Haijian Yang

[Google Scholar](#)

Address: 557 N 17 ST 312 APT, Milwaukee, 53233, WI, USA

Email: haijian.yang@marquette.edu

Phone: 414-406-3358

Website: https://haijianyang.com/

Ph.D. Candidate | Mechanical Engineering

Education

Ph.D. Candidate, Mechanical Engineering, Marquette University	09/2022-Current
M.E. Mechanical Engineering, Marquette University	09/2022- Fall 2024
M.S. Power Engineering, North China Electric Power University	09/2015-06/2018
B.S. Thermal Energy & Power Engineering, North China Electric Power University	09/2010-06/2014

Research Interests

Additive Manufacturing, Laser Powder Bed Fusion, Metallurgy Characterization, Mechanical Behavior Testing, Post Heat Treatment, Metallurgy, Superalloys and Materials. Finite Elements Method, Discrete Dislocation Dynamics

Employment

Research Assistant	Mechanical Engineering, Marquette University	09/2022-Current
Project Manager	Beijing Zhongkuang Celebrate Energy Saving Technology Co.	04/2020-04/2022

Publications

2026   **Haijian Yang**, Liyi Wang, Wei Xiong, Le Zhou. Heat-Treatment-Driven Phase-Tailored Creep Strengthening of Laser Powder Bed Fused Ti-6Al-4V Alloy. (Submitted to Additive Manufacturing) (IF:11.1)

  Yang H, Horder I, Weiss D, et al. Effect of Cerium alloying on the microstructure, tensile, and high-cycle fatigue properties of A356 aluminum alloy[J]. Materials Science and Engineering: A, 2026: 149805. (IF:7.0)

  Haijian Yang, Liyi Wang, Wei Xiong, David Weiss, Le Zhou. Mechanical Property and Microstructure of Laser Powder Bed Fused Hypereutectic Al16Ce1Mg Alloy. (Under review by Additive Manufacturing) (IF:11.1)

  Haijian Yang, Thinh Huynh, Yongho Sohn, Le Zhou. Effect of Zirconium on the Mechanical Properties and Microstructure Evolution of Cast and Laser Powder Bed Fused Eutectic Al-Ce Alloy. (Submitted to Journal of Alloys and Compounds) (IF:7.9)

2025   Zhou L, **Yang H**, Hyer H. Controlling Mechanical Properties of Laser Powder Bed Fused Alsi10mg Through Manipulation of Laser Scan Rotation[J]. *Materialia*, 2025,39: 102340. (IF:2.9)

2024   Song K, Xu G, Tanvir A N M, **Haijian Yang**, et al. Machine learning-assisted 3D printing of thermoelectric materials of ultrahigh performances at room temperature[J]. J*ournal of Materials Chemistry A*, 2024, 12(32): 21243-21251. (IF:9.5)

2017   H. Zhang, **H. Yang**, H.J. Chen, X. Du, D. Wen, H. Wu. Photothermal conversion characteristics of gold nanoparticles under different filter conditions, *Energy,*141:32-39, 2017. (IF:9.4)

Academic Awards

2025   Outstanding reviewer of Journal of Materials Engineering and Performance.

2024   2024 International Metallographic Contest, Electron Microscopy-Third Place, Artistic
       Microscopy-Honorable Mention, ASM (American Society for Metals), Geauga, Ohi

2024   Research Traveling Award, Richard W. Jobling Scholarship, Marquette University, Milwaukee, WI

2023   Annual Graduate Student Poster Presentation- Third Place, Marquette University, Milwaukee, WI

2014   Excellent Graduates, North China Electric Power University, Beijing, China

2013   Outstanding Student Scholarship, North China Electric Power University, Beijing, China

2012   Outstanding Student Scholarship, North China Electric Power University, Beijing, China

2011   Outstanding Student Scholarship, North China Electric Power University, Beijing, China

Research Experiences

Graduate Research Assistant, Marquette University

1. Post Heat Treatment Effects on Mechanical Behavior and Microstructure of L-PBF and Casting of Al-10Ce-Zr Sponsored by the National Science Foundation

- Successfully developed several Al alloys with outstanding printability for additive manufacturing (AM), near-eutectic Al-10Ce alloy with rare earth element Zirconium.
- Investigated the post-heat treatment effects on mechanical behavior and micro-structure evolution of laser powder bed fusion both and crucible cast Al-10Ce-Zr alloy.
- Multi-scale characterization of AM alloys through SEM, EBSD, and EDS.
- Tested the mechanical properties of AM alloys through Archimedes density test, Vickers micro-hardness, tensile tester, and both compression and tensile creep tests.
- Developed standard operating procedures for creep test and laser powder bed fusion, and investigated/optimized the processing parameters.

