

# QuantWeek 2011

Cutting edge quantitative seminars

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**London** June 6-10

Five separately bookable days

**DAY 1** Commodity prices, risk and performance with **Andrea Roncoroni**

**DAY 2** Flow products and markets with **Igor Smirnov**

**DAY 3** Advanced analytical tools for pricing  
and hedging in a volatile world with **Marcello Minenna**

**DAY 4** Interest rate modelling and model risk  
validation with **Massimo Morini**

**DAYS** Statistical arbitrage for equities:  
medium-frequency strategies with **Marco Avellaneda**

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## Course highlights

- Statistical arbitrage and medium frequency trading strategies
- Hedging and pricing strategies across derivative classes
- CVA modelling approaches taken at a leading CVA desk
- Advanced and practical application of techniques post Black-Scholes
- Energy risk modelling and portfolio performance assessment
- Portfolio construction and real-time analysis

## About the course

QuantWeek 2011 begins an annual series in London and New York of cutting-edge quantitative seminars.

QuantWeek provides those working in the quantitative community with face-to-face interaction with leading practitioners and world renowned experts in an environment geared towards technical, need to know content.

QuantWeek seminars are tailored to a niche, sophisticated audience and offer practical applications to inform and better equip those taking quantitative approaches to business critical thinking.

Running in June for European Quants and in October for North America, QuantWeek 2011 will deliver strategies and technical insights to equip quants with the refined skill-sets needed to operate across asset classes. Master class sessions will cover 2011 specific approaches to frequency trading strategies, pricing and hedging across a range of derivatives, modelling approaches and, in response to extensive research, practical CVA modelling.

**By attending QuantWeek, you will deepen your technical approach to quantitative finance.**

**QuantWeek ensures that you are well-placed to onboard, execute and adeptly respond to the latest approaches and strategies needed to tackle the key issues facing financial institutions.**



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## Learning outcomes

- Execute and deliver medium frequency trading strategies
- Perform dynamic portfolio construction strategies
- Commodity pricing and portfolios in the energy sector
- Statistical arbitrage and portfolio construction assessment
- Refined hedging and pricing strategies across derivative classes
- Accurately build CVA models – including incoming charge fee variations

## Course Tutors

### Igor Smirnov

Head of Flow Research,  
BNP PARIBAS



Igor Smirnov has worked in quantitative finance since 1998, joining BNP Paribas in

2000, where most recently as Global Head of Flow Research Group he was responsible for quantitative research and modelling of flow products (including Interest Rates, Credit and other product areas). Igor has tackled a number of research areas during his career, with a long standing focus on term structure modelling and risk dimensionality issues, as well as liquidity, funding and counterparty risks.

### Andrea Roncoroni

Professor of Finance,  
ESSEC BUSINESS SCHOOL



Andrea Roncoroni is Professor of Finance at ESSEC Business School in Paris and regular

lecturer at Bocconi University. He holds a BS in Economics from Bocconi University, an MS in Mathematics from the Courant Institute of Mathematical Sciences, and PhDs in Applied Mathematics and in Finance from University of Trieste and Bocconi University and University

Paris Dauphine, respectively. Andrea's research interests cover energy and commodity finance, financial econometrics, derivative structuring, and risk management.

### Marcello Minnena

Head of Quantitative Analysis,  
CONSOB



Marcello Minnena is Head of Quantitative Analysis at CONSOB (the Italian Securities and Exchange

Commission) where he is in charge of analysing and developing quantitative models for surveillance. Marcello has taught extensively around the world and is known for his engaging and charismatic approach. He received his PhD and MA in mathematics for finance from the State University of Brescia and from Columbia University. His research is widely used in developing quantitative models for surveillance. Marcello will be joined by his Teaching Assistant Paolo Verzella.

### Massimo Morini

Head of Credit Models and  
Coordinator of Model Research,  
BANCA IMI



Massimo Morini is Head of Credit Models and Coordinator of Financial Modelling

Research at IMI Bank of Intesa San Paolo. Massimo is a Professor

of Fixed Income at Bocconi University. He has delivered advanced courses on financial modelling with an emphasis on understanding how to respond to the credit crunch and improve interest rate, hybrid and credit modelling. Massimo has taught across Europe, the US and China and his expertise has been utilised by financial institutions in credit, interest and correlation modelling.

