

FUPENG SUN

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EDUCATION

- 🎓 **Ph.D.2024 - 2028 (Expected).** Imperial College Business School, the United Kingdom, Analytics & Operations.
- 🎓 **M.Res.2023 - 2024.** Imperial College Business School, the United Kingdom, Analytics & Operations, **Distinction.**
- 🎓 **M.S.2020 - 2023.** Beijing Institute of Technology, China, School of Mathematics and Statistics, **GPA 94.0/100.0, Ranking 1/100.**
- 🎓 **September 2018 - March 2019,** Rutgers University, the United States, School of Arts and Sciences, **GPA 4.0/4.0.**
- 🎓 **B.S.2016 - 2020.** Beijing Institute of Technology, China, School of Mathematics and Statistics, B.S Degree in Mathematics, **GPA 93.5/100.0, Ranking 1/130.**

RESEARCH INTERESTS

My research lies at the intersection of data-driven optimization, generative AI, machine learning, geometry, and game theory, with broad applications in data science. I aim to develop methodologies that are both theoretically rigorous—through convergence guarantees, complexity analyses, and robustness results—and practically effective.

PROFESSIONAL ABILITIES

- ★ **Analysis:** Proficient in Calculus; skilled in Real Analysis, Complex Analysis, Differential Equations, and Functional Analysis.
- ★ **Algebra:** Proficient in Linear Algebra; skilled in Abstract Algebra, Lie Groups, and Lie Algebras.
- ★ **Geometry:** Proficient in Point-Set Topology, Algebraic Topology, and Classical Geometry; skilled in Riemannian Geometry.
- ★ **Applied Mathematics:** Skilled in Statistics, Machine Learning, Optimization, Graph Theory, Computational Topology and Geometry, and Image and Signal Processing.

Working Papers

- **Fupeng Sun,** Huikang Liu, Zhe Liu, Wolfram Wiesemann, Robust Weakly Coupled Markov Decision Processes.

PUBLICATIONS (*: equal contribution)

1. Tianyi Bai*, Zengjie Hu*, **Fupeng Sun***, Jiantao Qiu*, Yizhen Jiang, Guangxin He, Bohan Zeng, Conghui He, Binhang Yuan, Wentao Zhang, Multi-Step Visual Reasoning with Visual Tokens Scaling and Verification, *arXiv*, 2025, doi: arxiv-2506.07235. [preprint]
2. Tianyi Bai, Yuxuan Fan, Jiantao Qiu, **Fupeng Sun**, Jiayi Song, Junlin Han, Zichen Liu, Conghui He, Wentao Zhang, Binhang Yuan, Hallucination at a Glance: Controlled Visual Edits and Fine-Grained Multimodal Learning, *arXiv*, 2025, doi: arxiv-2506.07227. [preprint]
3. Yanwei Sun*, **Fupeng Sun***, Chiwei Yan, Jiahua Wu, The Role of Prescreening in Auctions with Predictions, *arXiv*, 2025, doi: arxiv-2502.12117. [preprint]
4. Tianyi Bai, Ling Yang, Zhen Hao Wong, **Fupeng Sun**, Jiahui Peng, Xinlin Zhuang, Chi Zhang, Lijun Wu, Jiantao Qiu, Wentao Zhang, Binhang Yuan, Conghui He, Efficient Pretraining Data Selection for Language Models via Multi-Actor Collaboration, *Proceedings of the 63rd Annual Meeting of the Association for Computational Linguistics (ACL 2025, Main)*. [published]
5. Hanzhao Wang, Yu Pan, **Fupeng Sun**, Shang Liu, Kalyan Talluri, Guanting Chen, Xiaocheng Li, Understanding the Training and Generalization of Pretrained Transformer for Sequential Decision Making, *arXiv*, 2024, doi: arxiv-2405.14219. [preprint]
6. **Fupeng Sun***, Yanwei Sun*, Chiwei Yan, Li Jin, Restricting Entries to All-Pay Contests, *ACM Conference on Economics and Computation*, EC'24. [published]
7. **Fupeng Sun**, Yin Ni, Yihao Luo, Huafei Sun, ECG Classification based on Wasserstein Scalar Curvature, *Entropy*, 2022, 24(10), 1450. [published]
8. Yin Ni, **Fupeng Sun**, Yihao Luo, Zhengrui Xiang, Huafei Sun, A novel heart disease classification algorithm based on Fourier transform and persistent homology, *2022 IEEE International Conference on Electrical Engineering, Big Data and Algorithms (EEBDA)*, 116-122. [published]
9. **Fupeng Sun**, Yueqi Cao, Shiqiang Zhang, Huafei Sun, The Bayesian Inference of Pareto Models Based on Information Geometry, *Entropy*, 2021, 23(1), 45. [published]

RESEARCH EXPERIENCES IN BIT

- **Bayesian inference based on information geometry and data processing based on geometrical methods, funded by National Natural Science Foundation of China**
September 2019 - September 2023 Principal Researcher
 - Information Geometry on Lie Groups and Its Applications under Grant No.61179031, 2015 - 2020.
- **ECG classification based on geometrical and topological methods, funded by National Key Research and Development Project of China**
December 2020 - September 2023 The First Researcher
 - Research and Development of AI Identification Alarm System and Equipment for Public Stadium under Grant No.2020YFC2006201, 2020 - 2023.
 - Patent
 - * The second inventor of Heart Disease Identification Based on Persistent Homology and Fourier Transform (Publication Number: CN114287950A).
 - * The first inventor of Computer-aided Classification Method of Heart Disease via Curvature of Statistical Manifold (In process, application number: 202210595419.0).

