

Jiacheng Xue

Telephone: +86 187-2968-9067 | Email: jiachengxue2001@gmail.com | Website

Education

Xi'an Jiaotong University

Master of Mechanical Engineering, GPA: 86.21/100

Shaanxi, China

Sept. 2023 – present

Xi'an Jiaotong University

Bachelor of Mechanical Engineering, GPA: 85.61/100

Shaanxi, China

Sept. 2019 – Jul. 2023

Publications

- Chi, X.[†], **Xue, J.**[†], Jia, L., *et al.* (2025). Machine learning-based online monitoring and closed-loop controlling for 3D printing of continuous fiber-reinforced composites. *Additive Manufacturing Frontiers*, 4, 200196. <https://doi.org/10.1016/j.amf.2025.200196>. [†]Co-first authors.
- Wu, L., **Xue, J.**, Tian, X., *et al.* (2023). 3D-printed metamaterials with versatile functionalities. *Additive Manufacturing Frontiers*, 2, 100091. <https://doi.org/10.1016/j.cjmeam.2023.100091>.
- Wu, L., Lu, Y., Li, P., Wang, Y., **Xue, J.**, *et al.* (2024). Mechanical metamaterials for handwritten digits recognition. *Advanced Science*, 11, 2308137. <https://doi.org/10.1002/advs.202308137>.
- Song, X., Yan, S., Wang, Y., Zhang, H., **Xue, J.**, *et al.* (2025). Genetic algorithm-enabled mechanical metamaterials for vibration isolation with different payloads. *Journal of Materiomics*, 11, 100944. <https://doi.org/10.1016/j.jmat.2024.100944>.

Research Experience

Advanced Mobile Chassis Design

Mar. 2021 – Apr. 2023

- Engineered a series of innovative mobile chassis for robot systems in demanding environments, incorporating Mecanum wheel and four-steering wheel to enable omnidirectional agility and robust performance.
- Pioneered mobility enhancements by tripling robot speed (200% improvement) and boosting efficiency through precise tuning of motor reduction ratios and center of gravity positioning in Webots simulations, ensuring fluid, stable navigation under competitive pressures.
- innovated a spherical robot encased in a sealed spherical shell seamlessly, integrating worm drive, gear drive, and belt drive mechanisms to achieve precise, discrete gimbal control, ensuring chassis flexibility and gimbal stability.

Online Monitoring and Closed-Loop Control of 3D Printing

Sept. 2022 – Sept 2023

- Devised an advanced system integrating Mask-RCNN and Octoprint for real-time fracture detection and parameter monitoring in 3D printing, achieving 94.7% and 97.7% recognition accuracies for pure materials and fiber-reinforced composites,
- Amplified tensile strength by 17.3 times and elastic modulus by 44.8 times through closed-loop control.
- Authored an original research paper synthesizing experimental findings on 3D printing of composites, resulting in an online publication; presented the work at the 13th Asian-Australasian Conference on Composite Materials (ACCM) in Kyoto, Japan.

Pedestrian Trajectory Recognition and Prediction Based on UAV Vision

Oct. 2023 – Feb. 2024

- Converted the Trajnet dataset into SDD format for YOLOv8 training and employed the ByteTrack tool to effectively track pedestrian trajectories.
- Analyzed Social-GAN to predict pedestrian trajectories based on their prior locations. By inputting 12 frames of imagery, the process successfully generated 8 frames of predicted trajectories, achieving an ADE (Average Displacement Error) of 0.014.

Inverse Design of Mechanical Metamaterials Using Machine Learning

Oct. 2023 – present

- Validated mechanical metamaterial designs through finite element method (FEM) simulations and crafted a bespoke computer vision-based program for non-contact Poisson's ratio monitoring, significantly enhancing experimental analysis of negative Poisson's ratio and mechanical response.
- Analyzed and refined open source machine learning code from research papers to pinpoint the most effective algorithm for inverse design, designed for regression tasks, achieving an exceptional R² accuracy of 99.7%.
- Spearheaded the independent design, research, and authorship of a trailblazing paper integrating inverse design

with multi-objective optimization for mechanical metamaterials, expertly optimizing lattice structure parameters to balance manufacturability, compactness, and performance.

Mobile Robotic Platform for Additive Manufacturing

Apr. 2024 – present

- Independently constructed a gantry-based mobile robotic platform for additive manufacturing, integrating XYZ moving and rotating axes to enable full degrees of freedom for the 3D printing nozzle, attaining a precision positioning error of 1.41 mm over a 200 mm range.
- Programmed an STM32 microcontroller board to execute PID algorithms for motor control and streamline communication via CAN, I2C, and UART protocols, discretizing the control system to elevate robotic mobility and printing accuracy.
- Secured a Chinese invention patent (No. 7846171) for an innovative 3D printing robot design, enhancing automation in manufacturing processes.

Patents

- Li D, **Xue J. (2024)**. *Innovative 3D printing robot for automated manufacturing*. CN Patent No. 7846171. China National Intellectual Property Administration.

Honors

- First-Class SMC Fellowship 2021
- Outstanding Student Leader Graduate of Xi'an Jiaotong University 2023
- First Prize in the RoboMaster National Robotics Competition 2022, 2023 and 2024

Conference Presentations

- Presented machine learning-based inverse design of mechanical metamaterials at the 3rd China Metamaterials Conference, **Jiaxing, China** May 2024
- Delivered a talk on composite material innovations at the 13th Asian-Australasian Conference on Composite Materials, **Kyoto, Japan** Aug. 2024

Internships

- Conducted research on robotics technologies during an internship at DJI, **Shenzhen, China**. May 2024
- Developed and implemented motor Field-Oriented Control (FOC) algorithms during an internship at Xihu Phibotnacci Company, **Hangzhou, China**. Jul. 2024

Skills

- **Language:** English (TOEFL iBT: 98), Chinese (Native)
- **Technical Skills:** SOLIDWORKS, ABAQUS, Python (PyTorch), STM32, MATLAB, Adobe Illustrator
- **Methodologies:** Machine Learning, Finite Element Methods, 3D Printing, Robotics Control Systems