NH COLLECTION ROMA GIUSTINIANO, ITALY - 16TH / 17TH / 18TH OCTOBER 2019

THE 15TH QUANTITATIVE FINANCE CONFERENCE

SPEAKERS

Bruno Dupire: Head of Quantitative Research, Bloomberg L.P.
Jesper Andreasen (Kwant Daddy): Global Head Of Quantitative Research, Saxo Bank
Vladimir Piterbarg: MD, Head of Quantitative Analytics and Quantitative Development, NatWest Markets
Tony Guida: Executive Director – Senior Quant Research, RAM Active Investments
Artur Sepp: Head of Research, Quantica Capital AG
Blanka Horvath: Honorary Lecturer, Department of Mathematics, Imperial College London
Helyette Geman, PhD, PhD: Professor of Mathematical Finance, Birkbeck – University of London & Johns Hopkins
Fabio Mercurio: Head of Quant Analytics at Bloomberg L.P.
Peter Jaeckel: Deputy Head of Quantitative Research, VTB Capital
Saeed Amen: Founder, Cuemacro
Francois Bergeaud: FRTB Lead Quantitative Analyst, BNP Paribas
Michael Pykhtin: Manager, Quantitative Risk, U.S. Federal Reserve Board
Brian Norsk Huge: Chief Quantitative Analyst, Danske Markets
Marc Henrard: Managing Partner muRisQ Advisory and Visiting Professor, University College London
Ignacio Ruiz: Founder & CEO, MoCaX Intelligence
Antoine Savine: Quantitative Research, Danske Bank
Alexandre Antonov, Director, Standard Chartered Bank
Massimo Morini: Head of Interest Rate and Credit Models, Banca IMI
Dominique Bang: Director, Head of Interest Rates Vanilla Modelling, Bank of America Merrill Lynch
Edvin Hopkins: Technical Consultant, NAG
Alexei Kondratyev: Managing Director, Head of Data Analytics, Standard Chartered Bank
Andrey Chirikhin: Founder, Quantitative Recipes
Icarus Gupta: Quantitative Analyst, BNP Paribas
Gilles Artaud: Head of Model Internal Audit, Group Crédit Agricole
Jos Gheerardyn: Co-Founder and CEO, Yields.io
Jörg Kienitz: Partner, Quaternion Risk Management
Christian Fries: Head of Model Development, DZ Bank

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OVERVIEW

IMPORTANT NOTES

The Main Conference presentation files will be made available for download via a password protected website before the event.

Please print out each presentation if you wish to have hard copies before the conference and bring them with you.

Also, Wi-Fi access will be available at the conference venue to view presentations on laptops and mobile devices.

CONFERENCE BOOKING: DISCOUNT STRUCTURE

- When 2 colleagues attend the 3rd goes free!
- ~~Super Early Bird Discount: 25% Until 31st May~~
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PRE-CONFERENCE WORKSHOP DAY WEDNESDAY 16TH OCTOBER:

1. The Future of LIBOR: Quantitative Perspective on Benchmarks, Overnight, Fallback and Regulation
   by Marc Henrard: Managing Partner muRisQ Advisory and Visiting Professor, University College London

2. Back-propagation and Automatic Adjoint Differentiation (AAD) in Machine Learning and Finance
   by Antoine Savine: Quantitative Research, Danske Bank

3. Machine Learning for Option Pricing
   by Jörg Kienitz: Partner, Quaternion Risk Management

MAIN CONFERENCE STREAMS

THURSDAY 17TH OCTOBER - DAY ONE:
- Interest Rate Reform Stream
- Machine Learning & Quantum Computing Techniques Stream
- Volatility & Modelling Techniques Stream

FRIDAY 18TH OCTOBER - DAY TWO:
- XVA, AAD, MVA & Initial Margin Stream
- Machine Learning & Quantum Computing Techniques Stream
- Volatility & Modelling Techniques Stream

As always, delegates are not restricted to attend single streams on the main conference. You have the opportunity to hop around the different streams and attend the presentations that benefit you the most.

Stream presentation times will run concurrently with each other.

CONFERENCE LOCATION:

NH Collection Roma Giustiniano
Via dei Gracchin 324
00192 Rome
Italy

Tel: +39 06 6828 1601
Website: https://www.nh-collection.com/hotel/nh-collection-roma-giustiniano

PRE-CONFERENCE WORKSHOP 1: WEDNESDAY 16TH OCTOBER

THE FUTURE OF LIBOR: QUANTITATIVE PERSPECTIVE ON BENCHMARKS, OVERNIGHT, FALLBACK AND REGULATION BY MARC HENRARD: MANAGING PARTNER MURISQ ADVISORY AND VISITING PROFESSOR, UNIVERSITY COLLEGE LONDON

WORKSHOP PRESENTER

Over the last 20 years, Marc has worked in various areas of quantitative finance. Marc's career includes Head of Quantitative Research at OpenGamma, Global Head of Interest Rate Modeling for Dexia Group, Head of Quantitative Research and Deputy Head of Interest Rate Trading at the Bank for International Settlements (BIS) and Deputy Head of Treasury Risk also at BIS.

