## Yufei Zhang

CONTACT INFORMATION	Office: 803, Weeks Building, South Kensington Campus Mail: Department of Mathematics, 180 Queen's Gate, South Kensington Campus, Imperial College London, London, SW7 2AZ E-mail: yufei.zhang@imperial.ac.uk Website: https://yufei-zhang.github.io			
Research Interests	My research interests lie at the intersection of machine learning, stochastic control and games, and mathematical finance.			
ACADEMIC Appointments	Imperial College London, United Kingdom			
	Senior Lecturer at Department of Mathematics	Sep. 2023-present		
	London School of Economics, United Kingdom			
	Assistant Professor at Department of Statistics	Sep. 2021-Aug. 2023		
EDUCATION	University of Oxford, United Kingdom			
	<ul><li>D.Phil., Mathematics</li><li>Adviser: Professor Christoph Reisinger</li></ul>	Oct. 2017-June 2021		
	The Chinese University of Hong Kong, Hong Kong			
	M.Phil., Mathematics	Aug. 2015-July 2017		
	M.Sc., Mathematics	Aug. 2013-June 2015		
	<ul><li>B.B.A., Insurance, Financial and Actuarial Analysis</li><li>Minor in Mathematics</li></ul>	Aug. 2008-June 2013		
REFEREED JOURNAL PUBLICATIONS	[1] Lukasz Szpruch, Tanut Treetanthiploet, and Yufei Zhang, <i>Exploration-exploitation trade-off for continuous-time episodic reinforcement learning with linear-convex models</i> , The Annals of Applied Probability, forthcoming, arXiv:2112.10264, 2024.			
	[2] Michael Giegrich, Christoph Reisinger, and Yufei Zhang, Convergence of policy gradient methods for finite-horizon exploratory linear-quadratic control problems, SIAM Jour- nal on Control and Optimization, 62 (2024), pp. 1060-1092 [Preprint version.]			
	[3] Lukasz Szpruch, Tanut Treetanthiploet, and Yufei Zhang, <i>Optimal scheduling of entropy regulariser for continuous-time linear-quadratic reinforcement learning</i> , SIAM Journal on Control and Optimization, 62 (2024), pp. 135-166 [Preprint version.]			
	[4] Christoph Reisinger, Wolfgang Stockinger, and Yufei Zhang, <i>Linear convergence of a policy gradient method for some finite horizon continuous time control problems</i> , SIAM Journal on Control and Optimization, 61 (2023), pp. 3526-3558 [Preprint version.]			
	[5] Christoph Reisinger, Wolfgang Stockinger, and Yufei Zhang, A posteriori error estimates for fully coupled McKean-Vlasov forward-backward SDEs, IMA Journal of Numerical Analysis, online first, 2023 [Preprint version.]			
	[6] Xin Guo, Anran Hu and Yufei Zhang, Reinforcement learning for linear-convex models with jumps via stability analysis of feedback controls, SIAM Journal on Control and Optimization, 61 (2023), pp. 755-787. [Preprint version.]			

