Nazmul Haque Turja

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Education

- **New Mexico State University** — Las Cruces, NM
  Doctor of Philosophy (PhD.) in Electrical and Computer Engineering — *Aug 2026 – Current*
- **New Mexico State University** — Las Cruces, NM
  Master of Science (MSc.) in Electrical Engineering — *Aug 2021 – May 2023*
- **Bangladesh University of Engineering and Technology (BUET)** — Dhaka, Bangladesh
  Bachelor of Science (BSc.) in Electrical and Electronic Engineering (EEE) — *Jul 2014 – Apr 2019*
  Major: Communication Engineering

Experience

- **Intel Corporation** — Folsom, California
  GPU Logic Design Engineer — *Jul 2023 - Sep 2026*
  - **Pre-Silicon Verification**: Conducting functional pre-silicon verification for Intel discrete, integrated, and high-performance computing (HPC) GPUs, specializing in 3D render and compute pipelines.
  - **Intel Xe-Core Management**: Owning end-to-end validation for IP features by developing test plans, creating tests, and achieving comprehensive coverage closure for next-generation ray tracing and texture sampling features, ensuring feature robustness and performance.
  - **Validation and Debugging Expertise**: Performing comprehensive validation within Intel Graphics Raytracing subsystems, leveraging UVM methodologies to deepen understanding of architectural design principles. Executing functional debugging of regression failures in simulation and emulation environments; collaborating with design and architecture teams to resolve issues effectively.
- **Department of ET and SE, New Mexico State University** — Las Cruces, NM
  Graduate Assistant — *Jan 2023 - May 2023*
  - **Course Instructor**: Instructed Communication Systems I (ET 314) through theory and lab sessions, mentored students on weekly assignments and projects, and facilitated interactive discussions to enhance understanding and encourage idea exchange.
- **Intel Corporation** — Folsom, California
  Graduate Technical Intern — *May 2022 - Dec 2022*
  - **Power Analysis**: Addressed critical power run issues during power flow analysis (ptpx) to develop best-in-class low-power designs for Intel Xe-Core Samplers.
  - **Regressions and Debugging**: Managed regressions for Meteor Lake (MTL) Sampler CLT's OOO feature and identified two Silicon hangs.
  - **UVM Testbench Proficiency**: Created UVM testbenches using core components and gained proficiency in *gnr*, *elab*, and *runsim* tools.
- **Department of ECE, New Mexico State University** — Las Cruces, NM
  Graduate Research and Teaching Assistant — *Aug 2021 - May 2022*
  - **Basic Block Count with ML techniques**: Utilizing the nvbit supported PPT-GPU (Performance prediction toolkit for GPU), predicted the BB counts of different Polybench, Rodinia, Pannotia benchmarks, and Lulesh applications using ML techniques. (Paper Under Review)
  - **PPT-GPU**: Collaborated with **Los Alamos National Lab** for developing reuse distance and memory tracing toolkits for PPT-GPU. **GitHub:** https://github.com/lanl/PPT
  - **LDMS Sampler**: Associated with **Sandia National Lab** for developing Lightweight Distributed Metric System (LDMS) GPU Sampler toolkit (a modular system for HPC data collection) for IBM Power9 processor. **GitHub:** https://github.com/ovis-hpc/ovis
  - **Course Instructor**: Managed 50+ students on concepts of Electronics, Digital Circuit Design and VHDL and also mentored them in weekly assignments and projects with lively discussions and exchange of ideas to enhance learning.
- **Department of CSE, BRAC University** — Dhaka, Bangladesh
  Adjunct Faculty — *Feb 2021 - Sept 2021*
  - **Achievement**: Conducted theory and lab classes for VLSI Design (CSE 460), and Digital Electronics and Pulse Techniques (CSE 350). These labs involve Proteus, Quartus II, Microwind and ModelSim.
  - **IoT Applications**: Involved in several applications of Internet of Things(IoT) for health-care and agriculture for the People's Republic of Bangladesh under the supervision of Dr. Farhad Hossain, Professor, department of EEE, BUET. **GitHub:** https://github.com/nh-turja/internet-of-things

- **Nelsite Inc. Ltd.** Fukuoka, Japan
  Semiconductor Engineer *Nov 2019 - April 2020*
  - **Embedded Systems**: Worked on 32 bit ARM Cortex-M4 microcontroller using keil compiler and embedded C language.
  - **Semiconductor Industrial Training**: Received on-job training on basic fabrication, material characterization and the current technological trends of the semiconductor industries of Japan.

