

Donghun Kang, Ph.D.

University of California, San Diego
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Education

University of California, Davis

Ph.D. in Mechanical and Aerospace Engineering, Advisor: Dr. Seongkyu Lee
GPA: 3.91/4.00

Davis, USA

Sep 2020 – Sep 2024

Korea Advanced Institute of Science and Technology (KAIST)

M.S. in Aerospace Engineering, Advisor: Dr. Oh Joon Kwon
GPA: 3.88/4.00

Daejeon, Korea

Mar 2016 – Feb 2018

Korea Aerospace University

B.S. in Aerospace Engineering
GPA: 3.87/4.00 – Ranked 2nd out of 180

Goyang, Korea

Mar 2010 – Feb 2016

Professional Appointments

Postdoctoral Researcher

Department of Mechanical and Aerospace Engineering at University of California, San Diego

San Diego, USA

Oct 2024 – Present

Graduate Research Assistant

Department of Mechanical and Aerospace Engineering at University of California, Davis

Davis, USA

Sep 2020 – Sep 2024

Aerodynamics Engineer

Aircraft Aerodynamics Branch at Agency for Defense Development

Daejeon, Korea

May 2018 – Sep 2020

Journal Publications

[J1] **DH. Kang** and S. Lee, “Effect of Misaligned Flow on Trailing-edge Noise,” *Journal of Sound and Vibration*, Vol. 611, pp. 119102, 2025. [\[link\]](#)

[J2] **DH. Kang** and S. Lee, “Role of Hydrodynamic and Acoustic Pressures in Trailing-edge Noise Using Numerical and Analytical Approaches,” *Physical Review Fluids*, Vol. 10, No. 3, pp. 034609, 2025. [\[link\]](#)

[J3] **DH. Kang** and S. Lee, “Effect of Trailing-edge Curvature on Airfoil Noise Source and Radiation Characteristics,” *Physics of Fluids*, Vol. 37, No. 3, pp. 035134, 2025. [\[link\]](#)

[J4] **DH. Kang** and S. Lee, “Cross-Spectrum Method for Acoustic Source Identification and Visualization of Airfoil Noise,” *Aerospace Science Technology*, Vol. 151, pp. 109278, 2024. [\[link\]](#)

[J5] **DH. Kang** and S. Lee, “Aerodynamic and Aeroacoustic Effects of Different Transition Mechanisms on an Airfoil,” *AIAA Journal*, Vol. 62, No. 4, pp. 1517–1535, 2024. [\[link\]](#)

[J6] **DH. Kang**, S. Lee, D. Brouzet, and S. K. Lele, “Wavelet-based Pressure Decomposition for Airfoil Noise in low Mach Number Flows,” *Physics of Fluids*, Vol. 35, pp. 075112, 2023. [\[link\]](#)

[J7] **DH. Kang**, JW. Yim, and HC. You, “Numerical Investigation of Aerodynamic Characteristics of a Ducted Fan-Vane Configuration and Improvement of Control Performance in Hover,” *Journal of Korean Society of Aeronautical and Space Sciences*, Vol. 49, No. 3, pp. 221–231, 2021. [\[link\]](#)

[J8] **DH. Kang** and OJ. Kwon, “Numerical Study about Buffet Characteristics and Attenuation of Vertical Tail at High Angles of Attack,” *International Journal of Aeronautical and Space Sciences*, Vol. 21, pp. 315–328, 2019. [\[link\]](#)

Patent

- JW. Yim, **DH. Kang**, KM. Kim, “Ducted Fan with Vanes,” KR Patent 10-2022-0013554, issued August 10, 2022. [\[link\]](#)

