

Junkai Tan

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 Google Scholar |  Github |  LinkedIn |  ResearchGate |

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OBJECTIVE

Pursuing advanced research and development opportunities in autonomous systems and control theory, leveraging expertise in reinforcement learning, game theory, and optimal control. Seeking to contribute to innovative projects at the intersection of human-machine interaction, autonomous systems, and intelligent control, with a focus on safety-critical applications and performance optimization.

EDUCATION

- **Xi'an Jiaotong University (C9 & 985 Project University)** Sep 2023 - Jun 2026
M.S. in Electrical Engineering
◦ GPA: 90.74/100 (3.65/4.0)
◦ Rank: 3/45 (Top 7%)
◦ School of Electrical Engineering - Industrial Enterprise Direction
- **Xi'an Jiaotong University (C9 & 985 Project University)** Sep 2019 - Jun 2023
B.E. in Electrical Engineering and Automation
◦ GPA: 90.51/100 (3.86/4.3)
◦ Rank: 29/356 (Top 8%)
◦ Honorable Graduate of Xi'an Jiaotong University
◦ School of Electrical Engineering

PROJECTS

- **Finite-Time Tracking Control Research for Unmanned Systems with Prescribed Performance** Aug 2023 - Present
Tools: Optimal Control, Game Theory, Reinforcement Learning, MATLAB, Unmanned Aerial & Ground Vehicles  |  | 
◦ 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 4 first-author papers in *IEEE TASE*, *Information Science*, *Nonlinear Dynamics* (2), *IJRNC* and presented at ASCC, ICARM, ICDL
- **Human-Machine Hybrid Enhancement Research for Data-Driven Shared Optimal Performance** May 2022 - Dec 2024
Tools: Optimal Control, Reinforcement Learning, Game Theory, MATLAB, Unmanned Aerial Vehicles 
◦ 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 3 first-author journal papers in *Neurocomputing*, *JAI*, *IJICS* and obtained 3 national patents

PATENTS AND PUBLICATIONS

C=CONFERENCE, J=JOURNAL, P=PATENT, S=IN SUBMISSION, T=THESIS

- [J.1] J. Tan, S. Xue, H. Li, et al. (2025). **Prescribed performance robust approximate optimal tracking control via stackelberg game**. *IEEE Trans. Autom. Sci. Eng.*, Mar. 2025. (IF: 5.9, JCR Q1)
- [J.2] J. Tan, S. Xue, Q. Guan, et al. **Finite-time safe reinforcement learning control of multi-player nonzero-sum game for quadcopter systems**. *Inf. Sci.*, p. 122117, Mar. 2025. (IF: 8.1, JCR Q1)
- [J.3] J. Tan, S. Xue, Q. Guan, et al. (2025). **Unmanned aerial-ground vehicle finite-time docking control via pursuit-evasion games**. *Nonlinear Dyn.*, Mar. 2025. (IF: 5.2, JCR Q1)
- [J.4] J. Tan, S. Xue, T. S. Niu, et al. (2025). **Fixed-time concurrent learning-based robust approximate optimal control**. *Nonlinear Dyn.* (Accepted, IF: 5.2, JCR Q1)
- [J.5] J. Tan, S. Xue, Z. Guo, et al. (2025). **Data-driven optimal shared control of unmanned aerial vehicles**. *Neurocomputing*, vol. 622, pp. 129428-129440. (IF: 5.5, JCR Q1)
- [J.6] S. Xue, J. Tan, Z. Guo, et al. (2024). **Cooperative game-based optimal shared control of unmanned aerial vehicle**. *Unmanned Syst.* (IF: 3.0, JCR Q1)
- [J.7] J. Tan, J. Wang, S. Xue, et al. (2025). **Human-machine shared stabilization control based on safe adaptive dynamic programming with bounded rationality**. *Int. J. Robust Nonlinear Control*, Mar. 2025. (IF: 3.2, JCR Q1)