Marc's research focuses on interest rate modeling and risk management. More recently he focused his attention to market infrastructure (CCP and bilateral margin, exchange traded product design, regulatory costs). He publishes on a regular basis in international finance journals, and is a frequent speaker at academic and practitioner conferences. He recently authored two books: The multi-curve framework: foundation, evolution, implementation and Algorithmic Differentiation in Finance Explained.

Marc holds a PhD in Mathematics from the University of Louvain, Belgium. He has been research scientist and university lecturer in Belgium, Italy, Chile and the United Kingdom.

WORKSHOP OUTLINE

With the increased expectation of some IBORs discontinuation and the increasing regulatory requirements related to benchmarks, a more robust fallback provision and a clear transition plan for benchmark-linked derivatives is becoming paramount for the interest rate market.

The recent regulations include the EU Benchmark Regulation (BMR) which may have a severe impact on the EUR market as early as January 2020. For all major currencies, new benchmarks have been proposed and the market are in a transition phase. Each transition has his idiosyn- crasies and a commun transition approach cannot be expected. We also describe the new products associated to the new benchmarks and the status in term of liquidity for each market.

On the fallback side, several options have been proposed and ISDA held a consultation on some of them. The results of the ISDA consultation has been to select the "compounding setting in arrears" adjusted rate and the "historical mean/median" spread approach. We analyse the proposed options in details and present an alternative option supported by different working groups. The presentation focuses is on the quantitative finance impacts for derivatives.

PRE-CONFERENCE WORKSHOP 1: WEDNESDAY 16TH OCTOBER

THE FUTURE OF LIBOR: QUANTITATIVE PERSPECTIVE ON BENCHMARKS, OVERNIGHT, FALLBACK AND REGULATION

DAY SCHEDULE: 09:00 – 17:30
BREAK: 10:30 – 10:45 / LUNCH: 12:30 – 13:30 / BREAK: 15:15 – 15:30

WORKSHOP AGENDA

Cash-collateral discounting.

- The standard collateral results and their exact application.
- What is hidden behind OIS discounting (and when it cannot be used)?
- Impact of new benchmarks on valuation

EU Benchmark regulation
The "alternative" benchmarks:

- SOFR, reformed SONIA, ESTER, SARON, TONAR.
- Secured v unsecured choice.
- What about term rates?
- Curve calibration
- SOFR and EFFR: two overnight rates in one currency!

Status in different currencies. Cleared OTC products, liquidity. The dierent consultations in progress and what to expect from them. Fallback procedure

- ISDA consultation results
- The adjusted rate: compounding setting in arrears
- The adjustment spread: historical mean/median approach
- Quantitative issues with compounding setting in arrears
- Term rates: a credible alternative?
- Value transfer: transfers already incorporated and transfers to come

Clearing House doption

- Differences between bilateral and CCP rules
- EFFR to SOFR transition in USD

Risk management of the fallback

- Delta risk through the transition
- Potential impacts on systems
- What a risk solution would look like
- Multi-curve: double or quit?
- Vanilla becoming exotics: cap/ oor and swaptions

New products associated to new benchmarks

- Volume and liquidity in the new benchmarks
- Futures on overnight benchmarks
- Deliverable swap futures

Detailed lecture notes for participants.
Some details will be adapted to the evolution of the market.

PRE-CONFERENCE WORKSHOP 2: WEDNESDAY 16TH OCTOBER

BACK-PROPAGATION AND AUTOMATIC ADJOINT DIFFERENTIATION (AAD) IN MACHINE LEARNING AND FINANCE BY ANTOINE SAVINE: QUANTITATIVE RESEARCH, DANSKE BANK

DAY SCHEDULE: 09:00 – 17:30
BREAK: 10:30 – 10:45 / LUNCH: 12:30 – 13:30 / BREAK: 15:15 – 15:30

WORKSHOP PRESENTER

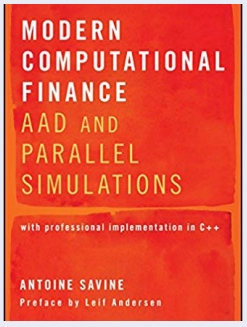
Antoine Savine has worked for various Investment Banks since 1995, along Bruno Dupire, Leif Andersen and Marek Musiela. He was Global Head of Quantitative Research for Fixed Income, Currency and Credit Derivatives for BNP-Paribas 1999-2009, and currently works in Copenhagen for Danske Bank, where his work with Jesper Andreasen earned the In-House System of the Year 2015 Risk Award. His upcoming publications in Wiley's Computational Finance series are dedicated to teaching the technologies implemented in those award-winning systems.

Antoine also teaches Volatility Modeling and Numerical Finance in the University of Copenhagen's Masters of Science in Mathematics-Economics. The curriculum for his Numerical Finance lectures is being published by Wiley under the name "AAD and Parallel Simulations".

Antoine holds a Masters from the University of Paris (Jussieu) and a PhD from the University of Copenhagen, both in Mathematics.