Selected Coursework

- **Computer Engineering**: Advanced Computer Architecture, Application of Parallel Programming, ASIC Design, Hardware and Software Co-design, Compiler Transition, Computer Architecture, VLSI, Microprocessor and Interfacing, Analog and Digital Electronics.
- **Artificial Intelligence**: Application of Machine Learning, Deep Learning, Random Signal Analysis, Linear Algebra, Probability and Statistics.

Programming Skills

- **Languages**: CUDA, OpenCL, Python, Embedded C/C++, VHDL, System Verilog, Golang, Lex, Yacc, LaTex
- **Software and Tools**: Verdi, UVM, Numpy, Pandas, Tensorflow, Keras, Scikit-learn, Linux, Eagle, Proteus, Quartus II, Cadence, OpenCV

Master's Technical Report

- **Utilizing CPI Breakdown for Bottleneck Analysis of Power9 Processor Performance**: My technical report introduces the Lightweight Distributed Metric System Sampler (LDMS-Sampler) as a comprehensive framework for CPI Breakdown analysis and pinpointing bottlenecks in IBM Power9 Processor. **Technical Report Link:** https://tinyurl.com/cpibreakdown

Bachelor's Thesis

- **A Secured Offline Online Approach for Internet of Things(IoT) Using Real-time Database**: My thesis presents several IoT applications along with a new cyber-secured MQTT based offline system that can automate various systems integrated into a single dashboard where monitoring and controlling can be simultaneously executed. **Thesis Book Link:** https://tinyurl.com/y2n2qenu

Projects

- **Design Validation using ASMD Diagram**: Debugged and verified hardware design using Algorithmic State Machine with Data Path Diagram. **GitHub:** https://github.com/nh-turja/asmd_diagram_hw_sw_co_design_project
- **Cache Memory Simulator**: Using C++, wrote various programs for Cache Memory Simulator, which can be used for simulating different types of caches (direct mapped, set associative, etc.) **GitHub:** https://github.com/nh-turja/cache-simulator
- **MIPS**: Created an MIPS by using Abstract Syntax Tree (AST) for the course of Compiler Transition. **GitHub:** https://tinyurl.com/39dyv6zv
- **8-bit Simple As Possible(SAP) Computer**: Designed an 8-bit microcomputer with 64kBytes of main memory(RAM) support and simulated it in Proteus software. **GitHub:** https://github.com/nh-turja/simple-as-possible-computer
- **4-bit Shift Register**: Designed a general-purpose 4-bit shift register that is capable of left shift, right shift, and parallel loading.
- **Wearable device for Alzheimer's Patient**: Made a wearable device for Alzheimer's patients for path finding in a house. **GitHub:** https://tinyurl.com/y4mza8h9

Publications

- Nahian Ibn Hasan, Md. Tasnimul Hasan, Nazmul Haque Turja, Rishad Raiyan, Shuvagata Saha, Md Farhad Hossain. 2019. **A Cyber-Secured MQTT based Offline Automation System.** *International Conference on Wireless Communications Signal Processing and Networking (WiSPNET).*
- Shamminuj Aktar, Hamdy Abdelkhalik, Nazmul Haque Turja, Yehia Arafa, Atanu Barai, Nishant Panda, Gopinath Chennupati, Nandakishore Santhi, Stephan Eidenbenz, Abdel-Hameed Badawy. 2023. **BB-ML: Basic Block Performance Prediction using Machine Learning Techniques.**
- Nazmul Haque Turja, Hamdy Abdelkhalik, Jeanine Cook, Omar Aaziz, Abdel-Hameed Badawy. 2024. **Utilizing CPI Breakdown for Bottleneck Analysis of Power9 Processor Performance.**

Awards

- **Battle of Hardware (IoT)**: Champion at Battle of Hardware (IoT) in "CSE Festival 2018" organized by Department of CSE, BUET.
- **CISCO Hackathon, BD**: Honorable mention at the Hackathon of the Internet of Things (IoT) organized by CISCO, Bangladesh in 2018.