

Hyeji Im, Ph.D.

Case Western Reserve University, Materials Science and Engineering

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EDUCATION	Korea Advanced Institute of Science and Technology (KAIST)	Daejeon, South Korea
	<i>Ph.D. in Materials Science and Engineering</i>	Sep 2016 – Aug 2020
	Development and characterization of W-free Co-based superalloys • Supervisor: Prof. Pyuck-Pa Choi	
	KAIST	Daejeon, South Korea
	<i>M.S. in Materials Science and Engineering</i>	Sep 2014 – Aug 2016
	Fabrication and characterization of Graphene/Metal/Polymer composites for EMI shielding • Supervisor: Prof. Soon Hyung Hong	
	Inha University	Incheon, South Korea
	<i>B.S. in Materials Science and Engineering</i>	Mar 2010 – Aug 2014
EMPLOYMENT	Case Western Reserve University	Cleveland, United States
	<i>Assistant professor Materials Science and Engineering</i>	Feb 2024 – Current
	Design and manufacture of structural materials for technology and sustainability	
	Northwestern University	Evanston, United States
	<i>Postdoctoral scholar McCue Research Group</i>	Feb 2022 – Jan 2024
	Selective laser melting of plasma-facing materials	
	<i>Postdoctoral scholar Dunand Research Group</i>	Oct 2021 – Oct 2023
	Selective laser melting of Co-based superalloys	
	KAIST	Daejeon, South Korea
	<i>Postdoctoral scholar Nano Materials & Adv. Characterization Lab.</i>	Sep 2020 – Sep 2021
RESEARCH EXPERIENCE	Max-Planck-Institut für Eisenforschung	Düsseldorf, Germany
	<i>Guest researcher Atom Probe Tomography (APT) Group</i>	Jan – Aug 2019
	Understanding of mechanical behavior using high-resolution characterization techniques	
	<i>Guest researcher APT Group</i>	Jul 2017 – Feb 2018

Application of atom probe crystallography techniques to Co-based superalloys

Korea Institute of Industrial Technology

Incheon, South Korea

Intern

Jan 2013

Analysis of mechanical behaviour using Vickers hardness test

RESEARCH GRANTS

- "Quantitative characterization of chemical interaction of solutes with defects for predicting intergranular corrosion", \$49,000, Jan 2025 – Sep 2025, *Naval Nuclear Laboratory (NNL) through Center for Materials Data Science for Reliability and Degradation (MDS-Rely)*.
- Co-PI, "Residual Stress", Jan 2025 – Dec 2026, *Center for Hybrid Autonomous Manufacturing Moving from Evolution to Revolution (HAMMER)*.

PUBLICATIONS Peer-reviewed Journals

- **H. J. Im***, D. Dunand. Microstructure, hardness, and creep of Co-Fe-Ni-based high-entropy superalloy processed by laser powder-bed fusion. *Materials Science and Engineering A*, 916:147378, 2024.
- K. Ryou, Y. Park, **H. J. Im***, P.-P Choi*. Prevention of hot cracking in Ni-based superalloy via passivation layer formation during additive manufacturing. *Journal of Materials Research and Technology*, 33:3155–3162, 2024.
- **H. J. Im***, J. Santos, C. Campbell, D. Dunand. Co-Ni-Al-W γ/γ' superalloy with Cr and Ti additions fabricated via laser fusion of elemental powders. *Materials Science and Engineering A*, 914:147105, 2024.
- **H. J. Im***, J. Santos, C. Liu, C. Campbell, D. Dunand. Microstructure and properties of Co-Ni-Al-W γ/γ' superalloy fabricated via laser fusion of elemental powders. *Additive Manufacturing*, 76:103790, 2023.
- K. Ryou, **H. J. Im**, J. Park*, P.-P Choi*. Microstructural evolution and hot cracking prevention in direct-laser-deposited Ni-based superalloy through Hf addition. *Materials & Design*, 234:112298, 2023.
- **H. J. Im**, K. Ryou, T. H. Kang, S. Jimbo, S. Nambu, J. Han, P.-P Choi*. Thermally driven changes in the microstructure and mechanical properties of martensitic 15-5 precipitation-hardened stainless steel during directed energy deposition. *Additive Manufacturing*, 74:103729, 2023.
- M. S. Jeong, T. M. Park, D.-I Kim, H. Fujii, **H. J. Im**, P.-P Choi*, S.-J Lee*, J. Han*. Improving toughness of medium-Mn steels after friction stir welding through grain morphology tuning. *Journal of Materials Science & Technology*, 118:243–254, 2022.