WORKSHOP OUTLINE

- Introduction to Artificial Neural Networks and Deep Learning
- Back-propagation through ANNs
- Applications of ANNs and back-prop in finance
- Hands-on examples with Python and Tensor Flow
- How to extract computation graphs to differentiate arbitrary calculations
- Fast (reverse mode) AAD with operator overloading in C++
- Application to financial risk management
- Hands-on examples in (basic) C++ with Dupire's model and Monte-Carlo simulations



This workshop includes a complimentary copy of
Modern Computational Finance: AAD and Parallel Simulations by Antoine Savine

PRE-CONFERENCE WORKSHOP 3: WEDNESDAY 16TH OCTOBER

MACHINE LEARNING FOR OPTION PRICING
BY JÖRG KIENITZ: PARTNER, QUATERNION RISK MANAGEMENT

WORKSHOP PRESENTER

Previously: Director FSI Assurance Deloitte GmbH and Co-Head of Quant Unit, Head of Quantitative Analytics, Dt. Postbank AG, Senior System Architect, Postbank Systems AG Financial Consultant, Reuters; Academic: Adj. Assoc. Prof. UCT, PD University of Wuppertal, PhD Math., Diploma Math. Books (Wiley): (A) Monte Carlo Frameworks in C++ (B) Financial Modelling – Theory, Implementation and Practice with Matlab Code, (Palgrave McMillan) (C) Interest Rate Derivatives Explained – Part I

WORKSHOP OUTLINE

The goal of this workshop is to provide a detailed overview of machine learning techniques applied for finance. We offer insights into the latest techniques of using such techniques for modelling financial markets where we focus on pricing and calibration.

We not only tackle the theory but give practical guidance and live demonstrations of the computational methods involved. After introducing the subject we cover Gaussian Process Regression and Artifical Neural Networks and show how such methods can be applied to solve option pricing problems, speed up the calculation of xVAs or apply them for hedging.

We further show how to use existing pricing libraries to interact with machine learning environments often set up in Python. To this end we consider the interaction with Excel, C++ (QuantLib/ORE) and Matlab.

We explain how to set up the methods in Matlab and Python using Keras, Tensorflow, SciKit and PyTorch by explaining the implementation on Matlab source code as well as Jupyther notebooks.

This workshop covers the fundamentals and illustrates the application of state-of-the-art machine learning applications in the financial markets. The examples used for illustration are given to the delegates after the course.

COURSE HIGHLIGHTS

This workshop covers the latest techniques for mastering the application of Gaussian Process Regression methods and Artificial Neural Networks techniques. We consider the theoretical underpinnings and give finance related examples in Matlab and/or Python.

WHAT WE'LL COVER

- Overview of some Machine Learning techniques
- Implementation and Examples
- Gaussian Process Regression for option pricing
- The maths of Neural Networks (with examples)
- Deep learning for pricing using the Heston and other SV models
- Deep learning for calibrating Stochastic Volatility Models

COURSE METHODOLOGY

- Presentation
- Examples (Matlab/Jupyter Notebooks)

PRE-CONFERENCE WORKSHOP 3: WEDNESDAY 16TH OCTOBER

MACHINE LEARNING FOR OPTION PRICING
BY JÖRG KIENITZ: PARTNER, QUATERNION RISK MANAGEMENT

DAY SCHEDULE: 09:00 – 17:30
BREAK: 10:30 – 10:45 / LUNCH: 12:30 – 13:30 / BREAK: 15:15 – 15:30

WORKSHOP AGENDA

Machine Learning and Finance Overview

- Machine Learning
  - Supervised Learning for Classification, Regression
  - Unsupervised Learning
  - Selfsupervised Learning
  - Reinforcement Learning
- Finance
  - Pricing and hedging
  - Calibration
  - Simulation and exposure
  - Fraud detection

Machine Learning and Finance – Programming Overview

- ML and Financial Applications – an overview
  - Python, Tensorflow, Keras
  - C++, Java, Matlab, QuantLib/ORE
- Interfacing
  - Python – Excel
  - Python – QuantLib/ORE
  - Python – Matlab
- Some illustrations
  - Exposure for Bermudan Swaptions in Tensorflow
  - Hull-White with PDE in Python using QL
  - Monte Carlo Simulation in Tensorflow

Gaussian Process Regression (GPR)

- Intro to GPR and Regression
  - How does it work?
  - Train, Validate, Test
  - Covariance Functions
- Pricing Models and Methods
- GPR and Option Pricing (Heston, American Options,...)

Artificial Neural Networks in Finance – Introduction and examples I

- Intro to Artificial Neural Networks
  - Construction
  - ANN at work
- ANN math recap (with examples)
  - on Linear Algebra: Points, Vectors, Matrices, Tensors,...
  - on Optimization: Gradient Descent, ...
  - on Autodifferentiation
- Illustration: Learning a function
- It's only an approximation!
- Illustration:
  - Black-Scholes Merton Model
  - Heston Model
  - SABR Model
- Observations
- Preprocessing/Feature engineering
- Overfitting / Underfitting
- Train, Validate, Test
- Hyperparameters
- Different Types of Networks
  - FFNN – Feed Forward
  - CNN – Convolutional
  - RNN – Recursive
  - LSTM – Long Short Term Memory
  - GAN – General Adversial
  - Autoencoders

Artificial Neural Networks in Finance – Introduction and examples II

- Calibration Basics
- Illustration: Deep Calibration
  - Heston Model
  - SABR Model
- Hedging Basics
- LSTM revisited
- Illustration: Deep Hedging
- (Time Series Analysis and Forecasting

Matlab Code / Jupyter Notebooks are provided for this workshop

MAIN CONFERENCE DAY ONE – THURSDAY 17TH OCTOBER

08:00 – 09:00 REGISTRATION AND MORNING WELCOME COFFEE

09:00 – 09:45 KEYNOTE - BRUNO DUPIRE: HEAD OF QUANTITATIVE RESEARCH, BLOOMBERG L.P.

