Quantitative Finance at La Défense 2026

Session 1: Quantitative Portfolio Management

9:00 AM - Jean-Philippe Bouchaud

“Ponzi funds” and the order driven view of markets

We contrast the Efficient Market Hypothesis with the Inelastic Market Hypothesis, where prices are formed by flows, not discovered through news. Using ETF data, we find further evidence for such a mechanism and further reveal a "Ponzi fund" dynamics where investors cannot distinguish skill from price impact, creating self-reinforcing feedback loops: strong returns attract inflows, driving prices higher, attracting more inflows. The implications are far-reaching for economic theory and investment management, suggesting that we should stop thinking about “fundamental prices” discovered by markets, but about a co-construction where prices and information feedback on one another, creating a host of price anomalies (like trend following) that pervade financial markets.

9:45 AM - Raul Leote de Carvalho

Portfolio Construction for Robo-Advisory with Active and Passive Funds

This talk focuses on robo-advisory applications, where robust multi-asset portfolios must be constructed in a fully automated manner: at scale, rapidly, and with increasing levels of customization. I will present a robust portfolio optimization framework that integrates active and passive funds, explicitly accounting for uncertainty in investment views while incorporating expected alpha from actively managed funds, along with management fees, benchmark alignment, and implementation constraints.

As an integrated approach to modern portfolio construction, it enables the systematic generation of portfolios that remain consistent with strategic and tactical convictions while operating effectively under real-world conditions.

Session 2: Financial Connectedness and Risk Transmission

11:00 AM - Paolo Barucca

The Physics of Financial Networks

The field of Financial Networks is a paramount example of the novel applications of Statistical Physics that have made possible

by the present data revolution. As the total value of the global financial market has vastly outgrown the value of the real economy, financial institutions on this planet have created a web of interactions whose size and topology calls for a quantitative analysis by means of Complex Networks. Financial Networks are not only a playground for the use of basic tools of statistical physics as ensemble representation and entropy maximization; rather, their particular dynamics and evolution triggered theoretical advancements as the definition of DebtRank to measure the impact and diffusion of shocks in the whole systems. In this talk, I will start from the different definitions of financial networks, ranging from static monopartite to temporal multilayered networks (based either on loans, on assets ownership, on contracts involving several parties – such as credit default swaps, to multiplex representation when firms are introduced in the game and a link with real economy is drawn), and then discussing the various dynamics of financial contagion as well as applications in financial network inference and validation. We believe that the informed integration of complex network theory with neural network approaches can play a pivotal role in the transformation of our society towards a more sustainable world.

11:40 AM - Bastien Buchwalter

Clustered network connectedness: a new measurement framework, with application to global equity markets

Network connections, both across and within markets, are central in countless economic contexts. In recent decades, a large literature has developed and applied flexible methods for measuring network connectedness and its evolution, based on variance decompositions from vector autoregressions (VARs), as in Diebold and Yilmaz (2014). Those VARs are, however, typically identified using full orthogonalization (Sims, 1980), or no orthogonalization (Koop, Pesaran, and Potter, 1996; Pesaran and Shin, 1998) which, although useful, are special and extreme cases of a more general framework that we develop in this paper. In particular, we allow network nodes to be connected in "clusters", such as asset classes, industries, regions, etc., where shocks are orthogonal across clusters (Sims style orthogonalized identification) but correlated within clusters (Koop-Pesaran-Potter-Shin style generalized identification), so that the ordering of network nodes is relevant across clusters but irrelevant within clusters. After developing the clustered connectedness framework, we apply it in a detailed empirical exploration of sixteen country equity markets spanning three global regions.

12:05 PM - Paolo Bartesaghi

Global and Local Balance in Financial Correlation Networks: A Unified Framework for Systemic Risk and Asset Selection

Balance measures in signed financial networks offer a powerful perspective on market structure and dynamics. In this work, we develop a unified view of balance measures in signed financial correlation networks, highlighting their relevance for both systemic risk assessment and asset selection during crises. We first show that the global balance index can be interpreted as a systemic risk measure. Specifically, we derive it from a diffusive process describing information propagation on the network, whose steady state solves a linear system governed by the exponential of a replication matrix. We then relate the numerical stability of this system, measured by its condition number, to the structural predictability of the network and to established systemic risk indicators. We further examine local balance, recently introduced as a node-level contribution to overall network balance, and show that deviations of local balance from global balance can help identify assets that behave atypically during crisis periods. Since crises are characterized by heightened comovement and diminished diversification benefits, such assets may provide useful opportunities for focused portfolio allocation. Evidence from real financial data confirms the value of this balance-based framework in both descriptive and predictive settings.

Session 3: Volatility Modelling and Volatility Arbitrage

2:00 PM - Markus Bibinger

Multivariate rough fractional volatility – How correlations improve forecasting and statistical inference

Recent research across finance, statistics and econometrics emphasizes rough fractional volatility as a central feature of financial markets. This has important implications and, in particular, has been shown to provide accurate risk forecasts. While theory and empirical analysis of univariate rough fractional volatility are well developed, multivariate fractional models remain largely unexplored. We consider multivariate fractional Brownian motion (mfBm) with component-wise Hurst exponents to model and forecast realized volatility. We study the interplay between correlation coefficients and Hurst exponents, and propose estimators for all model parameters. We show how the multivariate model yields efficiency gains, reducing risk in both forecasting and statistical inference. Consistent with optimal forecasting theory, out-of-sample forecasts based on mfBm outperform those from univariate fBm, particularly when estimated Hurst exponents differ significantly. Empirical results further demonstrate that mfBm-based forecasts surpass standard time-series benchmarks.

