

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

Manuscript under Preparation

MANUSCRIPT

- **KIM, J.**, KIM, J. & RYU, J. Effects of boundary-layer thickness on shock wave/turbulent boundary layer interactions. *Under Preparation*.
- **KIM, J.**, KIM, J. & RYU, J. Low-frequency unsteadiness of shock wave/turbulent boundary layer interactions under sinusoidal inflow forcing. *Under Preparation*.
- **KIM, J.**, CHO, M., LEE, C. & RYU, J. Compressible flow phenomena and aerodynamics of a sphere in open and confined spaces. *Under Preparation*.

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. *The 78th APS Division of Fluid Dynamics (78th APS DFD)*.
- **KIM, J.**, KIM, J. & RYU, J. 2025 Numerical study of oblique shock wave and thickened boundary layer interactions. *The 18th Asian Congress of Fluid Mechanics (18th ACFM)*.
- **KIM, J.**, CHO, M. & RYU, J. 2024 Investigation of high-speed flow past a sphere in open and confined spaces. *The 77th APS Division of Fluid Dynamics (77th 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. *The 25th International Congress on Theoretical and Applied Mechanics (25th 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. *2024 AIAA SciTech Forum*.
- **KIM, J.**, LE, T. T. G., CHO, M. & RYU, J. 2023 Investigation of compressible flow and wave phenomena in hyperloop system. *The 34th International Symposium on Shock Wave (34th 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. *The 3rd 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

Programming	Fortran, C/C++, MATLAB, Python
Simulation (DNS/LES)	STREAmS-2, MFC
Simulation (RANS)	SU2, OpenFOAM, ANSYS Fluent
Visualization	ParaView, Catalyst, VisIt
Languages	Korean, English