Khanh Nguyen (He/Him)

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EDUCATION

Konkuk University (KU), Seoul, Republic of Korea

Doctor of Philosophy, Smart Vehicle Engineering (2022 – Expected Feb 2026)

- GPA: 4.00/4.00
- Courses: Robot Kinematics, Numerical Analysis, Optimal Control Theory, Elasticity (36 credits)

Master of Science, Smart Vehicle Engineering (2019 – 2021)

- GPA: 3.89/4.00
- Courses: Finite Element Method (FEM), Advanced FEM, Structural Dynamics, Microsystem (24 credits)

Vietnam National University, Ho Chi Minh City University of Technology (VNU – HCMUT)

Bachelor of Engineering, Mechanical and Aerospace Engineering (2013 – 2018)

- The Training Programs of Excellent Engineers in Vietnam (PFIEV), which is accredited by France's CTI and awarded the EUR–ACE Master's label, is a five-year program comprising 274 European credits (ECTS).
- GPA: 3.18/4.00
- Courses: Aerodynamics, Aircraft Propulsion, Computational Fluid Dynamics (CFD), Helicopters, Flight Mechanics.

RESEARCH EXPERIENCE

Ph.D. Program, Konkuk university, Seoul, Republic of Korea

Project 1: Flapping-wing robot in fast forward flight (ongoing collaboration with Prof. Dario Floreano's lab, EPFL)

- Conducted CFD simulation of a flapping wing motion under tethered, stroke-plane tilting conditions with inflow speeds of 2 to 4 m/s, using a wind tunnel.

Project 2: Design and fabrication of a fast-swimming robot (5-year ongoing project)

01 first-authored paper after first year (data complete, writing 90% finished, preparing for submission)

- Created a fast-robotic fish using physical parameters within realistic real and artificial fish ranges to achieve target speed.

Project 3: Flapping flights on Mars (ongoing)

01 first-authored paper (2024, JCR Q1, IF = 5.0) & **01** first-authored paper (data 90% finished, writing preparation).

- Investigated stability characteristics of a flapping-wing hover under Martian atmospheric condition using ANSYS–Fluent.
- Studied aerodynamic characteristics of a flapping-wing robot during takeoff under varying ultra–low air densities using ANSYS-Fluent (ongoing).

Project 4: Leaping robotic fish

01 first-authored paper (2023, JCR Q1, IF = 4.6) & **01** co-authored paper (2023, JCR Q1, IF = 4.6).

- Conducted CFD simulation with ANSYS–Fluent to estimate body drag using measured undulatory swimming kinematics.
- Performed CFD analysis using ANSYS–Fluent to explore the feasibility of gliding in a flying–fish–liked robot utilizing submerged tail beating and fixed wings after fast swimming underwater and leaping from water.

M.S. Program, Konkuk university, Seoul, Republic of Korea

Project 1: Aerodynamic improvement

01 first-authored paper (2021, JCR Q1, IF = 5.0).

- Numerically proposed an optimal wing kinematics (WK) to improve aerodynamic performance of a flapping-wing hover by 31%, maintaining lift and reducing drag. Modifications include distributed spanwise wing corrugation, adjusted wing motion, and exclusion of the clap–fling mechanism.

Project 2: Stability of a flapping-wing robot

01 first-authored paper (2021, JCR Q1, IF = 5.0).

- Conducted CFD simulation to compare the longitudinal and lateral stability characteristics of two flappers hovering using different stroke–plane–change and trailing–edge–change mechanisms.

Graduate Research, VNU – Ho Chi Minh City University of Technology, Vietnam

Project 1: Aerodynamics of UAV–HOPE (fixed wings in forward flight)

01 co-authored paper (2024, JCR Q3, IF = 0.9, main contributor)

- Investigated the aerodynamics of the UAV–HOPE's fixed wings during forward flight using OpenFOAM.
- Analyzed laminar purple separation and flow detachment along both the chordwise and spanwise positions.

Project 2: Aerodynamics of UAV–HOPE (tricopter frame in forward flight)

01 co-authored paper (2020, SJR: Q3, IF = 0.3)

- Co-supervised an aerodynamic investigation of the tricopter, the main UAV–HOPE frame, during forward flight using Virtual Blade Method (VBM) in OpenFOAM.
- Developed an iterative MATLAB program to predict a tip path plane angle in forward flight of the tricopter using mass, lift, and drag coefficients.

UNDERGRADUATE THESIS, VNU – HO CHI MINH CITY UNIVERSITY OF TECHNOLOGY, VIETNAM

Project: Aerodynamics of UAV–HOPE (tricopter frame during takeoff) (Graduate thesis graded **9.07/10.0**)

01 international conference paper presented at Southeast Asia Workshop on Aerospace Engineering (SAWAE, Thailand, 2018).

