Yao Su

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RESEARCH INTERESTS

Robotics，UAV，Humanoid，Control and System，Locomotion，Optimization，Planning，Dynamics

EDUCATION

University of California, Los Angeles	**Los Angeles, CA**
Ph.D. in Mechanical Engineering	09/2017-06/2021

  Mechatronics and Control Laboratory (MacLab), Advisor: Dr. **Tsu-Chin Tsao**

M.S. in Mechanical Engineering 09/2016-06/2017

  Robotics and Mechanisms Laboratory (RoMeLa), Advisor: Dr. **Dennis Hong**

Harbin Institute of Technology	**Harbin, China**
B.S in Mechanical Engineering and Automation	09/2012-06/2016

  State Key Laboratory of Robotics and System, Advisor: Dr. **Yili Fu**

APPOINTMENTS

State Key Laboratory of General Artificial Intelligence, Beijing Institute for General Artificial Intelligence(BIGAI)
  Research Scientist in Robotics   06/2021–Present

PUBLICATIONS

Under Review

[J20]   Wu, J.*, Li, J.*, Zhang S., He, Z., Wang, Z., Leng, X., Liu, H., Zhang, J., Wang, J., Zhu, S., **Su, Y**.[#](2024). Efficient Footstep Planning and Control for Humanoid Robots in Sequential Inspection Tasks. IEEE Robotics and Automation Letters (RA-L).

[J19]   **Su, Y.*,** Jiao, Z.*, Liu, H., Li, J., Wang, M., Li, H., Liang, H., Zhang, J., Zhu, S., & Liu, H.[#](2024). Design, Planning, and Control of an Over-actuated Aerial Manipulator for Sequential Manipulation. IEEE Transactions on Robotics (TRO).

[J18]   Wang, M., Li, W., Chen, Q., Li, H., **Su, Y.[#]**, Liu, H.[#] (2025). Real-time High-accuracy Visuo-Tactile Localization with Structured 3D Patterns. IEEE Robotics and Automation Letters (RA-L).

[J17]   Huang, W.*, Zhang, J.* [#], Hu, X., Wu, J., Zhang, S., Zhu, S., Liu, H., Yang, Y., **Su, Y.[#]** (2025). A Reinforcement Learning Framework of Humanoid Robots for Minimizing Energy Consumption. IEEE Transactions on Automation Science and Engineering (TASE).

[C16]   Li, W.*, Lin, P.*, Wang, M., Jiao, Z., **Su, Y.[#]**, Liu, H.[#] (2025). FTact: A Round High-Frequency Vision-based Tactile Sensor for Accurate Shape Reconstruction. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).

[C15]   Zhang, T., He, X., Han, M., **Su, Y.[#],** Zhang, Z.[#], Zhu, S. (2025). Multi-Agent Joint Task Planning in Symmetrical Reality. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).

[J16]   Gao, H., Li, Z., Zhou, K., Ding, K., **Su, Y.**, Liu, H., Li, S., & Liu, C.[#](2024). BVA-Tracker: Belief-Space Visibility-Aware Target Tracking in Unknown Cluttered Environments. IEEE Transactions on Systems, Man, and Cybernetics (TSMC).

[J15]   Zhou, K., Li, Z., Gao, H., **Su, Y.**, Liu, H., Yu, J., & Liu, C.#(2024). ReSPIRe: Informative and Reusable Belief Tree Search for Robot Probabilistic Search and Tracking in Unknown Environments. IEEE Transactions on Systems, Man, and Cybernetics (TSMC).

[J14]   Jiao, Z., Niu, Y., Zhang, Z., Wu, Y., **Su, Y.**, Zhu, Y., Liu, H.#, & Zhu, S. (2024). Integration of Robot and Scene Kinematics for Sequential Mobile Manipulation Planning. IEEE Transactions on Robotics (TRO).