THE PERILS OF PARAMETERIZATION

- Market-makers adopt parametric forms. How consistent is it?
- The geometry of arbitrage. Separating today from tomorrow's manifold
- The problem with recalibration. Arbitrage in Black-Scholes and Heston models
- Does the FX market know that high strike implied variance should never increase?

Abstract:
Automation, risk management and taste for Markov models lead markets to adopt parametric forms, for volatility for instance. It means that in the space of asset price vectors, the possibles states at a future date lie on a low dimensional manifold that sometimes can be separated from the current price vector by a hyperplane, creating an arbitrage. We illustrate this principle with several situations (European type profiles, sticky strike assumption, term structure parameterization, recalibration issues with Black-Scholes, Heston and SABR models). We show that if every day the implied variance, defined as the square of implied volatility times the residual maturity, converges as strikes go to infinity (common assumption in FX options), this level can never go up. In the case of a market that uses a Black-Scholes model every day (flat volatility surface every day but its level may change from one day to the next), we construct explicitely a portfolio of options that gains in value whenever the volatility level has changed, at any time before the first maturity, for any spot price.

09:45 – 10:45 PANEL: MACHINE LEARNING, AI & QUANTUM COMPUTING IN QUANTITATIVE FINANCE

Moderator:

- **Bruno Dupire: Head of Quantitative Research, Bloomberg L.P.**

Panelists:

- **Tony Guida: Executive Director – Senior Quant Research, RAM Active Investments**
- **Alexei Kondratyev: Managing Director, Head of Data Analytics, Standard Chartered Bank**
- **Artur Sepp: Head of Research, Quantica Capital AG**
- **Blanka Horvath: Honorary Lecturer, Department of Mathematics, Imperial College London**
- **Jos Gheerardyn: Co-Founder and CEO, Yields.io**

Topics:

- What is the current state of utilisation of machine learning in finance?
- What are the distinct features of machine learning problems in finance compared to other industries?
- What are the best practices to overcome these difficulties?
- What's the evolution of a team using machine learning in terms of day to day operations?
- What is a typical front office 'Quant' skillset going to look like in three to five years time?
- How do we deal with model risk in machine learning case?
- How is machine learning expected to be regulated?
- What applications can you list among its successes?
- How much value is it adding over and above the "classical" techniques such as linear regression, convex optimisation, etc.?
- Do you see high-performance computing (HPC) as a major enabler of machine learning?
- What advances in HPC have caused the most progress?
- What do you see as the most important machine learning techniques for the future?
- What are the main pitfalls of using Machine Learning currently in trading strategies?
- What new insights can Machine Learning offer into the analysis of financial time series?
- Discuss the potential of Deep Learning in algorithmic trading?
- Do you think machine learning and HPC will transform finance 5-10 years from now?
- If so, how do you envisage this transformation?
- Can you anticipate any pitfalls that we should watch out for.
- Discuss quantum computing in quant finance:
    - Breakthroughs
    - Applications
    - Future uses

10:45 – 11:15 MORNING BREAK AND NETWORKING OPPORTUNITIES

MAIN CONFERENCE DAY ONE – THURSDAY 17TH OCTOBER

MACHINE LEARNING & QUANTUM COMPUTING TECHNIQUES STREAM

STREAM CHAIR:
TONY GUIDA: EXECUTIVE DIRECTOR – SENIOR QUANT RESEARCH, RAM ACTIVE INVESTMENTS

11:15 – 12:00

REVERSE QUANTUM ANNEALING APPROACHES TO PORTFOLIO OPTIMIZATION PROBLEMS

by Alexei Kondratyev: Managing Director, Head of Data Analytics, Standard Chartered Bank

- Finding optimal parameters for the reverse quantum annealing protocol

VOLATILITY & MODELLING TECHNIQUES STREAM

STREAM CHAIR:
TO BE CONFIRMED

11:15 – 12:00

OPTIMAL INVESTMENT STRATEGY IN STOCHASTIC AND LOCAL VOLATILITY MODELS

by Vladimir Piterbarg: MD, Head of Quantitative Analytics and Quantitative Development at NatWest Markets

- We revisit the classical Merton optimal allocation problem
- We consider local and stochastic volatility models
- Significant corrections to the Merton ratio arise from hard to observe behaviour of the variance process around zero
- Adjustment to the myopic Merton ratio can be largely deduced from observed option prices
- Deep learning as an approach to determine model-free optimal investment strategy

INTEREST RATE REFORM STREAM

STREAM CHAIR:
MARC HENRARD: MANAGING PARTNER MURISQ ADVISORY AND VISITING PROFESSOR, UNIVERSITY COLLEGE LONDON

11:15 – 12:00

A QUANT PERSPECTIVE ON LIBOR FALLBACK

by Marc Henrard: Managing Partner muRisQ Advisory and Visiting Professor, University College London

- The current status on fallback
- Potential difficulties with the proposed options
- Value transfer in the fallback
- The RFR term rates

MAIN CONFERENCE DAY ONE – THURSDAY 17TH OCTOBER

MACHINE LEARNING & QUANTUM COMPUTING TECHNIQUES STREAM

12:00 – 12:45

APPLYING MACHINE LEARNING FOR TROUBLESHOOTING CVA EXPOSURE CALCULATION

by Shengyao Zhu: Senior Quantitative Analyst, XVA Trading Desk, Nordea

- Applying convolutional neural network to characterizing and troubleshooting CVA exposures used in XVA and Risk.
- How we choose the model specification to strike a balance between model performance and decision speed.
- Compare the model performance with human analyst.
- Possible extension for this model to other area like FRTB.

