Final Program and Abstracts



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> Wednesday, November 12 5:00 PM – 7:00 PM

Thursday, November 13 8:00 AM – 7:30 PM

Friday, November 14 8:00 AM – 3:30 PM

Saturday, November 15 8:00 AM – 4:30 PM

Hotel Address

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Meeting At-A-Glance

Thursday, November 13

Wednesday, November 12

5:00 PM – 7:00 PM Registration *Registration Counter - 6th Floor*

Thursday, November 13

8:00 AM - 7:30 PM Registration *Registration Counter - 6th Floor*

10:00 AM - 12:00 PM **Concurrent Sessions** MS1 Portfolio Selection and Asset Pricing in the Non-EUT Framework Water Tower Parlor - 6th Floor MS2 Variable Annuities Adams - 6th Floor MS3 Radial Basis Function Based Methods in Finance Grant Park Parlor - 6th Floor MS4 Topics from Derivatives Central Clearing Hancock Parlor - 6th Floor CP1 Credit Risk Millennium Parlor - 6th Floor **CP2** Econometrics/Empirics LaSalle 5 - 7th Floor CP3 Numerical Analysis - Part 1 LaSalle 1 - 7th Floor **CP4** Options - Part 1 LaSalle 3 - 7th Floor CP5 Stochastic Control - Part 1 LaSalle 2 - 7th Floor

12:00 PM - 1:25 PM Lunch Break *Attendees on their own*

1:25 PM - 1:30 PM Welcome Remarks *Adams - 6th Floor*

1:30 PM - 2:15 PM

IP1 No-arbitrage Under Model Ambiguity and Fundamental Theorems of Asset Pricing Bruno Bouchard, Université Paris-Dauphine and ENSAE-ParisTech, Ceremade and Crest, France

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Adams - 6th Floor

2:15 PM - 3:00 PM IP2 Multi-Period Mean Variance Asset Allocation: Is It Bad To Win the Lottery? Peter Forsyth, University of Waterloo, Canada Adams - 6th Floor

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3:00 PM - 3:30 PM Coffee Break *Monroe - 6th Floor*



3:30 PM - 5:30 PM **Concurrent Sessions** MS5 Advanced Numerical Techniques in Financial Mathematics - Part I of II Adams - 6th Floor MS6 Optimal Stopping with Financial Applications Grant Park Parlor - 6th Floor MS7 Optimal Investment with Transaction Costs Hancock Parlor - 6th Floor MS8 Dynamic Risk and Performance Measures and Related Fields -Part I of II Water Tower Parlor - 6th Floor MS9 Liquidity Risk in a System Context Millennium Parlor - 6th Floor MS10 Mean-field Games Modeling in Economy and Finance LaSalle 1 - 7th Floor CP6 Fixed Income LaSalle 2 - 7th Floor CP7 Options - Part 2 LaSalle 3 - 7th Floor **CP8** Systemic Risk LaSalle 5 - 7th Floor

5:30 PM - 5:45 PM Intermission

5:45 PM - 6:30 PM IP3 Bid-Ask Imbalance and Trade Arrival Modeling

Michael Sotiropoulos, Bank of America Merrill Lynch, USA Adams - 6th Floor

6:30 PM - 8:30 PM Welcome Reception *Monroe - 6th Floor*

Friday, November 14

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8:00 AM - 3:30 PM Registration Registration Counter - 6th Floor

8:30 AM - 10:30 AM

Concurrent Sessions MS11 Dynamic Risk and Performance Measures and Related Fields -Part II of II Water Tower Parlor - 6th Floor MS12 Mean Field Games -Part I of II Adams - 6th Floor MS13 Recent Progress in Equilibrium Theory LaSalle 1 - 7th Floor MS14 Counterparty Risk, Liquidity and Funding - Part I of II Grant Park Parlor - 6th Floor MS15 Systemic and Liquidity Risk Hancock Parlor - 6th Floor MS16 Asymptotic Methods in Continuous-Time Models with Jumps LaSalle 2 - 7th Floor **CP9** High-Frequency Markets Millennium Parlor - 6th Floor **CP10** Risk Measures LaSalle 3 - 7th Floor CP11 Stochastic Volatility - Part 1 LaSalle 5 - 7th Floor

10:30 AM - 10:55 AM Coffee Break *Monroe - 6th Floor*



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10:55 AM - 11:00 AM Announcements Adams - 6th Floor

11:00 AM - 11:45 AM

IP4 Robust Meets Realistic: Interpolating Between Model-Specific and Model-Free Settings for Pricing and Hedging Jan Obloj, Oxford University, United Kingdom Adams - 6th Floor

11:45 AM - 12:30 PM

IP5 Long-Term Valuation and Misspecified Recovery Lars Peter Hansen, The University of Chicago, USA Adams - 6th Floor

Meeting At-A-Glance

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Friday, November 14

Saturday, November 15

Saturday, November 15

12:30 PM - 2:00 PM

Lunch Break Attendees on their own

2:00 PM - 2:30 PM

SP1 SIAG/FME Junior Scientist Prize Lecture: Some Financial Markets with Discontinuities Tomoyuki Ichiba, University of California, Santa Barbara, USA Adams - 6th Floor

2:30 PM - 3:00 PM Coffee Break Monroe - 6th Floor

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3:00 PM - 5:00 PM **Concurrent Sessions** MS17 Large Population Stochastic Control LaSalle 1 - 7th Floor MS18 Statistical Analysis of Risk and Stress Tests for Regulatory Policies -Part I of II Grant Park Parlor - 6th Floor MS19 Spectral and Transform Methods in Finance - Part I of II Hancock Parlor - 6th Floor MS20 Robust Hedging and Pricing under Model Uncertainty - Part I of II Adams - 6th Floor MS21 Systemic Financial Risk Millennium Parlor - 6th Floor MS22 Operator Splitting Methods for Pricing Options LaSalle 2 - 7th Floor MS23 Algorithmic Trading -Part I of II Water Tower Parlor - 6th Floor **CP12** Commodities LaSalle 3 - 7th Floor CP13 Numerical Analysis - Part 2 LaSalle 5 - 7th Floor

5:00 PM - 5:15 PM Intermission

5:15 PM - 6:00 PM

SIAG/FME Business Meeting Adams - 6th Floor Complimentary beer and wine will be served.



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8:00 AM - 4:30 PM Registration Registration Counter - 6th Floor

8:30 AM - 10:30 AM **Concurrent Sessions** MS24 Statistical Inference for Continuous-time Models of Asset Prices Grant Park Parlor - 6th Floor MS25 Algorithmic Trading - Part II of II Water Tower Parlor - 6th Floor MS26 Spectral and Transform Methods in Finance - Part II of II Millennium Parlor - 6th Floor MS27 Robust Hedging and Pricing under Model Uncertainty - Part II of II LaSalle 1 - 7th Floor MS28 Monte Carlo Methods in Finance Hancock Parlor - 6th Floor MS29 Forward Asset Allocation Adams - 6th Floor **CP14** Insurance LaSalle 5 - 7th Floor CP15 Stochastic Control - Part 2 LaSalle 2 - 7th Floor CP16 Stochastic Volatility - Part 2 LaSalle 3 - 7th Floor

..... 10:30 AM - 10:55 AM

Coffee Break Monroe - 6th Floor

Adams - 6th Floor



11:00 AM - 11:45 AM IP6 Moral Hazard in Dynamic Risk Management Jakša Cvitanic, California Institute of Technology, USA

11:45 AM - 12:30 PM IP7 Adaptive Grids in Regression Monte Carlo Mike Ludkovski, University of California, Santa Barbara, USA Adams - 6th Floor

12:30 PM - 2:00 PM Lunch Break Attendees on their own

..... 12:30 PM - 2:00 PM SIAG/FME Conference Paper Prize Session Adams-6th Floor

2:00 PM - 2:45 PM

IP8 The Value of Being Lucky: Option Backdating and Non-diversifiable Risk Vicky Henderson, University of Warwick, United Kingdom Adams - 6th Floor

2:45 PM - 3:30 PM

IP9 The Value of Queue Position in a Limit Order Book Ciamac C. Moallemi, Columbia University, USA Adams - 6th Floor

3:30 PM - 4:00 PM Coffee Break Monroe - 6th Floor



4:00 PM - 6:00 PM **Concurrent Sessions** MS30 Advanced Numerical Techniques in Financial Mathematics - Part II of II LaSalle 1 - 7th Floor MS31 Asymptotics in Finance Hancock Parlor - 6th Floor MS32 Mean Field Games - Part II of II Grant Park Parlor - 6th Floor MS33 Statistical Analysis of Risk and Stress Tests for Regulatory Policies -Part II of II Millennium Parlor - 6th Floor MS34 Counterparty Risk, Liquidity and Funding - Part II of II Adams - 6th Floor MS35 Stochastic Financial Equilibria Water Tower Parlor - 6th Floor CP17 Stochastic Control - Part 3 LaSalle 2 - 7th Floor

Key to abbreviations and symbols

СР	=	Contributed Presentation			
IP	=	Invited Speaker			
MS	=	Minisymposium			
Ì	=	Business Meeting			
B	=	Coffee Break			
3	=	Refreshments			
SP	=	Special Lecture			

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Get-togethers

 Welcome Reception Thursday, November 13 6:30 PM – 8:30 PM

• Business Meeting (open to SIAG/FME members)

Friday, November 14

5:15 PM - 6:00 PM

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Invited Plenary Speakers

**All Invited Plenary Presentations will take place in Adams – 6th Floor **

Thursday, November 13

1:30 PM - 2:15 PM

IP1 No-arbitrage Under Model Ambiguity and Fundamental Theorems of Asset Pricing Bruno Bouchard, Université Paris-Dauphine and ENSAE-ParisTech, Ceremade and Crest, France

2:15 PM - 3:00 PM

IP2 Multi-Period Mean Variance Asset Allocation: Is It Bad To Win the Lottery? Peter Forsyth, University of Waterloo, Canada

5:45 PM - 6:30 PM

IP3 Bid-Ask Imbalance and Trade Arrival Modeling Michael Sotiropoulos, Bank of America Merrill Lynch, USA

Friday, November 14 11:00 AM - 11:45 AM

IP4 Robust Meets Realistic: Interpolating Between Model-Specific and Model-Free Settings for Pricing and Hedging Jan Obloj, University of Manchester, United Kingdom

11:45 AM - 12:30 PM

IP5 Long-Term Valuation and Misspecified Recovery Lars Peter Hansen, The University of Chicago, USA

Invited Plenary Speakers

**All Invited Plenary Presentations will take place in Adams – 6th Floor **

Saturday, November 15 11:00 AM – 11:45 AM

IP6 Moral Hazard in Dynamic Risk Management Jakša Cvitanic, California Institute of Technology, USA

11:45 AM - 12:30 PM

IP7 Adaptive Grids in Regression Monte Carlo Mike Ludkovski, University of California, Santa Barbara, USA

2:00 PM - 2:45 PM

IP8 The Value of Being Lucky: Option Backdating and Non-diversifiable Risk **Vicky Henderson**, University of Warwick, United Kingdom

2:45 PM - 3:30 PM

IP9 The Value of Queue Position in a Limit Order Book Ciamac C. Moallemi, Columbia University, USA

Prizes

All Prize Presentations will take place in Adams

Friday, November 14 2:00 PM – 2:30 PM

SP1 SIAG/FME Junior Scientist Prize Lecture

Some Financial Markets with Discontinuities Tomoyuki Ichiba, University of California, Santa Barbara, USA

> Saturday, November 15 12:30 PM – 2:00 PM

SIAG/FME Conference Paper Prize Session

Information not available at time of publication.

