



Chonghyo Joo

Born on 1995.04.27

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🔗 [Github](#)

Scientific interests

- AI Transformation
- Industrial AI
- Smart Manufacturing Systems

Education

2025.08 PhD in Chemical &

Biomolecular

Engineering

– Yonsei University

(Advisor: Prof. Il Moon)

– Seoul, South Korea

2022.02 (Double major)

Bachelor in Chemical

Engineering/Mechanical

Engineering

– Konkuk University

– Seoul, South Korea

– Exchange student, METU,

Ankara, Turkey (Fall 2019)

Current position

2026.08 – Present **Assistant Professor**

School of Energy and Chemical Engineering,

University of Ulsan

Experience

2026.04 – 2026.08 **Postdoctoral Researcher**

Department of Battery and Chemical Engineering,

Hanyang University (Advisor: Prof. Jaewon Lee)

2025.09 – 2026.03 **Postdoctoral Researcher**

Department of Chemical Engineering,

University College London (Advisor: Prof. Lauren Lee)

2023.03 – 2023.08 **Teaching Assistant**

Chemical Engineering Computer Aided Modeling,

Yonsei University

2021.08 – 2022.08 **Teaching Assistant**

Advanced analytics lecture course, AI education course,

Hanwha Totalenergies

2020.09 – 2022.02 **Visiting Researcher**

Green Materials and Processes R&D Group,

Korea Institute of Industrial Technology

Publications

*First author (14/20)

Joo, C. and Lee, L. (2026) Temperature-conditioned molecular representation for organic solubility prediction *Chemical Engineering Journal*. doi: [10.1016/j.cej.2026.180019](https://doi.org/10.1016/j.cej.2026.180019)

Oh, S., Roh, J., Park, H., Lee, D., Joo, C. et al. (2025) Enhancing Catalyst Performance Prediction with Hybrid Quantum Neural Networks: A Comparative Study on Data Consistency Variation *ACS Sustainable Chemistry & Engineering*. doi: [10.1021/acssuschemeng.4c08534](https://doi.org/10.1021/acssuschemeng.4c08534)

