

Phu-Hoa Pham

MACHINE LEARNING RESEARCHER · AI FOR SCIENCE

Ho Chi Minh City, Viet Nam

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“Towards Physics-Aware AI for Scientific Discovery”

Summary

An AI researcher who has been fascinated by the Earth and the sky since childhood, and who is now moving from machine learning theory toward physics-informed models for Earth and space science. Studying learning algorithms that stay reliable as data streams in and tasks keep changing, and wanting to build models that respect the physical laws behind the atmosphere and the stars rather than treating them as black boxes. Has worked across continual learning, cross-view geo-localization and LLM alignment, with five papers accepted at NeurIPS 2026 and a strong academic record at VNU-HCM University of Science. Currently a final-year undergraduate, a research collaborator of Prof. Long Tran-Thanh at the University of Warwick, and an AI engineer at Realtime Robotics. Seeking a PhD to pursue physics-informed machine learning for Earth and space science.

Highlights

- Five papers accepted at NeurIPS 2026:
 - Co-first author of MIST and COMPOSE (continual learning)
 - Contributing author of SkyPart, DISCA and the Mouse vs. AI Benchmark (Evaluations and Datasets Track)
- Received academic honors at the University of Science, VNU-HCM:
 - Certificate of Merit for Excellence in Scientific Research (Semester 2, 2024–25; Semester 1, 2025–26)
 - Academic Encouragement Scholarship (Semester 2, 2023–24; Semester 2, 2024–25; Semesters 1 and 2, 2025–26)
 - Ranked in the top 3% of the cohort in Years 1 and 2 (2023–2025)
- Won competitions while working on applied vision and learning problems:
 - Won both tracks of the NeurIPS 2025 Mouse vs. AI Robust Visual Foraging Challenge
 - Won the FSE-Alware 2026 competition on agentic Python dependency resolution
 - Placed 2nd at SHREC 2025 (ROOMELSA, 18 teams) as team lead
 - Earned a Kaggle Silver Medal in the NVIDIA Nemotron Model Reasoning Challenge (99/4,182 teams)
 - Placed 2nd in the TRACS astronomy paper categorization shared task (IJCNLP-AACL 2025) and 4th in EVENTA Track 2 (ACM Multimedia 2025)
- Research and professional experience:
 - Research collaborator with Prof. Long Tran-Thanh (University of Warwick) and Prof. The Anh Han (Teesside University)
 - AI engineer at Realtime Robotics, working on drone-satellite geo-localization

Field of Interest

MY FIELDS OF INTEREST INCLUDE, BUT ARE NOT CONFINED TO:

- Physics-informed machine learning and hybrid physics-AI models
- AI for scientific discovery
- Symbolic regression and equation discovery with AI
- Interpretability of neural networks
- Anomaly detection and time-series analysis for astronomical data
- AI for Earth and space science, including atmospheric retrieval from satellite data
- Probabilistic modelling and uncertainty quantification
- Surrogate models and emulators of physical systems
- Continual and few-shot learning

Education

VNU-HCM University of Science (HCMUS)

Ho Chi Minh City, Viet Nam

B.SC. IN ARTIFICIAL INTELLIGENCE (4-YEAR PROGRAMME)

Sep. 2023 - Jul. 2027 (expected)

- GPA 9.57/10 (3.94/4.0 on the university's 4-point scale)
- Relevant coursework (HCMUS official scale, /10): Calculus 1B (9.5) and 2B (10.0), Linear Algebra (10.0), Probability & Statistics (9.8), Mathematical Methods for AI (9.9), General Physics I (9.9) and II (9.1), Earth Science (9.6), Introduction to Quantum Computing (10.0)

Ea H'leo High School

Dak Lak, Viet Nam

HIGH SCHOOL DIPLOMA

2020 - 2023

- GPA 9.0/10
- Gold Medal, Provincial Mathematics Olympiad, Dak Lak (Grade 10); Second Prize, Provincial Excellent Student Contest in Mathematics

Publications

Underline denotes co-first authors. Author lists follow the arXiv / OpenReview versions.