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Probability Theory in Finance

A Mathematical Guide to the Black-Scholes Formula, Second Edition

Seán Dineen, University College Dublin, Ireland

In addition to the usual improvements in response to comments and suggestions, the new edition reflects the experience of teaching real analysis. ... Dineen is doing something valuable by trying to find ways to communicate mathematics in a serious way to an audience that often gets little more than recipes and rules. It's a project definitely worth supporting. —Fernando Q. Gouvêa, MAA Reviews

An outstanding introduction to the Black-Scholes formula for students of mathematical finance, in which the author employs a first-principles approach by developing only the minimum background necessary to justify mathematical concepts while placing mathematical developments in context.

Graduate Studies in Mathematics, Volume 70; 2013; 305 pages; Hardcover; ISBN: 978-0-8218-9490-3; List US\$65; AMS members US\$52; Order code GSM/70.R

Supplementary Reading Introduction to the Mathematics of Applied Mathematics Finance

of Finance

R. J. Williams, University of California, San Diego, La Jolla, CA

1

The text is clearly written and well-arranged and most of the results are proved in detail. Each chapter is completed with exercises, which makes the textbook very comprehensive. -EMS Newsletter

Graduate Studies in Mathematics, Volume 72; 2006; 150 pages; Hardcover; ISBN: 978-0-8218-3903-4; List US\$40; AMS members US\$32; Order code GSM/72

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John B. Walsh, University of British Columbia, Vancouver, BC, Canada

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- Website

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Uncertainty Quantification: Theory, Implementation, and Applications Ralph C. Smith

Computational Science and Engineering 12

The field of uncertainty quantification is evolving

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2013 • xviii + 382 pages • Hardcover • 978-1-611973-21-1 List Price \$74.00 • Attendee Price \$59.20 SIAM Member Price \$51.80 • Order Code CS12



Elementary Calculus of Financial Mathematics A. J. Roberts

Mathematical Modeling and Computation 15

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Mathematics and Climate Hans Kaper and Hans Engler

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 \mathbf{L}_{\circ} Society for Industrial and Applied Mathematics

Wednesday, November 12

Registration 5:00 PM-7:00 PM Room:Registration Counter - 6th Floor

Thursday, November 13

Registration 8:00 AM-7:30 PM Room:Registration Counter - 6th Floor Thursday, November 13

Portfolio Selection and Asset Pricing in the Non-EUT Framework

10:00 AM-12:00 PM

Room: Water Tower Parlor - 6th Floor

A variety of alternative theories to the expected utility theory (EUT) have been proposed in the literature to better describe individuals' preference under risk. This minisymposium is devoted to the recent advances in portfolio selection and asset pricing based on these alternative theories. Two of the four speakers address portfolio selection problems under the rank-dependent expected utility theory and under a general law-invariant preference measure while the other two study equilibrium asset pricing problems in which the agent has non-EUT preference relations such as those with time-changing risk aversion and those represented by the cumulative prospect theory.

Organizer: Xuedong He Columbia University, USA

10:00-10:25 Rank Dependent Utility and Risk Taking in Complete Markets

- *Xuedong He*, Columbia University, USA; Roy Kouwenberg, Mahidol University, Thailand; Xunyu Zhou, University of Oxford, United Kingdom, and The Chinese University of Hong Kong, China
- 10:30-10:55 Rationalizing Investors' Choices
- *Carole Bernard*, University of Waterloo, Canada; Jit Seng Chen, GGY, Canada; Steven Vanduffel, Vrije Universiteit Brussels, Belgium

11:00-11:25 The Effect of Time Changing Risk Aversion on Equilibrium Pricing

Traian A. Pirvu, McMaster University, Canada

11:30-11:55 Equilibrium Asset Pricing with Rational and Irrational Investors *Jing Guo*, Columbia University, USA

MS2 Variable Annuities 10:00 AM-12:00 PM

Room:Adams - 6th Floor

Variable Annuities with embedded guarantees are increasingly popular in many markets across the world. These products combine financial option-like investment features with traditional life insurance. As such, the pricing and risk management of these products present challenging problems that have attracted interest from quantitative researchers from different fields. This minisymposium first offers an overview of various types of investment guarantees, and then covers a number of topical research problems in this area. In particular, the presentations discuss analytical and computational techniques for the valuation, the modeling and hedging of dynamic policyholder behavior, the optimization of guaranteed benefits, and computational methods for risk measures of guaranteed benefits.

Organizer: Runhuan Feng

University of Illinois at Urbana-Champaign, USA

Organizer: Daniel Bauer

Georgia State University, USA 10:00-10:25 Revisiting the Risk-Neutral Approach to Optimal Policyholder Behavior: a Study of Withdrawal Guarantees in Variable Annuities Thorsten Moenig, University of St. Thomas,

USA; *Daniel Bauer*, Georgia State University, USA

10:30-10:55 Hedging Costs for Variable Annuities under Regime-Switching

Peter Forsyth, University of Waterloo, Canada

11:00-11:25 Computation of Risk Measures for Variable Annuity Guaranteed Benefits

Runhuan Feng, University of Illinois at Urbana-Champaign, USA; Hans W. Volkmer, University of Wisconsin, Milwaukee, USA

11:30-11:55 Optimal Initiation of a Glwb in a Variable Annuity: No Arbitrage Approach

Huaxiong Huang, Moshe Milevsky, and Tom Salisbury, York University, Canada

Thursday, November 13

MS3 Radial Basis Function Based Methods in Finance

10:00 AM-11:30 PM

Room: Grant Park Parlor - 6th Floor Numerical methods based on radial basis function (RBF) approximation have often been suggested as interesting for computational problems arising in finance because they allow for easy implementation of highdimensional problems. However, there are also other interesting properties that can be explored. Because the methods are meshfree, they easily allow for local adaptivity. They can be used for evaluating fractional derivatives that arise in jump diffusion problems and Gaussian RBFs can be interpreted as representing statistical uncertainty. In this minisymposium, we will explore a range of financial problems where RBFs have been proven successful in different ways.

Organizer: Elisabeth Larsson Uppsala University, Sweden

Organizer: Lina von Sydow

Uppsala University, Sweden

10:00-10:25 Filtering and Parameter Estimation of Partially Observed Diffusion Processes Using Gaussian RBFs

Josef Höök and *Elisabeth Larsson*, Uppsala University, Sweden; Erik Lindström, Lund University, Sweden; Lina von Sydow, Uppsala University, Sweden

10:30-10:55 Option Pricing under Fractional Diffusion Using Radial Basis Functions

Cecile M. Piret, Université Catholique de Louvain, Belgium

11:00-11:25 Efficient Pricing of Vanilla and Exotic Options with Multiple Discrete Dividends using Finite-difference Method for Algorithmic Trading System

Alexander Toropov, TBricks AB, Sweden and ITMO University, Russia; Dmitry Ivanov, TBricks AB, Sweden; Yuri Shpolyanskiy, TBricks AB, Sweden and ITMO University, Russia

Thursday, November 13

MS4 Topics from Derivatives Central Clearing 10:00 AM-12:00 PM

Room:Hancock Parlor - 6th Floor

Efficiently margining derivatives and securities lending portfolios is principally a classic application of short-term market risk measurement. It involves econometrics, pricing, simulation, portfolio risk quantification and managing the model risk of these models. Most relevant phenomena can be observed in historical data. But regulatory guidance and best practice around margins are moving beyond an objective approach and acknowledging heretofore mutualized risks such as the market impact of a liquidation that may emerge only under the circumstances of a fail where little to no historical data is available.

Organizer: John A. Dodson Options Clearing Corporation, USA

10:00-10:25 A Class of Fat-Tailed Residuals for Log-Returns Consistent with Finite Asset Price Expectations Ziyi Guo, Options Clearing Corporation, USA

10:30-10:55 Principal Components Analysis in Yield-Curve Modeling

Carlos Tolmasky, University of Minnesota, USA

11:00-11:25 Pricing and Hedging of Futures Contracts under Multiple Stochastic Factors

Jinchun Ye, Options Clearing Corporation, USA

11:30-11:55 Quantifying the Mutual Information Between Innovations in the Prices of Security Options and Their Underlyings

Lu Zhou, University of Minnesota, USA

CP1 Credit Risk

10:00 AM-12:00 PM

Room:Millenium Parlor - 6th Floor

Chair: Hugo E. Ramirez, The University of Manchester, United Kingdom

10:00-10:25 The Application of Kmv Model in Chinese Market

Haoyun Chen, Central University of Finance and Economics, China

10:30-10:55 Bank Liquidity Risk Management

Mmboniseni Mulaudzi, University of South Africa, South Africa; Mark Petersen and Janine Mukuddem-Petersen, North-West University, South Africa

11:00-11:25 Capital Investment and Liquidity Management with Collateralized Debt

Erwan Pierre, EDF Lab, France; Stephane Villeneuve, Toulouse University, France; Xavier Warin, EDF Lab, France

11:30-11:55 Hedge Fund Management with Liquidity Constraint

Hugo E. Ramirez, Peter Duck, Sydney Howell, and Paul Johnson, The University of Manchester, United Kingdom

Thursday, November 13

CP2

Econometrics/Empirics

10:00 AM-12:00 PM

Room:LaSalle 5 - 7th Floor

Chair: - Lingjiong Zhu, University of Minnesota, USA

10:00-10:25 High-Speed Fourier Method Estimation of Covariances from Asynchronous Data for Real-Time Cluster Analysis

Dieter Hendricks, Tim Gebbie and Diane Wilcox, University of Witwatersrand, South Africa

10:30-10:55 Statistically Significant Fits of Hawkes Processes to Financial Data

Mehdi Lallouache and Damien Challet, Ecole Centrale Paris, France

11:00-11:25 Regime Change in Dynamic Correlation Matrices of Financial Data

Joongyeub Yeo and George C. Papanicolaou, Stanford University, USA

11:30-11:55 Hawkes Processes and Applications in Finance *Lingjiong Zhu*, University of Minnesota, USA

Thursday, November 13

CP3 Numerical Analysis - Part 1

10:00 AM-12:00 PM

Room:LaSalle 1 - 7th Floor

Chair: Hailing Wu, Nanyang Technological University, Singapore

10:00-10:25 Pricing "Partial-Average" Asian Options with Binomial Method

Erwinna Chendra, Institute Technology Bandung and Parahyangan Catholic University, Indonesia; Kuntjoro Adji Sidarto and Dila Puspita, Institute Technology Bandung, Indonesia

