

# 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 (2026 – 2027)
- First Prize, 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. *Aerosp. 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. *Aerosp. 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. *Aerosp. 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

<b>Park, Hoon Cheol, Ph.D.</b> Professor, Director of Laboratory of Bioinspired System Department of Aerospace-Mobility Engineering, Future Drone Center Konkuk University, RoK hcpark@konkuk.ac.kr	<b>Le, Thi-Hong-Hieu, Ph.D.</b> Senior Lecturer, Dean, and Coordinator of PFIEV Program Department of Aerospace Engineering Vietnam National University, Ho Chi Minh City University of Technology, Vietnam honghieu.le@hcmut.edu.vn	<b>Phan, Hoang-Vu, Ph.D.</b> Assistant Professor, Director of AIRmotion Laboratory University of Nevada, Reno, USA vuphan@unr.edu
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