

DR. HOANG H. NGUYEN

Postdoctoral Researcher in Machine Learning, Graph Learning & Software Security

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WORKING EXPERIENCE

Postdoctoral Researcher

CUIP, University of Tennessee at Chattanooga

- Focus on federated learning to advance research and application in the field
- Develop modern machine learning solutions for trajectory prediction at traffic intersections
- Utilize decentralized data sources to improve prediction accuracy and reliability in real-world scenarios
- Ensure solutions adhere to privacy and security standards throughout the development process, maintaining the integrity of sensitive data

August 2024 – Present USA

Doctoral Researcher

L3S Research Center, Leibniz University Hannover

- Utilizing graph embeddings to enhance investigative capabilities by predicting unseen connections in criminal networks
- Employing graph representation learning for vulnerability detection in blockchain smart contracts
- Applying graph neural networks to analyze data from cubelet sensors to enhance the accuracy of predicting multiple object trajectories
- Developing a database to manage and analyze large-scale blockchain-powered social network data

February 2020 – July 2024 Germany

Research Collaborator

HCMC University of Technology - HCMUT

- Modeling Ethereum smart contracts' control flow and data dependency
- Applying machine learning to analyze Bitcoin and Ethereum transaction security vulnerabilities
- Analyzing real-time data of warehouse and transportation management systems integrated with Ethereum and EOS blockchain

June 2018 – December 2019 Vietnam

Research Assistant & Research Associate

Singapore Management University

- Generating control-flow graphs and data dependencies of Android platform
- Analyzing Android apps behaviors based on whole-system control flow
- Identifying private data leaks in Android framework APIs
- Context-aware code localization and recommendation

Mar 2016 – March 2018 Singapore

Android Developer & Android Team Leader

Fabrica Vietnam Co., Ltd & EFSE Co., Ltd

- User experience analysis using Material Design
- QR Code and Image Processing technologies
- Payment Processing technologies (NFC)
- Analyzing Android native launcher
- Designing new techniques for floating apps
- Building apps related to Coupon & Auction, Car Selling, Overlay Photos, Android Launcher, NFC, Call Blocker, and Location

Jan 2013 – Dec 2015 Vietnam

RESEARCH INTERESTS

- Graph Learning
- Machine Learning
- Network Analysis
- Program Analysis
- Software Security
- Smart Contracts

EDUCATION

Dr. rer. nat. (Ph.D.) in Computer Science

Leibniz University Hannover

Grade: Very Good / Magna Cum Laude
Thesis: Graph Representation Learning for Security Analytics in Decentralized Software Systems and Social Networks

May 2024 Germany

M.Eng. in Computer Science

HCMC University of Technology - HCMUT

Computer Security - Grade: Good
Thesis: Generating Control-Flow Graph from Android Binary Code

April 2017 Vietnam

B.Sc. in Electronics and Telecommunications

HCMC University of Science - HCMUS

Computer and Embedded Systems - Grade: Fair
March 2013 Vietnam

TECHNICAL SKILLS

- Python
- Java
- Javascript
- Solidity
- PyTorch
- PyG
- DGL
- NetworkX
- SKLearn
- Ethereum
- Hive
- Soot
- Git
- Google Cloud APIs
- Android SDK
- Flask
- NodeJS
- KnockoutJS
- D3JS

RESEARCH SKILLS

- Report Writing
- Presentation
- Self Motivation
- Teamwork
- Problem Solving
- Critical Thinking

FEATURED PROJECTS

- 5GAPS
- ROXANNE
- MANDO
- SoChainDB
- LibraryGURU
- Kurumaerabi
- Android Launcher

REVIEWS

CONFERENCES:

- AAAI Conference on Artificial Intelligence (AAAI 2025, 2024, 2023)
- International Conference on Software Engineering (ICSE 2025, 2018)
- International Conference on Software Maintenance and Evolution (ICSME 2024)

JOURNALS:

