

LEVEL39, CANARY WHARF, LONDON

# THE 2ND QUANTITATIVE FINANCE CONFERENCE (SPRING EDITION)

17TH - 19TH MAY 2023

## SPEAKERS

Adolfo Montoro: Director, Global Market Risk Analytics, Bank of America  
Matthias Arnsdorf: Global Head of Counterparty Credit Risk Quantitative Research, J.P. Morgan  
Blanka Horvath: Associate Professor in Mathematical and Computational Finance,  
University of Oxford and Researcher, The Alan Turing Institute  
Andrei Lyashenko: Head of Market Risk and Pricing Models, Quantitative Risk Management (QRM), Inc.  
Tony Guida: Executive Director – Co-Head Systematic Macro, RAM Active  
Gordon Lee: Head of XVA and Derivatives Quantitative Analytics, BNY Mellon  
Youssef Elouerkaoui: Managing Director, Global Head of Markets Quantitative Analysis, Citi  
Laura Ballotta: Prof. of Mathematical Finance, Bayes Business School (formerly Cass)  
Andrew Green: Managing Director and Lead GFI Quant, Scotiabank  
Caio Natividade: Global Head of Quantitative Investment Solutions Research, Deutsche Bank  
Alexander Sokol: Executive Chairman and Head of Quant Research, Compatibl  
Fabrizio Anuso: Traded Risk Measurement, PRA, Bank of England  
Marco Bianchetti: Head of Internal Model Market Risk, Intesa Sanpaolo  
Svetlana Borovkova: Head of Quantitative Modelling, Probability & Partners and Associate Professor,  
Vrije Universiteit Amsterdam  
Chris Kenyon: Director: Head of XVA Quant Modelling, MUFG Securities EMEA plc  
Manola Santilli: Market Risk Manager, Intesa Sanpaolo  
Jodie Humphreys: Director, Bank of America  
Robert Dargavel Smith: Lead Data Scientist, Clarity AI  
Saeed Amen: Turnleaf Analytics / Cuemacro / Visiting Lecturer at QMUL  
Elias Daboussi: Quantitative Analyst, Bank of America Merrill Lynch  
Arun Verma: Head of Quantitative Research Solutions, Bloomberg, LP  
Jörg Kienitz: Quantitative Finance and Machine Learning (Acadiasoft), Partner (Quaternion), Adjunct  
Prof (UCT), Assistant Prof (BUW)  
Andrea Macrina: Professor of Mathematics, University College London (UCL)

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WBS Training are delighted to announce that in May 2023 we are once again hosting the 2nd running of our new exciting two streamed event, the Quantitative Finance Conference, Spring Edition in-person in London.

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## WEDNESDAY 17TH MAY: PRE-CONFERENCE WORKSHOP DAY: INTRODUCTION TO AUTOENCODERS AND AUTOENCODER MARKET MODELS (AEMM)

by Alexander Sokol: Executive Chairman and Head of Quant Research, CompatibL

This workshop is complimentary to all conference attendees, numbers limited so first come first served.

## THURSDAY 18TH MAY: MAIN CONFERENCE, DAY ONE

## FRIDAY 19TH MAY: MAIN CONFERENCE, DAY TWO

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

Some presentation slides may be restricted due to company compliance rules.

# WORKSHOP DAY - INTRODUCTION TO AUTOENCODERS AND AUTOENCODER MARKET MODELS (AEMM): WEDNESDAY 17TH MAY

BY ALEXANDER SOKOL: EXECUTIVE CHAIRMAN AND HEAD OF QUANT RESEARCH, COMPATIBL

## 13:30 – 15:00 SESSION ONE: MACHINE LEARNING ARCHITECTURE (VAE, VEGD)

During this session we will train autoencoders to optimally represent the yield curve using one, two, or three model state variables, and compare our results to implicit and explicit factor representations used by popular classical models.

