Ho Nhut Minh

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Educations

1. **PhD in Computer Science**, National University of Singapore (NUS), Singapore. 2015 - 2020
   Supervisor: Associate Professor Wong Weng Fai.
2. **B.Eng. in Computer Engineering**, Ho Chi Minh City University of Technology (HCMUT), Vietnam. 2014

Research Experiences

1. **Research Fellow**, NUS (2022 -). Mentor: Prof. Ooi Beng Chin
   - Securing blockchain smart contracts with machine learning and software engineering techniques.
   - Building blockchain interoperability solutions on Ethereum and Cosmos-based blockchains.
2. **Research Fellow**, NUS (2020 - 2021). Mentor: Prof. Wong Weng Fai and Prof. John L. Gustafson
   - Optimizing low bitwidth number formats (e.g. Posit 6-8 bits, 2-4 bits table lookup) for the training and deployment of Generative Adversarial Networks (GANs) and other machine learning models.
3. **Research Assistant**, NUS. Mentor: Prof. Wong Weng Fai.
   - Multi-GPU support for Multi-agent simulation frameworks (2014).
   - Low bitwidth fixed point formats for deep neural networks deployment on edge devices (2019 - 2020).

Recent Research Projects

- Verazt – Smart contract verification, analysis, and fuzzing-testing
- Neuromorphic Computing (NC) - Project 6 : Software-Hardware interfacing and Neuromorphic Emulator
- NGA: Next Generation Arithmetic Project
- Optimization of Deep Neural Networks for On-device Implementations
- SINGAPRO: A Paradigm for Energy-efficient Approximate Parallel Computing
- Parallel Simulation and Analysis of Massive Agent Networks

Awards

1. **Best Paper Finalist**, by High-Performance Extreme Computing Conference, Waltham, MA, USA 2017
2. **Research Scholarship**, by School of Computing, NUS 2015 - 2019
3. **Silver Medal**, (Graduation GPA rank 2) by Faculty of Computer Science and Engineering, HCMUT 2014
4. **Second Prize**, Singapore Blockchain Innovation Challenge, Enthusiast Track 2021
5. **GAP Funding**, Verazt – Smart contract verification, analysis, and fuzzing-testing, NUS Enterprise 2022
6. **Research Grant**, Massively Parallel Smart Contract Fuzzing on GPUs, Ethereum Foundation 2023

Selected Professional Services

1. Program commitee member, SoC Research Week, School of Computing, NUS 2019
2. Session Chair, Big Data, Parallel and Distributed Computing, NUS SoC Research Workshop 2017

Reviewer/Subreviewer

1. IEEE Transactions on Parallel and Distributed Systems (TPDS) 2023
2. IEEE Access 2021
3. Conference on Computer Vision and Pattern Recognition (CVPR) 2021
4. International Conference On Computer Aided Design (ICCAD) 2021
5. IEEE International Conference on Computer Design (ICCD) 2019
6. Transactions on Computers (TC) 2019
7. International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS) 2019
8. Design Automation Conference (DAC) 2018
9. International Conference on Compilers, Architectures, and Synthesis for Embedded Systems (CASES) 2017-18

Selected Open-source Tools

1. **QPytorch**$^{+}$, (https://github.com/minhhn2910/QPyTorch) 2020 -
   Enabling low bitwidth Posit arithmetics and novel number formats for the training and inference of neural networks on Pytorch. Published Python package received > 4000 installations: PIP download statistics
2. **Trustless NFT Migration**, (https://github.com/minhhn2910/trustless-nft-migration) 2021
   A full-stack solution and smart contracts for trustless NFT migration across multiple blockchains. It received the second prize at Singapore Blockchain Innovation Challenge 2021
3. **FpTuning**, (https://github.com/minhhn2910/fpPrecisionTuning) 2016 - 2017
   A distributed search algorithm utilizing MPI to determine how many bits are required for the fraction of each floating point variable in a program. It was used by Open Transprecision Computing project http://oprecomp.eu/

