Xiaolu Tan

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(updated May 24, 2018)

Work Experience

2013 - present, University of Paris-Dauphine, PSL University, Assistant Professor.

2012 - 2013, University of Paris-Dauphine, PSL University, Temporary Teaching/Research Fellow.

2010 - 2012, Ecole Polytechnique, Teaching Assistant

2009 - 2011, AXA, Group Risk Management, Industrial Consulting (one day per week).

Education

Decembre 2017, University of Paris-Dauphine, PSL University, **Habilitation**.

2009 - 2011, Ecole Polytechnique, CMAP, **PhD**, supervised by Nizar Touzi and Frédéric Bonnnans.

2008 - 2009, UPMC - X, Master "Probability and Finance", **Master**.

2005 - 2009, Ecole Polytechnique, **French Engineering Degree**.

2001 - 2005, Peking University, School of Mathematical Science, **Bachelor**.

Teaching

Main Courses at University of Paris-Dauphine:

- 2017 - present: **Pricing of financial assets and arbitrage** (Masef, M2)
- 2016 - present: **Static and dynamic optimisation** (MIDO, M1)
- 2014 - 2017: **Jump process** (Masef, M2)
- 2013 - present: **Stochastic process and PDE** (ISF, M2)
- 2012 - 2017: **Monte Carlo** (MIDO, M1)

Exercise courses

- At Ecole Polytechnique: Stochastic optimal control, C++, Scilab, etc.
- At University of Paris-Dauphine: Analyse, Monte Carlo, Risk management, Discrete Process, Poisson Processus and Actuarial Science, Time Series, Brownian motion and evaluation of financial assets, etc.

Research

Research Interest

- Stochastic optimal control, martingale optimal transport;
- Numerical methods for nonlinear PDEs and optimisation problems;
- Data science;
- Financial mathematics, insurance, etc.

List of publications:

1. X. Tan and N. Touzi, Optimal Transportation under Controlled Stochastic Dynamics, *Annals of Probability*, Vol. 41, No. 5, 3201-3240, 2013.
2. J.F. Bonnans and X. Tan, A model-free no-arbitrage price bound for variance options, *Applied Mathematics & Optimization*, Vol. 68, Issue 1, 43-73, 2013.
3. X. Tan, A splitting method for fully nonlinear degenerate parabolic PDEs, *Electron. J. Probab*, 18(15):1-24, 2013.
4. X. Tan, Discrete-time probabilistic approximation of path-dependent stochastic control problems, *Annals of Applied Probability*, 24(5):1803-1834, 2014.
5. P. Henry-Labordère, X. Tan and N. Touzi, A numerical algorithm for a class of BSDEs via branching process, *Stochastic Processes and their Applications*, 124(2):1112-1140, 2014.
6. D. Possamaï and X. Tan, Weak approximation of second order BSDEs, *Annals of Applied Probability*, 25(5):2535-2562, 2015.
7. J. Claisse, D. Talay and X. Tan, A pseudo-Markov property for controlled diffusion processes, *SIAM Journal on Control and Optimization*, 54(2):1017-1029, 2016.
8. P. Henry-Labordère, X. Tan and N. Touzi, An Explicit Martingale Version of the One-dimensional Brenier's Theorem with Full Marginals Constraint, *Stochastic Processes and their Applications*, 126(9):2800-2834, 2016.
9. G. Guo, X. Tan and N. Touzi, Optimal Skorokhod embedding under finitely-many marginal constraints, *SIAM Journal on Control and Optimization*, 54(4):2174-2201, 2016.
10. G. Guo, X. Tan and N. Touzi, On the monotonicity principle of optimal Skorokhod embedding problem., *SIAM Journal on Control and Optimization*, 54(5):2478-2489, 2016.
11. B. Bouchard, D. Possamaï and X. Tan, A general Doob-Meyer-Mertens decomposition for g-supermartingale systems, *Electronic Journal of Probability*, 21(36):1-21, 2016.
12. G. Guo, X. Tan and N. Touzi, Tightness and duality of martingale transport on the Skorokhod space, *Stochastic Processes and their Applications*, 127(3):927-956, 2017.
13. S. Källblad, X. Tan and N. Touzi, Optimal Skorokhod embedding given full marginals and Azema-Yor peacocks, *Annals of Applied Probability*, 27(2):686-719, 2017.
14. Z. Ren and X. Tan, On the convergence of monotone schemes for path-dependent PDE, *Stochastic Processes and their Applications*, 127(6):1738-1762, 2017.
15. P. Henry-Labordère, X. Tan and N. Touzi, Unbiased simulation of stochastic differential equations, *Annals of Applied Probability*, 27(6):1-37, 2017.
16. B. Bouchard, X. Tan, Y. Zou and X. Warin, Numerical approximation of BSDEs using local polynomial drivers and branching processes, *Monte Carlo Methods and Applications*, 23(4):241-263, 2017.
17. D. Possamaï, X. Tan and C. Zhou, Stochastic control for a class of nonlinear kernels and applications, *Annals of Probability*, 46(1):551-603, 2018.
18. B. Bouchard, D. Possamaï, X. Tan and C. Zhou, A unified approach to a priori estimates for supersolutions of BSDEs in general filtrations, *Annales de l'Institut Henri Poincaré (B) Probabilités et Statistiques*, 54(1):154-172, 2018.
19. P. Henry-Labordère, N. Oudjane, X. Tan, N. Touzi and X. Warin, Branching diffusion representation of semilinear PDEs and Monte Carlo approximation, *Annales de l'Institut Henri Poincaré (B) Probabilités et Statistiques*, to appear.
20. B. Bouchard, S. Deng and X. Tan, Super-replication with proportional transaction cost under model uncertainty, *Mathematical Finance*, to appear.

