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, *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 Reseacher

- **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.

⚥ Thrid 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 & SEVICE

🏛 **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.