Muhammad Hamis Haider

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Professional Summary

I design secure and efficient computing architectures for deployable AI systems, with a focus on edge computing and privacy-sensitive applications. My work spans RISC-V systems, FPGA acceleration, and hardware–software co-design, including support for large language models in regulated domains. I work close to the hardware, developing AI accelerators and secure SoCs using near-data and multi-precision computing, with hands-on RTL design in Verilog/SystemVerilog and UVM-based verification.

I emphasize scalable engineering practices by building reusable frameworks and streamlined workflows that improve productivity and enable rapid, high-quality system development.

Experience

Postdoctoral Fellow (ECE) *Saskatoon, SK, Canada*
KoLab, University of Saskatchewan *Jan 2026 – present*
Postdoctoral research focused on secure, privacy-preserving edge AI systems and RISC-V–based hardware acceleration under the supervision of Dr. Seok-Bum Ko.

- Designed novel edge AI accelerators enabling private and encrypted inference and training for sensitive applications with a ~20% throughput increase.
- Developing RISC-V-baed privacy-preserving AI accelerators integrating differential privacy, cryptographic primitives, and hardware–software co-design.
- Investigating homomorphic encryption and compute-in-memory techniques to reduce latency, energy, and memory overhead in secure AI workloads.

Doctoral Researcher, Electrical and Computer Engineering *Saskatoon, SK, Canada*
KoLab, University of Saskatchewan *Sept 2021 – Dec 2025*
PhD research under Dr. Seok-Bum Ko focused on efficient, reliable, and secure computing architectures for edge AI systems.

- Designed novel approximate and reconfigurable computing architectures for energy-efficient AI acceleration with up to 60% resource consumption reduction.
- Developed hardware–software co-designed systems enabling AI deployment on resource-constrained edge platforms with up to ~50% reduction in LLM computation cost.
- Conducted applied research on reliable and secure AI systems for healthcare applications.
- Nominated for the Best Thesis Defence Award (2026). Awaiting decision.

Research Assistant *Islamabad, Pakistan*
National University of Sciences and Technology (NUST) *Jan 2019 – Dec 2019*
Early-stage research in computer architecture under the supervision of Dr. Rehan Ahmed.

- Pioneered RISC-V architecture research at NUST.
- Contributed to the design of Pakistan's first in-house RISC-V microcontroller.
- Supported RTL development and architectural validation for custom processor designs.

Sessional Lecturer & Graduate Teaching Fellow (ECE) *Saskatoon, SK, Canada*
University of Saskatchewan *Jan 2023 – Dec 2025*
Teaching and curriculum delivery for undergraduate computer architecture and networking courses.

- Lecturer for CME 334: Network Architecture Design (3 credit hours), teaching cohorts of 10–40 students.
- Delivered lectures, designed assessments, and supervised labs covering modern network architectures.
- Graduate Teaching Fellow and Teaching Assistant for CME 433: Computer Architecture Design (40 students).
- Mentored students across three academic years (2022–2024), supporting labs, grading, and project guidance.

Postdoctoral Fellow *Saskatoon, SK, Canada*
KoLab, University of Saskatchewan *Feb 2026 – present*

- Developed deep learning models for the detection of gravitational waves in LIGO data
- Published 3 peer-reviewed research papers about the project and results

Software Engineer *Aug 2018 – present*
Freelancer
Selective contract-based software and web engineering projects delivered for external clients. Visit my website for more details.

- Developed a 3D door placement and visualization engine for an online retail platform using ray-traced lighting and shadowing to generate near-photorealistic room previews from user images with ~30% improved loading speed than competitors.
- Contributed across full-stack development and performance optimization, reducing page load times by approximately 30–55% across multiple client websites.
- Consistently exceeded client expectations with early delivery and maintained a 5-star Fiverr rating, with repeat clients and testimonials citing strong communication and problem-solving.

Publication

Power-Efficient and Reconfigurable Compute Unit for Multi-Precision AI Inference at the Edge Jan 2026
Muhammad Hamis Haider, Hao Zhang, Seok-Bum Ko
(IEEE International Symposium on Circuits and Systems (ISCAS))

Memory-Efficient Differential Privacy Accelerator Jan 2025
Muhammad Hamis Haider, Nam J. Kim, Hao Zhang, Jorge Arias-Garcia, Hyun J. Lee, Seok-Bum Ko
(IEEE Asia Pacific Conference on Circuits and Systems (APCCAS))

Exploring Hardware-Driven Privacy Techniques for Trustworthy Machine Learning Jan 2025
Muhammad Hamis Haider, Hao Zhang, S. Deivalaskhmi, G. Lakshmi Narayanan, Seok-Bum Ko
(Springer (Book Chapter))

Optimized Transformer Models: ℓ' BERT with CNN-like Pruning and Quantization Jan 2024
Muhammad Hamis Haider, Sebastian Valarezo-Plaza, S. Muhsin, Hao Zhang, Seok-Bum Ko
(IEEE International Symposium on Circuits and Systems (ISCAS))

Is Neuromorphic Computing the Key to Power-Efficient Neural Networks: A Survey Jan 2024
Muhammad Hamis Haider, Hao Zhang, S. Deivalaskhmi, G. Narayanan, Seok-Bum Ko
(Springer (Book Chapter))

Decoder Reduction Approximation Scheme for Booth Multipliers Jan 2023
Muhammad Hamis Haider, Hao Zhang, Seok-Bum Ko
(IEEE Transactions on Computers)

Booth-Encoding-Based Energy-Efficient Multipliers for Deep Learning Systems Jan 2022
Muhammad Hamis Haider, Hao Zhang, Seok-Bum Ko
(IEEE Transactions on Circuits and Systems II: Express Briefs)

Education

University of Saskatchewan *Saskatoon, SK, Canada*
PhD in Electrical and Computer Engineering *Sept 2021 – Jan 2026*
- Working on the optimization of autonomous vehicles in urban environments

National University of Sciences and Technology (NUST) *Lahore, Punjab, Pakistan*
BS in Electrical Engineering *Sept 2017 – June 2021*
- GPA: 3.9/4.0, ranked 1st out of 100 students
- Awards: Best Senior Project, High Honor

Skills

ASIC & FPGA Design:

Programming: Proficient with Python, C++, and Git; good understanding of Web, app development, and DevOps

Mathematics: Good understanding of differential equations, calculus, and linear algebra

Languages: English (fluent, CELPIP-G[L/R/W/S]: 12/11/12/11), Urdu (native)