(Preprint)

21. A. Aksamit, S. Deng, J. Obłój and X. Tan, Robust pricing-hedging duality for American options in discrete time financial markets. *Mathematical Finance*, minor revision.
22. N. El Karoui and X. Tan, Capacities, measurable selection and dynamic programming Part I: abstract framework.

23. N. El Karoui and X. Tan Capacities, Measurable Selection and Dynamic Programming Part II: Application in Stochastic Control Problems.
24. B. Bouchard, X. Tan and X. Warin, Numerical approximation of general Lipschitz BSDEs with branching processes.
25. S. Deng, X. Tan and X. Yu, Utility maximization with proportional transaction costs under model uncertainty.

PhD supervising

– Gaoyue Guo (2013 - 2016), co-supervised with Nizar Touzi,
– Shuoqing Deng (2015 -), co-supervised with Bruno Bouchard,
– Fabrice Djete (2017 -), co-supervised with Dylan Possamaï.

PhD defense committee member

– Gaoyue Guo, on October 27, 2016, at Ecole Polytechnique,
– Yiyi Zou, on Octobre 09, 2017, at University of Paris-Dauphine.
– Julien Baptiste, on June 21, 2018, at University of Paris-Dauphine.

Supervised Master Memory:

– Adel Cherchali (2015), Shuoqing Deng (2015), Hao Ngoc DANG (2017), Fabrice Djete (2017), Gabin Maillet (2018).

Long time visit:

– 2014/08, NUS, Singapore, one month.
– 2015/04, ENIT, Tunis, one week.
– 2016/04, Oxford University, UK, 3 weeks.
– 2018/04, CMU, Pittsburg, USA, one week.

Project/grant

– Member of the projet Merlion “Principal Agent models for Electricity”, 30 000 euros sponsored by French Embassy in Singapour, 2017-2019.
– Co-PI (with Zhenjie Ren) of a CNRS PEPS project for young researchers, 4 000 euros, 2018.

Organization of workshop/seminar

– Since September 2015, co-organisation of Bachelier Seminar (joint seminar of the mathematical finance community in Paris).
– 2013-2014, co-organisation du Thematic Cycle on “Robust management in finance”, financially supported by Institute Louis Bachelier.
– September 2016, 3rd London-Paris Bachelier Workshop, in Paris.
– July 2017, Special Session on ”non-Markovian control” at Workshop on BSDEs and SPDEs, in Edinburgh.
– September 2017, 4th London-Paris Bachelier Workshop, in London.
– April 2018, 4th Young Researchers Meeting on BSDEs, Nonlinear Expectations and Mathematical Finance, in Shanghai.

