MUYLEANG ING



AI Engineer | AI & Quantum Computing Researcher | DevOps Engineer

Quantum Computing Laboratory, Pukyong National University
Busan, South Korea

Nationality: Cambodian (Khmer) · **Date of Birth**: 8 July 2001

✉ muyleanging@pukyong.ac.kr · muyleanging@gmail.com · ☎ +855 96 789 6888
github.com/MuyleangIng · linkedin.com/in/muyleang-ing-7977912a0 · huggingface.co/INGMUYLEANG
muyleanging.com (portfolio) · Quantum Lab profile · github.com/KhmerStack

KEY HIGHLIGHTS

- **Open Khmer AI models:** built and trained 4 small, open Khmer AI models - OCR (Chakkhu), speech recognition (Sota), text-to-speech (VoxPocket) and Sing Khmer transliteration (Akkhara) - with 6 models and 5 public datasets on Hugging Face, live demos, and CPU-friendly deployment.
- **Top 1 award** at a quantum computing event in Seoul (2025) as Full-Stack, DevOps & AI Engineer on **qummit.io**, serving classical and quantum machine learning models.
- **Production deployment experience:** FastAPI microservices, Docker, Kubernetes, CI/CD, AWS and bare-metal servers for real lab projects.
- **Published AI & quantum researcher:** journal paper submitted to *Physica Scripta* (2026), papers at ICCE-Asia 2025 and QTML 2025; M.S. in AI Convergence at Pukyong National University.
- **Leadership & teaching:** former DevOps instructor and project mentor at ISTAD (6 projects mentored); founder of KhmerStack and MekongTunnel (published on npm, PyPI, VS Code and JetBrains marketplaces).

PROFESSIONAL SUMMARY

AI Engineer and researcher who takes AI from idea to production. I am a Master's student in AI Convergence and a researcher in the Quantum Computing Laboratory at Pukyong National University, South Korea, working on quantum circuit compilation and protection, resource-efficient quantum simulation and hardware-aware quantum machine learning. In the lab I also build and deploy **FastAPI microservices** and run **MLOps on Kubernetes**, **AWS** and **bare-metal servers** for production projects.

Outside the lab I build **open AI models for the Khmer language**: trained from data to deployment, benchmarked against existing tools, and made small enough to run on ordinary laptops and phones. On **qummit.io**, a quantum computing platform that won **Top 1** at a quantum event in Seoul, I handled DevOps, full-stack development and AI implementation. Before Korea, I worked at ISTAD in Cambodia (2024–2025) as an Instructor and DevOps Engineer, and I lead **KhmerStack**, an open-source community for Khmer developers.

CORE AI & ENGINEERING SKILLS

AI / ML	Deep learning, PyTorch, Hugging Face Transformers, Conformer / T5 architectures, OCR, speech recognition (ASR), text-to-speech (TTS, voice cloning, VoxCPM), Khmer NLP and transliteration, model distillation, RAG architecture, model evaluation (CER, precision/recall/F1, MSE), reinforcement learning, quantum machine learning (Qiskit)
Model Optimization	ONNX export, int8 quantization, small on-device / CPU-only models, in-browser inference
MLOps & Deployment	Model serving with FastAPI microservices, Hugging Face Spaces, Docker, Kubernetes, Helm, ArgoCD, CI/CD (Jenkins), monitoring with Prometheus & Grafana
Cloud & Infrastructure	AWS servers, bare-metal (physical) server setup, Linux administration, Terraform, Ansible, Vault, DevSecOps and service security
AI Automation	n8n workflow automation connecting AI models and services
Quantum	Quantum circuit compilation, cutting and obfuscation, quantum simulators, Qiskit (Aer, fake backends, IBM hardware), QCNN, QRL
Languages	Python, Go (Golang), Rust, C/C++, Java, TypeScript/JavaScript, SQL, Bash/Groovy
Backend & Web	FastAPI, Flask, Django, Spring Boot, Node.js, React, Next.js, Electron, Tailwind CSS
Data	PostgreSQL, MongoDB, Redis, Elasticsearch, Kafka
Spoken languages	Khmer (native), English (professional)

OPEN KHMER AI MODELS (2025 – PRESENT)

Self-directed project: four small, open Khmer AI models, each with its own website, live demo and benchmark. All on Hugging Face.

Chakkhu - Khmer + English OCR · website

- Reads Khmer and English text lines from documents, old typewritten decrees, scans, phone photos and screenshots, with a confidence score for every line; served through a free API.

- 18.6M parameters, ~140 ms per line on CPU. **4.5% character error rate** on the KHOB benchmark (4,018 lines), ahead of Netra-OCR (5.87%) and Tesseract.