10:30-10:55 Flexible Finite Element Method for Option Pricing in Lévy Models

Kathrin Glau, Technical University München, Germany

11:00-11:25 A Radial Basis Function Partition of Unity Penalty Method for Pricing American Basket Call Options *Victor Shcherbakov* and Elisabeth Larsson,

Uppsala University, Sweden

11:30-11:55 Fredholm Expansions and Pde Methods Applied to Quadratic Functionals of the Ou Process

Hailing Wu and Nicolas Privault, Nanyang Technological University, Singapore

CP4 Options - Part 1

10:00 AM-12:00 PM

Room:LaSalle 3 - 7th Floor Chair: To Be Determined

10:00-10:25 Return-Volatility Correlation Implied by the Asymmetry in Options Trading Activity

Jungwoo Lee, Yonsei University, South Korea

10:30-10:55 A Model Selection Method for Option Pricing Berk Orbay, Refik Gullu, and Wolfgang Hormann, Bogazici University, Turkey

11:00-11:25 Efficient Computation of Hedge-Sensitivities Via Automatic Differentiation

Juergen T. Topper, University of Hannover, Germany; Thomas Kaminski, FastOpt, Germany; Michael B. Giles, University of Oxford, United Kingdom

11:30-11:55 Holding Period Information in Options Hedging

Antoine E. Zambelli, University of California, Los Angeles, USA Thursday, November 13

CP5 Stochastic Control - Part 1

10:00 AM-12:00 PM

Room:LaSalle 2 - 7th Floor

Chair: Chao Zhu, University of Wisconsin, Milwaukee, USA

10:00-10:25 The Optionality of a Financially Constrained Firm

Mingliang Cheng, Geoffrey Evatt, and Paul V. Johnson, University of Manchester, United Kingdom

10:30-10:55 Leveraged Investments and Agency Conflicts When Prices are Mean Reverting

Kristoffer J. Glover and Gerhard Hambusch, University of Technology, Sydney, Australia

11:00-11:25 An Explicit Formula for the Optimal Government Debt Ceiling

Ricardo Huaman-Aguilar and Abel

Cadenillas, University of Alberta, Canada

11:30-11:55 On Linear Programing Approach to Inventory Control Problems

Chao Zhu, University of Wisconsin, Milwaukee, USA

Lunch Break

12:00 PM-1:25 PM

Attendees on their own

Welcome Remarks

1:25 PM-1:30 PM Room:Adams - 6th Floor

Thursday, November 13

IP1

No-arbitrage Under Model Ambiguity and Fundamental Theorems of Asset Pricing

1:30 PM-2:15 PM

Room:Adams - 6th Floor

Chair: Christoph Reisinger, Oxford University, United Kingdom

We will present several recent versions of the Fundamental Theorem of Asset Pricing for discrete and continuous time models under model ambiguity, with and without proportional transaction costs. This talks is based on recent collaborations with S. Biagini, K. Kardaras and M. Nutz.

Bruno Bouchard

Université Paris-Dauphine and ENSAE-ParisTech, Ceremade and Crest, France

IP2

Multi-Period Mean Variance Asset Allocation: Is It Bad To Win the Lottery?

2:15 PM-3:00 PM

Room:Adams - 6th Floor

Chair: Christoph Reisinger, Oxford University, United Kingdom

We present semi-self-financing meanvariance (MV) dynamic asset allocation strategies which are superior to selffinancing MV portfolio strategies. Our strategies are built upon a Hamilton-Jacobi-Bellman (HJB) equation approach for the solution of the portfolio allocation problem. Under an HJB framework, our strategies have a simple and intuitive derivation, and can be readily employed in a very general setting, namely continuous or discrete re-balancing, jump-diffusions, and realistic portfolio constraints. MV strategies are often criticized for penalizing the upside as well as the downside. However, under our strategies, the MV portfolio optimization problem can be shown to be equivalent to maximizing the expectation of a wellbehaved utility function of the portfolio wealth. We show that, for long term investors, the the use of dynamic MV strategies can achieve the same expected value with a much smaller standard deviation compared to a constant proportions strategy.

Peter Forsyth

University of Waterloo, Canada

Coffee Break

3:00 PM-3:30 PM



Thursday, November 13

MS5

Advanced Numerical Techniques in Financial Mathematics - Part I of II

3:30 PM-5:30 PM

Room:Adams - 6th Floor

For Part 2 see MS30

These two minisymposia aim to discuss advanced numerical techniques for modern applications in financial mathematics. We will encounter efficient versions of Monte Carlo methods, for stochastic local volatility models, and for Credit Valuation Adjustment (CVA). Regarding PDE techniques we will discuss dimension reduction, spectral methods, discontinuous Galerkin, and also a CVA PDE technique under the Heston model. We have Fourier integration for BSDEs and for the so-called VIX Heston model calibration. Latest results for recent topics in computational finance are thus reported.

Organizer: Cornelis W. Oosterlee

Centrum voor Wiskunde en Informatica (CWI), Netherlands

Organizer: Karel In 't Hout University of Antwerp, Belgium

3:30-3:55 The Time-Dependent FX-SABR Model: Efficient Calibration based on Effective Parameters

Anthonie W. Van der Stoep, Rabobank International and CWI, The Netherlands

4:00-4:25 The VIX-Heston Model for Asset Liability Management Stefan Singor, Ortec-Finance, United Kingdom

4:30-4:55 Second Order Weak Taylor Scheme and a Numerical Fourier Method for Backward Sdes

Marjon Ruijter and Kees Oosterlee, CWI, Amsterdam, Netherlands

5:00-5:25 Credit Valuation Adjustment and the Stochastic Grid Bundling Method

Qian Feng,and Cornelis W. Oosterlee, Centrum voor Wiskunde en Informatica (CWI), Netherlands

Thursday, November 13

MS6 Optimal Stopping with Financial Applications 3:30 PM-5:30 PM

Room:Grant Park Parlor - 6th Floor

This minisymposium presents four talks on optimal single/multiple stopping problems in finance. The problem formulations and solution techniques will be relevant to number of financial applications such as mean-reversion/ pairs trading, optimal capital structure, stock loans, and real options.

Organizer: Tim Leung

Columbia University, USA

3:30-3:55 Optimal Multiple Stopping with Random Refraction Times under Levy Models

Hongzhong Zhang, Columbia University, USA

4:00-4:25 Sequential Replacement under Uncertainty in the Population Distribution

Dharma Kwon, University of Illinois at Urbana-Champaign, USA; Steven Lippman, University of California, Los Angeles, USA

4:30-4:55 Optimal Capital Structure with Scale Effects under Spectrally Negative Levy Models

Kazutoshi Yamazaki, Kansai University, Japan; Budhi Surya, Bandung Institute of Technology, Indonesia

5:00-5:25 Optimal Mean Reversion Trading with Transaction Cost & Stop-Loss Exit

Tim Leung, Columbia University, USA



MS7 Optimal Investment with Transaction Costs

3:30 PM-5:30 PM

Room: Hancock Parlor - 6th Floor

The problem of Optimal Investment is fundamental in Mathematical Finance, and frictions make the underlying market model more realistic. One of the most fundamental frictions in the market are transaction costs. In this session, we will present recent developments in optimal investment with transaction costs, as well as with more general price impact models. Particular emphasis is placed on the one hand on elegant conditions for robust no arbitrage in the market and on the other hand on asymptotic techniques that allow us to obtain tractable results as transaction costs become small.

Organizer: Maxim Bichuch

Worcester Polytechnic Institute, USA 3:30-3:55 Trading with Small Price Impact

Johannes Muhle-Karbe, ETH Zürich, Switzerland

4:00-4:25 Fundamental Theorem of Asset Pricing under Transaction Costs and Model Uncertainty

Erhan Bayraktar, University of Michigan, USA; Yuchong Zhang, University of Michigan, Ann Arbor, USA

4:30-4:55 Balancing Small Fixed and Proportional Transaction Cost in Trading Strategies

Arash Fahim, Florida State University, USA; Jose Alcala, Universidad Jesuita de Guadalajara, Mexico

5:00-5:25 Portfolio Choice with Liquid and Illiquid Assets

Maxim Bichuch, Worcester Polytechnic Institute, USA; Paolo Guasoni, Boston University, USA

Thursday, November 13

MS8

Dynamic Risk and Performance Measures and Related Fields - Part I of II

3:30 PM-5:30 PM

Room: Water Tower Parlor - 6th Floor

For Part 2 see MS11

The focus of this minisymposium will be on the recent theoretical and practical developments in the areas of risk and performance measures. Specifically, the emphasis will be put on the theory and applications of dynamic risk measures and dynamic performance measures, whose importance and use in financial and insurance industries is unquestionable. The talks will be presented by the following renowned experts in these areas.

Organizer: Tomasz Bielecki

Illinois Institute of Technology, USA

Organizer: Igor Cialenco Illinois Institute of Technology, USA

Organizer: Marco Maggis Milano University, Italy

Organizer: Antonis Papapantoleon TU Berlin, Germany

3:30-3:55 Market Making Via Acceptability Indices *Igor Cialenco*, Illinois Institute of Technology,

USA

4:00-4:25 Price and Risk in Discrete Time Market Models Subject to Model Misspecification

Marco Maggis, Milano University, Italy

4:30-4:55 A Robust Fundamental Theorem of Asset Pricing in Continuous Time

Patrick Cheridito, Princeton University, USA; Michael Kupper and Ludovic Tangpi, Universität Konstanz, Germany

5:00-5:25 Distribution Based Risk Measures and Their Implementation Stefan Weber, Leibniz Universität Hannover, Germany

Thursday, November 13

Liquidity Risk in a System Context

3:30 PM-5:30 PM

Room: Millenium Parlor - 6th Floor

In today's complex financial systems, liquidity risk and systemic risk cannot be disentangled. We explore how systemic risk emerges form the collective behavior of the market participants that face liquidations constraints. Three viewpoints area taken: a network approach with applications to over-the-counter markets, a price formation model approach in which assets are endogenously correlated in periods of mass liquidations and a mean field games approach.

Organizer: Andreea Minca

Cornell University, USA

3:30-3:55 Systemic Risk with Central Counterparty Clearing

Hamed Amini, Swiss Finance Institute, École Polytechnique Fédérale de Lausanne, Switzerland

4:00-4:25 Institutional Investors and the Dependence Structure of Asset Returns

Lakshithe Wagalath, IESEG School of Management, France

4:30-4:55 Welfare Analysis of Dark Pools

Krishnamurthy Iyer, Cornell University, USA; Ramesh Johari, Stanford University, USA; Ciamac C. Moallemi, Columbia University, USA

5:00-5:25 Networks of Overlapping Portfolios: Aggregation and Measures of Vulnerability

Anton Braverman and Andreea Minca, Cornell University, USA

MS10 Mean-field Games Modeling in Economy and Finance

3:30 PM-5:00 PM

Room:LaSalle 1 - 7th Floor

This minisymposium will be a continuation of the one submitted on large population stochastic control. It will more specifically focus on mean-field games. Mean-field games theory was introduced in 2006 by Lasry and Lions and by Huang, Caines and Malhamé as a way to describe consensus among population of individuals submitted to cost constraints. Various applications appear in economy, finance and engineering. Speakers of the session will discuss some of these applications by considering several advanced examples of modeling in economy and finance.

