

# Junkai Tan

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 Google Scholar |  Github |  LinkedIn |  Researchgate |  ORCID



Master student at Xi'an Jiaotong University (Top 7%, IELTS Score 7.0) specializing in **optimal control, game theory, and RL**. My research on **safe, robust control for unmanned systems** (HRI, UAV-UGV) has resulted in **10 first-author journal papers** in top-tier venues (JAS, IEEE T-ASE  $\times 2$ , NODY  $\times 2$ , IEEE TIE  $\times 2$  in Revision). Proficient in MATLAB, Python, and UAV/UGV hardware.

## EDUCATION

- **Xi'an Jiaotong University (C9 & 985 Project University)** Sep 2023 - Jun 2026  
*M.S. in Electrical Engineering, School of Electrical Engineering*  
• **GPA: 90.74/100 (3.65/4.0)**  
• **Rank: 3/45 (Top 7% in Major)**  
• **English Proficiency (IELTS):** Overall Band Score 7.0 (Reading 9.0)
- **Xi'an Jiaotong University (C9 & 985 Project University)** Sep 2019 - Jun 2023  
*B.E. in Electrical Engineering and Automation, School of Electrical Engineering*  
• **GPA: 90.51/100 (3.86/4.3)**  
• **Rank: 29/356 (Top 8% in Major)**  
• **Honorable Graduate of Xi'an Jiaotong University**
- **Peking University (C9 & 985 Project University)** July 2025  
*"Data and Operations Intelligence" Summer School, College of Engineering*  
• Advanced courses on **optimization, control**, and **RL**. Beijing, China

## FIRST-AUTHOR/STUDENT-FIRST JOURNAL PUBLICATIONS

J=JOURNAL

- [J.1] **J. Tan**, S. Xue, Z. Guo, et al. (2025). **Fixed-Time Hierarchical Game-Based Unmanned Aerial-Ground Vehicle Docking Control**. *IEEE/CAA Journal of Automatica Sinica* [IEEE/CAA JAS, Accepted, IF: 19.2, JCR Q1]
- [J.2] **J. Tan**, S. Xue, H. Li, et al. (2025). **Prescribed performance robust approximate optimal tracking control via stackelberg game**. *IEEE Transactions on Automation Science and Engineering*, Mar. 2025. [IEEE T-ASE, IF: 6.4, JCR Q1]
- [J.3] **J. Tan**, S. Xue, H. Li, et al. (2024). **Hierarchical safe reinforcement learning control for leader-follower systems with prescribed performance**. *IEEE Transactions on Automation Science and Engineering* [IEEE T-ASE, IF: 6.4, JCR Q1]
- [J.4] **J. Tan**, S. Xue, Q. Guan, et al. **Finite-time safe reinforcement learning control of multi-player nonzero-sum game for quadcopter systems**. *Information Sciences*, p. 122117, Mar. 2025. [INS, IF: 6.8, JCR Q1]
- [J.5] **J. Tan**, S. Xue, Q. Guan, et al. (2025). **Unmanned aerial-ground vehicle finite-time docking control via pursuit-evasion games**. *Nonlinear Dynamics*, Mar. 2025. [NODY, IF: 6.0, JCR Q1,  ESI Highly Cited Paper]
- [J.6] **J. Tan**, S. Xue, T. S. Niu, et al. (2025). **Fixed-time concurrent learning-based robust approximate optimal control**. *Nonlinear Dynamics* May. 2025. [NODY, IF: 6.0, JCR Q1]
- [J.7] **J. Tan**, S. Xue, Z. Guo, et al. (2025). **Data-driven optimal shared control of unmanned aerial vehicles**. *Neurocomputing*, vol. 622, pp. 129428-129440. [Neuro, IF: 6.5, JCR Q1,  ESI Highly Cited Paper]
- [J.8] **J. Tan**, J. Wang, S. Xue, et al. (2025). **Human-machine shared stabilization control based on safe adaptive dynamic programming with bounded rationality**. *International Journal of Robust and Nonlinear Control* [IJRNC, IF: 3.2, JCR Q1]
- [J.9] S. Xue, **J. Tan**, Z. Guo, et al. (2024). **Cooperative game-based optimal shared control of unmanned aerial vehicle**. *Unmanned Syst.* [US, IF: 3.0, JCR Q1]
- [J.10] **J. Tan**, S. Xue, H. Cao, and S. S. Ge. (2025). **Human-AI interactive optimized shared control**. *Journal of Automation and Intelligence* [JOAI]