Sota - Khmer speech recognition (ASR) · website

- Trained from scratch on ~1,100 hours of Khmer speech; 26M parameters, 33 MB int8 ONNX model that runs offline on CPU or in the browser (1 minute of audio in ≈0.2 s).
- Early test model: **3.4% CER** on 16 unseen speakers (12 h), compared with 13.2% for Qwen3-ASR-0.6B-km and 18.57% for whisper-small-km.

VoxPocket - Khmer / English text-to-speech · website

- 0.89B-parameter TTS model at 44.1 kHz for Khmer, code-mixed Khmer-English and English, with voice cloning from a short clip and speaking styles (happy, sad, angry, whisper).
- Compressed from its 2.4B VoxCPM2 teacher: **2.7× smaller, 33% faster, 38% less energy**, with a lower median letter error on Khmer (4.3% vs 4.8%).

Akkhara - Sing Khmer → Khmer script transliteration · website

- Converts Khmer typed in Latin letters (as people chat) into Khmer script with a top-5 suggestion list like a smart keyboard (IME); trained on 206K pairs (public dataset).
- Released in 0.3B and an 18M on-device version; building it into an offline Android keyboard app.

Other applied AI

- **RAG architecture** - built a retrieval-augmented generation pipeline end to end: document chunking, embeddings, vector search and LLM answering.
- **AI automation with n8n** - built workflows connecting AI models and services into automated pipelines.

PROFESSIONAL EXPERIENCE

Graduate Researcher - AI & Quantum Computing — **Mar 2025 – Present**

Quantum Computing Laboratory, Pukyong National University, Busan

- Built and deployed FastAPI microservices for lab projects, including service security for production use.
- Set up MLOps on Kubernetes: containerizing services with Docker, automating deployment with CI/CD, and monitoring running workloads.
- Provisioned and managed AWS servers for lab production projects, and set up physical bare-metal servers (Linux installation, configuration and maintenance).
- Research on quantum compiler and simulator design, quantum circuit protection and hardware-aware quantum machine learning (see Research below).

Full-Stack, DevOps & AI Engineer - Qummit (team project) — **2025 – 2026**

Quantum computing web platform · qummit.io

- Team member on qummit.io, a quantum computing web platform; responsible for DevOps, full-stack development (frontend and backend) and AI feature implementation.
- Deployed and managed the servers running the platform, including its classical machine learning and quantum machine learning models.
- Top 1 award at a quantum computing event in Seoul, South Korea (2025).

Instructor, DevOps Engineer & Project Mentor — **Jan 2024 – Feb 2025**

ISTAD (Institute of Science and Technology Advanced Development), Phnom Penh

- Taught DevOps, Spring Boot, full-stack web development, Python and Database courses; developed IT curriculum and served as final-project mentor.
- Mentored FluentFlow, an AI-powered English learning platform for Cambodian learners (FastAPI, Kafka), guiding its system design, AI feature integration and cloud deployment.
- Led and mentored student teams through full-stack development and deployment: ISTAD Alumni (Next.js, Spring Boot, Elasticsearch, Jenkins), DealKh (deals and coupons platform), Cloudinator (Kubernetes DevOps platform), ISTAD School Website and ISTAD Verify (certificate verification).
- Built CI/CD pipelines and explored DevSecOps and microservices optimization for scalable deployments (role concluded on moving to South Korea for graduate study in 2025).

Research Collaborator - AI (outsourced project) — **2024**

Pukyong National University, South Korea

- Algorithm analysis and AI model development in PyTorch/C++ for a flooding-detection AI project.

Student Project Developer — **Feb 2023 – Jan 2024**

ISTAD, Phnom Penh

- SurveyBox - survey and article platform (Next.js, Spring Boot, PostgreSQL, Docker); Top 1, Basic Course.
- AutomateX - DevOps automation platform (Jenkins, Kubernetes, Ansible, IaC); Top 2, Advanced Course.

Mobile Frontend Developer (Freelance) **2021 – 2023**

Phnom Penh, Cambodia

- UX/UI design and feature development for Flutter mobile applications; QA testing and defect reporting.

RESEARCH & PUBLICATIONS

Q-MaskCut - Quantum circuit protection via masked circuit cutting (M.S. thesis) **Sep 2025 – Present**

Quantum Computing Laboratory, Pukyong National University

- Designed a compilation method that cuts a quantum circuit into masked subcircuits, protecting its structure from untrusted compilers and hardware providers while remaining executable.
- Benchmarked against ECQCO and OpaQue using normalized graph edit distance (normGED), total variation distance (TVD) and fidelity change, under noiseless (Aer) and noisy (FakeMontreal) simulation; thesis targeted for the 2026 second-semester examination.

Evaluating quantum circuit protection after compilation **2026**

- Empirical comparison of how well quantum circuit protection methods still hide a circuit after it has been compiled; submitted to *Physica Scripta* (IOP Publishing).

