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## **SCOR CHAIR « Market Risk and Value Creation »**

### **Activity Report 2011**

*Head of the Chair* : Christian Gollier  
*Co- Head of the Chair* : Stéphane Villeneuve

#### *Scientific Council*

- Louis Eeckhoudt, University of Louvain
- Elyès Jouini, University Paris Dauphine
- Jean-Michel Beacco, Fondation du risque
- Patrick Rey, IDEI
- Jean-Charles Simon, SCOR

*Last Meeting Tour SCOR, Paris la defense March 11th 2011*

## **1 Objectives**

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The aim of the chair is to support the theoretical and applied research on Risk sharing mechanisms with the willingness to combine methodologies from financial economics, industrial organization and econometrics.

## **2 Researchers**

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- **Andrea Attar** IDEI Researcher
- **Christophe Bisière** Professor of Finance TSE
- **Sébastien Van Bellegem** Professor of Mathematics TSE
- **Helmut Cremer** Professor of Economics TSE
- **Jean-Paul Décamps** Professor of Mathematics TSE
- **Philippe De Donder** Research Director CNRS
- **Jean-Pierre Florens** Professor of Mathematics TSE
- **Christian Gollier** Professor of Economics TSE
- **Augustin Landier** Professor of Economics TSE
- **Jean-Marie Lozachmeur** CNRS Researcher
- **Thomas Mariotti** Research Director CNRS
- **Nour Meddahi** Senior Researcher TSE
- **Sébastien Pouget** Professor of Finance
- **Pierre Pestiau** Professor of Economy, Liege
- **Guillaume Plantin** Professor of Finance TSE
- **Francois Salanié** Research Director INRA
- **Emmanuel Thibault** Professor of Economics Perpignan University
- **Jean Tirole** Scientific Director TSE
- **Nicolas Treich** Research Director INRA
- **Stéphane Villeneuve** Professor of Mathematics TSE

## **3 Topics**

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The following topics have been kept moving during the year 2011

- **Methodology of credit risk models**  
This research topic aims to specify the structural models of credit risk in order to understand the role of debt maturity. The researchers involved in this topic are A. Attar, J.P. Décamps, T. Mariotti and S. Villeneuve.
- **Regulation, liquidity and solvency risks**  
This research topic aims to understand the consequences of regulatory solvency requirement when market imperfections are taken into account. The researchers involved in this topic are C. Gollier, F. Salanié, T. Mariotti, J. Tirole, N. Treich and S. Villeneuve.
- **Ambiguity, Bias and Risk attitude**  
This research topic aims to understand the risk attitude towards ambiguous risks occurring when the probability distribution of losses are imperfectly known. Again in the year 2009, this research topic has also been tackled within the framework of experimental economics. The researchers involved in this topic are C. Bisière, J.P. Décamps, C. Gollier, S. Pouget, F.



➤ **Econometrics**

This research topic aims to study original econometrics methods for quantifying the risk. The researchers involved in this topic are S. van Bellegem, J.P. Florens and N. Meddahi

In 2011, the following topic has been added to the chair

➤ **. Longevity risk, long term care and (social) insurance**

Social insurance has long been at the core of public concerns, in France and elsewhere. This has been reinforced lately by the increasing importance of the longevity risk, including in its long term care dimension. We study the various aspects of this topic by using tools from the risk theory, microeconomics analysis, macroeconomic dynamics, optimal taxation, political economy, public economics and/or insurance theory. The researchers pursuing this research agenda are H. Cremer, P. De Donder, J.M. Lozachmeur, P. Pestieau and E. Thibault

#### **4 Summary of the activities of 2011**

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➤ Meetings organized by the chair:

- **First ERC-SCOR Conference on “Risk management after the crisis”**, Toulouse University, April 06-07.
- **Inflation Conference, SCOR-TSE**, Paris, France, June 24, 2011.

