

Lu WANG

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College of Design and Engineering, National University of Singapore, Singapore 117578

EDUCATION

National University of Singapore (NUS)

Ph.D. Mechanical Engineering

Singapore

Aug. 2019 – Jun. 2023

- **Supervisor:** [Dr. Wentao Yan](#) and [Prof. Heow Pueh Lee](#)
- **Research Interest:** Metal Additive Manufacturing, Computational Fluid Dynamics, Thermal Fluid Flow Simulation

Huazhong University of Science and Technology (HUST)

M.Eng. Engineering Design & Manufacturing of Ship and Marine Structure

Wuhan, China

Sep. 2013 – Jun. 2016

Huazhong University of Science and Technology (HUST)

B.Eng. Naval Architecture & Ocean Engineering

Wuhan, China

Sep. 2009 – Jun. 2013

EMPLOYMENT

Research Fellow

National University of Singapore (NUS)

Jun. 2023 – Now

Singapore

- High-fidelity Multi-physics Modeling of Molten Pool Dynamics in Metal Additive Manufacturing

Teaching Assistant

National University of Singapore (NUS)

Jan. 2020 – Jul. 2021

Singapore

- Tutoring ME2112 Strength of Materials;
- Teaching experiments in ME2142 Feedback Control Systems;

Research Associate

Huazhong University of Science and Technology (HUST)

Jan. 2019 – Jul. 2019

Wuhan, China


- Studying the influence of laser parameters on L-PBF part quality through experiments
- Conducting experiments on the independently developed L-PBF machine.

PUBLICATIONS

[1] Wang, L., Zhang, Y., Chia, H. Y., & Yan, W. (2022). Mechanism of keyhole pore formation in metal additive manufacturing. *npj Computational Materials*, 8(1), 22.

(SCI, JCR Ranked 49/424, 11.56% in MATERIALS SCIENCE, MULTIDISCIPLINARY, IF 9.7, highly cited) 

[2] Wang, L., & Yan, W. (2021). Thermoelectric magnetohydrodynamic model for laser-based metal additive manufacturing. *Physical Review Applied*, 15(6), 064051.

(SCI, JCR Ranked 37/178, 20.78% in PHYSICS, APPLIED, IF 4.6) 

[3] Wang, L., Zhang, Y., & Yan, W. (2020). Evaporation model for keyhole dynamics during additive manufacturing of metal. *Physical Review Applied*, 14(6), 064039.

(SCI, JCR Ranked 37/178, 20.78% in PHYSICS, APPLIED, IF 4.6) 

[4] Wang, L., Wang, S., Zhang, Y., & Yan, W. (2023). Multi-phase flow simulation of powder streaming in laser-based directed energy deposition. *International Journal of Heat and Mass Transfer*, 212, 124240.

(SCI, JCR Ranked 17/137, 12.40% in MECHANICS, IF 5.2) A

[5] Wang, L., Guo, Q., Chen, L., & Yan, W. (2023). In-situ experimental and high-fidelity modelling tools to advance understanding of metal additive manufacturing. *International Journal of Machine Tools and Manufacture*, 104077.

(SCI, JCR Ranked 2/136, 1.47% in ENGINEERING, MECHANICAL, IF 14.0) A+

[6] Wang, Y., Wang, L., Liu, D., Miao, B., Wu, H., Pei, J., ... & Yuan, G. (2023). Mechanisms of processing map difference between laser powder bed fusion of Mg solid cubes and lattice structures. *Additive Manufacturing*, 76, 103773.

(SCI, JCR Ranked 5/50, 10.00% in ENGINEERING, MANUFACTURING, IF 11.0, Co-first) A+

[7] Zhang, S., Ding, M., Wang, L., Ge, W., & Yan, W. (2022). Laser powder bed fusion of diamond/N6 MMCs enabled by Ni-Ti coated diamond particles. *Materials & Design*, 217, 110635.