Resource-efficient quantum circuit simulation **2025**

With Leanghok Hour and Prof. Youngsun Han

- Contributed to a circuit-partitioning and qubit-reuse approach for simulating large quantum circuits with reduced memory; published at ICCE-Asia 2025.

Hybrid quantum-classical model for protein–ligand binding affinity **2025**

- Resource-efficient hybrid quantum-classical model predicting how strongly a drug molecule binds to a protein, using few quantum resources; presented at QTML 2025, Singapore.

Quantum ML studies: Quantum RL (QRL) and Quantum CNN (QCNN) **Mar – Aug 2025**

- Experimental study of quantum-enhanced reinforcement learning algorithms for optimization problems.
- Implemented and benchmarked quantum convolutional neural networks for image classification and pattern recognition; this hands-on QML experience informed the later Q-MaskCut thesis work.

Journal paper

- Muyleang Ing, Leanghok Hour, Youngsun Han. *Evaluating Quantum Circuit Protection Methods After Compilation: An Empirical Comparison.* Physica Scripta (IOP Publishing), submitted Nov 2026.

Conference papers

- Leanghok Hour, Muyleang Ing, Youngsun Han. *Resource-Efficient Simulation of Large Quantum Circuits Using Circuit Partitioning and Qubit Reuse.* ICCE-Asia 2025, Busan, South Korea.
- Tara Kit, Leanghok Hour, Muyleang Ing, Youngsun Han. *A Resource-Efficient Quantum-Classical Model for Protein–Ligand Binding Affinity Prediction.* QTML 2025 (9th International Conference on Quantum Techniques in Machine Learning), Singapore.

EDUCATION

M.S. in AI Convergence **2025 – Present (expected 2027)**

Pukyong National University, Busan, South Korea

Quantum Computing Laboratory (QCL), advisor: Prof. Youngsun Han
Focus: AI, quantum compiler design, quantum circuit cutting, quantum simulators, hardware-aware QML

Full Stack Web Development Program (ITE Generation 1) **2023**

Institute of Science and Technology Advanced Development (ISTAD), Phnom Penh, Cambodia

Basic Course (800 h): Java OOP, React, Next.js, Spring Boot, PostgreSQL, Git, Docker, NGINX - Top 1 team project (SurveyBox)
Advanced Course (616 h): Linux, Kubernetes, ArgoCD, Helm, Terraform, Vault, Prometheus/Grafana, DevSecOps, CI/CD - Top 2 team project (AutomateX)

B.S. in Computer Science **2019 – 2023**

Royal University of Phnom Penh, Cambodia

Coursework: C/C++, Java, VB.NET, SQL Server, MySQL, ASP.NET, Java Web, Software Engineering

BacII Diploma (High School) **2016 – 2019**

Paññāsāstra International School (PSIS), Phnom Penh, Cambodia

Top 2 - Mathematics Award

CONFERENCES ATTENDED

- Quantum Resources 2026 - Nihonbashi Hall, Tokyo, Japan, March 16–20, 2026.

- 9th International Conference on Quantum Techniques in Machine Learning (QTML 2025) - Singapore, November 16–21, 2025 (co-authored paper). Theme: AI for Quantum, Quantum for AI.
- ICCE-Asia 2025 - Busan, South Korea (co-author, paper presented).

OPEN-SOURCE & PERSONAL PROJECTS

- **QuBitLab / QuantumLab** - full-stack quantum computing web platform and Qiskit web IDE: drag-and-drop circuit composer with a VS Code-style editor, compile and depth comparison across optimization levels, circuit cutting, runs on simulators, fake backends and real IBM hardware, TVD/fidelity metrics with Bloch and Q-sphere views, a gate-by-gate debug mode, and a community publishing system.
- **MekongTunnel (Founder)** - local tunnel tool that exposes a local app to the internet in one command, with CLI, SDKs and editor integrations; published on VS Code Marketplace, JetBrains Marketplace, npm and PyPI. mekongtunnel.dev
- **KhmerStack (Founder)** - open-source organization building practical developer tools for the Khmer developer community. khmerstack.muyleanging.com
- **kForge** - multi-platform Docker image build CLI powered by BuildKit. GitHub
- **Stack Forge** - visual builder: connect DevOps tools on a canvas and generate install scripts for real platform setups. GitHub
- **ClipVault** - local-first cross-platform clipboard manager for text and images on macOS, Windows and Linux (Electron, React). GitHub

AWARDS & HONORS

- Top 1 award - Qummit (qummit.io), quantum computing event, Seoul, South Korea, 2025
- Top 1 team project (SurveyBox), ISTAD Basic Course, 2023
- Top 2 team project (AutomateX), ISTAD Advanced Course, 2023
- Top 2 - Mathematics Award, Paññāsāstra International School, 2019