Europass Curriculum Vitae

Personal information

Surname(s) / First name(s)	**Cremaschi, Andrea**
Address(es)	30 Medical Dr, Singapore 117609.
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Email(s)	andrea.cremaschi@sics.a-star.edu.sg / andreacremaschi87@gmail.com
Nationality(-ies)	Italian
Date of birth	Nov 20th 1987

Current Position

Sep 2020 – Now

Senior Research Fellow
Singapore Institute for Clinical Sciences (SICS), A*STAR, 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)
Oslo Centre for Biostatistics and Epidemiology, 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).
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, due to the complex phenomena typically investigated, representing an ideal field of application for my research.
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 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

Cremaschi A., De Iorio M., Chong Y. S., Meaney M., Kee M. (2021). "A Bayesian nonparametric approach to dynamic item-response modelling: an application to the GUSTO cohort study". *Statistics in Medicine* (*accepted*).

Rønneberg L., Cremaschi A., Hanes R., Enserink J. M., Zucknick M. (2021). "bayesynergy: flexible Bayesian modelling of synergistic interaction effects in in-vitro drug combination experiments". *Briefings in Bioinformatics* https://doi.org/10.1093/bib/bbab251.

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

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* (honorable 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 J. U., Raj D., Munthe L. A., Tjønnfjord G. G. E., Taskén K. (2019) "An in vitro assay for biomarker discovery and dose prediction applied to ibrutinib plus venetoclax treatment of CLL". *Leukemia*.

Skånland S. S., Cremaschi A., Bendiksen H., Hermansen J. U., Raj D. B. T. G. Munthe, L. A. Tjønnfjord, G. E. Taskén, K. (2019). "Ibrutinib plus Venetoclax synergistically reduces signaling and viability in CLL: implications for niomarker discovery: PB1870". *HemaSphere*, 3, 852.

Raj T. D. G., Cremaschi A., Skånland S., Gade A., Schjesvold F., Tjønnfjord G. E., Geir E., Munthe A. L. 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 T. G., Cremaschi A., Skånland S. S., Gade A., Schjesvold F. H., Tjønnfjord G. E., Geir E., Munthe A. L. 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 I. K., Cremaschi A., Hermansen J. U., Tjønnfjord G. E., Munthe L. A., 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 T. L. (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 J. E. (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

Molinari M., Cremaschi A., De Iorio M., Chaturvedi N., Hughes A. D., Tillin T. (2020). "Bayesian nonparametric modelling of multiple graphs with an application to ethnic metabolic differences" (*under revision*).

Molinari M., Cremaschi A., De Iorio M., Chaturvedi N., Hughes A. D., Tillin T. (2020). "Bayesian Dynamic Network Modelling: an application to metabolic associations in cardiovascular diseases" (*under revision*).

Cremaschi A., Argiento R., De Iorio M., Shirong C., Chong Y.S., Meaney M.J., Kee M.Z. (2021) "Seemingly Unrelated Multi-State processes: a Bayesian semiparametric approach". (*submitted*) arXiv preprint arXiv:2106.03072.

Cremaschi A., De Iorio M., Tint M., Eriksson J.. "Joint analysis of growth indicators and metabolic networks in the GUSTO cohort study".

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

Cadonna A., Cremaschi A., Guglielmi A., Quintana F.. "Bayesian nonparametric modelling for large spatio-temporal data with time-varying clustering".

Cadonna A., Cremaschi A., Guglielmi A.. "Bayesian nonparametric modelling for large spatio-temporal data with application to socio-economic data".

Cremaschi A., Frigessi A., Taskén K., Zucknick M. (2019) "A Bayesian approach to study synergistic interaction effects in in-vitro drug combination experiments". arXiv preprint arXiv:1904.04901.

Cremaschi A., Landskron J., Eroukhmanoff L., Gade A., Flage-Larsen L., Bjørge L., Urbanucci A., Taskén K.. "Ovarian cancer ascites promote aberrant signaling activation plasticity and chemo resistance in tumour microenvironment".

Raj D., Cremaschi A., Skånland S., Gade A., Tjønnfjord G. E., Schjesvold F. H., Munthe L. A. and Taskén K. . "In-Vitro Drug Sensitivity Screening in Chronic Lymphocytic Leukemia (CLL) Primary Patient Samples Identifies Drug Candidates for Precision Cancer Therapy".

Raj D., Giliberto M., Raj T. D. G., Cremaschi A., Skånland S., Gade A., Tjønnfjord G. E., Schjesvold F. H., Munthe L. A., Taskén K. (2021). "*Ex vivo* drug sensitivity screening for identification of identifies drug combinations that act synergistically against patient-derived multiple myeloma cells".

Invited talks

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 J. E.. "Bayesian inference and prediction for high-frequency data using Particle Filtering". CFE-CMStatistics 2016, Seville (Spain).

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

2014 – May — Cremaschi A., Griffin J. E.. "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

2021 – June, 28 — Cremaschi A., Argiento R., De Iorio M., Shirong C., Chong Y.S., Meaney M.J., Kee M.Z. (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 J. E.. "Bayesian inference for high-frequency data using particle filtering". 3rd Bayesian Young Statisticians Meeting (BAYSM), Florence (Italy).

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

Posters

2019 – Jun, 24 — Cremaschi A., L. Rønneberg, Frigessi A., Taskén K., Zucknick M.. *Investigating a Bayesian semi-parametric model for the study of synergistic interaction effects in in vitro drug combination experiments.* BNP 12, Oxford (UK).

2017 – Sep, 6 — Cremaschi A., Frigessi A., Taskén K., Zucknick M.. *A Bayesian model for the study of drug interactions. An application to ovarian cancer data.* EMBL Meeting, Helsinki (Finland).

