

Shahmir Rizvi

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EDUCATION

University of Maryland Baltimore County (UMBC) – Baltimore, MD

August 2021 – May 2025

Dual Track B.S. in Computer Engineering (Cybersecurity & Electronic Systems) | GPA: 3.6

WORK EXPERIENCE

CDD Services LLC | Co-Founder | Laurel, MD

March 2022 – Present

- Created professional SEO optimized websites for clients using WordPress with custom-coded HTML, CSS, and JavaScript functionalities with a strong focus on mobile optimization and UI/UX design
- Developed a comprehensive business dashboard using React for web and Flutter for mobile, integrated with a custom designed Node.js server hosted on a VPS and a phpMyAdmin database
- Implemented various cybersecurity protocols such as AES to safeguard company server against any malicious attacks such as Replay Attacks, DDoS Attacks, Imitation Attacks, and Cross-Site Scripting

UMBC | Undergraduate Researcher for DAMS Lab | Baltimore, MD

March 2025 - Present

- Designed and implemented a route optimization algorithm for tankers transporting raw goods in the Mediterranean and Black Sea, improving transit efficiency and reducing idle wait times through dynamic order chaining
- Scraped publicly available maritime data in order to develop and test optimization algorithm with real data
- Developed a trust-based logistics system to facilitate secure transactions between buyers and sellers without requiring mutual reliance

UMBC | Undergraduate TA for Systems Design and Programming Course | Baltimore, MD

January 2025 – May 2025

- Provided support in course concepts including Benchmarking, HDL, ISA, ARMv7, MIPS, x86, CPU Architecture, Memory, OS Kernel, IPC, Mutex, Semaphores and more
- Graded assignments, offered feedback on code quality and design, and collaborated with the instructor to improve course materials and student understanding

Blue Wave Semiconductors | PLC Integration Intern | Baltimore, MD

February 2025 - May 2025

- Programmed PLCs to automate chip manufacturing equipment, replacing manual switch operations with sensor- and timer-based triggers for improved precision and efficiency
- Developed a secure remote control interface by configuring network access to PLCs via open IP routing, enabling off-site monitoring and management of manufacturing processes

UMBC | Undergraduate Researcher for VLSI Lab | Baltimore, MD

November 2023 – November 2024

- Developed a System Verilog script which can take live input from a camera connected to the board and run a trained AI model to perform object detection and send results to a Raspberry Pi via the SPI protocol
 - Led a project to monitor the Electronic Noise Frequency (ENF) of the power grid by using Arduinos and Raspberry Pi to synchronize IOT devices by leveraging unique fluctuations the in frequency and period of the signal
 - Researched Next-Gen Reservoir Computing (NG-RC) AI models to predict chaotic systems in milliseconds
 - Enhanced AI testing by benchmarking inference times of TensorFlow and Darknet models on hardware like Raspberry Pi, Nvidia Jetson Nano, and Google Edge TPU
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CERTIFICATIONS

Algo Expert

- Completed training in data structures and algorithms, including trees, graphs, recursion, and dynamic programming; built efficient solutions with time and space complexity analysis

PUBLICATIONS AND PRESENTATIONS

Conference on Information and Knowledge Management, Applied Research Track

- Sanaa S. Mironov, Brandon Hill, **Shahmir Rizvi**, Roberto Yus, Alexey A. Mironov, Uluc Ekemen. *The Optimization of Oil Products Trade Routes in the Mediterranean under Geopolitical and Physical Constraints*. Research paper in preparation for submission to the **Applied Research Track, Conference on Information and Knowledge Management (CIKM)**, Seoul, South Korea, 2025.

Undergraduate Research and Creative Achievement Day (URCAD)

- Brandon Balbuena, Christopher Mantzouranis, **Shahmir Rizvi**. *Real-Time American Sign Language Recognition and Speech Output System Using Artificial Intelligence*. Poster presented at URCAD (Undergraduate Research and Creative Achievement Day), University of Maryland, Baltimore County (UMBC), Spring 2025.

ISVLSI 2025 (IEEE Computer Society Annual Symposium on VLSI)

- Riadul Islam, Joey Mulé, Dhandeep Challagundla, **Shahmir Rizvi**, Sean Carson. *An Event Autoencoder for High-Speed Vision Sensing*. Submitted to the **IEEE Computer Society Annual Symposium on VLSI (ISVLSI 2025)**, VLSI for Applied and Future Computing Track, Kalamata, Greece, July 6–9, 2025.

COEIT Research Day

- **Shahmir Rizvi**, Riadul Islam. *Time Synchronization-Based Electric Grid Attack Detection System*. Poster presented at COEIT Research Day, University of Maryland, Baltimore County (UMBC), Spring 2024.

SKILLS SUMMARY

Languages: VHDL, Verilog, C++, Python, x86 Assembly, JavaScript, SQL, MATLAB, Dart, PHP, Java, HTML and CSS

Frameworks: React, React Native, Flutter, Express.js, SwiftUI, Expo, Tensorflow, and Keras

Tools: Cadence Virtuoso, Xilinx Vivado, KiCAD, LTSpice, Android Studio, Valgrind, Wireshark, and Docker

Platforms: Linux, Raspberry Pi, MATLAB, Google Cloud, Arduino IDE, Godot, Unity, and Unreal Engine

Courses: VLSI Design, Universal Verification Methodology, Programmable Logic Devices, Hardware Security, Embedded Systems, Operating Systems, Electronic Circuits, Computer Security, Data Structures, and Computer Architecture

PROJECTS

32-Byte LRU Cache Design – VLSI Project

- Designed and implemented a fully functional 32-byte Least Recently Used (LRU) cache from transistor-level schematics using PMOS and NMOS logic; developed cache control logic using a custom finite state machine in VHDL
- Constructed all components (registers, cache blocks, I/O interfaces) both behaviorally and structurally; transitioned to schematic-level design and completed full physical layout with precise transistor sizing (finger width/number)
- Performed full design rule checks (DRC) and layout-versus-schematic (LVS) verification to ensure layout correctness and functional equivalence

FPGA-Based 8086 Processor Emulation

- Designed and implemented a simplified 8086 CPU architecture on an FPGA using SystemVerilog, including ALU, registers, control unit, and memory blocks
- Developed functional modules for arithmetic operations, instruction decoding, and control signal generation
- Integrated and tested components on the FPGA board to demonstrate sequential execution of custom instructions

Smart Home Automation System

- Integrated an **Arduino-controlled automated door lock**, **LED control system** with 74HC595 shift register, and **smart robot** into a cohesive home automation platform
- Utilized sensors for secure access control, optimized LED outputs with minimal GPIO, and developed robot behavior for proximity detection and manual operation
- Created a centralized control interface for seamless management of all devices