FM12 Program

SIAM Conference on

Financial Mathematics & Engineering

July 9-11, 2012
Hyatt Regency Minneapolis
Minneapolis, Minnesota, USA

Sunday, July 8

Registration
8:00 AM-8:00 PM

Room:Nicollet Promenade - Level 1

COAChing Sr. Faculty Women in the Art of Strategic Persuasion
9:30 AM-12:00 PM

Room:Nicollet D2 - Level 1

Sunday, July 8

MT1

Tutorial: Mathematical Modeling of Interest Rates: Challenges and New Directions
1:00 PM-4:30 PM

Room:Nicollet D1 - Level 1

Chair: Rama Cont, CNRS, France, and Columbia University, USA

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- Interest rate behavior during the financial crisis
- A simple credit model explaining the explosion of the basis
- The multi-curve environment
- A new definition of forward rate
- New pricing of Forward Rate Agreement and interest rate swaps
- Market formulas for caps and swaptions
- Extending the Libor market model to a multi-curve framework
- Joint modeling of interest rates with different tenors
- Modeling the spread between OIS and LIBOR rates
- Extending short rate models

Fabio Mercurio
Bloomberg LP, USA

Sunday, July 8

COAChing Jr. Faculty Women in the Art of Strategic Persuasion
1:30 PM-4:00 PM

Room:Nicollet D2 - Level 1

Student Orientation
5:00 PM-6:00 PM

Room:Exhibit Hall - Level 1

Welcome Reception
6:00 PM-8:00 PM

Room:Exhibit Hall - Level 1

Monday, July 9

Registration
7:30 AM-4:30 PM

Room:Nicollet Promenade - Level 1

Opening Remarks
8:15 AM-8:30 AM

Room:Nicollet D2/3 - Level 1

IC1
Optimal Execution in a General One-Sided Limit Order Book
8:30 AM-9:15 AM

Room:Nicollet D2/3 - Level 1

Chair: To Be Determined

We construct an optimal execution strategy for the purchase of a large number of shares of a financial asset over a fixed interval of time. Purchases of the asset have a nonlinear impact on price, and this is moderated over time by resilience in the limit-order book that determines the price. The limit-order book is permitted to have arbitrary shape. The form of the optimal execution strategy is to make an initial lump purchase and then purchase continuously for some period of time during which the rate of purchase is set to match the order book resiliency. At the end of this period, another lump purchase is made, and following that there is again a period of purchasing continuously at a rate set to match the order book resiliency. At the end of this second period, there is a final lump purchase. Any of the lump purchases could be of size zero. A simple condition is provided that guarantees that the intermediate lump purchase is of size zero. This is joint work with Gennady Shaikhet and Silviu Predoiu.

Steven E. Shreve
Carnegie Mellon University, USA

Monday, July 9

IC2
Stable Diffusions With Rank-based Interactions, and Models of Large Equity Markets
9:15 AM-10:00 AM

Room:Nicollet D2/3 - Level 1

Chair: To Be Determined

We introduce and study ergodic diffusion processes interacting through their ranks. These interactions give rise to invariant measures which are in broad agreement with stability properties observed in large equity markets over long time-periods. The models we develop assign growth rates and variances that depend on both the name (identity) and the rank (according to capitalization) of each individual asset. Such models are able realistically to capture critical features of the observed stability of capital distribution over the past century, all the while being simple enough to allow for rather detailed analytical study. The methodologies used in this study touch upon the question of triple points for systems of interacting diffusions; in particular, some choices of parameters may permit triple (or higher-order) collisions to occur. We show, however, that such multiple collisions have no effect on any of the stability properties of the resulting system. This is accomplished through a detailed analysis of collision local times. The models have connections with the analysis of Queueing Networks in heavy traffic, and with competing particle systems in Statistical Mechanics (e.g., Sherrington-Kirkpatrick model for spin-glasses). Their hydrodynamic-limit behavior is governed by generalized porous medium equations with convection, whereas limits of a different kind display phase transitions and are governed by Poisson-Dirichlet laws.

Ioannis Karatzas
Columbia University, USA

Monday, July 9

Exhibits Open
9:30 AM-4:30 PM

Room:Exhibit Hall - Level 1

Coffee Break
10:00 AM-10:30 AM

Room:Exhibit Hall - Level 1

MS1
Limit Order Books
10:30 AM-12:30 PM

Room:Nicollet D2 - Level 1

Organizer: Steven E. Shreve
Carnegie Mellon University, USA

10:30-10:55 Price Dynamics in Limit Order Markets: Limit Theorems and Diffusion Approximations
Rama Cont, CNRS, France, and Columbia University, USA; Adrien De Larrard, Université Pierre et Marie Curie - Paris VI, France

11:00-11:25 Information and the Value of Guaranteed Trade Execution
Krishnamurthy Iyer and Ramesh Johari, Stanford University, USA; *Ciamac C. Moallemi*, Columbia University, USA

11:30-11:55 Mean-variance Optimal Adaptive Order Execution and Dawson-Watanabe Superprocesses
Alexander Schied, University of Mannheim, Germany

12:00-12:25 Optimal Liquidation in a Limit Order Book
Sasha F. Stoikov and Rolf Waeber, Cornell University, USA

Monday, July 9

MS2

Optimal Investment With Transaction Costs

10:30 AM-12:30 PM

Room:Lake Superior A - Level 5

Transaction costs rank among the most pervasive frictions present in financial markets, casting doubt on many tenets of the classical frictionless theory of portfolio choice. In this session, we will present recent developments and open problems in optimal investment with transaction costs. Particular emphasis is placed on asymptotic techniques, that allow to obtain tractable results as transaction costs become small. The various tools used to solve the arising problems range from PDE method including viscosity solutions of HJB equations to Stochastic Calculus and the construction of shadow prices.

Organizer: Maxim Bichuch

Princeton University, USA

Organizer: Johannes Muhle-Karbe

ETH Zürich, Switzerland

10:30-10:55 Pricing a Contingent Claim Liability with Transaction Costs Using Asymptotic Analysis for Optimal Investment

Maxim Bichuch, Princeton University, USA

11:00-11:25 Optimal Investment with Small Transaction Costs and General Stochastic Opportunity Sets

Johannes Muhle-Karbe, ETH Zürich, Switzerland; Jan Kallsen, University of Kiel, Germany

11:30-11:55 The Optimal Use of Options to Reduce the Effect of Transaction Costs in a Portfolio

Dan Ostrov, Santa Clara University, USA; Jonathan Goodman, Courant Institute of Mathematical Sciences, New York University, USA

12:00-12:25 Shadow Prices and Well Posedness in the Optimal Investment and Consumption Problem with Transaction Costs

Jin Hyuk Choi, Gordan Zitkovic, and Mihai Sirbu, University of Texas at Austin, USA

Monday, July 9

MS3

Credit Risk

10:30 AM-12:30 PM

Room:Lake Nokomis - Level 5

This minisymposium will discuss recent advances in the modeling, valuation, and prediction of credit risk. Focus issues will be, among other issues, the role of information, counterparty risk, and market equilibrium in the presence of default risk.

Organizer: Kay Giesecke

Stanford University, USA

10:30-10:55 Pricing of Path-Dependent Vulnerable Claims in Regime Switching Markets

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

11:00-11:25 Modeling and Simulation of Systemic Risk in Insurance-Reinsurance Networks

Jose Blanchet and Yixi Shi, Columbia University, USA

11:30-11:55 Default and Systemic Risk in Equilibrium

Martin Larsson, Cornell University, USA; Agostino Capponi, Purdue University, USA

12:00-12:25 Filtered Likelihood for Point Processes

Gustavo Schwenkler and Kay Giesecke, Stanford University, USA

Monday, July 9

MS4

Portfolio Theory

10:30 AM-12:30 PM

Room:Nicollet D3 - Level 1

Invited Minisymposium

Organizer: Ioannis Karatzas

Columbia University, USA

10:30-10:55 Excursions in Atlas Models of Equity Market

Tomoyuki Ichiba, University of California, Santa Barbara, USA

11:00-11:25 Optimal Investment for All Time Horizons and Martin Boundary of Space-time Diffusion

Sergey Nadtochiy, Oxford University, United Kingdom

11:30-11:55 Generalizations of Functionally Generated Portfolios

Winslow C. Strong, University of California, Santa Barbara, USA

12:00-12:25 Volatility-Stabilized Markets

Radka Pickova, Columbia University, USA

Monday, July 9

MS5

Mathematical Finance, Stochastic Analysis, and Degenerate Partial Differential Equations

10:30 AM-12:30 PM

Room:Lake Calhoun - Level 5

Existence, uniqueness, regularity, and approximate solutions to degenerate elliptic and parabolic partial differential equations and applications to problems in optimal investment theory, American and European-style option pricing, and martingale and mimicking problems for degenerate Ito processes.

