

LEVEL39, CANARY WHARF, LONDON AND ONLINE

THE 5TH MACHINE LEARNING & QUANTUM COMPUTING CONFERENCE

5TH - 7TH APRIL 2022

SPEAKERS

- Igor Halperin: AI Research Associate, Fidelity Investments
- Alexander Sokol: Executive Chairman and Head of Quant Research, Compatibl
- Vladimir Piterbarg: MD, Head of Quantitative Analytics and Quantitative Development, NatWest Markets
- Alexandre Antonov: Chief Analyst, Danske Bank
- Ioana Boier: Independent
- Alexei Kondratyev: Quantitative Research & Development Lead, ADIA
- Blanka Horvath: Lecturer, King's College London and Researcher, The Alan Turing Institute
- Youssef Elouerkhaoui: Managing Director, Global Head of Credit and Commodities Quantitative Analysis, Citi
- Petter Kolm: Clinical Full Professor and Director of the M.S. in Mathematics in Finance Program, Courant Institute of Mathematical Sciences, New York University & Partner, CorePoint-Partners.com
- Artur Sepp: Head Systematic Solutions and Portfolio Construction, Sygnum Bank
- Ignacio Ruiz: Head of Counterparty Credit Risk Measurement and Analytics, Scotiabank
- Harsh Prasad: Vice President, Morgan Stanley
- Ryan Ferguson: Founder & CEO, Riskfuel
- Assad Bouayoun: XVA and Credit Derivative Quant, Daiwa Capital Markets
- Paul Bilokon: Founder, CEO, Thalesians & Senior Quantitative Consultant, BNP Paribas
- Saeed Amen: Founder: Cuemacro
- Ángel Rodríguez-Rozas: Associate Director, Quantitative Analyst, Model Validation, Banco Santander
- Dimitrios Emmanoulopoulos: Lead Data Scientist, Applied R&D, Barclays
- David Garvin: Principal Researcher, NEC Australia
- Vladyslav Ivanov: Quantitative Researcher, Outremont Technologies
- Lingjiang Zhu: Associate Professor, Florida State University

EARLY BIRD DISCOUNT

15% UNTIL 18TH MARCH 2022

SPECIAL OFFER:

WHEN 2 COLLEAGUES ATTEND
THE 3RD GOES FREE!



EVENT SPONSORS

Riskfuel

COMPATIBL

CONFERENCE OVERVIEW

WBS Training are delighted to announce the return of our Machine Learning & Quantum Computing in Quantitative Finance Conference. This conference will be in a hybrid format of both in-person & virtual presenters & delegates. The live aspect will take place at our office; One Canada Square, Canary Wharf, London.

LOCATION:

Level39, One Canada Square, Canary Wharf, London, E14 5AB

Website: www.level39.co

TUESDAY 5TH APRIL:

PRE-CONFERENCE WORKSHOP DAY: MACHINE LEARNING MODELS FOR THE INTEREST RATES

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

This workshop is complimentary to all conference attendees.

WEDNESDAY 6TH APRIL: MAIN CONFERENCE, DAY ONE

THURSDAY 7TH APRIL: MAIN CONFERENCE, DAY TWO

CONFERENCE BOOKINGS - DISCOUNT STRUCTURE:

- **Early Bird Discount: 15% until 18th March**
- SPECIAL OFFER: When 2 colleagues attend the 3rd goes free!
- 70% Academic Discount (FULL-TIME Students Only)

CPD CERTIFICATION



You will be able to receive CPD points for attending this event (number of points to be confirmed).

The CPD Certification Service was established in 1996 as the independent CPD accreditation institution operating across industry sectors to complement the CPD policies of professional and academic bodies. The CPD Certification Service provides recognised independent CPD accreditation compatible with global CPD principles.

www.cpduk.co.uk

IMPORTANT NOTES:

This conference will be hybrid, live in London and hosted via Zoom globally for live chat and includes access to our online educational portal. At the end of each conference day the video lecture, and slides will be uploaded online to continue the debate via the daily forum.

- Full access to conference presentation videos during and post-event
- Presentation slides all online
- Take part in the presentation forums at the end of each conference day

Post conference the recordings will be available via our online educational portal for two months.

*Some presentation slides and video recordings may be restricted due to company compliance rules.