Conference and Presentations

- [C1] **DH. Kang** and S. Lee, “Aerodynamic and Aeroacoustic Investigations of a NACA 0018 Airfoil with Morphed Trailing Edges,” AIAA SciTech Forum, Orlando, FL, Jan 8-10, 2025.[\[link\]](#)
- [C2] **DH. Kang** and S. Lee, “Aeroacoustic Study of Morphed Trailing-Edge Airfoils Using Large-Eddy Simulations,” 12th International Conference on Computational Fluid Dynamics, Kobe, Japan, July 14-19, 2024.
- [C3] **DH. Kang** and S. Lee, “Numerical and Analytical Investigations on Airfoil Noise Reduction with a Sweep Angle,” 30th AIAA/CEAS Aeroacoustics Conference, Rome, Italy, June 4-7, 2024.[\[link\]](#)
- [C4] **DH. Kang** and S. Lee, “A New Acoustic Source Identification and Visualization Method for Airfoil Noise Using Large-Eddy Simulations,” AIAA SciTech Forum, Orlando, FL, Jan 8-12, 2024. [\[link\]](#)
- [C5] **DH. Kang** and S. Lee, “A Revisit of Amiet’s Trailing-edge Noise Theory through Large-Eddy Simulations,” AIAA Aviation Forum, San Diego, CA, June 12-16, 2023. [\[link\]](#), (**Selected as one of the top 5 best student papers in the aeroacoustics conference**).
- [C6] **DH. Kang** and S. Lee, “On the Effect of Boundary-layer Tripping for Trailing-edge Noise Predictions,” AIAA SciTech Forum, National Harbor, MD, Jan 23-27, 2023. [\[link\]](#)
- [C7] S. Lee, **DH. Kang**, D. Brouzet, and S. K. Lele, “Airfoil Trailing-Edge Noise Source Identification Using Large-Eddy Simulation and Wavelet Transform,” Proceedings of the 2022 Center for Turbulence Research Summer Program, 2022. [\[link\]](#)
- [C8] **DH. Kang** and S. Lee, “Assessment of Wavelet-based Separation Algorithms on Turbulent Boundary Layer Trailing-edge Noise Prediction,” 11th International Conference on Computational Fluid Dynamics, Maui, Hawaii, July 11-15, 2022. [\[link\]](#)
- [C9] **DH. Kang** and S. Lee, “Application of Wavelet Analysis to Trailing-edge Noise,” 28th AIAA/CEAS Aeroacoustics Conference, Southampton, UK, June 14-17, 2022. [\[link\]](#)

Research Experience

Postdoctoral Researcher at University of California, San Diego

Oct 2024 – Present

Large-Scale Design Optimization Laboratory (PI: Dr. John T. Hwang)

San Diego, USA

- Developed Farassat Formulation 1A of Ffowcs Williams-Hawkings acoustic analogy and Fast Fourier Transform (FFT) using Computational System Design Language (CSDL; home-grown open source code) to integrate the advanced acoustic method into engineering design optimization
- Established a modular aerodynamic shape optimization framework (CSDL-CFD (DAFoam) interface) with key components of geometry parametrization, mesh deformation, flow solver, adjoint solver, and optimizer
- Modified CFD (SU2) source code to perform the projection-based reduced-order model for the shape optimization of blended-wing body aircraft

Graduate Research Assistant at University of California, Davis

Sep 2020 – Sep 2024

Computational Flow Physics and Aeroacoustics Laboratory

Davis, USA

- Investigated flow-induced noise using wall-resolved large-eddy simulations (LES), advanced time-frequency methods, and data-driven techniques: demarcating the role of hydrodynamic and acoustic pressures, boundary-layer tripping effects on radiated noise, and wavelet filtering
- Developed the spectral tool for acoustic analysis: cross-spectrum method
- Reduced up to 5.5 dBA in sound pressure levels through flow misalignment, and 2.0 dBA through trailing-edge morphing while improving aerodynamic performance for the morphed airfoil

Visiting Researcher at Stanford University

Jul 2022 – Aug 2022

*The eighteenth biennial Summer Program of the Center for Turbulence Research (CTR)**Stanford, USA*

- Worked on the topic titled, "Airfoil trailing-edge noise source identification using large-eddy simulation and wavelet transform." (Hosts: Prof. Sanjiva. K. Lele and Dr. Davy Brouzet)
- Conducted collaborated works with program participants specialized in turbulence and relevant multi-physics involving wavelet-denoising method and pressure decomposition, and published the research report
- Sponsored by the NSF, NASA, ONR, and the Department of Energy (DoE)