- Introduction to Variational Autoencoders (VAE)
  - The roles of encoder and decoder, latent space
  - Deliberately introducing uncertainty in reconstruction
  - Loss function and optimization loop
  - Conditional VAE (CVAE) vs. unconditional VAE
  - Reconstruction with VAE
  - Generation with VAE
- VAE for the yield curve
  - Training to single currency dataset
  - Training to multi-currency dataset
  - Few-shot learning with multi-currency dataset
- Hands-on examples with Python
  - Swap curve VAE trained to single currency dataset
  - Swap curve VAE trained multi-currency dataset
  - Few-shot VAE for currencies with short time series

## 15:00 – 15:30 COFFEE BREAK

## 15:30 – 17:00 SESSION TWO: APPLICATION TO INTEREST RATE MODELS

For five popular model families (three in Q-measure and two in P-measure), we will review a representative classical model in each family and then build its machine learning counterpart.

- Introduction to Autoencoder Market Models (AEMM)
  - Dimension Reduction as Compression
  - Combining VAE with stochastic process in latent space
  - Deterministic and stochastic volatility AEMM
- Models in Q-Measure
  - One Factor Short Rate Models
    - One Factor Hull-White Model (classical)
    - One Factor Short Rate AEMM (ML)
  - Two Factor Short Rate Models
    - Two Factor Hull-White Model (classical)
    - Two Factor Short Rate AEMM (ML)
  - Forward Rate Models
    - HJM, LMM and SABR-LMM Models (classical)
    - AFNS and FHJM Models (classical)
- Models in P-Measure
  - Forecasting Models
    - Dynamic Nelson-Siegel Model (classical)
    - Forecasting AEMM (ML)
  - Stochastic Models
    - CKLS Model (classical)
    - Stochastic AEMM (ML)
- Hands-on examples with Python
  - Compare curve shapes generated by classical Q-measure models and AEMM
  - Compare interest rate forecasting by classical P-measure models and AEMM

## 17:00 – 17:30 Q&A

# MAIN CONFERENCE DAY ONE: THURSDAY 18TH MAY

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

## AI & MACHINE LEARNING STREAM

## LATEST QUANTITATIVE MODELLING & REGULATIONS STREAM

09:00 – 09:45

### GENERATIVE DEEP LEARNING IN QUANT FINANCE (TOPIC TO BE CONFIRMED)

**Presenter:** Andrew Green: Managing Director and Lead GFI Quant, Scotiabank

09:00 – 09:45

### LATEST FRTB UPDATE

**Presenter:** Adolfo Montoro: Director, Global Market Risk Analytics, Bank of America

09:45 – 10:30

### AUTOENCODER MARKET MODELS FOR INTEREST RATES

**Presenter:** Alexander Sokol: Executive Chairman and Head of Quant Research, Compatibl

09:45 – 10:30

### COUNTING JUMPS: AN ANALYSIS OF DIFFERENT WAITING TIME DISTRIBUTIONS. APPLICATIONS IN FINANCE

**Presenter:** Laura Ballotta: Prof. of Mathematical Finance, Bayes Business School (formerly Cass)

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

11:00 – 11:45

### DERIVATIVES PRICING WITH SOBOLEV DEEP LEARNING

- Motivation: Fast and Stable Deep Learning
- An Introduction to Sobolev Deep Learning Universal Representation
- Theorem on Sobolev Spaces
- Practical Numerical Implementation Applications

**Presenter:** Yousef Elouerkhaoui: Managing Director, Global Head of Markets Quantitative Analysis, Citi

11:00 – 11:45

### LEVERAGED WRONG-WAY RISK

We introduce a simple model for the credit exposure to leveraged and collateralized counter-parties. Wrong-way risk is captured by linking the counter-party default probability directly to changes in the portfolio value. This applies e.g. to leveraged firms such as hedge funds where large collateral calls can be the driver of default. We show that our model is able to reproduce the large losses observed in recent events. These losses were unexpected based on typical exposure models which neglect the relatedness of large market moves and the viability of the counter-party. Our model is intuitive to parameterize and straightforward to implement and thus provides a useful tool for assessing the credit risk inherent in leveraged portfolios.