WORKSHOP DAY - MACHINE LEARNING MODELS FOR THE INTEREST RATES: TUESDAY 5TH APRIL

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

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

- Variational autoencoder architecture (VAE)
 - The roles of encoder and decoder, latent space
 - Deliberately introducing uncertainty in reconstruction
 - Loss function and optimization loop
 - Reconstruction with VAE
 - Generation with VAE
- Variational encoder-generator-decoder architecture (VEGD)
 - The role of generator between encoder and decoder
 - Generator parameterization
 - Generator training
- Hands-on examples with Python
 - VAE for handwritten digits from the MNIST dataset
 - VEGD for arithmetic on handwritten digits from the MNIST dataset

15:00 – 15:30 COFFEE BREAK

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

- Principles of interest rate model construction
 - Stochastic drivers and state variables
 - Historical calibration in P-measure
 - Arbitrage-free calibration in Q-measure
 - Three types of interest rate models and connection between them
- One factor short rate models
 - SDE models: HW, BK, CIR++
 - Machine learning (VEGD) models
- Two factor short rate models
 - SDE models: HW2F/G2, CIR2++
 - Machine learning (VEGD) models
- Forward rate models
 - Single rate SDE models: Black, SABR
 - Forward curve SDE models: HJM, LMM, SABR-LMM
 - Machine learning (VEGD) models
- Curve basis models
 - Static models: Nelson-Siegel (NS), Nelson-Siegel-Svensson (NSS)
 - SDE models: AFNS, Factor HJM
 - Machine learning (VAE) counterparts of static models
 - Machine learning (VEGD) counterparts of SDE models
- Hands-on examples with Python
 - VAE for the yield curve with one and two dimensional latent space
 - Historical VEGD model training in P-measure
 - Arbitrage-free market implied VEGD model calibration in Q-measure

17:00 – 17:30 Q&A

MAIN CONFERENCE DAY ONE: WEDNESDAY 6TH APRIL

08:30 – 09:00 REGISTRATION AND MORNING WELCOME COFFEE

09:00 – 10:30 ALTERNATIVES TO DEEP NEURAL NETWORKS FOR FUNCTION APPROXIMATIONS IN FINANCE

Presenters:

Vladimir Piterbarg: MD, Head of Quantitative Analytics and Quantitative Development, NatWest Markets and
Alexandre Antonov: Chief Analyst, Danske Bank

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

11:00 – 11:45 NEW DEVELOPMENTS IN DEEP PRICING

Presenter:

Youssef Elouerkhaoui: Managing Director, Global Head of Credit and Commodities Quantitative Analysis, Citi

11:45 – 12:30 VARIATIONAL ENCODER-GENERATOR-DECODER (VEGD) MODELS FOR THE INTEREST RATES

Presenter:

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

Abstract:

- We propose a variational encoder-generator-decoder (VEGD) model architecture in Q- and P-measure where:
 - Latent space geometry is discovered by pretraining VAE encoder and decoder to optimally represent historical interest rate curves, rather than rate increments
 - Probability distribution over the latent space is determined by the generator located between encoder and decoder
 - Curve and calibration constraints in Q-measure are applied as additional biases of the decoder
- VEGD model learns the optimal mapping of state variables to latent variables and latent space geometry directly from the data, without committing to an SDE
- The proposed architecture permits building a wide variety of models with desirable properties depending on the available calibration data, just like with traditional SDE-based models
- Examples of using VEGD architecture to build machine learning counterparts of short rate models, forward rate models, and curve factor models are provided

12:30 – 13:30 LUNCH

MAIN CONFERENCE DAY ONE: WEDNESDAY 6TH APRIL

13:30 – 14:15 EXPLAINABILITY OF LEARNING MODELS

Presenter:

Harsh Prasad: Vice President, Morgan Stanley

14:15 – 15:00 FORECASTING INTRADAY STOCK RETURNS WITH DEEP LEARNING USING THE LIMIT ORDER BOOK

Presenter:

Petter Kolm: Clinical Full Professor and Director of the M.S. in Mathematics in Finance Program, Courant Institute of Mathematical Sciences, New York University & Partner, CorePoint-Partners.com

15:00 – 15:45 FUNCTION APPROXIMATION IN RISK CALCULATIONS: WHEN TO USE DEEP NEURAL NETWORKS AND WHEN TO USE CHEBYSHEV TENSORS

Presenter:

Ignacio Ruiz: Head of Counterparty Credit Risk Measurement and Analytics, Scotiabank

