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
- Thesis title: *Scaling-Based Design Approach for Tailbeat Fish-Inspired Robots Swimming at High Speed and Propulsive Efficiency.*

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

- GPA: 3.88/4.00 – Graduate thesis grade: 95/100
- Thesis title: *Investigation of stability and aerodynamic performance of a flapping-wing micro air vehicle in hover using 3D computational fluid dynamics (CFD) analyses.*

VIETNAM NATIONAL UNIVERSITY, HCM CITY UNIVERSITY OF TECHNOLOGY (VNU–HCMUT), HCM, VIETNAM

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

- GPA: 3.18/4.00 – Graduate thesis grade: 9.07/10
- Thesis title: *Computational Approach on the Aerodynamics of UAV combining fixed wing and three propellers.*
- The most prestigious and talented 5-year Frech – Vietnamese Training Program for Excellent Engineers (PFIEV) is accredited by France's Engineering Degree Commission (2004 – 2022) and designated as a EUR – ACE Master Program by the European Network for Accreditation of Engineering Education (ENAEE, 2010 – 2022).
- This program offers a high-quality engineering education, comprising 274 European Credits (ECTS).

RESEARCH EXPERIENCE

PH.D. PROGRAM, KU, SEOUL, REPUBLIC OF KOREA

Project-2024: Flapping-Wing Micro Air Vehicle (FW-MAV) in Fast Forward Flight

Ongoing collaboration with Prof. Dario Floreano's lab, EPFL, Switzerland

Expected 01 *co-authored* paper (Good agreement within 6% between CFD simulation and experiment)

- Performed simulations using the measured wing kinematics of the FW robot under tethered, stroke-plane tilting conditions with inflow varying at speeds of 4.3 m/s by a wind tunnel.

Project-2024 (invited): Out-of-plane Motion and Aerodynamics of Hummingbird-Like FW-MAV

Short-term collaboration with Prof. Dirk Vandepitte's lab, KU Leuven, Belgium

Expected 01 *co-authored* paper (Submitted to Bioinspiration & Biomimetics, under review)

- Co-advised CFD simulations to analyze the wing deviation effects on hummingbird-like FW aerodynamics.

Project-2022: Development of Biomimetic Underwater Robot Platform

Expected more than 01 *first-authored* paper (Submitted to Ocean Engineering, under review)

- Developed a tailbeat robotic fish that can achieve a target speed of 1.79 m/s (5.5 BL/s) with a low cost of transport using a scaling-based design approach, ranking it among the most energy-efficient tailbeat robotic fish.

Next phase**:**

- Developed a larger-scale model for faster swimming speed and higher-payload capability.
- Conducted simulation to investigate hydrodynamic force production and vortex formation during free swimming using measured undulatory kinematics.

Project-2021: Flapping Flights on Mars

01 *first-authored* paper: 2024, JCR Q1, IF = 5.8, top 11% in Eng., Aerospace (Link)

- Numerically investigated stability characteristics of a FW hovering under Martian atmospheric conditions.

Expected 01 *first-authored* paper (data 100% completed)

- Studied aerodynamics of an FW robot during takeoff under ultra-low air densities using CFD simulation.

Expected 01 *co-authored* paper (data 100% completed)

- Performed simulations to support conclusions of aerodynamics under one-digit percentage density condition.

Project-2020: Leaping Robotic Fish

01 *first-authored* paper: 2023, JCR Q1, IF = 5.5, top 8% in Eng., Marine and 3% in Eng., Oceanography (Link)

- Performed CFD simulations to analyze the feasibility of gliding in a flying-fish-like robot after leaping from water.

01 *co-authored* paper: 2023, JCR Q1, IF = 5.5, top 8% in Eng., Marine and 3% in Eng., Oceanography (Link)

- Conducted CFD simulations to estimate body drag using measured undulatory swimming kinematics.