- Modelled the geometric characteristics of a 3-rotor propulsion system in OpenFOAM.
- Performed CFD analysis of tricopter taking off under the speeds of 0.1–6.0 m/s using VBM method.
- At 6833 RPM, the CFD thrust (Blade Element Theory) deviated by 5% from manufacturer data, while the analytical method (Blade Element Momentum Theory) showed a 12% difference.

HONORS AND AWARDS

Postdoctoral Fellowship, KU, Republic of Korea (Verbally awarded; Expected Feb 2026 – Aug 2027).
Doctoral Fellowship, KU, Republic of Korea (50% tuition and living expenses, 2022 – 2026).
Teaching Assistant Fellowship, KU, Republic of Korea (2023 – 2024).
Best Paper Award, Korean Society for Aeronautical and Space Sciences 2024 Conference (KSAS), Republic of Korea (2024).
Best Paper Award, 18th International Conference on Intelligent Unmanned Systems (ICIUS), Japan (2022).
Graduate Research Assistant, KU, Republic of Korea (50% tuition and living expenses, 2019 – 2021).
Outstanding Scholar Tuition Grant, KU, Republic of Korea (50% tuition, 2019 – 2021 & 2022 – 2024).
Research Assistant Fellowship, VNU – HCMUT, Vietnam (8 months, 2018).
Teaching Assistant Fellowship, VNU – HCMUT, Vietnam (2018).
Excellent Student of VNU – HCMUT, Vietnam (120% tuition in 2018).
Merits for Quintessential Student, VNU – HCMUT, Vietnam (100% tuition in 2014 and 110% tuition in 2017).

PROFESSIONAL SERVICES

Journal reviewer, Ocean Engineering (invited in 2024).
Journal reviewer, Journal of Aeronautics Astronautics and Aviation (2023, 2024).
Journal reviewer, International Journal of Intelligent Unmanned Systems (2021).
Conference reviewer, International Conference on Intelligent Unmanned Systems (2021).

UNIVERSITY SERVICES

Teaching Assistant

Assisted in grading assignments (KU): Basics of mechanics (Fall, 2020), Finite Element Method (Spring, 2025).
Facilitated students understanding assignments during lectures (VNU – HCMUT): Fluid Mechanics (delivered in English, 2018).

Research Assistant

Provided co-supervision for two students on their graduation theses (Doan, T.K.K. & Nguyen, T.N.) (VNU – HCMUT, 2018).

TECHNICAL SKILLS

Programming: C++, HTML, CSS.
Development Tools: Visual Studio, VS Code.
Meshing Generators: ANSYS-ICEM, Salome, snappyHexMesh.
Simulation and Post-Processing Tools: ANSYS-Fluent, CFD-Post, OpenFOAM, ParaFoam.
Manufacturing Tools: Mill, Match3Mill, CNC Machine Tool, 3D Printing, Direct Linear Transformation Digitizing Tool.
Software: AutoCAD, ANSYS-Design Modeler, Adobe Photoshop, Cubicreator, MATLAB, MS Office, SolidWorks.
Processes: Silicone Mold Making, High Speed Camera Operation, Torque/Force Transducer Measurement, Image Processing.

JOURNAL ARTICLES

1. **Nguyen**, **K**, Ha, G. Park, HC. Aerodynamic behaviors of flapping wings under varying low-density air conditions. *In progress*.
2. **Nguyen**, **K**, Park, HC. A comprehensive design process for developing a tail-beat fast-swimming robot: scaling-based design approach. *In progress*.
3. Le, THH, **Nguyen**, **K**, Vuong, THN, **2024**. Numerical analysis for aerodynamic characteristics of the unmanned aerial vehicle (UAV) in forward flight. Journal of Aeronautics, Astronautics and Aviation, 1081, 2024 (Second author is the main contributor).
4. **Nguyen, K**, Ha, G, Kang, T, Park, HC, **2024**. Analysis of hovering flight stability of an insect-like flapping-wing robot in Martian condition. Aerospace Science and Technology, 152, 109371.
5. **Nguyen, K**, Park, HC, **2023**, Feasibility study on mimicking the tail-beating supported gliding flight of flying fish. Ocean Engineering, 287, 115745.
6. Pham, TH, **Nguyen**, **K**, Park, HC, **2023**. A robotic fish capable of fast underwater swimming and water leaping with high Froude number. Ocean Engineering, 268, 113512.
7. **Nguyen**, **K**, Au, LTK, Phan, HV, Park, HC, **2021**. Comparative dynamic flight stability of insect-inspired flapping-wing micro air vehicles in hover: Longitudinal and lateral motions. Aerospace Science and Technology, 119, 107085.
8. **Nguyen**, **K**, Au, LTK, Phan, HV, Park, SH, Park, HC, **2021**. Effects of wing kinematics, corrugation, and clap-and-fling on aerodynamic efficiency of a hovering insect-inspired flapping-wing micro air vehicle. Aerospace Science and Technology, 118, 106990.
9. Tran, DKK, **Nguyen**, **K**, Le, THH, Nguyen, NH, **2020**. Numerical simulation for the forward flight of the tri-copter using virtual blade model. Journal of Advanced Research in Fluid Mechanics and Thermal Sciences, 67, 1, 1-32.