- **H. J. Im**, S. K. Makineni, C.-S Oh, B. Gault, P.-P Choi*. Elemental sub-lattice occupation and microstructural evolution in γ/γ' Co-12Ti-4Mo-Cr alloys. *Microscopy and Microanalysis*, 28(4):1335–1339, 2022.
- **H. J. Im**, W. S. Choi, K. Ryou, T. H. Kang, J. B. Seol, W.-S Ko*, P.-P Choi*. Enhanced microstructural stability of γ/γ' -strengthened Co-Ti-Mo-based alloys through Al additions. *Acta Materialia*, 214:117011, 2021.
- **H. J. Im**, S. Lee, W. S. Choi, S. K. Makineni, D. Raabe, W.-S Ko*, P.-P Choi*. Effects of Mo on the mechanical behavior of γ/γ' -strengthened Co-Ti-based alloys. *Acta Materialia*, 197:69–80, 2020.
- J. Han, B. Yoo, **H. J. Im**, C.-S Oh, P.-P Choi*. Microstructural evolution of the heat affected zone of a Co-Ti-W alloy upon laser cladding with a CoNiCrAlY coating. *Materials Characterization*, 158:109998, 2019.
- B. Yoo, **H. J. Im**, J. B. Seol, P.-P Choi*. On the microstructural evolution and partitioning behavior of L1₂-structured γ' -based Co-Ti-W alloys upon Cr and Al alloying. *Intermetallics*, 104:97–102, 2019.
- **H. J. Im**, J. Y. Oh, S. Ryu, S. H. Hong*. The design and fabrication of multilayered graded GNP/Ni/PMMA nanocomposite for enhanced EMI shielding behavior. *RSC Advances*, 9(20):11289–11295, 2019.
- **H. J. Im**, S. K. Makineni, B. Gault, F. Stein, D. Raabe, P.-P Choi*. Elemental partitioning and site-occupancy in γ/γ' forming Co-Ti-Mo and Co-Ti-Cr alloys. *Scripta Materialia*, 154:159–162, 2018.
- **H. J. Im**, G. H. Jun, D. J. Lee, H. J. Ryu*, S. H. Hong*. Enhanced electromagnetic interference shielding behavior of Graphene nanoplatelet/Ni/Wax nanocomposites. *Journal of Materials Chemistry C*, 5(26):6471–6479, 2017.

Book Chapters

- P.-P Choi, **H. J. Im**, C. Jung, K. H. Ryou, H. Jeong. "Atom Probe Tomography: Unveiling the elemental distribution in nanostructured materials with near-atomic resolution." in *Encyclopedia of Materials: Metals and Alloys*, ed. F. G. Caballero (Elsevier, 2022) 4:641–647.

PATENTS

- S. H. Hong, H. J. Ryu, J. Y. Oh, **H. J. Im**. 2020. Multi-layer graphene-metal-polymer sheet for shielding electromagnetic wave. Korea Patent 10-2128067-0000, issued June 23, 2020.
- P.-P Choi, **H. J. Im**, B. R. Yoo, W. S. Choi. 2020. γ/γ' microstructure Co-based alloy with excellent high-temperature strength. Korea Patent 10-2197124-0000, issued December 23, 2020.

- S. H. Hong, H. J. Ryu, J. Y. Oh, **H. J. Im**. 2019. Multi-layer graphene-metal-polymer sheet for shielding electromagnetic wave. U.S. Patent 10,306,818, issued May 28, 2019.

CONFERENCES • “Accelerated Development of Tungsten Alloy Plasma Facing Materials,” TMS Spring Meeting 2025, USA, 2025.