Organizer: François Delarue

Université de Nice, Sophia Antipolis, France 3:30-3:55 On the Connection Between Mean Field Games and Symmetric N-Player Games

Markus Fischer, University of Padua, Italy

4:00-4:25 Wealth Distribution and the Business Cycle: The Role of Private Firms

Yves Achdou, University of Paris VII, France; Jean-Michel Lasry, University of Paris, Dauphine, France; Pierre-Louis Lions, Collège de France, France; *Benjamin Moll*, Princeton University, USA

4:30-4:55 Mean Field Games with Major and Minor Players

Geoffrey Zhu, Princeton University, USA

Thursday, November 13

CP6 Fixed Income

3:30 PM-5:30 PM

Room:LaSalle 2 - 7th Floor

Chair: Claudio Fontana, Université Paris-Diderot, France

3:30-3:55 A General HJM Framework for Multiple Curve Modeling

Claudio Fontana, Université Paris-Diderot, France; Christa Cuchiero, University of Vienna, Austria; Alessandro Gnoatto, Ludwig-Maximilians-Universität München, Germany

4:00-4:25 Interest Rate Derivative Pricing with Counterparty Risk and Funding Costs: A Lévy CVA Multiplecurve Model

Zorana Grbac, Université Paris-Diderot, France; Stéphane Crépey and Nathalie Ngor, University of Evry-Val-d'Essonne, France; David Skovmand, Copenhagen Business School, Denmark

4:30-4:55 Laplace Transform and Hypergeometric Functions Methods: a Unified Approach for Some Interest Rate Models

Dmitry Muravey, FM Investment Management, United Kingdom and ILQF HSE, Russia

5:00-5:25 Bond Pricing under Regime Switching among Multiple Short Rate Models

Keiichi Tanaka, Tokyo Metropolitan University, Japan

Thursday, November 13

CP7

Options - Part 2

3:30 PM-5:30 PM

Room:LaSalle 3 - 7th Floor

Chair: Hongzhong Zhang, Columbia University, USA

3:30-3:55 Pricing and Hedging Exotic Options with Transaction Cost under Jump-Diffusion Process

Waseem A. Khan, Sukkur Institute of Business Administration, Pakistan; Mohammad Rasras and Abdul Khaliq, Middle Tennessee State University, USA; Mohammad Yousuf, King Fahd University of Petroleum and Minerals, Saudi Arabia

4:00-4:25 Convergence of Monte-Carlo Computation on Various Exotic Options

Qingshuo Song, City University of Hong Kong, Hong Kong

4:30-4:55 Gaussian Markov Processes and Option Pricing Theory

Mackenzie Wildman, Vladimir Dobric, and Daniel Conus, Lehigh University, USA

5:00-5:25 Optimal Multiple Stopping with Negative Discount Rate and Random Refraction Times under Lévy Models

Tim Leung, Columbia University, USA; Kazutoshi Yamazaki, Kansai University, Japan; *Hongzhong Zhang*, Columbia University, USA

CP8 Systemic Risk

3:30 PM-5:30 PM

Room:LaSalle 5 - 7th Floor

Chair:Yuanying Guan, Indiana University, USA

3:30-3:55 Systemic Risk with Jump-Diffusion Processes

Yi-Tai Chiu and Jean-Pierre Fouque, University of California, Santa Barbara, USA

4:00-4:25 Dynamics of Trust in Networks and Systemic Risk

Joao Da Gama Batista, Ecole Centrale Paris, France; Jean-Philippe Bouchaud, Capital Fund Management, France; Damien Challet, Ecole Centrale Paris, France

4:30-4:55 Optimal Capital Reserve Strategies for a Bank and Its Regulator

Geoff Evatt, University of Manchester, United Kingdom

5:00-5:25 Financial Contagion with Heterogeneous Link-Weight Distributions

Yuanying Guan and Micah Pollak, Indiana University, USA

Intermission

5:30 PM-5:45 PM

Thursday, November 13

IP3 Bid-Ask Imbalance and Trade Arrival Modeling

5:45 PM-6:30 PM

Room:Adams - 6th Floor

Chair: Sebastian Jaimungal, University of Toronto, Canada

We consider the dynamics of trade arrivals and best bid and ask order sizes in an electronic limit order book. The joint evolution of these events is described by a three-dimensional diffusion model. We show how to construct semi-analytical solutions for the probability of price movement prior to the arrival of an aggressive market order. Finally, we calibrate the model to empirical limit order book data and discuss how it can be used to optimize order execution at the tactical level.

Michael Sotiropoulos Bank of America Merrill Lynch, USA

Welcome Reception

6:30 PM-8:30 PM Room:Monroe - 6th Floor



Friday, November 14

Registration 8:00 AM-3:30 PM Room:Registration Counter - 6th Floor

2014 SIAM Conference on Financial Mathematics and Engineering

Friday, November 14

MS11

Dynamic Risk and Performance Measures and Related Fields - Part II of II

8:30 AM-10:30 AM

Room: Water Tower Parlor - 6th Floor

For Part 1 see MS8

The focus of this minisymposium will be on the recent theoretical and practical developments in the areas of risk and performance measures. Specifically, the emphasis will be put on the theory and applications of dynamic risk measures and dynamic performance measures, whose importance and use in financial and insurance industries is unquestionable. The talks will be presented by the following renowned experts in these areas.

Organizer: Tomasz Bielecki Illinois Institute of Technology, USA

Organizer: Igor Cialenco Illinois Institute of Technology, USA

Organizer: Marco Maggis Milano University, Italy

Organizer: Antonis Papapantoleon TU Berlin, Germany

8:30-8:55 A Fourier Approach to the Computation of Risk Measures Antonis Papapantoleon, TU Berlin, Germany

9:00-9:25 On the Model-free Hedging Duality

Michael Kupper, Universität Konstanz, Germany

9:30-9:55 Correspondence Between Dynamic Quasi Concave Performance Measures and Parametric Families of Dynamic Risk Measures

Jocelyne Bion-Nadal, CMAP, Ecole Polytechnique, France

10:00-10:25 A Recursive Algorithm for Dynamic Multivariate Risk Measures and a Set-Valued Bellman's Principle

Birgit Rudolff, Princeton University, USA; Zachary Feinstein, Washington University in St. Louis, USA Friday, November 14

MS12 Mean Field Games -Part I of II

8:30 AM-10:30 AM

Room:Adams - 6th Floor

For Part 2 see MS32

Recent developments in the theory and applications of Mean Field Games (MFG)

Organizer: Rene Carmona Princeton University, USA

8:30-8:55 The Master Equation of Mean Field Games and Controlled McKean Vlasov Dynamics

Rene Carmona, Princeton University, USA

9:00-9:25 Coalescence of Hysteresis in a Large Population: Mean Field Stackelberg Games

S.C.P Yam, The Chinese University of Hong Kong, Hong Kong

9:30-9:55 Mean Field Games with Congestion

Diogo Gomes, King Abdullah University of Science & Technology (KAUST), Saudi Arabia

10:00-10:25 Linear-Quadratic Optimal Control Problems for Mean-Field Stochastic Differential Equations ---Time-Consistent Solutions

Jiongmin Yong, University of Central Florida, USA

Friday, November 14

MS13 Recent Progress in Equilibrium Theory

8:30 AM-10:30 AM

Room:LaSalle 1 - 7th Floor

This minisymposium focuses on recent developments in equilibrium models with multiple interacting agents. Special emphasis is placed on models with market incompleteness, price impact, and relative preference. These problems are important in economics and have also gain significant interest in math finance community. Some of these problems are mathematically tremendously complex and have remained almost untouched for two decades. Several progresses have been made in recent years by speakers in this minisymposium, using similar mathematical tools: analysis of systems of PDE/BSDE with nonlinearity in first order terms. These results also help to study several long standing open problems in BSDEs.

Organizer: Hao Xing

London School of Economics and Political Science, United Kingdom

8:30-8:55 Various Aspects of Incomplete Equilibrium Theory

Kasper Larsen, Carnegie Mellon University, USA

9:00-9:25 Existence of Close to Pareto Optimal Incomplete Radner Equilibrium

Hao Xing and Kostas Kardaras, London School of Economics and Political Science, United Kingdom; Gordan Zitkovic, University of Texas at Austin, USA

9:30-9:55 Finding Local Equilibria by Splitting Multidimensional BSDEs

Christoph Frei, University of Alberta, Canada

10:00-10:25 Quadratic BSDEs Arising from a Price Impact Model with Exponential Utility

Sergio Pulido, EPFL, Switzerland; Dmitry Kramkov, Carnegie Mellon University, USA

MS14 Counterparty Risk, Liquidity and Funding - Part I of II

8:30 AM-10:30 AM

Room: Grant Park Parlor - 6th Floor

For Part 2 see MS34

The importance and complexity of the counterparty credit risk (CCR) and funding biases has been brought to the forefront of financial risk management by the developments surrounding the credit crisis 2008-2010. This led to explosion of research work that was devoted to theoretical and practical aspects of the CCR and multiple funding curves, and their relation to the systemic risk. This minisymposium will focus on presentation of the recent developments in this area, presented by the leading researchers from academia and from financial industry.

Organizer: Tomasz Bielecki

Illinois Institute of Technology, USA

Organizer: Igor Cialenco Illinois Institute of Technology, USA

Organizer: Stephane C. Crepey

Evry University, France

8:30-8:55 Valuation and Hedging of Contracts with Funding Costs and Collateralization

Marek Rutkowski, University of Sydney, Australia; Tomasz Bielecki, Illinois Institute of Technology, USA

9:00-9:25 Underexposed Risk Snapshots - The Dangers of Risk-Neutral Exposures

Harvey Stein, Bloomberg LP, USA

9:30-9:55 Dynamic Replication Strategies under Funding and Collateral Costs

Stephan Sturm, Worcester Polytechnic Institute, USA; Agostino Capponi, Johns Hopkins University, USA

10:00-10:25 Efficient Options Pricing under Levy Processes with CVA and FVA

Justin Shek, Bank of China International, Hong Kong; Sergei Levendorskii, University of Leicester, United Kingdom Friday, November 14

MS15 Systemic and Liquidity Risk 8:30 AM-10:30 AM

Room: Hancock Parlor - 6th Floor

Systemic and liquidity risk have been at the heart of policy debates aiming at stabilizing the financial system. The intricate nature of linkages connecting economic sectors can cause wide propagation of shocks throughout the system, and generate large number of default related losses. This session aims at presenting recent developments by leading experts. The talks will illustrate the effect of preventive policies, such as those enforcing capital-to-asset ratio constraints, on asset prices. They will discuss how contagion effects may arise through balance sheet linkages, and illustrate how systematic effects may generate large losses in heterogeneous portfolios. Signal processing techniques will be introduced to analyze the impulse response of economic variables to fundamental shocks.

