Tao LIU

✉ tao.liu@manchester.ac.uk
Nancy Rothwell Building, Manchester, UK, M13 9PL
🌐 https://ryantaoliu.github.io/
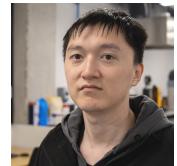
Research Interests

Neural-based design and manufacturing optimization, computational geometry, additive manufacturing, and robotics. In particular: multi-axis 3D printing, topology optimization, neural implicit representations for geometric modeling, fiber-reinforced composites, and computational design frameworks.

Research Experience

2023 – Now	**Ph.D. Student**, The University of Manchester, Manchester, UK Advised by Prof. Charlie C.L. Wang
2020 – 2023	**Research Assistant**, Central South University, Changsha, China Advised by Prof. Shengjun LIU

Research Publications

[12] Neural co-optimization of structural topology, manufacturable layers, and path orientations for fiber-reinforced composites
Tao LIU, Tianyu Zhang, Yongxue Chen, Weiming Wang, Yu Jiang, Yuming Huang, Charlie Wang
ACM Transactions on Graphics (TOG), 2025

[11] Neural Slicer for Multi-Axis 3D Printing
Tao LIU, Tianyu Zhang, Yongxue Chen, Yuming Huang, Charlie Wang
ACM Transactions on Graphics (TOG), 2024

[10] Curve-Based Slicer for Multi-Axis DLP 3D Printing
Chengkai Dai, **Tao LIU**, Dezhao Guo, Binzhi Sun, Guoxin Fang, Yeung Yam, Charlie C. L. Wang
ACM Transactions on Graphics (TOG), 44(6):1–14, 2025(**Best Paper Award**)

[9] Can Any Model Be Fabricated? Inverse Operation Based Planning for Hybrid Additive-Subtractive Manufacturing
Yongxue Chen, **Tao LIU**, Yuming Huang, Weiming Wang, Tianyu Zhang, Kun Qian, Zikang Shi, Charlie C. L. Wang
ACM Transactions on Graphics (TOG), 44(6):1–14, 2025

[8] Toolpath generation for high density spatial fiber printing guided by principal stresses
Tianyu Zhang, **Tao LIU**, Neelotpal Dutta, Yongxue Chen, Renbo Su, Zhizhou Zhang, Weiming Wang, Charlie Wang
Composites Part B: Engineering, 2025

[7] Memory-efficient modeling and slicing of large-scale adaptive lattice structures
Shengjun LIU, **Tao LIU**, Qiang Zou, Weiming Wang, Eugeni L Doubrovski, Charlie CL Wang
Journal of Computing and Information Science in Engineering, 21(6):061003, 2021

[6] Variational progressive-iterative approximation for RBF-based surface reconstruction
Shengjun LIU, **Tao LIU**, Ling Hu, Yuanyuan Shang, Xinru Liu
The Visual Computer, 2021

[5] Force-Based Adaptive Deposition in Multi-Axis Additive Manufacturing: Low Porosity for Enhanced Strength
Yuming Huang, Renbo Su, Kun Qian, Tianyu Zhang, Yongxue Chen, **Tao LIU**, Guoxin Fang, Weiming Wang, Charlie Wang
Robotics and Computer-Integrated Manufacturing, 2026

Research Publications (continued)

[4] Roadmap on Artificial Intelligence-Augmented Additive Manufacturing
Ali Zolfagharian, Liuchao Jin, Qi Ge, Wei-Hsin Liao, Andrés Díaz Lantada, Francisco Franco Martínez, Tianyu Zhang, **Tao LIU**, Charlie C. L. Wang, and others
Advanced Intelligent Systems, 2026

[3] Co-Optimization of Tool Orientations, Kinematic Redundancy, and Waypoint Timing for Robot-Assisted Manufacturing
Yongxue Chen, Tianyu Zhang, Yuming Huang, **Tao LIU**, Charlie Wang
IEEE Transactions on Automation Science and Engineering, 2025

[2] Learning Based Toolpath Planner on Diverse Graphs for 3D Printing
Yuming Huang, Yuhu Guo, Renbo Su, Xingjian Han, Junhao Ding, Tianyu Zhang, **Tao LIU**, Weiming Wang, Guoxin Fang, Xu Song, and others
ACM Transactions on Graphics (TOG), 2024

[1] Implicit progressive-iterative algorithm of curves and surfaces with compactly supported radial basis functions
Haibo Wang, **Tao LIU**, Shengjun Liu, Wenyan Wei, Xinru Liu, Pingbo Liu, Yanyu Bai, Yue'an Chen
Journal of Computer-Aided Design & Computer Graphics, 2021

Education

2023 – Now	**Ph.D. in Neural-Based Design and Manufacturing Optimization**, The University of Manchester, Manchester, UK Supervised by Prof. Charlie C.L. Wang
Aug 2013 – Jun 2020	**M.S. & B.S. in Computational Mathematics**, Central South University, ChangSha, China Supervised by Prof. Shengjun LIU (GPA 3.4/4 top 10%)

Honors & Awards

2025	**Best Paper Award**, SIGGRAPH Asia
2018	**Central South University Scholarship**, School of Mathematics, Central South University
2017	**University Recommendation for M.Sc. Admission (Exam-Exempt)**, School of Mathematics, Central South University
2014	**Excellent Student**, School of Chemistry, Central South University

Academic Service

Reviewer for Journals and Conferences

ACM SIGGRAPH and *SIGGRAPH Asia*
Additive Manufacturing Process (AMP)
Computer Aided Design (CAD)
ACM Symposium on Computational Fabrication (SCF)
Computer Aided Geometry Design (CAGD)
Eurographics (EG)
Graphical Models (GMod) Computers & Graphics (CG)

Teaching

September 2025	**Teaching Assistant**, Graphics & Virtual Environments, The University of Manchester (Undergraduate course)

Teaching (continued)

	Teaching Assistant, Fundamentals of Computer Architecture, The University of Manchester (Undergraduate course)
	Teaching Assistant, Experimental Methods (MSc Structural Engineering), The University of Manchester (Postgraduate course)
September 2024	**Teaching Assistant**, Introduction to Programming 1, The University of Manchester (Undergraduate course)
September 2023	**Teaching Assistant**, Additive Manufacturing & 3D Product Modelling, The University of Manchester (Undergraduate course)
	Teaching Assistant, Advanced Modelling & Simulation, The University of Manchester (Undergraduate course)
September 2018	**Teaching Assistant**, Computer Graphics, Central South University (Undergraduate course)

References

Available on Request