- Information and Software Technology, Elsevier (2024, 2023)
- IEEE Transactions on Network and Service Management, IEEE (2024)
- IEEE Network Magazine, IEEE (2024)
- IEEE Transactions on Dependable and Secure Computing, IEEE (2024)
- IEEE Transactions on Information Forensics and Security, IEEE (2024)
- IEEE Transactions on Software Engineering, IEEE (2024)
- Knowledge-Based Systems, Elsevier (2023)
- IEEE Transactions on Multimedia, IEEE (2022)

LIST OF PUBLICATIONS







 **Graph Representation Learning for Vulnerability Detection in Blockchain Smart Contracts - MANDO Project**

- **Nguyen, H. H.**, Nguyen, N.M., Xie, C., Ahmadi, Z., Kudenko, D., Doan, T. N., & Jiang, L. (2023, May). MANDO-HGT: Heterogeneous Graph Transformers for Smart Contract Vulnerability Detection. In *Proceedings of 20th International Conference on Mining Software Repositories*. (Rank A)
- **Nguyen, H. H.**, Nguyen, N.M., Doan, H.P., Ahmadi, Z., Doan, T. N., & Jiang, L. (2022, November). MANDO-GURU: Vulnerability Detection for Smart Contract Source Code By Heterogeneous Graph Embeddings. In *Proceedings of the ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering* (pp. 1736-1740) . (Rank A*)
- **Nguyen, H. H.**, Nguyen, N.M., Xie, C., Ahmadi, Z., Kudenko, D., Doan, T. N., & Jiang, L. (2022, October). MANDO: Multi-Level Heterogeneous Graph Embeddings for Fine-Grained Detection of Smart Contract Vulnerabilities. In *Proceedings of the 9th IEEE International Conference on Data Science and Advanced Analytics* (pp. 1-10). (Rank A)
- Bang, T., **Nguyen, H. H.**, Nguyen, D., Trieu, T., & Quan, T. (2020). Verification of ethereum smart contracts: a model checking approach. *International Journal of Machine Learning and Computing*, 10(4).







 **Graph Similarity Learning on Multi-Target Multi-Camera Object Tracking**

- Nguyen, T.T., **Nguyen, H.H.**, Sartipi, M., and Fisichella, M. (2024). LaMMOn: Language Model Combined Graph Neural Network for Multi-Target Multi-Camera Tracking in Online Scenarios. *Machine Learning Journal*. (Q1 Journal)
- Nguyen, T.T., **Nguyen, H.H.**, Sartipi, M., and Fisichella, M. (2023). Multi-Vehicle Multi-Camera Tracking With Graph-Based Tracklet Features. *IEEE Transactions on Multimedia*. (Q1 Journal)
- Nguyen, T.T., **Nguyen, H.H.**, Sartipi, M., and Fisichella, M. (2023). Real-Time Multi-Vehicle Multi-Camera Tracking With Graph-Based Tracklet Features. *Journal of Transportation Research Record*. (Q2 Journal)

ACHIEVEMENTS

-  **Best Paper Award, 2024**
L3S Research Center, Leibniz University Hannover
-  **Two Best Paper Awards, 2023**
L3S Research Center, Leibniz University Hannover
-  **SIGSOFT CAPS: ICSE 2023 Travel Grants, 2023**
45th International Conference on Software Engineering, ICSE 2023
-  **Silver Award \$7000 at Blockchain Hackathon, 2018**
Vietnam Blockchain Hub
-  **SMU Internship Scholarship for Excellent Graduate Students, 2016**
HCMC University of Technology
-  **500,000 app downloads, 2015**
Google Play store

EXTERNAL LINKS

-  **Homepage:**
<https://hoanghnguyen.com>
-  **Google Scholar:**
<https://scholar.google.com/citations?user=cDB2Tt8AAAAJ>
-  **DBLP:**
<https://dblp.uni-trier.de/pid/200/9071.html>
-  **ORCID:**
<https://orcid.org/0000-0003-0611-4634>
-  **in LinkedIn:**
<https://www.linkedin.com/in/mrerichoang>
-  **Github:**
<https://github.com/erichoang>

REFERENCES

Prof. Dr.-techn. Wolfgang Nejdl
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 Leibniz University Hannover