Journal Paper (*indicates joint first authors, # indicates joint corresponding authors)

[J13]   Liu, H., Xie, Q., Zhang, Z., Yuan, T., Wang, S., Wang, Z., Leng, X., Sun, L.,Zhang, J.#, He, Z.#, **Su, Y.**#(2024). PR2: A Physics- and Photo-realistic Humanoid Testbed with Pilot Study in Competition. Journal of Field Robotics (JFR). DOI: 10.1002/rob.22588

[J12]   He, Z., Wu, J., Zhang, J., Zhang, S., Shi, Y., Liu, H, Sun, L., **Su, Y.#**, Leng, X.# (2024). CDM-MPC: An Integrated Dynamic Planning and Control Framework for Bipedal Robots Jumping. IEEE Robotics and Automation Letters (RA-L), 9(7), 6672-6679. DOI: 10.1109/LRA.2024.3408487.

[J11]   Fu, Y., **Su, Y.**, Wei, J., Wang, B., Li, J.# (2024). Auto-focusing Femtosecond Laser Manufacturing System via Acoustic Emission Technology. Optics Letters, 49, 558-561. DOI: 10.1364/OL.516076

[J10]   Yu, P.*, **Su, Y.***#, Gerber, M. J., Ruan, L., & Tsao, T. C. (2023). Compensating Aerodynamics of Over-actuated Multi-rotor Aerial Platform with Data-driven Iterative Learning Control. IEEE Robotics and Automation Letters (RA-L), 8(10), 6187-6194. DOI: 10.1109/LRA.2023.3304539.

[J9]   Li, W.*, Wang, M.*, Li, J., **Su, Y.**#, Jia, D.K., Qian, X., Althoefer K., & Liu, H.# (2023). L3 F-TOUCH: A Wireless GelSight with Decoupled Tactile and Three-axis Force Sensing. IEEE Robotics and Automation Letters (RA-L), 8(8), 5148-5155. DOI: 10.1109/LRA.2023.3292575.

[J8]   **Su, Y.***#, Yu, P.*, Gerber, M. J., Ruan, L.#, & Tsao, T. C. (2024). Fault-Tolerant Control of an Over-actuated UAV Platform Built on Quadcopters and Passive Hinges. IEEE/ASME Transactions on Mechatronics (TMECH), 29(1), 602-613. DOI: 10.1109/TMECH.2023.3288032.

[J7]   Ruan, L.*#, Pi, C.*, **Su, Y.**#, Yu, P., Cheng, S., & Tsao, T. C. (2023). Control and experiments of a novel tiltable-rotor aerial platform comprising quadcopters and passive hinges. Mechatronics, 89, p.102927. DOI: 10.1016/j.mechatronics.2022.102927.

[J6]   **Su, Y.**, Jiang,Y., Zhu, Y., & Liu, H. (2021). Object Gathering With a Tethered Robot Duo. IEEE Robotics and Automation Letters (RA-L), 7(2), 2132-2139. DOI: 10.1109/LRA.2021.3141828.

[J5]   **Su, Y.***, Ruan, L.*, Yu, P.*, Pi, C. H., Gerber, M. J., & Tsao, T. C. (2021). A Fast and Efficient Attitude Control Algorithm of a Tilt-Rotor Aerial Platform Using Inputs Redundancies. IEEE Robotics and Automation Letters (RA-L), 7(2), 1214-1221. DOI: 10.1109/LRA.2021.3138806.

[J4]   **Su, Y.***#, Yu, P.*, Gerber, M. J., Ruan, L., & Tsao, T. C. (2021). Nullspace-Based Control Allocation of Overactuated UAV Platforms. IEEE Robotics and Automation Letters (RA-L), 6(4), 8094-8101. DOI: 10.1109/LRA.2021.3095035.

[J3]   Yu, P.*#, **Su, Y.***, Gerber, M. J., Ruan, L., & Tsao, T. C. (2021). An Over-Actuated Multi-Rotor Aerial Vehicle With Unconstrained Attitude Angles and High Thrust Efficiencies. IEEE Robotics and Automation Letters (RA-L), 6(4), 6828-6835. DOI: 10.1109/LRA.2021.3095035.

