Khanh Nguyen (He/Him)

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EDUCATION

KONKUK UNIVERSITY (KU), SEOUL, REPUBLIC OF KOREA 2019 – Expected 2026

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

GPA: 4.00/4.00

Courses: Robot Kinematics, Numerical Analysis, Optimal Control Theory, Elasticity

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

GPA: 3.89/4.00

Courses: Finite Element Method (FEM), Advanced FEM, Structural Dynamics, Microsystem

VIETNAM NATIONAL UNIVERSITY, HO CHI MINH CITY UNIVERSITY OF TECHNOLOGY (VNU – HCMUT) 2013 – 2018

Bachelor of Engineering, Mechanical and Aerospace Engineering

GPA: 3.18/4.00

The five–year France Excellent Engineer Training Program in Vietnam (PFIEV), accredited by France's CTI, is awarded the EUR–ACE Master's label and comprises a total of 274 European credits (ECTS).

Courses: Aerodynamics, Aircraft Propulsion, Combustion, Computational Fluid Dynamics (CFD), Helicopters, Flight Mechanics.

RESEARCH EXPERIENCE

PH.D. PROGRAM, KONKUK UNIVERSITY, SEOUL, REPUBLIC OF KOREA

Project 1: Flapping-wing fast forward flight (ongoing)

Project 2: Design of a fast-swimming robot (ongoing)

Project 3: Flapping flights on Mars

01 first-authored paper published in 2024.

- 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 & **01** co-authored paper published in 2023.

- 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. The robot achieves gliding after rapid swimming, leaping out of water, partially supported by submerged tail beating motion in combination with a pair of fixed wings.

M.S. PROGRAM, KONKUK UNIVERSITY, SEOUL, REPUBLIC OF KOREA

Project 1: Aerodynamic improvement

01 first-authored paper published in 2021.

- Numerically proposed an optimal wing kinematics (WK) that can improve aerodynamic performance of a flapping-wing hover by 31%. That proposed WK can maintain lift while reducing drag coefficients. The proposed modification includes distributed wing corrugation along the wingspan, adjusted wing motion, and exclusion of the clap–fling mechanism (2021).

Project 2: Stability of a flapping-wing robot

01 first-authored paper published in 2021.

- 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 (2021).

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 published in 2024 (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 published in 2020.

- Co-supervised an aerodynamic investigation of the tricopter, considered as the principal frame structure for UAV–HOPE design, during forward flight using Virtual Blade Element implemented in OpenFOAM.
- Developed a program to predict a converged tip path plane angle in forward flight using input parameters such as mass, lift, and drag coefficients of the tricopter.

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 (Thailand, 2018).

- Modelled the geometric characteristics of a 3-rotor propulsion system using commercial rotor blade (PJP-T-L 12x4.5)
- Conducted numerical aerodynamic analyses of a tricopter frame propelled by three rotor blades during takeoff under varying inflow speeds of (0.1, 0.3, 2.0 and 6.0) m/s using the Virtual Blade Model in OpenFOAM.
- At the same speed of 6833 RPM, the CFD–based thrust using Blade Element Theory was 5% lower than the thrust specified by the manufacturer, while the prediction using Blade Element Momentum Theory showed a 12% deviation.

HONORS AND AWARDS

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, 18th International Conference on Intelligent Unmanned Systems (ICIUS), Japan (2022).
Graduate Research Assistant, KU, Republic of Korea (50% tuition and living expenses, 2019 – 2021).
Merits for Exceptional Academic Students, 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 waiver in 2018).
Outstanding Scholar Tuition Grant, VNU – HCMUT, Vietnam (100% in 2014 and 110% in 2017).

PROFESSIONAL SERVICES

Journal reviewer, Journal of Aeronautics Astronautics and Aviation (JAAA, 2023, 2024)
Journal reviewer, International Journal of Intelligent Unmanned Systems (IJIUS, 2021)
Conference reviewer, International Conference on Intelligent Unmanned Systems (ICIUS, 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

Co-supervised two students on their graduation theses (Doan Tran Kim Khanh & Nguyen Tien Nghi) in 2018 (VNU – HCMUT).