(SCI, JCR Ranked 65/344, 18.89% in MATERIALS SCIENCE, MULTIDISCIPLINARY, IF 8.4, Co-first) A

[8] Han, Y., Wang, L., Liu, K., & Yan, W. (2020). Numerical modeling of laser powder bed fusion of metallic glasses: Prediction of crystallization. *Journal of Micromechanics and Molecular Physics*, 5(04), 2050013. (Co-first)

[9] Chia, H. Y., Wang, L., & Yan, W. (2023). Influence of oxygen content on melt pool dynamics in metal additive manufacturing: High-fidelity modeling with experimental validation. *Acta Materialia*, 249, 118824.

(SCI, JCR Ranked 3/79, 3.80% in METALLURGY & METALLURGICAL ENGINEERING, IF 9.4) A+

[10] Yang, M., Wang, L., & Yan, W. (2021). Phase-field modeling of grain evolutions in additive manufacturing from nucleation, growth, to coarsening. *npj Computational Materials*, 7(1), 56.

(SCI, JCR Ranked 49/424, 11.56% in MATERIALS SCIENCE, MULTIDISCIPLINARY, IF 9.7) A

[11] Du, D., Wang, L., Dong, A., Yan, W., Zhu, G., & Sun, B. (2022). Promoting the densification and grain refinement with assistance of static magnetic field in laser powder bed fusion. *International Journal of Machine Tools and Manufacture*, 183, 103965.

(SCI, JCR Ranked 2/136, 1.47% in ENGINEERING, MECHANICAL, IF 14.0) A+

[12] Yu, Y., Wang, L., Zhou, J., Li, H., Li, Y., Yan, W., & Lin, F. (2022). Impact of fluid flow on the dendrite growth and the formation of new grains in additive manufacturing. *Additive Manufacturing*, 55, 102832.

(SCI, JCR Ranked 5/50, 10.00% in ENGINEERING, MANUFACTURING, IF 11.0) A+

[13] Yang, M., Wang, L., & Yan, W. (2021). Phase-field modeling of grain evolution in additive manufacturing with addition of reinforcing particles. *Additive Manufacturing*, 47, 102286

(SCI, JCR Ranked 5/50, 10.00% in ENGINEERING, MANUFACTURING, IF 11.0) A+

[14] Chia, H. Y., Zhang, Y., Wang, L., & Yan, W. (2024). Unveiling gas-liquid metal reactions in metal additive manufacturing: High-fidelity modeling validated with experiments. *Acta Materialia*, 120029. (SCI, JCR Ranked 3/79, 3.80% in METALLURGY & METALLURGICAL ENGINEERING, IF 9.4) A+

[15] Zhang, Y., Yu, Y., Wang, L., Li, Y., Lin, F., & Yan, W. (2022). Dispersion of reinforcing micro-particles in the powder bed fusion additive manufacturing of metal matrix composites. *Acta Materialia*, 235, 118086.

(SCI, JCR Ranked 3/79, 3.80% in METALLURGY & METALLURGICAL ENGINEERING, IF 9.4) A+

[16] Xie, Z., Chen, F., Wang, L., Ge, W., & Yan, W. (2023). Data-driven prediction of keyhole features in metal additive manufacturing based on physics-based simulation. *Journal of Intelligent Manufacturing*, 1-14.

(SCI, JCR Ranked 10/50, 20.0% in ENGINEERING, MANUFACTURING, IF 8.3) **A**

[17] Hu, D., Grilli, N., Wang, L., Yang, M., & Yan, W. (2022). Microscale residual stresses in additively manufactured stainless steel: Computational simulation. *Journal of the Mechanics and Physics of Solids*, 161, 104822. (SCI, JCR Ranked 15/137, 10.94% in MECHANICS, IF 5.3)

A

[18] **Wang L.**, Guo Z., Peng G., Wu S., Zhang Y., Yan W., Evaporation-Induced Composition Evolution in Alloy Design for Metal Additive Manufacturing. (Under review).

