Zhekai Li

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EDUCATION

- **Shanghai Jiao Tong University (SJTU)** — Shanghai, China
  M.S. in Electrical Engineering — *Sept. 2022 - Jan. 2025* (expected)
  - *GPA: 3.94/4.0 (2/114)*
  - **Core Courses:** *Nonlinear Control Theory and Application, Numerical Analysis, Optimal Power Flow and Convex Optimization*
  - **Scholarships and Honors**: *First-Class Academic Scholarship ($2000; 2023 & 2024), Sieyuan Electric Co., Ltd. Scholarship (Top 5%; $750; 2024), Wen-Yuan Pan Scholarship (Top 1%; $1200; 2023)*

- **Huazhong University of Science and Technology (HUST)** — Wuhan, China
  B.S. in Electrical Engineering — *Sept. 2018 - Jun. 2022*
  - *GPA: 3.94/4.0 (Top 1%)*
  - **Core Courses:** *Mathematical Analysis I/II, Probability Theory and Statistics, Linear Algebra, Mathematical Physics Equation, Complex Function, Introduction to Management, Principles of Economics*
  - **Scholarships and Honors**: *National Scholarship (Top 0.2% highest scholarship from Ministry of Education of China; $1500; 2019 & 2021), Tellhow Sci-tech Co., Ltd. Scholarship (Top 1%; $3000; 2021)*

RESEARCH FIELD

- Multi-armed Bandits (MABs) and Adaptive Sequential Decision-Making, with a particular focus on various healthcare challenges
- Stochastic Process and Optimal Control Theory in Transportation Systems

WORKING PAPER

- [1] **Zhekai Li**, Tianyi Ma, Cheng Hua, Ruihao Zhu, Exploring Drug Candidates: All ε-Best Arms Identification in Linear Bandits.
  - To be submitted to *Operations Research*
  - Invited Talk, INFORMS Annual Meeting, 2024
  - Finalist, Best Paper Award, INFORMS Conference on Quality, Statistics, and Reliability (ICQSR), 2024

PUBLICATIONS

- [2] **Zhekai Li**, Renxin Yang, Zixi Fang, Haotian Yu, Xu Cai, "Research on Commutation Mechanism and Harmonic Suppression of Offshore Wind Farm Integration With DRU-VSC Hybrid Transmission System," Proceedings of the CSEE, pp. 1–16, doi: 10.13334/j.0258-8013.240697. (*Ranked first in power and energy engineering journals, and second in citations among all Chinese journals*) [Paper][Link]

- [3] **Zhekai Li**, Kun Han, Xu Cai, Renxin Yang, Haotian Yu, Kepeng Xia, Lulu Liu, "Frequency-Reactive Power Optimization Strategy of Grid-forming Offshore Wind Farm Using DRU-HVDC Transmission," in 2023 IEEE 7th Conference on Energy Internet and Energy System Integration (EI^2), Hangzhou, China: IEEE, Dec. 2023, pp. 1193–1199. doi: 10.1109/EI259745.2023.10512674. [Paper][Link][Poster]

- [4] **Zhekai Li**, Liliuyuan Liang, Renxin Yang, and Xu Cai, "The Virtual Admittance Control of Sending End Converter for Offshore Wind Farm Integration," in 2023 IEEE 14th International Symposium on Power Electronics for Distributed Generation Systems (PEDG), Jun. 2023, pp. 133–136. doi: 10.1109/PEDG56097.2023.10215304. [Paper][Link][Poster]

- [5] Xiangwen Sun, Zicheng Liu, **Zhekai Li**, Qianchen Sun, An Li, and Dong Jiang, "Three-phase Motor Drive Topology with the Fault-tolerant Capability of Open-circuit on the Multiplexing Bridge," in 2021 IEEE Energy Conversion Congress and Exposition (ECCE), Oct. 2021, pp. 5043–5047. doi: 10.1109/ECCE47101.2021.9595370. [Paper][Link]

PATENTS

- Xiangwen Sun, Zhiyuan Wang, **Zhekai Li**, et al (2022), *Phase Sequence and Modulation of Series Multiphase Winding With Minimum Current Stress of Bridge Arm*, CN214799254U, China National Intellectual Property Administration.

- Xiangwen Sun, Zhiyuan Wang, **Zhekai Li**, et al (2021), *A Multi-Rotor UAV and Its Power System With Fault-Tolerant Capability*, CN214799254U, China National Intellectual Property Administration.

- Xiangwen Sun, Zhiyuan Wang, **Zhekai Li**, et al (2021), *Topology and Modulation Method of Six-Phase Seven-Bridge Arm Series Winding Circuit with Reverse Winding*, CN113078839A, China National Intellectual Property Administration.