Engineer at Agency for Defense Development—Korean government agency

May 2018 – Sep 2020

*Aircraft Aerodynamics Branch**Daejeon, Korea*

- Designed control vanes used for thrust vectoring and rolling and yawing maneuvering control through computational fluid dynamics (Star-CCM+) and wind tunnel testing (KR Patent 10-2022-0013554)
- Designed deswirl stator to attenuate swirling flows induced by a ducted-fan blade
- Performed stability & control (S&C) and 6-DOF aerodynamic analysis of a vertical take-off landing (VTOL) aircraft and fan-blade system during level flight conditions through computational fluid dynamics and wind tunnel testing (collaborated with DLR-NWB)
- Conducted numerical simulations of VTOL configurations in transitional flight conditions to find aerodynamic similarities between forward flight speed and a blade pitch angle of ducted fan

Master Student at KAIST

Mar 2016 – Feb 2018

*Computational Aerodynamics and Design Optimization Laboratory**Daejeon, Korea*

- Computed detached eddy simulation of fighter jet (KF-21) and delta wing with vertical tail configuration to analyze buffet characteristics and calculated buffet loads at high angles of attack, funded by Korea Aerospace Industry Ltd. (KAI)
- Performed code implementation of a hybrid RANS/LES approach (delayed detached eddy simulation) in an unstructured mesh-based FVM in-house code and cavity flow analysis to resolve eddy viscosity contents for a backward-facing step configuration

Teaching Experience

Teaching Assistant at University of California, Davis

Sep 2021 – June 2024

Davis, USA

- Financially supported with Teaching Assistant (TA) activity in classes of Thermodynamics (2021 Fall), Aircraft Propulsion (2022/2023/2024 Winter), Rocket Propulsion (2023 Fall), Thermo and Fluids (2022/2024 Spring), and Applied Aerodynamics (2022 Fall)
- Led the TA discussion session to teach supplemental materials in the classes of Thermodynamics (2021 Fall) and Aircraft Propulsion (2022/2023/2024 Winter)
- Held the TA office hours to help students understand the class materials and solve the practice problems, developed the rubric, and graded the quizzes and exams

Professional Service

- Journal reviewer of Journal of Fluid Mechanics (JFM) Rapids, 2025
- Paper reviewer of AIAA Aviation Forum, Las Vegas, NV, July 21-25, 2025
- Paper reviewer of 30th AIAA/CEAS Aeroacoustics Conference, Rome, ITALY, June 4-7, 2024
- Paper reviewer of AIAA Aviation Forum, Las Vegas, NV, July 29 - Aug 2, 2024
- Paper reviewer of AIAA Aviation Forum, San Diego, CA, June 12-16, 2023

Software and Analysis Techniques

Programming Languages	: Python (Daily for research), Matlab (Daily for research), C++ (Source code modification), Fortran (Source code modification), and MPI libraries (Proficient)
CAD Software	: CATIA (5 years) and OpenVSP for geometry parametrization (1.5 years)
Flow Solver	: OpenFOAM (5 years), DAfoam&SU2 (1.5 years), Star-CCM+ (2.5 years), Fortran-based home-grown FVM flow solver (2 years), and CAMRAD-II (2 years)
Visualization	: Tecplot, Paraview, and FieldView, all of which are coupled with macro scripts to extract images of unsteady flow motions every time step
Acoustic Code	: PSU-WOPWOP (FW-H), Amiet's theory, and Brooks, Pope, and Marcolini (BPM) model
Optimization	: Computational System Design Language (CSDL), modopt, Mphys/OpenMDAO, MACH-Aero Framework (pyGeo and IDWarp), and Meshing (Gmsh, Pointwise, and pyHyp)
Data Analysis	: Signal processing—wavelet transform and wavenumber-frequency spectrum. Data-driven modeling—spectral proper orthogonal decomposition (SPOD) and dynamic mode decomposition (DMD)

Awards and Honors

• Joseph L. Steger Fellowship	May 2024
• Stanford University Center for Turbulence Research Summer Program Fellowship	July 2022
• National Science and Engineering Graduate Scholarship of Korea	Mar 2016 – Feb 2018
• Best Paper Award, Korean Society for Computational Fluids Engineering	Nov 2017
• Chancellor's Scholarship for Academic Excellence (Three Years)	Aug 2013 – Dec 2015
• KSAS-KAI Undergraduate Scholarship	Aug 2015
• Best Competition Award (Work of Capstone Design)	Jul 2015