➤ Prize and Grant:

- **SCOR - EGRIE Young Economist Best Paper Award** attributed to Carole Bernard and Steven Vanduffel for "*Financial bounds for Insurance Claims.*"
- **SCOR-Geneva Risk and Insurance Review Best 2010 Paper Award** attributed to Sharon Tennyson: "Incentive Effects of Community Rating in Insurance Markets: Evidence form Massachussets Automobile Insurance", *The Geneva Risk and Insurance Review*, Vol. 35, 19-46, April 2010.
- Thomas Mariotti has been appointed associate editor, *Econometrica*

➤ PhD Student and Internship:

- Hailin Sun, [Essay on Bargaining and Assortative Matching under Risk](#), Université Toulouse 1 Capitole, June 14, 2011
- Magdalena Simion, *Numerical methods for pricing exotic options* Internship under the supervision of Katia Voltchkova

➤ Publications and Working papers:

### **Topic Methodology of market risk models**

- Décamps J.P. and Villeneuve S. « *Rethinking dynamic capital Structure models with Roll-over debt* », formerly « *On the modelling of debt maturity and endogenous default: a caveat* » IDEI Working Paper, n°528, Revised 2011 and forthcoming in Mathematical Finance.
- Attar,A, Mariotti, T and Salanié F.: *Non Exclusive Competition under Adverse Selection*, IDEI working paper submitted.
- Decamps, J.P. and Villeneuve S. *A Bayesian singular control problem arising in Corporate finance*, formerly *Capital cash holdings, liquidity and solvency risks*. IDEI working paper.
- He, X.Z. and Treich N. *Necessary and Sufficient conditions for prediction markets accuracy*, IDEI working paper

### **Topic Risk Attitude**

- Armantier, O and Treich, N (2011): *Eliciting beliefs: Proper scoring rules: Incentives, stakes and hedging*, IDEI working paper.
- Alary, D., C. Gollier, and N. Treich, (2011), *The Effect of Ambiguity Aversion on insurance and self-protection*, under revision Economic Journal.
- Bisière Christophe, Décamps Jean-Paul and Lovo Stephano (2011): « *Risk Attitude, Beliefs Updating and the Information Content of Trades : An Experiment* », submitted to Management Science.
- Crémer, H., Gahvari F. and Pestiau P.: *Accidental Bequests: a curse for the rich and a boon for the poor*, forthcoming Scandinavian Journal of Economics
- Gollier, C., (2011), *Discounting and risk adjusting non-marginal investment projects*, European Review of Agricultural Economics, 38 (3), 297-324,
- Gollier, C., (2011), *Does ambiguity aversion reinforce risk aversion? Applications to portfolio choices and asset pricing*, Review of Economic Studies 78 (4), 1329-1344.
- Gollier, C., (2011), *On the underestimation of the precautionary effect in discounting*, Geneva Risk and Insurance Review 36, 95-111.
- Pouget, S. and Villeneuve, S.: *A mind is a difficult thing to change: Confirmation Bias in Financial markets*, formerly *Price formation under Confirmation bias* IDEI working paper submitted.

### **Topic Regulation, Liquidity and Solvency risks**

- Fahri E. and Tirole J.: *Bubbly Liquidity*, IDEI Working paper n°577 forthcoming The Review of Economic Studies.
- Fahri E. and Tirole J.: *Collective Moral Hazard, Maturity Mismatch and Systemic Bailout*, IDEI Working paper n°571 forthcoming The American Economic Review.
- Tirole J.: *Illiquidity and all its friends* (2011), Journal of Economic Literature, Vol 49, 2, 287-325.

- Rochet J.C. and Villeneuve S. (2011) « *Liquidity Management and Corporate Demand for Insurance* », Journal of Financial Intermediation Vol 3,300-323.

### **Topic Econometrics**

- Bouezmarni, T and Van Bellegem (2009): Non parametric Beta Kernel Estimator for Long Memory Time series. Submitted working paper.
- Bonomo M., Garcia R. , Meddahi N. and Tédongap R. (2011)“ *Generalized Disappointment Aversion, Long-Run Risks and Aggregate Asset Prices*” Review of Financial Studies, Vol 24, 82-122.
- Bontemps, C and Meddahi N.: *Testing Distributional Assumptions: a GMM approach*, forthcoming Journal of Applied Econometrics.
- Donovan P., Goncalves S. and Meddahi N. “*Bootstrapping realized volatility measures*”, forthcoming Journal of Econometrics.
- Florens, J.P., Johannes, J. and Van Bellegem S « *Identification and Estimation by Penalization in Nonparametric Instrumental Regression* », Econometric Theory, vol. 27, n°3, juin 2011, p. 472-496