[J2]   Luo, J., Gong, Z., **Su, Y.**, Ruan, L., Zhao, Y., Asada, H. H., & Fu, C.# (2021). Modeling and Balance Control of Supernumerary Robotic Limb for Overhead Tasks. IEEE Robotics and Automation Letters (RA-L), 6(2), 4125-4132. DOI: 10.1109/LRA.2021.3067850.

[J1]   Luo, J., **Su, Y.**, Ruan, L., Zhao, Y., Kim, D., Sentis, L., & Fu, C.# (2019). Robust Bipedal Locomotion Based on a Hierarchical Control Structure. Robotica, 37(10), 1750-1767. DOI: 10.1017/S0263574719000237.

Conference Paper (*indicates joint first authors, # indicates joint corresponding authors)

[C14]   Qian, Y., Yu, P., Wu, Y., **Su, Y**, Wang, W.#, & Fan, L.#(2024). Learning Concept-Based Visual Causal Transition and Symbolic Reasoning for Visual Planning. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).

[C13]   Wang, M.*, Li, W.*, Liang, H., Li, B., Althoefer K., **Su, Y.**[#], & Liu, H.[#] (2024). Large-scale Vision-based Tactile Sensor Deployment on Multi-fingered Grippers. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).

[C12]   **Su, Y.**, Jiao, Z., Zhang, Z., Zhang, J., Li, H., Wang, M., & Liu, H.[#] (2024). Flight Structure Optimization of Modular Reconfigurable UAVs. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).

[C11]   Li, Z.*, Niu, Y.*, **Su, Y.**, Liu, H., Jiao, Z.[#] (2024). Dynamic Planning for Sequential Whole-body Mobile Manipulation. IEEE Conference on Industrial Electronics and Applications (ICIEA).

[C10]   Zhou, K., Wu, P., **Su, Y.**, Gao, H., Ma, J., Liu, H., & Liu, C.[#] (2024). ASPIRe: An Informative Trajectory Planner with Mutual Information Approximation for Target Search and Tracking. IEEE International Conference on Robotics and Automation (ICRA).

[C9]   **Su, Y.***, Zhang, J.*, Li, H., Wang, M., & Liu, H.[#] (2024). Real-time Dynamic-Consistent Motion Planning for Over-actuated UAVs. IEEE International Conference on Robotics and Automation (ICRA).

[C8]   Gao, H., Wu, P., **Su, Y.**, Zhou, K., Ma, J., Liu, H., & Liu, C.[#] (2024). Probabilistic Visibility Aware Trajectory Planning for Target Tracking in Cluttered Environments. IEEE American Control Conference (ACC).

[C7]   Zhang, Z.[#], Zhang, Z., Jiao, Z., **Su, Y.**, Liu, H., Wang, W., & Zhu, S. (2024). On the Emergence of Symmetrical Reality. IEEE Conference on Virtual Reality and 3D User Interfaces (VR).

[C6]   Wang, M.*, **Su, Y.***, Li, H., Li, J., Liang, J., & Liu, H.[#] (2023). Aggregating Single-wheeled Modular Robots for Omnidirectional Movements. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).

[C5]   **Su, Y.***, Li, J.*, Jiao, Z*., Wang, M., Chu, C., Li, H., Zhu, Y., & Liu, H.[#] (2023). Planning Sequential Aerial Manipulation for Over-actuated Unmanned Aerial Manipulators. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

[C4]   **Su, Y.***, Chu, C.*, Wang, M., Li, J., Yang, L., Zhu, Y., & Liu, H.[#] (2022). Downwash-aware Control Allocation for Over-actuated UAV Platforms. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).

[C3]   Pi, C., Ruan, L., Yu, P., **Su, Y.**, Cheng, S., & Tsao, T. C.[#] (2021). A Simple Six Degree-of-Freedom Aerial Vehicle Built on Quadcopters. IEEE Conference on Control Technology and Applications (CCTA).

[C2]   Wang, M., **Su, Y.**, Liu, H., & Xu, Y.[#] (2020). WalkingBot: Modular Interactive Legged Robot with Automated Structure Sensing and Motion Planning. IEEE International Conference on Robot and Human Interactive Communication (RO-MAN).

