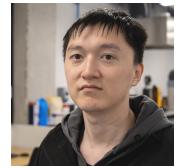


Tao LIU

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🌐 <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, Binzhai 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] TPMS-based mechanical bonding structures optimized by FEM with periodic boundary conditions
Charlie C.L. Wang, Renbo Su, Tao LIU, Tianyu Zhang, Yingjun Tian, Romain Hautier, Weiming Wang
Materials & Design, 263:115581, 2026

Research Publications (continued)

- [4] 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
- [3] 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
- [2] 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
- [1] 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
- [0] 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 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