Jung Yun Won

Ph.D. Candidate

Department of Materials Science and Engineering

Seoul National University

1, Gwanak-ro, Gwanak-gu, Seoul, 08826, Republic of Korea

E-mail jywon@snu.ac.kr, jywon0212@gmail.com

Tel. +82-2-880-7058 (Mobile: +82-10-4683-8570)

Personal Information

- Date of birth: Feb. 12th, 1998
- Nationality: Korean (Republic of)
- Family Status: Single
- Language: First language Korean, fluent in English
- Military service: Currently serving as a **research specialist** (Sep. 2023 **~ Feb. 2027**)

Education

09/2020 – present Integrated M.S.-Ph.D. course in Materials Science and Engineering
Seoul National University, Republic of Korea
Advisor: Prof. Myoung-Gyu Lee

03/2016 – 08/2020 Bachelor of Engineering in Materials Science and Engineering
Korea University, Republic of Korea

Research Interests

- Mechanics of materials
  - Advanced constitutive modeling and finite element (FE) analysis
  - Experimental mechanics and full-field measurements
- Tribology and wear
  - Friction and wear in automotive brake system
  - Multi-scale contact and friction modelling in FE simulations
  - Surface roughness and topology of materials (metals, composites, etc.)
- Failure models
  - Ductile fracture criterion and damage models
  - Interfacial damage models
- AI-assisted material characterization
  - Surrogate modelling using neural networks
  - Machine learning for solving inverse problems

Publications *(SCI-only)*

As a first author

[1] **Won J.Y.**, Seo H., Kim Y., Jeong H., Kyeong J., Lee M.-G., *"Multi-scale friction model for automotive brake system incorporating tribological effects of surface asperities"*, **Mater. Des.**, 256 114239 (2025)

[2] **Won J.Y.**, Kim C., Hong S., Yoon H.-S., Park J.K., Lee M.-G., *"Evaluation of crush performance of extruded aluminum alloy tubes based on finite element analysis with ductile fracture modeling"*, **Thin-Walled Struct.**, 200 (July) 111937 (2024)

[3] **Won J.Y**., Hong S., Nam B., Jung J.B., KimY., Lee M.-G., *"Identification of plasticity and fracture models for automotive extruded aluminum parts using finite element model updating algorithm"*, **JOM** (The Journal of The Minerals, Metals & Materials Society (TMS)), 75, 5479-5493 (2023)

[4] Moon C.M., **Won J.Y.**, Lee K., Lee J.W., Kim S.-W., Lee M.-G., *"Mechanical behavior and interface damage of carbon steel-stainless steel corrosion resisted-alloy (CRA) cladded plate: hybrid analysis based on experiment and finite element modeling"*, **Mater. Sci. Eng. A**, 852, 143697 (2022)

As a co-author

[*Under review*] Kim Y., Kim T., Kim H., **Won J.Y.**, Sim G.-J., Lee M.-G., *"Constitutive modeling of polymer composite friction material: Integrating anisotropy, pseudo-hyperelasticity, and viscoelasticity"*, SSRN 51833565

[*Under review*] Min K.M., Won J.Y., Hu X., Bong H.J., *"Unraveling Deformation Mechanisms in CP-Ti via Crystal Plasticity: Direction-Dependent Surface Roughness Evolution"*

[1] Jo S.Y., Sim G-J, Park E., Kim H., **Won J.Y.**, Park J., Lee M.-G., *"Effect of solder void on mechanical and thermal properties of flip-chip light-emitting diode: statistical analysis based on finite element modeling"*, **HELIYON**, 10 (12), e33242 (2024)

[2] Jeong Y.M., Hong S.J., **Won J.Y.**, Kim C., Lee M.-G., *"A practical inverse identification of Johnson-Cook parameters at intermediate strain rates using Split Hopkinson Pressure Bar test"*, **Met Mater Int.**, 30, 2093-2109 (2024)

Awards and Honors

12/2024 **Best Paper Award** for *"The Finite Element Modeling of Multi-Scale Friction and Wear in Automotive Brake System",* at the 7th International Conference on

Materials and Reliability (ICMR-2024), organized by the Korean Society of Mechanical Engineers (KSME)

10/2024 **Excellence Paper Award (first place)** for *"A novel multi-scale friction model: application to FE simulation of automotive brake system"*, at Fall Conference of the Korean Tribology Society (KTS)

10/2023 **Student Oral Presentation Excellence Award** for *"Plasticity and fracture modeling of automotive aluminum extrusion parts using an inverse engineering approach"*, at Fall Conference of the Korean Institute of Metals and Materials (KIM)

10/2021 **Poster Presentation Excellence Award** for *"Experiment and numerical analysis of cohesive interface in corrosion resistance alloy clad plate"*, at Fall Conference of the Korean Institute of Metals and Materials (KIM)

09/2024 BK21 scholarship, SNU
03/2023 Research assistant scholarship (100%), SNU
03/2022 Academic excellence scholarship (10%), SNU
09/2021 BK21 scholarship, SNU
03/2021 BK21 scholarship, SNU
09/2020 BK21 scholarship, SNU

Participated Research Projects

In Seoul National University (P.I.: Prof. M.-G. Lee)

04/2024 ~ Numerical modeling of slurry flow in CMP process
- Supported by Samsung Electronics