Organizer: Paul Feehan
Rutgers University, USA

Organizer: Victor Nistor
Pennsylvania State University, USA

10:30-10:55 Optimal Investment in the Presence of High-water Mark Fees
Gerard Brunick, University of California, Santa Barbara, USA; Karel Janecek, RSJ Algorithmic Trading, Czech Republic; Mihai Sirbu, University of Texas at Austin, USA

11:00-11:25 Existence, Uniqueness, and Global Regularity for Degenerate Obstacle Problems in Mathematical Finance
Paul Feehan, Rutgers University, USA; Panagiota Daskalopoulos, Columbia University, USA

11:30-11:55 A Uniqueness Theorem for a Degenerate QVI Appearing in An Option Pricing Problem
Naïma El Farouq, University Blaise Pascal, Clermont-Ferrand, France; Pierre bernhard, INRIA Sophia Antipolis, France

12:00-12:25 Approximate Solutions to Second Order Parabolic Equations with Time-dependent Coefficients
Victor Nistor, Anna Mazzucato, and Wen Cheng, Pennsylvania State University, USA

Monday, July 9

MS6

Numerical Methods for Option Pricing - Part I of II

10:30 AM-12:30 PM

Room:Cedar Lake - Level 5

For Part 2 see MS13
Pricing options sufficiently fast and accurately is often computationally challenging task. Non-local and high dimensional models as well as early exercise possibility makes pricing more difficult. This minisymposium considers efficient numerical methods including finite difference methods, Monte Carlo methods, and FFT based methods.

Organizer: Cornelis W. Oosterlee
Centrum voor Wiskunde en Informatica (CWI), Netherlands

Organizer: Olivier Pironneau
University of Paris VI, France

Organizer: Jari Toivanen
Stanford University, USA

10:30-10:55 Mixed Deterministic Monte-Carlo Simulations for Finance
Olivier Pironneau, University of Paris VI, France; Gregoire Loeper, Natixis, France

11:00-11:25 Efficient Option Pricing of Asian Options based on Fourier Cosine Expansions
Bowen Zhang and Cornelis W. Oosterlee, Delft University of Technology, Netherlands

11:30-11:55 Two-dimensional Fourier Cosine Series Expansion Method for Pricing Financial Options
Marjon Ruijter and Kees Oosterlee, CWI, Amsterdam, Netherlands

12:00-12:25 Risk-Neutral Valuation of Real Estate Options
Stefan Singor, Ortec Finance and Delft University of Technology, Netherlands; David van Bragt, Aegon, Netherlands; Marc Francke, Ortec-Finance, United Kingdom; Antoon Pelsser, University of Maastricht, Netherlands

Monday, July 9

MS7

Financial Modeling with Jump Processes

10:30 AM-12:30 PM

Room:Lake Minnetonka - Level 5

In this minisymposium, we will discuss a number of stochastic models with jumps processes for practical financial applications, including credit risk and equity derivatives pricing. In addition, some emphasis will be placed on the computational challenges in model implementation.

Organizer: Tim Leung
Columbia University, USA

10:30-10:55 Default Swap Games
Kazutoshi Yamazaki, Osaka University, Japan; Tim Leung, Columbia University, USA

11:00-11:25 Positive Subordinate CIR Processes with Two-Sided Mean-Reverting Jumps
Rafael Mendoza-Arriaga, University of Texas at Austin, USA

11:30-11:55 Multifactor Term Structure of Interest Rates under Regime Shifts and Levy Jumps
Yong Zeng, University of Missouri, Kansas City, USA; Xiangdong Liu, Jinan University, China; Lawrence Evans, University of Missouri, USA; Shu Wu, University of Kansas, USA

12:00-12:25 Sampling Error of the Supremum of a Levy Process
Liming Feng, University of Illinois at Urbana-Champaign, USA

Lunch Break

12:30 PM-2:00 PM

Attendees on their own

Monday, July 9

JP1

Systemic Risk

2:00 PM-2:45 PM

Room:Nicollet ABC - Level 1

Chair: Jean-Pierre Fouque, University of California, Santa Barbara, USA

What is systemic risk, how do we model it, how to we analyze it, and what are the implications of the analysis? I will address these issues both in a larger historical context and within current research mathematical finance. The key property of systems subject to systemic risk is their inter-connectivity and the way individual risk can become overall, systemic risk when it is diversified by inter-connectivity. I will discuss theoretical issues that come up with mean-field and other models and will also show results of numerical simulations.

George C. Papanicolaou
Stanford University, USA

Coffee Break

3:30 PM-4:00 PM

Room:Exhibit Hall - Level 1

Monday, July 9

SP1

AWM-SIAM Sonia Kovalevsky Lecture: The Role of Characteristics in Conservation Laws

2:45 PM – 3:30 PM

Room: Nicollet ABC - Level 1

Sonya Kovalevsky, in the celebrated Cauchy-Kovalevsky theorem, made clear the significance of characteristics in partial differential equations. In the field of hyperbolic conservation laws, characteristic curves (in one space dimension) and surfaces (in higher dimensions) dominate the behavior of solutions. Some examples of systems exhibit interesting, one might even say pathological, characteristic behavior. This talk will focus on ways that characteristics in systems of conservation laws give information about the systems being modeled.

Barbara Lee Keyfitz
The Ohio State University, USA

Monday, July 9

MS8

High Frequency and Algorithmic Trading

4:00 PM-6:00 PM

Room:Lake Superior A - Level 5

The availability of high frequency financial data has opened up new arenas for the application of stochastic control and introduces a host of new problems. Understanding how the LOB affects agent's optimal trading decisions on short time scales, through stochastic control problems on which they attempt to maximize profit but limit risk, is an important class of problems. For example, market makers submit both buy and sell orders to profit from the spread, while being exposed to inventory risk. This minisymposium brings together HFT and algorithmic trading experts and will highlight the mathematical tools and financial implications of the strategies.

Organizer: Sebastian Jaimungal
University of Toronto, Canada

4:00-4:25 New Models for Optimal Execution and High-frequency Market Making
Olivier Gueant, Université Paris-Diderot, France

4:30-4:55 Optimal HF Trading in a Prorata Microstructure
Huyen Pham and Fabien Guilbaud, Université Paris-Diderot, France

5:00-5:25 Risk Measures and Fine Tuning of High Frequency Trading Strategies
Alvaro Cartea, Universidad Carlos III, Spain; Sebastian Jaimungal, University of Toronto, Canada

5:30-5:55 Buy Low, Sell High using Self-Exciting Marked Point Proceses
Sebastian Jaimungal, University of Toronto, Canada; Alvaro Cartea, Universidad Carlos III, Spain; Jason Ricci, University of Toronto, Canada

Monday, July 9

MS9

Stochastic Control in Finance

4:00 PM-6:00 PM

Room:Nicollet D2 - Level 1

We will present some recent exciting methodological developments in stochastic control and their applications in finance.

Organizer: Erhan Bayraktar
University of Michigan, USA

4:00-4:25 Stochastic Perron's Method and Verification without Smoothness using Viscosity Comparison: Obstacle Problems and Dynkin Games
Erhan Bayraktar, University of Michigan, USA

4:30-4:55 Constructing Sublinear Expectations on Path Space
Marcel Nutz, Columbia University, USA; Ramon Van Handel, Princeton University, USA

5:00-5:25 Dynamic Portfolio Choice with Multiple Decentralized Agents
Andrew Lim, University of California, Berkeley, USA

5:30-5:55 Optimal Consumption and Investment in Incomplete Markets with General Constraints
Patrick Cheridito, Princeton University, USA

Monday, July 9

MS10

Systemic Risk

4:00 PM-6:00 PM

Room:Nicollet D3 - Level 1

Systemic risk in financial markets, a central concern in the debate on regulatory reform, manifests itself in the form of large scale failures in the banking system. Such failures may arise through various mechanisms: balance sheet contagion, illiquidity spirals and feedback effects due to fire sales. This MiniSymposium presents various attempts at mathematical modeling of the mechanisms behind systemic risk in financial markets.

Organizer: Rama Cont
CNRS, France, and Columbia University, USA

4:00-4:25 Feedback Effects and Endogenous Risk in Financial Markets
Lakshithe Wagalath, Université Pierre et Marie Curie, France; Rama Cont, CNRS, France, and Columbia University, USA

4:30-4:55 Coupled Diffusions, Swarming and Systemic Risk
Jean Pierre Fouque, University of California, Santa Barbara, USA

5:00-5:25 Failure and Rescue in an Interbank Network
Luitgard Veraart, London School of Economics, United Kingdom; Chris Rogers, Cambridge University, United Kingdom

5:30-5:55 Resilience to Contagion in Financial Networks
Hamed Amini, École Polytechnique Fédérale de Lausanne, Switzerland; Rama Cont, CNRS, France, and Columbia University, USA; Andreea Minca, Cornell University, USA

Monday, July 9

MS11

Machine Learning Methods in Quantitative Finance

4:00 PM-6:00 PM

Room:Lake Nokomis - Level 5

The minisymposium addresses four estimation problems from the areas of order-book modeling, portfolio selection, and factor analysis. The first presentation introduces a non-parametric, feature-based approach to short-term forecasting of the mid-price in a limit order book. The second presentation addresses high-dimensional covariance estimation from limited observations, by making regularizing assumptions on the monotonicity and smoothness of the covariance. The third presentation develops an algorithm for portfolio optimization in a regime-switching model driven by an HMM, for a market consisting of a stock, a money market account, and a defaultable security. The fourth presentation develops a particle-filter-based algorithm for estimating hedge fund risk factors from returns.

