Yiye Jiang

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Positions	**November 2023 - Present:** Post-doctoral researcher, Statify team, Inria, France
	February 2022 - June 2023: Temporary teacher-researcher (ATER), Université de Bordeaux/Image optimization and probability team, Institut de Mathématiques de Bordeaux, France
	October 2018 - December 2022: Doctoral researcher, Image optimization and probability team, Institut de Mathématiques de Bordeaux, France

Education

October 2018 - December 2022: Institut de Mathématiques de Bordeaux, France
Thesis title: *Statistical analysis of spatio-temporal and multi-dimensional data from a network of sensors.*
Supervisors: Jérémie BIGOT, Sofian MAABOUT
Funding : MESRI

September 2017 - November 2018: Université de Bordeaux, France
M.Sc. in Modelling of Images and Signals   162.163/200

September 2015 - December 2018: Xiamen Universiy, China
M.Sc. in Probability and Mathematical Statistics

September 2011 - July 2015: Xiamen Universiy, China
B.Sc. in Mathematics and Applied Mathematics

April 2013 - July 2015: Xiamen Universiy, China
B.Ec. in Financial Mathematics

Research articles

1. A Bayesian approach for estimating brain functional connectivity networks in resting-state fMRI data (in preparation), joint work with Alice Chevaux (phd student at UGA, France), Julyan Arbel (Associate researcher at Inria Grenoble, France), Guillaume Kon Kam King (Senior researcher at Inrae, France), Wendy Meiring (Professor at UC Santa Barbara, US), Alex Petersen (Associate professor at BYU, US), Sophie Achard (Senior researcher CNRS, France).

   Inference of brain functional connectivity (FC) networks from resting-state fMRI (rs-fMRI) data is a key focus in neuroimaging. This paper introduces a Bayesian model to infer a FC graph from multivariate rs-fMRI time series from one subject. Unlike most existing methods for this problem that estimate constant weights, our model infers posterior distributions of weights, deducing more robust point estimates by taking into account estimation uncertainty and enabling diverse post-inference analyses. To the best of our knowledge, only one existing Bayesian FC model is applicable to resting-state fMRI data for single subjects, making our approach a valuable addition to the field with superior performance demonstrated in our experiments. In practice, we introduce a prior distribution over correlation matrices that allows explicit control over the marginal means and variances of individual entries. This flexibility not only facilitates the integration of expert knowledge but also provides a robust foundation for constructing other models in the field.

2. Y. Jiang. Wasserstein multivariate autoregressive models and its application in graph learning from distributional time series. arXiv preprint arXiv: 2207.05442. 2022. Submitted to Journal of time series analysis.

This work concerns the modelling of a collection of distributional time series, $\boldsymbol{\mu}_t^i \in \mathcal{P}(\mathbb{R})$, $i = 1, \ldots, N, t \in \mathbb{Z}$. We would like to infer a graph which characterises the dependency structure of these series. To this end, we extended the classical vector auto-regressive model which is a central tool in time series analysis to describe the dependency of a collection of scalar time series. To deal with the complex and non-Euclidean nature of distributional data, we rely on the statistics in Wasserstein space. The developed tools thus not only made a significant contribution in the community of graph learning, but also have been the first work which considered multiple covariates in Wasserstein regressive models given the non-trivial difficulties lifting from univariate to multivariate case.

3. Y. Jiang, J. Bigot & S. Maabout. Online graph topology learning from matrix-valued time series. Computational Statistics & Data Analysis, 2025, 202, 108065.