- Kim, M., Joo, C. (co-first), Lim, J. et al. (2025) Novel inverse predictive system integrated with industrial lubricant information *Engineering Applications of Artificial Intelligence*. doi: [10.1016/j.engappai.2024.109853](https://doi.org/10.1016/j.engappai.2024.109853)
- Kim, S., Joo, C. (co-first), Lim, J. et al. (2024) A simultaneous optimization of the seawater bittern and waste seashell recovery process for CO₂ and SO_x utilization *Desalination*. doi: [10.1016/j.desal.2024.117736](https://doi.org/10.1016/j.desal.2024.117736)
- Park, H., Joo, C., Lim, J., et al. (2024) Novel natural gradient boosting-based probabilistic prediction of physical properties for polypropylene-based composite data *Engineering Applications of Artificial Intelligence*. doi: [10.1016/j.engappai.2024.108864](https://doi.org/10.1016/j.engappai.2024.108864)
- Joo, C., Lee, J., Lim, J. et al. (2024) A genetic algorithm-based optimal selection and blending ratio of plastic waste for maximizing economic potential *Process Safety and Environmental Protection*. doi: [10.1016/j.psep.2024.03.114](https://doi.org/10.1016/j.psep.2024.03.114)
- Roh, J., Park, H., Kwon, H., Joo, C. et al. (2024) Interpretable machine learning framework for catalyst performance prediction and validation with dry reforming of methane *Applied Catalysis B: Environmental*. doi: [10.1016/j.apcatb.2023.123454](https://doi.org/10.1016/j.apcatb.2023.123454)
- Ga, S., An, N., Lee, G., Joo, C. et al. (2024) Multidisciplinary high-throughput screening of metal-organic framework for ammonia-based green hydrogen production *Renewable and Sustainable Energy Reviews*. doi: [10.1016/j.rser.2023.114275](https://doi.org/10.1016/j.rser.2023.114275)
- Roh, J., Oh, S., Lee, D., Joo, C. et al. (2024) Hybrid Quantum Neural Network Model with Catalyst Experimental Validation: Application for the Dry Reforming of Methane *ACS Sustainable Chemistry & Engineering (Covered)*. doi: doi.org/10.1021/acssuschemeng.3c07496
- Joo, C., Kwon, H., Lim, J. et al. (2024) Multiobjective Optimization of CO₂ Emission and Net Profit for a Naphtha Cracking Furnace Using a Deep Neural Network with a Nondominated Sorting Genetic Algorithm *ACS Sustainable Chemistry & Engineering*. doi: [10.1021/acssuschemeng.3c07939](https://doi.org/10.1021/acssuschemeng.3c07939)
- Joo, C., Lee, J., Kim, Y. et al. (2024) A novel on-site SMR process integrated with a hollow fiber membrane module for efficient blue hydrogen production: Modeling, validation, and techno-economic analysis *Applied Energy*. doi: [10.1016/j.apenergy.2023.122227](https://doi.org/10.1016/j.apenergy.2023.122227)
- Ga, S., An, N., Lee, G., Joo, C. et al. (2024) Economic analysis with multiscale high-throughput screening for covalent organic framework adsorbents in ammonia-based green hydrogen separation *Renewable and Sustainable Energy Reviews*. doi: [10.1016/j.rser.2023.113989](https://doi.org/10.1016/j.rser.2023.113989)
- Joo, C., Park, H., Lim, J. et al. (2023) Machine learning-based heat deflection temperature prediction and effect analysis in polypropylene composites using catboost and shapley additive explanations *Engineering Applications of Artificial Intelligence*. doi: [10.1016/j.engappai.2023.106873](https://doi.org/10.1016/j.engappai.2023.106873)
- Ga, S., An, N., Joo, C. (co-first) et al. (2023) pyAPEP: An all-in-one software package for the automated preparation of adsorption process simulations *Computer Physics Communications*. doi: [10.1016/j.cpc.2023.108830](https://doi.org/10.1016/j.cpc.2023.108830)

- Jeong, S., Joo, C. (co-first), Lim, J., Cho, H. et al. **(2023)** A novel graph-based missing values imputation method for industrial lubricant data *Computers in Industry*. doi: [10.1016/j.compind.2023.103937](https://doi.org/10.1016/j.compind.2023.103937)
- Kim, J., Joo, C. (co-first), Kim, M., An, N. et al. **(2023)** Multi-objective robust optimization of profit for a naphtha cracking furnace considering uncertainties in the feed composition *Expert Systems with Applications*. doi: [10.1016/j.eswa.2022.119464](https://doi.org/10.1016/j.eswa.2022.119464)
- Lim, J., Joo, C. (co-first), Lee, J. et al. **(2023)** Novel carbon-neutral hydrogen production process of steam methane reforming integrated with desalination wastewater-based CO2 utilization *Desalination*. doi: [10.1016/j.desal.2022.116284](https://doi.org/10.1016/j.desal.2022.116284)
- Lee, J., Joo, C. (co-first), Lim, J. et al. **(2022)** Multiobjective optimization of plastic waste sorting and recycling processes considering economic profit and CO2 emissions using nondominated sorting genetic algorithm II *ACS Sustainable Chemistry & Engineering*. doi: [10.1021/acssuschemeng.2c02929](https://doi.org/10.1021/acssuschemeng.2c02929)
- Lee, J., Joo, C. (co-first), Cho, H., Kim, Y. et al. **(2022)** Design of multistage fixed bed reactors for SMR hydrogen production based on the intrinsic kinetics of Ru-based catalysts *Energy Conversion and Management*. doi: [10.1016/j.enconman.2022.115981](https://doi.org/10.1016/j.enconman.2022.115981)
- Joo, C., Park, H., Lim, J., Cho, H. et al. **(2021)** Development of physical property prediction models for polypropylene composites with optimizing random forest hyperparameters *International Journal of Intelligent Systems (Covered)*. doi: [10.1002/int.22700](https://doi.org/10.1002/int.22700)

Oral presentations

- Joo, C., Kim, J., Cho, H. et al. **(2023)** Chemical Property-Guided Neural Networks for Naphtha Composition Prediction *2023 IEEE 21st International Conference on Industrial Informatics (INDIN)*, July 18, 2023, Ramgo, Germany.
- Joo, C., Park, H., Lim, J. et al. **(2022)** Data-Driven Modeling to Predict the Physical Properties of the Lubricant *2022 AIChE Annual Meeting*, November 14, 2022, Phoenix, U.S.