- [7] Matteo Basei, Xin Guo, Anran Hu and Yufei Zhang, Logarithmic regret for episodic continuous-time linear-quadratic reinforcement learning over a finite-time horizon, Journal of Machine Learning Research, 23 (2022), pp. 1–34. [Preprint version.]
- [8] Christoph Reisinger and Yufei Zhang, *Regularity and stability of feedback relaxed controls*, SIAM Journal on Control and Optimization, 59 (2021), pp. 3118–3151. [Preprint version.]
- [9] Kazufumi Ito, Christoph Reisinger, and Yufei Zhang, A neural network based policy iteration algorithm with global H<sup>2</sup>-superlinear convergence for stochastic games on domains, Foundations of Computational Mathematics, 21 (2021), pp. 331–374. [Preprint version.]
- [10] Christoph Reisinger and Yufei Zhang, A penalty scheme and policy iteration for nonlocal HJB variational inequalities with monotone drivers, Computers and Mathematics with Applications, 93 (2021), pp. 199-213. [Preprint version.]
- [11] Roxana Dumitrescu, Christoph Reisinger, and Yufei Zhang, Approximation schemes for mixed optimal stopping and control problems with nonlinear expectations and jumps, Applied Mathematics & Optimization, 83 (2021), pp. 1387-1429.
- [12] Christoph Reisinger and Yufei Zhang, Rectified deep neural networks overcome the curse of dimensionality for nonsmooth value functions in zero-sum games of nonlinear stiff systems, Analysis and Applications, 18 (2020), pp. 951-999. [Preprint version.]
- [13] Christoph Reisinger and Yufei Zhang, Error estimates of penalty schemes for quasi-variational inequalities arising from impulse control problems, SIAM Journal on Control and Optimization, 58 (2020), pp. 243–276. [Preprint version.]
- [14] Christoph Reisinger and Yufei Zhang, A penalty scheme for monotone systems with interconnected obstacles: convergence and error estimates, SIAM Journal of Numerical Analysis, 57 (2019), pp. 1625–1648. [Preprint version.]

REFEREED CONFERENCE PUBLICATIONS

PREPRINTS

- Xinshi Chen, Yufei Zhang, Christoph Reisinger, and Le Song, Understanding deep architectures with reasoning layer, Advances in Neural Information Processing Systems (NeurIPS 2020), 33 (2020), pp. 1240–1252. [Preprint version.]
- [1] Xin Guo, Xinyu Li, and Yufei Zhang, An  $\alpha$ -potential game framework for N-player games, arXiv:2403.16962, 2024.
- [2] Bekzhan Kerimkulov, David Šiška, Łukasz Szpruch, and Yufei Zhang, *Mirror descent for stochastic control problems with measure-valued controls*, arXiv:2401.01198, 2024.
- [3] Bekzhan Kerimkulov, James-Michael Leahy, David Šiška, Łukasz Szpruch, and Yufei Zhang, A Fisher-Rao gradient flow for entropy-regularised Markov decision processes in Polish spaces, Submitted, arXiv:2310.02951, 2023.
- [4] Xin Guo and Yufei Zhang, *Towards an analytical framework for potential games*, Submitted, arXiv:2310.0225, 2023.
- [5] Eyal Neuman, Wolfgang Stockinger, and Yufei Zhang, *An offline learning approach to propagator models*, Submitted, arXiv:2309.02994, 2023.
- [6] Tanut Treetanthiploet, Yufei Zhang, Lukasz Szpruch, Isaac Bowers-Barnard, Henrietta Ridley, James Hickey, and Chris Pearce, *Insurance pricing on price comparison websites* via reinforcement learning, Submitted, arXiv:2308.06935, 2023.
- [7] Eyal Neuman and Yufei Zhang, Statistical learning with sublinear regret of propagator models, Submitted, arXiv:2301.05157, 2023.