■ **Study of Graph Theory, funded by Fundamental Research Funds for the Central Universities**

January 2021 - September 2023 Present Researcher

- **Research on Some Related Problems of Schur Positive Conjecture under Grant No.2021CX11012, 2021 - 2021.**

■ **Study of Graph Theory, funded by General Program of National Natural Science Foundation of China**

January 2022 - September 2023 Present Researcher

- **Research on Some Related Problems of 3+1 Conjecture of Chromatic Symmetric Function under Grant No.12171034, 2022 - 2025.**

HONORS AND AWARDS

🏆 **President Scholarship** at Imperial College London, 2024 - 2028

🏆 **Dean's List** for Academic Excellence at Imperial College Business School, 2023-2024

🏆 XUTELI Scholarship, *Beijing Institute of Technology (BIT)*, 2023. **(Highest Honor in BIT)**

🏆 Self-improvement Star Scholarship of Chinese University Students, *Ministry of Education of the People's Republic of China*, 2022. **(Only 1832 students obtained this scholarship in China, 2022)**

🏆 National Scholarship for Graduate Students, *Ministry of Education of the People's Republic of China*, 2022 and 2021 (twice).

🏆 National Scholarship for Undergraduate Students, *Ministry of Education of the People's Republic of China*, 2019 and 2017 (twice).

🏆 National Encouragement Scholarship, *Ministry of Education of the People's Republic of China*, 2018.

🏆 Second Prize, National College Students Mathematical Competition (CMC), *Chinese Mathematical Society (CMS)*, 2019.

🏆 Third Prize, National College Students Mathematical Competition (CMC), *Chinese Mathematical Society (CMS)*, 2017.

🏆 Excellent Students of Beijing, *Beijing Municipal Education Commission*, 2022 and 2021 (twice).

🏆 First prize, Beijing Site, the 8th China International College Students' "Internet + " Innovation and Entrepreneurship Competition, *Organizing Committee of China International College Students' "Internet + " Innovation and Entrepreneurship Competition*, 2022.

🏆 Outstanding Graduates of Beijing, *Beijing Municipal Education Commission*, 2020.

🏆 FEIZHENYONG Scholarship, *Beijing Institute of Technology (BIT)*, 2022. **(Highest Honor in School of Mathematics and Statistics in BIT)**

🏆 Outstanding Social Research Individual in Summer Vacation, *Beijing Institute of Technology (BIT)*, 2022.

🏆 The Model of Excellence in Character and Learning, *Beijing Institute of Technology (BIT)*, 2021.

🏆 The Model of Excellence in Character and Learning, *Beijing Institute of Technology (BIT)*, 2020.

- 🏆 Excellent Peer Mentor, *Beijing Institute of Technology (BIT)*, 2020.
- 🏆 Outstanding Social Research Individual in Winter Vacation, *Beijing Institute of Technology (BIT)*, 2017.

TEACHING & SERVICE

🏛️ Reviewer

- NeurIPS, ICLR, ICML

🏛️ Imperial College London Business School

- **Business Analytics**
 - * TA of Maths and Statistics Foundations for Analytics, 2024.
 - * TA of Logistics & Supply Chain Analytics, 2024.
- **Business Analytics Online**
 - * TA of Logistics and Supply Chain Analytics, 2023.
- **Executive MBA**
 - * TA of Big Data, AI & Machine Learning - On Campus, 2024.
- **Global Health Management**
 - * TA of Data Analytics and Visualisation for Business, 2024.
- **Global Online MBA**
 - * TA of Big Data, AI & Machine Learning, 2024J.
- **MRes**
 - * TA of Optimisation, 2024.

🏛️ Beijing Institute of Technology

- **School of Mathematics and Statistics**
 - * TA of Graph Theory, 2021.
 - * TA of Matrix Analysis, 2020-2022.
- **School of Beijing**
 - * TA of all basic courses of Mathematics, 2019-2023.

OTHER EXPERIENCES

🏠 Beijing Institute of Technology

- July 2023, deliver the *valedictorian speech*.
- **π Plan for Rural Children**
 - * December 2020 - September 2023, establish a public welfare fund and organize a volunteer program of school teaching to help rural children.

🏠 Beijing Fengtai Care Center for Retarded Children

- Volunteer Program of Teaching for 200 hours.

SKILLS AND HOBBIES

🔧 **Computer:** MATLAB, Python, Latex, Office.

🔧 **Languages:** Chinese: Native; English: **TOEFL 109, GRE 332.**

🔧 **Others:** Painting, swimming, badminton, soccer, basketball.