Aug 20th, 2023

Jiacheng Zhang

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**EMPLOYMENT**

**Postdoctoral Researcher, Industrial Engineering & Operations Research Department** 2021-present

UC Berkeley, under the supervision of Professor Xin Guo

**EDUCATION**

**PhD, Operations Research and Financial Engineering** 2016 - 2021

Princeton University, under the supervision of Professor Mykhaylo Shkolnikov and Professor Daniel Lacker

**Bachelor, Pure and Applied Mathematics** 2012 - 2016

Tsinghua University

**RESEARCH INTEREST**

My research focus lies in the theory of probability and stochastic optimization. I have worked on stochastic partial differential equations, especially Mckean-Vlasov type equation, partial differential equations, mathematical finance like stochastic portfolio theory and stochastic volatility modeling in the past few years. Now my research interests focus on two-level mean field games including principal agent games and the connection between machine learning and mean field game.

**HONORS & REWARDS**

**School of Engineering and Applied Science Award for Excellence at Princeton University** 2021

This award is given to SEAS advanced graduate students who have performed at the highest level as scholars and researchers

**Member of Tsinghua Xuetang Training Program for excellence in academy** 2012 - 2016

**National Scholarship** 2012 - 2013

**RESEARCH ARTICLES**

**“Dynamics of observables in rank-based models and performance of functionally generated portfolios” (2018)**

Joint work with Sergio A. Almada Monter and Mykhaylo Shkolnikov. *Annals of Applied Probability* **29, 2849-2883. (Equal distribution)**

**“Inverting the Markovian projection, with an application to local stochastic volatility models” (2019)**

Joint work with Daniel Lacker and Mykhaylo Shkolnikov. *Annals of Probability****.* 48, 2189-2211**. **(Equal distribution)**

**“Superposition and mimicking theorem for conditional McKean-Vlasov equations” (2020)**

Joint work with Daniel Lacker and Mykhaylo Shkolnikov. *To appear in Journal of the European Mathematical Society.* Preprint available at [*https://arxiv.org/abs/2004.0009*](https://arxiv.org/abs/2004.0009)(Equal distribution)

**“Stationary solutions and local equations for interacting diffusions on regular trees” (2023)**

Joint work with Daniel Lacker. *Electronic Journal of Probability* **28, 1-37** (Equal distribution)

**“Agency problem and mean field system of agents with moral hazard, synergistic effects and accidents”(2022)**

Joint work with Thibaut Mastrolia. *Submitted to Journal of Optimization Theory and Applications.* Preprint available at [*https://arxiv.org/abs/2207.11087*](https://arxiv.org/abs/2207.11087)(Equal distribution)

**“Optimization frameworks and sensitivity analysis of Stackelberg mean-field game” (2022)**

Joint work with Xin Guo and Anran Hu. *Submitted to Mathematics of Operations Research.* Preprint available at [*https://arxiv.org/pdf/2210.04110.pdf*](https://arxiv.org/pdf/2210.04110.pdf) (Equal distribution)

**“On time-consistent equilibrium stopping under aggregation of diverse discount rates”(2023)**

Joint work with Shuoqing Deng and Xiang Yu. *Submitted to Mathematical Finance.* Preprint available at[*https://arxiv.org/abs/2302.07470*](https://arxiv.org/abs/2302.07470) (Equal distribution)

**“Deep Learning for Population-Dependent Controls in Mean Field Control Problems”(2023)**

Joint work with Gökçe Dayanıklı and Mathieu Laurière. *Submitted to NeurIPS 2023.* Preprint available at[*https://arxiv.org/abs/2306.04788*](https://arxiv.org/abs/2306.04788)(Equal distribution)

**“Sharp interface limit for the Giacomin-Lebowitz model of phase segregation”**

Joint work with Sergey Nadtochiy and Mykhaylo Shkolnikov. In preparation.

**RESEARCH TALKS & PRESENTATIONS**

**Dynamics of observables in rank-based models and performance of functionally generated portfolios**

11th Oxford Princeton Workshop on Financial Mathematics and Stochastic Analysis, Princeton University, November 2018.

**Stationary stochastic local volatility**

SIAM Conference on Financial Mathematics & Engineering (FM19), University of Toronto, June 2019.

**Inverting the Markovian Projection with an Application to Local Stochastic Volatility Models**

Seminar talk in the Department of Applied Mathematics, the Hong Kong Polytechnic University, August 2019,

4th Eastern Conference on Mathematical Finance, October 2019.

**Superposition and mimicking theorem for conditional McKean-Vlasov equations**

Columbia-Princeton Probability Day 2021], May 2021

SIAM Conference on Financial Mathematics & Engineering (FM21), Virtual Conference, June 2021,

6th Berlin Workshop for Young Researchers on Mathematical Finance, Aug 2021.

SIAM Annul Meeting (AN22), Virtual Conference, July 2022

**Topics in Mckean-Vlasov equations and mimicking theorem**

CMU Probability/Math Finance Seminar, Jan 2021.

Berkeley IEOR Seminar, Feb 2021.

**Sharp interface limit for the Giacomin-Lebowitz model of phase segregation**

Princeton Graduate Student Seminar, October 2020.

Columbia Stochastic Partial Differential Equations Seminar(virtual), November 2020,

Applied math and Probability seminar at Stanford University, January 2021.

**Locally interacting diffusions and continuous Gibbs measures on trees**

Northeast Probability Seminar, November 2020.

Seminar at Center for Math Financial and Actuarial Science at University of California, Santa Barbara, April 2022.

Optimal transport and Mean field games Seminar at University of South Carolina, May 2022.

**Sensitivity and Robustness of Stackelberg Mean-Field Games**

Mean field game workshop at CRM, Montreal, May 2022.

Machine learning and mean field games at IMSI, Chicago, May 2022.

**Topics on** **Stackelberg Mean-Field Games**

 Quantitative Finance Seminar NUS(Suzhou) Research Institute, Aug 2022.

 Financial Mathematicsl Seminar, Princeton University, Sept 2022.

 Applied probability seminar, Columbia University, Sept 2022.

 Brownbag seminar, Boston University, Sept 2022.

**TEACHING EXPERIENCE**

**Princeton University (Assistant in Instruction)** 2016 - 2021

Probability and Stochastic Systems (ORF 309), Stochastic Calculus (ORF 527), Probability theory (ORF526)

**UC Berkeley (Teaching Assistant)** 2021 - 2023

Fintech2021, Financial Engineering Systems II (Fall 2021), Applied Stochastic Process II (Spring 2022, Spring 2023)

**PROFESSIONAL ACTIVITIES**

**Referee** for the SIAM Journal on Financial Mathematics, Latin American Journal of Probability and Mathematical Statistics, the book of ‘Machine learning in Financial Marker: A guide contemporary practices’, Digital Finance, Applied Mathematics and Optimization, Annals of Applied Probability