**Presenter:** Matthias Arnsdorf: Global head of Counterparty Credit Risk Quantitative Research, J.P. Morgan

11:45 – 12:30

### MODEL-AGNOSTIC PRICING OF EXOTIC DERIVATIVES USING SIGNATURES

**Presenters:**

**Blanka Horvath:** Associate Professor in Mathematical and Computational Finance, University of Oxford and Researcher, The Alan Turing Institute &  
**Gordon Lee:** Head of XVA and Derivatives Quantitative Analytics, BNY Mellon

11:45 – 12:30

### MODELING YIELD CURVES WITH FACTOR HJM

We present a new interest rate modeling framework based on the factor modeling approach widely used to model yield curves in real-world applications. The new modeling framework is very attractive as it combines the simplicity, intuitiveness, and computational efficiency of the factor modeling approach with the rigor of no-arbitrage term structure pricing models.

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

# MAIN CONFERENCE DAY ONE: THURSDAY 18TH MAY

## AI & MACHINE LEARNING STREAM

## LATEST QUANTITATIVE MODELLING & REGULATIONS STREAM

12:30 – 13:45 LUNCH

13:45 – 14:30

### MACHINE LEARNING IN SYSTEMATIC FUTURES ALLOCATION

- General concepts in systematic trend following
- How to use ML equity features' creation approach to cross-asset futures?
- Comparing and reporting outputs

Over the last seven years, Machine Learning applications in Finance have benefited from an increasing corpus of research stemming from academia and gradual adoption from practitioners in the investment industry. More recently, Systematic Trend Following strategies have been experiencing a tailwind in terms of realized performance and renew interest compared to other hedge funds strategies. In this educational presentation, we first review some general concepts about trends and how to build generic systematic trend following strategies according to classic definitions. Then we focus on the use of price-based features to construct a dataset designed for training different Machine Learning (ML) approaches (trees based and neural net based) to build diversified Futures portfolio. We finally conclude by contrasting the results between generic and ML based approach and how they relate to contemporary methodologies used in the systematic CTA/Trend following.

**Presenter: Tony Guida: Executive Director – Co-Head  
Systematic Macro, RAM Active**

13:45 – 14:30

### JOINT MODELLING OF CMS RATES IN A RISK-FREE RATE FRAMEWORK

**Presenter: Elias Daboussi: Quantitative Analyst,  
Bank of America Merrill Lynch**

14:30 – 15:15

### USING MACHINE LEARNING FOR CALIBRATION & PRICING OF FINANCIAL INSTRUMENTS

**Presenter: Arun Verma: Head of Quantitative Research  
Solutions, Bloomberg, LP**

14:30 – 15:15

### EFFICIENT VALUATION OF MID-CURVE SWAPTIONS

**Abstract:** We consider a model for midcurves that respects relevant swaption skews, allows a flexible correlation structure and accounts for the stochasticity of annuities. Furthermore, we present a method to evaluate the model efficiently.

**Presenter: Wen Jiang: Executive Director, Head of Structured  
Rates Quantitative Research, Nomura**

15:15 – 15:45 AFTERNOON BREAK AND NETWORKING OPPORTUNITIES

# MAIN CONFERENCE DAY ONE: THURSDAY 18TH MAY

## AI & MACHINE LEARNING STREAM

## LATEST QUANTITATIVE MODELLING & REGULATIONS STREAM

15:45 – 16:30

### SEMI-ANALYTIC CONDITIONAL EXPECTATIONS AND APPLICATIONS

We introduce a data driven and model free approach for computing conditional expectations. The new method combines Gaussian Mean Mixture models with classic analytic techniques based on the properties of the Gaussian distribution. As applications we consider

- Proxy hedges
- Bermudan options
- Stochastic Local Volatility
- Forward Backward Stochastic Differential Equations

**Presenter: Jörg Kienitz: Quantitative Finance and Machine Learning (Acadiasoft), Partner (Quaternion), Adjunct Prof (UCT), Assistant Prof (BUW)**