VOLATILITY & MODELLING TECHNIQUES STREAM

12:00 – 12:45

TOPIC TO BE CONFIRMED

Presenter to be confirmed

INTEREST RATE REFORM STREAM

12:00 – 12:45

NEW INTEREST RATE BENCHMARKS: VALUATION AND RISK MANAGEMENT ISSUES

by Marco Bianchetti: Head of Fair Value Policy, Intesa Sanpaolo and Marco Scaringi: Quant Risk Analyst, Fair Value Policy Office, Intesa Sanpaolo

- Classic vs Modern Benchmark Rates: EONIA, ESTER, EURIBOR and co.
- Pricing and risk management with past, present and future interest rates
- Focus on XVAs
- Bye-Bye multi-curves?

Abstract

Once upon a time there was a classic financial world where all the interest rates were equal and considered a good proxy of the ideal risk-free rate required as basic building block of no-arbitrage pricing theory. In the present financial world after the credit crunch, multiple yield curves and volatility cubes are required to price financial instruments.

The current global reform of interest rate benchmarks is radically changing the scenario, adding more and more interest rates, with important consequences for pricing and risk management of financial instruments, but could also lead us back to a future financial world based again on a classic single-curve, few-volatility framework.

12:45 – 14:00 LUNCH

MAIN CONFERENCE DAY ONE – THURSDAY 17TH OCTOBER

MACHINE LEARNING & QUANTUM COMPUTING TECHNIQUES STREAM

14:00 – 14:45

IDENTIFICATION AND FORECAST OF MARKET REGIMES USING MACHINE LEARNING

by Artur Sepp: Head of Research, Quantica Capital AG

- Applying Hidden Markov Models (HMM) to identify market regimes (bull/bear/range etc)
- Specification and estimation of HMMs using Unsupervised Learning
- Forecasting of likelihoods of regimes at different horizons
- Applications to systematic trading strategies

(To be confirmed)

14:45 – 15:30

TOPIC TO BE CONFIRMED

by Tony Guida: Executive Director – Senior Quant Research, RAM Active Investments

VOLATILITY & MODELLING TECHNIQUES STREAM

14:00 – 14:45

PAYOFF SCRIPTING LANGUAGES: SUNG AND UNSUNG GLORIES AND NEXT GENERATION

by Jesper Andreasen (Kwant Daddy): Global Head Of Quantitative Research, Saxo Bank

- Knowledge: There is (i). what you know, (ii). what you know you don't know, and (iii). what you don't know you don't know
- Scripting languages and exotic derivatives
- Scripting languages and XVA
- Scripting languages and AAD and regulatory capital
- Scripting languages and transactions, trade life cycle, back-office, and anti-money laundering

14:45 – 15:30

QUANTIFYING MODEL PERFORMANCE

by Alexandre Antonov: Director, Standard Chartered Bank

- Introduction: known issues with models
- Payoff replication quality as an objective measure of the hedging performance of a model
- Hedging quality criteria and its numerical expression via regression
- Numerical experiments
- Take the real-world 3Y path of USD/EUR
- Create different hedging strategies (Heston, BS etc.) for both European and exotic options
- Compare them using our model criteria and the standard P&L analysis

Conclusion: a new efficient model performance criteria for the back-testing

INTEREST RATE REFORM STREAM

14:00 – 14:45

TITLE TO BE CONFIRMED

by Elias Daboussi: Quantitative Analyst, Bank of America Merrill Lynch

14:45 – 15:30

SWAPTIONS MODELLING IN A WORLD TRANSITIONING FROM IBOR REFERENCES TO SOFR STYLE INDICES

by Dominique Bang: Director, Head of Interest Rates Vanilla Modelling, Bank of America Merrill Lynch

MAIN CONFERENCE DAY ONE – THURSDAY 17TH OCTOBER

MACHINE LEARNING & QUANTUM COMPUTING TECHNIQUES STREAM

VOLATILITY & MODELLING TECHNIQUES STREAM

INTEREST RATE REFORM STREAM

15:30 – 16:00 AFTERNOON BREAK AND NETWORKING OPPORTUNITIES

16:00 – 16:45
TOPIC TO BE CONFIRMED
Presenter to be confirmed

16:00 – 16:45
TOPIC TO BE CONFIRMED
Presenter to be confirmed

16:00 – 16:45
LOOKING FORWARD TO BACKWARD-LOOKING RATES: A MODELING FRAMEWORK FOR TERMS RATES REPLACING LIBOR
by Fabio Mercurio: Head of Quant Analytics, Bloomberg L.P.

