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Current Employment

May 2013- **Assistant Professor, Department of Mathematics, National University of Singapore (NUS)**

Affiliated Researcher, Centre for Quantitative Finance, Faculty of Science, NUS

Aug 2017- **Affiliated Researcher, Institute of Operations Research and Analytics (IORA), NUS**

Awards & Research Grants

1) Teaching Excellence Award, Faculty of Science, NUS, awarded in 2017

2) Project title: "Nonstandard BSDEs in Mathematical Finance: Theory, Application, Numerical Method", PI, Academic Research Fund (AcRF) **Tier 2 grant, Singapore Ministry Of Education**, awarded in 2018

3) Project title: "Principal Agent models for Electricity", PI, **Merlion Programme grant**, Institut Français de Singapour (IFS)/ French Embassy and NUS, awarded in 2016

4) Project title: "Mathematical treatments of some problems in quantitative finance", PI, Academic Research Fund (AcRF) **Tier 1 grant, Singapore Ministry Of Education**, awarded in 2015

Education

2009-2012 **Ph.D. , Applied Mathematics Centre, Ecole Polytechnique, Palaiseau, France**

Main subject: *Model Uncertainty in Finance and Second Order Backward Stochastic Differential Equations.* **Ph.D. thesis defended on October 1st, 2012 with highest honors**

2008-2009 Double diploma:

ENSAE (Paris Graduate School of Economics, Statistics and Finance)

University of Paris 9 Dauphine MSc. Mathematics for Insurance, Economics and Finance

2005-2009 **Ecole Polytechnique, Palaiseau, France**
Diplôme de Grande Ecole and Master's Degree in Engineering, Ecole Polytechnique
Specialized in Applied Mathematics and Economics

Experience

Jan-Apr 2013 **Temporary teaching and research position at the University of Maine, Le Mans, France**

Jun-Sep 2010 **Equity Derivative Quant Analyst Intern, Crédit Agricole CIB (CALYON), Paris, France**
Subject: Monte Carlo Method for Multi-underlying Options Pricing with Uncertain Volatility Model

Research interests

- **Second order backward stochastic differential equations (2BSDEs)**: Quadratic 2BSDEs and applications
- **Stochastic control in finance and insurance**: robust utility optimization under model uncertainty
- **Valuation adjustments (**XVAs): CVA, FVA, KVA, applications of BSDEs for XVAs
- **Principal-Agent problems**: moral hazard and adverse selection
- **Data analytics and information acquisition**: partial information, cost of information and data analytics
- **Deep learning methods**: deep learning methods for PDEs and BSDEs in Quantitative Finance

Publications and Preprints

1) Second Order BSDEs with Quadratic Growth, with Possamaï, D., **Stochastic Processes and their Applications**, 2013, 123(10):3770-3799.

2) Second Order Reflected Backward Stochastic Differential Equations, with Matoussi, A., Possamaï, D., **The Annals of Applied Probability**, 2015, 23(6):2420-2457.

3) Robust Utility Maximization in Non-dominated Models with 2BSDEs, with Matoussi, A., Possamaï, D., **Mathematical Finance**, 2015, 25(2):258-287.

4) The obstacle problem for semilinear parabolic partial integro-differential equations, with Matoussi, A., Sabbagh,

W., **Stochastics and Dynamics**, 2015, 15(01)-1550007.

5) Second Order Backward Stochastic Differential Equations with Jumps: Formulation and Uniqueness, with Kazi-Tani, N., Possamaï, D., **The Annals of Applied Probability**, 2015, 25(5)2867-2908.

6) Quadratic BSDEs with jumps: a fixed point approach, with Kazi-Tani, N., Possamaï, D., **Electronic Journal of Probability**, 2015, 20(66):1-28.

7) Second Order BSDEs with Jumps: Existence and Probabilistic Representation for fully-nonlinear PIDEs, with Kazi-Tani, N., Possamaï, D., **Electronic Journal of Probability**, 2015, 20(65):1-31.

8) Quadratic BSDEs with Jumps: Related Non-linear Expectations, with Kazi-Tani, N., Possamaï, D., **Stochastics and Dynamics**, 2016, 16(4)-1650012.

9) The sustainable Black-Scholes equations, with Armenti, Y., Crépey, S., 2016, In: Londoño J., Garrido J., Jeanblanc M. (eds) **Actuarial Sciences and Quantitative Finance**. ICASQF 2016. Springer.

10) A unified approach to *a priori* estimates for supersolutions of BSDEs in general filtrations, with Bouchard, B., Possamaï, D., Tan, X., **Annales de l'Institut Henri Poincare (B)**, 2018, 54(1):154-172.

11) Stochastic control for a class of nonlinear kernels and applications, with Possamaï, D., Tan, X., **The Annals of Probability**, 2018, 46(1):551-603.

12) Recovering Linear Equations of XVA in Bilateral Contracts, joint work with J. Lee, arXiv:1703.00259, 2017.

13) Bank monitoring incentives under moral hazard and adverse selection, with Hernandez, N., Possamaï, D., 2017, arXiv:1701.05864.

14) BSDEs with weak reflections and partial hedging of American options, with Dumitrescu, R., Elie, R., Sabbagh, W., 2017, arXiv:1708.05957.

15) Second order BSDE under monotonicity condition and liquidation problem under uncertainty, with Popier, A., 2017, **The Annals of Applied Probability**, to appear, arXiv:1712.10253.

16) On dynamic programming principle for stochastic control under expectation constraints, with Yu, X., Zhou, Y., 2018, arXiv:1802.03954.

17) Constrained portfolio-consumption strategies with uncertain parameters and borrowing costs, with Yang, Z., Liang, G., 2018, arXiv:1711.02939.

18) Investment Decisions and Falling Cost of Data Analytics, Keppo, J., Tan, H.M., 2018, SSRN: 3141043.

19) Second order stochastic target problems with generalized market impact, joint work with B. Bouchard, G. Loeper and H. M. Soner 2018, arXiv: 1806.08533.

Teaching

1) *Financial Time Series: Theory and Computation* (QF5210), M.Sc. course in Quantitative Finance (about 60 students) at National University of Singapore, 2013-2014, 2014-2015, 2015-2016

2) *Interest Rate Theory and Credit Risk* (QF5201), M.Sc. course in Quantitative Finance (about 60 students) at National University of Singapore, 2015-2016, 2016-2017

3) *Stochastic Analysis in Mathematical Finance* (MA5248), M.Sc. course in Mathematics and in Quantitative Finance (about 70 students) at National University of Singapore, Singapore, 2014-2015, 2015-2016, 2016-2017, 2017-2018

4) *Financial Econometrics* (FE5209), M.Sc. course in Financial Engineering (about 90 students) at National University of Singapore, Singapore, 2015-2016

5) *Mathematical Finance II* (MA4269), Undergraduates and M.Sc. course in Mathematics and in Quantitative Finance (about 170 students) at National University of Singapore, Singapore, 2016-2017, 2017-2018

Computer Skills

Languages: C++, C#, Python, Java, Matlab, Excel VBA

Languages

Chinese: Native speaker **French**: Excellent level **English**: Good working level