15:45 – 16:30

### COLLATERALISED EXPOSURE MODELLING: BRIDGING THE GAP RISK

**Presenter: Fabrizio Anfuso: Traded Risk Measurement, PRA, Bank of England**

16:30 – 17:30

### MACHINE LEARNING MODELS PANEL – PRESENT AND FUTURE

#### ML models for valuation, XVA, and risk

- Is ML a new numerical method, a new way to specify the model, or a new paradigm?
- Does ML training replace model selection, or model calibration?
- How do we know if we are truly learning or just interpolating?
- Is there enough historical data to train ML models?
- Trusted ML in quant finance – will the regulators accept ML model?

#### Natural language processing (NLP) and sentiment analysis in quant finance

- Is there usable sentiment data in news? Social media? Company filings?
- How will sentiment be used for alpha generation? Valuation and XVA? Risk?
- What matters more in recognizing sentiment – Speed? Quality? Stability?

#### ML and investing

- Will ML revolutionize fundamental analysis?
- Will ML enable the use of alternative data in new ways?
- Does ML have a role in integrating ESG in the investment process?

#### Moderator:

- **Alexander Sokol: Executive Chairman and Head of Quant Research, CompatibL**

#### Panellists:

- **Gordon Lee: Head of XVA and Derivatives Quantitative Analytics, BNY Mellon**
- **Marco Bianchetti: Head of Internal Model Market Risk, Intesa Sanpaolo**
- **Blanka Horvath: Associate Professor in Mathematical and Computational Finance, University of Oxford and Researcher, The Alan Turing Institute**

17:30 – 19:00 DRINKS RECEPTION

# MAIN CONFERENCE DAY TWO: FRIDAY 19TH MAY

08:30 – 09:00 MORNING WELCOME COFFEE

## ALT DATA, CRYPTO & DEFI STREAM

## ESG AND CLIMATE RISK QUANT MODELLING TECHNIQUES STREAM

09:00 – 09:45

### LEARNING MARKET DATA ANOMALIES

- Why anomaly data detection is crucial for market risk management
- Techniques: from simple statistics to isolation forest and (variational) autoencoders
- Comparing and reporting outputs
- Operational framework

**Abstract:**

Everyday market risk managers are required to check a huge amount of market data, scenarios and positions used to compute market risk measures. Some data may present anomalous values because of a wide range of reasons, e.g. bugs in the related production processes, sudden and severe market movements, etc. Hence, it is crucial to integrate the daily data quality process with automatic and statistically robust tools able to smartly analyse all the available information and identify possible anomalies (the "needles in the haystack"). To this purpose we combined both simple statistics and machine learning algorithms to build an anomaly detection framework which is general enough to cover different asset classes and data dimensionalities (multiple curves, surfaces and cubes). The results are encouraging but they strongly depend on assumptions and parameters, keeping crucial the human supervision.

**Presenters: Marco Bianchetti: Head of Internal Model Market Risk, Intesa Sanpaolo,  
Manola Santilli: Market Risk Analyst, Intesa Sanpaolo &  
Marco Scaringi: Quantitative Analyst, Risk Management, Intesa Sanpaolo**

09:00 – 09:45

### LEVERAGING LARGE LANGUAGE MODELS TO EXTRACT ESG INFORMATION IN PRACTICE

**Presenter: Robert Dargavel Smith: Lead Data Scientist, Clarity AI**

09:45 – 10:30

### FORECASTING INFLATION WITH MACHINE LEARNING, ALT DATA AND PYTHON

Inflation has become a key topic in recent months. In our talk, we discuss how to approach the topic from a machine learning perspective, and how to incorporate alternative data in the process. We will also discuss the tech stack we have used and the various Python libraries involved, as well as how we've speeded up the code.

