

**Tianyu ZHANG**  
Engineering Building A&B  
Oxford Rd, Manchester M13 9PL

+44(0)7568758847 (mobile)  
tianyu.zhang-10@postgrad.manchester.ac.uk  
<https://github.com/zhangty019>

## Education

<b>University of Manchester (UoM)</b> <i>PhD of Mechanical Engineering</i>	Manchester, UK <i>Jan. 2021 - Feb. 2024</i>
<b>The Chinese University of Hong Kong (CUHK)</b> <i>PhD student of Mechanical Engineering</i>	Hong Kong, CN <i>Aug. 2019 - Dec. 2020</i>
<b>Xi'an Jiaotong University (XJTU)</b> <i>Master of Engineering in Mechanical Manufacturing &amp; Automation</i>	Xi'an, CN <i>Sep. 2015 - Jul. 2018</i>
<b>University of Electronic Science and Technology of China (UESTC)</b> <i>Bachelor of Engineering in Mechanical Design, Manufacturing and Automation</i>	Chengdu, CN <i>Sep. 2011 - Jul. 2015</i>

## Research Interests

**Multi-axis Additive Manufacturing, Computational Geometry, Robotics, CNC**

## Awards and Honors

- **Best Paper Award** - ASME 43rd Computers and Information in Engineering Conference (CIE), 2023.
- **Best Paper Award** - Technical Papers, ACM SIGGRAPH Asia, 2022.
- **Finalist of Best Student Paper Award** - IEEE International Conference on Automation Science and Engineering, 2021.
- **Postgraduate Awards** - 2nd Class of National Scholarship, 2016 & 2015; Professional Master Scholarship, 2015; Outstanding Member of XJTU Graduate Student Union, 2017.
- **Undergraduate Awards** - 1st Class of People's Scholarship, 2014 & 2012; 2nd Class of People's Scholarship, 2013; Advanced Individual of Study, 2014, Recommended to XJTU Graduate School with the exemption of entrance exam, 2015.

## Publications

- [1] Tianyu Zhang, Guoxin Fang, Yuming Huang, Neelotpal Dutta, Sylvain Lefebvre, Zekai Murat Kilic, and Charlie C.L. Wang, " $S^3$  - Slicer: A general slicing framework for multi-axis 3D printing", ACM Transactions on Graphics (SIGGRAPH Asia 2022), vol.41, no.6, (15 pages), December 2022. (**Best Paper Award - Technical Papers**; 4/97 with a ratio of 0.98% in terms of 407 technical paper submissions)
- [2] Tianyu Zhang, Yuming Huang, Piotr Kukulski, Neelotpal Dutta, Guoxin Fang, and Charlie C.L. Wang, "Support Generation for Robot-Assisted 3D Printing with Curved Layers", IEEE International Conference on Robotics and Automation (ICRA), London, United Kingdom, May 29 - June 2, 2023.
- [3] Tianyu Zhang, Xiangjia Chen, Guoxin Fang, Yingjun Tian, and Charlie C.L. Wang, "Singularity-aware motion planning for multi-axis additive manufacturing", IEEE Robotics and Automation Letters, Presented at IEEE International Conference on Automation Science and Engineering (CASE 2021), Lyon, France, August 23-27, 2021, vol.6, no.4, pp.6172-6179, October 2021. (**Finalist of Best Student Paper Award**)
- [4] Tao Liu, Tianyu Zhang, Yongxue Chen, Yuming Huang, and Charlie C.L. Wang, "Neural slicer for multi-axis 3D printing", ACM Transactions on Graphics (SIGGRAPH 2024), 15 pages, accepted, April 2024.
- [5] Dutta Neelotpal, Tianyu Zhang, Guoxin Fang, Ismail E. Yigit, and Charlie C.L. Wang, "Vector Field Based Volume Peeling for Multi-Axis Machining", ASME Journal of Computing and Information Science

- in Engineering, Presented at ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE 2023), Boston, USA, August 20-23, 2023, vol.24, no.5, 051001 (12 pages), May 2024. (**Best Paper Award**)
- [6] Guoxin Fang, Tianyu Zhang, Yuming Huang, Zhizhou Zhang, Kunal Masania, and Charlie C.L. Wang, “Exceptional mechanical performance by spatial printing with continuous fiber: curved slicing, toolpath generation, and physical verification”, Additive Manufacturing, vol.82, 104048 (16 pages), February 2024.
- [7] Guoxin Fang, Tianyu Zhang, Sikai Zhong, Xiangjia Chen, Zichun Zhong, and Charlie C.L. Wang, “Reinforced FDM: Multi-axis filament alignment with controlled anisotropic strength”, ACM Transactions on Graphics (SIGGRAPH Asia 2020), vol.39, no.6, (15 pages), November 2020.
- [8] Yuming Huang, Guoxin Fang, Tianyu Zhang, and Charlie C.L. Wang, “Turning-angle optimized printing path of continuous carbon fiber for cellular structures”, Additive Manufacturing, vol.68, 103501 (16 pages), April 2023.

## Research&Work Experiences

### Vector-field guided tool-path planning for 3D printing with CCF

*Main Developer*

Manchester, UK

*Oct 2023 - Mar 2024*

- Joint project with **Broetje-Automation GmbH** (German)
- UKRI Impact Acceleration Account (IAA) Fund
- Contents: Determined optimal fiber placement following stress field and fabrication constraints; Filled the model material into the carbon fiber gaps caused by fabrication constraints; Combined toolpath commands of fiber and model material and the fabrication auxiliary information.

### Toolpath algorithms for 5XCAM hybrid manufacturing

*Main Developer*

Manchester, UK

*Aug 2021 - Jan 2023*

- Joint project with **5AXISWORKS Co., Ltd.** (UK)
- Innovate UK Smart Grants
- Contents: Developed a new CAM software program called "5XCAM" that supports the toolpath generation for machining and curved-layer 3D printing. Website: <https://5axismaker.co.uk/5xcam?rq=5XCAM>
- 5XCAM is the first and only automated CAM software platform of its kind.
- An extension of the curved slicing kernel and a fruitful academic-industry collaboration.

### Development of application software for electric vehicles

*Software Developer*

Suzhou, CN

*Jul 2018 - Jun 2019*

- Technical staff in **Shenzhen Inovance Technology Co., Ltd.**
- Responsible for coding and testing based on customer requirements for electric vehicle applications.

### Specification for Long Transmission Chain Mechanical Spindle

*Developer & Project Manager*

Xi'an, CN

*Oct 2016 - May 2018*

- Advisor: Chang-Jiang (Cheung Kong) Scholar Professor Wanhua Zhao
- A sub-project of National Funding Project-2015ZX04001002
- Contents: Eliminated the vibration of spindle structure by a designed model filter and instruction shaping; Built rapid control prototyping platform based on dSPACE and did experimental verification.

### Design of 3-RPS Parallel Robot Control Algorithm

*Software Developer & Project Manager*

Chengdu, CN

*Oct 2014 - Jun 2015*

- Contents: Conducted parallel robot's structure and inverse kinematics analysis, and built parallel robot SimMechanics model to simulate the actual parallel robot; Used adaptive inverse controller to realize the control of the parallel robot; Used xPC Target toolkit to build a rapid control prototyping platform.