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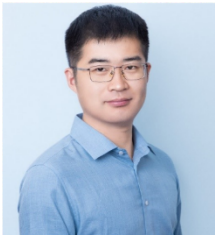

PROFILE

- Associate Professor in Mechanical Engineering at the National University of Singapore, specializing in additive manufacturing, computational mechanics, and multi-scale multi-physics modeling.
- Senior editor of the top journal *Additive Manufacturing.*
- My work integrates physics-based simulation, data-driven modeling, and process-structure-property prediction for advanced manufacturing systems.

EDUCATION

- **2008-2012** B.E., Mechanical Engineering, Tsinghua University, China
- **2012-2017** Ph.D., Mechanical Engineering, Tsinghua University (China) & Northwestern University (U.S.)

WORK EXPERIENCE

- **2017-2018** Postdoctoral Fellow, Mechanical Engineering, Northwestern University, U.S.
- **2018-2024** Assistant Professor, Mechanical Engineering, National University of Singapore
- **2025-Present** Associate Professor, Mechanical Engineering, National University of Singapore

RESEARCH INTERESTS

- Additive manufacturing / 3D printing
- Computational mechanics and multi-scale multi-physics modeling
- Data-driven modeling and integration of data analytics with physics-based modeling

RESEARCH IMPACT

- **Over 10,000 citations; h-index 59; i10-index 125 (accessed May 2026).**
- More than **140** papers published in leading journals, including ***Nature Communications, International Journal of Machine Tool and Manufacture, International Journal of Plasticity, Acta Materialia, Additive Manufacturing, Computer Methods in Applied Mechanics and Engineering, and Journal of the Mechanics and Physics of Solids***.
- High research visibility in additive manufacturing, computational mechanics, powder-bed-fusion process modeling, and process-structure-property prediction.
- Research contributions cover defect formation, powder spreading, pore elimination, multi-physics modeling, and data-driven characterization of additive manufacturing processes.

HONORS & AWARDS

2018 Young Investigator Award, 5th International Conference on Additive Manufacturing and Bio-Manufacturing

REPRESENTATIVE PUBLICATIONS IN RECENT YEARS

Zixu Guo, Yang Li, Lei Fan, Shiwei Wu, Daijun Hu, Guochen Peng, Feng Lin, Yong-Wei Zhang, Yilun Xu*, ***Wentao Yan****, Trigonometric Gradient Microstructures in Additively Manufactured Single Crystals Enable Strength-Ductility Synergy and Programmable Performance. ***Nature Communications***, 2025, 16(1): 9936.

Zixu Guo, Xiaochong Lu, Guochen Peng, Daijun Hu, Dawei Huang, Xiaojun Yan, Fionn PE Dunne, Huajian Gao, Yong-Wei Zhang**, Wentao Yan*,** Yilun Xu*, Beyond first-cycle damage: Mechanistic drivers of fatigue crack nucleation in single crystals. ***Journal of the Mechanics and Physics of Solids***, 2025: 106393.

Jianzhao Wu, Chaoyong Zhang, Guobiao Wang, Huajun Cao, Pai Zheng, Wenhui Liu, Lu Wang*, **Wentao Yan***, Physics-assisted feature-augmented metamodels to predict the keyhole geometry in laser additive manufacturing. ***Additive Manufacturing***, 2025: 104916.

Zhenhua Zhang, Zixu Guo, Quanquan Han, Daijun Hu, Shiwei Wu, Haiyang Fan, Erlei Li, Ming Li, Yilun Xu, Shoufeng Yang, Chuanzhen Huang, **Wentao Yan***, Anomalous anisotropy in an additively manufactured solid-solution-strengthened superalloy from room to elevated temperatures**. *International Journal of Plasticity***, 2025: 104409.

Zixu Guo, Xiaochong Lu, Chaitanya Paramatmuni, Huajian Gao, Fionn P.E. Dunne, **Wentao Yan*,** Yong-Wei Zhang*, Yilun Xu*, Slip system-resolved GNDs and SEDs: A multi-scale framework for predicting crack nucleation in single-crystal metals. ***Acta Materialia***, 2025(288): 120853.

Lu Wang, Zixu Guo, Guochen Peng, Shiwei Wu, Yanming Zhang, **Wentao Yan*,** Evaporation-induced composition evolution in metal additive manufacturing. ***Advanced Functional Materials***, 2024. 2412071

Hou Yi Chia, Yanming Zhang, Lu Wang, **Wentao Yan***, Unveiling gas–liquid metal reactions in metal additive manufacturing: High-fidelity modeling validated with experiments. ***Acta Materialia***, 2024(275). 120029

Lu Wang, Qilin Guo, Lianyi Chen*, **Wentao Yan***, In-situ experimental and high-fidelity modelling tools to advance understanding of metal additive manufacturing. ***International Journal of Machine Tools and Manufacture***, 2023: 104077.

