

## Yufei Zhang

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### CONTACT INFORMATION

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### RESEARCH INTERESTS

Stochastic Control and Games, Mathematical and Computational Finance, Theory and Applications of Machine Learning, particularly Deep Learning and Reinforcement Learning.

### 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

D.Phil., Mathematics

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

B.B.A., Insurance, Financial and Actuarial Analysis

Aug. 2008-June 2013

### JOURNAL PUBLICATIONS

- [1] Xin Guo, Xinyu Li, and Yufei Zhang, *An  $\alpha$ -potential game framework for  $N$ -player games*, SIAM Journal on Control and Optimization, forthcoming. [Preprint version.]
- [2] Eyal Neuman and Yufei Zhang, *Statistical learning with sublinear regret of propagator models*, The Annals of Applied Probability, forthcoming. [Preprint version.]
- [3] Xin Guo and Yufei Zhang, *Towards an analytical framework for dynamic potential games*, SIAM Journal on Control and Optimization, 63 (2025), pp. 1213-1242.
- [4] Christoph Reisinger, Wolfgang Stockinger, and Yufei Zhang, *A fast iterative PDE-based algorithm for feedback controls of nonsmooth mean-field control problems*, SIAM Journal on Scientific Computing, 46 (2024), pp. A2737-A2773.
- [5] Lukasz Szpruch, Tanut Treetanthiploet, and Yufei Zhang, *Exploration-exploitation trade-off for continuous-time episodic reinforcement learning with linear-convex models*, The Annals of Applied Probability, forthcoming. [Preprint version.]
- [6] Michael Giegrich, Christoph Reisinger, and Yufei Zhang, *Convergence of policy gradient methods for finite-horizon exploratory linear-quadratic control problems*, SIAM Journal on Control and Optimization, 62 (2024), pp. 1060-1092.
- [7] Lukasz Szpruch, Tanut Treetanthiploet, and Yufei Zhang, *Optimal scheduling of entropy regulariser for continuous-time linear-quadratic reinforcement learning*, SIAM Journal on Control and Optimization, 62 (2024), pp. 135-166.

- [8] Christoph Reisinger, Wolfgang Stockinger, and Yufei Zhang, *Linear convergence of a policy gradient method for some finite horizon continuous time control problems*, SIAM Journal on Control and Optimization, 61 (2023), pp. 3526-3558.
- [9] Christoph Reisinger, Wolfgang Stockinger, and Yufei Zhang, *A posteriori error estimates for fully coupled McKean-Vlasov forward-backward SDEs*, IMA Journal of Numerical Analysis, 44 (2024), pp. 2323-2369.
- [10] 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.
- [11] 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.
- [12] Christoph Reisinger and Yufei Zhang, *Regularity and stability of feedback relaxed controls*, SIAM Journal on Control and Optimization, 59 (2021), pp. 3118–3151.
- [13] Kazufumi Ito, Christoph Reisinger, and Yufei Zhang, *A neural network based policy iteration algorithm with global  $H^2$ -superlinear convergence for stochastic games on domains*, Foundations of Computational Mathematics, 21 (2021), pp. 331–374.
- [14] 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.
- [15] 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.
- [16] 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.
- [17] 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.
- [18] 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.

CONFERENCE  
PUBLICATIONS

- [1] 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.

PREPRINTS

- [1] Matthieu Meunier, Christoph Reisinger, Yufei Zhang, *Efficient Learning for Entropy-regularized Markov Decision Processes via Multilevel Monte Carlo*, arXiv: 2503.21224, 2025.
- [2] Yanwei Jia, Du Ouyang, and Yufei Zhang, *Accuracy of discretely sampled stochastic policies in continuous-time reinforcement learning*, arXiv:2503.09981, 2025.
- [3] Xin Guo, Anran Hu, Jiacheng Zhang, Yufei Zhang, *Continuous-time mean field games: a primal-dual characterization*, arXiv:2503.01042, 2025.
- [4] Lukasz Szpruch, Marc Sabaté Vidales, Tanut Treetanthiploet, Yufei Zhang, *Pricing and hedging of decentralised lending contracts*, Submitted, arXiv:2409.04233, 2024.

