Yufei Zhang

CONTACT INFORMATION

University of Oxford
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RESEARCH INTERESTS

Machine learning, stochastic control and their applications in mathematical finance: I focus on designing effective computational frameworks combining machine learning techniques and stochastic control methods to solve high-dimensional computational finance problems.

EDUCATION

University of Oxford, United Kingdom

D.Phil., Mathematics — Oct. 2017-May 2021(expected)

- Adviser: Professor Christoph Reisinger
- Area of Study: Scientific Computing, Mathematical Finance

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

- Minor in Mathematics

REFEREED JOURNAL PUBLICATIONS

[1] 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.]

[2] 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, Published online, May 2020. [Journal version.] [Preprint version.]

[3] 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. [Journal version.] [Preprint version.]

[4] 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. [Journal version.] [Preprint version.]

[5] Roxana Dumitrescu, Christoph Reisinger, and Yufei Zhang, *Approximation schemes for mixed optimal stopping and control problems with nonlinear expectations and jumps*, Applied Mathematics & Optimization, Published online, July 2019. [Journal version.]

REFEREED 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. [Preprint version.]

PREPRINTS AND WORKING PAPERS

[1] Christoph Reisinger, Wolfgang Stockinger, and Yufei Zhang, *Path regularity of coupled McKean-Vlasov FBSDEs*, preprint, arXiv:2011.06664, 2020.

[2] Christoph Reisinger, Wolfgang Stockinger, and Yufei Zhang, *Optimal regularity of extended mean field controls and their piecewise constant approximation*, preprint, arXiv:2009.08175v2, 2020.

[3] Christoph Reisinger, Wolfgang Stockinger, and Yufei Zhang, *A posteriori error estimates for fully coupled McKean-Vlasov forward-backward SDEs*, preprint, arXiv:2007.07731, 2020.

[4] Christoph Reisinger and Yufei Zhang, *Regularity and stability of feedback relaxed controls*, preprint, arXiv:2001.03148, 2020.

[5] Christoph Reisinger and Yufei Zhang, *A penalty scheme and policy iteration for nonlocal HJB variational inequalities with monotone drivers*, preprint, arXiv:1805.06255, 2018.

AWARDS

- G-Research PhD Prize in Maths and Data Science, *G-Research*, 2020.
- Academic Support Grands, *The Queen's College, University of Oxford*, 2017.
- Departmental Studentship, *Mathematical Institute, University of Oxford*, 2017–2021.
- Postgraduate Studentship, *The Chinese University of Hong Kong*, 2015–2017.
- Honours at Entrance, *The Chinese University of Hong Kong*, 2008–2013.

INVITED TALKS

[1] *2nd Fudan-Warwick Workshop on Financial Mathematics and Stochastic Analysis*, University of Warwick, United Kingdom, July 30–31, 2019.

[2] *3rd International Conference on Computational Finance*, A Coruña, Spain, July 8–12, 2019.

[3] *International Workshop on PDE-Constrained Optimization, Optimal Controls and Applications*, Sanya, China, Dec. 10–14, 2018.

[4] *10th Oxford-Berlin Young Researchers Meeting on Applied Stochastic Analysis*, Oxford, United Kingdom, Nov. 29–Dec. 1, 2018.

[5] *14th Viennese Conference on Optimal Control and Dynamic Games*, Vienna, Austria, July 3–6, 2018.

OTHER TALKS

[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

Referee Service

- *Automatica*
- *Applied Mathematical Finance*
- *Applied Mathematics and Optimization*
- *Finance and Stochastics*
- *Journal of Computational Finance*

- *Journal of Mathematical Analysis and Applications*
- *SIAM Journal on Control and Optimization*

Committee Service

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

TEACHING EXPERIENCE

University of Oxford, United Kingdom

- Tutor
  - Financial Derivatives 2020-21
- Teaching Assistant
  - Calibration 2018-19
  - Continuous Optimization 2018-19
  - Numerical Methods: Finite Differences 2017-19
  - Numerical Methods: Monte Carlo 2017-18

The Chinese University of Hong Kong, Hong Kong

- Teaching Assistant
  - Mathematical Analysis I 2015-17
  - Numerical Methods for Differential Equations (MATH3240) 2015-16
  - Mathematical Analysis II 2015-17

PROFESSIONAL MEMBERSHIPS

Institute of Mathematics and its Applications, Associate Member, 2017–present

Last updated on November 16, 2020