### Marco Avellaneda

Professor of Mathematics,  
Courant Institute of  
Mathematical Sciences,  
NEW YORK UNIVERSITY

(Risk Awards, Quant of the Year 2010)



Marco Avellaneda is Professor of Mathematics and the Director of Financial

Mathematics at New York University's Courant Institute of Mathematical Sciences. Marco invented the Uncertain Volatility model and is well known for his work on the weighted Monte Carlo algorithm and the theory of Dispersion Trading. He is renowned for developing quant strategies in equities and volatility trading for leading hedge funds. Marco won the prestigious Risk Awards 'Quant of the Year' 2010 for his groundbreaking work on the effect of short-selling restrictions on price dynamics.

# QuantWeek 2011

## LONDON DAY 1 Monday June 6th

### Commodity prices, risk, and performance with Andrea Roncoroni

08.00	Registration and coffee
08.30	<i>Morning seminar: Risk and Performance Monitoring</i>
	<b>Energy commodity positions assessment</b>
	<ul style="list-style-type: none"> <li>Time value of money: accrual and discounting</li> <li>Spot prices, forward prices and value parity</li> <li>Computing the marked-to-market value</li> <li>Energy structures and commodity-linked positions</li> </ul>
10.00	Morning break
10.30	<b>Energy commodity positions performance</b>
	<ul style="list-style-type: none"> <li>Marked-to-market variation over time /</li> <li>Cumulated cash-flow generated positions</li> <li>Benchmark value, earnings and profits</li> <li>Capital equivalent of performance values</li> </ul>
	<b>Energy commodity risk measurement</b>
	<ul style="list-style-type: none"> <li>Notion of risk, risk matrix, and market risk</li> <li>Risk measurement approaches and "at-risk" figures</li> <li>Expected shortfall and the subadditivity property</li> <li>Value-at-Risk: properties and open issues</li> </ul>
12.30	Lunch
13.30	<i>Afternoon seminar: Risk and Performance Management</i>
	<b>A risk monitoring toolkit: FloVaR™ suite</b>
	<ul style="list-style-type: none"> <li>The term structure of risk affecting a portfolio</li> <li>How to model the term structure of risk</li> <li>How to use the term structure of risk of hedging</li> <li>Case-study 1: a gas retailer portfolio management</li> </ul>
	<b>Risk-adjusted performance measurement</b>
	<ul style="list-style-type: none"> <li>Traditional accounting measures: ROE, ROI</li> <li>Risk-adjusted return: RAROC and EVA™</li> <li>Economic Capital, Capital-at-Risk, Profit-at-Risk</li> <li>Case-study 2: performance of a complex portfolio</li> </ul>
15.15	Afternoon break
15.45	<b>Price modelling and margin requirements</b>
	<ul style="list-style-type: none"> <li>Spot price modelling: construction and implementation</li> <li>Forward price modelling: construction and implementation</li> <li>Case-study 3: Electricity spot price modelling in the US and Germany</li> <li>Case-study 4: WTI oil and NYMEX gas futures price modelling</li> </ul>
17.00	<b>Q&amp;A – opportunity for further technical questions</b>