- [J.8] **J. Tan**, S. Xue, H. Cao, and S. S. Ge. (2025). **Human–AI interactive optimized shared control**. *J. Autom. Intell.*
- [J.9] **J. Tan**, S. Xue, and H. Cao. (2025). **Stackelberg game-based robust optimal control of cyber-physical system under hybrid attacks**. *Int. J. Intell. Control Syst.*, pp. 1-9. (Accepted)
- [S.1] **J. Tan**, S. Xue, Z. Guo, et al. (2025). **Fixed-Time Hierarchical Game-Based Unmanned Aerial-Ground Vehicle Docking Control**. *IEEE/CAA J. Autom. Sinica* (Revise and Resubmit, IF: 15.3, JCR Q1)
- [S.2] **J. Tan**, S. Xue, H. Li, et al. (2024). **Hierarchical safe reinforcement learning control for leader-follower systems with prescribed performance**. *IEEE Trans. Autom. Sci. Eng.* (Major Revision, IF: 5.9, JCR Q1)
- [S.3] **J. Tan**, S. Xue, Z. Guo, et al. (2024). **Adaptive safe control of quadcopter: a hierarchical safe reinforcement learning approach**. *Eng. Appl. Artif. Intell.* (Under Review)
- [S.4] S. Xue, **J. Tan**, Z. Guo, et al. (2024). **Finite-time dynamic event-triggered actor-critic-identifier for optimal control of nonlinear drifted system**. *Nonlinear Dyn.* (Under Review)
- [S.5] **J. Tan**, S. Xue, H. Cao, et al. (2025). **Finite-Time Stackelberg Game-Based Hybrid Attack-Defense Control for Cyber-Physical Systems**. *IEEE/CAA J. Autom. Sinica* (Under Review)
- [S.6] **J. Tan**, S. Xue, Z. Guo, et al. (2025). **Composite learning-based fixed-time optimized shared prescribed-performance control for human-robotics cooperative game**. *Inf. Sci.* (Under Review)
- [S.7] **J. Tan**, S. Xue, H. Cao, et al. (2025). **Data-driven Fixed-time Inverse Optimal Shared Control for Human-UAV Interaction**. *IEEE Trans. Artif. Intell.* (Under Review)
- [S.8] S. Xue, **J. Tan**, T. S. Niu, et al. (2025). **Prescribed performance optimized control of UAV with robust approximate dynamic programming under disturbance**. *IEEE Trans. Ind. Electron.* (Under Review)
- [S.9] **J. Tan**, S. Xue, Q. Guan, et al. (2025). **Fixed-time Stochastic Learning from Human-UAV Interaction with State-Input Constraints**. *IEEE Trans. Ind. Electron.* (Under Review)
- [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

JOURNAL REVIEW ACTIVITY

Reviewer for international journals/conferences including **IEEE Transactions on Automation Science and Engineering** (9), **Expert Systems with Applications** (4), **Engineering Applications of Artificial Intelligence** (3), **IEEE Conference on Decision and Control**, **Acta Astronautica**, and **Measurement**.

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
- **Languages:** English (CET-6 579), Chinese (Native)

HONORS AND AWARDS (TIMELINE)

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

LEADERSHIP EXPERIENCE

<div><div><div>• Party Branch Secretary</div><div><i>School of Electrical Engineering - Zhongying College Joint Third Party Branch, Xi'an Jiaotong University</i></div><div>◦ Managed overall party branch work and supervised other committee members' responsibilities</div><div>◦ Reported to branch committee, party member assembly and higher party organizations</div><div>◦ Organized party member activities and educational programs</div></div></div>	<i>Jul 2022 - Jun 2023</i>
<div><div><div>• Session Chair</div><div><i>2023 International Conference on Advanced Robotics and Mechatronics (ICARM)</i></div><div>◦ Chaired technical session at Class A conference of Chinese Association of Automation</div><div>◦ Organized and moderated academic presentations and discussions</div></div></div>	<i>Jul 2023</i>
<div><div><div>• Fitness Team Leader</div><div><i>School of Electrical Engineering, Xi'an Jiaotong University</i></div><div>◦ Manage gym facilities and equipment maintenance</div><div>◦ Provide scientific fitness guidance and instruction to students</div><div>◦ Organize fitness activities and training programs</div></div></div>	<i>Sep 2023 - Present</i>

CERTIFICATIONS

<div><div><div>• English Proficiency: CET-6 (College English Test Band 6) - Score: 579</div></div></div>	<i>Dec 2021</i>
<div><div><div>• Computer Skills: National Computer Rank Examination (Level 3)</div></div></div>	<i>Nov 2024</i>
<div><div><div>• Music: Grade 10 Music Performance Certification</div></div></div>	<i>Jan 2018</i>

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
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Email: huicao@mail.xjtu.edu.cn
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Relationship: Thesis Advisor & Research Supervisor

2. **Prof. Shuangsi Xue**

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Phone: +86-182-2900-8966
Relationship: Associate Advisor & Senior Research Fellow