### **Topic Longevity risk, long term care and (social) insurance**

- Georges Casamatta , Helmuth Cremer and Pierre Pestieau : « *Charities and the political support for estate taxation* » forthcoming 2012 (vol 115, pp. 423-426) Economics Letters.
- Hippolyte d’Albis and Emmanuel Thibault : « *Optimal annuitization, uncertain survival probabilities, and maxmin preferences* » forthcoming 2012 (vol 115, pp. 295-299) Economics Letters.
- Hippolyte d’Albis and Emmanuel Thibault: « *Ambiguous life expectancy and the demand for annuities* » submitted Journal of European Economic Association.
- Philippe De Donder and Pierre Pestieau: « *Private, social and self insurance for long-term care: a political economy analysis* » submitted to European Journal of Political Economy.
- Helmuth Cremer, Jean-Marie Lozachmeur and Pierre Pestieau: « *The design of long term care insurance: lump sum or cost sharing?* » Mimeo.

- International Conferences:
  - Gollier : Colloque "Le risque nucléaire et la décision publique" , "Compte tenu de ces incertitudes, comment doit-on quantifier le risque nucléaire (coût de l'accident, taux d'escompte, probabilités) ? Dans quelle mesure de telles évaluations peuvent-elles être utilisées par le décideur public ?" , ENS, Paris, November 16, 2011.
  - Gollier : "Keynote lecture : Discounting, inequalities and economic convergence" , 21st Congress of the Canadian Resource and Environmental Economics Study Group , September 23-25, 2011.
  - Gollier : "Decreasing aversion under ambiguity" , 38th Seminar of the European Group of Risk and Insurance Economists (EGRIE) , Vienna, Austria, September 19-21, 2011.
  - Gollier "Opening address : Evaluation des investissements" , 1er sommet économique du Grand Sud , Palais des Congrès P. Baudis, Toulouse, November 3, 2011.
  - Gollier L'évaluation du risque nucléaire dans la comparaison des filières , Conseil Economique du Développement Durable, Paris, June 27, 2011.
  - Gollier Installation du comité d'experts encadrant le rapport de la Cour des Comptes sur le "coût de la filière nucléaire" , Paris, June 23, 2011.
  - Gollier Erik Kempe Award lecture: Do we do enough for the future? , Université de Uméa, Suède, October 21, 2011.
  - Gollier "Discounting and risk adjusting non-marginal investment projects" , XIIIth Congress of the European Association of Agricultural Economists (EAAE): EAAE 2011 Congress , Suisse, August 30 - September 2, 2011.
  - Gollier "How (much) should Carbon be Priced?" , Conférence "SWFs and Other LTI: From 'Savings Glut' to Sustainable Growth" , October 17, 2011.
  - Gollier Ateliers doctoraux - INP-ENSEEIH, IUF-PRES, Décision en incertitude : comment les exceptions finissent par construire un nouveau paradigme , Toulouse, November 28, 2011.
  - Gollier : Conférence CAS technologie et risque, "Comment débattre des nouvelles technologies ?" , Maison de la chimie, Paris, November 8, 2011.
  - Gollier : First meeting of the lead authors of the 5th report of the WGIII of IPCC , Changwon City, Republic of Korea, July 12-15, 2011.
  - Pouget: A mind is a difficult thing to change: Confirmation Bias in financial markets, NBER Behavioral finance Meeting, Novembre 5 2011.
  - Treich: Necessary and Sufficient for predictions markets accuracy, ESEM 2011.
  - Treich: Necessary and Sufficient for predictions markets accuracy, "Recent Advances on the Role of Beliefs in Decision Theory" Paris-Dauphine November 2011.
  - Villeneuve: Cash holdings, liquidity and solvency risks, EPFL Seminar April 2011
  - Villeneuve: Cash holdings, liquidity and solvency risks, Conference Modelling and managing the risks, Paris 2011
  - Villeneuve: A Bayesian singular control problem arising in corporate finance, IMS World Congress Miami 2011.
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## 5 Planning for 2012

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### ➤ Forthcoming Conferences for 2012

In 2010, two conferences that will benefit from the financial support of the chair are scheduled.

