Phuc, Nguyen Duc Anh

phucnda.github.io | @ phucnda (at) gmail (dot) com | phucnda

Education

University of Maryland, College Park — Maryland, USA
Ph.D. in Computer Science – supervised by Prof. Ming C. Lin — *Sep 2025 - Now*

University of Information Technology - Vietnam National University — Ho Chi Minh, Vietnam
B.Sc. in Computer Science — *Nov 2020 – Aug 2023*

High School for the Gifted - Vietnam National University — Ho Chi Minh, Vietnam
Specialized in Physics — *Sep 2017 – July 2020*

Research Interests

My research focuses on 3D/4D reconstruction and understanding, particularly on developing scalable methods that jointly recover geometry, motion, and semantics from multi-view images and videos. I am interested in building spatially and temporally consistent representations of dynamic real-world environments, enabling machines not only to reconstruct scenes accurately but also to understand objects, their identities, and their interactions over time. My goal is to bridge geometric reconstruction and scene understanding for applications in robotics, autonomous driving, and embodied AI.

Selected Publications. See full list at Google Scholar

- **Scalable 3D Reconstruction and Understanding**
  Phuc Nguyen, Xiyi Chen, Dongki Jung, Anshul Rai, Guan-Ming Su, Dinesh Manocha, Ming C. Lin
  Under Review, 2026.

- **OpenVO: Open-World Visual Odometry with Temporal Dynamics Awareness**
  Phuc Nguyen*, Anh Nhu*, Ming C. Lin
  Compute Champion Award
  *Computer Vision and Pattern Recognition Conference (**CVPR**), 2026.*

- **Any3DIS: Class-Agnostic 3D Instance Segmentation by 2D Mask Tracking**
  Phuc Nguyen, Minh Luu, Anh Tran, Cuong Pham, Khoi Nguyen
  *Computer Vision and Pattern Recognition Conference (**CVPR**), 2025.*

- **Open-Ended 3D Point Cloud Instance Segmentation**
  Phuc Nguyen*, Minh Luu*, Anh Tran, Cuong Pham, Khoi Nguyen
  *International Conference on Computer Vision (**ICCV**), 2025.*

- **HA-RDet: Hybrid Anchor Rotation Detector for Oriented Object Detection**
  Phuc Nguyen
  *International Conference on Computer Vision (**ICCV**), 2025.*

- **Open3DIS: Open-Vocabulary 3D Instance Segmentation with 2D Mask Guidance**
  Phuc Nguyen*, Tuan Ngo*, Evangelos Kalogerakis, Chuang Gan, Anh Tran, Cuong Pham, Khoi Nguyen
  *Computer Vision and Pattern Recognition Conference (**CVPR**), 2024.*

Experience

University of Maryland, College Park – GAMMA Lab — **Maryland, USA**
PhD Student – Supervised by Prof. Ming C. Lin — *Sep 2025 – Now*

- Research Project: Open-World Visual Odometry
  - Developing a temporal, spatial, and camera-aware visual odometry system that estimates real-world-scale ego-motion from monocular dashcam footage captured by arbitrary cameras. Our method, OpenVO, achieves state-of-the-art performance on three benchmark outdoor datasets and has been accepted to CVPR 2026.

- Research Project: Generalizable Bird's-Eye-View Map Prediction
  * Existing BEV mapping methods often rely on limited autonomous driving datasets and weak geometric alignment across views. We investigate whether OpenVO can provide a reliable real-world-scale ego-trajectory for aggregating monocular observations into globally consistent semantic maps. This project aims to enable scalable and generalizable map prediction for autonomous intelligence across diverse environments, camera models, and capture conditions. Project is ongoing.
- Graduate Research Project: Scalable 3D Reconstruction and Understanding
  * Given a long video of a rigid environment, can we jointly recover accurate 3D reconstruction and consistent scene understanding at scale? Beyond reconstructing the scene geometry, Scale3D aims to produce globally consistent object-level semantic understanding across hundreds to thousands of views, enabling scalable perception and serving as a foundation for downstream application. One paper is currently under-review.

StackAV – ArgoAI **Pittsburgh, USA**

Research Intern – In close collaboration with Dr. Sudipta N. Sinha *May 2026 – Now*

- Research Project: Motion-controllable 4D synthesis for autonomous driving scenes.
  * How can a driving video be realistically synthesized so that the ego vehicle and other traffic participants follow precise user-defined motions? We address this by developing an efficient neural rendering framework on top of 4D scene reconstruction, enabling controllable synthesis of rare traffic events and transferable 4D vehicle assets for autonomous driving data generation and evaluation. Project is ongoing.