Awards

Best Poster Presentation, 2022 KIChE Fall Meeting and International Symposium

Title: Development of a probabilistic property prediction model using polypropylene composites recipe data

Best Poster Presentation, 2020 KSMTE Annual Autumn Conference

Title: Property prediction for polypropylene composites using randomforest

Projects

- Big Data-Based Platform for Commercial Battery Manufacturing Processes (2026 – Present)
 - Lead Organization: Hanyang University,
 - Objective: AI-based reduced order model (ROM) for electrode manufacturing,
 - Performance: Data curation & analysis, ROM development, AI pipeline construction
- MEng Research Project (2025 – 2026)
 - Lead Organization: University College London,
 - Objective: Deep learning-based solubility prediction in binary solvent-solute systems,
 - Performance: Data curation, Deep learning architecture & pipeline construction, Result analysis
- Development and validation of the optimized platform for AI-based autonomous manufacture in petroleum and chemical industry (2024 – 2025)
 - Lead Organization: GS Caltex,
 - Objective: Digital transformation using AI and optimization,
 - Performance: Data-preprocessing for the industrial data, AI-based modeling
- Improved AI-based lubricant property prediction model and Development of optimal recipe proposal model (2023 – 2024)
 - Lead Organization: GS Caltex,
 - Objective: Improved AI-based lubricant property prediction model and development recipe recommendation system,
 - Performance: Data-preprocessing for the industrial data, AI-based modeling, Material analysis, Optimization
- AI-based modeling for CO2 absorbent performance prediction and optimization of high/low concentration absorbent recipes (2023 – 2024)
 - Lead Organization: Doosan Enerbility,
 - Objective: Development of AI-based predictive modeling to predict VLE of the blended CO2 absorbents,
 - Performance: Data-preprocessing, AI-based modeling, Feature engineering, Optimization
- Development of AI Platform for Continuous Manufacturing of Chemical Process (2022 – 2023)
 - Lead Organization: GS Caltex,
 - Objective: Development of AI-based predictive system for customized lubricant,
 - Performance: Data-preprocessing for the industrial data, AI-based modeling, Feature engineering, Development of GUI for the application
- Development of AI-based prediction model and automation in engineering industry (2022)
 - Lead Organization: Samsung E&A,
 - Objective: AI-based predictive modeling for engineering control valve,
 - Performance: Data-preprocessing for the industrial data, Valve size prediction, Explainable AI application

- Development of Global Optimization System for Energy Process (2020 – 2021)
 - Lead Organization: Korea Institute of Industrial Technology,
 - Objective: Improvement of chemical processes,
 - Performance: CFD modeling, Reactor design, Data analysis, Optimization

Patents

(Application) Kim, J., Joo, C., Kim, M. **(2025)** Method and system for prediction of gas absorbing performance of blended absorbents using artificial neural network, and method and system for determining optimum composition of blended absorbents, PCT/KR2025/002695, PCT

(Application) Kim, J., Oh, S., Joo, C. **(2025)** Device and method for predicting catalyst performance using hybrid quantum neural network, 10-2025-0022833, KR

(Application) Kim, J., Joo, C. et al. **(2025)** Machine learning-based recipe recommendation system for customized lubricant development, 10-2025-0040619, KR

Skills

Python ● ● ● ●
 pytorch ● ● ● ●
 Matlab ● ● ● ○

gPROMS ● ● ● ○
 ANSYS Fluent ● ● ● ○

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