

HUANRONG XIE

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Interest: Rehabilitation/Surgical Robots, Embedded Systems, Microfluidic Chips

RESEARCH PROFILE

My current research focuses on laser powder bed fusion of biomedical metallic materials for implant applications, with particular interest in how powder processing and microstructural design influence mechanical performance, corrosion resistance, and wear behavior. Through this work, I have developed a strong interest in biomedical engineering problems at the interface of materials, manufacturing, and device design. Building on this foundation, I am currently preparing applications for PhD programs for the Fall 2027 intake, aiming to pursue research in medical robotics, especially surgical and interventional robotic technologies, with a broader interest in integrating advanced manufacturing and intelligent mechanical systems.

EDUCATION

Central South University, Changsha, CHN

2023.09 - 2027.06 (*Expected*)

Dundee International Institute

BEng in Mechanical Design, Manufacturing and Automation

GPA: 88.2/100

AWARDS

Academic Scholarship (Second Class), Central South University	2023–2024
Academic Scholarship (Second Class), Central South University	2024–2025
First Prize, Hunan Provincial Natural Science Excellent Academic Paper	2023–2025
Second Prize, Hunan Provincial Natural Science Excellent Academic Paper	2023–2025
National First Prize, Business Experience Challenge Competition	2024–2025
Outstanding League Cadre, Central South University	2024–2025

PUBLICATIONS

Accepted

- Xie, H., Li, D., Shuai, C., & Gao, C. (2026). Efficient solid-solution strengthening enhanced the wear resistance of Ti–Ta alloys manufactured by laser powder bed fusion. *Advanced Engineering Materials*, e71168. <https://doi.org/10.1002/adem.71168>
- Li, D., Xie, H., Gao, C., Jiang, H., Wang, L., & Shuai, C. (2025). Harmonic heterostructured pure Ti fabricated by laser powder bed fusion for excellent wear resistance via strength-plasticity synergy. *Opto-Electronic Advances*, 8 (9), 250043-1.
- Gao, C., Jiang, H., Xie, H., Li, D., & Shuai, C. (2026). Mechanical alloying integrated laser additive manufacturing of highly corrosion-resistant Ti-5Cu alloy for biomedical applications. *Electrochimica Acta*, 148597.
- Li, D*, Zhong, Q*, Xie, H., Shuai, C., & Gao, C. (2026). A low modulus and high strength dual-phase Ti–Ta alloy manufactured by laser powder bed fusion. *Advanced Engineering Materials*, e202502492.
- Shuai, C., Li, D., Xie, H., Yao, X., Peng, S., & Gao, C. (2025). Programmable lamellar eutectic Zn-2Al-Mg biodegradable implants manufactured by laser powder bed fusion for synergistic strength-ductility and osteogenesis. *Advanced Healthcare Materials*, 14 (32), e01917.

RESEARCH EXPERIENCE

Harmonic Heterostructured Pure Ti via LPBF for Wear Resistance 2023 - 2025

Research Participant Central South University

Personal Contribution: Prepared mechanically milled Ti powders and participated in XRD characterization, powder flowability testing, wear testing, and tensile testing. Curated and processed experimental data on wear rate and plasticity under different processing conditions, produced figures for data visualization, and contributed to sections of the original manuscript draft.

Programmable Eutectic Zn-2Al-Mg Biodegradable Implants via LPBF 2023 - 2025

Research Participant Central South University

Personal Contribution: Participated in electrochemical testing, SEM characterization, powder flowability testing, particle size analysis, and mechanical testing. Prepared figures for data visualization and used Photoshop to process bacterial staining images from in vitro antibacterial experiments. Also contributed to sections of the original manuscript draft.

Corrosion-Resistant Ti-5Cu Alloy via Mechanical Alloying and LPBF 2024 - 2026

Research Participant Central South University

Personal Contribution: Participated in powder preparation through mechanical alloying, supported parts of the LPBF process, and carried out XRD characterization, wire electrical discharge machining, and sample polishing. Performed formal analysis of XRD-related data, including lattice-parameter calculations, and visualized the results for the study.

Low-Modulus Dual-Phase Ti-Ta Alloy via LPBF for Biomedical Implants 2024 - 2026

Research Participant Central South University

Personal Contribution: Participated in powder preparation by mechanical milling, LPBF sample fabrication, XRD characterization, powder flowability testing, wear testing, and tensile testing. Conducted formal analysis of experimental data, prepared visualizations for the manuscript, and contributed to sections of the original draft.

Efficient Solid-Solution Strengthening Enhanced Wear Resistance of Ti-Ta Alloys via LPBF 2024 - 2026

Research Lead (First Author) Central South University

Personal Contribution: Designed and conducted experiments on Ti-Ta alloys fabricated by laser powder bed fusion (LPBF). Prepared alloy powders, optimized processing conditions, and performed XRD, EBSD, TEM, nanoindentation, and wear testing. Analyzed the effects of solid-solution strengthening and microstructural evolution on mechanical properties and wear resistance. Led manuscript preparation as the first author, including data visualization and scientific writing.

TECHNICAL STRENGTHS

Core Research Skills	Biomedical Implant Design, Laser Powder Bed Fusion, Lab Instruments, Mechanical Alloying, Materials Characterization, Structural Analysis
CAD/CAE Tools	AutoCAD, SolidWorks, ANSYS Workbench
Data & Visualization	Origin, GraphPad Prism, Vision64, HighScore Plus, Adobe Illustrator, Photoshop, 3ds Max
Programming Languages	MATLAB, C++ , LabVIEW English, Chinese (Native)