Organizer: Agostino Capponi

Johns Hopkins University, USA

8:30-8:55 Price Contagion Through Balance Sheet Linkages

Agostino Capponi, Johns Hopkins University, USA; Martin Larsson, Cornell University, USA

9:00-9:25 A Structural Model for Asset Price Contagion and Systemic Risk

Ciamac C. Moallemi, Columbia University, USA; Chen Chen, University of California, Berkeley, USA; Garud Iyengar, Columbia University, USA

9:30-9:55 Systemic Risk and the Macroeconomy: An Empirical Evaluation

Stefano Giglio and Bryan Kelly, The University of Chicago, USA; Seth Pruitt, Arizona State University, USA

10:00-10:25 Large Portfolio Asymptotics and Fluctuation Analysis for Losses from Default

Konstantinos Spiliopoulos, Brown University, USA

Friday, November 14

MS16 Asymptotic Methods in Continuous-Time Models with Jumps

8:30 AM-10:30 AM

Room:LaSalle 2 - 7th Floor

Asymptotic methods have become some of the most useful tools in mathematical finance. The applications are many, ranging from high-frequency nonparametric methods to short-time characterizations of option prices, and more. These methods are particularly crucial to deal with models with jumps due to the lack of tractable formulas and efficient computational/statistical methods for option prices, distributions, and volatility/covariance estimators. The minisymposium brings together leading researchers to present recent advances in selected problems of financial mathematics in which asymptotic methods are critical for their solutions.

Organizer: Jose E. Figueroa-Lopez Purdue University, USA

8:30-8:55 Optimally Thresholded Realized Power Variations for Levy Jump Diffusion Models

Jose E. Figueroa-Lopez and Jeff Nisen, Purdue University, USA

9:00-9:25 Convergence Rate of the Truncated Realized Covariance When Prices Have Infinite Variation Jumps *Cecilia Mancini*, University of Florence, Italy

9:30-9:55 Short-Time Expansions for Close-to-the-Money Options under a Levy Jump Model with Stochastic Volatility

Sveinn O. Olafsson, Purdue University, USA

10:00-10:25 Asymptotic Methods for Portfolio Risk Management

Peter Tankov, Université Paris-Diderot, France

CP9 **High-Frequency Markets**

8:30 AM-10:30 AM

Room: Millenium Parlor - 6th Floor

Chair: Amirhossein Sadoghi, Frankfurt School of Finance and Management, Germany and Linköping University, Sweden

8:30-8:55 Optimal Liquidation in Limit Order Books under General **Uncertainties**

James Blair, Paul V. Johnson, and Peter Duck, University of Manchester, United Kingdom

9:00-9:25 Long-Run Price Dynamics under a Level-1 Lob with Memory and Variable Spread

Jonathan A. Chávez Casillas and José Figueroa-López, Purdue University, USA

9:30-9:55 A Stochastic Free Boundary Problem and Limit Order Book Model

Marvin Mueller, TU Dresden and TU Berlin, Germany; Martin Keller-Ressel, TU Dresden, Germany

10:00-10:25 Optimum Strategy in Market Order Execution Associated with the Poisson Cluster Process

Amirhossein Sadoghi, Frankfurt School of Finance and Management, Germany and Linköping University, Sweden; Jan Vecer, Columbia University, USA

Friday, November 14

CP10 Risk Measures 8:30 AM-10:30 AM

Room:LaSalle 3 - 7th Floor

Chair: Dan Ren, University of Dayton, USA

8:30-8:55 Set-valued Shortfall Risk Measures for Multi-asset Markets Cagin Ararat and Birgit Rudloff, Princeton

University, USA; Andreas Hamel, Free University of Bolzen-Bolzano, Italy

9:00-9:25 Dynamic Optimal Portfolio **Choices for Robust Preferences**

Jingshu Liu and Marcel Rindisbacher, Boston University, USA

9:30-9:55 Classical Differentiability of Bsvies and Dynamic Capital Allocations

Ludger Overbeck, University of Giessen, Germany

10:00-10:25 Shortfall Aversion

Paolo Guasoni, Boston University, USA: Gur Huberman, Columbia Business School, USA; Dan Ren, University of Dayton, USA

Friday, November 14

CP11 Stochastic Volatility - Part 1

8:30 AM-10:00 AM

Room:LaSalle 5 - 7th Floor

Chair: Yeliz Yolcu Okur, Middle East Technical University, Turkey

8:30-8:55 A Fast Calibrating Volatility Model for Option Pricing

Paresh Date, Brunel University, United Kingdom

9:00-9:25 The Small Maturity Implied Volatility Slope for Levy Models

Stefan Gerhold, Technische Universitaet Wien, Germany; Ismail Gülüm, TU Wien, Austria

9:30-9:55 Computation of the Delta of **European Options under Stochastic** Volatility Models

Yeliz Yolcu Okur, Bilgi Yilmaz, and Alper Inkaya, Middle East Technical University, Turkey; Tilman Sayer, Fraunhofer Institute for Industrial Mathematics, Germany

10:00-10:25 Tax-Aware Dynamic Asset Allocation

Martin B. Haugh, Garud N. Iyengar, and Chun Wang, Columbia University, USA

Coffee Break



Room:Monroe - 6th Floor



Announcements

10:55 AM-11:00 AM Room:Adams - 6th Floor

IP4

Robust Meets Realistic: Interpolating Between Model-Specific and Model-Free Settings for Pricing and Hedging

11:00 AM-11:45 AM

Room:Adams - 6th Floor

Chair: Ronnie Sircar, Princeton University, USA

Classical models in mathematical finance, even if highly complex, typically share important methodological weaknesses: failure to account for model uncertainty and failure to incorporate market information in a consistent manner. In the wake of financial crisis these have been much debated. In response, an increasingly active field of research focuses on model-free super/sub-hedging using the underlying and Vanilla options. Explicit results often rely on pathwise inequalities and embedding techniques while pricing-hedging duality is obtained using martingale optimal transport methods. However, the resulting prices and hedges are often too expensive to be practically relevant. In this talk I show how to interpolate between the two worlds. I argue that quoted option prices should be incorporated through distributional constraints while beliefs, or past data, are most naturally included through pathwise restrictions. The resulting framework is robust and flexible. It allows for realistic outputs while quantifying the impact of making assumptions. I will present abstract results about pricing-hedging duality and then discuss examples of restrictions on future realised volatility and future option prices. Based on joint works with Sergey Nadtochiy (University of Michigan) and Zhaoxu Hou and Peter Spoida (University of Oxford).

Jan Obloj

Oxford University, United Kingdom

Friday, November 14

IP5 Long-Term Valuation and **Misspecified Recovery**

11:45 AM-12:30 PM

Room:Adams - 6th Floor

Chair: Ronnie Sircar, Princeton University, USA

Asset prices contain information about the probability distribution of future states and the stochastic discounting of those states. The stochastic discounting encodes market prices for the exposure of cash flows to uncertainty at alternative investment horizons. We represent asset valuation as a semigroup of valuation operators indexed by the investment horizon. This approach allows us to apply a generalization of Perron-Frobenius theory to characterize asset valuation. We use this theory to extract a martingale component to a stochastic discount factor process that reveals the durable contributions to risk pricing. The martingale induces a change of measure that is useful in understanding the determinants to valuation. It reflects long-term uncertainty in the underlying macroeconomy and investor concerns about future growth prospects. We describe methods for quantifying the importance of this martingale component. Other researchers have assumed this component to be degenerate, but we show that this assumption may result in the misspecified recovery of investor beliefs.

Lars Peter Hansen

The University of Chicago, USA

Lunch Break

12:30 PM-2:00 PM Attendees on their own

Friday, November 14

SP1

SIAG/FME Junior Scientist Prize Lecture: Some Financial Markets with Discontinuities

2:00 PM-2:30 PM

Room:Adams - 6th Floor

Chair: To Be Determined

We shall discuss some systems of stochastic differential equations with discontinuous and degenerate diffusion coefficients with applications to stochastic portfolio management. The underlying model is tailor-made for the financial systems with sadden changes. Allowing discontinuity in the description of the system increases the range of phenomena which might induce financial crisis. We examine long-time behaviors, ergodicity and invariant distribution of large financial markets, discuss some applications of Transportation Cost Information inequalities to portfolio comparisons, and propose some optimization problems.

Tomoyuki Ichiba

University of California, Santa Barbara, USA

Coffee Break



Room:Monroe - 6th Floor

2:30 PM-3:00 PM

MS17 Large Population Stochastic Control

3:00 PM-5:00 PM

Room:LaSalle 1 - 7th Floor

Large population stochastic control addresses the question of equilibriums within population of interacting agents or particles subject to cost or energy constraints. This research field has been growing fast for the last decade, motivated by various applications in engineering, economy, finance or social sciences. According to the nature of the equilibriums dictated by the modeling, it may refer to the mean-field game theory or to the control theory of McKean-Vlasov diffusion processes. Speakers will discuss some of the nowadays challenges, such as: theoretical results about existence and uniqueness of the equilibriums, numerical results about the approximation of the equilibriums and pratical use in modeling.

Organizer: François Delarue

Université de Nice, Sophia Antipolis, France

3:00-3:25 Uniqueness of Random Equilibriums in Large Population Stochastic Control

François Delarue, Université de Nice, Sophia Antipolis, France

3:30-3:55 Mean Field Games Systems with Local Coupling

Jameson Graber, ENSTA ParisTech, France; Pierre Cardaliaguet, University of Paris, Dauphine, France

4:00-4:25 Bertrand & Cournot Mean Field Games

Patrick Chan, Princeton, NJ, USA

4:30-4:55 On a Boltzmann Type Price Formation Model

Marie-Therese Wolfram, Johann Radon Institute for Computational and Applied Mathematics, Austria; Martin Burger, University of Muenster, Germany; Luis Caffarelli, University of Texas at Austin, USA; Peter Markowich, University of Cambridge, United Kingdom Friday, November 14

MS18

Statistical Analysis of Risk and Stress Tests for Regulatory Policies -Part I of II

3:00 PM-5:00 PM

Room: Grant Park Parlor - 6th Floor

For Part 2 see MS33

The Basel accords have suggested that VaR be the standard for measuring risk to financial institutions. Specifically, banks are required to keep regulatory capital sufficient to cover losses up to a prescribed quantile in their loss distributions. However, VaR continues to be the measurement of risk even though it has been shown to not encourage diversification in portfolio management. These talks will address various aspects of the regulatory system, such as measurement of risk, systemic risk factors, and statistical analysis of the financial data.