- A quick overview of the LIBOR transition
- Introducing the concept of extended zero coupon bond
- Defining and modeling in-arrears rates
- Modeling both forward-looking and backward-looking forward rates
- Modeling general forward-rate dynamics
- Introducing the generalized Forward Market Model (FMM)
- Differences between the FMM and the classic LMM
- The valuation of vanilla derivatives in the FMM
- Numerical examples

MAIN CONFERENCE DAY ONE – THURSDAY 17TH OCTOBER

MACHINE LEARNING & QUANTUM COMPUTING TECHNIQUES STREAM

16:45 – 17:30

DEEP LEARNING VOLATILITY

by Blanka Horvath: Honorary Lecturer, Department of Mathematics, Imperial College London

We present a consistent neural network based calibration method for a number of volatility models-including the rough volatility family-that performs the calibration task within a few milliseconds for the full implied volatility surface. The aim of neural networks in this work is an off-line approximation of complex pricing functions, which are difficult to represent or time-consuming to evaluate by other means. We highlight how this perspective opens new horizons for quantitative modelling: The calibration bottleneck posed by a slow pricing of derivative contracts is lifted. This brings several model families (such as rough volatility models) within the scope of applicability in industry practice. As customary for machine learning, the form in which information from available data is extracted and stored is crucial for network performance. With this in mind we discuss how our approach addresses the usual challenges of machine learning solutions in a financial context (availability of training data, interpretability of results for regulators, control over generalisation errors). We present specific architectures for price approximation and calibration and optimize these with respect different objectives regarding accuracy, speed and robustness. We also find that including the intermediate step of learning pricing functions of (classical or rough) models before calibration significantly improves network performance compared to direct calibration to data.

VOLATILITY & MODELLING TECHNIQUES STREAM

16:45 – 17:30

ANALYTICAL COMPOSITE OPTION VALUATION WITH FULL SMILES FOR FX AND PRIMARY UNDERLYING

by Peter Jaeckel: Deputy Head of Quantitative Research, VTB Capital

INTEREST RATE REFORM STREAM

16:45 – 17:30

LOOKING FORWARD TO BACKWARD-LOOKING RATES: LOCAL EXTENSIONS OF THE FORWARD MARKET MODEL

by Andrei Lyashenko: Head of Market Risk and Pricing Models, Quantitative Risk Management (QRM), Inc.

- Generalized Forward Rate Model
- Building zero-bond price curve evolution
- Building local bank account process
- Local stochastic extension with HJM
- Local stochastic extension with Cheyette
- Implying short rate process
- Numerical examples

20:00 **Gala Dinner. This is complimentary for all conference delegates.**

Location to be confirmed.

MAIN CONFERENCE DAY TWO – FRIDAY 18TH OCTOBER

MACHINE LEARNING & QUANTUM COMPUTING TECHNIQUES STREAM

VOLATILITY & MODELLING TECHNIQUES STREAM

XVA, AAD, MVA & INITIAL MARGIN STREAM

08:30 – 09:00 MORNING WELCOME COFFEE

STREAM CHAIR:
JOS GHEERARDYN: CO-FOUNDER AND CEO, YIELDS.IO

09:00 – 09:45

QUANTIFYING MODEL UNCERTAINTY WITH ARTIFICIAL INTELLIGENCE

by Jos Gheerardyn: Co-founder and CEO, Yields.io

- Defining model risk and model uncertainty
- Overview of relevant regulatory frameworks
- Measuring uncertainty with ML
- Model risk of AI

STREAM CHAIR:
TO BE CONFIRMED

09:00 – 09:45

TRANSFORMING FINANCIAL MARKETS THROUGH SMART CONTRACTS AND BLOCKCHAINS

by Massimo Morini: Head of Interest Rate and Credit Models, Banca IMI

- How is it being used as part of operations within organisations?

STREAM CHAIR:
IGNACIO RUIZ: FOUNDER & CEO, MOCAX INTELLIGENCE (TBC)

09:00 – 09:45

VITAMIN B, CHEBYSHEV POLYNOMIALS, HOMOCYSTEINE AND... DYNAMIC INITIAL MARGIN

by Ignacio Ruiz: Founder & CEO, MoCaX Intelligence

- The power of Chebyshev Polynomials. Exponential convergence of Chebyshev methods: why is it so fast?
- Theoretical basis
- Live demo of how they work
- Application to simulation of Initial Margin inside Monte Carlo simulations
- Examples: swaps, swaptions and beyond
- Comparison to regression and AD methods
- Numerical results
- Chebyshev is to Dynamic Initial Margin what Vitamin B is to Homocysteine
- Options for free software available for inhouse testing and implementation

MAIN CONFERENCE DAY TWO – FRIDAY 18TH OCTOBER

MACHINE LEARNING & QUANTUM COMPUTING TECHNIQUES STREAM

09:45 – 10:30

NON-NEGATIVE MATRIX FACTORIZATION FOR ANALYSING HIGH-DIMENSIONAL DATASETS

by Edvin Hopkins: Technical Consultant, NAG

Non-negative matrix factorization (NMF) is a widely-used tool for analysing high-dimensional datasets. Its popularity stems from its ability to extract meaningful factors from the data. Applications include image processing, text mining and bioinformatics. In this talk we will give an overview of NMF and demonstrate our implementations of recent NMF algorithms by automatically classifying a series of websites based on their content. We will then briefly discuss applications of NMF in finance.