[C1]   Lin, X., Krishnan, H., **Su, Y.**, & Hong, D. W.[#] (2018). Multi-limbed robot vertical two wall climbing based on static indeterminacy modeling and feasibility region analysis. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).

Dissertation

Su, Y. "Compensation and control allocation with input saturation limits and rotor faults for multi-rotor copters with redundant actuations." PhD diss., University of California, Los Angeles, 2021.

FUNDING HORIZONTAL PROJECTS

[H1]   Anhui Leju Artificial Intelligence Application Technology Service Co., Ltd., Research on Grasping Operation Planning and Control Methods for Biped Robots, 2023, CNY 400,000 (Principal Investigator).

[H2]   Leju (Shenzhen) Robotics Technology Co., Ltd., Research on Motion Control Algorithms for Biped Robots, 2024, CNY 1,000,000 (Principal Investigator).

[H3]   BIGAI-Leju Humanoid Robot Joint Laboratory, 2024–2029.

[H4]   BIGAI-Leju Humanoid Robot Technical Exploration Cooperation Agreement for Industrial Applications.

[H5]   School of Intelligence, Peking University, Visual Object Detection for Electronic Device Interfaces, 2024, CNY 100,000 (Participant).

[H6]   Hefei Leju Robotics Technology Co., Ltd., FAW Prosperity Factory Humanoid Robot POC Project, 2024, CNY 300,000 (Principal Investigator).

[H7]   Leju (Shenzhen) Robotics Technology Co., Ltd., Embodied AI Robot Curriculum Development Series, 2024, CNY 500,000 (Participant).

[H8]   Leju Smart Home (Qingdao) Robotics Technology Co., Ltd., Research on Full-Body Mobile Manipulation for Humanoid Robots, 2025, CNY 2,000,000 (Principal Investigator).

[H9]   Leju Smart Home (Qingdao) Robotics Technology Co., Ltd., Pre-research Project on Autonomous Sorting Operations for Humanoid Robots, 2025, CNY 1,200,000 (Principal Investigator).

FUNDING VERTICAL PROJECTS

[V1]   26th and 27th China Robotics and Artificial Intelligence Competition Humanoid Robot Innovation Challenge, 2024, 2025.

[V2]   Ministry of Industry and Information Technology (MIIT) 2023 Future Industry Innovation Task "Unveiling and Leading" Project (Humanoid Robot Direction): Typical Applications for Hazardous Operations, 2024–2025 (Participant).

[V3]   National Natural Science Foundation of China Youth Fund, Configuration Design and Intelligent Control Planning Methods for Over-Actuated UAVs Based on Omnidirectional Thrust Generators, 2025–2028.

[V4]   National-Local Joint Humanoid Robot Innovation Center Open Fund, Research on High-Dynamic Running for Humanoid Robots Based on Integration of Model Predictive Control and Reinforcement Learning, 2025–2026, CNY 500,000 (Principal Investigator).

HONORS AND AWARDS

- IROS 2023 Best Paper Award on Mobile Manipulation--Finalist
- The Excellent Graduate of HIT (3%)
- Merit Students for three times (6%)

INTERNSHIP

Robotics Engineer at DMAI, Los Angeles, CA 90024   01/2018-04/2020

PERSONAL EXPERIENCE

- Recommended for admission to Harbin Institute of Technology (HIT) without examination   03/2012
- First Prize of National Olympiad in Informatics in Provinces, Hebei，China   11/2011
- Second Prize of National Olympiad in Informatics in Provinces, Hebei，China   11/2010

PERSONAL SERVICE

IEEE ICRA 2024 Section Chair of Aerial Systems: Applications

IEEE Humanoids 2025 Associate Editor

Conference Reviewer: IEEE: IROS, ICRA, RSS, ACC, RO-MAN

Journal Reviewer: IEEE: TRO, TMECH, TIE, RA-L, Communications Magazine

                   Elsevier: Mechatronics, Robotics and Autonomous Systems

Journal Editor: Elsevier: Biomimetic Intelligence and Robotics