## LONDON DAY 2 Tuesday June 7th

### Flow products and markets with Igor Smirnov

08.00	Registration and coffee
08.30	<b>Fundamentals to flow – building blocks of derivative markets</b>
	<ul style="list-style-type: none"> <li>Overview of flow rates and credit derivative products</li> <li>Markets &amp; curves – calibration challenges</li> <li>Relationships to structured products</li> <li>Curve construction and flow pricing the traditional way: identifying the shortcuts</li> </ul>
10.30	Morning break
11.00	<b>Flow rates – without the blinkers</b>
	<ul style="list-style-type: none"> <li>Why the shortcuts were wrong – new risk factors of familiar products</li> <li>Understanding basis spreads</li> <li>Relating funding and discounting: Cost of collateral: modelling presence of bilateral collateral agreements and clearing houses   Uncollateralised funding and liquidity and credit risk</li> </ul>
12.30	Lunch
13.30	<b>Under the hood - tools and techniques for practical model development</b>
	<ul style="list-style-type: none"> <li>Joining the dots: overview of rates interpolation methods</li> <li>Relationship to market developments, including treatment of discontinuities and liquidity squeezes</li> <li>Curves and markets: understanding interdependencies of sets of term structures to be calibrated</li> <li>Calibration instruments – calibration techniques: efficient treatment of multidimensional optimisation</li> <li>Stability and performance enhancers</li> </ul>
15.00	Afternoon break
15.30	<b>Beyond flow rates – changes in credit and other markets</b>
	<ul style="list-style-type: none"> <li>Implications for structured products</li> <li>General valuation &amp; regulatory challenges</li> <li>Brave new credit world</li> <li>New conventions and the impact of SNAC: CDS &amp; funding   Recovery: point or surface?   Managing increasing dimensionality</li> <li>Option pricing in the new paradigm: adapting our favourite models</li> <li>The non-existent market price, and implications for: Electronic &amp; broker trading   Communication with clients, accounting and regulators</li> </ul>
17.00	<b>Q&amp;A – opportunity for further technical questions</b>



## LONDON DAY 3 Wednesday June 8th

### Advanced analytical tools for pricing and hedging in a volatile world

with Marcello Minenna

08.30	Registration and coffee
09.00	<b>Stylised facts on the real world as guidelines to build robust models beyond Black Scholes</b> <ul style="list-style-type: none"> <li>● The "anomaly" of the returns normality assumption</li> <li>● Real probability distributions for asset prices: asymmetry, Kurtosis and fat tails</li> <li>● An extended framework for pricing and hedging in the real world</li> <li>● Multifactorial diffusive models, jump diffusion and pure jump</li> <li>● Models: an overview</li> </ul>
10.30	Morning break
11.00	<b>Advanced mathematical tools for the real world</b> <ul style="list-style-type: none"> <li>● Multifactorial stochastic calculus</li> <li>● Levy processes</li> <li>● The Fourier and Laplace transforms</li> <li>● The mathematics of the complex plane</li> </ul>
12.30	Lunch
13.30	<b>Extending the Black-Scholes framework: multifactorial models</b> <ul style="list-style-type: none"> <li>● Stochastic interest rates models: a Martingale derivation</li> <li>● Stochastic volatility models: PDE derivation via Fourier transform</li> <li>● Solving the pricing problem via numerical algorithms in Excel and MATLAB</li> <li>● Calibrating multifactorial models: procedures and solutions in Excel and MATLAB, with extensive evaluation tests</li> <li>● Moving from Vanilla Derivatives to Exotics in a multifactorial setting: Monte Carlo solutions</li> </ul>
14.30	Afternoon break
15.00	<b>Extending the Black-Scholes framework: jump models</b> <ul style="list-style-type: none"> <li>● Jump diffusion models: replicating and quasi-replicating portfolios</li> <li>● Pure jump models: the stochastic time hypothesis and mixtures of probabilities densities</li> <li>● Solving the pricing problem via numerical algorithms in Excel and MATLAB</li> <li>● Calibrating jump models: procedures and solutions in Excel and MATLAB with extensive evaluation tests</li> <li>● Moving from vanilla derivatives to exotics in jump setting: Monte Carlo solutions</li> </ul>
17.00	<b>Q&amp;A – opportunity for further technical questions</b>