CONFERENCE PAPERS

1. **Nguyen, K**, Ha, G, Park, HC, Design and demonstration of a high-speed aquatic swimmer using tail-beat propulsion, ICIUS, Indonesia, 2025. **(Presenter)**
2. Ha, G, **Nguyen, K**, Park, HC, A study on the takeoff of an insect-like flapping-wing system under low air density and low gravity conditions, Proceedings of KSAS, Korea, 2024. (Best paper award).
3. **Nguyen, K**, Ha, G, Park, HC, Design and fabrication of high-thrust tail-beating mechanism for fish-inspired swimming robot, ICIUS, Indonesia, 2024. **(Presenter)**
4. **Nguyen**, **K**, Park, HC, Analytical and experimental performance verifications of a fast-swimming robotic fish, ICIUS, Indonesia, 2024. **(Presenter)**
5. **Nguyen**, **K**, Kang, TS, Park, HC, Hovering characteristics of an insect-like flapping-wing robot on Mars, Proceedings of KSAS, Korea, 2023. **(Presenter)**
6. **Nguyen, K**, Ha, G, Park, HC, Preliminary design of a fish-like fast robot by scaling of the KUFish, ICIUS, Australia, 2023.
7. **Nguyen**, **K**, Park, HC, Roles of hydrodynamic forces generated by tail-beating motion in gliding flight of flying-fish-mimicking robot, ICIUS, Adelaide, Australia, 2023. **(Presenter)**
8. Ha, G, **Nguyen, K**, Park, HC, Thrust generation by flapping-wings under the low-air density condition, ICIUS, Australia, 2023.
9. Le, THH, **Nguyen, K**, Tran, MH, Numerical analysis for aerodynamic characteristics of the unmanned aerial vehicle (UAV) in forward flight, SAWAE, Thailand, 2023.
10. **Nguyen, K,** Pham, TH, Park, HC, Numerical investigation of hydrodynamics for a fish-like robot under undulatory forward swimming, Proceedings of the Korean Society of Mechanical Engineers Annual Meeting, Jeju, Korea, 2022. **(Presenter)**
11. Ha, G, **Nguyen, K,** Park, HC, Prediction of flapping wing characteristics in ultra-low air-density condition using a dynamic model, ICIUS, Japan, 2022.
12. Pham, TH, **Nguyen, K,** Park, HC, Leaping out of water of the KUFish: Prediction and demonstration, ICIUS, Japan, 2022. (Best paper award)
13. **Nguyen, K,** Pham, TH, Park, HC, Numerical estimation of hydrodynamic thrust using the measured tail-beating kinematics of a fish-like robot, ICIUS, Japan, 2022. **(Presenter)**
14. **Nguyen, K,** Au, LTK, Phan, Hoang Vu, Park, HC, Wing kinematics modulation in an insect-like tailless flapping wing micro air vehicle (FW-MAV) for higher aerodynamic efficiency, ICIUS, Vietnam, 2021. **(Presenter)**
15. Dao, T.T, **Nguyen, K**, Park, HC, CFD and FSI-based parametric study on tail fin for high-speed underwater locomotion, ICIUS, Vietnam, 2021.
16. **Nguyen, K,** Au, LTK, Park, HC, Three-dimensional wing kinematics for improved aerodynamic performance of insect-like flapping-wing micro air vehicle, KSAS, Korea, 2020. **(Presenter)**
17. Au, LTK, **Nguyen, K**, Park, HC, Effect of wing corrugation on aerodynamic performance in 3D flapping wings, Proceedings of KSAS, Korea, 2019. **(Presenter)**
18. Tran, DKK, **Nguyen**, **K**, Le, THH, Numerical simulation for the forward flight of the tri-copter using Virtual Blade Model, SAWAE, Malaysia, 2019.
19. **Nguyen, K,** Nguyen, NH, Le, THH, Numerical approach for the vertical take-off and landing UAVs using the virtual blade model, SAWAE, Thailand, 2018. **(Presenter)**

REFERENCES

Prof. Park, Hoon Cheol, Ph.D.
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Fields of expertise: Aerospace Engineering; Structural Engineering; Mechanical Engineering; Micro air vehicles; Robotic fish.
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Fields of expertise: Computational Fluid Dynamics; Aerodynamics; Fluid Dynamics; Unmanned Aerial Vehicle; Wind Turbine.
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Fields of expertise: Biologically inspired flying robots; Multimodal locomotion robots; Flapping wing; Micro air vehicles.
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