04/2024 ~ Relationship between mechanical properties and crushing performance of aluminum alloy extrusions
- Supported by Hyundai Motors Company

08/2023 – 12/2024 **Multi-scale friction model in consideration of surface roughness and corrosion environment**
- Supported by Hyundai Mobis

03/2022 – 06/2023 Inverse engineering for obtaining material plasticity and ductile fracture
- Supported by Hyundai Motors Company

09/2020 – 12/2022 Finite element modeling of STS-Steel/Ni alloy-Steel Clad sheets for line pipe and pressure vessel
- Supported by grants from Korea Planning & Evaluation Institute of Industrial Technology (KEIT)

09/2020 – 12/2021 Construct material database of extruded Al alloys for crash performance evaluation
- Supported by Hyundai Motors Company

03/2021 – 02/2023 Graduate Educational Traineeship Program for Future Steels/Metals
- Supported by grants from Korea Institute for Advancement of Technology (KIAT)

Conference proceedings / presentations *(oral only)*

International conferences

[1] **Won J.Y.**, Seo H., Kim Y., Jeong H., Kyeong J., Lee K.Y., Lee M.-G., *"Multi-scale friction model for finite element analysis of automotive brake pad-disc components"*, Tribology International Conference (Tribology 2025), Albufeira/Algarve, Portugal, April 2025.

[2] **Won J.Y.**, Kim Y., T.-H. Kim, Jeong H., Kyeong J., Lee K.Y., Lee M.-G., *"Finite element modeling of multi-scale friction and wear in automotive brake system"*, 7th International Conference on Materials and Reliability (ICMR-2024), Busan, Korea, December 2024.

[3] **Won J.Y.**, Hong S., Kim C., Yoon H., Lee M.-G., *"Evaluation of crushing performance for extruded aluminum alloy tubes based on finite element simulation with ductile fracture"*, the 4th Asian Pacific Symposium on Technology of Plasticity (APSTP), Gangneung, Korea, October 2023.

[4] **Won J.Y.**, Moon C., Han H.N., Kim S.-W., Lee M.-G., *"Identification of mixed-mode cohesive zone model for predicting interfacial fracture of clad sheet using integrated finite element simulation and neural network"*, the 14th International Conference on Numerical Methods in Industrial Forming Processes (NUMIFORM), Krakow, Poland, June 2023.

[5] **Won J.Y.**, Moon C., Kim S.-W., Lee M.-G., *"Characterization of interfacial mechanical properties of carbon steel-stainless steel corrosion resistant clad plate"*, the 19th International Conference on Strength of Materials (ICSMA), Metz, France, June 2022.

Domestic conferences

[1] **Won J.Y.**, Seo H., Kim Y., Jeong H., Kyeong J., Oh W.J., Lee M.-G., *"Multi-scale friction model for automotive brake disc-pad system considering surface characteristics and mechanical properties"*, Spring Conference of the Korean Society of Automotive Engineers (KSAE), Jeju, Korea, May 2025.

[2] **Won J.Y.**, Kim Y., T.-H. Kim, Jeong H., Kyeong J., Oh W.J., Lee M.-G., *"A novel multi-scale friction model: application to FE simulation of automotive brake system"*, Fall Conference of the Korean Tribology Society (KTS), Yeosu, Korea, October 2024.

[3] **Won J.Y**., Hong S., Nam B., Jung J.B., KimY., Kim C., Lee M.-G., *"Plasticity and fracture modeling of automotive aluminum extrusion parts using an inverse engineering approach"*, Fall Conference of the Korean Institute of Metals and Materials (KIM), Daegu, Korea, October 2023.

[4] **Won J.Y.**, Moon C., Kim S.-W., Lee M.-G., *"An integrated finite element analysis – neural network for identifying interface properties of hot-rolled corrosion resistance alloy (CRA) cladding plate"*, 36th Conference on Advanced Structural Materials by the Korean Institute of Metals and Materials (KIM), Gyeongju, Korea, November 2022.

[5] **Won J.Y.**, Moon C., Park J., Paik M., Kim S.-W., Lee M.-G., *"Hybrid Experiment-Numerical Method to Identify the Interface Properties of a Clad Plate Using Integrated FE Analysis and Machine Learning"*, Fall Conference of the Korean Institute of Metals and Materials (KIM), Jeju, Korea, October 2022.

[6] **Won J.Y.**, Hong S., Kim C., Lee M.-G., *"Determination of Hosford-Coulomb ductile fracture model parameters and evaluation of crush characteristics of automotive aluminum extrusions"*, Spring Conference of the Korean Society for Technology of Plasticity and materials processing (KSTP), Yeosu, Korea, May 2022.

[7] **Won J.Y.**, Moon C., Kim S.-W., Lee M.-G., *"Mechanical properties and microstructural analysis for finite element modeling of clad piping process"*, Fall Conference of the Korean Society for Technology of Plasticity and materials processing (KSTP), Yeosu, Korea, May 2021.

Skills

- Coding skills: FORTRAN, MATLAB, Python
- Simulation software:
  - FEM: ABAQUS (including user subroutines), LS-DYNA
  - CFD: Ansys Fluent
- Experiments: Reduced-scale brake dynamometer test, confocal laser microscope, various tensile/bending/compression tests using Universal Testing Machine (UTM), Digital Image Correlation (DIC), Forming Limit Diagram (FLD) test, etc.