2:40 PM - Othmane Zarhali

From rough to multifractal volatility: Topics around the Log S-fBM model

We present a unified framework for modeling multiscale financial volatility based on the Log Stationary Fractional Brownian Motion (Log S-fBM) model, a family of stochastic volatility measures defined by: $M_{H,T}\,(dt) \;=\; e^{\omega_{H,T}\,(t)}dt$, where $\omega_{H,T}$ is a stationary fractional Brownian motion. The model interpolates continuously between multifractal volatility (H → 0), where the measure converges weakly to the multifractal random measure, and rough volatility dynamics observed empirically for 0 < H < 1/2. We discuss its main structural properties and address statistical estimation issues, showing in particular that naive scaling-based estimators may significantly overestimate the Hurst exponent. A Generalized Method of Moments (GMM) procedure based on the small intermittency regime provides stable parameter estimation and reveals robust empirical regularities: stock indices exhibit rough behavior (H $\approx$ 0.1) while individual stocks are nearly multifractal (H $\approx$ 0), with a remarkably stable intermittency coefficient across assets. We embed the framework into the Nested Factor Model of

Chicheportiche et al., where factor and residual log-volatilities share dominant stochastic modes. In a single-factor setting, the common volatility mode is rough ($H \approx 0.11$) while residual components are super-rough or multifractal ($H \approx 0$). This mechanism explains the empirical discrepancy between index and individual-stock roughness reported in recent studies. We propose a statistically consistent estimator of the factor Hurst exponent and validate the approach through numerical experiments and empirical analysis of S&P 500 data. Another straightforward multivariate stochastic volatility model is namely the multivariate Log S-fBM (mLog S-fBM), extending the model to correlated assets through a multidimensional stationary fractional Brownian motion characterized by co-Hurst and co-intermittency matrices. This construction preserves Log S-fBM marginals while encoding cross-asset dependence and allows a unified description of rough and multifractal regimes within a single stochastic structure. A multivariate small intermittency approximation leads to an efficient GMM calibration procedure based on cross-covariance estimation, validated on synthetic and S&P 500 data. Empirical results show multifractal behavior at the single-stock level together with rough collective dynamics consistent with index-level observations. Together, these results provide a coherent stochastic framework linking rough volatility, multifractal scaling, and factor structures, offering both theoretical insight and practical tools for volatility modeling.

This is based on joint works with Cécilia Aubrun, Emmanuel Bacry, Jean-Philippe Bouchaud and Jean-François Muzy.

3:05 PM - Stefano De Marco

Smile dynamics and rough volatility

We investigate the dynamic properties of various stochastic and notably rough volatility models, with an emphasis on the joint spot-implied volatility dynamics. We notably analyse the Skew-Stickiness Ratio (SSR), an industry-standard indicator of implied vol dynamics, pursuing the analysis of [Bergomi, Smile Dynamics IV, Risk, 2009] and extending it to rough volatility models.

After developing numerical methods and approximation formulas for the SSR, we study the response of models after calibration to the SPX option market, and observe that

- Different forward variance models (both classical Markovian and rough – notably 2-factor Bergomi, Heston, rough Heston, rough Bergomi) calibrated at best to the same SPX volatility term structure generate SSRs that are close to one another.
- This observation suggests a certain rigidity within the stochastic volatility family under consideration, and notably indicate that while rough volatility modeling drastically modifies the dynamics of the instantaneous volatility, it does significantly alter the dynamics of implied volatilities.
- Additionally, depending on market condition, the model-generated SSRs (for the models we consider) can display import deviations from the market behavior, failing to reproduce the term structure observed for the empirical SSR around the calibration date.

Based on joint works with Florian Bourgey (Bloomberg NY) and Jules Delemotte (former Ecole Polytechnique, now Qube RT)

Session 4: Microstructure and Liquidity

4:00 PM - Olivier Guéant

TBD

4:40 PM - Sergio Pulido

Optimal Execution under Liquidity Uncertainty

We study an optimal execution strategy for purchasing a large block of shares over a fixed time horizon. The execution problem is subject to a general price impact that gradually dissipates due to market resilience. We allow for general limit order book shapes to characterize instantaneous market impact. To model the resilience dynamics, we introduce a stochastic process that governs the rate at which the deviation between the impacted and unaffected prices decays. This volume-effect process reflects fluctuations in market activity that drive the pace of liquidity replenishment. Additionally, we incorporate stochastic liquidity variations through a regime-switching Markov chain to capture abrupt shifts in market conditions. We study this singular control problem, in which the trader optimally determines the timing and rate of purchases to minimize execution costs. The associated value function of this optimization problem is shown to satisfy a system of variational Hamilton–Jacobi–Bellman inequalities. Moreover, we establish that it is the unique viscosity solution to this HJB system and study the analytical properties of the free boundary separating the execution and continuation regions. To illustrate our results, we present numerical examples under different limit order book configurations, highlighting the interplay between price impact, resilience dynamics, and stochastic liquidity regimes in shaping the optimal execution strategy.

This is joint work with Etienne Chevalier, Yadh Hafsi and Vathana Ly Vath.

5:05 PM - Paul Besson

TBD