Tung Duong Ta

Ph.D. Candidate in Computer Science, University of Maryland, Baltimore County
dta1@umbc.edu · 610-322-6181 · Google Scholar · github.com/duongta155

Research Interests

Vietnamese handwriting recognition, vision-language models, stroke modality, deep ensembles, 3D CT report generation, mathematical reasoning of large language models, ICU outcome prediction, and Raman spectroscopy for skin lesion classification.

Education

University of Maryland, Baltimore County (UMBC) Aug 2022 to Dec 2026 (expected)
Ph.D. in Computer Science, GPA: 3.933/4.0 *Baltimore, MD*

Dissertation: "Low-Resource Vietnamese Handwriting Recognition: A Three-Level Dataset and a Multi-Path Architecture with Fusion Generalized to Computed Tomography Report Generation and Mathematical Reasoning"
Advisor: Dr. Tim Oates
Committee: Dr. Lara Martin, Dr. Justin Brooks, Dr. Manas Gaur, Dr. Trung Vu
Admitted to candidacy in Feb 2026. Expected graduation on Dec 18, 2026.

University of Maryland, Baltimore County (UMBC) May 2026
M.S. in Computer Science, earned en route to the Ph.D. *Baltimore, MD*

Villanova University May 2021
B.S. in Computer Science, GPA: 3.81/4.0 *Villanova, PA*

Publications

Conference Papers

[C1] **Tung Duong Ta**, Tim Oates, Manas Gaur, Trong-Nghia Nguyen, Tien-Cuong Nguyen, Tuan-Cuong Vuong, Trang Xuan Mai, Thien Van Luong. "MDEF: Multi-Report Deep Ensemble Fusion for 3D CT Report Generation." *Workshop on Large Language Models for Multimodal Data Fusion (LLM4MDF) at the IEEE International Conference on Data Mining (ICDM 2026, CORE A*)*. Code: github.com/duongta155/MDEF. **Accepted as a regular paper.**

Journal Articles

[J1] **Tung Duong Ta**, Tim Oates, Thien Van Luong, Huan Vu, Tien Cuong Nguyen. "MDToC: Metacognitive Dynamic Tree of Concepts for Boosting Mathematical Problem-Solving of Large Language Models." *Journal on Information Technologies & Communications (ICT Research)*, Vol. 28, No. 2 (Vol. 2026, No. 2), pp. 59–68, Sep 2026. Paper: duongta155.github.io/papers/mdtoc.pdf. Preprint: arXiv:2512.18841. Project: github.com/duongta155/MDToC. **Published.**

Under Review

[R1] Tuan-Cuong Vuong, Trang Mai Xuan, Son Thai Mai, **Tung Duong Ta**, Cuong Tien Nguyen, Huan Vu, Vu-Duc Ngo, Thien Van Luong. "PIKE: Patient-Context Informed Knowledge Graph Enrichment for ICU Outcome Prediction." *AAAI Conference on Artificial Intelligence (AAAI 2027)*. **Under review.**

[R2] Chu Duc Hoang, Nguyen Thanh Tung, Truong Huu Hoang, **Tung Duong Ta**. "Hierarchical Native-Coordinate Raman Classification of Skin Lesions under Provenance-Aware Repeated Validation." *Skin Research and Technology* (Wiley), Manuscript ID SRT-26-00625, submitted Oct 2026. **Under review.**

In Revision

[P1] **Tung Duong Ta**, Thai Dang Tran, The-Son Le, Quang Dang, Trung Vu, Manas Gaur, Tim Oates. "ViTLD: A Three-Level Vietnamese Handwriting Dataset from Photographed Pages." **In revision for resubmission.**

[P2] **Tung Duong Ta**, Thai Dang Tran, The-Son Le, Quang Dang, Trung Vu, Manas Gaur, Tim Oates. "SIME: A Stroke-Image Modality Ensemble in Word-Level Vietnamese Handwriting Recognition." **In revision for resubmission.**

Research Experience

Graduate Research Assistant, CoRaL Lab, UMBC Jan 2023 to Present
Advisor: Dr. Tim Oates *Baltimore, MD*

MDEF: Multi-Report Deep Ensemble Fusion for 3D CT Report Generation
First author · LLM4MDF at ICDM 2026 · Accepted

- Proposed MDEF, a deep-ensemble pipeline that turns the single-report paradigm into a multi-report paradigm.
- Outperformed MARCH, the best single-report baseline, by +0.079 and +0.045 CE F1 on RadGenome and CT-RATE, with a small positive margin on INSPECT.
- Raised recall by +70% to +97% relative to MARCH, averaged over the 18 pathologies.