15:45 – 16:15 AFTERNOON BREAK AND NETWORKING OPPORTUNITIES

16:15 – 17:00 MACHINE LEARNING FOR QUANT STRATEGIES IN CRYPTO ASSETS USING ON-CHAIN DATA

Presenter:

Artur Sepp: Head Systematic Solutions and Portfolio Construction, Sygnum Bank

- On-chain fundamental and flows data for crypto assets
- Features engineering
- Generalized fused and group Lasso ML methods for feature selection and model training
- Efficient solutions for high-dimensional estimation problem
- Simulation of quant strategies using trained Lasso models

17:00 – 18:00 MACHINE LEARNING & QUANTUM COMPUTING PANEL

PANELLISTS:

- **Paul Bilokon:** Founder, CEO, Thalesians & Senior Quantitative Consultant, BNP Paribas
- **Blanka Horvath:** Lecturer, King's College London and Researcher, The Alan Turing Institute
- **Vladyslav Ivanov:** Quantitative Researcher, Outremont Technologies
- **Alexander Sokol:** Executive Chairman and Head of Quant Research, CompatibL
- **David Garvin:** Principal Researcher, NEC Australia

18:00 – 19:30 DRINKS RECEPTION

MAIN CONFERENCE DAY TWO: THURSDAY 7TH APRIL

08:30 – 09:00 MORNING WELCOME COFFEE

09:00 – 09:45 A QUANTUM GENERATIVE ADVERSARIAL NETWORK FOR DISTRIBUTIONS

Presenter:

Alexei Kondratyev: Quantitative Research & Development Lead, ADIA

Abstract:

Generative Adversarial Networks are becoming a fundamental tool in Machine Learning, in particular in the context of improving the stability of deep neural networks.

At the same time, recent advances in Quantum Computing have shown that, despite the absence of a fault-tolerant quantum computer so far, quantum techniques are providing exponential advantage over their classical counterparts.

We develop a fully connected Quantum Generative Adversarial network and show how it can be applied in Mathematical Finance, with a particular focus on volatility modelling.

09:45 – 10:30 A PDE-BASED QUANTUM ALGORITHM FOR PRICING FINANCIAL DERIVATIVES

Presenter:

Ángel Rodríguez-Rozas: Associate Director, Quantitative Analyst, Model Validation, Banco Santander

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

11:00 – 11:45 TOPIC TO BE CONFIRMED

Presenter:

Assad Bouayoun: XVA and Credit Derivative Quant, Daiwa Capital Markets

11:45 – 12:30 QUANTUM MACHINE LEARNING IN FINANCE: TIME SERIES FORECASTING

Presenter:

Dimitrios Emmanoulopoulos: Lead Data Scientist, Applied R&D, Barclays

12:30 – 13:30 LUNCH

MAIN CONFERENCE DAY TWO: THURSDAY 7TH APRIL

13:30 – 14:15 COMBINING THE DIRECT AND INVERSE REINFORCEMENT LEARNING TO IMPROVE ASSET ALLOCATION FOR ACTIVE PORTFOLIO MANAGEMENT

Presenter:

Igor Halperin: AI Research Associate, Fidelity Investments

This talk presents a simple practical approach to improve asset allocation by combining the human and artificial intelligence

- The method can be used by portfolio managers to both learn from each other and remove their potential sector or factor biases
- The method involves a two-step procedure involving both the inverse reinforcement learning (IRL) and direct RL steps
- At the IRL step, we use the historical funds holdings data to infer the objective (reward) function of their portfolio strategies
- At the RL step, we use a direct RL algorithm called G-learner to improve the portfolio performance by finding the optimal asset allocation policy.

14:15 – 15:00 LOOKING FOR TROUBLE: VALIDATING ML PRICERS

Presenter:

Ryan Ferguson: Founder & CEO, Riskfuel

15:00 – 15:45 SHALLOW VS. DEEP LEARNING

Presenter:

Ioana Boier: Independent

15:45 – 16:00 AFTERNOON BREAK AND NETWORKING OPPORTUNITIES

MAIN CONFERENCE DAY TWO: THURSDAY 7TH APRIL

16:00 – 16:45 USING NLP TO TRADE FINANCIAL MARKETS

Presenter:

Saeed Amen: Founder: Cuemacro

- We'll be introducing some of the applications for NLP within financial markets including some stylized examples around the recent coronavirus pandemic
- We'll present some case studies including using macro based examples from Fed communications and also looking at machine readable news from the Financial Times

