

# Duc Anh Nguyen

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## RESEARCH INTEREST

My research aims to uncover the fundamental mathematical principles governing state-of-the-art foundation models, leveraging these theoretical insights to build the next generation of efficient, interpretable, and robust Large Language Models (LLMs) and Vision-Language Models (VLMs).

## EDUCATION

- Hanoi University of Science and Technology (HUST)** Oct 2020 – Sep 2024  
*B.S. in Mathematics and Informatics*  
Hanoi, Vietnam
  - Valedictorian (Ranked 1st), CGPA: 3.92/4.00.
  - Recipient of Merit Scholarship for Academic Excellence (all semesters).
  - Thesis: Steepest Descent for Multi-Objective Optimization and Machine Learning Applications.
- High School for Gifted Students, VNU University of Science (HSGS)** Sep 2017 – Sep 2020  
*High-Quality Class*  
Hanoi, Vietnam
  - GPA: 9.5/10 (Top 1%), graduated with high distinction.

## RESEARCH EXPERIENCE

- AI Research Resident** Mar 2024 – Present  
*VinAI Research (acquired by Qualcomm)*  
Hanoi, Vietnam
  - Supervisor: Dr. Toan Tran, Assistant Professor Tan Minh Nguyen.
  - Research Topic: Efficiency, Scalability, and Robustness of Foundation Models (State-Space Models and Sparse Mixture of Experts).
- Research Student** Aug 2022 - Aug 2024  
*Modeling, Simulation and Optimization in Data Science (HATLAB), HUST*  
Hanoi, Vietnam
  - Supervisor: Dr. Thang Tran Ngoc.
  - Research Topic: Multi-objective Optimization in Machine Learning.

## PUBLICATIONS & PATENTS

- Selective Sinkhorn Routing for Improved Sparse Mixture of Experts.**  
Duc Anh Nguyen\*, Huu Binh Ta\*, Nhuan Le Duc, Tan Minh Nguyen, Toan Tran.  
*US Patent filed by Qualcomm, 2025*
- Determinants of Credit Risk under the Basel II Accord: A Case Study of the Vietnamese Banking Sector.**  
Ngo Thu Giang, Duc Anh Nguyen, Vu Thi Thao Chi, Nguyen Bao Anh, Nguyen Tai Quang Dinh.  
*International Conference on Emerging Challenges in Economics and Business (ICECH 2023)*
- Adaptive Conflict-Averse Multi-gradient Descent for Multi-objective Learning.**  
Dinh Van Tuan, Tran Anh Tuan, Duc Anh Nguyen, Bui Khuong Duy, Tran Ngoc Thang.  
*International Conference on Intelligence of Things (ICIT 2023)*
- Exploration of Plane Geometry [Book].**  
Le Xuan Hoang, Duc Anh Nguyen.  
*Vietnam National University Press, 2022.*

## PREPRINTS

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1. **Selective Sinkhorn Routing for Improved Sparse Mixture of Experts**, *Under review*, 2025  
Duc Anh Nguyen\*, Huu Binh Ta\*, Nhuan Le Duc, Tan Minh Nguyen, Toan Tran
2. **Artificial Intelligence in Metal Additive Manufacturing: Current Status, Challenges, and Future Developments**, *Under review*, 2025  
Duc Anh Nguyen\*; Bui Truong Giang Le\*; Van Anh Nguyen; Minh Tuan Vu; Manh Ha Bui; Minh Thanh Le; Trong Duc Nguyen; Tien Dung Hoang; Xuan Hai Le
3. **A Steepest Gradient Method with Nonmonotone Adaptive Step-sizes for the Nonconvex Minimax and Multi-Objective Optimization Problems**, *Under review*, 2025  
Duc Anh Nguyen, Tran Ngoc Thang

## TALKS

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- Workshop on Scientific Computing and Applications (Talk in session with discussion): “The Minimax Approach for solving non-convex multiobjective optimization and Applications”, 2024
- VIASM Summer school “Research Experience for Undergraduates” (Talk in session with discussion): “The Steepest Descent Method for Solving Nonconvex Minimax Problem and Applications to Multi-Task Learning”, 2023

## HONORS & AWARDS

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- **National Program for the Development of Mathematics Scholarship** Nov 2023 – Apr 2024  
*Vietnam Institute for Advanced Study in Mathematics (VIASM)*
  - Awarded twice for outstanding academic performance in 2023–2024.
- **“Five–Good Student” Award** Jan 2024  
*Hanoi City, Vietnam*
  - Recognized for excellence in academics, ethics, physical fitness, volunteer work, and international integration.
- **Gold Medal – International Youth Math Challenge** Nov 2023
  - Final-round participant; ranked among top 2% of all participants.
- **Exness Scholarship** Aug 2023  
*Hanoi University of Science and Technology & Exness Corporation*
- **Third Prize – VIASM Summer School “Research Experiences for Undergraduates”** Aug 2023  
*Vietnam Institute for Advanced Study in Mathematics (VIASM)*
- **Gold Medal – Iranian Combinatorics Olympiad** Jun 2022
- **Silver Medal – Iranian Geometry Olympiad** Nov 2019
  - Ranked 4<sup>th</sup> nationally in Vietnam and 22<sup>nd</sup> globally during high school.

## LANGUAGE & CERTIFICATIONS

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- Vietnamese: Native
- English: IELTS Academic **7.0 Overall** (Listening 7.0, Reading 7.0, Writing 6.5, Speaking 6.5).

## REFERENCES

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1. **Dr. Toan Tran**  
Senior Staff Engineer, Qualcomm AI Research  
toatran@qti.qualcomm.com  
*Relationship: Mentor*
2. **Dr. Tran Ngoc Thang**  
Lecturer, Faculty of Mathematics and Informatics, Hanoi University of Science and Technology  
thang.tranngoc@hust.edu.vn  
*Relationship: Undergraduate Thesis Supervisor*