ACCEPTED, NEURIPS 2026 (POSTER)

1. **Phu-Hoa Pham**, Chi-Nguyen Tran, Phu-Quy Nguyen-Lam, Duy-Minh Dao-Sy, Trung-Kiet Huynh, and Long Tran-Thanh, “MIST: Reliable Streaming Decision Trees for Online Class-Incremental Learning via McDiarmid Bound,” *NeurIPS*, 2026. [arXiv]
2. Phu-Quy Nguyen-Lam, **Phu-Hoa Pham**, Duy-Minh Dao-Sy, Chi-Nguyen Tran, Trung-Kiet Huynh, and Long Tran-Thanh, “Unlocking Compositional Generalization in Continual Few-Shot Learning (COMPOSE),” *NeurIPS*, 2026. [arXiv]
3. Chi-Nguyen Tran, Duy-Minh Dao-Sy, Trung-Kiet Huynh, Phu-Quy Nguyen-Lam, **Phu-Hoa Pham**, and Long Tran-Thanh, “Weather-Robust Cross-View Geo-Localization via Prototype-Based Semantic Part Discovery (SkyPart),” *NeurIPS*, 2026. [arXiv]
4. Trung-Kiet Huynh, Duy-Minh Dao-Sy, Tuan Nguyen, Chi-Nguyen Tran, **Phu-Hoa Pham**, Phu-Quy Nguyen-Lam, The Anh Han, and Long Tran-Thanh, “Training-Free Cultural Alignment of Large Language Models via Persona Disagreement (DISCA),” *NeurIPS*, 2026. [arXiv]
5. Marius Schneider, Joe S. Canzano, Yuchen Hou, Jing Peng, Anjali Deepu, Utsab Karan, **Phu-Hoa Pham**, Chi-Nguyen Tran, Duy-Minh Dao-Sy, Phu-Quy Nguyen-Lam, Trung-Kiet Huynh, Simone Azeglio, Spencer Smith, and Michael Beyeler, “Visual Robustness and Neural Alignment in a Shared Foraging Task: The Mouse vs. AI Benchmark,” *NeurIPS 2026, Evaluations and Datasets Track*.

INTERNATIONAL JOURNAL

1. Trong-Thuan Nguyen et al. (33 authors, including **Phu-Hoa Pham**), “SHREC 2025: Retrieval of Optimal Objects for Multi-modal Enhanced Language and Spatial Assistance (ROOMELSA),” *Computers & Graphics*, 2025. [Paper] [Code]

TECHNICAL REPORTS

1. **Phu-Hoa Pham**, Chi-Nguyen Tran, Duy-Minh Dao-Sy, Phu-Quy Nguyen-Lam, and Trung-Kiet Huynh, “Navigating Simply, Aligning Deeply: Winning Solutions for Mouse vs. AI 2025,” *arXiv:2602.00982*, 2026 (1st place in both tracks). [arXiv]

Research and Work Experience

Prof. Long Tran-Thanh, University of Warwick

RESEARCH COLLABORATOR

Oct. 2025 - Present

- Contributed to four papers accepted at NeurIPS 2026 (MIST, COMPOSE, SkyPart, DISCA), as co-first author on MIST and COMPOSE.
- MIST (online class-incremental learning with streaming decision trees): derived a tight, class-count-independent McDiarmid confidence radius for Gini split gain and proved its bounded-difference constant sharp for arbitrary K , removing the $\log K$ growth of Hoeffding-style criteria; developed Bayesian split inheritance, which projects parent statistics to child nodes and reduces the variance of their estimates (average accuracy on ten benchmark streams rises from 0.744 to 0.823); used per-leaf KLL quantile sketches so that splits and predictions need no raw data.
- COMPOSE (continual few-shot learning): realized that slot features built on self-supervised patch geometry carry meaningful object-level semantics and exploited them for compositional generalization; showed that part-level matching during training drives slot over-specialization, and co-designed holistic training with compositional inference; reached 94.14% on the unseen-concept split of CGQA (previous best 91.97%).

Realtime Robotics

Ho Chi Minh City, Viet Nam

AI ENGINEER

2026 - Present

- Research on drone image processing: cross-view geo-localization and vision-based perception for GNSS-denied navigation.
- Contributed to SkyPart, a lightweight prototype-based part-discovery head on a DINOv2 ViT-S/14 backbone (26.95M parameters) for drone-satellite matching, with state-of-the-art results on SUES-200, University-1652 and DenseUAV.

Skills

Programming	Python, C/C++, Java, LaTeX
Machine learning	PyTorch, TensorFlow, scikit-learn, OpenCV, PyTorch3D, Open3D
Scientific data	NumPy, Pandas, xarray, netCDF4 (satellite and reanalysis data)
Languages	Vietnamese (native); English: IELTS Academic overall 7.0 (L 7.5, R 8.5, W 7.0, S 5.5), Oct. 2025