Organizer: Ilya Pollak
Purdue University, USA

4:00-4:25 Nonparametric Prediction in a Limit Order Book
Ilya Pollak and Deepan Palguna, Purdue University, USA

4:30-4:55 Smooth and Monotone Covariance Estimation for Elliptical and Generalized Hyperbolic Distributions
Dmitry Malioutov, DRW Holdings, USA; Xiaoping Zhou, Stony Brook University, USA

5:00-5:25 Dynamic Modeling of Systemic Risk
PengChu Chen and Agostino Capponi, Purdue University, USA

5:30-5:55 Estimating Hedge Fund Risk Factors
Douglas Johnston, Quantalysis, LLC, USA; Petar Djuric, Stony Brook University, USA

Monday, July 9

MS12

Dynamic Risk Measures, Dynamic Acceptability Indices and Their Applications

4:00 PM-6:00 PM

Room:Lake Calhoun - Level 5

The need for dynamic assessment of performance and/or risk of a portfolio arises very naturally in the finance industry. However, in spite of numerous works on that subject, several problems remain open. One of such open problems is the issue of dynamic consistency of dynamic risk measures and dynamic acceptability indices: how should it be properly defined and analyzed. Also, the issues regarding applications of dynamic risk measures and dynamic acceptability indices to optimal portfolio choice and to valuation and hedging of derivative instruments still require in depth study. This minisymposium aims at providing an overview of some of the recent progress regarding the above problems.

Organizer: Igor Cialenco
Illinois Institute of Technology, USA

Organizer: Samuel Drapeau
Humboldt University Berlin, Germany

Organizer: Tomasz Bielecki
Illinois Institute of Technology, USA

4:00-4:25 Dynamic Assessment Indices
Martin Karliczek, Humboldt University Berlin, Germany

4:30-4:55 Minimal Supersolutions of BSDEs and Robust Hedging
Michael Kupper, Humboldt University Berlin, Germany

5:00-5:25 Set-valued Dynamic Risk Measures in Markets with Transaction Costs
Birgit Rudloff, Princeton University, USA

5:30-5:55 Portfolio Choice with Time-consistent Dynamic Risk Measures
Mijda Stadje, Tilburg University, The Netherlands; Roger Laeven, University of Amsterdam, Netherlands

Monday, July 9

MS13

Numerical Methods for Option Pricing - Part II of II

4:00 PM-6:00 PM

Room:Cedar Lake - Level 5

For Part 1 see MS6

Pricing options sufficiently fast and accurately is often computationally challenging task. Non-local and high dimensional models as well as early exercise possibility makes pricing more difficult. This minisymposium considers efficient numerical methods including finite difference methods, Monte Carlo methods, and FFT based methods.

Organizer: Cornelis W. Oosterlee
Centrum voor Wiskunde en Informatica (CWI), Netherlands

Organizer: Olivier Pironneau
University of Paris VI, France

Organizer: Jari Toivanen
Stanford University, USA

4:00-4:25 Pricing American Options Under Jump-diffusion Models
Jari Toivanen, Stanford University, USA; Santtu Salmi, University of Jyvaskyla, Finland

4:30-4:55 Exponential Time Differencing Methods for Pricing and Hedging American Options
Abdul M. Khaliq, Middle Tennessee State University, USA; Mohammad Yousuf, King Fahd University of Petroleum and Minerals, Saudi Arabia; Britta Kleefeld, Brandenburgische Technische Universität Cottbus, Germany

5:00-5:25 Efficient and Robust Time Stepping Under Jump-diffusion Models
Santtu Salmi, University of Jyvaskyla, Finland; Jari Toivanen, Stanford University, USA

5:30-5:55 The Valuation of Double Barrier Options under Multifactor Pricing Models
José C. Dias and João Nunes, ISCTE-IUL Business School, Portugal

Monday, July 9

MS14

Computational Methods for Option Pricing in Jump-diffusion Models

4:00 PM-6:00 PM

Room:Lake Minnetonka - Level 5

In two talks, new efficient analytical and Monte-Carlo methods for Heston model and its generalizations are considered. In the third talk, new efficient methods for Laplace inversion, calculation of the Wiener-Hopf factors and pricing lookbacks in exponential Levy models is presented, and in the fourth talk, quadratic hedging of barrier options in exponential Levy models

Organizer: Sergei Levendorskii
University of Leicester, United Kingdom

4:00-4:25 Efficient Pricing and Reliable Calibration in the Heston Model and its Generalizations
Sergei Levendorskii, University of Leicester, United Kingdom

4:30-4:55 Exact Simulation of the Heston Jump-Diffusion
Xueying Hu and Erhan Bayraktar, University of Michigan, USA; Kay Giesecke, Stanford University, USA

5:00-5:25 Efficient Laplace Inversion, Wiener-Hopf Factorization and Pricing Lookbacks
Svetlana Boyarchenko, University of Texas at Austin, USA

5:30-5:55 Quadratic Hedging of Barrier Options under Leptokurtic Returns Driven by an Exponential Lévy Model
Aleš Cerný, Cass Business School, London, United Kingdom

Intermission

6:00 PM-6:15 PM

Monday, July 9

PD1

Panel on BIG Data in Applied Mathematics, Computational Science, and Statistics

6:15 PM-7:15 PM

Room:Nicollet ABC - Level 1

Chair: Tasso J. Kaper, Boston University, USA

Chair: Michele Benzi, Emory University, USA

The ability to collect and interpret ever-growing amounts of data is playing an increasingly important role in scientific and technological progress. New challenges and opportunities abound from big data problems in bioinformatics, computer vision, geophysics, high energy physics, industrial processes, microarrays, networks, neuroscience, object recognition, sensors, scientific computation, signal processing, social science, and other fields. These challenges and opportunities are leading to new analysis, theory, and simulation in diverse areas: algebra, dynamical systems, graph theory, harmonic analysis, linear algebra, machine learning, numerical analysis, optimization, statistics, and topology, etc... This panel centers on the roles of mathematics, computational science, and statistics in 'Big Data.'

Panelists:

Gunnar Carlsson
Stanford University, USA

William Harrod
DOE Office of Science, USA

Tamara Kolda
Sandia National Laboratories, USA

Sastry Pantula
National Science Foundation, USA

Monday, July 9

PD2

Industry Panel: Establishing and Nurturing Productive Collaborations

6:15 PM-7:15 PM

Room:Nicollet D2 - Level 1

Chair: Thomas A. Grandine, The Boeing Company, USA

Success of mathematics in an industrial setting is frequently determined by the extent to which significant mathematical ideas are developed and disseminated through collaboration. In particular, adoption and deployment of those ideas often relies upon the level of confidence non-experts have in those ideas. Collaboration, both inside and outside companies, involving both academic and non-academic collaborators, has proven to be a useful tool for mathematical technology transfer for technical and non-technical reasons. The panelists will probe the ways in which collaboration has strengthened both their companies and the mathematical technologies which have helped to make those companies successful.

Panelists:

Tor Dokken
SINTEF, Norway

Lalitha Venkataramanan
Schlumberger-Doll Research, USA

Charles Wampler
General Motors Corporation, USA

Career Fair / Graduate Student Reception / Industry Reception

7:15 PM-9:15 PM

Room:Greenway Promenade - Level 2

Tuesday, July 10

Registration

8:00 AM-4:30 PM

Room:Nicollet Promenade - Level 1

IC3

Simulation Schemes for Stopped Lévy Processes

8:30 AM-9:15 AM

Room:Nicollet D2/3 - Level 1

Chair: To Be Determined

Jump processes, and Lévy processes in particular, are notoriously difficult to simulate. The task becomes even harder if the process is stopped when it crosses a certain boundary, which happens in applications to barrier option pricing or structural credit risk models. In this talk, I will present novel adaptive discretization schemes for the simulation of stopped Lévy processes, which are several orders of magnitude faster than the traditional approaches based on uniform discretization, and provide an explicit control of the bias. The schemes are based on sharp asymptotic estimates for the exit probability and work by recursively adding discretization dates in the parts of the trajectory which are close to the boundary, until a specified error tolerance is met.