M.S. PROGRAM, KU, SEOUL, REPUBLIC OF KOREA

Project-2020: Aerodynamic improvement of a hovering FW-MAV

01 *first-authored* paper: 2021, JCR Q1, IF = 5.8, top 11% in Engineering, Aerospace (Link)

- Numerically proposed an optimal wing kinematics to improve aerodynamic efficiency by 31%.
- Modifications include spanwise corrugation, adjusted wing rotation angles, and exclusion of clap-fling mechanism.

Project-2019: Comparative stability analyses of FW-MAVs
01 *first-authored* paper: 2021, JCR Q1, IF = 5.8, top 11% in Engineering, Aerospace (Link)
- Performed CFD simulation to compare the longitudinal and lateral stability characteristics of 2 hovering flappers.

GRADUATE RESEARCH, VNU – HCMUT, HO CHI MINH, VIETNAM (VN)
Project-2018: Aerodynamics of UAV–HOPE: Fixed Wings in Forward Flight
01 *co-authored* paper: 2024, JCR Q3, IF = 1.1 (Link. Main contributor: Original draft, editing & revisions).
- 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-2018: Aerodynamics of UAV–HOPE: Tricopter Frame in Forward Flight
01 *co-authored* paper: 2020, SJR: Q3, IF = 0.3 (Link)
- Co-advised a study on tricopter's forward-flight aerodynamics using Virtual Blade Method (VBM) in OpenFOAM.
- Developed an iterative MATLAB program to predict a tip path plane angle in forward flight.

B.E. PROGRAM, VNU – HCMUT, HO CHI MINH, VIETNAM
Thesis-2018: Aerodynamics of UAV–HOPE: Tricopter Frame During Takeoff
01 *conference* paper: presented at Southeast Asia Workshop on Aerospace Engineering (SAWAE, Thailand, 2018).
- Performed CFD analysis of tricopter taking off at speeds of 0.1–6.0 m/s using VBM method in OpenFOAM.

HONORS AND AWARDS

Postdoctoral Fellowship, KU (Awarded) 2026 – 2027
Doctoral Fellowship, KU (living cost + 50% tuition) 2022 – 2026
Best Paper Award, Korea Society for Aeronautical and Space Sciences Conference (KSAS) 2024
Best Paper Award, International Conference on Intelligent Unmanned Systems (ICIUS) 2022 & 2025
Language Proficiency Award upon Ph.D. Admission (50% tuition), KU 2022
Merits for Academic Achievement (50% tuition), KU 2019 – 2021, 2022 – 2024
Graduate Research Assistant, KU (living cost + 50% tuition) 2019 – 2021
Graduate Research Assistant, University of Ulsan, Republic of Korea (Declined) 2019
Research Fellowship, HCMUT Apr-Dec, 2018
Teaching Assistant Fellowship, at HCMUT and KU 2018, 2024
Excellent Student of HCMUT (150% tuition) 2018
Merits for Quintessential Student, HCMUT (125% tuition) 2014, 2017
Top Admission Scorers of Faculty of Aerospace Eng. & Qualification for the PFIEV Program, HCMUT 2013
Quintessential Student in the National University Entrance Exam at Tran Phu High School (HCM)
Top 1% Nationwide in the Vietnam National University Entrance Exam. Total score**:** 25/30 (Link)

PROFESSIONAL SERVICES

Journal Reviewer, Ocean Engineering (invited in 2024, 2025).
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).

ACADEMIC SERVICE AND MENTORSHIP

Teaching Assistant
Assisted in grading assignments for Basics of Mechanics (Fall 2020) & Finite Element Method (Spring 2025) at KU.
Facilitated students in solving and explaining Fluid Mechanics assignments (in English) at HCMUT (2018).

Research and Mentorship Assistant
Provided comments on a manuscript concerning FW simulations, Prof. Dirk Vandepitte's Lab, KU Leuven (2025).
Co-advised students on CFD and mechanical design for the robotic fish project, Prof. Taesam Kang's Lab, KU (2025).
Co-supervised 08 students for Student Research Program funded by VNU-HCM, Dr. Le Thi Hong Hieu's lab (2025).
Co-advised 03 undergraduate students on their graduation theses, Dr. Le Thi Hong Hieu's Lab, HCMUT (2018).