[19] Deng Q., Chen F., **Wang L.**, ... and Yan W., Cold cracking in laser powder bed fusion of high-strength Mg-15Gd-1Zn-0.4Zr alloy. (*Journal of Materials Science & Technology*, Under review)

[20] Zhang Y., Ge W., Li Y., Peng G., Wu S., Yang Z., **Wang L.**, Yan W., Thermal effect of in-situ chemical reaction in multi-material metal additive manufacturing. (Under review)

Google Scholar: 570 citations; h index: 11; i10 index: 11.

Invited Reviewer: *Nat. Commun., Npj Comput. Mater., Addit. Manuf., Mech. Syst. Signal Process., Mater. Des., J. Manuf. Process., Int. J. Mech. Sci., etc.*

PROJECTS

[1] MOE-T2EP50221-0013 Tier 2 MOE Data-driven multi-scale modelling of thermal stress in additively manufactured parts, 01/06/2022-31/05/2025, **SGD 784,108** (Participant)

[2] M22L2b0111 MTC Programmatic Fund A*STAR Advanced Models for Additive Manufacturing, 01/03/2023-28/02/2026, **SGD 9,844,250** (Participant)

CHAPTERS & INVENTIONS

[1] **Lu Wang**, Yefeng Yu, Daijun Hu, Wentao Yan, “Chapter 9: Multiscale modeling applied to additive manufacturing”, *Fundamentals of Multiscale Modeling of Structural Materials*, W. Xia, Ed., 1st Edition, Elsevier, 2022, pp. 333–388.

[2] **Lu Wang**, Wentao Yan, Thermoelectric Magnetohydrodynamic Model for Metal Additive Manufacturing. ILO Ref: 2022-052. (Software Invention Disclosure)

TALKS & CONFERENCES

[1] High-fidelity Multi-physics Modeling of Molten Pool Dynamics in Metal Additive Manufacturing. *Invited talk* at **Northwestern Polytechnical University**, Xi'an, China, 2024. (Host: Assoc. Prof. Min Yang)

[2] High-fidelity Multi-physics Modeling of Molten Pool Dynamics in Metal Additive Manufacturing. *Invited talk* at **Norwegian University of Science and Technology**, Trondheim, Norway, 2023. (Host: Assoc. Prof. Jun Ma)

[3] Simulation of Molten Pool Dynamics during Metal Additive Manufacturing. *Invited talk* at **Huazhong University of Technology and Science**, Wuhan, China, 2022. (Host: Prof. Shengyong Pang)

[4] Simulation of Molten Pool Dynamics during Metal Additive Manufacturing. *Invited talk* at Wuhan University of Technology, Wuhan, China, 2022.

[5] **Lu Wang**, Wentao Yan, Modeling of Molten Pool Dynamics in Additive Manufacturing with External Magnetic Fields. SIM-AM 2023, Munich, Germany, 2023.

[6] **Lu Wang**, Wentao Yan, Simulation of Molten Pool Dynamics during Metallic Additive Manufacturing. TMS2022, California, US, 2022. (Online)

[7] **Lu Wang**, Wentao Yan, Evaporation Model for Keyhole Dynamics during Additive Manufacturing of Metal. International Solid Freeform Symposium, Texas, US, 2021. (Online)

[8] **Lu Wang**, Yanmin Zhang, Wentao Yan, Simulation of molten pool dynamics in metallic additive manufacturing. Materials for Humanity (MH21), Online, 2021.

HONORS & AWARDS

- **Chinese Government Award for Outstanding Self-financed Students Abroad, 2022**
- **Three 1st and four 2nd places at AM-Bench 2022 Simulation Challenge, NIST, 2023**
- NUS Research Scholarship, NUS, 2019-2023
- Academic Scholarship for Graduate, HUST, 2014-2016
- Outstanding Graduate, HUST, 2016
- Outstanding Undergraduate, HUST, 2013
- National Scholarship for Encouragement, HUST, 2011