MDToC: Metacognitive Dynamic Tree of Concepts
First author · ICT Research · Published

- Proposed MDToC, a three-phase prompting technique built on the metacognitive stages of planning, monitoring, and reviewing.
- Outperformed GoT by 5% on CHAMP, 5.4% on MATH, and 4% on Game-of-24, three mathematical benchmarks.
- Outperformed ToT by up to 19% and GoT by up to 13% across the backbone models.

ViTLD: A Three-Level Vietnamese Handwriting Dataset from Photographed Pages
First author · In revision for resubmission

- Built ViTLD from 565 paper images of 435 writers, the first Vietnamese handwriting dataset with word, line, and paragraph annotation on photographed papers.
- Proved ViTLD harder than the two existing three-level datasets, VNOnDB and UIT-HWDB, raising the average word-level CER of nine handwriting recognition systems to 12.56 from 7.32 and 9.39.
- Proved ViTLD harder at line level, raising the average CER to 22.57, from 14.09 on VNOnDB and 16.91 on UIT-HWDB.

PIKE: Patient-Context Informed Knowledge Graph Enrichment for ICU Outcome Prediction
Contributing author · AAAI 2027 · Under review

- Contributed to PIKE, built on Evidence-Guided Node Selection (EGNS) and Bidirectional Low-Rank Fusion (BLRF).
- Outperformed the strongest baseline by 2.2 to 4.0 AUROC points in each setting on MIMIC-III and MIMIC-IV.
- Improved AUPRC by up to 6.9 points over CTPD, the strongest baseline on MIMIC-IV mortality.

SIME: A Stroke-Image Modality Ensemble in Word-Level Vietnamese Handwriting Recognition
First author · In revision for resubmission

- Proposed SIME, which adds the stroke modality, reconstructed from the image by stroke derendering, to an ensemble of fine-tuned VLMs.
- Outperformed the strongest image modality ensemble on two out-of-distribution benchmarks, reducing CER by about 11% on VN-Para and 9% on VN-Addr.
- Released VN-Para, a diacritic-rich word-level benchmark of 8,042 handwritten word images from 100 documents.

Hierarchical Native-Coordinate Raman Classification of Skin Lesions
Contributing author (data curation, supervision, resources) · Skin Research and Technology · Under review

- Contributed to H-QFR, a hierarchical classifier (benign vs. malignant, then BCC vs. melanoma) that learns directly on the native, nonuniform Raman wavenumber grid instead of resampling to an artificial uniform axis.
- Evaluated with a provenance-aware validation protocol using source-family grouped splits (ten repeats of five-fold outer, three-fold inner) to prevent leakage between related spectra.

- Reached 82.87% repeat-level balanced accuracy and 83.59% overall accuracy on BCC, benign, and melanoma spectra, +1.49 points over the inner-selected baseline.

Teaching Experience

Teaching Assistant, UMBC Fall 2022 to Spring 2026

Natural Language Processing (two terms), Algorithms, Computer Architecture (undergraduate and graduate), Databases, Data Visualization, Mobile Computing

Grader, UMBC Fall 2026 to Present

Software Engineering I

Industry Experience

Big Data Engineer, CMC Corporation May 2021 to Jul 2022

Hanoi, Vietnam

- Implemented Random Walk with Restart on knowledge graph embeddings for company similarity search, with 2% higher accuracy and 5% faster ranking.
- Fine-tuned BERT-based models for NER-based business information extraction (85% accuracy).
- Fine-tuned BERT-based models for Vietnamese natural language-to-SQL conversion (78% accuracy).

Technical Skills

Programming Languages	Python, C++, Java, SQL
Frameworks & Libraries	PyTorch, Hugging Face Transformers, PEFT (LoRA), OpenCV, MONAI
ML/AI Techniques	Vision-language model fine-tuning, deep ensembles, LLM prompting, knowledge graph embeddings
Models	Qwen2.5-VL, InternVL3, TrOCR, RadBERT, GPT-4-Turbo
Tools & Infrastructure	SLURM multi-GPU clusters, distributed PyTorch training, Git, LaTeX, Neo4j, AmpliGraph, FAISS

Honors and Awards

Second Place, CCSC Eastern Programming Contest Oct 2020

References

Dr. Tim Oates (Ph.D. advisor)
Professor
Computer Science and Electrical Engineering
University of Maryland, Baltimore County
oates@umbc.edu

Dr. Manas Gaur
Assistant Professor
Computer Science and Electrical Engineering
University of Maryland, Baltimore County
manas@umbc.edu

Dr. Thien Van Luong
Lecturer and Head of Business AI Lab
Faculty of Data Science and Artificial Intelligence
National Economics University, Hanoi, Vietnam
thienlv@neu.edu.vn

Dr. Trung Vu
AI Engineer
LinkedIn
Mountain View, CA
trvu@linkedin.com