# Moho Borhani

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Network (security) engineer, and PhD candidate in Computer Science, specializing in secure overlay networking, IPsec-based Layer 2 VPNs, and scalable industrial network architectures for Industrial Internet and Industry 4.0 environments. Experienced in designing and optimizing Zero Trust communication frameworks through protocol-level implementation and cryptographic integration, supported by large-scale network simulations and reproducible testbeds. Proven ability to collaborate across research and engineering teams to deliver practical, scalable solutions for industrial systems.

## Skills

**Networking/Security**: L2/L3 VPNs, IPsec, Cloud Networking, Zero Trust Architecture, Secure IoT Com., Vulnerability scanning, Cisco IOS CLI, Switching & Routing, Network Automation, Kali Linux, Network Design Optimization
**Languages**: Python (main language), C++, SQL, Bash
**Technologies**: Linux (Networking), Git, Kubernetes, SDN (OpenFlow, Ryu), Docker, ICS/SCADA, Open vSwitch(OVS)
**Data & ML**: NumPy, Pandas, Scikit-learn, Gurobi (Optimization), Matplotlib

## Experience

**Doctoral Researcher & Engineer,** Linköping University | Linköping, Sweden                *Sep 2021 – August 2026*
- *Network Automation & Optimization*: implemented a Python-based optimization engine for Industrial IoT networks, formulated as Integer Linear Programming to reduce tunnel overhead and optimize routing resource allocation
- *Security Architecture*: Architected a Zero-Trust security framework for Layer 2 VPNs. Implemented a modified Host Identity Protocol (HIP) extension in Linux to eliminate single points of failure in provider-edge routers

**Research Engineer,** Linköping University | Linköping, Sweden                *Oct 2020 – Sept 2021*
- *Network Emulation & Containerization*: Developed network testbeds using Mininet, Docker, and OVS to validate scalability proofs, handling simulated traffic for thousands of industrial nodes (SCADA/ICS)
- *Protocol engineering*: Implemented and debugged HIP base-exchange extensions (packet handling, state machine logic, SA management)

**Industrial Thesis,** ABB Power Grids Sweden AB, Västerås-Ludvika, Sweden                *Jan 2020 – June 2020*
- *End-to-end analysis and pipeline design*: developed a procedure for data preparation, modeling, and evaluation for an operational/industrial unit in HVDC systems
- *Anomaly Detection using ML*: Developed an anomaly detection method using machine learning for an HVDC power system setting

**Technical Staff (Computer Networks Lab)**, University of Tehran, Tehran, Iran                *Jan 2017 – Dec 2019*
- *Realistic Emulator design*: Developed reproducible lab environments in containerized network emulator

## Projects

**Scalable Network Resource Scheduler (Python, Gurobi)**                github.com/Mohammad-b0/Python-IpsecTunnel
- Designed and implemented a high-performance scheduling algorithm for secure tunnel relaying for Layer-2 VPNs (VPLS) networks in large-scale industrial Internet
- Analyzed computational overhead for key distribution in dynamic network environments by optimizing server placement

**Zero-Trust Multi-Party Key Agreement System (Python, Linux)**                github.com/Mohammad-b0/hip-mbex-vpls
- Implemented a modified version of RFC 7401
- Developed a decentralized cryptographic key exchange mechanism for Software-Defined WANs (SD-WAN).
- Integrated the solution with the Host Identity Protocol (HIP) stack on Linux to enable secure, integrity-protected communication between untrusted edge devices; reduced end-to-end latency by 8.3%

**IoT Vulnerability Detection & Analysis in Sweden (Data Analysis, Python)**  https://doi.org/10.1016/j.jii.2024.100623
- Leveraged Shodan, Nmap, and network telemetry data to perform footprinting on legacy industrial protocols, providing actionable mitigation strategies against automated exploitation
- Present the solution at the Swedish National Computer Networking and Cloud Computing Workshop

## Education

**Linköping University** — PhD, Computer Science | *2021–2026*
**Mälardalen University (thesis at ABB Corporate Research)** — MSc, Software Engineering | *2019–2020*
**University of Tehran** — MSc, Information Technology | *2017–2020*

## Awards/Honors

**Distinguished Teacher Award** — Sweden | 2025    [ida.liu.se/~mohbo63/assets/images/teacher_award.jpeg](ida.liu.se/~mohbo63/assets/images/teacher_award.jpeg)
**Awarded as Erasmus+ International Credit Mobility** — Iran-Sweden | 2019
**Excellent Thesis Award**

## Activities

**Industry-Partnered M.Sc. Thesis Supervisor (2020–2025):** Mentored and directed master's students in executing in direct collaboration with Swedish tech companies. Key supervision areas included:

- *Sectra Communications AB*: [Adversary emulation tools and threat modeling](#)
- *NIRA Dynamics AB*: [Cloud security and AWS Identity and Access Management (IAM)](#)
- *Ida Infront AB*: [Dynamic Application Security Testing](#)
- *MindRoad AB*: [Intrusion Detection Systems (IDS) and advanced Snort rule sets](#)
- *Maxar International Sweden*: [Information classification model for satellite imagery](#)
- *ACTIA Nordic*: [Data compression in Internet of Vehicles (IoV)](#)

**Event Organizer, IEEE Region 8 (2024)**
**Presenter & Active Participations in *Svenska nätverket för doktorander inom IT-säkerhet (SWITS)* (2022–2025)**:
Regularly presented [applied network solutions](#) at SWITS