Long Nguyen Khac

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Education

B.Eng. in Automation and Informatics, Specialization in Automation *Sep. 2021 - Present*
International School, Vietnam National University, Hanoi *Hanoi, Vietnam*

- **GPA:** 3.71/4.00 (Top 3/73 in class; 4% in the 2021 cohort).
- **Graduation thesis:** "Adaptive Control for AUV with Wireless Power Transfer System" (in progress).
- **Coursework:** Control Systems, Robotics, Modeling and Simulation, Signals and Systems, Embedded Control Systems, Electrical Drives, Artificial Intelligence.
- **Research interests:** autonomous underwater vehicles, adaptive/robust control, wireless power transfer, and AI-enabled robotic systems.

Research Experience

Research Fellow | Underwater Wireless Power Transfer for AUVs *Feb. - Mar. 2026*
Water & Energy Research Lab, EEE, Nanyang Technological University *Singapore*

- Studied relay-coil-enhanced 3D wireless power transfer for AUV charging by modeling equivalent circuits and analyzing coupling, load resistance, and relay-coil resonance effects on efficiency and output power.
- Designed a disc-shape AUV concept in SolidWorks and reviewed underwater communication and docking constraints to connect mechanical design, control, and energy-transfer requirements.
- Presented the research in NTU Global Connect Fellowship final poster session and won Most Popular Poster Award.

Research Intern | Smart Manufacturing and Data-driven Modeling *May 2025 - Present*
AISC Lab, AIM-HI, National Chung Cheng University *Taiwan / Remote*

- Built cutting-force and tool-wear prediction models for CNC milling using Random Forest, XGBoost, and Support Vector Regression.
- Processed 12 onsite experimental datasets and 27 Taguchi-design datasets to evaluate feature quality, model performance, and machining-condition effects.
- Developed a research workflow from data cleaning to model comparison for practical tool-condition monitoring in smart manufacturing.

Student Researcher *Sep. 2022 - Present*
Intelligent Control and Artificial Intelligence Laboratory, VNUIS *Vietnam*

- Develop adaptive and robust control strategies for robotic systems, with current focus on AUV station keeping and wireless charging integration.
- Implemented adaptive fuzzy backstepping control for a 3-DOF delta parallel robot to improve trajectory tracking under model uncertainties; co-authored an ICTA 2024 Springer paper.
- Trained YOLOv5s-based PPE detection models on a 2,632-image construction dataset and compared activation functions using precision, recall, mAP@0.5, and mAP@0.5-0.95; co-authored a national conference paper.

Selected Projects

Adaptive Control for AUV-WPT System | Graduation Thesis *Apr. 2026 - Present*
Project Leader *Vietnam*

- Develop an AUV prototype that integrates motion control requirements with planar wireless power transfer constraints.
- Focus on station keeping and stable positioning during wireless charging, implementing adaptive control system design for AUV operation.

Trajectory Tracking Control for a 6-DOF Robotic Manipulator *May 2026 - Present*
Team Leader *Vietnam*

- Lead a 4-member research team to reproduce and compare PID, SMC, backstepping, and adaptive control methods for 6-DOF manipulator trajectory tracking.
- Build MATLAB/Simulink simulations, paper matrix, and reproducible research workflow toward a journal manuscript in robotics/control.

Publications

- A. T. Le, G. L. Truong, H. Q. Nguyen, T. A. T. Ngoc, B. T. The, **L. N. Khac**, et al., "Adaptive Fuzzy Logic in Backstepping Control for 3-DOF Parallel Delta Robot," *International Conference on Advances in Information and Communication Technology (ICTA)*, Springer, 2024. DOI: 10.1007/978-3-031-80943-9_57.
- D. M. Tuan, T. M. T. Kiet, N. V. Tung, N. X. The, N. A. Chau, P. T. Ngoc, **N. K. Long**, et al., "YOLOv5s Model with Applied Activation Functions for Personal Protective Equipment Detection in Construction Sites," *Proceedings of the National Conference on Smart Technology Applications in Industry 4.0, Smart City, and Sustainability (STAIS)*, 2023.

Skills

- **Software:** MATLAB/Simulink, SolidWorks, Altium Designer, Proteus, Visual Components, Git/GitHub.
- **Specialized expertise:** Control systems (adaptive control, backstepping control, sliding mode control, model predictive control), trajectory tracking, wireless power transfer, embedded systems.
- **Programming languages:** Python (NumPy, Pandas, Matplotlib, scikit-learn, PySINDy), MATLAB/Simulink (control simulation, trajectory tracking, data visualization), C/C++, LaTeX.
- **Languages:** Vietnamese (native), English (IELTS 6.5).

Honours and Awards

- **NUS ASEAN SPARK Fellowship,** Fully funded fellowship for the NUS Enterprise Summer Programme in Entrepreneurship, 2026.
- **Most Popular Poster Award,** NTU Global Connect Fellowship Final Research Presentation, 2026.
- **NTU Global Connect Fellowship,** Selected as 1 of 39 young scholars worldwide from 2700 applicants, 2026.
- **Outstanding Young Face Award,** Awarded by Vietnam National University, International School, 2025.
- **Five Good Merits Award,** Awarded by Vietnam National University, Hanoi, 2024.
- **Toshiba Scholarship,** Awarded by Toshiba International Foundation, 2024.
- **Fighting Spirit Prize,** IEEE Southeast Asia Circuits and Systems Society Hackathon, 2022.
- **Merit-based Academic Scholarship,** Five-semester recipient for excellent academic performance, 2021-2025.

References

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