

PROGRAMME AND ABSTRACTS

16th International Conference on
Computational and Financial Econometrics (CFE 2022)

<http://www.cfenetwork.org/CFE2022>

and

15th International Conference of the
ERCIM (European Research Consortium for Informatics and Mathematics) Working Group on
Computational and Methodological Statistics (CMStatistics 2022)

<http://www.cmstatistics.org/CMStatistics2022>

King's College London, UK

17 – 19 December 2022



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Local Organizer:

King's Business School and King's Department of Mathematics.
CFEnetwork and CMStatistics.

Dear Friends and Colleagues,

We warmly welcome you to London for the 16th International Conference on Computational and Financial Econometrics (CFE 2022) and the 15th International Conference of the ERCIM Working Group on Computational and Methodological Statistics (CMStatistics 2022). After two years of mainly virtual meetings, we are delighted to have the opportunity to have a mostly in-person conference again. In light of the ongoing uncertainty caused by the pandemic, we have opted for the conference to have a hybrid format, so that the participants can select to participate in person or virtually according to their circumstances; however, this year, most of the sessions are planned to be fully in person or hybrid, with the majority of the participants onsite.

The conference aims to bring together researchers and practitioners to discuss recent developments in computational methods for economics, finance, and statistics. The CFE-CMStatistics 2022 programme consists of about 450 sessions, four plenary talks, and more than 1750 presentations. With around 1930 participants registered, this conference is once again the biggest meeting of the conference series in terms of the number of participants and presentations. The growth of the conference in terms of size and quality makes it undoubtedly one of the most important international scientific events in the field.

The co-chairs have endeavoured to provide a balanced and stimulating programme that will appeal to the diverse interests of the participants. The international organizing committee hopes that the hybrid conference will provide an ideal environment to communicate effectively with colleagues, in many cases, for the first time in months. The conference is the collective effort of many individuals and organizations. The Scientific Programme Committee, the Session Organizers, the supporting universities, and many agents have contributed substantially to the organization of the conference. We acknowledge their work and the support of our networks.

The Kings College London (KCL) provides excellent facilities and a fantastic environment in central London. Through their efforts the local host and sponsoring organizations have substantially contributed to the successful organization of the conference. We thank them all for their support. In particular we express our sincere appreciation to the hosts, the Department of Mathematics at KCL and the Data Analytics for Finance and Macro (DAFM) Research Centre at the Kings Business School.

The Elsevier journal *Econometrics and Statistics* (EcoSta), inaugurated in 2017, will have its first impact factor next year. The EcoSta is an official journal of the networks of Computational and Financial Econometrics (CFEnetwork) and of Computational and Methodological Statistics (CMStatistics). It publishes research papers in all aspects of econometrics and statistics, and it comprises two sections, namely, Part A: Econometrics and Part B: Statistics. The participants are encouraged to submit their papers to special or regular peer-reviewed issues of EcoSta and its supplement *Annals of Computational and Financial Econometrics*.

The CMStatistics has also commenced *The Annals of Statistical Data Science* (SDS), which will be published as a supplement to the Elsevier journal *Computational Statistics & Data Analysis* (CSDA). The CSDA is also the official journal of CMStatistics. You are encouraged to submit your papers to the *Annals of Statistical Data Science* or regular peer-reviewed issues of CSDA.

Looking ahead, the CFE-CMStatistics 2023 will be held at HTW Berlin - University of Applied Sciences, from Saturday the 16th of December 2023 to Monday the 18th of December 2023. Tutorials will take place on Friday, the 15th of December 2023. You are invited and encouraged to participate in these events actively.

We wish you a productive and stimulating conference.

Ana Colubi, Erricos J. Kontoghiorghes and Manfred Deistler
Coordinators of CMStatistics & CFEnetwork and EcoSta.

**CMStatistics: ERCIM Working Group on
COMPUTATIONAL AND METHODOLOGICAL STATISTICS**

<http://www.cmstatistics.org>

The working group (WG) CMStatistics comprises a number of specialized teams in various research areas of computational and methodological statistics. The teams act autonomously within the framework of the WG in order to promote their own research agenda. Their activities are endorsed by the WG. They submit research proposals, organize sessions, tracks and tutorials during the annual WG meetings and edit journal special issues. The Econometrics and Statistics (EcoSta) and Computational Statistics & Data Analysis (CSDA) are the official journals of the CMStatistics.