- Statistical Analysis of Dependences and Extremes of Financial Data: Workshop in fall 2012.
- Second Conference on Risk Management and Finance, September 6-7.

### ➤ Organized Workshop IDEI/ SCOR for 2011

An internal workshop has been organized on November 2011 at SCOR with the SCOR Global Investment team. The objective of the workshop was to present the recent advance on the portfolio optimization under constraints. Two academics presentations have been made. One by Augustin Landier on the Black and Litterman model, the other by Stephane Villeneuve on the portfolio optimization under CvaR constraints.

### ➤ Summary of the first ERC-SCOR Conference.

The conference Risk Management After the Crisis held in Toulouse on April 6-7 2011, gathered around 50 theorists and practitioners from Europe and United States. The objective of the Conference was to analyze the economic forces driving phenomena such as liquidity, risk taking and funding. The conference hosted four sessions.

The first session, about liquidity, was opened by Oren Sussman. In his work jointed with A. Guembel, authors analyze the welfare properties of liquidity fragmentation (i.e., a restriction on mobility of liquidity). In their model two countries face different liquidity needs coming from a financial shock. If liquidity is allowed to flow from one country to another, contagion is an equilibrium outcome: a country with low liquidity requirements may suffer a financial crisis as its liquidity is sucked out to service the other country. But the converse may also occur in equilibrium: a country is saved from financial crisis by drawing on slack liquidity in the other country. On the other hand, if liquidity is not allowed to flow from one country to another, the amount of liquidity that each country hoards is higher. They conclude that the market provision of liquidity have two dimensions: i) the total supply of liquidity, which is suboptimal, and ii) the mobility of liquidity to the highest valuation user, whose effect is ambiguous.

In the next presentation, Javier Suarez presented his paper (jointed with A. Segura) on liquidity shocks, roll-over risk and debt maturity. They develop an infinite horizon model of an economy in which banks finance loan term assets by placing non-tradable debt among savers. Banks choose the overall principal, interest rate, and maturity of their debt taking into account two opposite forces: investors' preferences for short maturities, and banks' exposure to systemic liquidity crises. The terms of access to refinancing during crises depend endogenously on banks' aggregate refinancing needs. They show that the competitive equilibrium exhibits inefficiently short debt maturities. In their framework, welfare can be improved by limiting debt maturity or by imposing Pigovian taxes.

The last paper of this section was presented by Randy Wright (jointed with B. Lester and A. Postlwaite). This work analyzes the relationship between information, liquidity, asset prices and monetary policy. In their economy, multiple assets are valued both for their return and their liquidity. Liquidity is modeled by having some trade occur in decentralized markets, with frictions, where certain assets are more likely to be accepted in trade. This is due to an information problem: while all agents recognize some assets, like currency, they are less sure about and hence less inclined to accept others. Recognizability is endogenized by letting agents invest in information, potentially generating



multiple equilibria with different liquidity properties. They show that small changes in information, which determines the liquidity of the asset, may generate large responses in prices, allocations and welfare.

The second session of the conference focused on risk-taking. David Thesmar presented an empirical work assessing the relationship between monetary policy and risk taking by financial institutions. Using loan level data from a large subprime mortgage originator (New Century Financial Corporation), they provide evidence of risk-shifting in the lending behavior. This change follows the monetary policy tightening implemented by the Fed in 2004, which resulted in an adverse shock to the investment portfolio. New Century Financial Corporation reacted to this shock by massively resorting to deferred amortization loan contracts. As a result, it held not only more risky loans, but also more sensitive to real estate prices returns. As predicted by standard model of portfolio selection in financial distress, New Century was financing projects with a high beta on its own survival.

Next, Augustin Landier presented his work (jointed with G. Plantin) about inequality and financial stability. In the presence of increasing returns to tax avoidance, the middle class is willing to take non rewarded financial risk despite risk aversion. Electoral pressure may lead an incumbent politician to endorse this excessive risk taking if the right tail of wealth distribution is sufficiently fat. By increasing the scope for tax avoidance, globalization of capital and human capital markets might have increased financial fragility.