RESEARCH EXPERIENCE (SELECTED)

- **Exploring Drug Candidates: All ε-Best Arms Identification in Linear Bandits** [1] Shanghai, China
  Researcher - Supervised by Prof. Ruihao Zhu and Prof. Cheng Hua *Oct. 2023 - present*
  - ○ Expanded All-ε Identification Problem (a fundamental pure exploration challenge) from the stochastic bandit framework to the linear setting, motivated by the need to successfully identify multiple candidates that can dramatically enhance outcomes in complex and high-stakes tasks such as drug discovery.
  - ○ Proposed LinFACTE (Linear Fast Arm Classification with Threshold Estimation), an algorithm designed to optimize the identification of all ε-best arms in linear bandits.
  - ○ Provided the first information-theoretic lower bound on the complexity of this problem and showed that our algorithm achieves instance optimality, matching this lower bound up to a logarithmic term, while extending our theoretical contributions to the misspecified setting and the generalized linear model (GLM).
  - ○ Conducted numerical experiments to show the practical advantages of LinFACTE over baseline methods, highlighting its ability to accelerate early-stage drug development and outstanding performance with various synthetic data.

- **Reducing Tardiness: Field Experimental Evidence from a Hospital** Shanghai, China
  Research Assistant - Supervised by Prof. Meng Li and Prof. Qiang Li *Jun. 2023 - Aug. 2023*
  - ○ Designed the associated laboratory experiment as a part of the response letter of the paper (Reject and Resubmit to *Management Science*) regarding the field experiment of patient no-shows at the hospital.
  - ○ Literature review of Human-Centered Artificial Intelligence (HCAI) about AI's influence on human decision-making, productivity, and operational efficiency across sectors like finance, psychology, and healthcare.

- **Frequency Support of Wind Farm and Multi-Terminal Flexible DC system** [2][4] Shanghai, China
  Researcher - Supervised by Prof. Xu Cai *Jan. 2022 - Apr. 2024*
  - ○ Established simplified and detailed models of the parallel hybrid converter system.
  - ○ Proposed the optimized control strategy to resolve the control instability problem caused by the current limitation.
  - ○ Conducted state-space modeling, parameter design, and small-signal stability analysis.

- **A High-Reliability UAV Power System with Fault-Tolerant Capability** [5] Wuhan, China
  Researcher - Supervised by Prof. Dong Jiang *Oct. 2020 - Nov. 2021*
  - ○ Developed a motor drive topology based on the series winding structure and the matched fault-tolerant algorithm for optimization. The constructed topology and algorithm increased the power density by more than 50%.
  - ○ Designed and modeled the mounting fixture for the electronic speed controller (ESC) and the UAV power system.

RELEVANT SKILLS

- **Languages:** English (Proficient, GRE: 331, TOEFL: 99), Mandarin (Native)
- **Programming:** C++, Python, Fortran, LaTeX, Markdown, HTML, MATLAB
- **Modeling and Simulation:** Simulink, PSCAD, PSIM, Ansoft Maxwell, COMSOL, SOLIDWORKS, AutoCAD

EXTRACURRICULAR EXPERIENCE

- **Invited Talks and Presentations**
  - ○ INFORMS Annual Meeting, Seattle, Oct. 2024 (Chaired by David Simchi-Levi and Chonghuan Wang)
  - ○ INFORMS Conference on Quality, Statistics, and Reliability (ICQSR), Lake Como and Milan, July 2024

- **Academic Service**
  - ○ Assisted in Peer Review Process for *Production and Operations Management Society* (POMS)
  - ○ Reviewer for *2023 IEEE Conference on Energy Internet and Energy System Integration* (EI^2)

- **Competitions**
  - ○ First Prize, the 17th "Challenge Cup" National College Students' Extracurricular Academic Science and Technology Competition (national academic competition with the largest number of participants in China) *2021*
  - ○ First Prize, the Electrician Mathematical Contest in Modeling (Top 3%) - *Operation Analysis and Modeling of High-Speed Rail Traction Power Supply System* *2021*
  - ○ Honorable Mention, the MCM/ICM - *Post-Disaster Response to Australian Wildfires Based on Drone Monitoring* *2021*
  - ○ Second Prize, the National Mathematics Competition for College Students *2019*

- **Jock for Sports**
  - ○ Volleyball (varsity volleyball team), Soccer (qualification of athletes for the national level), Badminton (7 years of professional training), Go (third place in the national competition, first dan), Ultimate Frisbee (varsity sports team), Fitness