Peter Tankov
Université Paris-Diderot, France

Tuesday, July 10

SP6

SIAG/FME Junior Scientist Prize: Market-Based Approach to Modeling Derivatives Prices

9:15 AM-10:00 AM

Room: Nicollet D2/3 - Level 1

Most of the existing quantitative methods in Finance rely on the assumptions of the underlying mathematical models. The problem of choosing the appropriate model assumptions is one of the cornerstones of modern Financial Engineering. I am interested in developing modeling frameworks that facilitate the use of historical observations when making the choice of model assumptions. It turns out that, in the markets with a large family of liquid derivative contracts, it is rather hard to construct a model that exploits the information contained in the historical prices of these derivatives. In fact, constructing such models requires the use of the so-called Market-Based Approach. The idea of this approach is to treat the liquid derivatives as generic financial assets and prescribe the joint evolution of their prices in such a way that any future arbitrage-free combination of prices is possible. In this presentation, I will outline the main difficulties associated with the construction of market-based models and will present a general methodology that bypasses these difficulties. Finally, I will illustrate the theory by describing (both mathematically and numerically) a family of market-based models for the European call options of multiple strikes and maturities.

Sergey Nadtochiy

Oxford University, United Kingdom

Tuesday, July 10

Exhibits Open

9:30 AM-4:30 PM

Room:Exhibit Hall - Level 1

Coffee Break

10:00 AM-10:30 AM

Room:Exhibit Hall - Level 1

Intermission

10:30 AM-11:10 AM

Tuesday, July 10

CP1

Interest Rate Modeling

11:10 AM-12:30 PM

Room:Lake Superior A - Level 5

11:10-11:25 Pricing Interest Rate Derivatives in a Multifactor Hjm Model with Time Dependent Volatility

Ingo Beyna, Frankfurt School of Finance & Management, Germany; Carl Chiarella and *Boda Kang*, University of Technology, Australia

11:30-11:45 A Paradigm Shift in Interest-Rate Modeling

Peter Lin, Johns Hopkins University, USA

11:50-12:05 Pricing Swaptions under Multifactor Gaussian Hjm Models

Joao Pedro V. Nunes, ISCTE-IUL Business School, Portugal; Pedro Prazeres, Sociedade Gestora dos Fundos de Pensoes do Banco de Portugal, Portugal

12:10-12:25 Pricing and Hedging the Smile with Sabr: Evidence from the Interest Rate Caps Market

Tao L. Wu, Illinois Institute of Technology, USA

Tuesday, July 10

CP2

Commodity and Electricity Markets

11:10 AM-12:30 PM

Room:Lake Calhoun - Level 5

Chair: Marcus Erikson, University of Oslo, Norway

11:10-11:25 Swing Options in Commodity Markets: A Model with Multidimensional Jump Diffusions
Marcus Eriksson and Jukka Lempa, University of Oslo, Norway; Trygve Nilssen, University of Agder, Norway

11:30-11:45 Decomposing the Risk from Investing in Foreign Commodities
Nina Lange, Copenhagen Business School, Denmark

11:50-12:05 A Real-Time Pricing Model for Electricity Consumption
Ranjan Pal, University of Southern California, USA

12:10-12:25 A Resampling Particle Filter Parameter Estimation For Electricity Prices With Jump Diffusion
Bahri Uzunoglu, Gotland University, Sweden; Dervis Bayazit, Federal Home Loan Bank of Atlanta, USA

Tuesday, July 10

CP3

Financial Models with Jumps

11:10 AM-12:30 PM

Room:Lake of the Isles - Level 5

Chair: Peter Hieber, University of Toronto, Canada

11:10-11:25 Efficiently Simulating the Double-Barrier First-Passage Time in Jump-Diffusion Models
Peter Hieber, University of Toronto, Canada; Lexuri Fernandez, Universidad Autonoma de Madrid, Spain; Matthias Scherer, TU München, Germany

11:30-11:45 Numerical Solution of Jump-Diffusion SDEs
Gerald Teng and Kay Giesecke, Stanford University, USA

11:50-12:05 Basket and Spread Options in a Variance Gamma Model
Svetlana Borovkova, Vrije Universiteit Amsterdam, The Netherlands

12:10-12:25 High-order Short-time Expansions for ATM Option Prices Under the CGMY Model
Ruoting Gong, Georgia Institute of Technology, USA

Tuesday, July 10

CP4

Model Risk and Dependence

11:10 AM-12:30 PM

Room:Cedar Lake - Level 5

Chair: John Dodson, University of Minnesota, USA

11:10-11:25 Model Risk Based on the Distribution of the Hedge Error
Nils Detering, Frankfurt School of Finance & Management, Germany

11:30-11:45 Why Is It So Hard to Estimate Expected Returns?
John A. Dodson, University of Minnesota, USA

11:50-12:05 A New Perspective on Dependence Within Financial Markets
David S. Matteson, Cornell University, USA

12:10-12:25 The Herd Behavior Index: a New Measure for the Implied Degree of Co-Movement in Stock Markets
David Vyncke, Ghent University, Belgium; Jan Dhaene, Daniel Linders, and Wim Schoutens, Katholieke Universiteit Leuven, Belgium

Tuesday, July 10

CP5

Valuation of Exotic Options

11:10 AM-12:30 PM

Room:Lake Minnetonka - Level 5

Chair: Olympia Hadjiliadis, City University of New York, USA

11:10-11:25 Incorporating Parameter Risk into Derivatives Prices - An Approach to Bid-Ask Spreads

Karl F. Bannör and Matthias Scherer, TU München, Germany

11:30-11:45 Analytical Calculation of Risk Measures for Variable Annuity Guaranteed Benefits

Runhuan Feng and Hans W Volkmer, University of Wisconsin, Milwaukee, USA

11:50-12:05 Diversification and Crash-Protection Using Variance Swap Calendar Spreads

Qixiang Zhou, MathFinance AG, Germany; Nils Detering, Frankfurt School of Finance & Management, Germany; Uwe Wystup, MathFinance AG, Germany

12:10-12:25 Fair Valuation of Drawdown Insurance

Olympia Hadjiliadis, City University of New York, USA; Tim Leung and Hongzhong Zhang, Columbia University, USA

Tuesday, July 10

CP6

Real Options

11:10 AM-12:30 PM

Room:Lake Nokomis - Level 5

Chair: Uwe Wystup, MathFinance AG, Germany

11:10-11:25 Optimal Cash Holdings in a Firm

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

11:30-11:45 Risk Aversion and Managerial Cash-Flow Estimates in Real Options

Yuri Lawryshyn, University of Toronto, Canada

11:50-12:05 Irreversible Investment with Regime Switching : Revisit with Linear Algebra

Keiichi Tanaka, Tokyo Metropolitan University, Japan

12:10-12:25 Embedded Currency Exchange Options in Roll-over Loans

Uwe Wystup, MathFinance AG, Germany

Prizes and Awards Luncheon

12:30 PM-2:30 PM

Room:Exhibit Hall - Level 1

Be sure to bring your ticket to the Luncheon.

Tuesday, July 10

SP2

The John von Neumann Lecture: Liquid Crystals for Mathematicians

2:30 PM - 3:30 PM

Room: Nicollet ABC - Level 1

Chair: Lloyd N. Trefethen, Oxford University, United Kingdom

Liquid crystals form an important class of soft matter systems with properties intermediate between solid crystals and isotropic fluids. They are the working substance of liquid crystal displays, which form the basis of a huge multinational industry. The lecture will describe these fascinating materials, and what different branches of mathematics, such as partial differential equations, the calculus of variations, multiscale analysis, scientific computation, dynamical systems, algebra and topology, can say about them.

John Ball

University of Oxford, United Kingdom

Coffee Break

3:30 PM-4:00 PM

Room:Exhibit Hall - Level 1

Tuesday, July 10

MS15

Network Models and Over-the-counter (OTC) Markets

4:00 PM-6:00 PM

Room:Lake Superior A - Level 5

While mathematical modeling in finance has mostly focused on price behavior in exchanges, a wide range of derivatives and other financial instruments are traded Over-the-counter (OTC). Various issues related to OTC markets, in particular the market for Credit Default Swaps (CDS), have become the focus of intense regulatory discussion following the recent financial crisis: design of central clearing facilities for OTC derivatives, transparency and information in OTC derivatives markets, the impact of central clearing on systemic risk and collateral requirements,... This Minisymposium presents some recently proposed modeling approaches which attempt to tackle these issues from a mathematical modeling perspective.

Organizer: Rama Cont

CNRS, France, and Columbia University, USA

4:00-4:25 Central Clearing of OTC Derivatives : Bilateral vs Multilateral Netting

Thomas Kokholm, Aarhus University, Denmark; Rama Cont, CNRS, France, and Columbia University, USA

4:30-4:55 Are CDS Auctions Biased?

Haoxiang Zhu and SongZi DU, Stanford University, USA

5:00-5:25 Central Clearing Mechanisms for Credit Default Swaps

JinBeom Kim, Columbia University, USA; Rama Cont, CNRS, France, and Columbia University, USA

5:30-5:55 Measuring Contagion in Financial Networks

Sebastian Stiller, Technische Universitaet Berlin, Germany

Tuesday, July 10

MS16

Risk in Interacting Stochastic Systems

4:00 PM-6:00 PM

Room:Nicollet D2 - Level 1

The events of 2007--09 made clear the need for a better understanding of the behavior of risk in the financial system. The crisis highlights the significance of interaction of entities such as firms and agents. This minisymposium will discuss the formulation and analysis of stochastic systems with mean-field and local interaction. The analysis will involve, in particular, notions of stability, typical events, and rare events in such systems. This will lead to laws of large numbers, central limit theorems, and large deviation principles. Applications include efficient numerical methods for the analysis of rare events, and the prediction of systemic risk.