SpreeAI **California, USA**

AI Research Engineer – In close collaboration with Dr. Aayush Bansal and Dr. Minh Vo *Nov 2024 – Sep 2025*

- Research Project: Multimodal representations for physically-grounded Multimodal-LLM.
  * How can we determine whether a multimodal LLM's grounding is truly reliable, given that even humans often do not know what they do not know? Can a model assess whether it understands or is hallucinating? We address this through an Active Continual Learning framework with human-in-the-loop feedback, where the model actively selects the most informative data and learns incrementally rather than retraining from scratch. An internal system delivered.

Qualcomm – VinAI Research **Hanoi, Vietnam**

AI Research Resident – Supervised by Dr. Anh Tran and Prof. Cuong Pham *Feb 2023 – Nov 2024*

- Research Project: Open-Vocabulary 3D Instance Segmentation
  * Developing an algorithm for tackling the open-vocabulary 3D point cloud instance segmentation by using 2D prior, achieves state-of-the-art results on five different dataset benchmarks. One paper accepted to the CVPR'24, winning two workshop challenges ICCV'23, and CVPR'24.
- Research Project: Class-agnostic 3D Instance Segmentation
  * Developing an algorithm for high-quality class-agnostic 3D instance segmentation by leveraging a tracking foundation model and an optimization-based mask aggregation approach. One paper accepted to the CVPR'25.
- Research Project: Vocabulary-Free 3D Point Cloud Understanding
  * Introducing a new benchmark and algorithms for open-ended 3D point cloud instance segmentation, leveraging Large-Language Models to establish several baselines. One paper accepted to the ICCV'25.
- Applied R. Project: Vietnam Geographic Map Understanding – *Advised by Prof. Minh Hoai*
  * VinAI Research collaborates with the Ministry of Information and Communications on a project utilizing computer vision to identify counterfeit Vietnam geographic maps online, facilitated by the introduction of the extensive VinMap dataset. One paper accepted to the Vietnam local conference.

University of Information Technology – Vietnam National University **Ho Chi Minh, Vietnam**

Research BS Student *Nov 2020 – Aug 2023*

- Graduate Thesis: Hybrid-Anchor Rotation Detector for Oriented Object Detection (9.8/10.0)
  * Developing a hybrid model for Oriented Object Detection achieves state-of-the-art performance with the least training resource on three dataset benchmarks. Best thesis award - one paper accepted to ICCV'25.
- Research Project: Aerial Oriented Object Detection
  * Investigating Oriented Object Detection in Aerial Images. Algorithms implementations and dataset development for adverse weather conditions. Four papers accepted at the local conferences/journals.
- Research Project: Page Object Detection
  * Evaluating the new YOLO design on two dataset benchmarks of page object detection. One paper accepted at the local conferences.

Awards & Achievements

Compute Champion Award CVPR: Highest recognition in methodology, and reproducibility details. (2026)
UMD Dean' Fellowship: Awarded to candidates with exceptional academic records. (2025–2027)
First Prize CVPR Workshop: VinAI-3DIS ranked top-1 in OpenSUN3D CVPR workshop. (2024)
Second Prize ICCV Workshop: VinAI-3DIS ranked top-2 in OpenSUN3D ICCV workshop. (2023)
Best Thesis Award: Awarded to thesis with the highest grade. (2023)
Third Prize UIT AI Challenge: The team ranked top-3 in Scene Text recognition challenge. (2023)
Second Prize UCPC: Ranked top-2 in UIT Collegiate Programming Contest. (2022)
Expert Codeforces: Reaching Expert title on Codeforces – Competitive Programming platform. (2022)
First Prize UIT-AlgoBootcamp: Winning Competitive Programming Competition at UIT. (2021)
Outstanding Student Scholarship: Awarded to students with the best academic performance. (2021)
Outstanding Student in Physics: Awarded to students with the highest GPA in Physics. (2020)

Service

Reviewer:

* IEEE/CVF Computer Vision and Pattern Recognition (CVPR'24,26)
* IEEE/CVF International Conference on Computer Vision (ICCV'25)
* European Conference on Computer Vision (ECCV'24)
* International Conference on Learning Representations (ICLR'25)
* Neural Information Processing Systems (NeurIPS'24,26)
* British Machine Vision Conference (BMVC'25)
* Transactions on Machine Learning Research (TMLR'25,26)

Teaching Assistant UMD:

* CMSC420 (Fall'25): Advanced Data Structures
* CMSC421 (Spring'26): Introduction to AI