

Haijian Yang

[Google Scholar](#)

Address: 1515 W. Wisconsin Ave, 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	09/2022-05/2024
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 Interest

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

Publication

- 2026 **Yang H**, Huynh T, Wang L, et al. Mechanical Properties and Microstructure Evolution of Laser Powder Bed Fused Hypereutectic Al-16Ce-1Mg Alloy[J]. *Additive Manufacturing*, 2026: 105181.
- 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.
- Yang H**, Wang L, Huynh T, et al. Effect of Zirconium on the Mechanical Properties and Microstructure of Cast and Laser Powder Bed Fused Eutectic Al-Ce Alloy[J]. *Journal of Alloys and Compounds*, 2026: 188790.
- Haijian Yang**, Liyi Wang, Wei Xiong, Le Zhou. Heat-Treatment-Driven Phase-Tailored Creep Strengthening of Laser Powder Bed Fused Ti-6Al-4V Alloy. (Under review by *Additive Manufacturing*).
- Haijian Yang**, Haoyou Zhang, Zhao Wang, Thinh Huynh, Yongho Sohn, Baolin Wan, Le Zhou. MeltPoolPhysicsNet: Thermal-physics-informed machine learning for predicting melt-pool geometry from single-track laser scanning of pure elements toward alloy design. (Submitted to *Acta Materialia*).
- 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.
- 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]. *Journal of Materials Chemistry A*, 2024, 12(32): 21243-21251.
- 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.

Academic Award

- 2026 Graduate Student Poster Competition-Third Place, Marquette University, Milwaukee, WI
- 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, OH
- 2024 Research Traveling Award, Richard W. Jobling Scholarship, Marquette University, Milwaukee, WI
- 2023 Graduate Student Poster Competition-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 Experience

Graduate Research Assistant, Marquette University

1. Post Heat Treatment Effects on Mechanical Behavior and Microstructure of L-PBF and Casting of Al-10Ce-Zr (NSF)

- Designed and developed Zr-modified Al-based alloys with enhanced printability for laser powder bed fusion additive manufacturing.
- Characterized the post-heat-treatment-induced microstructural evolution and mechanical response of LPBF and crucible-cast Al-10Ce-Zr alloys using SEM, EBSD, and EDS.
- Assessed Vickers microhardness, tensile properties, elevated-temperature compression, and tensile creep behavior to establish the contribution of Zr modification to mechanical-property enhancement.

2. Mechanical Properties, Heat Treatment Improvement, and Microstructural Characteristics for Hypereutectic Al-Ce Alloys by Laser Powder Bed Fusion (NSF)

- Designed and developed highly printable Al-Ce-Mg alloys for laser powder bed fusion (LPBF), establishing optimized processing windows for high-density fabrication.
- Characterized tensile behavior, fracture mechanisms, and microstructural evolution of LPBF alloys before and after hot isostatic pressing (HIP).
- Assessed the high-temperature compressive creep resistance of hypereutectic ternary Al-Ce alloys under varied temperature and stress conditions.

3. Effect of Compositional Changes on the Microstructure and Creep Resistance of High-Entropy Superalloys

- Designed a promising class of high-entropy superalloys (HESAs) with potential service capability near upper operating temperature limits.
- Collaborated with multiple research groups to investigate the effects of aging heat treatment on L1₂-ordered Ni₃(Al,Ti) γ' precipitates and their strengthening contribution to the FCC γ matrix.
- Evaluated mechanical performance through microhardness, high-temperature compressive creep, and uniaxial tensile testing.

4. Machine Learning-Assisted Melt Pool Prediction for Single-Laser Scanning of Multi-Element Systems

- Integrated laser powder bed fusion (LPBF) processing with thermophysical-property-guided machine learning to predict melt-pool dimensions.
- Developed machine-learning models to quantify interactions between laser scanning parameters, material properties, and processing energy input for predicting melt-pool behavior.
- Evaluated melt-pool responses of multicomponent alloys across broad laser scanning conditions using a user-defined graphical user interface (GUI).
-

Master Research Assistant, North China Electric Power University

5. Intelligent Additive Manufacturing System Platform Simulation

- Developed structured ANSYS APDL scripts to construct simulation models, define boundary conditions, and implement laser scanning paths.
- Simulated thermal transport and stress-strain distributions during the selective laser melting (SLM) process.
- Optimized laser processing conditions by analyzing their effects on melt-pool geometry, hatch spacing, local temperature evolution, and mechanical behavior across different energy densities.

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 Seminar

Presenter*

2026 Haijian Yang*, Liyi Wang, Tinh Huynh et al. “Effect of Zirconium on the Microstructure and Mechanical Properties of Laser Powder Bed Fused Eutectic Al-Ce-Zr Alloy” *155th TMS Annual Meeting & Exposition*, San Diego, California, USA, March 23-27, 2025.

2025 Haijian Yang*, Tinh Huynh, Kevin Graydon, et al. “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*, Tinh Huynh, Kevin Graydon, et al. “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*, Tinh Huynh, Yongho Sohn, et al. “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, Tinh 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, Tinh 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*, Tinh 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 Experience

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

- 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
- 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.
- 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.
- 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.

Journal Manuscript Reviewer

- *Additive Manufacturing*
- *Journal of Materials Engineering and Performance*
- *The International Journal of Advanced Manufacturing Technology*
- *Annals of Nuclear Energy*
- *Journal of Applied Physics*
- *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)