Presentation titles and abstracts

Name: **Hailiang Du**	*Title:* Nowcasting with indistinguishable states

Abstract:
Constructing ensembles of indistinguishable states (Judd and Smith, 2001) provides an attractive new, alternative approach to data assimilation in high dimension nonlinear systems. In this setting, Ensemble Kalman Filtering (EKF) approaches are hampered by foundational assumptions of dynamical linearity, while particle filters require vast ensemble sizes to perform well in even moderately high dimensional spaces. The indistinguishable states approach is contrasted with an Ensemble Kalman Filtering (EKF) approach in terms of nowcasting; specifically the statistics of the predictive mass placed within an epsilon ball about the True state are computed as a function of epsilon. Specific cases are presented in detail to reveal why the indistinguishable states approach systematically outperforms this EKF; conditions under which it may be expected to outperform the plethora of other variants of the Kalman Filter are noted (unsurprisingly, the relevant shortcomings of the KF were first noted by Kalman (Kalman 1960) himself). The improved performance comes at the cost of not being a one-step method, which, on the other hand, allows an enhanced balance between the extracting information from the dynamic equations and information in the observations themselves. Results are presented in the 12 dimensional Lorenz 1996 system as well as illustrated with lower dimensional systems to ease visualization of the state space.

Name: **Flavia Giammarino**	*Title:* Econometric modelling of credit risk

Abstract:
My current research aims to model the relationship between credit default swaps (CDS) indices and other asset classes such as the stock market, the stock market's volatility, the spot interest rate and the foreign exchange market. Currently, only a few analyses have been carried out on CDS indices and most of the existing literature is focused on linear models for the conditional mean of single-name CDS spreads. In my research I focus on modelling both the conditional mean and the conditional variance of iTraxx Europe. This might be relevant for the purpose of portfolio and risk management and for trading and pricing iTraxx options.

Name: **Oksana Savina**	*Title:* Pareto-optimality: beyond the one-period model

Abstract:
The models for the one-period Pareto-optimal risk exchanges (POREX) are well-established. In this presentation, I introduce two alternative definitions for the multiperiod POREX, and obtain some necessary and sufficient conditions.

Name: **Pauline Sculli**	*Title:* Contagion in affine default processes

Abstract:
We present a new framework for the construction of contagion in reduced-form models of credit risk, originating from piecewise deterministic Markov process theory, which allows the credit dynamics of a large number of firms to be looped together in a mathematically tractable way. Furthermore, rather than working in the classical "single-default" framework, we model credit event arrival processes, which are often of greater contractual interest. We let the number of credit events occurring for each firm be a Poisson counting process with Levy intensity dynamics characterised by two classes of jumps, the origins of which can be self-infecting or contagious. Self-infectious shocks arise in reaction to a firm's own credit events, whereas contagious jump shocks arise in reaction to counterparty credit events. Alongside, we can also allow for background jump shocks that arrive but are not, ex-post, drivers of credit events. We present an exponential affine martingale which facilitates the analytical construction of survival probabilities via the probability generating function and the construction also of intensity moments, which we find as functions of the Laplace transforms of contagion distributions.

Name: **Sandrine Tobelem**	*Title:* Optimal portfolios under model ambiguity

Abstract:
In the present paper, we propose a new way to account for model ambiguity aversion, through the Ambiguity Robust Weighting (ARW) transformation function that is applied to the optimal weights obtained through expected utility maximization under each of the prior models the investor considers, rather than maximizing a Subjective Expected Utility where the probability weight assigned to each model is transformed through a concave function, as proposed by Klibanoff MArinacci and Mukerji (2006). Our model is more practical and easily applicable empirically: instead of trying to solve an exhaustive maximization problem, we first solve optimization problems for each of the priors considered, assuming they are not ambiguous. Then we compute an expected value of those weights, transformed by the ARW function This methodology allows the investor to differentiate between the judged probabilities she assigns to each of her priors (which can be assimilated to the likelihood of a given prior), and her psychological decision weights accounting for her ambiguity aversion. This methodology is often preferred among practitioners for its tractability and simplicity.

Name: **Edward Tredger**	*Title:* Current issues in the evaluation of climate models

Abstract:
Great political and public interest in the effects of global warming, combined with ever increasing computing power has resulted in some of the most copmlex models ever created - Global Circulation Models of the Earth's climate system. The nature of these models is introduced as well as the main areas of research in ths field. Current issues in establishing what predictive skill climate models can provide decision makers are discussed. Questions regarding the optimum distribution of computational resources for future development are presented.

Name: **Limin Wang**	*Title:* MSE in Gaussian processes

Abstract:
We regard eigenfunction from Karhunen-Loeve expansion as the basis function for Gaussian regression. Given observations, the optimal prediction for the next point is the posterior mean. Since we can only use finite order for the expansion, the MSE for the prediction can be calculated. We try to show that the MSE decreases when order increases under certain condition and provide a bound for it. Also, when order go to infinity, we discuss the Sacks-Ylvisaker condition for asymptotic behaviour of the MSE.

Name: **Shanle Wu**	*Title:* Parisian option pricing with jump processes

Abstract:
Brownian motion as the most popular model for the trajectory of stock prices has been questioned in recent years. Researchers in this field have provided several papers, extending the pricing models to the jump processes for some types of options. Nevertheless, there hasn't been any literature on Parisian options based on jump processes, which is the main focus of my research. Some powerful tools such as generator, optional sampling theory and Laplace transform have been applied to my recent research.

Name: **Young Lee**	*Title:* Pricing and hedging call option

Abstract:

Name:
Noha Youssef

Title:
Branch and bound algorithm for maximum entropy sampling

Abstract:
Finding an optimal design is an important issue in the context of experimental design. A design can be chosen according to maximum entropy sampling criterion. In the Gaussian case, the problem is equivalent to maximize the determinant of the covariance matrix. This problem is combinatorial and thus it cannot be solved directly. The Branch and Bound algorithm is suggested to find the maximum entropy design. Several covariance structures are used in our implementation of the algorithm. In addition, we discuss the role of different bounding functions in improving the performance of the algorithm.