11:00 – 11:45

P PRICING BY Q LEARNING

by Andrey Chirikhin: Founder, Quantitative Recipes

VOLATILITY & MODELLING TECHNIQUES STREAM

09:45 – 10:30

SMART DERIVATIVE CONTRACTS

by Christian Fries: Head of Model Development, DZ Bank and Peter Kohl-Landgraf, XVA Management, DZ BANK

11:00 – 11:45

FUTURES AND OPTIONS ON BITCOINS: A TENTATIVE ARBITRAGE APPROACH

by Helyette Geman, PhD, PhD: Professor of Mathematical Finance, Birkbeck – University of London & Johns Hopkins

XVA, AAD, MVA & INITIAL MARGIN STREAM

09:45 – 10:30

KVA UNDER IMM AND ADVANCED APPROACHES

by Justin Chan: Quantitative Strategy, Adaptiv, FIS

The two largest components of Capital Valuation Adjustment (KVA) are the costs of Counterparty Credit Risk (CCR) and CVA capital. For a bank using the most advanced capital models – Internal Models Method for CCR and the incoming SA-CVA capital –an accurate KVA involves forward simulating expected exposures (EE) over the lifetime of the portfolio – potentially a Monte Carlo in a Monte Carlo. We present a practical regression-based solution.

- Simulating EE: from regulatory stressed real-world measure to market implied measure
- A comparative study of regression vs brute force nested Monte Carlo
- SA-CVA: extending from simulating forward EE to simulating forward CVA sensitivities

11:00 – 11:45

EFFICIENT CALCULATION TECHNIQUES FOR CREDIT EXPOSURE IN THE PRESENCE OF INITIAL MARGIN

by Michael Pykhtin: Manager, Quantitative Risk, U.S. Federal Reserve Board

- Modeling collateralized exposure
- Producing exposure on a daily simulation time grid without daily revaluations or daily IM calculations
- Reducing simulation noise in the presence of IM
- Alternatives to calculating IM along simulation paths

10:30 – 11:00 MORNING BREAK AND NETWORKING OPPORTUNITIES

MAIN CONFERENCE DAY TWO – FRIDAY 18TH OCTOBER

MACHINE LEARNING & QUANTUM COMPUTING TECHNIQUES STREAM

11:45 – 12:30

VALIDATING / AUDITING ML MODELS

by Gilles Artaud: Head of Model Internal Audit, Group Crédit Agricole

Machine Learning Models are like any other models, but different. You probably had presentation or experiences on how to use them in order to get good value out of their relative complexity.

This presentation will be about what, from a Model Audit point of view, should be set in place in order to avoid them failing despite all the efforts you put in building them.

But also incidentally how some can exploit their specific vulnerability to make them fail.

It will cover :
Model Risk : Machine Learning models are like any other model.

- So what's required for non-ML models?

Artificial Intelligence and ML : Machine Learning models are not exactly like any other model.

- **What** could make them fail?
- **How** could they fail?

Tricks or treats? Application to Neuron networks or Random Forest

VOLATILITY & MODELLING TECHNIQUES STREAM

11:45 – 12:30

SPX, VIX, AND DERIVATIVES

by Julien Guyon: Senior Quant, Bloomberg L.P.

XVA, AAD, MVA & INITIAL MARGIN STREAM

11:45 – 12:30

TOPIC TO BE CONFIRMED

Presenter to be confirmed

12:30 – 13:30 LUNCH

MAIN CONFERENCE DAY TWO – FRIDAY 18TH OCTOBER

MACHINE LEARNING & QUANTUM COMPUTING TECHNIQUES STREAM

13:30 – 15:00

EXTENDED TALK: DEEP ANALYTICS

by Antoine Savine: Quantitative Research, Danske Bank and Brian Norsk Huge: Chief Quantitative Analyst, Danske Markets

Abstract:

We apply deep learning to resolve the conundrum of revaluation of large, diverse trading books in the context of regulatory simulations and also offer a solution to MVA.

VOLATILITY & MODELLING TECHNIQUES STREAM

13:30 – 15:00

EXTENDED TALK: LATEST UPDATE ON FRTB

by Francois Bergeaud: FRTB Lead Quantitative Analyst, BNP Paribas and Icarus Gupta: Quantitative Analyst, BNP Paribas

XVA, AAD, MVA & INITIAL MARGIN STREAM

13:30 – 15:00

EXTENDED TALK: BALANCE SHEET XVA BY DEEP LEARNING AND GPU

by Stéphane Crépey, Univ Evry, France, and Rodney Hoskinson, ANZ Bank, Singapore

Abstract:

Two competing XVA paradigms are a semi-replication framework and a cost-of-capital, incomplete market approach. Burgard and Kjaer once dismissed an earlier incarnation of the Albanese and Crépey holistic, incomplete market XVA model as being elegant but difficult to solve explicitly. We show that the model (set on a forward/backward SDE formulation) is not only elegant, but also able to be solved efficiently using GPU computing combined with AI methods in a whole bank balance sheet context. We calculate the Mark-to-Market process cube (or its increment, in the context of trade incremental XVA computations) using GPU computing and the XVA process cube using Deep Learning (including joint ES and VaR) Regression methods.