## LONDON DAY 4 Thursday June 9th

### Interest rate modelling and model risk validation with Massimo Morini

08.30	Registration and coffee
09.00	<b>Model risk and validation</b> <ul style="list-style-type: none"> <li>● Understanding model risk: Lessons from the past crises</li> <li>● Regulators and fair value accounting: indications for model validation</li> <li>● From theory to practice: a practical scheme for model risk management</li> <li>● Using different models for model validation. An example on gap risk</li> </ul>
10.30	Morning break
11.00	<b>Stress-testing: design and pitfalls - examples from credit risk</b> <ul style="list-style-type: none"> <li>● Using market information to design stress-tests. Detecting the credit correlation mistake</li> <li>● Using historical information to design stress-tests in illiquid markets. Example on mapping for bespoke portfolios</li> <li>● Pitfalls in stress-testing. When the model breaks down. Copula errors in measuring liquidity risk, dynamic VaR and wrong-way counterparty risk</li> </ul>
12.00	Lunch
13.00	<b>Model evolution and paradigm change - examples from interest rates and funding</b> <ul style="list-style-type: none"> <li>● How the interest-rate consensus model broke down when the basis spreads exploded</li> <li>● Understanding the new risk factors in the interest rate market. Modelling with different curves</li> <li>● Liquidity and counterparty risk in Libor. The effect of collateral</li> <li>● The explosion of the funding problem</li> <li>● The risk of double counting with credit</li> <li>● New market approaches to incorporate liquidity in pricing</li> </ul>
14.30	Afternoon break
15.00	<b>Model risk in hedging – examples from interest rates</b> <ul style="list-style-type: none"> <li>● The limits of pricing models when applied to hedging</li> <li>● The validation of a real hedging strategy</li> <li>● Practical example: local volatility models vs. stochastic volatility models</li> </ul>
15.45	<b>When the problem is the payoff - examples from credit</b> <ul style="list-style-type: none"> <li>● The bad consequences of payoff misunderstanding</li> <li>● Examples on index options and the errors in representing default loss for counterparty risk valuation</li> </ul>
16.30	<b>Approximations, interpolations and extrapolations</b> <ul style="list-style-type: none"> <li>● Understanding the risks from wrong calibrations and improving with maths and market information.</li> <li>● Examples on the Libor market model, SABR, CMS and correlation skew</li> </ul>
17.15	<b>Q&amp;A – opportunity for further technical questions</b>

# QuantWeek 2011

LONDON DAY 5 Friday June 10th

## Statistical arbitrage for equities: medium-frequency strategies

with Marco Avellaneda

08.00	Registration and coffee
08.30	<b>US Equities and Exchange Traded Funds: a quant perspective</b> <ul style="list-style-type: none"><li>● PCA and factor analysis of large-scale correlation matrices</li><li>● Extracting factors from market correlations</li><li>● Systematic volatility, idiosyncratic volatility and their variation in time</li></ul>
10.00	Morning break
11.00	<b>Exchange Traded Funds</b> <ul style="list-style-type: none"><li>● Exchange-traded funds (ETFs): review</li><li>● ETFs as risk factors</li><li>● Leveraged ETFs and Volatility ETFs</li></ul>
12.30	Lunch
13.30	<b>Pairs-trading, mean-reversion, cointegration</b> <ul style="list-style-type: none"><li>● Pairs trading: theoretical framework</li><li>● Leveraged ETFs pairs trading</li><li>● VIX ETF pairs trading</li><li>● Stock/sector ETF pairs trading</li></ul>
15.00	Afternoon break
15.20	<b>Statistical Arbitrage</b> <ul style="list-style-type: none"><li>● Portfolio construction</li><li>● Leverage &amp; financing considerations</li><li>● Dynamic risk-management: limiting systematic risk</li><li>● Practical considerations</li></ul>
16.00	<b>Historical Results via backtesting</b> <ul style="list-style-type: none"><li>● Late 1990s</li><li>● 2002-2007: How the subprime crisis affected statistical arbitrage</li><li>● 2008-2010: The future of medium-frequency statistical arbitrage</li></ul>
17.00	<b>Q&amp;A – opportunity for further technical questions</b>

## Who should attend?

QuantWeek seminars communicate best practice approaches to the leading areas of quantitative finance.

With seminars delivered by some of the world's leading practitioners, attendees will gain crucial insights into the latest thinking and practical application of techniques used across the quantitative finance community.

To improve your business critical decisions, QuantWeek is the quantitative seminar event in the calendar to mark down as a must attend.

QuantWeek is particularly appropriate to those working within the following areas in investment banking, commercial and retail banking, asset management and investment banks:

## Company types:

- Investment Banks
- Commercial Banks
- Hedge Funds
- Asset Management Companies
- Insurance Companies
- Pension Funds
- Energy Companies
- Derivatives and Risk Management
- Software Vendors
- Financial Consultants