	[8] Christoph Reisinger, Wolfgang Stockinger, and Yufei Zhang, <i>A fast iterative PDE-based algorithm for feedback controls of nonsmooth mean-field control problems</i> , Revised and resubmitted, SIAM Journal on Scientific Computing, arXiv:2108.06740, 2021.
	[9] Christoph Reisinger, Wolfgang Stockinger, and Yufei Zhang, <i>Path regularity of coupled McKean-Vlasov FBSDEs</i> , preprint, arXiv:2011.06664, 2020.
	[10] Christoph Reisinger, Wolfgang Stockinger, and Yufei Zhang, Optimal regularity of ex- tended mean field controls and their piecewise constant approximation, preprint, arXiv:2009.08175v2, 2020.
Awards	<ul> <li>The Mathematical Institute DPhil Thesis Prize 2021, University of Oxford.</li> <li>G-Research PhD Prize in Maths and Data Science, G-Research, 2020.</li> <li>Academic Support Grands, The Queen's College, University of Oxford, 2017.</li> <li>Departmental Studentship, Mathematical Institute, University of Oxford, 2017–2021.</li> <li>Postgraduate Studentship, The Chinese University of Hong Kong, 2015–2017.</li> <li>Honours at Entrance, The Chinese University of Hong Kong, 2008–2013.</li> </ul>
GRANTS	<ol> <li>CNRS-Imperial "Abraham de Moivre" International Lab in Mathematics Short-Term Ex- change Grant, £1,400, 2024.</li> </ol>
	[2] Co-Investigator, "Reinforcement Learning for Insurance Pricing" in partnership with The Alan Turing Institute, £39,000, November 1, 2022 to April 28, 2023.
INVITED TALKS	[1] 16th International Conference of the ERCIM WG on Computational and Methodological Statistics, Berlin, Dec. 16-18, 2023.
	[2] 7th London-Paris Bachelier Workshop on Mathematical Finance, London, Sept. 18-19, 2023.
	[3] The Second HKSIAM Biennial Meeting, Hong Kong, Aug. 28-Sept. 1, 2023.
	[4] Recent Advances on Quantitative Finance, Hong Kong, Aug. 27-30, 2023
	[5] 10th International Congress on Industrial and Applied Mathematics, Tokyo, Aug. 20-25, 2023.
	[6] 11th Advanced Mathematical Methods for Finance Conference, Bielefeld, June 26-30, 2023.
	[7] Stochastic Analysis and Math Finance Seminar, Berlin, June 22, 2023.
	[8] Berlin Probability colloquium, Berlin, June 21, 2023.
	[9] North British Probability Seminar, The University of Edinburgh, June 14, 2023.
	[10] Data Science Seminar, The University of Essex, May 11, 2023.
	[11] 2nd Workshop on Machine Learning for PDEs, Imperial College London, Apr. 3-4, 2023.
	[12] Probability Seminar, The University of Bath, Jan. 9, 2023.
	[13] World Online Seminars on Machine Learning in Finance, Virtual, Nov. 22, 2022.
	[14] Machine Learning and Optimal Control, Royal Statistical Society, Virtual, Oct. 19, 2022.
	[15] Finance and Stochastic Seminar, The University of Sydney, Oct. 11, 2022.
	[16] London-Paris Bachelier Workshop on Mathematical Finance, Paris, France, Sept. 15-16, 2022.

- [17] Machine learning for PDEs, London, UK, Sept. 6-8, 2022.
- [18] *The 9th International Colloquium on BSDEs and Mean Field Systems*, Annecy, France, June 26–July 1, 2022.
- [19] *Machine Learning and Mean-Field Games Workshop*, The Institute for Mathematical and Statistical Innovation, Chicago, May 23–27, 2022.
- [20] Maxwell Institute Probability Seminar, Heriot-Watt University and University of Edinburgh, Mar. 24, 2022.
- [21] Finance and Stochastic Seminar, Imperial College London, Mar. 23, 2022.
- [22] Financial/Actuarial Mathematics Seminar, University of Michigan, Virtual, Mar. 16, 2022.
- [23] SIAG/FME virtual seminar, Virtual, Mar. 10, 2022.

