Jichuan YU

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EDUCATION

Tsinghua University Beijing, China

Ph.D. in Mechanical Engineering Sep. 2021 – Jun. 2026 (expected)

Research Field: Robotic Motion Planning, Motion Control of Mechatronic Systems

Tsinghua University Beijing, China

Bachelor in Mechanical Engineering (Elite Program), GPA: 3.82/4.0 ***(Rank: 5/133)*** Sep. 2017 – Jun. 2021

McGill University Montreal, Canada

Exchange Student in Mechanical Engineering, ***GPA: 4.0/4.0*** Aug. 2019 – Dec. 2019

RESEARCH EXPERIENCE

Real-time Motion Planning for Dual-arm Cooperative Manipulation Sep. 2023 – Present

- Developed a hierarchical real-time motion planning framework for dual-arm collaboration in dynamic environments. The framework integrates a centralized, optimization-based global planner with two distributed local reactive planners, enabling real-time adjustments of both long-horizon trajectories and local motion behaviors to effectively avoid moving obstacles. The framework was implemented on ROS platform and validated through dual-arm simulations and experiments.

Laser-assisted 3D-printing of Refractory Metals for High-temperature Sensing Applications Feb. 2022 – May 2023

- Proposed a Direct Ink Writing and Tar-Mediated Laser Sintering (DIW-TMLS) process and developed the corresponding equipment, enabling rapid fabrication of refractory metal patterns in ambient air. The DIW-TMLS process can create conformal circuits on 3D curvilinear surfaces and even produce 3D freestanding architectures. In addition, molybdenum-patterned wireless sensor is demonstrated, which is capable of withstanding temperature up to 350°C and exposure to flames.

Contouring Error Estimation and Compensation of Five-axis Machine Tools Feb. 2021 – Feb. 2022

- Designed a numerical algorithm for synchronized estimation of both tool tip and tool orientation contouring errors in five-axis machine tools, which is capable of operating in real-time at a frequency of 5000 Hz.
- Proposed an iterative contouring error compensation scheme with theoretical guarantee of convergence. Experiments demonstrate that the proposed scheme can effectively reduce contouring errors in extreme contours with large curvatures and sharp corners.

CPG-based Gait Planning and Locomotion Control of Quadruped Robots Feb. 2020 – May 2021

National Training Program of Innovation and Entrepreneurship for Undergraduates (Group Leader)

- Designed a gait planning algorithm for quadruped robots based on modulated Central Pattern Generator (CPG) network.
- Developed a quadruped robot prototype. Designed a leg admittance control strategy for compliant walking on uneven ground.

SELECTED PUBLICATIONS

[1] **J. Yu**, Z. Jin, C. Hu, et al., "Hierarchical real-time motion planning for safe multi-robot manipulation in dynamic environments," in *IEEE International Conference on Advanced Robotics and Mechatronics (ICARM)*, Tokyo, Japan, 2024. ***(Best Paper Award in Advanced Robotics)***

[2] **J. Yu**†, C. Hu†, Z. Wang, et al., "Printing three-dimensional refractory metal patterns in ambient air: Toward high temperature sensors," *Advanced Science*, vol. 10, no. 31, p. 2302479, 2023. ***(Inside Back Cover)***

[3] C. Hu, **J. Yu**, Z. Wang and Y. Zhu, "An iterative contouring error compensation scheme for five-axis precision motion systems," *Mechanical Systems and Signal Processing*, vol. 178, p. 109226, 2022.

SELECTED HONORS AND AWARDS

- National Scholarship for Postgraduates ***(Top 2%)*** Dec. 2023
- Outstanding Teaching Assistant Award of Tsinghua University ***(The highest honor for TA**, 10 recipients per year)* Dec. 2023
- National 1st Prize in China Mechanical Engineering Innovation Competition, Micro-Nano Sensing Technology and Intelligent Applications Category, Postgraduate Group ***(Rank: 1/88)*** Aug. 2023
- Outstanding Graduate of Beijing Jul. 2021

SKILLS

- **Language**: Mandarin (native), English (fluent, TOEFL: 97, CET6: 610), French (beginner)
- **Programming**: MATLAB, Python, C/C++
- **Softwares/Tools**: SolidWorks, AutoCAD, Ansys, ROS
- **Interests**: Piano (amateur level 7), Photography