Organizer: Kay Giesecke

Stanford University, USA

4:00-4:25 Large Portfolio Asymptotics for Loss From Default

Kay Giesecke, Stanford University, USA; Konstantinos Spiliopoulos, Brown University, USA; Richard Sowers, University of Illinois at Urbana-Champaign, USA; Justin Sirignano, Stanford University, USA

4:30-4:55 Most Likely Path to Systemic Failure

Konstantinos Spiliopoulos, Brown University, USA; Kay Giesecke, Stanford University, USA; Richard Sowers, University of Illinois, USA

5:00-5:25 Branching and Interacting Particle Models of Systemic Risk

Michael Ludkovski and Tomoyuki Ichiba, University of California, Santa Barbara, USA

5:30-5:55 Endogenous Equilibria in Liquid Markets with Frictions and Boundedly Rational Agents

Paolo Dai Pra and Fulvio Fontini, University of Padova, Italy; Elena Sartori and Marco Tolotti, Ca' Foscari University, Italy

Tuesday, July 10

MS17

Real Option Management of Commodity Storage

4:00 PM-6:00 PM

Room:Lake Calhoun - Level 5

Commodity storage plays a fundamental role in matching the supply and demand of storable commodities. The real option management of commodity storage is an active area of research and applications in diverse fields, such as financial engineering, operations research, and operations management. This mini-symposium brings together leading researchers both from academia and practice to present their current and unpublished research on this topic.

Organizer: Selvaprabu Nadarajah

Carnegie Mellon University, USA

Organizer: Nicola Secomandi

Carnegie Mellon University, USA

4:00-4:25 Approximate Linear Programming Relaxations for Commodity Storage Real Option Management

Selvaprabu Nadarajah, Francois Margot, and Nicola Secomandi, Carnegie Mellon University, USA

4:30-4:55 Quasi-convex Dynamic Programming for Storage Evaluation

John Birge, University of Chicago, USA

5:00-5:25 Natural Gas Storage Valuation, Optimization, Market and Credit Risk Management

Matt Thompson, Queen's University, Canada

5:30-5:55 A Kernel Based Approach to Gas Storage and Swing Contracts Valuations in High Dimensions

Denis Mazieres, LCH.Clearnet and Birkbeck. London University, United Kingdom; Alexander Boogert, EnergyQuants BV, Netherlands

Tuesday, July 10

MS18

Jump Processes in Finance: Modeling, Statistics and Option Pricing

4:00 PM-6:00 PM

Room:Nicollet D3 - Level 1

Organizer: Peter Tankov

Ecole Polytechnique, France

4:00-4:25 Small-time Expansions for Stochastic Volatility Models with Lévy Jumps

Jose E. Figueroa-Lopez, Purdue University, USA

4:30-4:55 Parametric Inference and Dynamic State Recovery from Option Panels

Viktor Todorov, Torben G. Andersen, and Nicola Fusari, Northwestern University, USA

5:00-5:25 A New Look at Short-term Implied Volatility in Models with Jumps

Aleksandar Mijatovic, Imperial College London, United Kingdom; Peter Tankov, Université Paris VII, France

5:30-5:55 Large Deviations and Stochastic Volatility with Jumps: Asymptotic Implied Volatility for Affine Models

Martin Keller-Ressel, TU Berlin, Germany; Antoine Jacquier and Aleksandar Mijatovic, Imperial College London, United Kingdom

Tuesday, July 10

MS19

Asymptotic Methods in Option Pricing

4:00 PM-6:00 PM

Room:Cedar Lake - Level 5

Organizer: Elisa Alos

Universitat Pompeu Fabra

4:00-4:25 A Decomposition Formula for Option Prices in the Heston Model and Applications to Option Pricing Approximation

Elisa Alos, Universitat Pompeu Fabra, Spain

4:30-4:55 Small-noise Expansion for Projected Diffusions and Implied Volatility Asymptotics

Antoine Jacquier, Imperial College London, United Kingdom; Peter Friz and Jean-Dominique Deuschel, TU Berlin, Germany; Sean Violante, Imperial College London, United Kingdom

5:00-5:25 Multi-Factor Stochastic Volatility Models for Options and Options on Variance

Jean Pierre Fouque and *Yuri Saporito*, University of California, Santa Barbara, USA; Jorge P. Zubelli, IMPA, Brazil

5:30-5:55 Asymptotics of Implied Volatility to Arbitrary Order

Roger Lee and Kun Gao, University of Chicago, USA

Tuesday, July 10

MS20

Stochastic Control and Optimization Related to Portfolio and Risk Management

4:00 PM-6:00 PM

Room:Lake Minnetonka - Level 5

Since the seminal work on Merton's portfolio optimization problem in 1970's, stochastic control theory plays increasingly important role in mathematical finance, which provides both theoretical and computational tools in a wide range of financial applications. This minisymposium intends to review some recent developments in stochastic control arising from different aspects of portfolio and insurance risk management, reflecting the interplay between control theory and mathematical finance. It is anticipated that the minisymposium will help to foster collaborations among participants as well as identify important future research areas.

Organizer: Qingshuo Song

City University of Hong Kong, Hong Kong

Organizer: Chao Zhu

University of Wisconsin, Milwaukee, USA

4:00-4:25 Outperformance Portfolio Optimization via the Equivalence of Pure and and Randomized Hypothesis Testing

Jie Yang, University of Illinois, Chicago, USA; Tim Leung, Columbia University, USA; Qingshuo Song, City University of Hong Kong, Hong Kong

4:30-4:55 Numerical Solutions of Optimal Risk Control and Dividend Optimization Policies

Zhuo Jin, University of Melbourne, Australia; George Yin, Wayne State University, USA; Chao Zhu, University of Wisconsin, Milwaukee, USA

5:00-5:25 Optimal Trend-following Trading Rules under a Three-state Regime-switching Mode

Jie Yu, Roosevelt University, USA; Qing Zhang, University of Georgia, USA

5:30-5:55 On the Multi-Dimensional Controller and Stopper Games

Yu-Jui Huang, University of Michigan, Ann Arbor, USA; Erhan Bayraktar, University of Michigan, USA

Tuesday, July 10

MS21

Applications of Spectral Methods in Finance

4:00 PM-6:00 PM

Room:Lake Nokomis - Level 5

The session focuses on recent work on applications of spectral methods in financial mathematics, including to derivatives pricing, early exercise and optimal stopping, and models with jumps and stochastic volatility.

Organizer: Vadim Linetsky

Northwestern University, USA

4:00-4:25 Building Financial Models with Time Changes
Vadim Linetsky, Northwestern University, USA

4:30-4:55 Pricing Derivatives on Multiscale Diffusions: An Eigenfunction Expansion Approach
Matthew Lorig, Princeton University, USA

5:00-5:25 Evaluating Callable and Putable Bonds: An Eigenfunction Expansion Approach
Dongjae Lim, Northwestern University, USA

5:30-5:55 Closed-form Expansions of Option Prices under Time-changed Dynamics
David Pedersen and Elisa Nicolato, Aarhus University, Denmark

Dinner Break

6:00 PM-7:30 PM

Attendees on their own.

SIAG/FME Business Meeting

7:30 PM-8:00 PM

Room:Nicollet D2/3 - Level 1

Complimentary beer and wine will be served.

Tuesday, July 10

PP1

Poster Session and Dessert Reception

8:00 PM-10:00 PM

Room:Exhibit Hall - Level 1

Adjoint Monte-Carlo Technique for Calibration of Financial Market Models
Bastian Gross, University of Trier, Germany; Ekkehard W. Sachs, University of Trier, Germany and Virginia Tech, USA

The Impact of Constraints on the Views of the Black-Litterman Model
Byron Wilson and Gareth Q. Witten, University of Cape Town, South Africa

On Efficient Option Pricing Under Jump Diffusion
Ruediger U. Seydel, University of Cologne, Germany

Wednesday, July 11

Registration

8:00 AM-4:30 PM

Room:Nicollet Promenade - Level 1

IC5

Optimal Order Placement in Limit Order Books

8:30 AM-9:15 AM

Room:Nicollet D2/3 - Level 1

Chair: To Be Determined

There is a growing body of research works on trading strategies for big orders over a period of time with various assumptions of price impact. These works mostly focus on a macroscopic timescale. On the millisecond timescale the price is no longer well defined and the state of the order book contains important information.

More importantly, one of the key issues at this timescale is the order placement problem, which is different from the optimal execution one. We discuss several models and strategies to place orders in a limit order book with the objective of minimizing the expected cost. We show that optimal strategies may be path dependent and depend on key order book statistics.