   This work is motivated by the graph learning from a collection of vectorial time series in the online fashion. To this end, we first extended the vector auto-regressive model to the matrix-variate auto-regressive model by relying on the Kronecker sum and its interpretation of Cartesian product graph. Secondly, we focused on the estimation method. Especially in high dimension, we proposed a novel Lasso type which distinguishes with the structure constraint and the l_1 regularization only on a subset of parameters. We then derived its homotopy algorithm. This derivation is non-trivial and in particular can be applied to other structure and partial sparsity designs. Since in online setting, the detrending step is forbidden, by contrast raw time series is usually not stationary as assumed by auto-regressive models. Therefore, in this final step, we augmented the auto-regressive model by incorporating periodic trends, and then adapted the previously derived algorithms. The combination of all these contributions provided the realistic online graph learning algorithms which can be applied directly on raw time series.

4. Y. Jiang, G Vergara-Hermosilla. Extended SIRU model with dynamic transmission rate and its application in the forecasting of COVID-19 under temporally varying public intervention. Biomath, 13 (2024), 2412176.

   This work concerns the empirical studies of the cumulative daily reported cases in Chile by considering the machine learning tools together with the classical epidemiological models.

5. Y. Jiang, J. Bigot & S. Maabout. Sensor selection on graphs via data-driven node sub-sampling in network time series. arXiv preprint arXiv:2004.11815. 2020.

   In this work, we are inspired by understanding the predictability of the data observed on different nodes in a network. We proposed the approaches to evaluate moreover rank the predictability of nodes with respect to the linear, kernel, and neural network predictors. The derived rankings serve as data-driven strategies for sensor selection. In this setting, the presence of historical data has significantly improved the reconstruction performance. In particular, the sensor selection based on the neural networks as a reconstruction method is innovative, which is far from the existing approaches.

6. Y. Jiang, J. Bigot, E. Provenzi. Commutativity of spatiochromatic covariance matrices in natural image statistics. *Mathematics in Engineering.* 2020, 2(2): 313-339. *This work is conducted in the context of the Master 2 internship at Institut de Mathématiques de Bordeaux.*

Reports

F. Coppini, Y. Jiang, S. Tabti. Predictive models on 1D signals in a small-data environment. Hal: hal-03211100. 2020. *This report is the result of work during the Semaine d'Études Mathématiques et Entreprises, where 4 teams of PhD students were dedicated to solve the problems proposed by the partner companies.*

Talks	**December 2024** 2024 IMS International Conference on Statistics and Data Science, Nice, France
	December 2024 The 18th International Joint Conference on Computational and Financial Econometrics (CFE) and Computational and Methodological Statistics (CM-Statistics), London, UK
	May 2024 Les 55ièmes Journées de Statistique, Bordeaux, France
	February 2024 Seminar of School of mathematical sciences, Xiamen University, China
	May 2023: Seminar of département Data, Laboratoire Jean Kuntzmann, Grenoble, France
	November 2022: Seminar of Causal Inference and Missing Data (CIMD) group at Inria, online
	October 2022: Seminar of Image Optimisation and Probability (IOP) team, Institut de Mathématiques de Bordeaux, Bordeaux, France
	August 2022: Journées MAS 2022, Rouen, France
	October 2021: Colloque des jeunes Probabilistes et Statisticiens 2021, île d'Oléron
Teaching	**September 2022 - June 2022:** Temporary teaching-research position (ATER) at Université de Bordeaux (160 HETD)
	- Chargée de TD en Fonctions de plusieurs variables L2.
	- Chargée de TD en Outils mathématiques L1.
	- Chargée de TD en Algèbre linéaire L1.
	February 2022 - July 2022: ATER at Université de Bordeaux (96 HETD)
	- Chargée de TD en Algèbre linéaire L1.
	- Chargée de TP en Statistiques nonparamétriques M1.
	- Supervision of the project *Algorithmes stochastiques pour la régression logistique* and jury member in the module *Données Massives* M2.
	November 2020 - March 2021: Supervision of the research internship of a Master 2 student in Applied Mathematics and Statistics (with main supervisor: Jérémie Bigot), at Université de Bordeaux. *Weekly video meetings as well as the various exchanges by email.*
Services	Reviewer for *Biometrika, Biometrics.*