- [5] Christoph Knochenhauer, Alexander Merkel, and Yufei Zhang, *Continuous-time dynamic decision making with costly information*, Submitted, [arXiv:2408.09693](#), 2024.
- [6] Deven Sethi, David Šiška, and Yufei Zhang, *Entropy annealing for policy mirror descent in continuous time and space*, Revision at SIAM Journal on Control and Optimization, [arXiv:2405.20250](#), 2024.
- [7] Tanut Treetanthiploet, Łukasz Szpruch, and Yufei Zhang,  *$\epsilon$ -policy gradient for online pricing*, Revision at Applied Mathematics and Optimization, [arXiv:2405.03624](#), 2024.
- [8] Bekzhan Kerimkulov, David Šiška, Łukasz Szpruch, and Yufei Zhang, *Mirror descent for stochastic control problems with measure-valued controls*, Submitted, [arXiv:2401.01198](#), 2024.
- [9] 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*, Revision at Foundations of Computational Mathematics, [arXiv:2310.02951](#), 2023.
- [10] Eyal Neuman, Wolfgang Stockinger, and Yufei Zhang, *An offline learning approach to propagator models*, Revision at Mathematical Finance, [arXiv:2309.02994](#), 2023.
- [11] Christoph Reisinger, Wolfgang Stockinger, and Yufei Zhang, *Optimal regularity of extended mean field controls and their piecewise constant approximation*, preprint, [arXiv:2009.08175v2](#), 2020.

#### AWARDS

- The Mathematical Institute DPhil Thesis Prize 2021, *University of Oxford*.
- G-Research PhD Prize in Maths and Data Science, *G-Research*, 2020.
- Academic Support Grant, *The Queen's College, University of Oxford*, 2017.
- Departmental Studentship, *Mathematical Institute, University of Oxford*, 2017–2021.

#### GRANTS

- Principal Investigator, “Reinforcement Learning for Insurance Pricing” in partnership with The Alan Turing Institute, £95,000, November 1, 2022 to April 28, 2023.
- Corresponding Proposer, Isaac Newton Institute Satellite Programme “Bridging Stochastic Control And Reinforcement Learning”, £119,840, November 3-28, 2025.

#### POSTDOCTORAL FELLOWS

- Wolfgang Stockinger - Chapman Fellowship in Mathematics, 2022-2023.
- Yonatan Shadmi - Chapman Fellowship in Mathematics, started in 2023.

#### PH.D SUPERVISION

- Philipp Plank (2024-now, Imperial College London).

#### CONFERENCES ORGANISATION

- Isaac Newton Institute Satellite Program “Bridging Stochastic Control and Reinforcement Learning”, Cambridge (Nov. 3-28, 2025)
- BIRS workshop “Advances in Stochastic Control and Reinforcement Learning: Theory and Application”, Banff, Canada (April 27-May 2, 2025)
- “London–Oxford–Warwick Mathematical Finance Workshop”, Oxford (Jan. 9-10, 2025).
- The London Mathematical Finance Seminar Series, London (September 2021-now)
- Algorithmic Learning in Games Seminar, online (September 2024-now)
- 8th-London-Paris Bachelier Workshop, Paris (September 2024).
- ETH–Hong Kong–Imperial Mathematical Finance Workshop, London (June 2024).
- 7th-London-Paris Bachelier Workshop, London (September 2023).

#### ADMINISTRATIVE DUTIES

- Member of the Research Committee of the Department of Mathematics, Imperial College (2024-2025).
- Organiser of the Finance and Stochastics seminar at Imperial College (2023-2025).

## REVIEWER

- Journals (in alphabetical order)
  - in **mathematical finance**: Applied Mathematical Finance, Finance and Stochastics, Journal of Computational Finance, Market Microstructure and Liquidity, Mathematical Finance, SIAM Journal on Financial Mathematics, and others.
  - in **machine learning**: Journal of Machine Learning Research, Journal of Machine Learning, and others.
  - in **control and optimization**: Applied Mathematics and Optimization, Automatica, IEEE Transactions on Automatic Control, Operations Research, SIAM Journal on Control and Optimization, and others.
  - in **probability and statistics**: Annals of Applied Probability, Annals of Statistics, Stochastic Processes and Their Applications, and others.
  - in **computational mathematics**: Advances in Computational Mathematics, SIAM Journal on Scientific Computing, and others.
  - in **other areas of applied mathematics**: Discrete and Continuous Dynamical Systems Series B, Journal of Mathematical Analysis and Applications, and others.
- Conferences
  - in **machine learning**: Advances in Neural Information Processing Systems (NeurIPS 2021), Conference on Mathematical and Scientific Machine Learning (MSML 2020).

