Hai Duong's
Curriculum Vitae

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1 Education

- **PhD**, Computer Science, George Mason University, Fairfax, VA   2022–present

  Advisor: ThanhVu Nguyen

- **MS**, Electrical Engineering, Hanoi University of Science and Technology, Hanoi, VN   2019–2021

  Advisor: Quoc-Cuong Nguyen

- **BS**, Electrical Engineering, Hanoi University of Science and Technology, Hanoi, VN   2014–2019

2 Experience

- **Research Assistant**, ROARS Lab, George Mason University   2022–present

  Developed a verification tool, NeuralSAT, ranked 4th in VNN-COMP'23, 2nd in '24 and '25.
  Developed a proof generation tool, APTP, outperforms prior work on 400 DNNV problems.
  Developed a compositional verification framework that verifies 6.5x problems than SoTA verifiers.
  Published papers at FSE'24, CAV'25, and NeurIPS'25.

- **Research Assistant**, BachLe's Lab, University of Melbourne   2021–2022

  Worked on a graph-based source code modeling and explanation technique.
  Published paper at ICSME'22.

- **Research Assistant**, Sensor Lab, Hanoi University of Science and Technology   2019–2021

  Developed a speech enhancement system using graph-based neural beamforming.
  Developed a small-footprint keyword spotting system using deformable convolution.
  Published papers at IETE'21 and IJACSA'22.

3 Awards and Honors

- **Scholar Award**, NeurIPS   2025

- **Spotlight Paper Award** (C1), NeurIPS   2025

- **NeuralSAT** ranked *2nd*, VNN-COMP   2024–2025

- **NeuralSAT** ranked *4th* and received **New Participant Award**, VNN-COMP   2023

- **Merit Scholarship** (Full Tuition), HUST   2019–2021

- **Outstanding Undergraduate Award**, HUST   2015–2018

4 Publications

4.1 Under Submission

U1 Hai Duong, ThanhVu Nguyen, and Matthew Dwyer. "A DPLL(T) Framework for Verifying Deep Neural Networks". In: *arXiv*. 2024

4.2 Refereed Conference Papers (in print)

C1 Hai Duong, David Shriver, ThanhVu Nguyen, and Matthew Dwyer. "Compositional Neural Network Verification via Assume-Guarantee Reasoning". In: *Advances in Neural Information Processing Systems (NeurIPS)*. 2025, to appear

    Spotlight Paper

C2 Hai Duong, ThanhVu Nguyen, and Matthew Dwyer. "Generating and Checking DNN Verification Proofs". In: *Advances in Neural Information Processing Systems (NeurIPS)*. 2025, to appear

C3 Hai Duong, ThanhVu Nguyen, and Matthew Dwyer. "NeuralSAT: A High-Performance Verification Tool for Deep Neural Networks". In: *Computer Aided Verification (CAV)*. 2025, pages 409–423

C4 Dong Xu, Nusrat Jahan Mozumder, Hai Duong, and Matthew B Dwyer. "Training for Verification: Increasing Neuron Stability to Scale DNN Verification". In: *International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*. Springer. 2024, pages 24–44

C5 ThanhVu Nguyen, KimHao Nguyen, and Hai Duong. "SymInfer: Inferring Numerical Invariants using Symbolic States". In: *International Conference on Software Engineering (ICSE)*. IEEE, 2022, pages 197–201

C6 Thanh-Dat Nguyen, Thanh Le-Cong, Duc-Minh Luong, Van-Hai Duong, Xuan-Bach D Le, David Lo, and Quyet-Thang Huynh. "Ffl: Fine-grained fault localization for student programs via syntactic and semantic reasoning". In: *2022 IEEE International Conference on Software Maintenance and Evolution (ICSME)*. IEEE. 2022, pages 151–162

4.3 Refereed Journal Papers (in print)

J1 Hai Duong, Dong Xu, ThanhVu Nguyen, and Matthew Dwyer. "Harnessing Neuron Stability to Improve DNN Verification". In: *Proceedings of the ACM on Software Engineering (PACMSE)* 1.FSE (2024), pages 859–881

J2 Huu Binh Nguyen, Van Hai Duong, Anh Xuan Tran Thi, and Quoc Cuong Nguyen. "Efficient keyword spotting system using deformable convolutional network". In: *IETE Journal of Research* 69.7 (2023), pages 4196–4204

J3 Huu Binh Nguyen, Duong Van Hai, Tien Dat Bui, Hoang Ngoc Chau, and Quoc Cuong Nguyen. "Multi-channel speech enhancement using a minimum variance distortionless response beamformer based on graph convolutional network". In: *International Journal of Advanced Computer Science and Applications* 13.10 (2022)

5 Miscellaneous

- Contributed to proposal: NSF CAREER: NeuralSAT: A Constraint-Solving Framework for Verifying Deep Neural Networks. NSF 2238133. 8/1/2023–7/31/2028, $510,509. NSF (funded).

- Contributed to proposal: Amazon Research Award: Scalable and Precise DNN Constraint Solving with Abstraction and Conflict Clause Learning. 2023, $50,000 unrestricted gift. Amazon (funded).

- Helped review papers at ISSTA'23, PLDI'24, OOPSLA'24.