Specialized teams

Currently, the ERCIM WG has over 1950 members and the following specialized teams

BIO: Biostatistics	NPS: Non-Parametric Statistics
BS: Bayesian Statistics	RS: Robust Statistics
DMC: Dependence Models and Copulas	SA: Survival Analysis
DOE: Design Of Experiments	SAE: Small Area Estimation
FDA: Functional Data Analysis	SDS: Statistical Data Science: Methods and Computations
HDS: High-Dimensional Statistics	SEA: Statistics of Extremes and Applications
IS: Imprecision in Statistics	SL: Statistical Learning
LVSEM: Latent Variable and Structural Equation Models	TSMC: Times Series
MM: Mixture Models	

You are encouraged to become a member of the WG. For further information, please contact the Chairs of the specialized groups (see the WG's website) or email at info@cmstatistics.org.

**CFEnetwork
COMPUTATIONAL AND FINANCIAL ECONOMETRICS**

<http://www.CFEnetwork.org>

The Computational and Financial Econometrics (CFEnetwork) comprises a number of specialized teams in various research areas of theoretical and applied econometrics, financial econometrics and computation, and empirical finance. The teams contribute to the network's activities by organizing sessions, tracks and tutorials during the annual CFEnetwork meetings, and by submitting research proposals. Furthermore, the teams edit special issues currently published under the Annals of CFE. The Econometrics and Statistics (EcoSta) is the official journal of the CFEnetwork. Currently, the CFEnetwork has over 1100 members.

You are encouraged to become a member of the CFEnetwork. For further information, please see the website or contact by email at info@cfenetwork.org.

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algorithms, mainly within the computational statistics community. We propose a new direction, and accompanying methodology borrowing ideas from statistical physics and computational chemistry for inferring the posterior distribution of latent diffusion paths and model parameters, given observations of the process. Joint configurations of the underlying process noise and of parameters, mapping onto diffusion paths consistent with observations, form an implicitly defined manifold. Then, by making use of a constrained Hamiltonian Monte Carlo algorithm on the embedded manifold, we are able to perform computationally efficient inference for a class of discretely observed diffusion models. Critically, in contrast with other approaches proposed in the literature, our methodology is highly automated, requiring minimal user intervention and applying alike in a range of settings, including: elliptic or hypo-elliptic systems; observations with or without noise; linear or non-linear observation operators. Exploiting Markovianity, we propose a variant of the method with complexity that scales linearly in the resolution of path discretisation and the number of observation times.

EO112 Room S0.13 PROJECTION PURSUIT: THEORY	Chair: Nicola Loperfido
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E1144: Partial least squares and interesting directions in data*Presenter:* **John Kent**, University of Leeds, United Kingdom

Consider the usual multiple linear regression of a response random variable y on a p -dimensional vector of explanatory random variables x . Ordinary least squares estimation looks for the linear combination of x that has the highest correlation with y . In contrast, partial least squares (PLS) is an iterative method; the first iteration looks for the standardized linear combination of x that has the highest covariance with y . The focus on standardized linear combinations makes PLS a “regularized” method of regression analysis. Higher-order iterations yield linear combinations of x that have no “direct” correlation with y , but instead have an “indirect” correlation through their correlations with earlier linear combinations of x . Partial least squares have close links to envelope models and Krylov matrix decompositions. The sequence of optimal linear combinations identified by PLS can be viewed as a sequence of random variables that is dual to a one-dimensional Gaussian Markov chain; indirect correlation in the regression setting corresponds to conditional dependence in the Markov chain setting. These connections provide some novel insights into the behavior of PLS.