Xin Guo
University of California, Berkeley, USA

SIAM Presents

Since 2008, SIAM has recorded many Invited Lectures, Prize Lectures, and selected Minisymposia from various conferences. These are available by visiting SIAM Presents (http://www.siam.org/meetings/presents.php).

Wednesday, July 11

IC6

Quantitative Absence of Arbitrage and Equivalent Changes of Measure

9:15 AM-10:00 AM

Room:Nicollet D2/3 - Level 1

Chair: To Be Determined

It is well known that absence of arbitrage is a highly desirable feature in mathematical models of financial markets. In its pure form (whether as NFLVR or as the existence of a variant of an equivalent martingale measure R), it is qualitative and therefore robust towards equivalent changes of the underlying reference probability (the "real-world" measure P). But what happens if we look at more quantitative versions of absence of arbitrage, where we impose for instance some integrability on the density dR/dP? To which extent is such a property robust towards changes of P? We discuss these questions and present some recent results. The talk is based on joint work with Tahir Choulli (University of Alberta, Edmonton).

Martin Schweizer
ETH Zürich, Switzerland

Exhibits Open

9:30 AM-4:30 PM

Room:Exhibit Hall - Level 1

Coffee Break

10:00 AM-10:30 AM

Room:Exhibit Hall - Level 1

Wednesday, July 11

MS22

Stochastic Models in Behavioral Finance

10:30 AM-12:30 PM

Room:Lake Nokomis - Level 5

Organizer: Vicky Henderson
University of Oxford, United Kingdom

10:30-10:55 Optimal Portfolios under Worst Case Scenarios
Carole Bernard and Jit-Seng Chen, University of Waterloo, Canada; Steven Vanduffel, Vrije Universiteit Brussel, Belgium

11:00-11:25 Myopic Loss Aversion, Reference Point, and Money Illusion
Xuedong He, Columbia University, USA; Xunyu Zhou, University of Oxford, United Kingdom, and The Chinese University of Hong Kong, China

11:30-11:55 Consumption-based Behavioral Portfolio Selection in Continuous Time
Hanqing Jin, Oxford University, United Kingdom

12:00-12:25 Utility Maximization with Addictive Consumption Habit Formation in Incomplete Markets
Xiang Yu, University of Texas at Austin, USA

Wednesday, July 11

MS23

New Developments in Optimal Portfolio Choice Problems

10:30 AM-12:30 PM

Room:Nicollet D2 - Level 1

Organizer: Martin Schweizer
ETH Zürich, Switzerland

10:30-10:55 Market Depth and Trading Volume Dynamics
Paolo Guasoni, Boston University, USA; Marko Weber, Dublin City University, Ireland

11:00-11:25 The Log Optimal Portfolio under Transaction Costs and the Shadow Price: The Geometric Ornstein-Uhlenbeck Process and a Counterexample
Christoph Czichowsky and Philipp Deutsch, University of Vienna, Austria; Johannes Muhle-Karbe, ETH Zürich, Switzerland; Walter Schachermayer, University of Vienna, Austria

11:30-11:55 Long-run Investment under Drawdown Constraints: optimal portfolios and numeraire property
Jan Obloj, Oxford University, United Kingdom

12:00-12:25 Wealth vs Risk in a Continuous Time Model
Harry Zheng, Imperial College London, United Kingdom

Wednesday, July 11

MS24

Stress Tests: From Arts to Science - Part I of II

10:30 AM-12:30 PM

Room:Lake Superior A - Level 5

For Part 2 see MS27

Expectations on stress tests are high in the financial industry: they should measure the resilience of individual financial institutions and of the whole banking system as part of an economy. Additionally, they should act as a calmative for nervous markets. It is time to assess the expectations about what information can realistically be obtained from stress tests. How should we choose scenarios which are at the same time plausible and informative of potential weaknesses? How can we assess the validity of our models and the potential consequences where our models break down? How can we adequately discriminate adverse external shocks and dangerous endogenous effects?

Organizer: Thomas Breuer

FH Vorarlberg, Austria

10:30-10:55 Stress Tests: From Arts to Science (Overview)

Thomas Breuer, Fachhochschule Vorarlberg, Austria

11:00-11:25 Finding Stress Scenarios That Get the Job Done, with Credit Risk Applications

Craig A. Friedman, Standard & Poor's, USA

11:30-11:55 Must Stress Tests be Credible?

Til Schuermann, Oliver Wyman, USA

12:00-12:25 Stress Testing Model Risk

Paul Kupiec, FDIC, USA

Wednesday, July 11

MS25

Commodities, Energy Markets & Equilibrium - Part I of II

10:30 AM-12:30 PM

Room:Lake Calhoun - Level 5

For Part 2 see MS28

Commodities and energy markets bring new challenges to Financial Mathematics. These include equilibrium and game theory problems, non-standard stochastic models, and interplay between supply/demand and speculation. These two minisymposia will highlight recent work in these areas and continue the representation of this growing research subfiled at the SIAM FME meetings.

Organizer: Ronnie Sircar

Princeton University, USA

Organizer: Rene Carmona

Princeton University, USA

10:30-10:55 Probabilistic Approach to Mean Field Games and the Control of McKean Vlasov Dynamics

Rene Carmona, Princeton University, USA

11:00-11:25 Utility Indifference Pricing in Energy Markets

Luciano Campi, Université Paris 13, France

11:30-11:55 Forward-Backward SDE Games and Stochastic Control under Model with Uncertainty

Agnès Sulem, INRIA, France

12:00-12:25 Levy Semistationary Processes with Applications to Electricity Markets

Heidar I. Eyjolfsson and Fred Espen Benth, University of Oslo, Norway

Wednesday, July 11

MS26

Stochastic Analysis and Partial Differential Equations in Finance

10:30 AM-12:30 PM

Room:Nicollet D3 - Level 1

The connection between parabolic partial differential equations (PDEs) and option pricing theory, well understood in the case of Markovian models, has been extended to non-Markovian semimartingales by differnet methods. One is through "Markovian projection": the construction of a Markov process with the same marginal distributions, following the methods proposed by Gyongy (1986) and Dupire (1994). Another, more recent approach, uses functional extensions of the Ito formula to derive a functional version of the backward Kolmogorov equation for path-dependent options. This session presents recent work in these directions, which extend PDE methods to a non-Markovian setting.

Organizer: Rama Cont

CNRS, France, and Columbia University, USA

10:30-10:55 Forward Equations and Mimicking Theorems for Discontinuous Semimartingales

Amel Bentata, Université Pierre et Marie Curie, France; Rama Cont, CNRS, France, and Columbia University, USA

11:00-11:25 Degenerate Parabolic PDEs, Martingale Problems and a Mimicking Theorem for Itō Processes

Camelia A. Pop and Paul FEEHAN, Rutgers University, USA

11:30-11:55 Local Vs Non-Local Forward Equations for Option Pricing

Yu Gu, Columbia University, USA; Rama Cont, CNRS, France, and Columbia University, USA

12:00-12:25 Functional Ito Calculus and the Pricing and Hedging of Path-dependent Derivatives

Rama Cont, CNRS, France, and Columbia University, USA; *David Fournie*, Morgan Stanley, USA

Wednesday, July 11

CP7

Backward Stochastic Differential Equations

10:30 AM-12:10 PM

Room:Cedar Lake - Level 5

Chair: Coskun Cetin, California State University, Sacramento, USA

10:30-10:45 Dynamic Quadratic Hedging in the Presence of Partially Hedgeable Assets and Liabilities
Coskun Cetin, California State University, Sacramento, USA

10:50-11:05 BSDEs with BMO Market Price of Risk
Christoph Frei, University of Alberta, Canada; Markus Mocha, Humboldt University Berlin, Germany; Nicholas Westray, Imperial College London, United Kingdom

11:10-11:25 A Continuous Time Bank Run Model for Insolvency, Recovery and Rollover Risks
Gechun Liang, University of Oxford, United Kingdom

11:30-11:45 Quadratic Reflected Bsdes with Bounded Conditions. Application to American Options.
Arnaud Lionnet, University of Oxford, United Kingdom

11:50-12:05 A Simple Proof of Bichteler–Dellacherie–Mokobodzki Theorem
Pietro Siorpaes and Mathias Beiglböck, University of Vienna, Austria

Wednesday, July 11

CP8

Stochastic and Implied Volatility Modeling

10:30 AM-12:30 PM

Room:Lake Minnetonka - Level 5

Chair: Muhammad Al-Saadony, University of Plymouth, United Kingdom

10:30-10:45 Inference for the Fractional Heston Model Using the Auxiliary Particle Filter
Muhannad Al-Saadony, University of Plymouth, United Kingdom

10:50-11:05 Non-Parametric Calibration of the Local Volatility Surface for European Options
Jian Geng and Michael Navon, Florida State University, USA; Xiao Chen, Lawrence Livermore National Laboratory, USA