Talks at seminar, workshop, conference, etc.

- Octobre 2018, **Conference**, ”Stochastic Analysis and Applications” at Hammamet, Tunis.
- September 2018, **Plenary Invited Talk**, **Conference** on Robust Techniques in Quantitative Finance, Oxford, UK.
- September 2018, **Conference** Innovative Research in Mathematical Finance, Luminy, France.
- July 2018, Viennese **Conference** on Optimal Control and Dynamic Games, Vienna.

- May 2018, **Plenary Invited Talk**, Byrne **Workshop** on Stochastic Analysis in Finance and Insurance, University of Michigan, Ann Arbor, USA.
- April 2018, Mathematical Finance **Seminar** at Columbia University, New York.
- April 2018, Probability and Computational Finance **Seminars**, CMU, Pittsburgh, USA.
- February 2018, Séminaire Probabilité et Statistique, Université Lorraine, Nancy, France.
- January 2018, 12th Bachelier **Colloquim**, Metabief, France.
- December, 2017, **Séminaire** Calcul stochastique de l'IRMA, Strasbourg.
- November, 2017, **Conference** "Advances in Stochastic Analysis for Risk Modeling", CIRM, Luminy.
- October, 2017, **Conference** "Stochastic Analysis and Applications" at Hammamet, Tunis.
- October, 2017, Mathematical Finance **Seminar** at Columbia University, New York.
- September, 2017, "Martingale Optimal Transport (and Friends)" **Workshop** at Oxford.
- July, 2017, **Workshop** on BSDEs, SPDEs and their applications at Edinburgh, UK.
- June, 2017, **Seminar** at Hong Kong Baptist University, Hong Kong.
- June, 2017, The Third International **Conference** on Engineering and Computational Mathematics, at Hong Kong Polytechnic University, Hong Kong.
- May, 2017, Second Paris-Asia **conference** in quantitative finance, at Suzhou, China.
- April, 2017, **Séminaire** du Laboratoire SAF at University Lyon 1.
- March, 2017, "Pricing-Hedging Duality" **Workshop** at ETH
- February 2017, Stochastic Analysis and Stochastic finance **seminar**, Berlin.
- January 2017, **Conference** "Advances in financial mathematics", Paris.
- November, 2016, Berlin-Paris Young Researchers **Workshop** in "Stochastic Analysis with applications in Biology and Finance", TU Berlin.
- October, 2016, **Groupe de Travail** LPMA, Paris.
- July 2016, International **Conference** on Monte Carlo techniques, Paris.
- April 2016, Nomura **Seminar**, University of Oxford.
- March 2016, **Séminaire** de probabilités et mathématiques financières, Université Evry Val d'Essonne.
- March 2016, **Workshop** "Skorokhod embeddings, Martingale Optimal Transport and their applications", University of Oxford.
- February 2016, **Séminaire** Bachelier, IHP, Paris.
- February 2016, Joint Risk & Stochastics and Financial Mathematics **Seminar**, LSE, Londres.
- January 2016, 10th Bachelier **Colloquim**, Metabief, France.
- November 2015, International **Workshop** on Analysis and Control of SPDEs, Fudans University, Shanghai, China.
- November 2015, Stochastic Analysis **Seminar**, University of Oxford.
- Octobre 2015, International **Conference** on Stochastic Analysis and Application, Hammamet, Tunisie.
- July 2015, 10th IMACS **Seminar** on Monte Carlo Methods, Linz.
- June 2015, **Summer School** on "Risk Measure and Optimization in Finance and Insurance", BICMR, Beijing.
- June 2015, AMS-EMS-SPM **Meeting**, Porto.
- April 2015, **Workshop** "Numerical Probability and Applications to Finance", ENIT, Tunis.
- April 2015, Séminaire Bachelier, IHP.
- March 2015, **Workshop** "Optimal transport and stochastics", Bonn.
- January 2015, **Séminaire** du LMM, l'Universit du Maine.
- January 2015, 9th Bachelier **Colloquim**, Metabief.
- Septembre 2014, London-Paris Bachelier **Workshop**, Paris.

