Dayoung Kang

PhD Student
Computational Science and Engineering, Georgia Institute of Technology
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PROFILE SUMMARY

- Third-year PhD student with research in developing rapid yet accurate machine learning models
- Specialized in multifidelity modeling – using both limited expensive data and abundant cheaper data
- Experienced in both data-driven and physics-based surrogate modeling with applications to digital twin, design optimization, and reliability analysis

RESEARCH INTERESTS

Scientific Machine Learning (neural network, linear models, Gaussian process), **Multifidelity Methods** (multifidelity Monte Carlo, multifidelity Gaussian process), **Reduced Order Models** (POD, reduced basis)

EDUCATION

Georgia Institute of Technology   **Atlanta, GA**
PhD in Computational Science and Engineering   Aug 2023 – *Present*

Pusan National University   **South Korea**
Master in Aerospace Engineering   Sep 2020 – Aug 2022

Pusan National University   **South Korea**
Bachelor in Aerospace Engineering   Mar 2016 – Aug 2020

JOURNAL PUBLICATIONS

Kang, D., Kang, S., Kim, B., & Lee, K. (2025). Condition-Based Fatigue Life Monitoring of a High-Pressure Hydrogen Storage Vessel Using a Reduced Basis Digital Twin. *Engineering Structures*, 336, DOI: 10.1016/j.engstruct.2025.120196

Qian, E., **Kang, D.**, Sella, V., & Chaudhuri, A. (2025). Multifidelity linear regression for scientific machine learning from scarce data. *Foundations of Data Science*, 7(1), 271-297. DOI: 10.3934/fods.2024049

Kang, D., Noh, H. G., Kim, J., and Lee, K. (2022). Inverse Identification of a Constitutive Model for High-Speed Forming Simulation: an Application to Electromagnetic Metal Forming. *Materials*, 15(20), 1–30. DOI: 10.3390/ma15207179

Kang, D., Pham. T. M., and Lee, K. (2022). Reliability-based Design Optimization of a High-Pressure Hydrogen Storage Vessel Using a Static Condensation Reduced Basis Element Method. *Transactions of the Korean Society of Mechanical Engineers, A*, 46(2), 127–144. DOI: 10.3795/KSME-A.2022.46.2.127

Kang, S., **Kang, D.**, and Lee, K. (2021). On the Effect of Air-Simulated Side-Jets on the Aerodynamic Characteristics of a Missile by Multi-Fidelity Modeling. *Journal of the Korean Society for Aeronautical & Space Sciences*, 49(2), 95-106. DOI: 10.5139/JKSAS.2021.49.2.95

CONFERENCES

Qian, E., **Kang, D.**, Sella, V., and Chaudhuri, A. (March, 2025). Multifidelity Linear Regression for Scientific Machine Learning from Scarce Data. Poster presentation at *SIAM Conference on Computational Science and Engineering*

Kang, D., Pham. T. M., and Lee, K. (November, 2022). Statistical Fatigue Life Prediction of Damaged Structure Using Reduced Basis Method. Oral presentation at *The Korean Society for Aeronautical & Space Sciences 2022 Fall Conference*

Kang, D., Pham. T. M., and Lee, K. (May, 2022). Design Optimization of a Hydrogen Vessel Under Operating Condition Uncertainty via a Parametrized Component-Based Reduced Basis Model. Oral presentation at *The Korean Society of Mechanical Engineers 2022 Spring Conference*

AWARDS

Best Paper Award November 2023

Awarded by *the Korean Society of Mechanical Engineers* for the first-authored paper "Reliability-based Design Optimization of a High-Pressure Hydrogen Storage Vessel Using a Static Condensation Reduced Basis Element Method"

Outstanding Thesis Award January 2024

Awarded by *the Korean Society for Design Optimization* for the Master's Thesis "Reliability-Based Design Optimization and Digital Twin-Driven Fatigue Life Prediction of a Hydrogen Storage Vessel via Reduced Basis Method"

Dean's Writing Award April 2019

Awarded at *the State University of New York at Oswego* for the co-authored report "A Brief Study of the Mechanics Behind Hydroelectric and Wind Powered Renewable Energy Systems"

Foundation Scholarship Spring 2019

Funded by *the National Research Foundation (NRF) of Korea* for selection as an international exchange student

PROJECTS

Estimation of Hydrodynamic Coefficients of a Submarine Based on Machine Learning Techniques (Funded by an Agency for Defense Development, South Korea)

Constructed surrogate models to predict hydrodynamic forces of an unmanned underwater vehicle using Kriging

Six-DOF Aerodynamic Database Modeling With Simulation and Experimental Data (Funded by an Agency for Defense Development, South Korea)

Constructed multifidelity surrogate models to predict aerodynamic coefficients of a missile using Co-Kriging

TEACHING

Teaching Assistant for **Numerical Analysis and Algorithms** Spring 2024, Spring 2025

Georgia Institute of Technology Atlanta, GA

- Led exam review sessions, developed homework problems and solutions
- Guided students in weekly in-class problem-solving activities

Teaching Assistant for **Introduction to IoT-based Digital Twin** Fall 2022

Pusan National University South Korea

- Led lectures on mesh generation with *Cubit*, structural simulation with *Akselos*, and introduction to fatigue analysis, developed homework problems and solutions

MENTORING

Research Mentor for Multifidelity Neural Network Project Fall 2024 – Fall 2025

Mentored an undergraduate student in developing neural network models with multifidelity data

- Mentor for Georgia Tech President's Undergraduate Research Award (PURA) project
- Guided theory and development of multifidelity neural networks

Research Mentor for Multifidelity Linear Regression Project Summer 2025

Mentored an undergraduate student in implementing multifidelity models for uncertainty quantification

- Mentor for Georgia Tech's Summer Undergraduate Research in Engineering (SURE) program
- Guided theory and implementation of multifidelity Monte Carlo and multifidelity linear regression

SKILLS

Programming Python, MATLAB, C++, R
Libraries PyTorch, scikit-learn, libMesh