16:45 – 17:30 THE HEAVY-TAIL PHENOMENON IN SGD

Presenter:

Lingjiong Zhu: Associate Professor, Florida State University

Abstract:

In recent years, various notions of capacity and complexity have been proposed for characterizing the generalization properties of stochastic gradient descent (SGD) in deep learning. Some of the popular notions that correlate well with the performance on unseen data are (i) the flatness of the local minimum found by SGD, which is related to the eigenvalues of the Hessian, (ii) the ratio of the stepsize to the batch-size, which essentially controls the magnitude of the stochastic gradient noise, and (iii) the tail-index, which measures the heaviness of the tails of the network weights at convergence. In this talk, we argue that these three seemingly unrelated perspectives for generalization are deeply linked to each other. We claim that depending on the structure of the Hessian of the loss at the minimum, and the choices of the algorithm parameters, the distribution of the SGD iterates will converge to a heavy-tailed stationary distribution. We rigorously prove this claim in the setting of a simple linear regression problem. We further characterize the behavior of the tails with respect to algorithm parameters, the dimension, and the curvature. We then translate our results into insights about the behavior of SGD in deep learning. We support our theory with experiments conducted on synthetic data, fully connected, and convolutional neural networks.

CONFERENCE SPONSORS



COMPATIBL

Compatibl is a leading provider of risk management software, model validation and quantitative consultancy services. The company's award-winning cloud and on-premises software solution is used by financial institutions worldwide, including four major derivatives dealers, central banks and some of the world's largest asset managers.

Our quantitative research program produced multiple innovations in models and numerical methods for counterparty credit risk, settlement risk, risk premia in the yield curve, and has been recognized by multiple awards.

www.compatibl.com

Riskfuel

AI technology is progressing quickly and has put real-time risk management of derivatives books within reach. Underpinned by sophisticated models requiring intense computations, the opportunities are centred on real-time portfolio analysis – on trading, exposure monitoring and capital utilization.

www.riskfuel.com

Contact: Ryan Ferguson: rf@riskfuel.com



THE 5TH MACHINE LEARNING & QUANTUM COMPUTING CONFERENCE
LEVEL39, CANARY WHARF, LONDON AND ONLINE
5TH - 7TH APRIL 2022

CONFERENCE FEE STRUCTURE

	Early Bird Discount: 25% until 25th February	Early Bird Discount: 15% until 18th March	Regular Event Fee
<input type="checkbox"/> In-Person Conference attendance:	£1121.25 + UK VAT	£1270.75 + UK VAT	£1495.00 + UK VAT
<input type="checkbox"/> Online Conference attendance:	£373.75	£523.25	£749.50

Special Discount Code:

SPECIAL OFFER: When 2 colleagues attend the 3rd goes free!

70% Academic Discount / FULL-TIME Students Only

DELEGATE DETAILS

COMPANY:
NAME:
JOB TITLE/POSITION:
NAME:
JOB TITLE/POSITION:
NAME:
JOB TITLE/POSITION:
DEPARTMENT:
ADDRESS:
COUNTRY:
TELEPHONE:
E-MAIL:
DATE:
SIGNATURE:

sales@wbstraining.com

FLIGHT DETAILS:

All delegates flying into London on the morning of the event are reminded that they should arrive 30 minutes before the conference starts for registration. The venue's location is approximately 1 hour from all 3 main London airports, Heathrow, Gatwick and City. Returning flights should equally allow for the events finishing time.

SPONSORSHIP:

World Business Strategies Ltd, offer sponsorship opportunities for all events, e-mail headers and the web site. Contact sponsorship via telephone on: +44 (0)1273 201 352

DISCLAIMER:

World Business Strategies command the rights to cancel or alter any part of this programme.

REGISTER WITH CONFIDENCE:

Your booking can be cancelled up to 14 days before, or switched to the virtual option if required.

DISCOUNT STRUCTURE:

The discount is available on any day permutation, and can be combined across delegates within the same company (only at the time of booking and not retrospectively).

By completing and submitting this form, you accept WBS Training's GDPR Policy (www.wbstraining.com/details/gdpr) and agree to communication from time to time with relevant details and information on WBS Training events and services

REGISTRATION:
Tel: +44 (0)1273 201 352

CONTACT:
www.wbstraining.com | sales@wbstraining.com