- September 2014, **Workshop** on Advances in Stochastic Analysis for Risk Modeling CIRM, Luminy.
- August 2014, **Séminaire** à Hong Kong Baptist University.
- July, 2014, 2nd Young researchers **meeting** on BSDEs, Numerics and Finance, Bordeaux, France.
- July, 2014, 7th international **symposium** on BSDEs, Weihai, Chine, 22-27.
- June, 2014, **Séminaire** INRIA-Tosca, Sophia-Antipolis, France.
- May, 2014, **Séminaire** "Analysis and Probability", Max-Planck-Institut, Leipzig, Allemany.
- May, 2014, **Workshop**: "Stochastic Analysis in Finance and Insurance", Oberwolfach, Germany.
- March 2014, Fourth **spring school** of the Euro-Mediteranean Research Center for Mathematics and its Applications, Tunis.
- March, 2014, 11th Young European Probabilists **Workshop**: "Mass transport in analysis and probability", Eindhoven.
- Novembre, 2013, **Workshop** on Robust Hedging and Uncertainty, Paris, France.
- Octobre, 2013, **Conférence** "Les nouveaux outils du développement durable", Paris.
- July 2013, **Conference** "New Developments in Stochastic Analysis : Probability and PDE Interactions", Beijing, China.
- July 2013, IMS-China International **Conference** on Statistics and Probability, Chengdu, China.
- May 2013, **Congress** of SMAI, Seignosse, France.
- April, 2013, **Séminaire** LPMA, University of Paris VI-VII, Paris, France.
- March, 2013, Probability **seminar**, University of Rennes, Rennes, France.
- January 2013, 7th Bachelier **Colloquium**, Metabief, France.
- December, 2012, **Séminaire** Probability and Statistics, Unversity of Maine, le Mans, France.
- November, 2012, **Séminaire** Mathfi, University of Evry.
- Septembre 2012, **Workshop** "Sequential Monte Carlo Methods and Efficient Simulation in Finance", Palaiseau, France.
- August 2012, 21st International **Symposium** on Mathematical Programming, Berlin, Germany.
- July 2012, **Workshop** "BSDEs, Numerics and Finances", Oxford, United Kingdom.
- June 2012, Mathfi **seminar**, University of Marne-la-Vallee, France.
- February 2012, LPMA **seminar**, University of Paris VI-VII, Paris, France.

Other activities

- Since 2017, member of laboratory council of the CEREMADE of University of Paris-Dauphine
- 2014-2016, member CCR (Commissions Consultatives. Représentatives) of Ceremade,
  - Organisation of the recruiting process for assistant professor positions at Cereamde.
  - Recruitment of the ATER (temporary teaching/research position) at Ceremade.
- 2015, Member of the recruitment committee for an assistant professor position at Ceremade
- 2014-2018, Premium for Research Working (PEDR in French: Prime d'encadrement doctoral et de recherche).
- Referees for different journals in probability (AOP, AAP, PTRF, etc.), in financial mathematics (Math. Finance, Finance Stoch., etc.), in control (SICON, ESAIM:COCV, etc.), and in numerical methods (SISC, etc.), etc.
- Industrial ollaboration :
  - Aymeric Kalife, Xiaolu Tan and Lihang Wang, Dynamic hedging by a large player: From theory to practical implementation. *Neural, Parallel and Scientific Computations*, 20:191-214, 2012.
  - Lihang Wang, Aymeric Kalife, Xiaolu Tan, Bruno Bouchard and Saad Mouti, Understanding guaranteed minimum withdrawal benefit: a study on financial risks and rational lapse strategy. *Insurance Markets and Companies (open-access)*, 6(1), 2015.
  - Aymeric Kalife, Saad Mouti and Xiaolu Tan, Minimizing market impact of hedging insurance liabilities within risk appetite constraints. *Insurance Markets and Companies (open-access)*, 6(2), 2015.