

NGUYEN HONG PHUC

+84 326 060 805 | 23phuc.nh@vinuni.edu.vn | phucngvinuni.github.io | github.com/phucngvinuni

EDUCATION

VinUniversity

Bachelor of Science in Electrical and Computer Engineering

Ha Noi, Vietnam

Oct. 2023 – Present

- **Cumulative GPA: 3.80/4.00 (Rank 1 in ECE Cohort 4)**
- **Honors:** 2 times President's List (AY 23-25), Dean's List (5 Semesters), 100% Talent Scholarship (2023–2027).

Bac Ninh High School for the Gifted

Physics Major

Bac Ninh, Vietnam

Aug. 2020 – May 2023

- **GPA: 9.6/10**
- **Selected Awards:** Second Prize National Physics Olympiad (2023), Gold Medal High School Olympiad (2021-2022), 5th Place Worldwide Thomas Jefferson Physics Olympiad (2023).

HONORS & AWARDS

Best Poster Award, Open Innovation Conference 2025
Gold Medal, WorldQuant Challenge
Australia-Vietnam Strategic Technologies Scholarship
Silver Medal, The University Physics Competition 2024
Finalist, 2025 Quantum Global Industry Challenge (Connected DMV)
Finalist, IoT Challenge 2025 (FPT Software)
Student Research Grant (\$3,500) – VinUniversity (Lead, Smart Aquaculture)

TECHNICAL SKILLS

Languages: Python, C/C++, Verilog, MATLAB, LaTeX
Frameworks/AI: PyTorch, TensorFlow, Scikit-learn, OpenCV, PennyLane, Qiskit
Tools & Platforms: Docker, Git, Vivado, Altium, PSpice, Arduino, Raspberry Pi, Linux, Teensy

PUBLICATIONS

* indicates equal contribution or first author.

Journal Papers

AquaSC: Task-Oriented Semantic Communication for Efficient and Intelligent Aquaculture IoT Systems

H.-P. Nguyen, T. T. Nguyen, S. H. Wanasekara, N. M. Ngo, D. V. Dzung and V.-D. Nguyen

IEEE Transactions on Emerging Topics in Computational Intelligence (Submitted 10/2025, Major Revision).

FISHER: Gradient-Decoupled Hierarchical Multi-Task Learning for Fine-Grained Aquatic Species Recognition

H.-P. Nguyen*, B. H. Ngo*, M. P. Tran and V.-D. Nguyen

IEEE Transactions on Circuits and Systems for Video Technology (Submitted 4/2026, Major Revision).

arXiv:2607.20523

From Monitoring to Action: A Comprehensive Survey of Autonomous Decision-Making in Smart Aquaculture Systems

Q.-H. N. Dam, P. H. Nguyen, et al.

Computers and Electronics in Agriculture (Submitted 4/2026, Major Revision).

Preprint available

Energy-Aware Resource Allocation for Energy Harvesting Powered Wireless Sensor Nodes

N. M. Ngo, T. T. Nguyen, H.-P. Nguyen and V.-D. Nguyen

IEEE Communications Letters, vol. 29, no. 3, pp. 542-546, Mar. 2025.

Conference Papers

ChronoSC: Task-Oriented Semantic Communication via Temporal-to-Color Encoding

P. H. Nguyen, T. T. Nguyen, Q. N. Duong, V.-D. Nguyen

IEEE ICCE 2026 (accepted).

SemPose-Fi: Label-Free Cross-Environment Wi-Fi Pose Estimation via Semantic CSI Transmission

P. H. Nguyen, Toan Gian, V.-D. Nguyen
IEEE INFOCOM 2027 (A*) (under review).

Preprints

C-MambaPose: A Physics-Informed Complex Mamba Framework for Cross-Environment WiFi Human Pose Estimation

Phuc Nguyen H
arXiv preprint, 2026.
arXiv:2606.13700

WORK EXPERIENCE

Research Intern

Jul 2026 – Present

HKU AIoT Lab, The University of Hong Kong

Hong Kong

- Selected as 1 of 40 students for a fully funded summer internship.
- Supervised by Prof. Chenshu Wu; working on thermal sensing research.