2. Mechanical Properties, Heat Treatment Improvement, and Microstructural Characteristics of Additive Manufactured with Magnesium on Al-Ce Alloys (Al-16Ce-1Mg) by Laser Powder Bed Fusion Sponsored by the National Science Foundation

- Successfully developed Al-Ce alloys with Magnesium excellence printability for laser powder bed fusion.
- Identify the LPBF optimum density processing parameters.
- Investigated the tensile properties and fracture surface at optimum LPBF parameters.
- Examine the microstructural evolution before and after hot isotropic press (HIP) effects on micro-hardness, density, and tensile strength.
- Determine the improvement creep resistance of compressive creep resistance with different temperatures and compression loads with respect to hypereutectic ternary Al-Ce alloy.
- Multiscale characterization of heat treatment influential on microstructure evolution via high magnification optical microscope, SEM, EBSD, and EDS.
- Developed standard operating procedures for creep test and hot isotropic press (HIP) processing procedures.

3. Printing and Interface Engineering of Colloidal Nanocrystals for Flexible Thermoelectrics and Electronics

- Collaborated with other research groups to investigate the post-treatment cold press (CP), cold isostatic pressing (CIP), and hot isostatic pressing (HIP) effects on sintered BiSbTe thermoelectric properties by additive manufacturing.

- Examine the cross-section image analysis porosity effects on electrical conductivity, the Seebeck coefficient, and power factor.
- Machine learning assisted in optimizing ink formulation and printing parameters to achieve the best thermoelectric properties with different element compositions.

4. Effect of Compositional Changes on the Microstructure and Creep Resistance of High-Entropy Superalloys
- Designed the promising class of high entropy superalloys (HESA) that reached near maximum service temperatures.
- Collaborated with other research groups to investigate aging post-heat treatment on the L12-ordered Ni3(Al, Ti) gamma prime precipitates to strengthen the FCC matrix.
- Combined with multiple mechanical properties tests through micro-hardness, high-temperature compressive creep resistance, and coaxial tensile test.

5. Single Laser Scanning Melt Pool Prediction Model with Multiple Periodic Elements Thermophysical Property by Machine Learning Assistant
- Combined additive manufacturing laser scanning motivation with machine learning to build the relationship between the melt pool dimension and the element's thermophysical properties.
- Collaborated with machine learning research groups to studied the relationship between the scanning parameters and thermophysical properties, and built a prediction model for better understanding laser powder bed fusion processing energy input and melt pool dimension in composite elements.
- Obtained refractory and volatile elements melt pool dimensions with various laser scanning parameters.

Master Research Assistant, North China Electric Power University
6. Intelligent Additive Manufacturing System Platform Simulation
- Developed the Ansys Parametric Design Language (APDL) powerful structured script language to create model, boundary condition, laser parameters, and elements properties.
- Simulated heat transfer process and stress-strain distribution of selective laser melting process
- Multiple laser parameters were utilized to obtain optimum melt pool dimensions, hatch space, and specific node temperature and mechanical behavior with different energy density inputs.

Industry Research Assistant, Beijing Zhongkuang Celebrate Energy Saving Technology Co.
8. Application Research on the Utilization of Low-Temperature Waste Heat from Mine Ventilation Using Separated Heat Pipe
- Developed the heat exchange software to design and modularization of separate heat pipe energy re-utilization systems.
- Innovated an automatically controlled online pressure monitoring system to balance new and original wind pressure systems.
- Successfully designed and applied up to 9000 kW heat exchange by separate heat pipe energy re-utilization system in the clean energy research field.
- Started a real-time online monitoring system to automatically adjust mine ventilation and heat pipe devices operation parameters.

Joined Research Project

Project Title: Manufacturability of Novel High-Temperature Aluminum Alloys Through Additive Manufacturing Cycle (NSF: 2138588)

Project Title: Printing and Interface Engineering of Colloidal Nanocrystals for Flexible Thermoelectrics and Electronics (NSF: 1747685)

Conference Presentations and Seminars

Presenter*

2025   **Haijian Yang***, Thinh Huynh, Kevin Graydon, Yongho Sohn, David Weiss, Le Zhou, "Microstructure, Mechanical and Creep Property of Laser Powder Bed Fused Hypereutectic Al-16Ce-1Mg Alloy", *2025 SEM Annual Conference & Exposition on Experimental & Applied Mechanics*, Milwaukee, WI, USA, June, 2-5, 2025.

Haijian Yang*, Thinh Huynh, Kevin Graydon, Yongho Sohn, David Weiss, Le Zhou, "Mechanical Property and Microstructure of Laser Powder Bed Fused Hypereutectic Al-16Ce-1Mg Alloy", *154th TMS Annual Meeting & Exposition*, Las Vegas, Nevada, USA, March 23–27, 2025.

Haijian Yang*, Thinh Huynh, Yongho Sohn, David Weiss, Le Zhou, "Effect of Zirconium on the Microstructure and Mechanical Properties of Laser Powder Bed Fused Eutectic Al-Ce Alloy", *154th TMS Annual Meeting & Exposition*, Las Vegas, Nevada, USA, March 23–27, 2025.

2024   **Haijian Yang***, Le Zhou, Thinh Huynh, "Post Heat Treatment Effects on Mechanical Behavior and of L-PBF and Casting of Al-10Ce-Zr", 2024 *Three Minutes Research Presentation Competition,* Marquette University, Milwaukee, WI, USA, February 23, 2024.