Prof. Dr. Lingxiao Jiang
@ lxjiang@smu.edu.sg
 Singapore Management University

Prof. Dr. Mina Sartipi
@ mina-sartipi@utc.edu
 University of Tennessee at Chattanooga

Dr. Zahra Ahmadi
@ ahmadi.zahra@mh-hannover.de
 Hannover Medical School



Graph Representation Learning for Criminal Network Analysis - ROXANNE Project - <https://roxanne-euproject.org/>

- Ahmadi, Z., **Nguyen, H. H.**, Zhang, Z., Bozhkov, D., Kudenko, D., Jofre, M., Calderoni, F., Cohen, N., & Solewicz, Y. (2023). Inductive and transductive link prediction for criminal network analysis. *Journal of Computational Science*, 102063. (Q1 Journal)
- **Nguyen, H. H.**, Bozhkov, D., Ahmadi, Z., Nguyen, N. M., & Doan, T. N. (2022, July). SoChainDB: A Database for Storing and Retrieving Blockchain-Powered Social Network Data. In *Proceedings of the 45th International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR 2022)* (pp. 3036-3045). (Rank A*)
- Nguyen, T. H., **Nguyen, H. H.**, Ahmadi, Z., Hoang, T. A., & Doan, T. N. (2021, December). On the Impact of Dataset Size: A Twitter Classification Case Study. In *IEEE/WIC/ACM International Conference on Web Intelligence and Intelligent Agent Technology* (pp. 210-217). (Rank B)
- Maly, K., Backfried, G., Calderoni, F., Černocký, J., Dikici, E., Fabien, M., Hořínek, J., Hughes, J., Janošík, M., Kovac, M., Motlíček, P., **Nguyen, H. H.**, Parida, S., Rohdin, J., Skácel, M., Zerr, S., Klakow, D., Zhu, D. & Krishnan, A. (2021). ROXSD: a Simulated Dataset of Communication in Organized Crime. In *ISCA Symposium on Security and Privacy in Speech Communication*, Virtual Event, 10-12 November 2021 (pp. 32-36).
- Fabien, M., Parida, S., Motlíček, P., Zhu, D., Krishnan, A., & **Nguyen, H. H.** (2021). ROXANNE Research Platform: Automate Criminal Investigations. In *Interspeech* (pp. 962-964). (Rank A)
- **Nguyen, H. H.**, Zerr, S., & Hoang, T. A. (2020, December). On Node Embedding of Uncertain Networks. In *2020 IEEE International Conference on Big Data (Big Data)* (pp. 5792-5794). IEEE. (Rank B)



Android API Recommendation System - Library GURU Project - <http://libraryguru.info>

- Yuan, W., **Nguyen, H. H.**, Jiang, L., Chen, Y., Zhao, J., & Yu, H. (2019). API recommendation for event-driven Android application development. *Information and Software Technology*, 107, 30-47. (Q1 Journal)
- Yuan, W., **Nguyen, H. H.**, Jiang, L., & Chen, Y. (2018, May). LibraryGuru: API recommendation for Android developers. In *Proceedings of the 40th International Conference on Software Engineering: Companion Proceedings* (pp. 364-365). (Rank A*)



Analyzing Android System Behaviors

- **Nguyen, H. H.**, Jiang, L., & Quan, T. (2017, May). Android repository mining for detecting publicly accessible functions missing permission checks. In *2017 IEEE/ACM 25th International Conference on Program Comprehension (ICPC)* (pp. 324-327). IEEE. (Co-located ICSE 2017) (Rank A)
- **Nguyen, H. H.**, Jiang, L., & Quan, T. T. (2017). Whole-system analysis for understanding publicly accessible functions in Android.(2017). In *South East Asian Technical University Consortium (SEATUC) 11th Symposium Proceedings: Ho Chi Minh City, Vietnam, March 13-14*.
- **Hoang, N. H.** (2016, June). Poster: Android whole-system control flow analysis for accurate application behavior modeling. In *Proceedings of the 14th Annual International Conference on Mobile Systems, Applications, and Services Companion* (pp. 30-30). (Rank B)