## INVITED TALKS

- *2nd ETH-HKG-ICL Mathematical Finance Workshop*, Hong Kong, April 22-25, 2025.
- *ISOR Colloquium*, University of Vienna, Vienna, Austria, Mar. 31, 2025.
- *Statistics Seminar Series*, Collegio Carlo Alberto, Torino, Italy, Feb. 12-14, 2025.
- *Modeling, Learning and Understanding: Modern Challenges between Financial Mathematics, Financial Technology and Financial Economics*, Banff, Nov. 10-15, 2024.
- *12th Bachelier World Congress of the Bachelier Finance Society*, Rio de Janeiro, July 8-12, 2024.
- *New Trends and Challenges in Stochastic Differential Games*, Banff, June 23-28, 2024.
- *ETH-Hong Kong-Imperial Mathematical Finance Workshop*, London, June 17-20, 2024.
- *Probability for Machine Learning seminar*, Oxford, June 12, 2024.
- *Mathematical Finance seminar*, Bielefeld, June 5, 2024.
- *Bachelier Seminar*, Paris, April 17, 2024.
- *Fields-CFI Bootcamp on Machine Learning in Quantitative Finance*, Toronto, April 25-26, 2024.
- *Recent Advances in Stochastic Control, Machine Learning and Quantitative Finance*, Shanghai, April 15-19, 2024.
- *IMSI Workshop on Decision Making and Uncertainty*, Chicago, Feb. 2-9, 2024.
- *CityU-NUS MFG/MFC seminar*, Jan. 30, 2024.
- *16th International Conference of the ERCIM WG on Computational and Methodological Statistics*, Berlin, Dec. 16-18, 2023.
- *7th London-Paris Bachelier Workshop on Mathematical Finance*, London, Sept. 18-19, 2023.
- *The Second HKSIAM Biennial Meeting*, Hong Kong, Aug. 28-Sept. 1, 2023.
- *Recent Advances on Quantitative Finance*, Hong Kong, Aug. 27-30, 2023.
- *10th International Congress on Industrial and Applied Mathematics*, Tokyo, Aug. 20-25, 2023.
- *11th Advanced Mathematical Methods for Finance Conference*, Bielefeld, June 26-30, 2023.
- *Stochastic Analysis and Math Finance Seminar*, Berlin, June 22, 2023.
- *Berlin Probability Colloquium*, Berlin, June 21, 2023.
- *North British Probability Seminar*, The University of Edinburgh, June 14, 2023.
- *Data Science Seminar*, The University of Essex, May 11, 2023.
- *2nd Workshop on Machine Learning for PDEs*, Imperial College London, Apr. 3-4, 2023.
- *Probability Seminar*, The University of Bath, Jan. 9, 2023.

- *World Online Seminars on Machine Learning in Finance*, Virtual, Nov. 22, 2022.
- *Machine Learning and Optimal Control*, Royal Statistical Society, Virtual, Oct. 19, 2022.
- *Finance and Stochastic Seminar*, The University of Sydney, Oct. 11, 2022.
- *London-Paris Bachelier Workshop on Mathematical Finance*, Paris, France, Sept. 15-16, 2022.
- *Machine Learning for PDEs*, London, UK, Sept. 6-8, 2022.
- *The 9th International Colloquium on BSDEs and Mean Field Systems*, Annecy, France, June 26–July 1, 2022.
- *IMSI Workshop on Machine Learning and Mean-Field Games*, Chicago, May 23–27, 2022.
- *Maxwell Institute Probability Seminar*, Heriot-Watt University and University of Edinburgh, Mar. 24, 2022.
- *Finance and Stochastic Seminar*, Imperial College London, Mar. 23, 2022.
- *Financial/Actuarial Mathematics Seminar*, University of Michigan, Virtual, Mar. 16, 2022.
- *SIAG/FME virtual seminar*, Virtual, Mar. 10, 2022.
- *15th German Probability and Statistics Days*, Virtual, Sept. 27-Oct. 1, 2021.
- *2nd Fudan-Warwick Workshop on Financial Mathematics and Stochastic Analysis*, University of Warwick, UK, July 30–31, 2019.
- *3rd International Conference on Computational Finance*, A Coruña, Spain, July 8–12, 2019.
- *International Workshop on PDE-Constrained Optimization, Optimal Controls and Applications*, Sanya, China, Dec. 10–14, 2018.
- *10th Oxford-Berlin Young Researchers Meeting on Applied Stochastic Analysis*, Oxford, United Kingdom, Nov. 29–Dec. 1, 2018.
- *14th Viennese Conference on Optimal Control and Dynamic Games*, Vienna, Austria, July 3–6, 2018.

#### TEACHING EXPERIENCE

- Lecturer at Imperial College London:
  - Simulation Methods for Finance Spring 2024, 2025
  - Advances in Machine Learning Spring 2025
  - Interest Rate Models Spring 2025
- Lecturer at London School of Economics:
  - Stochastic Process Fall 2021, 2022
  - Stochastic Simulation Spring 2023
  - Computational Methods in Finance and Insurance Spring 2022, 2023
- Tutor at University of Oxford:
  - 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

#### PROFESSIONAL MEMBERSHIPS

- Member, Bachelier Finance Society
- Member, Society for Industrial and Applied Mathematics

*Last updated on May 5, 2025*