

# Jihoon Kim

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“Exploring the fields of compressible and wall-bounded turbulent flows.”

## Education



### Korea University

M.S.-PH.D. IN MECHANICAL ENGINEERING

DISSERTATION: SHOCK WAVE/TURBULENT BOUNDARY LAYER

INTERACTIONS UNDER SINUSOIDAL INFLOW FORCING AND

BOUNDARY LAYER STATES (ADVISOR: PROF. JAIYOUNG RYU)

- A Ph.D. fellowship from the National Research Foundation (NRF) of Korea
- The Excellent Graduate Student Award in mechanical engineering at Korea University

Seoul, South Korea

Aug. 2026 (expected)

### Chung-Ang University

B.S. IN MECHANICAL ENGINEERING

Seoul, South Korea

Feb. 2020

## Award & Experience

### Japan-Korea Fluid Mechanics Online Workshop (JK-Flow)

INVITED TALK, SHOCK WAVE/TURBULENT BOUNDARY LAYER INTERACTIONS: BOUNDARY-LAYER THICKNESS EFFECTS

South Korea

Dec. 2025

### Ph.D. fellowship from the National Research Foundation of Korea

TITLE: NUMERICAL ANALYSIS OF THE COMBINED INTERACTION PHENOMENA OF SUPERSONIC FREESTREAM TURBULENCE, OBLIQUE SHOCK WAVE, AND TURBULENT BOUNDARY LAYER

South Korea

Jun. 2024

### Excellent graduate student award

MECHANICAL ENGINEERING, KOREA UNIVERSITY

South Korea

Mar. 2024

### Exchange program at University of California, Irvine (PI: Prof. Yoonjin Won)

VISITING GRADUATE STUDENT

Irvine, CA, USA

Aug. 2022 - Feb. 2023

## Publication

### JOURNAL PAPER

- LE, T. T. G., CHO, M., **KIM, J.**, PARK, G. D. & RYU, J. 2025 Aerodynamic and shock wave investigation in hyperloop: Comparative analysis of maglev support configurations. *Physics of Fluids* 37(3).
- **KIM, J.**, LEE, C., LE, T. T. G., KIM, D., WON, Y., CHO, M. & RYU, J. 2024 Effects of eccentricity in tube-pod arrangements on hyperloop aerodynamics. *International Journal of Mechanical Sciences* 279, 109505.
- HASSAN, S. M. S., FEENEY, A., DHARUV, A., **KIM, J.**, SUH, Y., RYU, J., WON, Y. & CHANDRAMOWLISHWARAN, A. 2023 BubbleML: A multiphase multiphysics dataset and benchmarks for machine learning. *Advances in Neural Information Processing Systems* 36.
- SUNG, W., **KIM, J.**, JANG, K. S., LE, T. T. G., KIM, J., KIM, D. H., LEE, H. & RYU, J. 2023 Parametric study of a projectile launched by a compressed air cannon. *Journal of Mechanical Science and Technology* 37, 5913-5933.
- AHN, M. H., **KIM, J.**, LEE, S. R., LEE, U. D., KIM, S., SHIN, D., LEE, H. & RYU, J. 2023 Experimental analysis of biomimetic silencer to reduce exhaust noise in pneumatic devices. *Applied Acoustics* 214, 109681.
- LE, T. T. G., **KIM, J.**, PARK, G. D., SUNG, W., CHO, M., LEE, H. & RYU, J. 2023 Effect of curvature radius and angle on aerodynamic characteristics of a sphere travelling in a branched tube system. *Engineering Applications of Computational Fluid Mechanics* 17, 2208633.
- **KIM, J.**, LEE, S., HO, V. T., SHIN, D. & RYU, J. 2023 Effects of speed and posture on aerodynamic characteristics of running and required power. *International Journal of Applied Mechanics* 15, 2250105.

