Chi-Hieu Nguyen

Ph.D. Student
University of Technology Sydney

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━━━ EDUCATION

University of Technology Sydney (UTS)   **Australia**
Ph.D., Engineering   *Apr. 2022 - Present*
- Thesis: *Secure and Privacy-Preserving Edge Intelligence for Emerging Applications in 6G Networks*

Hanoi University of Science and Technology (HUST)   **Vietnam**
MA. SC, Computer Science   *Nov. 2020 - Nov. 2021*
- Thesis: *Multi-UAV Assisted Data Gathering Schemes For Maximizing WSN Lifetime*

Hanoi University of Science and Technology (HUST)   **Vietnam**
B.Eng., Information Systems   *Aug. 2015 - Aug. 2020*

━━━ EXPERIENCE

Graduate Research Assistant at 5G/6G Wireless Communications and IoT Networking Lab - UTS   **2022 - Present**

Supervisor: Assoc. Prof. Hoang Dinh and Assoc. Prof. Diep Nguyen
Research on privacy-preserving machine learning, federated learning and edge computing in 5G/6G wireless networks.

Academic Tutor - University of Technology Sydney   **2022 - Present**
Cyber Security for Mobile Platforms

━━━ SELECTED PUBLICATIONS

Journal articles
- **C-H. Nguyen**, D. T. Hoang, D. N. Nguyen, K. Lauter, M. Kim. "Empowering AI with Privacy: Homomorphic Encryption for Secure Deep Reinforcement Learning," *Nature Machine Intelligence* (IF=25.9, Q1, **ranked among the most prestigious journals in CS/AI**).
- **C-H. Nguyen**, Y. M. Saputra, D. T. Hoang et al. "Encrypted Data Caching and Learning Framework for Robust Federated Learning-Based Mobile Edge Computing," *IEEE/ACM Transactions on Networking*, 2024 (IF=3.8, Q1, **highest ranked IEEE journal in computer networking**).
- **C-H. Nguyen**, D. T. Hoang, D. N. Nguyen et al. "Secure Human Pose Estimation from Wearable Sensors Using Homomorphic Encryption," in preparation for submission to *IEEE Transactions on Dependable and Secure Computing*, 2025.
- B. D. Manh, **C-H. Nguyen**, D. T. Hoang et al. "Privacy-Preserving Cyberattack Detection in Blockchain-Based IoT Systems Using AI and Homomorphic Encryption," *IEEE Internet of Things Journal*, 2025 (IF=8.2, Q1, **highest-ranked IEEE journal in IoT**).

Conference articles
- **C-H. Nguyen**, B. D. Manh, D. T. Hoang et al. "Towards Secure AI-empowered Vehicular Networks: A Federated Learning Approach using Homomorphic Encryption," *IEEE Vehicular Technology Conference* (VTC2024-Fall), 2024.
- **C-H. Nguyen**, B. D. Manh, D. T. Hoang et al. "Demo: PP-AICloud for Edge-Assisted Privacy-Preserving AI Inference with Homomorphic Encryption in Cloud-Based Mobile Services," *ACM Mobicom*, 2025.
- B. D. Manh, **C-H. Nguyen**, D. T. Hoang et al. "Homomorphic Encryption-Enabled Federated Learning for Privacy-Preserving Intrusion Detection in Resource-Constrained IoV Networks," *IEEE Vehicular Technology Conference* (VTC2024-Fall), 2024.

Book chapters

- M. Aljumaie, **C-H. Nguyen**, et al. "Potential Applications and Benefits of Metaverse," *Metaverse Communication and Computing Networks: Applications, Technologies, and Approaches*, 2023.

HONORS & AWARDS

- Beyond academic research, I have actively participated in problem-solving competitions on the Fherma.io platform—a collaborative initiative by FHERMA, OpenFHE, and IBM Research—focused on developing efficient building blocks and advanced algorithms for Fully Homomorphic Encryption (FHE) in privacy-preserving machine learning, blockchain, and Web3 applications.
  1st place achievements:
  - **IBM Array Sorting Challenge**: Developed an FHE-based sorting algorithm for encrypted real-valued arrays using the CKKS scheme, achieving a runtime of less than 40 seconds for sorting 128 values, which is **2.6× faster** than 2nd place.
  - **IBM Parity Challenge**: Designed an optimized HE-based solution for parity bit computation, reducing evaluation time to 1.9 seconds—**22% faster** than 2nd place.
  - **Private Ethereum Fraud Detection**: Developed a model for classifying encrypted Ethereum transactions as fraudulent or legitimate while ensuring data privacy during inference. Achieved **92% accuracy**—**5% higher** and **3× faster** than 2nd place.
  - **Private House Price Prediction**: Developed an HE-secure regression model for housing price prediction, achieving **>85% R^2 score**, outperforming the 2nd place by **12%** in accuracy.
  - **Encrypted Image Classification**: Implemented an ML model capable of classifying HE-encrypted images from the CIFAR-10 dataset in under **0.5 seconds** (**4× faster**) with **94% accuracy** (**1% higher** than 2nd place).
- **ARC DECRA Funded Project Scholarship** *2022*
- **UTS International Research Scholarship** *2022*
- **VinIF Master's Scholarship** *2020*
- **Best paper award - IEEE RIVF 2019** *2019*
- **Vietnam Mathematical Olympiad - Second Place** *2015*

SKILLS

- Advanced expertise in privacy-preserving machine learning, including federated learning, homomorphic encryption, secure multi-party computation, and differential privacy.
- Strong experience in using leading homomorphic encryption libraries: Microsoft SEAL, OpenFHE, IBM HELayers, and Lattigo.
- Experience in MPC tools: CrypTen, MP-SPDZ.
- Proficiency in programming languages: Python, C++, Matlab.
- Proficiency in deep learning frameworks: TensorFlow, PyTorch, Scikit-learn.
- Experience in conducting large-scale simulations and deploying privacy-preserving AI solutions.

PROFESSIONAL SERVICES

- TPC Member of IEEE VTC2024-Fall, IEEE WCNC 2024
- Reviewer for IEEE Transactions on Information Forensics & Security, IEEE Transactions of Mobile Computing, IEEE Transactions on Cognitive Communications and Networking, IEEE Transactions on Network Science and Engineering, Proceedings of the IEEE, IEEE Internet of Things Journal
- Secretary of the IEEE Student Branch, University of Technology Sydney, Australia

REFERENCES

- Assoc. Prof. Hoang Dinh - *Principal Supervisor*   hoang.dinh@uts.edu.au
- Assoc. Prof. Diep N. Nguyen - *Co-supervisor*   diep.nguyen@uts.edu.au