15:00 – 15:15 **AFTERNOON BREAK AND NETWORKING OPPORTUNITIES**

15:15 – 16:00

CLOSING PRESENTATION:

NLP AND QUANT INVESTING: FINDING SIGNALS IN THE NOISE

Saeed Amen: Founder, Cuemacro

At it's most basic, Natural Language Processing can be seen as a way for a computer to understand human language. Given that the vast majority of data comes in unstructured form, the potential opportunities for structuring, modeling and implementing text-based investment strategies are huge. For all those on the buy-side, understanding NLP – and the data, tools and processes needed to make it a success – is essential.

- How NLP has developed alongside the explosion of text-based content.
- Use-cases today for NLP within investment processes.
- Factors to consider when building NLP into a quantitative strategy

END OF CONFERENCE

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MoCaX intelligence

Both through regulation and industry practice, there is an increasing number of risk calculations that need to be done on a regular basis. These calculations require the valuation of portfolios on up to hundredths of thousands of scenarios making them computationally very expensive in time and cost.

MoCaX technology, based on Chebyshev Spectral Decomposition methods, is a methodology and software application which massively reduces the computational burden in a risk calculation. This is achieved by pricing the portfolio on very small number of pre-defined collection of points yielding an object capable of approximating a pricing function and its greeks to a very high degree of accuracy. The object can then be evaluated on thousands of risk scenarios in an ultra-efficient and numerically stable manner.

Several benefits are obtained with this technology. Applications include Market Risk VaR, IMA-FRTB, Dynamic Initial Margin for MVA and IMM, Exposure profiles for CVA and IMM, what-if analysis tools, etc.

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QWAFAFEW

QWAFAFEW is an informal organization of quantitatively oriented professionals in various aspects of financial services, primarily investment management.

The members span the gamut from owners and senior executives of investment related organizations to recent entrants to the industry. Most attendees have some technical training beyond the M.B.A. level, and many have Ph.D.s. All share a common interest in quantitative solutions to understanding investment markets.

Please visit www.qwafafew.org for more information.

FIS

FIS Adaptiv provides solutions for enterprise-wide risk management solutions, spanning trade capture to operations management. Adaptiv Analytics is a state-of-the-art calculation engine that offers marketleading performance for market risk, counterparty credit risk, and regulatory calculations. AAD-enabled Analytics software is the latest exciting development from FIS Adaptiv. This will add to the suite of performant technologies upon which Analytics is built, which includes vectorization and GPU support, and will enable real-time calculation of exact XVA sensitivities for effective risk reporting, credit limit monitoring, and position management.

Through the depth and breadth of our solutions portfolio, global capabilities and domain expertise, FIS serves more than 20,000 clients in over 130 countries. Headquartered in Jacksonville, Fla., FIS employs more than 55,000 people worldwide and holds leadership positions in enterprise risk management, payment processing, financial software and banking solutions. Providing software, services and outsourcing of the technology that empowers the financial world, FIS is a Fortune 500 company and is a member of Standard & Poor's 500© Index.

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The Thalesians are a think tank of dedicated professionals with an interest in quantitative finance, economics, mathematics, physics and computer science, not necessarily in that order.

www.thalesians.com/finance/index.php/Main_Page

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Yields.io is the first FinTech platform that uses AI for real-time model risk management on an enterprise-wide scale.

Our clients use our solution to speed up model validation tasks, to generate regulatory compliant documentation and to industrialize model monitoring. The platform works with all models that are used within the financial sector such as credit risk models, valuation algorithms, market risk, AML, AI and behavioural models.

Yields.io was founded by Jos Gheerardyn and Sébastien Viguié. The company is expanding quickly and has offices in Brussels and London. Yields.io has an international portfolio of clients with both investment banks as well as regional financial institutions.

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Welcome to The Machine Learning Institute Certificate in Finance (MLI)

Quantitative finance is moving into a new era. Traditional quant skills are no longer adequate to deal with the latest challenges in finance. The Machine Learning Institute Certificate offers candidates the chance to upgrade their skill set by combining academic rigour with practical industry insight.

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This course has been designed to empower individuals who work in or are seeking a career in machine learning in finance. Throughout our unique MLI programme, candidates work with hands-on assignments designed to illustrate the algorithms studied and to experience first-hand the practical challenges involved in the design and successful implementation of machine learning models. The MLI is a career-enhancing professional qualification, that can be taken worldwide.

mlinstitute.org

The Numerical Algorithms Group (NAG) are experts in numerical algorithms, software engineering and high-performance computing. They have served the finance industry with numerical software and consulting services for over four decades because of their outstanding product quality and technical support. Specifically, relevant to the finance industry, NAG pioneer in the provision of the NAG Library – numerical, machine learning and statistical components ideal for building Quant Libraries, Risk Applications and the like.

NAG also provides best-in-class C++ operator-overloading AD tools for CPU and GPU called dco (derivative computation through overloading) and dco/map (dco meta adjoint programming). The NAG Library and AD tools are used by many of the largest Investment Banks where they are embedded in Quant Libraries and XVA applications. As a not-for-profit company, NAG reinvests surpluses into the research and development of its products, services, staff and its collaborations.

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