2016 – Jun, 6 — Cremaschi A., Griffin J. E.. *Bayesian inference for high-frequency data using particle filtering.* ISBA World Meeting, Sardegna (Italy).

2014 – Nov, 6 — Cremaschi A., Griffin J. E.. *Bayesian (non)parametric inference for integer-valued Lévy processes with Gaussian AR(1) stochastic volatility modelling*, ESOBE Meeting, ESSEC, Paris (France)

2012 – Jul, 7 — Cremaschi A., Griffin J. E.. *Bayesian (non)parametric inference for integer-valued Lévy processes with non-Gaussian Ornstein-Uhlenbeck stochastic volatility modelling.* Computational Methods for Jump Processes, CRiSM, Warwick (UK)

Invited/Contributed talks at conferences (by coauthors)

2018 – Dec, 14 — **Cadonna A.**, Cremaschi A., G. Guglielmi. "Bayesian spatio-temporal clustering for areal data". CFE-CMStatistics 2018, Pisa (Italy).

Dec, 14 — **Antoniano-Villalobos I.**, Cremaschi A., Piccarreta R., Wade S.. "Colombian women's life choices: A Bayesian nonparametric multivariate regression approach". CFE-CMStatistics 2018, Pisa (Italy).

Jun, 24 — **Argiento R.**, Cremaschi A., Vannucci M.. "A hierarchical nonparametric approach for robust graphical modelling in omics data". ISBA *2018 World Meetings*, Edinburgh (UK).

2016 – Jun — Antoniano-Villalobos I., Cremaschi A., Piccarreta R., **Wade S.**. "Colombian women's life choices: A Bayesian nonparametric multivariate regression approach". ISBA *2016 World Meeting*, Cagliari (Italy).

2012 – Jun — **Argiento R.**, Cremaschi A., Guglielmi A.. "A "density-based" algorithm for cluster analysis using Dirichlet process Gaussian mixture models". ISBA *2012 World Meeting*, Kyoto (Japan).

Research Seminars

2018 – Oct, 31 — Cremaschi A., Frigessi A., Taskén K., Zucknick M.. "A Bayesian model for the study of Drug-Drug Interactions". Institute for Cancer Research, Radium Hospital, Oslo (Norway).

Jun, 7 — Cremaschi A., Frigessi A., Taskén K., Zucknick M.. "A Statistical model for the study of Drug Interactions". Norwegian Center for Molecular Medicine (NCMM), Oslo (Norway).

2017 – Mar, 14 — Cremaschi A., Frigessi A., Taskén K., Zucknick M.. "Preliminary study of drug-drug interaction data". Norwegian Center for Molecular Medicine (NCMM), Oslo (Norway).

2016 – Feb, 26 — Cremaschi A., Griffin J. E.. "Bayesian analysis of high-frequency financial data". University of Kent, Canterbury (UK).

Jan	Cremaschi A., Griffin J. E.. "Bayesian analysis of high-frequency financial data". Politecnico di Milano, Milan (Italy).
2015 – Oct, 26	Cremaschi A., Griffin J. E.. "Analysis using Particle Filtering techniques (continued)". EPSRC Meeting, London (UK).
May, 19	Cremaschi A., Griffin J. E.. "Analysis using Particle Filtering techniques". EPSRC Meeting, London (UK).
Mar, 6	Cremaschi A.. "Bayesian parametric Survival Analysis: an application to *Game of Thrones* data". University of Kent, Canterbury (UK).
2014 – Nov, 1	Cremaschi A.."Interpretation(s) of Probability and Statistical Modelling". University of Kent, Canterbury (UK).
Oct, 7	Cremaschi A., Griffin J. E.. "Analysis of High-Frequency data". University of Kent, Canterbury (UK).
Sept-Nov	Cremaschi A.. Introductory weekly classes on Stochastic Calculus. University of Kent, Canterbury (UK).
Jun, 27	Cremaschi A., Griffin J. E.. "Some approaches to Big Data analysis". EPSRC Meeting, London (UK).
Mar, 14	Cremaschi A.. "Introduction to Bayesian nonparametrics". University of Kent, Canterbury (UK).
2012 – Nov, 23	Cremaschi A.. "Clustering via Bayesian nonparametrics". University of Kent, Canterbury (UK).

Visiting

2018 – Jul	Visting 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).

Scientific Activities and Awards

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.
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).

Teaching

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., F. Quintana. 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).
2017 – Aug-Dec	M. Cominelli. "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).

2015 – Mar

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, Oslo (Norway).

Lecturer for the course Foundation Statistics. School of Mathematics, Statistics and Actuarial Science (SMSAS), University of Kent, Canterbury (UK). AcYrs: 2014/15.

Tutoring for the course Stage 1 Mathematics. School of Mathematics, Statistics and Actuarial Science (SMSAS), University of Kent, Canterbury (UK). AcYrs: 2012/13, 2013/14, 2014/15.

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 and
Principal Investigator at SICS (A*STAR) and
Professor of Science at Yale-NUS College and
Professor of Biostatistics in the Department of Statistical Science, UCL (UK)
email: mdi@nus.edu.sg, m.deiorio@ucl.ac.uk

Prof. Jim Griffin: Professor of Statistical Science, Department of Statistical Science, UCL (UK)
email: j.griffin@ucl.ac.uk

Prof. Marina Vannucci: Noah Harding Professor and Graduate Advisor, Department of Statistics, Rice University (Texas)
email: marina@rice.edu

Prof. Alessandra Guglielmi: Full Professor in Statistics, Department of Mathematics, Politecnico di Milano (Italy)
email: alessandra.guglielmi@polimi.it

Dr. Raffaele Argiento: Associate Professor of Statistics, Department of Statistics, Università Cattolica del Sacro Cuore (Italy)
email: raffaele.argiento@unicatt.it