Organizer: Andrew Papanicolaou

University of Sydney, Australia

Organizer: Igor Cialenco

Illinois Institute of Technology, USA

3:00-3:25 Risk Measures for Financial Networks

Zachary Feinstein, Washington University in St. Louis, USA

3:30-3:55 Stochastic Intensity Models of Wrong Way Risk: Wrong Way CVA Need Not Exceed Independent CVA Samim Ghamami, Federal Reserve Bank,

USA

4:00-4:25 The Systemic Effects of Benchmarking

Gustavo Schwenkler, *Diogo Duarte*, and Keith Lee, Boston University, USA

4:30-4:55 Likelihood Inference for Large Financial Systems

Justin Sirignano, Stanford University, USA; Gustavo Schwenkler, Boston University, USA; *Kay Giesecke*, Stanford University, USA

Friday, November 14

MS19

Spectral and Transform Methods in Finance -Part I of II

3:00 PM-5:00 PM

Room: Hancock Parlor - 6th Floor

For Part 2 see MS26

Spectral and Transform methods play a very important role in Mathematical Finance. This session focuses on recent theoretical advances in these methods as well as their applications to modeling and derivative pricing in a variety of markets, including interest rates, credit, electricity and commodities.

Organizer: Lingfei Li

The Chinese University of Hong Kong, Hong Kong

Organizer: Rafael Mendoza-Arriaga

University of Texas at Austin, USA

3:00-3:25 On Additive Subordination with an Application in Cross Commodity Modeling

Lingfei Li, The Chinese University of Hong Kong, Hong Kong; Rafael Mendoza-Arriaga, University of Texas at Austin, USA

3:30-3:55 Modeling Electricity Prices: A Time Change Approach

Rafael Mendoza-Arriaga, University of Texas at Austin, USA; Lingfei Li, The Chinese University of Hong Kong, Hong Kong

4:00-4:25 Ghost Calibration and Pricing Barrier Options and CDSs in Spectrally One-Sided Lévy Models: the Parabolic Laplace Inversion Method

Sergei Levendorskii, University of Leicester, United Kingdom

4:30-4:55 Barrier Options, CDS and Quanto CDS in Lévy Models with Stochastic Interest Rate

Svetlana Boyarchenko, University of Texas at Austin, USA; Sergei Levendorskii, University of Leicester, United Kingdom

MS20 Robust Hedging and Pricing under Model Uncertainty -Part I of II

3:00 PM-5:00 PM

Room:Adams - 6th Floor

For Part 2 see MS27

Pricing and hedging under a given model are always subject to the risk of model misspecification. How to price and hedge in a robust manner is therefore of great interest. Based on Skorokhod's embedding, classical methods in this direction rely directly on market data (such as quotes of liquidly traded options), instead of any calibrated model. With the aid of new techniques, including quasi-sure analysis, theory of optimal transport, and stochastic control, we will present new directions toward model-independent pricing, risk measuring, as well as their implications to the lifetime ruin problem.

Organizer: Arash Fahim

Florida State University, USA

Organizer: Yu-Jui Huang

Dublin City University, Ireland 3:00-3:25 Model Uncertainty and Its Impact on the Pricing of Derivative Instruments

Rama Cont, Imperial College of London, United Kingdom

3:30-3:55 Model Uncertainty and Optimal Transport

Marcel Nutz, Columbia University, USA

4:00-4:25 Martingale Optimal Transport in the Skorokhod Space

Yan Dolinsky, Hebrew University of Jerusalem, Israel; Mete Soner, ETH Zürich, Switzerland

4:30-4:55 On Arbitrage and Duality under Model Uncertainty and Portfolio Constraints

Zhou Zhou, University of Michigan, Ann Arbor, USA; Erhan Bayraktar, University of Michigan, USA Friday, November 14

MS21 Systemic Financial Risk 3:00 PM-5:00 PM

Room: Millenium Parlor - 6th Floor

The Great Financial Crisis of 2007-09 highlights the need to better understand the behavior of risk in the financial system. This minisymposium will feature talks by advanced graduate students, Postocs, junior and mid-career faculty from the US and Asia. It is hoped that the talks stimulate further discussion in this important area, and that the talks generate interest in students to take up work in this area.

Organizer: Kay Giesecke Stanford University, USA

Organizer: Nan Chen

The Chinese University of Hong Kong, Hong Kong

3:00-3:25 Interconnected Balance Sheets, Market Liquidity, and the Amplification Effects in a Financial System

Nan Chen, The Chinese University of Hong Kong, Hong Kong

3:30-3:55 Rehypothecation and Systemic Risk

Alex Shkolnik, Stanford University, USA

4:00-4:25 Information Contagion in Financial Networks

Jennifer La'O, Columbia University, USA; *Alireza Tahbaz-Salehi*, Columbia Business School, USA

4:30-4:55 Efficient Risk Analysis for Mortgage Pools and Mortgagebacked Securities

Justin Sirignano and Kay Giesecke, Stanford University, USA

Friday, November 14

MS22 Operator Splitting Methods for Pricing Options

3:00 PM-5:00 PM

Room:LaSalle 2 - 7th Floor

Pricing and hedging European and American options under a jumpdiffusion framework requires solving either a parabolic PDE/PIDE or a linear complementarity problem, both with the same jump-diffusion operator. Usually this is computationally expensive. An operator splitting method addresses this by reducing the multi-dimensional solution to a sequence of the lower dimensional ones. For instance, for jump-diffusion models splitting is used to decompose the entire operator into the local and global parts. Either of them could be further directionally decomposed as well. This mini symposium aims to discuss modern results in this area.

Organizer: Andrey Itkin New York University, USA

Organizer: Jari Toivanen

Stanford University, USA

3:00-3:25 High-Order Splitting Methods for Forward PDEs and PIDEs *Andrey Itkin*, New York University, USA

3:30-3:55 Convergence of ADI Schemes for Two-dimensional Convection-diffusion Equations with Mixed Derivative Term

Karel In 't Hout and Maarten Wyns, University of Antwerp, Belgium

4:00-4:25 Efficient Implicit Predictor-Corrector Methods for Pricing American Options under Regime Switching

Abdul M. Khaliq, Middle Tennessee State University, USA; Mohammad Yousuf, King Fahd University of Petroleum and Minerals, Saudi Arabia; Ruihua Liu, University of Dayton, USA

4:30-4:55 Pricing Options under Stochastic Volatility Models with Jumps

Jari Toivanen, Stanford University, USA; Santtu Salmi, University of Jyvaskyla, Finland; Lina von Sydow, Uppsala University, Sweden

MS23 Algorithmic Trading -Part I of II

3:00 PM-5:00 PM

Room: Water Tower Parlor - 6th Floor

For Part 2 see MS25

In modern electronic markets nearly all trading is executed using an algorithm and a great deal of these algorithms rely on sophisticated mathematical models. This minisymposium brings together some of the cutting edge research papers which explore different topics including: optimal execution, adverse selection, market making, trading with information, LOB dynamics and other aspects of order flow information.

Organizer: Alvaro Cartea

University College London, United Kingdom

3:00-3:25 Simulating and Analyzing Order Book Data: The Queue-Reactive Model

Mathieu Rosenbaum, CMAP, Ecole Polytechnique, France

3:30-3:55 When Option Pricing Meets Optimal Execution

Olivier Gueant, Université Paris-Diderot, France

4:00-4:25 Algorithmic Trading with Learning

Damir Kinzebulatov, The Fields Institute, Toronto, Canada

4:30-4:55 Title Not Available at Time of Publication

Sasha F. Stoikov, Cornell University, USA

Friday, November 14

CP12 Commodities 3:00 PM-5:00 PM

Room:LaSalle 3 - 7th Floor

Chair: Nina Lange, Copenhagen Business School, Denmark

3:00-3:25 Hedging of Quantity Risk in Energy Markets

Nina Lange, Copenhagen Business School, Denmark; Fred Espen Benth, University of Oslo, Norway

3:30-3:55 Optimal Writing of American Call Options on Electricity with Physical Delivery: A Free Boundary Analysis of Optimal Entry

Jan Palczewski, University of Leeds, United Kingdom; John Moriarty, University of Manchester, United Kingdom

4:00-4:25 Enhancement of Practice-Based Methods for the Real Option Management of Commodity Storage Assets

Nicola Secomandi, Carnegie Mellon University, USA

4:30-4:55 Modeling Risks in Climate Change by Real Option Analysis

Shuhua Zhang, Tianjin University of Finance and Economics, China

Friday, November 14

CP13 Numerical Analysis - Part 2 3:00 PM-5:00 PM

Room:LaSalle 5 - 7th Floor

Chair: Abass Sagna, Evry University, France

3:00-3:25 A Grid Based Optimization Algorithm to Select Intertwined Markets That Maximize Trading Returns

Athula D. Gunawardena and William Dougan, University of Wisconsin, Whitewater, USA; Patrick Monaghan, Blackthorne Capital Management, LLC., USA

3:30-3:55 A Second Order Discretization Scheme for the Extended Cox-Ingersoll-Ross Process

Chulmin Kang, National Institute for Mathematical Sciences, Korea

4:00-4:25 Radial Basis Functions Generated Finite Differences (RBF-FD) for Solving High-Dimensional PDEs in Finance

Slobodan Milovanovic and Lina von Sydow, Uppsala University, Sweden

4:30-4:55 Marginal Quantization of An Euler Diffusion Process and Its Application to Finance

Abass Sagna, Evry University, France; Gilles Pagès, Université Paris 6, France

Intermission

5:00 PM-5:15 PM

SIAG/FME Business Meeting

5:15 PM-6:00 PM Room:Adams - 6th Floor

Complimentary beer and wine will be served.

Registration

8:00 AM-4:30 PM Room:Registration Counter - 6th Floor

MS24

Statistical Inference for Continuous-time Models of Asset Prices

8:30 AM-10:30 AM

Room: Grant Park Parlor - 6th Floor

Continuous-time stochastic processes are widely used in finance and economics. They describe the time-series behavior of asset prices, interest and foreign exchange rates, commodity and energy prices, default rates, and other economic factors. In spite of their popularity, statistical inference is often challenging. This minisymposium will present new developments in the field of statistical inference for continuous-time models in finance. Our goal is to give researchers from different fields an opportunity to discuss new approaches and techniques.

Organizer: Gustavo Schwenkler Boston University, USA

Organizer: Kay Giesecke Stanford University, USA

8:30-8:55 Simulated Likelihood Estimators for Discretely Observed Jump-Diffusions

Kay Giesecke, Stanford University, USA; Gustavo Schwenkler, Boston University, USA

9:00-9:25 Assessment of Uncertainty in High Frequency Data: The Observed Asymptotic Variance

Per Mykland, The University of Chicago, USA; *Lan Zhang*, University of Ilinois at Chicago, USA

9:30-9:55 Parametric Inference and Dynamic State Recovery from Option Panels

Torben G. Andersen, Northwestern University, USA

10:00-10:25 Nonparametric Tests for Constant Betas in Jump-Diffusions

Viktor Todorov, Northwestern University, USA

Saturday, November 15

MS25 Algorithmic Trading -Part II of II

8:30 AM-10:30 AM

Room:Water Tower Parlor - 6th Floor

For Part 1 see MS23

In modern electronic markets nearly all trading is executed using an algorithm and a great deal of these algorithms rely on sophisticated mathematical models. This minisymposium brings together some of the cutting edge research papers which explore different topics including: optimal execution, adverse selection, market making, trading with information, LOB dynamics and other aspects of order flow information.