Selected Publications

1. **SmartFuzz: A Scalable and Extensible Fuzzing System for Smart Contracts**
   On going work
2. **Simeuro: A Hybrid CPU-GPU Parallel Simulator for Neuromorphic Computing Chips** TPDS'23
   Huaipeng Zhang, *Nhut-Minh Ho*, Yigit Polat Dogukan, Peng Chen, Mohamed Wahib, Truong Thao Nguyen, Jintao Meng, Rick Siow Mong Goh, Satoshi Matsuoka, Tao Luo, Weng-Fai Wong
   IEEE Transactions on Parallel and Distributed Systems 2023
3. **Vulnerability Detection for Smart Contracts in Multiple Blockchain Platforms**
   Quang-Trung Ta, *Nhut-Minh Ho*, Beng Chin Ooi
   Patent Application, Singapore
4. **Interoperability in Blockchain: A Survey** TKDE'23
   Kunpeng Ren, *Nhut-Minh Ho*, Dumitrel Loghin, Thanh-Toan Nguyen, Beng Chin Ooi, Quang-Trung Ta, and Feida Zhu
   IEEE Transactions on Knowledge and Data Engineering 2023
5. **Qtorch+: Next Generation Arithmetic for Pytorch Machine Learning** CoNGA'22
   Nhut-Minh Ho, Himeshi DeSilva, John L. Gustafson, and Weng-Fai Wong
   Next Generation Arithmetic, Lecture Notes in Computer Science, 2022
6. **Tensorox: Accelerating GPU applications via neural approximation on unused tensor cores** TPDS'21
   Nhut-Minh Ho, and Weng-Fai Wong
   IEEE Transactions on Parallel and Distributed Systems 2021
7. **Posit Arithmetic for the Training and Deployment of Generative Adversarial Networks** DATE'21
   Nhut-Minh Ho, Duy-Thanh Nguyen, Himeshi DeSilva, John L. Gustafson, Weng-Fai Wong, and Ik-Joon Chang
   Design, Automation & Test in Europe Conference & Exhibition (DATE) 2021
8. **GRAM: A Framework for Dynamically Mixing Precisions in GPU Applications** TACO'21
   Nhut-Minh Ho, Himeshi DeSilva, and Weng-Fai Wong
   ACM Transactions on Architecture and Code Optimization
9. **DRAMA: An Approximate DRAM Architecture for High-performance and Energy-efficient Deep Training System** ICCAD'20
   Duy-Thanh Nguyen, Chang-Hong Min, *Nhut-Minh Ho*, and Ik-Joon Chang
   IEEE/ACM International Conference on Computer-Aided Design 2020
10. **ApproxSymate: path sensitive program approximation using symbolic execution** LCTES'19
    Himeshi De Silva, Andrew E. Santosa, *Nhut-Minh Ho*, and Weng-Fai Wong
    The 20th ACM SIGPLAN/SIGBED International Conference on Languages, Compilers, and Tools for Embedded Systems 2019
11. **St-DRC: Stretchable DRAM Refresh Controller with No Parity-overhead Error Correction Scheme for Energy-efficient DNNs** DAC'19
    Duy-Thanh Nguyen, *Nhut-Minh Ho*, and Ik-Joon Chang
    The 56th Annual Design Automation Conference (DAC) 2019
12. **Multi-objective Precision Optimization of Deep Neural Networks for Edge Devices** DATE'19
    Nhut-Minh Ho, Ramesh Vaddi, and Weng-Fai Wong
    Design, Automation & Test in Europe Conference & Exhibition (DATE) 2019
13. **Compilation and Other Software Techniques Enabling Approximate Computing.** Book Chapter
    Weng-Fai Wong, Pooja Roy, Rajashi Ray, and *Nhut-Minh Ho*
    In Approximate Circuits (2019)
14. **Exploiting half precision arithmetic in Nvidia GPUs** HPEC'17
    Nhut-Minh Ho, and Weng-Fai Wong
    IEEE High Performance Extreme Computing Conference (HPEC) 2017
15. **Efficient floating point precision tuning for approximate computing** ASP-DAC'17
    Nhut-Minh Ho, Elavarasi Manogaran, Weng-Fai Wong, and Asha Anoosheh
    22nd Asia and South Pacific Design Automation Conference (ASP-DAC) 2017

References/ Previous supervisors

1. **Dr. Weng-Fai Wong** – Associate Professor, National University of Singapore – ✉ wongwf@nus.edu.sg
2. **Dr. John L. Gustafson** – Research Professor, National University of Singapore – ✉ johngustafson@earthlink.net