Shiwei Wu, Hou Yi Chia, Tianlong Zhang, Yuefei Jia, Yongkun Mu, Qing Zhang, Yung Zhen Lek, Daijun Hu, Lei Fan, **Wentao Yan***. A precipitation-strengthened high-entropy alloy with high (Al+ Ti) content for laser powder bed fusion: Synergizing intrinsic hot-cracking resistance and ultrahigh strength. ***Acta Materialia***, 2023:119193.

Hou Yi Chia, Lu Wang, **Wentao Yan***, Influence of oxygen content on melt pool dynamics in metal additive manufacturing: High-fidelity modeling with experimental validation. Acta Materialia, 2023:118824.

Daijun Hu, Nicolò Grilli, **Wentao Yan***, Dislocation structures formation induced by thermal stress in additive manufacturing: Multiscale crystal plasticity modeling of dislocation transport. ***Journal of the Mechanics and Physics of Solids***, 2023: 105235.

Dafan Du, Lu Wang, Anping Dong*, **Wentao Yan***, Guoliang Zhu, Baode Sun, Promoting the densification and grain refinement with assistance of static magnetic field in laser powder bed fusion. ***International Journal of Machine Tools and Manufacture***, 2022, 183: 103965.

Yanming Zhang, Yefeng Yu, Lu Wang, Yang Li, Feng Lin, **Wentao Yan***, Dispersion of reinforcing micro-particles in the powder bed fusion additive manufacturing of metal matrix composites. ***Acta Materialia***, 2022: 118086

Lu Wang, Yanming Zhang, Hou Yi Chia, **Wentao Yan***, Mechanism of the keyhole pore formation during metal additive manufacturing, ***npj Computational Materials***, 2021.

Yunlong Li, Xin Lin*, Yunlong Hu, **Wentao Yan***, Jerry Ying Hsi Fuh, Hongbiao Dong, Weidong Huang, Precipitation behavior of Nb-Si-based in-situ composite manufactured by laser directed energy deposition, ***Scripta Materialia***. 2022 (207): 114288.

Hui Chen, Yuxiang Chen, Yin Liu, Qingsong Wei*, Yusheng Shi, **Wentao Yan***, Packing quality of powder layer during counter-rolling-type powder spreading process in additive manufacturing, ***International Journal of Machine Tool and Manufacture***, 2020. 153: 103553

Hui Chen, **Wentao Yan***, Spattering and denudation in laser powder bed fusion process: Multiphase flow modelling, ***Acta Materialia***. 2020. 196: 154-167

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Wentao Yan*, Yan Lu, Kevontrez Jones, Zhuo Yang, Jason Fox, Paul Witherell, Gregory Wagner, Wing Kam Liu*, Data-driven characterization of computational models for powder-bed-fusion additive manufacturing, ***Additive Manufacturing***. 2020. 101503

Hui Chen, Qingsong Wei, Yingjie Zhang, Fan Chen, Yusheng Shi, **Wentao Yan*,** Deposition mechanisms of powder-spreading process of powder bed-based additive manufacturing: experimental test and particulate scale simulations, ***Acta Materialia***. 2019. 179: 158-171

S. M. H. Hojjatzadeh, N. D. Parab, **Wentao Yan**, Qilin Guo, Lianghua Xiong, Cang Zhao, Luis I. Escano, Minglei Qu, Xianghui Xiao, Kamel Fezzaa, Wes Everhart, Tao Sun, Lianyi Chen. Pore elimination mechanisms during 3D printing of metals. ***Nature Communications***. 2019. 10(1):3088

Wentao Yan, Yanping Lian, Cheng Yu, Orion Kafka, Zeliang Liu, Wing Kam Liu, Gregory Wagner, An integrated Process-Structure-Property modeling framework for additive manufacturing. ***Computer Methods in Applied Mechanics and Engineering***, 2018. 339: 184-204

Wentao Yan, Ya Qian, Wenjun Ge, Stephen Lin, Gregory Wagner, Feng Lin, Wing Kam Liu, Meso-scale modeling of multiple-layer fabrication process in Selective Electron Beam Melting: inter-layer/track voids formation. ***Materials & Design***, 2018. 141: 210-219

Wentao Yan, Ya Qian, Weixin Ma, Bin Zhou, Yongxing Shen, Feng Lin, Modeling and experimental validation of electron beam selective melting process. ***Engineering***, 2017. 3(5): 701-707

Wentao Yan, Wenjun Ge, Ya Qian, Stephen Lin, Gregory Wagner, Feng Lin, Wing Kam Liu, Multi-physics modeling of single/multiple-track defect mechanisms in Electron Beam Selective Melting. ***Acta Materialia***, 2017. 134:324-333

Wentao Yan, Wenjun Ge, Jacob Smith, Stephen Lin, Orion Kafka, Feng Lin, Wing Kam Liu, Multiscale modeling of electron beam melting of functionally graded materials, ***Acta Materialia***, 2016. 115: 403-412