Organizer: Alvaro Cartea

University College London, United Kingdom

8:30-8:55 Volume Imbalance and Algorithmic Trading

Ryan Donnelly, University of Toronto, Canada

9:00-9:25 Optimal Execution and Order Flow Imbalance

Michael Ludkovski, University of California, Santa Barbara, USA; *Kyle Bechler*, University of California, Santa Barbara, USA

9:30-9:55 The Self-Financing Condition for High Frequency Trading Rene Carmona, Princeton University, USA; *Kevin Webster*, Independent Researcher

10:00-10:25 Robust Market Making Alvaro Cartea, University College London, United Kingdom

Saturday, November 15

MS26

Spectral and Transform Methods in Finance -Part II of II

8:30 AM-10:30 AM

Room: Millenium Parlor - 6th Floor

For Part 1 see MS19

Spectral and Transform methods play a very important role in Mathematical Finance. This session focuses on recent theoretical advances in these methods as well as their applications to modeling and derivative pricing in a variety of markets, including interest rates, credit, electricity and commodities.

Organizer: Rafael Mendoza-Arriaga

University of Texas at Austin, USA

Organizer: Lingfei Li

The Chinese University of Hong Kong, Hong Kong

8:30-8:55 A Martingale Approach to Long Term Risk and Ross Recovery: Theory

Vadim Linetsky, Northwestern University, USA

9:00-9:25 A Martingale Approach to Long Term Risk and Ross Recovery: Examples

Likuan Qin and Vadim Linetsky, Northwestern University, USA

9:30-9:55 Sticky Reflecting Ornstein-Uhlenbeck Processes and Interest Rate Modeling with Zero Lower Bound

Yutian Nie, Northwestern State University, USA; Vadim Linetsky, Northwestern University, USA

10:00-10:25 A Class of Distributions with Analytic Characteristic Functions *Liming Feng*, University of Illinois at

Urbana-Champaign, USA

MS27

Robust Hedging and Pricing under Model Uncertainty -Part II of II

8:30 AM-10:30 AM

Room:LaSalle 1 - 7th Floor

For Part 1 see MS20

Pricing and hedging under a given model are always subject to the risk of model misspecification. How to price and hedge in a robust manner is therefore of great interest. Based on Skorokhod's embedding, classical methods in this direction rely directly on market data (such as quotes of liquidly traded options), instead of any calibrated model. With the aid of new techniques, including quasi-sure analysis, theory of optimal transport, and stochastic control, we will present new directions toward model-independent pricing, risk measuring, as well as their implications to the lifetime ruin problem.

Organizer: Arash Fahim

Florida State University, USA

Organizer: Yu-Jui Huang Dublin City University, Ireland

8:30-8:55 Optimal Transport and Skorokhod Embeddina

Mathias Beiglböck, University of Vienna, Austria

9:00-9:25 Model-Independent Hedging under Portfolio Constraints

Arash Fahim, Florida State University, USA; Yu-Jui Huang and Yu-Jui Huang, Dublin City University, Ireland

9:30-9:55 Quantile Hedging in a Semi-Static Market with Model Uncertainty

Gu Wang and Erhan Bayraktar, University of Michigan, USA

10:00-10:25 Minimizing the Probability of Lifetime Ruin Under Ambiguity Aversion

Yuchong Zhang, University of Michigan, Ann Arbor, USA; Erhan Bayraktar, University of Michigan, USA

Saturday, November 15

MS28 Monte Carlo Methods in Finance

8:30 AM-10:30 AM

Room: Hancock Parlor - 6th Floor

The minisymposium will explore new directions and developments in Monte Carlo techniques in financial mathematics, especially in the context of stochastic control and sensitivity analysis.

Organizer: Michael Ludkovski

University of California, Santa Barbara, USA

8:30-8:55 Improved Greeks for American Options Using Simulation Lars Stentoft, Western University, Canada

9:00-9:25 Rare Event Simulations using shaking transformations on stochastic processes

Emmanuel Gobet, and Gang Liu, Ecole Polytechnique, France

9:30-9:55 An Iterative Simulation Approach for Solving Stochastic **Control Problems in Finance**

Chunyu Yang, BI Norwegian Business School, Norway; Stathis Tompaidis, University of Texas at Austin, USA

10:00-10:25 Global Ranking Problems, **Sequential Design and Applications** to Real Options

Ruimeng Hu, and Michael Ludkovski, University of California, Santa Barbara, USA

Saturday, November 15

MS29 Forward Asset Allocation 8:30 AM-10:30 AM

Room:Adams - 6th Floor

The talks in this minisymposium will include results on optimal investments, turnpike problems and portfolio construction under market uncertainty under the new class of the so called forward performance criteria. These criteria complement the classical ones while offering flexibility with respect to investment horizons, market views and benchmarking.

Organizer: Thaleia Zariphopoulou

University of Texas at Austin, USA

8:30-8:55 Predictable Investment Preferences: The Binomial Model

Xunyu Zhou, University of Oxford, United Kingdom

9:00-9:25 Time-reversed HJB **Equations**

Sergey Nadtochiy, University of Michigan, Ann Arbor, USA

9:30-9:55 The Robust Forward Criteria: **Forward Performance Processes Under Model Uncertainty**

Sigrid Kallblad, École Polytechnique, France

10:00-10:25 Predictable Investment Preferences (Part II)

Thaleia Zariphopoulou, University of Texas at Austin, USA

CP14

Insurance

8:30 AM-10:00 AM

Room:LaSalle 5 - 7th Floor

Chair: Jungmin Choi, East Carolina University, USA

8:30-8:55 Indifference Pricing of Variable Annuities

Jungmin Choi, East Carolina University, USA

9:00-9:25 Regression-based Monte Carlo Methods for Stochastic Control Models: Variable Annuities with Lifelong Guarantees

Yao Tung Huang and Yue Kuen Kwok, Hong Kong University of Science and Technology, Hong Kong

9:30-9:55 Constant Proportion Portfolio Insurance in Defined Contribution Pension Plan Management

Busra Z. Temocin, Middle East Technical University, Turkey; Ralf Korn, University of Kaiserslautern, Germany; Sevtap Kestel, Middle East Technical University, Turkey Saturday, November 15

CP15 Stochastic Control - Part 2

8:30 AM-10:00 AM

Room:LaSalle 2 - 7th Floor

Chair: Li-Hsien Sun, University of California, Santa Barbara, USA

8:30-8:55 Equilibrium in Risk Sharing Games

Michail Anthropelos, University of Piraeus, Greece; Constantinos Kardaras, London School of Economics, United Kingdom

9:00-9:25 Asymptotics for Merton Problem with Capital Gain Taxes and Small Interest Rate

Min Dai, National University of Singapore, Republic of Singapore

9:30-9:55 Mean Field Games and Systemic Risk: Heterogeneous Grouping Models

Li-Hsien Sun and Jean-Pierre Fouque, University of California, Santa Barbara, USA

Saturday, November 15

CP16

Stochastic Volatility - Part 2

8:30 AM-10:30 AM

Room:LaSalle 3 - 7th Floor

Chair: Hongtao Yang, University of Nevada, Las Vegas, USA

8:30-8:55 Volatility, Risk-Premiums and Feedback Effect

Alper Inkaya, Middle East Technical University, Turkey

9:00-9:25 Asian Option Pricing Using Mellin Transform for BN-S Models with Stochastic Volatility

Indranil Sengupta, North Dakota State University, USA

9:30-9:55 Resolution of Policy Uncertainty and Sudden Declines in Volatility

Dacheng Xiu, University of Chicago, USA; Dante Amengual, Center for Monetary and Financial Studies, Spain

10:00-10:25 Market Option Prices and the Informational Consistency

Hongtao Yang and Seungmook Choi, University of Nevada, Las Vegas, USA

Coffee Break



Room:Monroe - 6th Floor

10:30 AM-11:00 AM

IP6 Moral Hazard in Dynamic Risk Management

11:00 AM-11:45 AM

Room:Adams - 6th Floor

Chair: Erhan Bayraktar, University of Michigan, USA

We consider a contracting problem in which a principal hires an agent to manage a risky project. When the agent chooses volatility components of the output process and the principal observes the output continuously, the principal can compute the quadratic variation of the output, but not the individual components. This leads to moral hazard with respect to the risk choices of the agent. Using a recent theory of singular changes of measures for Ito processes, we formulate a principal-agent problem in this context, and solve it in the case of CARA preferences. In that case, the optimal contract is linear in these factors: the contractible sources of risk, including the output, the quadratic variation of the output and the cross-variations between the output and the contractible risk sources. Thus, path-dependent contracts naturally arise when there is moral hazard with respect to risk management. We also provide comparative statics via numerical examples, showing that the optimal contract is sensitive to the values of risk premia and the initial values of the risk exposures.

Jakša Cvitanic

California Institute of Technology, USA

Saturday, November 15

IP7

Adaptive Grids in Regression Monte Carlo

11:45 AM-12:30 PM

Room:Adams - 6th Floor

Chair: Erhan Bayraktar, University of Michigan, USA

Regression Monte Carlo has been enormously successful in numerical solution of optimal stopping problems. It relies on the statistical tool of regression and the probabilistic idea of a stochastic mesh to construct an approximate stopping strategy. While the former has been extensively investigated, grid placement is typically prescribed by a basic simulation of underlying state process. We discuss the associated layers of inefficiency and introduce adaptive generation of these grids using sequential design schemes. This accomplishes active learning of the classifiers partitioning the state space into the continuation and stopping regions. As we show, adaptive refinement of the grids around the stopping boundaries can achieve an order of magnitude savings in gridding budgets. Moreover, sequential design opens the door for other statistical approaches, including Bayesian methods, kriging, and multi-armed bandits for this class of control problems. We examine dynamic regression algorithms that can implement such recursive estimation of the stopping strategy, and present several numerical examples in the context of multi-dimensional Bermudan option pricing.