Finally, Florian Hider presented his work (jointed with B. Biais and M. Hoerova) on the relationship between risk sharing gains and risk taking incentives. They model hedging as the design of a contract between a protection buyer, seeking to reduce his risk exposure, and a protection seller. They show that if the seller learns that the hedge is likely to be loss-making for her even though actual losses have not materialized yet, her incentives to control the risk of her other positions diminish. Consequently, the seller's risk-taking incentives limit hedging and generate endogenous counterpart risk.

The third session focuses on policy. Anton Korinek opened the session presenting his work (jointed with O. Jeanne) on credit booms and bust. They develop a dynamic model in which the interaction between debt accumulation and asset prices magnifies credit booms and busts. It is shown that the interaction between borrower's constraints and asset prices is not internalized by borrowers, which leads to excessively large booms and busts in both credit flows and asset prices. They show that a Pigouvian tax on borrowing increases welfare by making borrowers internalize these externalities.

Next, Josef Schroth talked about his work on crisis resolution. This paper studies pecuniary externalities that arise from the interaction of competitive credit markets and endogenous bank capital requirements. In an infinite horizon production economy, financial intermediaries allow final investors to invest in profitable projects. To protect final investors, financial intermediaries are subject to endogenous capital requirements when providing credit to final borrowers competitively. A financial crisis arises if the intermediary cannot meet demand for credit due to insufficient intermediary capital. The distinctive feature of this economy is that intermediaries affect capital requirements via their activities on the credit market. He finds that market externality limits the flow of funds to profitable projects during financial crises. Thereby, a constrained efficient regulation features credit rationing in steady state.

Finally, Hans Gersbach presented his work (jointed with J-C. Rochet) on macroprudential regulation. They present a model where the combination of bank moral hazard, banks high exposure to aggregate shocks and flexibility of investment decisions makes bank credit is excessively volatile. As a result, the competitive equilibrium is not constrained efficient banks' level of short term debt is too high, and capital reallocations across sectors react too much to aggregate shocks. Macroprudential regulation arises as

a policy response to this dysfunctionality.

The last session was about corporate finance and intermediation. Here, Andrea Attar presented his work (jointed with C. Casamatta, A Chassagnon and J-P Décamps) on credit market competition and contract design. In a framework where contracts are not exclusive (i.e., one borrower can contract with several lenders) and borrowers are subject to moral hazard, They show that the equilibrium outcome leads to a lower provision of investment and distorts the distribution of surplus relative to the exclusive scenario. They also show that the use of covenants contingent on the project's cash flow in the financial contract makes that every feasible allocation can be supported at equilibrium. This calls for the explicit consideration of some institutional mechanism to restore efficient outcomes.

Next, Christian Hellwig presented his work (jointed with E. Albagli and A. Tsyvinski) on the effects of aggregating information and investment decisions. They propose a noisy rational expectations equilibrium model of a financial market with a general specification of an asset's payoffs. They show that the firm's share price differs systematically from the firm's expected dividends. They find that there exists an informational feedback from prices to firm decisions, which results on an overvaluation of securities. It is due to excessive sensitivity of prices to market-generated information, and excessive sensitivity of investment when incentives are tied to share-price performance.

The last paper was presented by Jean-Paul Décamps. In a jointed work with S. Villeneuve, Décamps analyzes the interactions between the risk of liquidity and the risk of profitability on the investment project. They develop a dynamic model for a cash constrained firm with uncertainty about the profitability of its project.