Haijian Yang*, Le Zhou, Thinh Huynh, Kevin Graydon, "Mechanical properties, heat treatment improvement and microstructural characteristics of additive manufactured with Magnesium on Al-Ce alloys by laser powder bed fusion", *2024 Graduate School Research Poster Competition*, Marquette University, Milwaukee, WI, USA, February 21, 2024.

Haijian Yang*, Thinh Huynh, Kevin Graydon, Yongho Sohn, David Weiss, Le Zhou, "Mechanical Property and Microstructure of Laser Powder Bed Fused Hypereutectic Al-16Ce-1Mg Alloy", *153th TMS Annual Meeting & Exposition*, Orlando, Florida, USA, March 3–7, 2024.

Ian Horder, **Haijian Yang**, David Weiss, Le Zhou, "Microstructure and Mechanical Property of Sand Cast A356 Modified with Cerium", *153rd TMS Annual Meeting & Exposition*, Orlando, Florida, March 3–7, 2024.

Ian Horder, **Haijian Yang**, David Weiss, Le Zhou, "Microstructure and Mechanical Property of Sand Cast A356 Modified with Cerium", *2024 Big East Undergraduate Research Poster Symposium*, New York City, New York, March 16, 2024.

Research Mentor Experiences

Research Mentor, mentored graduate and undergraduate students to carry out independent research at Marquette University

   a.   Alipour Aghdam Sina, research topic: Post de-binding and sintering parameters effects on 3D printed steel porosity ratio improvement, now as a Ph.D. student studying at Mechanical

Engineering, Marquette University. Fall 2023-Current

b.   Ian Horder, research topic: Microstructure and Mechanical Property of Sand Cast A356 Modified with Cerium, expects to enter graduate school at Mechanical Engineering at Marquette University. Spring, 2024.

c.   Kroening Sam, research topic: Different composite of decomposed organic fiber strengthening mechanism with epoxy tensile experimentation, now studying at Biomedical Engineering, Marquette University. Summer, 2023.

d.   Healey Austin, research topic: 3D printing mounting mold print performance optimization with different printers' operation and model design, expecting to pursue Master's degree at Mechanical Engineering, Marquette University. Summer, 2023.

Peer Manuscripts Review

- *Additive Manufacturing*
- *Journal of Materials Engineering and Performance*
- *The International Journal of Advanced Manufacturing Technology*
- *Annals of Nuclear Energy*
- *Metallography, Microstructure, and Analysis*

Machinery, Equipment, and Lab Experience

Mechanical Testing	Employed dynamic testing system to test and analyze various samples ranging from Al-, Mg-, Cu-, Fe-, Ti- Ni-based alloys and Printed PLA, composite, etc. Expertise in tensile tests, and fatigue tests more than 300 working hours.
Additive Manufacturing	Worked on the **SLM Solutions 125 HL Laser Powder Bed** Manufacturing **Fusion System** and **Renishaw AM250-400 Laser Powder Bed Fusion System**. Expertise includes processing a wide range of alloys including Ti-, Al-, Fe-, and Ni-based alloys.
Hardness/Indentation	Performed various hardness tests on bulk metallic utilizing a **Hysitron TI Premier Nanoindenter** as well as worked with various **Vickers, Rockwell, and Knoop Hardness Testers.**
Microscopy	Microscopy skills include over 500 hours logged on utilizing and analyzing data from **Optical Microscopy, Scanning Electron Microscopy (SEM), and Energy Dispersive Spectroscopy (EDS).**
Spectroscopy	After mechanical testing and sample preparation, further skills include working with and analyzing spectra generated by various spectroscopy methods such as **UV-Vis Spectroscopy, and X-ray diffraction (XRD)**.
Thermal Analysis	Worked with previously include utilizing **Differential Scanning Calorimetry (DSC)**. Used these techniques to record thermal expansion data, elements analysis, and thermomechanical behavior.
Machining	Hands-on experience with basic machining equipment such as lathes, steel saws, band saws, and mills. Other sectioning equipment includes abrasive well saws, plasma cutters, diamond saws, and chop saws.
Heat Treatment	Worked with a variety of high and low-temperature furnaces to carry out heat treatments. Understanding includes oxidation characteristics of metals and choosing the proper atmosphere or inert environment to carry out heat treatments. Performed hot isostatic pressing (HIP) with high pressure and temperature heat treatment on the Ti-, Al-, Fe-, Bi-, Sn-, Te-, Si-, and Ni-based alloys. Moreover, have had to design and carry out heat treatment optimizations for Ni-, Al-, and Fe- based alloys on the microstructural observations and mechanical properties.

Metallography	Extensive hands-on experience in metallographic preparation starting from proper sectioning of samples to producing scratch-free mirror surface finishes. Worked with polishing Ti-, Mo-, W-, Al-, Mg-, Cu-, Fe-, and Ni-based alloys. The softest and hardest materials prepared were pure Cu and CM247 Ni-based superalloy, respectively.

Membership

2025-Current	Metals, Minerals, and Materials Society (TMS)
2025-Current	American Society of Mechanical Engineers (ASME)
2025-Current	Society for Experimental Mechanics (SEM)
2024-Current	International Metallographic Society (IMS)