## IN REVISION/SUBMITTED JOURNAL MANUSCRIPTS

R=IN REVISION, S=IN SUBMISSION

- [R.1] **J. Tan**, S. Xue, Q. Guan, et al. (2025). **Fixed-time Stochastic Learning from Human-UAV Interaction with State-Input Constraints**. *IEEE Transactions on Industrial Electronics* [IEEE TIE, Major Revision, IF: 7.2, JCR Q1]
- [R.2] S. Xue, **J. Tan**, T. S. Niu, et al. (2025). **Prescribed performance optimized control of UAV with robust approximate dynamic programming under disturbance**. *IEEE Transactions on Industrial Electronics* [IEEE TIE, Major Revision, IF: 7.2, JCR Q1]
- [R.3] S. Xue, **J. Tan**, Z. Guo, et al. (2024). **Finite-time dynamic event-triggered actor-critic-identifier for optimal control of nonlinear drifted system**. *Information Sciences* [INS, Major Revision, IF: 6.8, JCR Q1]
- [R.4] **J. Tan**, S. Xue, Z. Guo, et al. (2024). **Adaptive safe control of quadcopter: a hierarchical safe reinforcement learning approach**. *Engineering Applications of Artificial Intelligence* [EAAI, Major Revision, IF: 8.0, JCR Q1]
- [S.1] **J. Tan**, S. Xue, H. Cao, et al. (2025). **Finite-Time Stackelberg Game-Based Hybrid Attack-Defense Control for Cyber-Physical Systems**. *IEEE/CAA Journal of Automatica Sinica* [IEEE/CAA JAS, Under Review]
- [S.2] **J. Tan**, S. Xue, Z. Guo, et al. (2025). **Composite learning-based fixed-time optimized shared prescribed-performance control for human-robotics cooperative game**. *Information Sciences* [INS, Under Review]

- [S.3] **J. Tan**, S. Xue, H. Cao, et al. (2025). **Data-driven Fixed-time Inverse Optimal Shared Control for Human-UAV Interaction**. *IEEE Transactions on Systems, Man, and Cybernetics* [IEEE TSMC, Under Review]
- [S.4] **J. Tan**, S. Xue, H. Cao, et al. (2025). **Predefined-Time Learning-Based Optimal Stabilization Control for Nonlinear Systems**. *IEEE Transactions on Cybernetics* [IEEE TC, Under Review]
- [S.5] **J. Tan**, S. Xue, H. Cao, et al. (2025). **Fixed-Time Convergent Resilient Critic-Learning Control with Asymmetric Input-State Constraints under Hybrid FDI-DoS Attacks**. *IEEE Transactions on Industrial Informatics* [IEEE TII, Under Review]

## CONFERENCE PROCEEDINGS, PATENTS & THESIS

C=CONFERENCE, P=PATENT, T=THESIS

- [C.1] **J. Tan**, S. Xue, H. Li, et al. (2024). **Safe stabilization control for interconnected virtual-real systems via model-based reinforcement learning**. In *2024 14th Asian Control Conference (ASCC)*, pp. 605-610.
- [C.2] **J. Tan**, S. Xue, H. Cao, et al. (2023). **Safe human-machine cooperative game with level-k rationality modeled human impact**. In *2023 IEEE International Conference on Development and Learning (ICDL)*, pp. 188-193.
- [C.3] **J. Tan**, S. Xue, H. Cao, et al. (2023). **Nash equilibrium solution based on safety-guarding reinforcement learning in nonzero-sum game**. In *2023 International Conference on Advanced Robotics and Mechatronics (ICARM)*, pp. 630-635.
- [T.1] **J. Tan**. (2023). **Research on Safety-Guarding Control of Interconnected Systems Based on Adaptive Dynamic Programming**. Bachelor's Thesis, Xi'an Jiaotong University.
- [P.1] S. Xue, **J. Tan**, H. Cao, et al. (2024). **A pilot-UAV hierarchical reinforcement learning tracking control method**. Patent CN202410717333.X
- [P.2] S. Xue, **J. Tan**, H. Cao, et al. (2024). **An optimal control method for suppressing chaotic phenomena in nonlinear permanent magnet synchronous motors**. Patent CN202410856259.X
- [P.3] S. Xue, **J. Tan**, X. D. Zheng, et al. (2024). **A UAV reinforcement learning tracking control method with prescribed performance under disturbance**. Patent CN202411079828.0

## PROJECTS

- **Precise Sequence Synchronization Control of Multi-Intelligent System with Human-Machine Collaboration** Aug 2023 - Present  
China Postdoctoral Science Foundation (General Program) [🔗 | 🔗 | 🔗]
  - Developed Stackelberg game-based reinforcement learning framework for robust optimal control
  - Implemented prescribed performance constraints for efficient tracking control in nonlinear systems
  - Created novel game-theoretic optimization method for high-dimensional nonlinear systems
  - Published 5 first-author papers in *IEEE TASE* (2), *Information Science*, *Nonlinear Dynamics* (2) and presented at ASCC, ICARM, IC DL
- **Precise Sequence Intelligent Control of Distributed Energy System for Human-Machine Consistency** May 2022 - Dec 2024  
Xi'an Young Talent Support Program (Class A) [🔗]
  - Developed safety-guarding RL method for optimal shared control in pilot-UAV interactive systems
  - Implemented Nash equilibrium and level-k rationality model to enhance human-machine collaboration stability
  - Created data-driven interaction modeling approach to optimize human-machine cooperative strategies
  - Published 4 first-author journal papers in *Neurocomputing*, *IJRNC*, *JAI*, *IJICS* and obtained 3 national patents

