Junwoo Jang

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Education

Purdue University, West Lafayette, IN — Aug 2025 – Exp. May 2026
- Master of Science in Mechanical Engineering — GPA: In progress

Purdue University, West Lafayette, IN — Aug 2019 – May 2025
- Bachelor of Science in Mechanical Engineering — GPA: 3.96/4.0
- Graduated with Distinction - Dean's List and Semester Honors, every semester

Honors and Awards

2025	Senior Design – Research Category, **1st Place** (Purdue ME)
2024-2025	Undergraduate Research Scholarship — $1,000 (Purdue College of Engineering)
2024-2025	John M Bruce Scholarship — $ 2,205 (Purdue ME)
2024	Summer Undergraduate Research Fellowship — $6,000 (Purdue College of Engineering)
2024	Undergraduate Research Professional Development Grant — $500 (Purdue College of Engineering)
2023	H. William Bottomley Research Scholarship — $1,000 (Purdue ME)
2022	Division Commander's Commendation (ROKMC) — ROK–U.S. joint missions and service extension

Publications

Order to disorder transition due to entropy in layered and 2D carbides — Jan 2025

Wyatt, B. C., **Jang, J.**, et al. *ChemRxiv* Preprint. doi.org/10.26434/chemrxiv-2025-7f2c4

Design of a portable fluorescence imaging platform for on-site detection target analyte by loop-mediated isothermal amplification — Jun 2024

Boursier, N., **Jang, J.**, et al. *SPIE Proceedings*, Vol. 13060. doi.org/10.1117/12.3016161

Research Experience

Laser Annealing of HZO Thin Films, Graduate Researcher — Jan 2025 – Present
- Designed fs-laser annealing (800 nm, 120 fs, 5 kHz) for 10 nm HZO/10 nm W/Si; built TMM optical model and heat-transfer model in MATLAB to select pulse energy/exposure windows.
- Performing Raman, PL, and micro- and nano-FTIR to monitor phase transitions.
- Developing heat transfer models in MATLAB to guide laser dosage parameter.

Disorder and Thermal Characteristics of MXenes, UG Researcher — May 2024 – Present
- Coupled temperature-dependent Raman and COMSOL to extract $5.48 \pm 1.12\, Wm^{-1}K^{-1}$ in-plane conductivity for Few Layered Ti_3C_2 MXene.
- Processed Raman data to identify peak shifts and spectral transitions of high entropy MXenes.
- Science (AAAS), accepted; in production. Expected online Sept 3, 2025.

Micro-scaled Two-step Absorption Polymerization 3D Printing, UG Research — Jan 2024 – May 2024
- Supported experimental optimization of two-step absorption polymerization for microscale 3D printing.
- Conducted systematic print tests to evaluate how laser power and scan speed affected print quality and undesired material accumulation.

Portable Fluorescence Imaging Platform, UG Research Team Lead — Jan 2023 – Dec 2023
- Spearheaded the design and prototyping of a portable LAMP-based fluorescence imaging platform for on-site mycotoxin detection, integrating Arduino-based control, isothermal heating, and CMOS imaging.
- Co-authored and presented work at SPIE Defence and Commercial Sensing 2024.

Projects

Elastic Light Scattering Detection System – Project Manager junwoojang.me/projects/ELS

- Directed a five-person cross-disciplinary team to deliver a rapid, non-destructive particle-detection prototype.
- Wrote a full Mie-scattering simulator in MATLAB, compensating for large particle size.

Teaching and Mentorship

Teaching Assistant – ME27400 (Basic Mechanics II), Purdue University Aug 2024 – Dec 2024

- **Graded coursework** for sophomore mechanical-engineering students—homework sets, quizzes, and exams—using Brightspace/Gradescope rubrics; delivered written feedback within 48 h and tracked scores in Excel for the course instructor.
- **Held 5 office hours** per week, guiding students through sample problems and crafting visual frameworks that improved conceptual understanding.

Leadership and Service

Tau Beta Pi (TBP) Engineering Honor Society - Internal Affairs Chair Jan 2024 – May 2024

- Curated the chapter's social calendar: bowling nights, stress-free events, and networking mixers, delivering 13 social events that nearly quadrupled average attendance from previous semesters

Republic of Korea Marine Corps – Infantry Battalion Oct 2020 – May 2022

- **Weapons mechanic & airborne-qualified;** managed armory readiness and served as Korean–English interpreter; awarded Division Commander's Commendation for extended service and ROK–U.S. joint-mission support.

Technologies and Instrumentation

Modeling and Code: COMSOL (heat transfer), MATLAB (fitting/Lorentzian), Python (NumPy/Pandas)

Spectroscopy and Microscopy: Raman, PL, micro-/nano-FTIR, AFM.

Design and Manufacturing: Autodesk, Siemens NX, Parametric Creo, ASME GDnT, Metal Machining