Qier An

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Research Interests

Space situational awareness, space-based image processing, optical 3D perception, multi-agent intelligence.

Academic Positions

2023-present	**Associate Professor of Aeronautical and Astronautical Science and Technology** National Key Laboratory of Aerospace Flight Dynamics School of Astronautics, Northwestern Polytechnical University
2026-present	**Postdoctoral Researcher** State Key Laboratory of Lunar and Planetary Sciences Macau University of Science and Technology

Education

2018-2023	**Ph.D. in Information and Communication Engineering** Department of Electronic Engineering, Tsinghua University (Advisor: Prof. Yuan Shen) Thesis title: "Theory and Methods for Multi-Agent Cooperation in Visual 3D Reconstruction"
2014-2018	**Bachelor in Electronic Information Science and Technology** Department of Electronic Engineering, Tsinghua University

Research Projects

2026-2028	**Space-Based Visual-LiDAR Sensing for Position, Attitude and 3D Geometry of Space Unknown Proximity Target** National Natural Science Foundation of China (NSFC) - Youth Program, Principal Investigator
2024-2025	**Space Target Intention Inference Based on Multi-Source Fusion 3D Sensing** Funded by National Key Laboratory of Space Intelligent Control, Principal Investigator
2024-2026	**Multispacecraft Cooperative Visual-LiDAR 3D Sensing of Unknown Orbital Targets** Funded by State Key Laboratory of Micro-Spacecraft Rapid Design and Intelligent Cluster Principal Investigator
2023-2024	**Cooperative Active Visual Sensing of Space Targets** Fundamental Research Funds for the Central Universities, Principal Investigator

Publications

[1] **An Q**, Yuan Y, Liu H, Yue X. Space-based visual localization and 3D reconstruction of unknown orbital target with observability analyses on a ROS/Gazebo-based framework[J]. **Chin. J. Aeronaut.**, 2026 (Accept).

[2] **An Q**, Yuan Y, Zhang Z, Liu H, Yue X. On the information evolution and sensor deployment for multispacecraft cooperative visual 3-D sensing of orbital targets[J]. **IEEE Sensors J.**, 2024, 24(8): 13227-13243.

[3] **An Q**, Wang J, Zhang Z, Shen Y. Information-based bit allocation for cooperative visual sensing in vehicular networks[J]. **IEEE Trans. Veh. Technol.**, 2023, 72(2): 2365-2380.

[4] **An Q**, Shen Y. Air-ground integrated mobile edge computing in vehicular visual sensor networks[J]. **IEEE Sensors J.**, 2022, 22(24): 24395-24405.

[5] **An Q**, Wang J, Shen Y. Sensing-oriented communications in vehicular networks: sensing assessment and resource allocation. **IEEE Commun. Lett.**, 2022, 26(10): 2420-2424.

[6] **An Q**, Shen Y. On the information coupling and propagation of visual 3D perception in vehicular networks with position uncertainty[J]. **IEEE Trans. Veh. Technol.**, 2021, 70(12): 13325-13339.

[7]   **An Q**, Wang Y, Shen Y. Sensor deployment for visual 3D perception: a perspective of information gains[J]. **IEEE Sensors J.**, 2021, 21(6): 8464-8478.

[8]   **An Q**, Shen Y. Distributed coverage control for mobile camera sensor networks with anisotropic perception[J]. **IEEE Sensors J.**, 2021, 21(14): 16264-16274.

[9]   **An Q**, Wu J, Wei C. Multi-spacecraft cooperative visual 3D sensing of noncooperative target[C]// Proc. IFAC Symp. Autom. Control Aerosp. (ACA), 2025, 59(20): 67-72.

[10]   **An Q**, Wu J, Wei C. On the observability for visual-lidar 3D sensing of noncooperative space targets[C]// Proc. Asia Conf. on Mech. Eng. and Aerosp. Eng. (MEAE), 2024: 1653-1657.

[11]   **An Q**, Shen Y. On the observability in visual SLAM networks[C]// Proc. IEEE Int. Conf. on Acoust., Speech and Signal Process. (ICASSP), 2022: 1-5.

[12]   **An Q**, Shen Y. On the camera position dithering in visual 3D reconstruction[C]// Proc. IEEE Int. Conf. on Acoust., Speech and Signal Process. (ICASSP), 2021: 1-5.

[13]   **An Q**, Wang J, Wang Y, Shen Y. Cooperative dynamic coverage control in wireless camera sensor networks with anisotropic perception[C]// Proc. IEEE Global. Telecomm. Conf. (GLOBECOM), 2021: 1-6.

[14]   **An Q**, Shen Y. Camera configuration design in cooperative active visual 3D reconstruction: a statistical approach[C]// Proc. IEEE Int. Conf. on Acoust., Speech and Signal Process. (ICASSP), 2020: 1–5.

[15]   **An Q**, Shen Y. On the performance analysis of active visual 3D reconstruction in multi-agent networks[C]// Proc. Int. Conf. Wireless Commun. Signal Process. (WCSP), 2019: 1-5.

Teaching

Visual 3D Perception for Robotics (M02M11180.01)
Instructor: Designed, organized, and presented a new course on visual 3D perception in robotics.
Spacecraft Attitude Dynamics and Control (U02M12521.01)
Instructor: Dynamics and control design of flight vehicles, and their applications in satellite design.

Honors and Awards

2025	Macau Young Scholars Program
2023	Qihang Award, Gold Award, Tsinghua University
2022	China National Scholarship
2021, 2020	Comprehensive Excellence Scholarship, Tsinghua University
2018	Direct PhD program (from Bachelor to PhD), Tsinghua University
2017, 2016	Academic Excellence Scholarship, Tsinghua University
2014	Leading Plan, Tsinghua University

Professional Activities

- Member, Youth Committee of China Simulation Federation (CSF) (2025-)
- Member, International Deep Space Exploration Association (IDSEA) (2025-)
- Youth Editorial Board Member, Astrodynamics (IF=6.5) (2025-)
- Guest Speaker, 2025 5th China Conference on Future Space Science and Technology
- Guest Speaker, 2025 1st China Conference on Embodied AI Systems and Applications
- Publicity Chair/Session Chair, 2025 & 2024 Asia Conference on Mechanical Engineering and Aerospace Engineering
- Program Co-Chair, 2023 1st Autonomous Robotic Technology Seminar

Industry Experience

06/2021~07/2021   Qianxun Spatial Intelligence Inc., Summer Intern, "Visual-PPP localization"
04/2018~08/2018   Momenta.ai., Summer Intern, "High precision mapping for autonomous driving"
07/2017~08/2017   Weijingtianxia Technology Co., Ltd., Summer Intern, "Texturing for 3D scene reconstruction"

Language Skills

Mother language: Chinese
Other languages: English (TOEFL 104, CET6 593)