## INTERNSHIP EXPERIENCE

- **Electric Power Research Institute, China Southern Power Grid** Jul 2025 - Aug 2025 (Expected)  
Research Intern Guangzhou, China
  - Investigated AI-driven acceleration for power system simulations, focusing on Quantum Computing and Physics-Informed Neural Networks (PINN) for power flow analysis.
  - Authored a comprehensive literature review on Quantum-Power Flow Calculation and researched PINN-based acceleration methods.
  - Contributed to research expected to result in one conference paper and 1-2 patents.

## JOURNAL REVIEW ACTIVITY

Over 80 papers reviewed for 10+ top-tier journals and conferences in control systems and robotics.

- Reviewer for **IEEE Transactions on Automation Science and Engineering** (50+ reviews)
- Reviewer for **Expert Systems with Applications** (10+ reviews)
- Reviewer for **Engineering Applications of Artificial Intelligence** (5+ reviews)
- Reviewer for **Knowledge-Based Systems**
- Reviewer for **Applied Soft Computing**
- Reviewer for **Information Sciences**
- Reviewer for **Neurocomputing**
- Reviewer for **Journal of the Franklin Institute**
- Reviewer for **Measurement**
- Reviewer for **Acta Astronautica**

## SKILLS

- **Programming Languages:** MATLAB/Simulink, Python, C++, LaTeX, Git, ROS
- **Control & Simulation:** Gazebo, V-REP, AirSim, PX4, ArduPilot, QGroundControl
- **Hardware Experience:** Nvidia Jetson, Raspberry Pi, Pixhawk, UAV/UGV Platforms
- **Specialized Knowledge:** Optimal Control, Game Theory, System Identification, Nonlinear Control
- **Soft Skills:** Teamwork, Communication, Leadership, Problem-Solving

## HONORS AND AWARDS (TIMELINE)

- **Honorable Graduate** Jun 2023  
*Xi'an Jiaotong University*
  - Recognized for overall excellence in academic performance and contributions
- **State Grid UHV Scholarship** Sep 2020  
*State Grid Corporation of China*
  - Merit-based scholarship awarded for academic excellence
- **Outstanding Student Award** Sep 2020  
*Xi'an Jiaotong University*
  - Recognized for exceptional academic performance in 2019-2020
- **Second Prize, Shaanxi Province** Oct 2020  
*12th National College Students Mathematics Competition*
  - Demonstrated advanced mathematical problem-solving abilities
- **First Prize, Shaanxi Province** Oct 2021  
*National College Student Mathematical Modeling Competition*
  - Led team to develop innovative mathematical models for real-world problems
- **Second-Class University Scholarship** Oct 2021 & Oct 2022  
*Xi'an Jiaotong University*
  - Awarded for consistent academic excellence
- **Second Prize, Shaanxi Province** Nov 2021 & Aug 2022  
*National College Students' Electronic Design Competition*
  - Developed innovative electronic systems and solutions
- **Honorable Mention** Apr 2021  
*Mathematical Contest in Modeling (MCM/ICM)*
  - International recognition for mathematical modeling capabilities
- **Bronze Award** Jul 2021  
*7th China International College Students' "Internet+" Innovation and Entrepreneurship Competition*
  - Developed innovative internet-based entrepreneurial project
- **Second Prize** Nov 2023  
*National Graduate Mathematical Modeling Competition*
  - Advanced mathematical modeling and problem-solving at graduate level

## LEADERSHIP EXPERIENCE

- **Session Chair** Jul 2023  
*2023 International Conference on Advanced Robotics and Mechatronics (ICARM)*
  - Chaired technical session at Class A conference of Chinese Association of Automation
  - Organized and moderated academic presentations and discussions
- **Fitness Team Leader** Sep 2023 - Present  
*School of Electrical Engineering, Xi'an Jiaotong University*
  - Manage gym facilities and equipment maintenance
  - Provide scientific fitness guidance and instruction to students
  - Organize fitness activities and training programs

## ADDITIONAL INFORMATION

**Languages:** English (Professional working proficiency), Chinese (Native)

**Interests:** Robotics and Control Systems, Machine Learning, Fitness and Sports, Travel and Photography

## REFERENCES

1. **Prof. Hui Cao**  
Professor, School of Electrical Engineering  
Xi'an Jiaotong University  
Email: huicao@mail.xjtu.edu.cn  
Phone: +86-139-9119-3207  
*Relationship: Thesis Advisor & Research Supervisor*
2. **Prof. Badong Chen**  
Professor, College of Artificial Intelligence  
Xi'an Jiaotong University  
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*Relationship: Collaborative Advisor*