reviewed journalS *Annals of Applied Statistics*, *Australian & New Zealand Journal of Statistics*, *Briefings in Bioinformatics*, *Statistics in Medicine*.

2014 — Seminar co-Leader for the Postgraduate and PhD seminars at the School of Mathematics, Statistics and Actuarial Science (SMSAS). University of Kent, Canterbury (UK).

Seminar Leader for the reading group: "Introduction to Stochastic Calculus". School of Mathematics, Statistics and Actuarial Science (SMSAS). University of Kent, Canterbury, Kent (UK).

Visiting

2022 – Aug (full month) — Visiting Prof. Michael Meaney at The Douglas Research Centre, affiliated with McGill University and the Montreal West Island IUHSSC, Montreal, Canada.

2019 – May — Visiting Dr. Annalisa Cadonna at WU (Vienna University of Economics and Business).

2018 – Jul — Visiting Prof. Alessandra Guglielmi at the Dept. of Mathematics, Politecnico di Milano, Milan (Italy).

2017 – May — Visiting Prof. Tero Aittokallio and Dr. Krister Wennerberg at the Institute for Molecular Medicine Finland (FIMM), Helsinki (Finland).

2013 – May — Visiting Dr. Sara Wade and Prof. Zoubin Ghahramani at the Dept. of Engineering, University of Cambridge, Cambridge (UK).

Teaching

2021 – Sep, 23 — Masterclass on "Statistical Analysis of Questionnaire Data" for the Ministry of Education of Singapore (MOE), MOE Research Forum. Lecture by Prof. Maria De Iorio, Practical by Andrea Cremaschi.

2020 – Dec — Lecture talk to the students of the course of Bayesian Statistics "A change-point random partition model for large spatio-temporal datasets" Cadonna A, Cremaschi A, Guglielmi A, Quintana F. Politecnico di Mialno, Milan (Italy).

2019 – Jul — Lecture talk to the students of the course of Bayesian Statistics "A Bayesian model for the Study of Drug-Drug Interactions" Cremaschi A, Frigessi A, Taskén K, Zucknick M. Politecnico di Mialno, Milan (Italy).

2018 – Nov	PhD lecture from "A Bayesian analysis of some nonparametric problems" by Ferguson, T. S. *The annals of statistics* (1973): 209-230. Dept. of Mathematics, University of Oslo (Norway).
2017 – Aug-Dec	Cominelli M. "Bayesian mixture models for the analysis of pFLOW data: an application to a Chronic Lymphocytic Leukemia dataset". Masters Degree dissertation. Supervisors: Guglielmi A and Cremaschi A. The student visited the Oslo Center for Biostatistics and Epidemiology (OCBE), Oslo (Norway).
2014 – **2015**	Lecturer for the course Foundation Statistics and Tutor for the course Stage 1 Mathematics. School of Mathematics, Statistics and Actuarial Science (SMSAS), University of Kent, Canterbury (UK).

Skills

Software	Experienced programmer in R, Rcpp, Matlab, WinBUGS, C/C++.
Languages	English (fluent); Italian (mother tongue); Spanish (discrete); Norwegian (basic).

Referees

Prof. Maria De Iorio	Professor at Yong Loo Lin School of Medicine, National University of Singapore, Singapore; Principal Investigator at SICS (A*STAR); Professor of Biostatistics in the Department of Statistical Science, UCL (UK) **email**: mdi@nus.edu.sg, m.deiorio@ucl.ac.uk
Prof. Marina Vannucci	Noah Harding Professor and Graduate Advisor, Department of Statistics, Rice University (Texas) **email**: marina@rice.edu
Prof. Raffaele Argiento	Statistics at the Department of Economics, Universitá degli Studi di Bergamo (Italy) **email**: raffaele.argiento@unibg.it
Prof. Alessandra Guglielmi	Full Professor in Statistics, Department of Mathematics, Politecnico di Milano (Italy) **email**: alessandra.guglielmi@polimi.it
Prof. Jim Griffin	Professor of Statistical Science, Department of Statistical Science, UCL (UK) **email**: j.griffin@ucl.ac.uk