- “Accelerated Development of Tungsten Alloy Plasma Facing Materials,” TMS Spring Meeting 2024, USA, 2024.
- “Effect of scanning strategies and additive elements on the microstructure and mechanical properties of tungsten manufactured by laser powder-bead fusion,” 2023 MRS Fall Meeting, USA, 2023.
- “Enhancing the Performance of Plasma-Facing Materials through Additive Manufacturing,” 2023 MRS Fall Meeting, USA, 2023.
- “Enhancing the performance of plasma-facing materials and γ/γ' superalloys by laser powder-bed fusion,” Gordon Research Conference: 2023 Physical Metallurgy, USA, 2023 (Poster).
- “Microstructure and mechanical properties of Co-based superalloy with γ/γ' microstructure fabricated by laser powder bed fusion,” Materials Science & Technology 2022, USA, 2022.
- “Effects of alloying elements on microstructures of Co-based superalloys by atom probe tomography,” The 6th International Conference on Electronic Materials and Nanotechnology for Green Environment, South Korea, 2020.
- “The effects of alloying elements on microstructures of γ/γ' -strengthened Co-Ti-based alloys,” 2020 Spring Conference of the Korean Institute of Metals and Materials, South Korea, 2020. - **awarded Best Student Oral Presentation**
- “The effects of alloying elements on microstructures and mechanical properties of γ/γ' -strengthened Co-Ti-based alloys,” 2019 Fall Conference of the Korean Institute of Metals and Materials, South Korea, 2019. - **awarded Best Student Oral Presentation**
- “Elemental partitioning and site occupation of Mo and Cr in Co-Ti based superalloys,” Atom Probe Tomography and Microscopy 2018, USA, 2018.
- “The effects of alloying elements on microstructures and mechanical properties of γ/γ' -strengthened Co-Ti-based alloys,” 2018 Fall Conference of the Korean Institute of Metals and Materials, South Korea, 2018. - **awarded Best Student Oral Presentation**
- “Elemental partitioning and site-occupancy behavior in γ/γ' -strengthened Co-Ti-based superalloys,” 2018 Spring Conference of the Korean Institute of Metals and Materials, South Korea, 2018.

- “The effect of alloying elements and process on the microstructure of Co-based superalloys,” 2017 Spring Conference of the Korean Institute of Metals and Materials, South Korea, 2017. (Poster)
- “Multi-layer structure design of GNP/Ni/PMMA nanocomposites for enhanced EMI shielding,” The 3rd Korean Graphene Symposium, South Korea, 2016.
- “Fabrication and characterization of Graphene/Metal/Polymer nanocomposites for EMI shielding,” 2015 Fall Conference of the Korean Institute of Metals and Materials, South Korea, 2015.

SUPERVISION Undergraduate Students

- Kenta Yap (2025)
- James Kinney (2025)
- David Kaplan (2024 – 2025)
- Ian Suddarth (2024 – 2025)
- Suhani Dangre (2024 – 2025)
- Anselm Kabwa (2024)
- Erin Huang (2024)

COURSES

- EMSE 320 Materials Laboratory II (Fall 2024)
- EMSE 398/399 Senior Project in Materials I/II (Fall 2024, Spring 2025, Fall 2025)
- EMSE 417 Properties of Materials in Extreme Environments (Spring 2025)

SERVICE

Administrative Service

- Thesis Committee Member
 - Anthony Lino. M.S. in Materials Science and Engineering (Jul 2025)
 - Kristen Hernandez. M.S. in Materials Science and Engineering (Apr 2025)
 - Mirra Rasmussen. M.S. in Materials Science and Engineering (Jul 2024)
- Ph.D. Qualifying Exam Committee Member
 - Maliesha Sumudumalie (May 2025)
 - Jonah Bachman (May 2025)
 - Kristen Hernandez (Dec 2024)
- MSE Faculty Search Committee Member (2025)
- MSE Undergraduate Studies Committee Member (2024 –)
- MetLab Supervisor (2024 –)

Professional Service

- Symposium Organizer, *Fundamentals of Sustainable Metallurgy and Processing of Materials*, TMS 2026.
- Journal Reviewer: Acta Materialia, Scripta Materialia, Additive Manufacturing, Journal of Alloys and Compounds, Journal of Materials Research and Technology, Materials Characterization, Advanced Engineering Materials.
- National Science Foundation Ad-hoc Reviewer: Advanced Manufacturing program (Dec 2024), SBIR/STTR small business program (Mar 2025).