11:10-11:25 Small-time Asymptotics For Some Stochastic Volatility Models
Jerome Grand'maison, University of Southern California, USA

11:30-11:45 Stochastic Calibration to Implied Volatility Surfaces
Chuan-Hsiang Han, National Tsing Hua University, Taiwan

11:50-12:05 Understanding Jumps in the High-Frequency VIX
Inna Khagleeva, University of Illinois, Chicago, USA

12:10-12:25 Implied Volatiltiy from Black-Scholes and Other Formulas
Olivia Mah, Kais Hamza, and Fima Klebaner, Monash University, Australia

Wednesday, July 11

CP9

Monte Carlo and PDE Methods in Finance

10:30 AM-12:30 PM

Room:Lake of the Isles - Level 5

Chair: Wanwan Huang, Florida State University, USA

10:30-10:45 Extensions of the Lt Method for Option Pricing
Nico Achtsis, Ronald Cools, and Dirk Nuyens, Katholieke Universiteit Leuven, Belgium

10:50-11:05 Variance Reduction for Monte Carlo Simulation of European Call Options Under the Coupled Additive-Multiplicative Noise Model
Wanwan Huang and Brian Ewald, Florida State University, USA

11:10-11:25 Central Limit Theorem for the Multi-Level Monte Carlo Algorithm and Applications to Option Pricing
Ahmed Kebaier, University of Paris XIII, France; Ben Alaya Mohamed, Université Paris XIII, France

11:30-11:45 A Hybrid Pricing Method for Options with Multi Assets
Yongsik Kim and Hyeong-Ohk Bae, Ajou University, Korea; Tae-Chang Jo, Inha University, Korea

11:50-12:05 Control Variate Methods and Applications in Asian and Basket Options Pricing and Hedging under Jump-Diffusion Models
Yongzeng Lai, Wilfrid Laurier University, Canada; Zhongfei Li and Yan Zeng, Sun Yat-Sen University, China

12:10-12:25 Taylor-Like Anova Expansion for High Dimensional Pdes Arising in Finance
Philipp Schroeder, Thomas Gerstner, and Gabriel Wittum, Goethe University, Germany

Lunch Break

12:30 PM-2:00 PM

Attendees on their own

Wednesday, July 11

PD5

Foward Looking Session

Financial Markets and Financial Mathematics: Current & Future Challenges

12:45 PM-1:45 PM

Room:Nicollet D2/3 - Level 1

The panelists will discuss their views of challenges arising from modern financial markets, and how Mathematics can help. Topics include systemic risk, the growing importance of commodities and energy markets, financial regulation, high-frequency trading.

Panelists:

Rene Carmona
Princeton University

Sebastian Jaimungal
University of Toronto

George Papanicolaou
Stanford University

Steve Shreve
Carnegie Mellon University

Wednesday, July 11

SP3

Past President's Address: Reflections on SIAM, Publishing, and the Opportunities Before Us

2:00 PM - 3:00 PM

Room: Nicollet ABC - Level 1

Chair: Lloyd N. Trefethen, Oxford University, United Kingdom

Upon taking up the post of president I had, of course, formulated my priorities for SIAM. This talk provides a good occasion to revisit some of those. One area turned out to play a vastly larger role than I would have anticipated, namely mathematical publishing and many issues associated with it, ethical, technological, economic, political, and scientific. The future of scholarly publishing is far from clear, but one thing seems certain: big changes are needed and will be coming. We, as mathematicians, are major stakeholders. We should also be major agents in guiding these changes. I will present some of my observations and thoughts as we confront the opportunities before us.

Douglas N. Arnold
University of Minnesota, USA

Wednesday, July 11

SP4

W. T. and Idalia Reid Prize Lecture: Large Algebraic Properties of Riccati Equations

3:00 PM - 3:30 PM

Room: Nicollet ABC - Level 1
Chair: Lloyd N. Trefethen, Oxford University, United Kingdom

In the eighties there was considerable interest in the algebraic properties of the following Riccati equation

$$A^*X+XA-XBB^*X+C^*C=0,$$

where $A,B,C \in \mathfrak{A}$, a Banach algebra with identity, and the involution operation *. Conditions are sought to ensure that the above equation has a solution in A. The results were disappointing and the problem was forgotten until this century when engineers studied the class of spatially distributed systems. One application was to control formations of vehicles where the algebraic property was essential. This case involves matrices A,B,Cwith components in a scalar Banach algebra. Positive results are obtained for both commutative and noncommutative algebras.

Ruth Curtain
University of Groningen, Netherlands

Coffee Break

3:30 PM-4:00 PM

Room:Exhibit Hall - Level 1

Wednesday, July 11

MS27

Stress Tests: From Arts to Science - Part II of II

4:00 PM-6:00 PM

Room:Lake Superior A - Level 5

For Part 1 see MS24

Expectations on stress tests are high in the financial industry: they should measure the resilience of individual financial institutions and of the whole banking system as part of an economy. Additionally, they should act as a calmative for nervous markets. It is time to assess the expectations about what information can realistically be obtained from stress tests. How should we choose scenarios which are at the same time plausible and informative of potential weaknesses? How can we assess the validity of our models and the potential consequences where our models break down? How can we adequately discriminate adverse external shocks and dangerous endogenous effects?

Organizer: Thomas Breuer

FH Vorarlberg, Austria

4:00-4:25 Lessons and Limits of Stress Tests as a Macroprudential Supervisory Tool

Konstantinos Tsatsaronis, Bank for International Settlements, Switzerland

4:30-4:55 A Systematic Approach to Multi-period Stress Testing of Portfolio Credit Risk

Martin Summer, OeNB, Austrian Central Bank, Austria; Thomas Breuer and Martin Jandacka, Fachhochschule Vorarlberg, Austria; Javier Mencia, Banco de Espana, Spain

5:00-5:25 Credit Risk Concentration under Stress

Michael Kalkbrener, Deutsche Bank, Germany

5:30-5:55 Risk Assessment Modelling of Systemic Institutions

Jack McKeown, Bank of England, United Kingdom

Wednesday, July 11

MS28

Commodities, Energy Markets & Equilibrium - Part II of II

4:00 PM-6:00 PM

Room:Lake Calhoun - Level 5

For Part 1 see MS25

Commodities and energy markets bring new challenges to Financial Mathematics. These include equilibrium and game theory problems, non-standard stochastic models, and interplay between supply/demand and speculation. These two minisymposia will highlight recent work in these areas and continue the representation of this growing research subfiled at the SIAM FME meetings.

Organizer: Ronnie Sircar

Princeton University, USA

Organizer: Rene Carmona

Princeton University, USA

4:00-4:25 A Feedback Model for the Financialization of Commodity Prices

Ronnie Sircar, Princeton University, USA

4:30-4:55 Dark Pools and Hidden Markets

Ulrich Horst, Humboldt University Berlin, Germany

5:00-5:25 Adaptations of Least-squares Methods to Convex Control Problems

Juri Hinz, ETH Zürich, Switzerland

5:30-5:55 Derivatives on Non-Storable Renewable Resources: Fish Futures and Options, Not So Fishy after All.

Christian Ewald, University of Glasgow, Scotland, UK

Wednesday, July 11

MS29

Matrix-valued Processes and their Applications to Multivariate Stochastic Volatility Modeling

4:00 PM-6:00 PM

Room:Nicollet D2 - Level 1

Constructing models for the stochastic behavior of multiple assets is markedly different than the corresponding univariate case. A popular approach is specifying a positive matrix-valued process for the modeling of the covariance matrix of the assets. The Wishart process and its extensions are particularly attractive positive semidefinite affine processes, and thus have analytic Fourier-Laplace transforms, which enables fast option pricing. However, many challenges remain within this modeling framework. Estimation and calibration, simulation methods, fast evaluation of Laplace transforms and portfolio optimization, are all topics were interesting problems arise in a multivariate setting. This mini-symposium brings together leading figures within these fields.

Organizer: Christa Cuchiero

University of Vienna, Austria

Organizer: David Skovmand

Aarhus University, Denmark

4:00-4:25 Calibration of Multivariate Affine Stochastic Volatility Models

Christa Cuchiero, University of Vienna, Austria; Elisa Nicolato and *David Skovmand*, Aarhus University, Denmark; Josef Teichmann, ETH Zürich, Switzerland

4:30-4:55 A Flexible Matrix Libor Model with Smiles

Alessandro Gnoatto, Ludwig-Maximilians-Universität München, Germany; Jose Da Fonseca, Auckland University of Technology, New Zealand; Martino Grasselli, University of Padova, Italy

5:00-5:25 The Explicit Laplace Transform for the Wishart Process

Martino Grasselli, University of Padova, Italy

5:30-5:55 Generalized Affine Transform Formulae and Exact Simulation of the WMSV Model

Chulmin Kang and Wanmo Kang, KAIST, Korea

Wednesday, July 11

MS30

Calibration and Inverse Problems in Finance

4:00 PM-6:00 PM

Room:Nicollet D3 - Level 1

In this minisymposium we will present a panorama of practical as well as theoretical issues involved in financial model calibration from the perspective of inverse problems and numerical analysis. The main goal will be to emphasize a diversity of instruments of interest to the financial industry including derivative pricing in different contexts and regimes. To accomplish that goal we will give a broad overview of techniques ranging from fast scales and algorithm trading applications to longer term ones such as commodity derivatives and passing through the calibration of volatility surfaces.