OTHER TALKS

- [24] 15th German Probability and Statistics Days, Virtual, Sept. 27-Oct. 1, 2021.
- [25] 2nd Fudan-Warwick Workshop on Financial Mathematics and Stochastic Analysis, University of Warwick, UK, July 30–31, 2019.
- [26] 3rd International Conference on Computational Finance, A Coruña, Spain, July 8–12, 2019.
- [27] International Workshop on PDE-Constrained Optimization, Optimal Controls and Applications, Sanya, China, Dec. 10–14, 2018.
- [28] 10th Oxford-Berlin Young Researchers Meeting on Applied Stochastic Analysis, Oxford, United Kingdom, Nov. 29–Dec. 1, 2018.
- [29] 14th Viennese Conference on Optimal Control and Dynamic Games, Vienna, Austria, July 3–6, 2018.
- [1] 8th Workshop on High-Dimensional Approximation, ETH Zurich, Switzerland, Sept. 9– 13, 2019.
  - [2] 12th European Summer School in Financial Mathematics, Padova, Italy, Sept. 2–6, 2019.
  - [3] SIAM Financial Mathematics and Engineering (FM19), Toronto, Ontario, Canada, June 4–7, 2019.
  - [4] Scientific Computation using Machine-Learning Algorithms, Nottingham, United Kingdom, Apr. 25–26, 2019.
  - [5] Oxford-ETH Workshop in Mathematical & Computational Finance, Oxford, United Kingdom, Mar. 14–15, 2019.
  - [6] Robust Techniques in Quantitative Finance, Oxford, United Kingdom, Sept. 3–7, 2018.
  - [7] 11th European Summer School in Financial Mathematics, Paris, France, Aug. 27–31, 2018.
  - [8] The Fourth Young Researchers Meeting on BSDEs, Nonlinear Expectations and Mathematical Finance, Shanghai, China, Apr. 23–27, 2018.

PROFESSIONAL SERVICE	<ul> <li>Referee Service <ul> <li>Automatica</li> <li>Advances in Computational Mathematics</li> <li>Advances in Continuous and Discrete Models: Theory and Applications</li> <li>Applied Mathematical Finance</li> <li>Applied Mathematics and Optimization</li> <li>Discrete and Continuous Dynamical Systems Series B</li> <li>Finance and Stochastics</li> <li>Journal of Computational Finance</li> <li>Journal of Mathematical Analysis and Applications</li> <li>Journal of Mathematical Theory and Applications</li> <li>Journal of Optimization Theory and Applications</li> <li>Market Microstructure and Liquidity</li> <li>SIAM Journal on Financial Mathematics</li> <li>SIAM Journal on Financial Mathematics</li> <li>Stochastic Processes and Their Applications</li> </ul> </li> </ul>
	<ul> <li>Stochastic Processes and Their Applications</li> <li>Advances in Neural Information Processing Systems (NeurIPS 2021)</li> <li>Conference on Mathematical and Scientific Machine Learning (MSML 2020)</li> </ul>

## **Committee Service**

- Treasurer, University of Oxford SIAM Student Chapter, 2018-20.
- Mathematrix, University of Oxford, 2020-21.

Teaching Experience

## London School of Economics, United Kingdom

urer	
Stochastic Process	Fall 2021, 2022
Stochastic Simulation	Spring 2023
Computational Methods in Finance and Insurance	e Spring 2022, 2023
ity of Oxford, United Kingdom	
r	
Analysis II	Spring 2021
Fixed Income	Spring 2021
Financial Derivatives	Fall 2020
introduction to Probability	Fall 2020
Advanced Numerical Methods	Spring 2020
Numerical Methods	Fall 2019
hing Assistant	
Analysis I	Fall 2020
Calibration	Spring 2019
Continuous Optimization	Spring 2019
Numerical Methods: Finite Differences	Fall 2018, Spring 2018, Spring 2019
Numerical Methods: Monte Carlo	Spring 2018
inese University of Hong Kong, Hong Kong	
hing Assistant	
Mathematical Analysis II	Spring 2016, Spring 2017
Numerical Methods for Differential Equations	Spring 2016
Mathematical Analysis I	Fall 2015, Fall 2016
	urer Stochastic Process Stochastic Simulation Computational Methods in Finance and Insuranc <b>ity of Oxford</b> , United Kingdom r Analysis II Fixed Income Financial Derivatives ntroduction to Probability Advanced Numerical Methods Numerical Methods thing Assistant Analysis I Calibration Continuous Optimization Numerical Methods: Finite Differences Numerical Methods: Monte Carlo <b>inese University of Hong Kong</b> , Hong Kong thing Assistant Mathematical Analysis II Numerical Methods for Differential Equations Mathematical Analysis I

PROFESSIONAL MEMBERSHIPS

- Institute of Mathematics and its Applications, Associate MemberSociety for Industrial and Applied Mathematics, Member

Last updated on April 4, 2024