TECHNICAL SKILLS

Programming Languages: MATLAB, 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.
Tools: Mill, Match3Mill, CNC Machine Tool, 3D Printing, Direct Linear Transformation Digitizing Tool.
Software: AutoCAD, Adobe Photoshop, Cubicreator, MS Office, SolidWorks.
Processes: Silicone Mold Making, High Speed Camera Operation, Transducer Measurement, Image Processing.

JOURNAL ARTICLES

1. Roelandt T, **Nguyen K**, Park HC, Vanierschot M, Vandepitte D. Out-of-plane wing motion effects on aerodynamic performance of a hummingbird-like flapping wing. *Under review*.
2. **Nguyen K**, Park HC. Scaling-Based Design Approach for Tailbeat Fish-Inspired Robots Swimming at High Speed and Propulsive Efficiency. *Under review*.
3. **Nguyen K**, Ha G, Park HC. Aerodynamics of flapping wings under low-density air conditions. *In progress*.
4. Le THH, **Nguyen K**, Vuong THN. Numerical analysis for aerodynamic characteristics of the unmanned aerial vehicle (UAV) in forward flight. J. Aeronaut. Astronaut. Aviat. 1081 **2024**. (JCR Q3, IF = 1.1, main contributor)
5. **Nguyen K**, Ha G, Kang T, Park HC. Analysis of hovering flight stability of an insect-like flapping-wing robot in Martian condition. Aerosp. Sci. Technol. 152 109371 **2024**. (JCR Q1, IF = 5.8, 6th/55 in Eng., Aerospace)
6. **Nguyen K**, Park HC, Feasibility study on mimicking the tail-beating supported gliding flight of flying fish. Ocean Eng. 287 115745 **2023**. (JCR Q1, IF = 5.5, 2nd/25 in Eng., Marine)
7. Pham TH, **Nguyen K**, Park HC. A robotic fish capable of fast underwater swimming and water leaping with high Froude number. Ocean Eng. 268 113512 **2023**. (JCR Q1, IF = 5.5, 2nd/25 in Eng., Marine)
8. **Nguyen K**, Au LTK, Phan HV, Park HC. Comparative dynamic flight stability of insect-inspired flapping-wing micro air vehicles in hover: Longitudinal and lateral motions. Aerosp. Sci. Tech. 119 107085 **2021**. (JCR Q1, IF = 5.8, 6th/55 in Eng., Aerospace)
9. **Nguyen K,** Au LTK, Phan HV, Park SH, Park HC. Effects of wing kinematics, corrugation, and clap-and-fling on aerodynamic efficiency of a hovering insect-inspired flapping-wing micro air vehicle. Aerosp. Sci. Technol. 118 106990 **2021**. (JCR Q1, IF = 5.8, 6th/55 in Eng., Aerospace)
10. Tran DKK, **Nguyen K**, Le THH, Nguyen NH. Numerical simulation for the forward flight of the tri-copter using virtual blade model. J. Adv. Res. Fluid Mech. Therm. Sci. 67 1 1-32 **2020**. (SJR Q3, IF = 0.3)

CONFERENCE PAPERS

1. **Nguyen K**, Ha G, Park HC, Design and fabrication of high-thrust tail-beating mechanism for fish-inspired swimming robot, ICIUS, Indonesia, 2025. (Presenter & Best paper award).
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, AU, 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. **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)
9. Pham TH, **Nguyen K,** Park HC, Leaping out of water of the KUFish: Prediction and demonstration, ICIUS, Japan, 2022. (Best paper award).
10. **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)
11. **Nguyen K,** Au LTK, Phan HV, 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)
12. **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)
13. Tran, DKK, **Nguyen K**, Le THH, Numerical simulation for the forward flight of the tri-copter using Virtual Blade Model, SAWAE, Malaysia, 2019.
14. **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

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