- LE, T. T. G., **KIM, J.**, CHO, M. & RYU, J. 2022 Effects of tail shapes/lengths of hyperloop pod on aerodynamic characteristics and wave phenomenon. *Aerospace Science and Technology* 131, 107962
- LE, T. T. G., **KIM, J.**, JANG, K. S., LEE, K. S. & RYU, J. 2022 Numerical study of unsteady compressible flow induced by multiple pods operating in the hyperloop system. *Journal of Wind Engineering and Industrial Aerodynamics* 226, 105024.
- **KIM, J.**, LE, T. T. G., CHO, M. & RYU, J. 2022 Theoretical and numerical analysis of effects of sudden expansion and contraction on compressible flow phenomena in hyperloop system. *Aerospace Science and Technology* 126, 107587.
- **KIM, J.**, JANG, K. S., LE, T. T. G., LEE, K. S. & RYU, J. 2022 Theoretical and numerical analysis of pressure waves and aerodynamic characteristics in hyperloop system under cracked-tube conditions. *Aerospace Science and Technology* 123, 107458.
- LE, T. T. G., **KIM, J.**, JANG, K. S., LEE, K. S. & RYU, J. 2022 Numerical study on the influence of the nose and tail shape on the aerodynamic characteristics of a hyperloop pod. *Aerospace Science and Technology* 121, 107362.
- JANG, K. S., LE, T. T. G., **KIM, J.**, LEE, K. S. & RYU, J. 2021 Effect of compressible flow phenomena on the aerodynamic characteristics in hyperloop system. *Aerospace Science and Technology* 117, 106970.

## INTERNATIONAL CONFERENCE

- **KIM, J.**, KIM, J. & RYU, J. 2025 Numerical analysis of boundary-layer thickness effects on shock wave/turbulent boundary layer interactions. *APS Division of Fluid Dynamics (APS DFD)*.
- **KIM, J.**, KIM, J. & RYU, J. 2025 Numerical study of oblique shock wave and thickened boundary layer interactions. *Asian Congress of Fluid Mechanics (ACFM)*.
- **KIM, J.**, CHO, M. & RYU, J. 2024 Investigation of high-speed flow past a sphere in open and confined spaces. *APS Division of Fluid Dynamics (APS DFD)*.
- **KIM, J.**, PARK, G. D., CHO, M., LE, T. T. G. & RYU, J. 2024 Quasi-1D analytical and numerical study on compressible flow phenomena of an object in a straight pipe. *International Congress on Theoretical and Applied Mechanics (ICTAM)*.
- **KIM, J.**, CHO, M., LE, T. T. G. & RYU, J. 2024 Quasi-one-dimensional analysis and its verification of compressible flow phenomena and aerodynamics in hyperloop system. *AIAA SciTech Forum*.
- **KIM, J.**, LE, T. T. G., CHO, M. & RYU, J. 2023 Investigation of compressible flow and wave phenomena in hyperloop system. *International Symposium on Shock Wave (ISSW)*.
- **KIM, J.**, JANG, K. S., LE, T. T. G., LEE, K. S., JANG, Y. J. & RYU, J. 2021 Analysis of hyperloop system under cracked tube condition. *Asian Conference on Railway Engineering and Transportation*.

## DOMESTIC CONFERENCE

- **KIM, J.**, CHO, M. & RYU, J. 2024 Investigation of aerodynamic characteristics of high-speed object in open and confined spaces. *Korean Society of Mechanical Engineering (KSME Meeting)*.
- **KIM, J.**, JANG, K. S., LE, T. T. G., CHO, M. & RYU, J. 2022 Investigation of compressible flow phenomena and aerodynamic characteristics in hyperloop system under cracked-tube. *National Congress on Fluids Engineering (NCFE Meeting)*.
- **KIM, J.**, JANG, K. S., LE, T. T. G., LEE, K. S., JANG, Y. J. & RYU, J. 2020 Investigation of aerodynamic characteristics in hyperloop system under cracked tube condition. *Korean Society of Mechanical Engineering (KSME Meeting)*.

## Skills

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| <b>Programming</b>          | C/C++, Fortran, MATLAB, Python, LaTeX, HTML |
| <b>Simulation (DNS/LES)</b> | STREAmS, MFC, UCNS3D, CharLES, AMReX        |
| <b>Simulation (RANS)</b>    | SU2, OpenFOAM, Ansys Fluent, Star-CCM+      |
| <b>Meshing tool</b>         | ICEM, Gmsh, SnappyHexMesh, Pointwise        |
| <b>Visualization</b>        | ParaView, Catalyst, VisIt                   |
| <b>Languages</b>            | Korean, English                             |