

Khanh Nguyen (He/Him)

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EDUCATION

KONKUK UNIVERSITY (KU), SEOUL, REPUBLIC OF KOREA

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

- GPA: **4.00/4.00** – Graduate thesis grade: **93/100**
 - Thesis: *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: *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: *Computational Approach on the Aerodynamics of UAV combining fixed wing and three propellers.*
- The most prestigious and talented 5-year French – 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 (ENAE, **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

Joint research with Prof. Dario Floreano's lab, EPFL, Switzerland

01 co-first author journal paper (in progress)

- Processed the measured wing kinematics of the FW robot under tethered condition with a tilting stroke plane, using a desk-sized wind generator providing a speed of 4.3 m/s.
- Achieved good agreement between simulation and experimental measurements.

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

Joint research with Prof. Dirk Vandepitte's lab, KU Leuven, Belgium

01 co-authored journal (submitted to the journal)

- Co-advised CFD modeling and simulation to analyze hovering aerodynamics of a FW robot.

Project-2022: Development of Biomimetic Underwater Robot Platform

01 first-authored journal paper (submitted to the journal, under review)

- Developed a tailbeat robotic fish that can achieve a target speed of 1.79 m/s (5.5 body lengths per second) with a low cost of transport using a scaling-based design approach.
- Developed a larger-scale model aiming for faster speed and higher-payload capability.
- Conducted simulation to study hydrodynamic force production and vortex formation during free swimming using measured undulatory kinematics.

Project-2021: Toward Flapping Flights on Mars

01 first-authored journal (2024) & 01 co-authored journal (under review)

- Investigated stability characteristics of a FW hovering on Mars using CFD simulations.
- Analyzed aerodynamics of a flapper during takeoff under ultra-low air densities by CFD.

Project-2020: Leaping Robotic Fish

01 first-authored & 01 co-authored journal publications (2023)

- Analyzed the feasibility of gliding in a flying-fish-like robot after water exit using CFD.
- Estimated body drag through CFD analyses and measured undulatory kinematics.

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

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

01 first-authored journal (2021)

- Proposed optimal wing kinematics that improved aerodynamic efficiency by 31%.
- Analysis included spanwise corrugation, adjusted wing rotation angles, and exclusion of clap-fling mechanism.

Project-2019: Comparative stability analyses of FW-MAVs**01 first-authored journal (2021)**

- Compared the longitudinal and lateral stability characteristics of two flappers using CFD.

GRADUATE RESEARCH, VNU – HCMUT, HO CHI MINH, VIETNAM (VN)**Project-2018: Aerodynamics of UAV-HOPE: Fixed Wings in Forward Flight****01 co-authored journal (2024); Contribution: Original draft, review, editing and revisions**

- Investigated the aerodynamics of fixed wings during forward flight using OpenFOAM.
- Analyzed laminar purple separation along chordwise and spanwise positions.

Project-2018: Aerodynamics of UAV-HOPE: Tricopter Frame in Forward Flight**01 co-authored journal (2020)**

- Co-advised tricopter aerodynamics study using Virtual Blade Method in OpenFOAM.
- Iteratively predicted the tip-path-plane angle during forward flight using MATLAB, based on CFD-derived aerodynamic force coefficients.

B.E. PROGRAM, VNU – HCMUT, HO CHI MINH, VIETNAM**Thesis-2018: Aerodynamics of UAV-HOPE: Tricopter Frame During Takeoff****01 international conference paper at Southeast Asia Workshop on Aerospace Engineering (2018).**

- Analyzed aerodynamics of a tricopter during takeoff using the Virtual Blade Method in OpenFOAM.

AWARDS AND FELLOWSHIP

- Postdoctoral Fellowship, KU, Korea ($\approx \$50,000$, 2026)
- Single Doctoral Awardee, Graduate School Research Achievement Award (College of Engineering), KU (2026)
- Ph.D. Fellowship, KU ($\approx \$78,000$, 2022 – 2026)
- Best Paper Award, Korea Society for Aeronautical and Space Sciences Conference (2024) & International Conference on Intelligent Unmanned Systems (2022 & 2025)
- Research Assistant Fellowship, HCMUT ($\approx \$1,200$, 2018) and KU ($\approx \$22,000$, 2019 – 2021)
- Merit-based Scholarship, KU ($\approx \$21,000$, 2019 – 2024)
- Teaching Assistant Fellowship, HCMUT ($\approx \$100$, 2018) and KU ($\approx \$10,000$, 2024)
- Excellent Student of HCMUT (150% Tuition $\approx \$250$, 2018)
- Quintessential Student of HCMUT (125% Tuition $\approx \$350$, 2014 & 2017)
- Top 1%** Nationwide (Score: 25/30), Honor Cup for Excellent Student (**Top 1%**) of Tran Phu High School, & Qualification for the PFIEV program (Score: 49.25/60) – National University Entrance Exam (2013)
- Qualification for the Honors Science Program of Tran Phu High School (Score: 42/50, 2010)

PROFESIONAL SERVICES

- Reviewer, Ocean Engineering, Journal of Aeronautics Astronautics and Aviation, International Journal of Intelligent Unmanned Systems

ACADEMIC SERVICE AND MENTORSHIP**Teaching Assistant**

- Grading assignments: Basics of Mechanics (KU, 2020); Finite Element Method (KU, 2025).
- Solving and explaining assignments: Fluid Mechanics (HCMUT, 2018).

Research and Mentorship Assistant

- Co-supervised **10** undergrads for Student Research Program funded by HCMUT, Dr. Le's lab (2025).
- Mentored **03** master students on CFD simulation and mechanical design, Prof. Kang's Lab, KU (2024).
- Co-advised **03** undergrads on their graduation theses, Dr. Le'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:* CNC & 3D Printing Machines, Direct Linear Transformation Digitizing Tool.
- Software:* AutoCAD, Adobe Photoshop, Cubicreator, MS Office, SolidWorks.
- Processes:* Silicone Mold Making, Transducer Measurement, Image Processing.

JOURNAL ARTICLES

- 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. *In progress*.
- Nguyen K**, Park HC. Scaling-Based Design Approach for Tailbeat Fish-Inspired Robots Swimming at High Speed and Propulsive Efficiency. *Under review*.

3. Ha G, **Nguyen K**, Yu J, Kang T, Park HC. Can flapping wings keep lift coefficient unchanged at takeoff under extremely low air density? Submitted to the journal. *Submitted to the journal*.
4. **Nguyen K**, Ha G, Park HC. Aerodynamics of flapping wings under low-density air conditions. *In progress*.
5. **Nguyen K**, Phan HV, Ha G, Lim HJ, Yu J, Kang T, Floreano D, Park HC. Fast forward flight aerodynamics of an insect-inspired flapping-wing robot. *In progress*.
6. 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: drafting, editing, review, & revisions*)
7. **Nguyen K**, Ha G, Kang T, Park HC. Analysis of hovering flight stability of an insect-like flapping-wing robot in Martian condition. *Aerospace Sci. Technol.* 152 109371 **2024**. (*JCR Q1, IF = 5.8, top 11% in Eng., Aerospace - Link*)
8. **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, top 8% in Eng., Marine and 3% in Eng., Oceanography - Link*)
9. 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, top 8% in Eng., Marine and 3% in Eng., Oceanography - Link*)
10. **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. *Aerospace Sci. Tech.* 119 107085 **2021**. (*JCR Q1, IF = 5.8, top 11% in Eng., Aerospace - Link*)
11. **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. *Aerospace Sci. Technol.* **2021**. (*JCR Q1, IF = 5.8, top 11% in Eng., Aerospace - Link*)
12. 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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