Mike Ludkovski

University of California, Santa Barbara, USA

Lunch Break

12:30 PM-2:00 PM

Attendees on their own

SIAG/FME Conference Paper Prize Session 12:30 PM - 2:00 PM

Adams-6th Floor

Saturday, November 15

IP8

The Value of Being Lucky: Option Backdating and Nondiversifiable Risk

2:00 PM-2:45 PM Room:Adams - 6th Floor

Chair: - Peter Tankov, Université Paris-Diderot, France

The practice of executives influencing their option compensation by setting a grant date retrospectively is known as backdating. Since these options are usually granted at-the-money, selecting an advantageous grant date will be valuable to the executive. There is substantial evidence that backdating took place in the US, particularly prior to the tightening of SEC reporting requirements. In this talk, we develop and solve a utilityindifference model to quantify the value of the opportunity to backdate options. We show that the magnitude of ex ante gains from backdating is significant. Our model can be used to explain why backdating was more prevalent at firms with highly volatile stock prices. Joint work with Jia Sun (China Credit Ratings) and Elizabeth Whalley (Warwick **Business School**)

Vicky Henderson

University of Warwick, United Kingdom

IP9

The Value of Queue Position in a Limit Order Book

2:45 PM-3:30 PM

Room:Adams - 6th Floor

Chair: - Peter Tankov, Université Paris-Diderot, France

Many financial markets are organized as electronic limit order books operating under a price-time priority rule. In practice, this creates a technological arms among high-frequency traders to establish advantageous early positions in the resulting FIFO queue. We develop a model for valuing orders based on their queue position that identifies two components of positional value: a static component that relates to the instaneneous trade-off between earning a spread and incurring adverse selection costs; and a dynamic component that captures future value that accrues by locking in given queue position. We empirically calibrated and test the model. Joint work with Kai Yuan (Columbia)

Ciamac C. Moallemi Columbia University, USA

Coffee Break 3:30 PM-4:00 PM Room:Monroe - 6th Floor



Saturday, November 15 MS30

Advanced Numerical Techniques in Financial Mathematics - Part II of II

4:00 PM-6:00 PM

Room:LaSalle 1 - 7th Floor

For Part 1 see MS5

These two minisymposia aim to discuss advanced numerical techniques for modern applications in financial mathematics. We will encounter efficient versions of Monte Carlo methods, for stochastic local volatility models, and for Credit Valuation Adjustment (CVA). Regarding PDE techniques we will discuss dimension reduction, spectral methods, discontinuous Galerkin, and also a CVA PDE technique under the Heston model. We have Fourier integration for BSDEs and for the so-called VIX Heston model calibration. Latest results for recent topics in computational finance are thus reported.

Organizer: Cornelis W. Oosterlee

Centrum voor Wiskunde en Informatica (CWI), Netherlands

Organizer: Karel In 't Hout University of Antwerp, Belgium

4:00-4:25 Dimension Reduction Techniques in Space and Discontinuous Galerkin in Time to Price High-Dimensional Options

Lina von Sydow, Uppsala University, Sweden; Erik Lehto, Royal Institute of Technology, Stockholm, Sweden; Paria Ghafari and Mats Wångersjö, Uppsala University, Sweden

continued in next column

4:30-4:55 A New Hybrid Monte Carlo-Finite Difference Method to Obtain Counterparty Exposure Profiles and Sensitivities

Kees de Graaf, University of Amsterdam, The Netherlands; Drona Kandhai, University of Amsterdam and ING Bank, The Netherlands; Peter Sloot, University of Amsterdam, The Netherlands

5:00-5:25 A Robust Spectral Method for Pricing Options under Local Volatility

Pindza Edson, *Kailash C. Patidar*, and Edgard Ngounda, University of the Western Cape, South Africa

5:30-5:55 On the Sensitivity of Calibrated American Put Values to Short Rate Volatility

Aleksey Polishchuk, Bloomberg LP, USA

MS31 Asymptotics in Finance

4:00 PM-5:30 PM

Room: Hancock Parlor - 6th Floor

Asymptotic analyses have contributed to our understanding of the limiting behaviors of prices in financial markets. This session features applications to derivative contracts.

Organizer: Roger Lee University of Chicago, USA

4:00-4:25 Explicit Implied Vols for Multifactor Local-Stochastic Vol Models

Matthew Lorig, University of Washington, USA; Stefano Pagliarani, Ecole Polytechnique, France; Andrea Pascucci, Universita' di Bologna, Italy

4:30-4:55 Convergence of the Discrete Variance Swap in Time-Homogeneous **Diffusion Models**

Carole Bernard, University of Waterloo, Canada; Zhenyu Cui, Brooklyn College of the City University of New York, USA; Don McLeish, University of Waterloo, Canada

5:00-5:25 Asymptotic Approximations for Some Path-Dependent Contracts Roger Lee, University of Chicago, USA

Saturday, November 15

MS32

Mean Field Games -Part II of II

4:00 PM-6:00 PM

Room: Grant Park Parlor - 6th Floor

For Part 1 see MS12 Recent developments in the theory and applications of Mean Field Games (MFG)

Organizer: Rene Carmona Princeton University, USA

4:00-4:25 Mean Field Games and Systemic Risk

Jean Pierre Fouque, University of California, Santa Barbara, USA

4:30-4:55 Mean Field Games with a **Common Noise**

Daniel Lacker and Rene Carmona, Princeton University, USA; François Delarue, Université de Nice, Sophia Antipolis, France

5:00-5:25 Robust Nash Strategies in Mean Field LQG Games

Jianhui Huang, The Hong Kong Polytechnic University, Hong Kong; Minyi Huang, Carleton University, Canada

5:30-5:55 Mean Field Models for **Dynamic Matching Markets**

Nick Arnosti and Ramesh Johari, Stanford University, USA

Saturday, November 15

MS33

Statistical Analysis of **Risk and Stress Tests for Regulatory Policies -**Part II of II

4:00 PM-6:00 PM

Room: Millenium Parlor - 6th Floor

For Part 1 see MS18

The Basel accords have suggested that VaR be the standard for measuring risk to financial institutions. Specifically, banks are required to keep regulatory capital sufficient to cover losses up to a prescribed quantile in their loss distributions. However, VaR continues to be the measurement of risk even though it has been shown to not encourage diversification in portfolio management. These talks will address various aspects of the regulatory system, such as measurement of risk, systemic risk factors, and statistical analysis of the financial data.

Organizer: Andrew Papanicolaou

University of Sydney, Australia

Organizer: Igor Cialenco

Illinois Institute of Technology, USA

4:00-4:25 Asymptotic Single Risk Factor Model of Credit Risk: Empirical **Evidence from Australia**

Silvio Tarca and Marek Rutkowski, University of Sydney, Australia

4:30-4:55 Perturbation Analysis on **Decision-Making for Investment Portfolios Under Partial Information**

Andrew Papanicolaou, University of Sydney. Australia

5:00-5:25 Short Rate Models with Stochastic Volatility

Andrew Lesniewski, Baruch College, USA; Heng Sun, Bank of New York Mellon, USA; Qi Wu, Chinese University of Hong Kong, Hong Kong

5:30-5:55 Optimal Consumption With Habit Formation In Markets with Transaction Costs And Unbounded **Random Endowment**

Xiang Yu, University of Michigan, USA

MS34 Counterparty Risk, Liquidity and Funding - Part II of II

4:00 PM-5:30 PM

Room:Adams - 6th Floor

For Part 1 see MS14

The importance and complexity of the counterparty credit risk (CCR) and funding biases has been brought to the forefront of financial risk management by the developments surrounding the credit crisis 2008-2010. This led to explosion of research work that was devoted to theoretical and practical aspects of the CCR and multiple funding curves, and their relation to the systemic risk. This minisymposium will focus on presentation of the recent developments in this area, presented by the leading researchers from academia and from financial industry.

Organizer: Tomasz Bielecki Illinois Institute of Technology, USA

Organizer: Igor Cialenco Illinois Institute of Technology, USA

Organizer: Stephane C. Crepey Evry University, France

4:00-4:25 Wrong Way and Gap Risks Modeling: A Marked Default Time Approach

Stephane C. Crepey, Evry University, France

4:30-4:55 Joint Measure Calibration and Mean Reversion Skew for Interest Rates

Alexander Sokol, CompatibL, USA

5:00-5:25 Derivative Pricing under Collateralization and Differential Rates

Fabio Mercurio, Bloomberg LP, USA

Saturday, November 15

MS35 Stochastic Financial Equilibria 4:00 PM-6:00 PM

Room: Water Tower Parlor - 6th Floor

A fundamental problem in financial economics is the one of existence, uniqueness and characterization of equilibrium prices in financial markets. It provides a theoretical underpinning of the entire field and gives rise to very interesting mathematical problems. Current research in the field include endogenous completeness and incomplete market models as well as a spectrum of mathematical difficulties that arise from their analysis. These range from various continuity and stability questions in the context of optimal-investment problems in incomplete markets to existence and uniqueness issues related to nonlinear BSDEs and their systems.

Organizer: Gordan Zitkovic University of Texas at Austin, USA

Organizer: Kasper Larsen Carnegie Mellon University, USA

4:00-4:25 Feedback, Equilibrium and Financialization of Commodities Markets

Ronnie Sircar, Princeton University, USA

4:30-4:55 Integral Representation Theorems for Martingales Motivated by the Problems of Endogenous Completeness and Market Completeness with Derivative Securities

Daniel Schwarz and Dmitry Kramkov, Carnegie Mellon University, USA

5:00-5:25 The Folk Theorem with Imperfect Public Information in Continuous Time

Benjamin Bernard, University of Alberta, Canada

5:30-5:55 Taylor Approximation in Incomplete Radner Equilibrium Models *Jin Hyuk Choi*, Carnegie Mellon University,

USA

Saturday, November 15 CP17

Stochastic Control - Part 3 4:00 PM-6:00 PM

Room:LaSalle 2 - 7th Floor

Chair: Bin Zou, University of Alberta, Canada

4:00-4:25 Stochastic Target Problems with Controlled Probability of Success -A Probabilistic Approach

Geraldine Bouveret and Jean-Francois Chassagneux, Imperial College London, United Kingdom; Bruno Bouchard, Université Paris-Dauphine and ENSAE-ParisTech, Ceremade and Crest, France

4:30-4:55 Turnpike Property and Convergence Rate for an Investment Model with General Utility Functions *Harry Zhang*, Imperial College, United

Kingdom

5:00-5:25 Time Consistent Portfolio Selection under Short-Selling Prohibition

Kwok Chuen Wong, The University of Hong Kong, Hong Kong and Imperial College London, United Kingdom; Alain Bensoussan, The University of Texas at Dallas and City University of Hong Kong, Hong Kong; Phillip S. Yam, The Chinese University of Hong Kong, Hong Kong; Siu Pang Yung, University of Hong Kong, Hong Kong, PRC

5:30-5:55 Optimal Investment and Risk Control Policies for An Insurer: Expected Utility Maximization

Bin Zou and Abel Cadenillas, University of Alberta, Canada

Notes

FM14 Abstracts



Abstracts are printed as submitted by the author.

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FM14 Budget

Conference Budget SIAM Conference on Financial I November 13-15, 2014 Chicago, IL	Mathematics a	nd Engineering
Expected Paid Attendance	220	
Revenue		
Registration Income		\$67,330
Total		\$67,330
Expenses		
Printing		\$1,000
Organizing Committee		\$3,100
Invited Speakers		\$10,125
Food and Beverage		\$20,400
AV Equipment and Telecommunic	cation	\$16,200
Advertising		\$4,000
Conference Labor (including bene	fits)	\$33,958
Other (supplies, staff travel, freight	t, misc.)	\$5,900
Administrative		\$9,523
Accounting/Distribution & Shippi	ng	\$4,675
Information Systems		\$8,361
Customer Service		\$3,097
Marketing		\$4,809
Office Space (Building)		\$2,626
Other SIAM Services		\$2,976
Total		\$130,750
Net Conference Expense		(\$63,420)
Support Provided by SIAM		<u>\$63,420</u> \$0
Estimated Support for Travel Awa	rds not include	d above:

Early Career and Students 18 \$1	12,800
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Hotel Floor Plan Palmer House, Chicago

