

Tianyu ZHANG
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<https://github.com/zhangty019>

Education

- **University of Manchester (UoM)** Manchester, UK
PhD of Mechanical Engineering Jan. 2021 - Feb. 2024
 - Thesis: Geometric Computing Based Enabler for Multi-axis Additive Manufacturing
 - Research Field: Multi-axis 3D Printing, Computational Geometry, Robotics, CNC
- **The Chinese University of Hong Kong (CUHK)** Hong Kong, CN
PhD student of Mechanical Engineering Aug. 2019 - Dec. 2020
- **Xi'an Jiaotong University (XJTU)** Xi'an, CN
Master of Engineering in Mechanical Manufacturing & Automation Sep. 2015 - Jul. 2018
 - Thesis: Control Strategy for Mechanical Spindle with a Long Transmission Chain under High Acceleration Starts and Stops
 - Recommended to XJTU Graduate School with the exemption of entrance exam
- **University of Electronic Science and Technology of China (UESTC)** Chengdu, CN
Bachelor of Engineering in Mechanical Design, Manufacturing and Automation Sep. 2011 - Jul. 2015
 - Thesis: Control Strategy for Mechanical Spindle with a Long Transmission Chain under High Acceleration Starts and Stops
 - Overall GPA: 3.67/4.0

Research Experience

- **Toolpath algorithms for 5XCAM hybrid manufacturing** Manchester, UK
Main Developer Aug 2021 - Jan 2023
 - Joint project with 5AXISWORKS Co., Ltd.
 - Innovate UK Smart Grants
 - 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 nice experience of academic-industry collaboration.
- **Specification for Long Transmission Chain Mechanical Spindle** Xi'an, CN
Main Developer & Project Manager Oct 2016 - May 2018
 - Advisor: Chang-Jiang (Cheung Kong) Scholar Professor Wanhua Zhao
 - A sub-project of National Funding Project-2015ZX04001002
 - 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** Chengdu, CN
Software Developer & Project Manager Oct 2014 - Jun 2015
 - Conducted parallel robot's structure and inverse kinematics analysis, and built parallel robot SimMechanics model to simulate the actual parallel robot.
 - Used PID and adaptive inverse controller to realize the control of the parallel robot.
 - Used xPC Target toolkit to build a rapid control prototyping platform.

Work Experience

- **Vector-field guided tool-path planning for 3D printing with CCF** Manchester, UK
Main Developer Oct 2023 - Mar 2024

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

• **Shenzhen Inovance Technology Co., Ltd.**

Suzhou, CN

Software Developer

Jul 2018 - Jun 2019

- Responsible for coding and testing based on customer requirements for electric vehicle applications.
- Did investigation on the current situation of active safety development, completed mechanism analysis of wheel-slip on various occasions, and programmed for skid-resistance module.

Publications

- Zhang, T.**, Huang, Y., Kukulski P., Dutta, N., Fang, G., Wang, C.C., 2023. Support Generation for Robot-Assisted 3D Printing with Curved Layers. IEEE International Conference on Robotics and Automation (ICRA), pp.12338-12344. [**Open-Sourced**]
- Zhang , T.**, Fang , G., Huang, Y., Dutta, N., Lefebvre, S., Kilic, Z.M. and Wang, C.C., 2022. S^3 -slicer: A general slicing framework for multi-axis 3D printing. ACM Transactions on Graphics (TOG), 41(6), pp.1-15. [**Open-Sourced**], [**Best Paper Award**]
- Zhang, T.**, Chen, X., Fang, G., Tian, Y. and Wang, C.C., 2021. Singularity-aware motion planning for multi-axis additive manufacturing. IEEE Robotics and Automation Letters (RAL), 6(4), pp.6172-6179. [**Open-Sourced**] [**Finalist of Best Student Paper Award**]
- Dutta, N., **Zhang, T.**, Fang, G., Yigit, I.E. and Wang, C.C., 2023. Vector field based volume peeling for multi-axis machining. Journal of Computing and Information Science in Engineering (JCISE), pp.1-13. [**Best Paper Award**]
- Fang, G., **Zhang, T.**, Huang, Y., Zhang, Z., Masania, K. and Wang, C.C., 2024. Exceptional mechanical performance by spatial printing with continuous fiber: Curved slicing, toolpath generation and physical verification. Additive Manufacturing (ADDMA), p.104048.
- Fang, G., **Zhang, T.**, Zhong, S., Chen, X., Zhong, Z. and Wang, C.C., 2020. Reinforced FDM: Multi-axis filament alignment with controlled anisotropic strength. ACM Transactions on Graphics (TOG), 39(6), pp.1-15.
- Huang , Y., Fang , G., **Zhang, T.**, and Wang, C.C., 2023. Turning-angle optimized printing path of continuous carbon fiber for cellular structures. Additive Manufacturing (ADDMA), 68, p.103501.
- Ren, M., Lu, W., Shao, Q., Han, F., Ouyang, W., **Zhang, T.**, Wang, C.C. and Chen, S.C., 2021. Aberration-free large-area stitch-free 3D nano-printing based on binary holography. Optics Express (OE), 29(26), pp.44250-44263.

Honors and awards

- 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