**Presenter: Saeed Amen: Turnleaf Analytics / Cuemacro /  
Visiting Lecturer at QMUL**

09:45 – 10:30

### SLOW VS FAST ESG SCORES: DO THEY MEASURE THE SAME THING?

- What are the similarities and differences between "slow" ESG scores (of Sustainalytics, Moody's and such) and "fast", media-based ESG data, obtained with AI and NLP?
- What can we learn from this comparison?
- What are financial consequences of using fast ESG information?
- Can fast ESG data help us design successful trading and investment strategies?

**Presenter: Svetlana Borovkova: Head of Quantitative Modelling, Probability & Partners and Associate Professor, Vrije Universiteit Amsterdam**

# MAIN CONFERENCE DAY TWO: FRIDAY 19TH MAY

ALT DATA, CRYPTO & DEFI STREAM

ESG AND CLIMATE RISK QUANT  
MODELLING TECHNIQUES STREAM

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

<p><b>11:00 – 11:45</b> VALIDATING SYNTHETIC DATA WITH AI (TOPIC TO BE CONFIRMED) Presenter: Jodie Humphreys: Director, Bank of America</p>	<p><b>11:00 – 11:45</b> TOPIC AND PRESENTER TO BE CONFIRMED</p>
<p><b>11:45 – 12:30</b> SENTIMENT INVESTING, WITH APPLICATIONS FOR ALPHA AND RISK MODELLING Presenter: Caio Natividade: Global Head of Quantitative Investment Solutions Research, Deutsche Bank</p>	<p><b>11:45 – 12:30</b> CO2EVA: PRICING CARBON EXTERNALITIES TRANSITION (TOPIC TO BE CONFIRMED) Presenter: Chris Kenyon: Director: Head of XVA Quant Modelling, MUFG Securities EMEA plc</p>

## 12:30 – 13:30 LUNCH

<p><b>13:30 – 14:15</b> CHARACTERISTICS OF AUTOMATED MARKET MAKERS (AMMS) IN DEFI (TOPIC TO BE CONFIRMED) Presenter: Katia Babbar: University of Oxford, Academic Visitor &amp; Immersive Finance, Co-Founder</p>	<p><b>13:30 – 14:15</b> CARBON-EQUIVALENCE PRINCIPLE IN ACTION</p> <ul style="list-style-type: none"><li>• Carbon-equivalence principle</li><li>• Policy-impacted climate finance</li><li>• Marginal financial net-zero</li><li>• Minimization of carbon costs</li><li>• Green hedge business</li></ul> <p>Presenter: Andrea Macrina: Professor of Mathematics, University College London (UCL)</p>
<p><b>14:15 – 15:00</b> MODELING IMPLIED VOLATILITY SURFACES OF CRYPTO OPTIONS Presenter: Parviz Rakhmonov: Vice President, Quantitative Analyst, Citibank</p>	<p><b>14:15 – 15:00</b> CLIMATE RISK MODELLING</p> <ul style="list-style-type: none"><li>• Mapping physical risk and transition risks</li><li>• Earning at risks</li><li>• Scenario analysis</li><li>• Climate VaR</li><li>• Practical examples</li></ul> <p>Presenter: Maurizio Garro: Senior Lead – IBOR Transition programme, Lloyds Banking Group</p>

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



# MAIN CONFERENCE DAY TWO: FRIDAY 19TH MAY

ALT DATA, CRYPTO & DEFI STREAM

ESG AND CLIMATE RISK QUANT  
MODELLING TECHNIQUES STREAM

15:15 – 16:00

## WHAT THE PANDEMIC, WAR IN UKRAINE AND THE RETURN OF INFLATION TELL YOU – A CONTRARIAN LOOK AT ESG

- Geophysical basis of climate and adverse weather events: what do reinsurers think?
- The energy mix and other resource intensive industries.
- Two years after “Peak ESG”, what remains? ESG versus free markets.
- Is the financial industry the right tool to craft environmental policy?
- How to invest your portfolio through a greenwash boom and bust?

**Presenter: Erik Vynckier: Interim Chief Executive, Foresters Friendly Society**

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17TH - 19TH MAY 2023

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