Undergraduate Research Assistant

Oct. 2023 – Present

ICCL Lab (VinUni & Trinity College Dublin)

- Investigated Open RAN architecture, 5G networks, and Task-Oriented Semantic Communication under supervision of Prof. Nguyen Van Dinh.
- Developed multi-modality AI models for smart aquaculture: computer vision for fish tracking, underwater size estimation, and image segmentation.
- Explored Diffusion Models for enhanced data generation and signal processing.

Project Intern (Top 20 Finalist, IoT Challenge)

May 2025 – Sep. 2025

FPT Software

Ha Noi, Vietnam

- Deployed quantized LLMs (LLaMA/Mistral with GGUF) on Raspberry Pi to build a conversational conservation chatbot.
- Engineered a full-stack solution (Frontend/Backend) for real-time shopper tracking and route optimization via BLE localization.

Research Consultant

Sep. 2024 – May 2025

WorldQuant

Remote

- Developed predictive mathematical models (Alphas) to forecast financial instrument price movements.
- Performed statistical analysis on historical data to optimize trading signals.

SELECTED PROJECTS

Deep JSCC for Visible Light Communication | PyTorch, Analog Circuit, Signal Processing

Jan. 2026

- Designed a hardware-in-the-loop Deep Joint Source-Channel Coding (Deep JSCC) system that transmits semantic features via analog light intensity using a custom 8-bit R-2R DAC.
- Implemented an Autoencoder in PyTorch with differentiable channel approximation; learned robust representations against non-linear hardware noise.
- Achieved 98% compression (MNIST) and optimized transmission through a custom channel linearization algorithm.
- GitHub: Code & Demo

Smart Aquaculture IoT System | Multimodal AI, LLM RAG, Hydrophone, Full-stack

In-Progress

- Developed a multi-sensory IoT node with water quality sensors, underwater cameras, and hydrophones for real-time pond health monitoring and server-side processing.
- Engineered a Multimodal AI framework fusing visual and acoustic data to optimize feeding schedules; integrated time-series forecasting for water quality trends.
- Built a Web App with an LLM-powered RAG pipeline to provide context-aware technical advisory services to farmers.

Teensy 4.1 Flight Controller Firmware | C++, Embedded Systems, Control Theory

Jan. 2026

- Developed custom C++ firmware on Teensy 4.1 implementing a 400Hz PID control loop for Quad-X stabilization.
- Integrated Madgwick sensor fusion (MPU6050) for precise attitude estimation and real-time RC signal noise filtering.
- Implemented safety arming logic and optimized serial plotting (500k baud) for PID tuning and diagnostics.
- GitHub: Code & Demo

WinCart – AI Shopping Assistant | Edge AI, Raspberry Pi, Silicon Labs

Completed

- Engineered an AI-powered smart shopping cart enabling hands-free user experience.
- Deployed real-time indoor positioning using ML on Silicon Labs hardware and built a full-stack Edge AI pipeline for product recognition and billing.

Neural Network From Scratch | C++, C, Mathematics

Completed

- Implemented a Convolutional Neural Network (CNN) in C++ and a Feedforward NN in C for MNIST classification – no ML libraries used.
- Demonstrates deep understanding of backpropagation, optimization, and memory management.
- CNN (C++) | NN (C)

CERTIFICATES & COURSES

Specializations: Digital Signal Processing (EPFL/Coursera), Neural Networks and Deep Learning (DeepLearning.AI/Coursera), Wireless Communications (Yonsei Univ.)

Other: Open RAN 101, Quantum 101, Introduction to Optimization

LANGUAGES

Vietnamese: Native | **English:** Professional working proficiency (academic & technical)

PROFESSIONAL ACTIVITIES

Invited Reviewer: IEEE International Conference on Advanced Technologies for Communications (ATC) 2026

Invited Reviewer: IEEE Transactions on Cognitive Communications and Networking