Curriculum Vitae

Personal information

Name / Surname	**Andrea Cremaschi**
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Nationality	Italian
Date of birth	Nov 20th 1987
Gender	Male

Current Position

Apr 2023 – Now	**Senior Scientist I**
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 (both parametric and nonparametric), using flexible models for inference in scenarios where the data present non-standard features. These include scenarios where the data present deviations from standard assumptions, such as normality, homogeneity, non-linear relationships and group-specific dependencies. These features are often encountered in biomedical studies, a primary focus of my work, due to the complex phenomena typically investigated in this field. Nevertheless, my interests extend across various domains, including econometrics and behavioural science among others.

The work I am conducting at the Singapore Institute of Clinical Sciences (SICS, A*STAR) focuses on the implementation of advanced, often semi-parametric, Bayesian models to real-life data applications. In particular, I am involved in the study of large longitudinal cohorts (e.g., GUSTO, S-PRESTO) involving Singaporean children and their parents, collecting a wealth of information including biological samples, behavioural traits and socio-demographic characteristics. These datasets are highly heterogeneous as they involve mixed-type responses, a wide range of predictors and time dynamics. In this framework, the application of Bayesian nonparametric models allows for a more flexible fitting. The focus of my work is on detection of modifiable factors for early intervention. The fields of research I mostly focus on are transaltional neuroscience, metabolomics and child development.

Besides biomedical applications, I am also interested in the cost-effectiveness analysis of intervention strategies in the framework of Health Economics, application of machine learning techniques to imaging, as well as population density dynamics. Recently, I have been involved in projects related to these fields of study, currently in their submission phase.

Publications

Cremaschi A, De Iorio M, Kothandaraman N, Yap F, Tint MT and Eriksson J (2023) Joint modelling of association networks and longitudinal biomarkers: an application to child obesity. *Statistics in Medicine* - in publication.

Kee MZL, **Cremaschi A**, De Iorio M, Chen H, Montreuil T, Nguyen TV, Côté SM, O'Donnell KJ, Giesbrecht GF, Letourneau N, Chan SY and Meaney MJ (2023) Perinatal Trajectories of Maternal Depressive Symptoms in Prospective, Community-Based Cohorts across Three Continents. *JAMA Network Open*, 6(10), e2339942-e2339942.

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. *Spatial Statistics*, 52, p.100715.

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)*, 71(5), 1181-1204.

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 in Bioinformatics*, 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.

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*, 34(2), 478-487.

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. *Hema-Sphere*, 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, 4676.

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.

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.

Pipeline

Cremaschi A, Wertz T, De Iorio M. Repulsion, Chaos and Equilibrium in Mixture Models (*requested revision*) arXiv preprint arXiv:2306.10669.

Cremaschi A, Cadonna A, Guglielmi A, Quintana F. "A change-point random partition model for large spatio-temporal datasets" (*submitted*) arXiv preprint arXiv:2312.12396.

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. (*requested revision*) *Research Square*. doi: 10.21203/rs.3.rs-2542277/v1

Husain SF, **Cremaschi A**, Suaini NHA, De Iorio M, Loo EXL, Shek LP, Goh AEN, Meaney MJ, Tham EH and Law EC. "Maternal asthma symptoms during pregnancy on child behaviour and executive function: A Bayesian phenomics approach" (*requested revision*).

Harris A, **Cremaschi A**, Lim TS, De Iorio M, Kwa CG. "From Past to Future: Digital Methods Towards Artefact Analysis" (*submitted*) arXiv preprint arXiv:2312.13790.

Bischof K, **Cremaschi A**, Eroukhmanoff L, Landskron J, Flage-Larsen L, Gade A, Bjørge L, Urbanucci A and Taskén K. "Patient-derived ascites affects drug responses in ovarian cancer cell lines through the activation of key signaling pathways" (*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.".

van den Boom W, **Cremaschi A**, Beng Hui Ng N, Franzolini B, Tan KB, Chan Kok Yen J, Tan KH, Chong YS, Eriksson JG and De Iorio M. "Post-partum diabetes screening of mothers with a history of gestational diabetes: a cost-effectiveness analysis in Singapore" (*in preparation*).

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 " (*in preparation*).

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" (*in preparation*).

Other Scientific Output

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.*

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

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 (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.

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 – 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), A*STAR.
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 (IN-RAE, 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	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 and Supervision

2021/2022 Co-supervision of final projects of students from Yale-NUS college, Singapore.
Main supervisor: Prof. Maria De Iorio (NUS, A*STAR).

- Yoon S: "Bayesian Multiple Response Model through RegressiOn Graph Universal Estimator"
- Ropion MDV: "Probability Theory as an Approximation of Reality"

2021 – Sep, 23 Masterclass on "Statistical Analysis of Questionnaire Data" for the Ministry of Education of Singapore (MOE), MOE Research Forum. Lecture (1h) by Prof. Maria De Iorio; Practical (1h) 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, C/C++, Rcpp, Matlab, BUGS, Python.

Languages English (fluent); Italian (mother tongue); Spanish (intermediate); Norwegian (beginner).