TECHNICAL SKILLS

Programming: C++, Python, 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, Digitalizing Tool-DLTdv
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, Int'l Conf. of Intelligent Unmanned System (ICIUS), Bali, Indonesia, Aug. 20-24, 2025. **(Presenter)**
2. **Nguyen, K**, Ha, G, Park, HC, Design and fabrication of high-thrust tail-beating mechanism for fish-inspired swimming robot, Int'l Conf. of Intelligent Unmanned System (ICIUS), Bandung, Indonesia, Aug. 20-24, 2024. **(Presenter)**

3. **Nguyen**, **K**, Park, HC, Analytical and experimental performance verifications of a fast-swimming robotic fish, Int'l Conf. of Intelligent Unmanned System (ICIUS), Bandung, Indonesia, Aug. 20-24, 2024. **(Presenter)**
4. **Nguyen**, **K**, Kang, TS, Park, HC, Hovering characteristics of an insect-like flapping-wing robot on Mars, Proceedings of Korean Society for Aeronautical and Space Sciences (KSAS), Korea, Nov. 16, 2023. **(Presenter)**
5. **Nguyen, K**, Ha, G, Park, HC, Preliminary design of a fish-like fast robot by scaling of the KUFish, Int'l Conf. of Intelligent Unmanned System (ICIUS), Adelaide, Australia, July 5-7, 2023.
6. **Nguyen**, **K**, Park, HC, Roles of hydrodynamic forces generated by tail-beating motion in gliding flight of flying-fish-mimicking robot, Int'l Conf. of Intelligent Unmanned System (ICIUS), Adelaide, Australia, July 5-7, 2023. **(Presenter)**
7. Ha, G, **Nguyen, K**, Park, HC, Thrust generation by flapping-wings under the low-air density condition, Int'l Conf. of Intelligent Unmanned System (ICIUS), Adelaide, Australia, July 5-7, 2023.
8. Le, THH, **Nguyen, K**, Tran, MH, Numerical analysis for aerodynamic characteristics of the unmanned aerial vehicle (UAV) in forward flight, Southeast Asia Workshop on Aerospace Engineering (SAWAE), Thailand, 2023.
9. **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)**
10. Ha, G, **Nguyen, K,** Park, HC, Prediction of flapping wing characteristics in ultra-low air-density condition using a dynamic model, Int'l Conf. of Intelligent Unmanned System (ICIUS), Tokushima, Japan, Aug. 9-12, 2022.
11. Pham, TH, **Nguyen, K,** Park, HC, Leaping out of water of the KUFish: Prediction and demonstration, ICIUS, Tokushima, Japan, Aug. 9-12, 2022. (Selected best paper award)
12. **Nguyen, K,** Pham, TH, Park, HC, Numerical estimation of hydrodynamic thrust using the measured tail-beating kinematics of a fish-like robot, ICIUS, Tokushima, Japan, Aug. 9-12, 2022. **(Presenter)**
13. **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, Aug. 25-27, 2021. **(Presenter)**
14. Dao, T.T, **Nguyen, K**, Park, HC, CFD and FSI-based parametric study on tail fin for high-speed underwater locomotion, ICIUS, Vietnam, Aug. 25-27, 2021.
15. **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)**
16. Au, LTK, **Nguyen, K**, Park, HC, Effect of wing corrugation on aerodynamic performance in 3D flapping wings, Proceedings of Korean Society for Aeronautical and Space Sciences (KSAS), Korea, 2019. **(Presenter)**
17. Tran, DKK, **Nguyen**, **K**, Le, THH, Numerical simulation for the forward flight of the tri-copter using Virtual Blade Model, Southeast Asia workshop on Aerospace Engineering (SAWAE), Malaysia, 2019.
18. **Nguyen, K,** Nguyen, NH, Le, THH, Numerical approach for the vertical take-off and landing UAVs using the virtual blade model, Southeast Asia workshop on Aerospace Engineering (SAWAE), Thailand, 2018. **(Presenter)**