

Email [vdcuong2002 \[at\] gmail.com](mailto:vdcuong2002[at]gmail.com)

Sites <https://dc-vu.github.io>

Education

Master of Science in Automation and Control (Jul 2024 - present)

School of Electrical - Electronics Engineering, Hanoi University of Science and Technology ([HUST](#)),
Hanoi, Vietnam

- **Research project:** Design control structures for Parallel Platforms in Maritime applications
- **Funded by:** Master, PhD Scholarship Programme of Vingroup Innovation Foundation ([VinIF](#))

Bachelor of Science in Automation and Control (Oct 2020 - Mar 2024)

School of Electrical - Electronics Engineering, Hanoi University of Science and Technology ([HUST](#)),
Hanoi, Vietnam

- **Excellent degree**, GPA: 3.71/4. Finished the 4-year BSc program in **just 3.5 years**.
- **Ranking:** 22/499 in the same cohort.
- **Bachelor Thesis:** Balancing, motion planning, and tracking control for ballbot systems [[pdf](#)] .
Thesis score: 9.9/10 - The best thesis defense

Work experience

Research Assistant (Oct 2021 - present)

The Mechatronics Engineering Group, Hanoi University of Science and Technology ([HUST](#)),
Hanoi, Vietnam

- Conducted research on advanced control strategies, robotics, motion control, and multi-agent systems, focusing on both theoretical development and practical implementation for automation and marine robotics.
- Developed and validated high-fidelity simulation models using tools such as Simscape and MuJoCo, bridging the gap between simulation and real-world experiments.
- Integrated hardware and software components for real-time control, and contributed to experimental setup, data acquisition, and system troubleshooting.
- **Supervisor:** [Assoc.Prof.PhD. Tung Lam Nguyen](#) ([lam.nguyentung\[at\] hust.edu.com](mailto:lam.nguyentung[at]hust.edu.com))

Selected publications

Journal Ocean Engineering (SCIE Q1) (2025)

Lagrangian-based modeling and safety-critical controls for Stewart platforms under marine operations

Duc Cuong Vu, Danh Huy Nguyen, Minh Nhat Vu, and Tung Lam Nguyen

DOI: [10.1016/j.oceaneng.2025.122142](https://doi.org/10.1016/j.oceaneng.2025.122142)

Journal IEEE Access (SCIE Q2) (2025)

CBFs-based Model Predictive Control for Obstacle Avoidance with Tilt Angle Limitation for Ball-Balancing Robots

Minh Duc Pham, **Duc Cuong Vu**, Thi Thuy Hang Nguyen, Thi Van Anh Nguyen, Minh Nhat Vu, and Tung Lam Nguyen

DOI: [10.1109/ACCESS.2025.3567474](https://doi.org/10.1109/ACCESS.2025.3567474)

Journal Results in Engineering (ESCI Q1) (2025)

A novel approach of Consensus-based Finite-time Distributed Sliding Mode Control for Stewart platform manipulators motion tracking

Duc Cuong Vu, Danh Huy Nguyen, and Tung Lam Nguyen

DOI: [10.1016/j.rineng.2024.103872](https://doi.org/10.1016/j.rineng.2024.103872)

Journal International Journal of Robust and Nonlinear Control (SCIE Q1) (2024)

Time-optimal trajectory generation and observer-based hierarchical sliding mode control for ballbots with system constraints

Duc Cuong Vu, Minh Duc Pham, Thi Thuy Hang Nguyen, Thi Van Anh Nguyen, and Tung Lam Nguyen

DOI: [10.1002/rnc.7358](https://doi.org/10.1002/rnc.7358)

Academic activities

Invited review for

Nonlinear Dynamics (this is my first time as a reviewer)

Seminars and Talks

2025: Talk "MuJoCo for Advanced Physics Simulation: From manipulators to autonomous vehicles" for "Motion Control" master course at HUST and MoCAR seminar [[pdf](#)]

2025: Seminar "Underwater Vehicles" for modeling training of Autonomous Underwater Vehicle at MEG-MoCAR [[pdf](#)]

Conferences

IEEE 12th International Conference on Control, Automation and Information Sciences (IEEE ICCAIS 2023)

Hanoi, Vietnam

2024 International Conference on Advanced Technologies for Communications (IEEE ATC2024)

Ho Chi Minh City, Vietnam

International Conference on Intelligent Systems and Networks (Springer ICISN 2023)