## **6-Tribunes dans la presse 2011**

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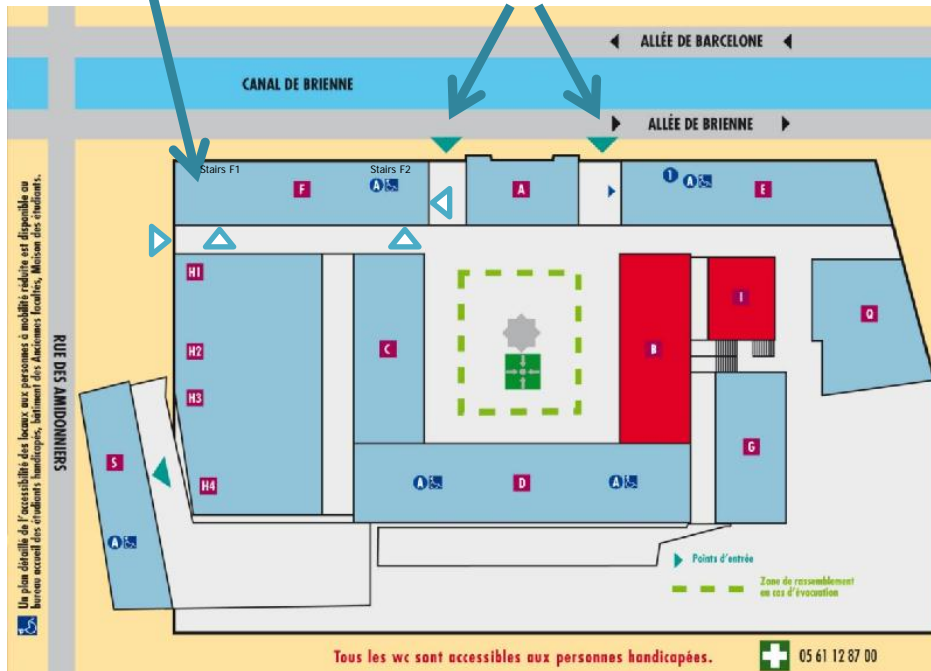
- Bruno Biais, « On ne rase plus gratis », La Croix, 19 décembre 2011.
- Augustin Landier et David Thesmar, « Recapitalisation des banques, mode d'emploi », Les Echos, 12 octobre 2011.
- Augustin Landier et David Thesmar, « Une seule solution, la recapitalisation des banques », Le Monde, 27 septembre 2011
- Guillaume Plantin, « Il faut renforcer les autorités de régulation, notamment aux Etats-Unis », Le Monde, 24 mai 2011.
- "[L'assurance-vie, un produit d'épargne à repenser](#)", [Les Echos](#), December 29, 2011.
- "[Risques et décision publique](#)", [Les Echos](#), August 9, 2011.(with Vincent Chriqui)
- "[Le risque et la décision politique](#)", [La Tribune](#), July 28, 2011.(with Vincent Chriqui)



**Building F**  
Third floor :  
Stairs F1 - Room MF323

**Manufacture des Tabacs**  
21, allée de Brienne – Toulouse

**ENTRY**



# Stochastic control and optimal stopping in finance

Thursday 8 December and Friday 9 December 2011

**TOULOUSE**

Organised by Stéphane VILLENEUVE and Adrien BLANCHET

**Manufacture des Tabacs – Building F – Room MF323**  
21, allée de Brienne – 31000 TOULOUSE

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**GREMAQ**  
Groupe de Recherche en Economie  
Mathématique et Quantitative

## Thursday 8 December

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09:00-09:30 : Welcome address

09:30-10:30 : **Goran PESKIR**  
Optimal detection of a hidden target

10:30-11:00 : Coffee Break (room MF322)

11:00-12:00 : **Michael LUDKOVSKI**  
Price discrepancies and optimal timing to buy options

12:00-14:00 : Lunch for speakers and registered people (room MF322)

14:00-15:00 : **Erik EKSTRÖM**  
Optimal timing for an asset sale under incomplete information

15:00-15:30 : Coffee Break (room MF322)

15:30-16:30 : **Bruno BOUCHARD**  
Robust non linear pricing and stochastic target problems in game form

16:30-17:30 : **Ronnie SIRCAR**  
TBA

Dinner (by invitation only)

## Friday 9 December

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09:00-10:00 : **Damien LAMBERTON**  
Some properties of American put options in exponential Lévy models

10:00-10:30 : Coffee Break (room MF322)

10:30-11:30 : **Savas DAYANIK**  
Optimal stopping problems for asset management

11:30-12:30 : **Peter TANKOV**  
Asymptotically optimal discretization of hedging strategies with jumps

12:30-14:00 : Lunch for speakers and registered people (room MF322)

14:00-15:00 : **David HOBSON**  
Inverse Optimal Stopping

15:00-15:30 : Coffee Break (room MF322)

15:30-16:30 : **Mihail ZERVOS**  
Optimal stopping of one-dimensional diffusions with generalized drift