E0763: The location of a minimum variance squared distance functional*Presenter:* **Zinoviy Landsman**, University of Haifa, Israel*Co-authors:* Tomer Shushi

A novel multivariate functional is introduced that represents a position where the intrinsic uncertainty of a system of mutually dependent risks is maximally reduced. The proposed multivariate functional defines the location of the minimum variance of squared distance (LVS) for some n -variate vector of risks X . We compute the analytical representation of $LVS(X)$, which consists of the location of the minimum expected squared distance, $LES(X)$, covariance matrix A , and a matrix B of the multivariate central moments of the third order of X . From this representation, it follows that $LVS(X)$ coincides with $LES(X)$ when X has a multivariate symmetric distribution, but differs from it in the non-symmetric case. As $LES(X)$ is often considered a neutral multivariate risk measure, we show that $LVS(X)$ also possesses the important properties of multivariate risk measures: translation invariance, positive homogeneity, and partial monotonicity. We also study the mean-variance approach based on the balanced sum of an expectation and a variance of the square of the aforementioned Euclidean distance and control for the closeness of $LES(X)$ and $LVS(X)$. The proposed theory and the results are distribution-free, meaning that we do not assume any particular distribution for the random vector X . The results are demonstrated with real data on Danish fire losses.

E0788: Optimal portfolio projections and their applications to skew-elliptically distributed portfolio returns*Presenter:* **Tomer Shushi**, Ben Gurion University of the Negev, Israel*Co-authors:* Nicola Loperfido

The concept of optimal portfolio projection is defined, as a procedure that projects the vector of weights of the portfolio return to a lower dimension such that one can explicitly solve the problem of optimal portfolio selection for any given risk measure. We study the class of skew-elliptically distributed risks. We show that following the proposed procedure, we are able to obtain explicit optimal weights for such risks, with a dramatic reduction of the complexity of such an optimization problem.

E0341: A computational perspective on projection pursuit in high dimensions: Feasible or infeasible feature extraction*Presenter:* **Chunming Zhang**, University of Wisconsin-Madison, United States

Finding a suitable representation of multivariate data is fundamental in many scientific disciplines. Projection pursuit (PP) aims to extract interesting “non-Gaussian” features from multivariate data and tends to be computationally intensive even when applied to data of low dimension. In high-dimensional settings, recent work on PP addresses asymptotic characterization and conjectures of the feasible projections as the dimension grows with sample size. To gain practical utility and learn theoretical insights into PP in an integral way, data analytic tools needed to evaluate the behaviour of PP in high dimensions become increasingly desirable but are less explored in the literature. The focus is on developing computationally fast and effective approaches central to finite sample studies for (i) visualizing the feasibility of PP in extracting features from high-dimensional data, as compared with alternative methods like PCA and ICA, and (ii) assessing the plausibility of PP in cases where asymptotic studies are lacking or unavailable, with the goal of better understanding the practicality, limitation and challenge of PP in the analysis of large data sets.

E0907: Projection pursuit in high dimensions*Presenter:* **Nicola Loperfido**, University of Urbino, Italy

Projection pursuit is a multivariate statistical technique aimed at finding interesting data projections. It suffers from several problems when applied to high-dimensional datasets. These problems are investigated within the framework of skewness-based projection pursuit, when the interesting projections are the maximally skewed ones. We address the problems by means of generalized tensor eigenvectors and symmetrizing linear projections. We illustrate the problems and the proposed solutions with a simple dataset with more variables than units.

EO060 Room Safra Lecture Theatre METHODS AND APPLICATIONS FOR FUNCTIONAL DATA ANALYSIS	Chair: Enea Bongiorno
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E1084: Mapping Brexit debate on twitter via functional graphical models*Presenter:* **Nicola Pronello**, University of Chieti-Pescara, Italy*Co-authors:* Emiliano del Gobbo, Lara Fontanella, Rosaria Ignaccolo, Luigi Ippoliti, Sara Fontanella

In recent years a literature on multivariate functional graph models has been developed. The graphical representation of the conditional dependence among a finite number of random variables is indeed appealing in different applications, such as for example the analysis of the brain connectivity. We want to investigate a novel extension of this methodology, considering random functions spatially and temporally correlated. A motivating example is the analysis of the semantic network emerging from twitter users. In particular the main goal of our analysis is to track the change of the Brexit debate on Twitter across UK during a particular time frame. By considering the change in time of a word usage as a functional realization, the semantic network regarding the topic of interest is then defined as a graphical representation of the conditional dependence among functional variables. Since each tweet considered is localized in both time and space we shall take into accounts such features to properly define the functional semantic network.

E1112: Robust control charts for multivariate functional data*Presenter:* **Christian Capezza**, University of Naples Federico II, Italy