Hanoi, Vietnam

Projects

Member/Researcher (Mar 2025 - Dec 2025)

Advanced Control of a Ship-Mounted Stewart Platform for Marine Applications

- Field: Marine Robotics and Control Systems.
 - International Collaboration of Korea Institute of Science and Technology and Institute ([KIST](#)) for Control Engineering and Automation ([HUST](#)) via the KIST School Partnership Project.
 - Supervisors: [PhD. Minh Nhat Vu](#) (PI) and [Assoc.Prof.PhD. Tung Lam Nguyen](#)
 - Designing and implementing advanced control algorithms for the Stewart platform, including safety-critical and robust control strategies tailored for marine environments.
 - Developing high-fidelity simulation (Simscape, MuJoCo) that capture marine environmental disturbances (such as waves, currents, and ship motion) and accurately represent the platform's kinematics and dynamics.
 - Building the experimental setup, including mechanical assembly, hardware integration, Linux-based real-time kernel configuration, and EtherCAT communication for precise control and data acquisition.
 - Collaborating with cross-institutional teams to refine system requirements, troubleshoot technical challenges, and ensure seamless integration of hardware and software components.
 - Preparing detailed technical documentation, authoring scientific publications, including Ocean Engineering (OE) and Results in Engineering, and presenting project outcomes to both academic and industrial collaborators.
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Member/Researcher (Jan 2025 - Dec 2027)

Robot navigation system integrating sensor network and wireless communication

- Field: Communications, Optimization, Robotics, and Control Systems.
- Funded by Hanoi University of Science and Technology ([HUST](#)).
- Supervisors: Supervisors: [PhD. Chinh Hoang Duc](#) (PI) and [Assoc.Prof.PhD. Tung Lam Nguyen](#).

- Designing and developing a comprehensive simulation environment for Autonomous Underwater Vehicles (AUVs) using the MuJoCo physics engine, enabling accurate modeling of underwater dynamics, sensor feedback, and environmental disturbances.
- Implementing and validating advanced control algorithms for robust navigation, obstacle avoidance, and trajectory tracking in challenging underwater scenarios.
- Integrating sensor network data and wireless communication protocols into the simulation framework to evaluate system performance under realistic communication constraints.
- Collaborating with team members to troubleshoot technical challenges, optimize simulation fidelity, and ensure seamless integration between sensing and control systems.
- Documenting research findings, preparing technical reports, and authoring a peer-reviewed scientific paper for submission to an international journal or conference based on the project outcomes.

Bachelor graduated project (*Jul 2023 - Jul 2024*)

Balancing, motion planning, and tracking control for ballbot systems

- Field: Optimization, Robotics, and Control Systems.
- Supervisors: [Assoc.Prof.PhD. Tung Lam Nguyen](#).
- Developed mathematical models and simulation environments for 3D ballbot systems, focusing on nonlinear dynamics, trajectory generation, and safety constraints.
- Designed and implemented advanced control algorithms, including observer-based hierarchical sliding mode control and nonlinear model predictive control (NMPC) with control barrier functions (CBFs) for obstacle avoidance and tilt angle limitation.
- Formulated and solved time-optimal trajectory planning problems using flatness theory and optimization techniques, enabling smooth and efficient motion planning for ballbot navigation.
- Authored and co-authored peer-reviewed journal papers based on the project outcomes, including publications in the International Journal of Robust and Nonlinear Control (RNC) and IEEE Access.

Honours & awards

Master, PhD Scholarship Programme

Vingroup Innovation Foundation (VINIF)

Best Thesis Defense Award

Hanoi University of Science and Technology

Skills

Programming	Proficient in Python, C/C++, and MATLAB for algorithm development, numerical computation, and embedded system applications.
Simulation	Experienced with Simulink, Simscape, and MuJoCo for multi-domain physical modeling, robot dynamics simulation, and virtual prototyping.
Control & Math	Solid foundation in rigid body dynamics, control theories, motion control, optimization, and Guidance–Navigation–Control (GNC) systems.
Engineering	Hands-on experience with version control (Git), PCB design and debugging, 3D CAD modeling using SolidWorks, and designing experimental platforms for validation.
Systems	Familiar with EtherCAT-based Linux kernel development, real-time control architectures, and embedded systems programming for robotics and automation.
Research	Capable of conducting scientific research, writing academic publications, and presenting technical findings at international conferences. Experienced in literature review, hypothesis formulation, and experimental validation.