Organizer: Jorge P. Zubelli
IMPA, Brazil

4:00-4:25 Volatility Surface Calibration and Relative-Entropy Minimization
Marco Avellaneda, Courant Institute of Mathematical Sciences, New York University, USA

4:30-4:55 Calibrating Self-exciting Marked Point Processes for Algorithmic Trading
Sebastian Jaimungal and *Jason Ricci*, University of Toronto, Canada

5:00-5:25 Calibrating Volatility Surfaces for Commodity Derivatives
Vinicius Albani, IMPA, Brazil

5:30-5:55 An Overview of Calibration Methods of Local Volatility Surfaces
Jorge P. Zubelli, IMPA, Brazil

Wednesday, July 11

CP10

Liquidity and Trade Execution

4:00 PM-6:00 PM

Room:Cedar Lake - Level 5

Chair: Qihang Lin, Carnegie Mellon University, USA

4:00-4:15 Optimal Trade Execution with Dynamic Risk Measures
Qihang Lin and Javier Pena, Carnegie Mellon University, USA

4:20-4:35 An Optimal Trading Rule under Switchable Mean Reversion Market
Duy Nguyen, University of Georgia, USA

4:40-4:55 Price Impact and Market Indifference Prices with Power Utilities
Nadim Sah, TU Berlin, Germany

5:00-5:15 Evolutionary Game Dynamics Using a Non-Equilibrium Price Formation Rule for Trading with Market Orders
Gareth Q. Witten, University of Cape Town, South Africa

5:20-5:35 Optimal Order Routing in Limit Order Markets
Arseniy Kukanov, Columbia University, USA; Rama Cont, CNRS, France, and Columbia University, USA

5:40-5:55 A Self-exciting Point Process Model for Limit Order Books
Ekaterina Vinkovskaya, Columbia University, USA; Allan Andersen, Copenhagen Business School, Denmark; Rama Cont, CNRS, France, and Columbia University, USA

Wednesday, July 11

CP11

Utility Maximization

4:00 PM-6:00 PM

Room:Lake Minnetonka - Level 5

Chair: Stephan Sturm, Princeton University, USA

4:00-4:15 On the Existence of Shadow Prices.
Giuseppe Benedetti, CREST, France; Luciano Campi, Université Paris 13, France; Johannes Muhle-Karbe, ETH Zürich, Switzerland; Jan Kallsen, University of Kiel, Germany

4:20-4:35 Indifference Pricing with Uncertainty Averse Preferences
Flavia Giammarino and Pauline Barrieu, London School of Economics, United Kingdom

4:40-4:55 Portfolio Optimization Based on Independent Sets of Market Cliques
Athula D. Gunawardena, University of Wisconsin, Whitewater, USA; Robert Meyer, University of Wisconsin, Madison, USA; Thisath Kularatna, OptSolv LLC., USA; Michael Monaghan, Blackthorne Capital Management, LLC., USA; Joseph Haske, University of Wisconsin, Whitewater, USA

5:00-5:15 Portfolio Optimization under Convex Incentive Schemes
Stephan Sturm and Maxim Bichuch, Princeton University, USA

5:20-5:35 Optimal Portfolios for Hedge Funds and Their Managers
Gu Wang and Paolo Guasoni, Boston University, USA

5:40-5:55 An Equilibrium Approach to Utility-Based and Indifference Pricing
Daisuke Yoshikawa, Mizuho-DL Financial Technology Co., LTD., Japan; Mark Davis, Imperial College London, United Kingdom

Wednesday, July 11

CP12

Insurance Applications

4:00 PM-5:40 PM

Room:Lake Nokomis - Level 5

Chair: Jeffrey Humpherys, Brigham Young University, USA

4:00-4:15 Optimal Decumulation: An Investment-Consumption Models for Retirees

Jeffrey Humpherys, Brigham Young University, USA; David Babbel, University of Pennsylvania, USA; Craig Merrill, Brigham Young University, USA

4:20-4:35 Voluntary Retirement and Annuity Contract

Minsuk Kwak, Korea Advanced Institute of Science and Technology, Korea; Yong Hyun Shin, Sookmyung Women's University, Korea

4:40-4:55 Bang-Bang Controls on Some Optimal Insurance Problems

Siu Pang Yung, University of Hong Kong, Hong Kong, PRC

5:00-5:15 Optimal Consumption and Portfolio Choice with Life Insurance under Uncertainty and Borrowing Constraints

Xudong Zeng, Shanghai University, China

5:20-5:35 Optimal Dividend Payments for the Piecewise-Deterministic Compound Poisson Risk Model

Runhuan Feng, University of Wisconsin, Milwaukee, USA; Shuaiqi Zhang, Central South University, China; *Chao Zhu*, University of Wisconsin, Milwaukee, USA

Wednesday, July 11

CP13

Credit Risk

4:00 PM-6:00 PM

Room:Lake of the Isles - Level 5

Chair: Justin Sirignano, Stanford University, USA

4:00-4:15 On the Credit Risk of Secured Loans

Agnes Tourin, Polytechnic Institute of New York University, USA; *Fabian Astic*, Moody's Investors Service, USA

4:20-4:35 Conditional Expected Default Rate Calculations for Credit Risk Applications

Andrew Barnes, GE Global Research, USA

4:40-4:55 Measure Changes for Reduced-Form Affine Credit Risk Models

Claudio Fontana, University of Padova, Italy

5:00-5:15 Killed Brownian Motion with a Prescribed Lifetime Distribution and Models of Default

Alexandru Hening, Steven Evans, and Boris Ettinger, University of California, Berkeley, USA

5:20-5:35 Analysis of Recovery Rate of Non-Performing Consumer Credit

Markus Hoechstoetter and *Abdolreza Nazemi*, Karlsruhe Institute of Technology, Germany; Svetlozar T. Rachev, Stony Brook University, USA; CASLAV Bozic, Karlsruhe Institute of Technology, Germany

5:40-5:55 Maximum Likelihood Estimation for Large Interacting Stochastic Systems

Justin Sirignano, Gustavo Schwenkler, and Kay Giesecke, Stanford University, USA

Intermission

6:00 PM-6:15 PM

Wednesday, July 11

SP5

I.E. Block Community Lecture: Creating Reality: The Mathematics Behind Visual Effects

6:15 PM - 7:15 PM

Room: Nicollet ABC - Level 1

Chair: Lloyd N. Trefethen, Oxford University, United Kingdom

Film-makers have long realized one of the best ways to convince audiences that a computer-generated effect, like a stormy ocean, is real is to numerically solve physical equations describing the motion, bringing mathematics and scientific computing into the forefront of animation. As we progress to solving more physics more accurately and faster, a whole new way of working has emerged, "virtual practical effects", where artists set up shots virtually as they'd want to in the real world and let simulated physics take over. I'll demonstrate how a little mathematical analysis can make a world of difference to making a film.

Robert Bridson

University of British Columbia, Canada

Community Reception

7:15 PM-8:15 PM

Room:Exhibit Hall - Level 1

AN12 Speaker Index

July 9–13

Hyatt Regency Minneapolis
Minneapolis, Minnesota, USA

Italicized names indicate session organizers.

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FM12 Speaker Index

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SIAM Activity Group on Financial Mathematics and Engineering (SIAG/FME)

www.siam.org/activity/fme

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- FM12 prize lecture, invited speakers, and select minisymposia will be available online via "SIAM Presents" in the fall.
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Notes

Notes

Conference Budget

SIAM Annual Meeting and
SIAM Conference on Financial Mathematics and Engineering
July 9-13, 2012
Minneapolis, MN

Expected Paid Attendance: 925

Revenue	
Registration	$247,175
Exhibits	$11,500
Total	$258,675
Direct Expenses	
Printing	$12,200
Organizing Committee	$5,000
Invited Speaker	$35,300
Food and Beverage	$50,100
Telecomm	$10,000
AV and Equipment *(rental)*	$49,500
Room *(rental)*	$0
Advertising	$31,000
Professional Services	$10,000
Conference Staff Labor	$62,000
Other *(supplies, staff travel, freight, exhibits, misc.)*	$16,600
Total Direct Expenses:	$281,700
Support Services: *	
Services covered by Revenue	$0
Services covered by SIAM	$218,354
Total Support Services:	$218,354
Total Expenses:	$500,054

** Support services includes customer service (who handle registration), accounting, computer support, shipping, marketing and other SIAM support staff. It also includes a share of the computer systems and general items (building expenses in the SIAM HQ).*

Hyatt Regency Minneapolis Hotel