MD JONAYET HOSSAIN

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EDUCATION

University of New Hampshire - Durham, NH   *Expected: May 2026*

- **Relevant Coursework:** Integrated Circuits Design, Digital Signal Processing, Modern Communication System, Biomedical Instrumentation, Electronic Design I, II, & III, Electromagnetics.
- **Honors:** Dean's List (Spring 2025, Fall 2025)

TECHNICAL SKILLS

- **Instruments:** Oscilloscope (high-bandwidth), Vector Network Analyzer, Spectrum Analyzer, Bit Error Rate Tester, Arbitrary Waveform Generator, SmartBits, and Digital Multimeter.
- **Simulation tool & modeling:** Altium designer, Ansys HFSS, Keysight ADS, and LTspice/QSpice/Multisim
- **Programming:** MATLAB & Simulink, Python, PyTorch (Deep Learning & Machine Learning), C/C++, Verilog, Application Extension Language (AEL) and Instrumental Programming (SCPI).
- **Standards:** IEEE 802.3 Ethernet 10BASE-T1S, 100BASE-T1, 1000BASE-T1, 100BASE-T, 1000BASE-T and multi-gig ethernet (2.5G, 5G and 10GBASE-T).
- **Specialized Knowledge:** Analog/Digital Circuit Design, High Speed PCB Design and simulation, Signal & Power Integrity, Deep Learning & Machine Learning, Filter Design, Soldering & PCB assembly, Amplifier Design, 3D modeling, and Graphic User Interface Design.

PROFESSIONAL EXPERIENCE

UNH InterOperability Laboratory | Lead Hardware & Automation Developer   *Nov 2022 – Present*

- **Commercial Product Design:** Launched and designed a new commercial automation board that cuts IEEE 802.3 C96 & C97 test setup time by **90%** by leading the full development cycle, including circuit & PCB design, signal integrity analysis (Keysight ADS, Ansys HFSS, SPICE), assembly, and circuit bring-up.
- **Vendor Collaboration**: Partnered with engineers from **Microchip, Marvell, and Infineon** to resolve 1000BASE-T1 mode conversion loss challenges. Engineered a high-precision fixture that currently achieves the most negligible mode conversion loss.
- **Precision Analog & Power Design:** Designed a **staggered RLC filter network** to linearize power supply output, eliminating ripple for a strict **high-side current sensing** circuit and **PIN diode** variable terminators for 6GHz applications.
- **Reverse Engineering & Troubleshooting:** Led the board bring-up and debugging of a 4-layer high-speed automation board with zero documentation, utilizing simulation (LTspice) to map connections and restore full functionality.

- **System Architecture & Fixture Design:** Architected and built a universal, swappable test fixture for **100BASE-T1/1000BASE-T1**, optimizing trace geometry to minimize insertion loss. Currently building a pre-emphasis circuit to minimize insertion loss.
- **Technical Leadership:** Lead a PCB design team through weekly **design reviews** to validate SI/DFM compliance, while mentoring 5 technicians on **software automation** and IEEE test suites.
- **Test Compliance Automation & Validation: Automated rigorous IEEE 802.3 compliance testing** (e.g., Droop, Jitter, Return Loss, PSD, Distortion) using MATLAB, reducing validation cycles by 80%.

ACADEMIC PROJECTS

AI-Based Signal Analyzer & Equalizer | *Senior Capstone*   *July 2025 – Present*
- Developing a **Multi-Task Learning (MTL) model** in PyTorch to predict signal integrity metrics (Eye Height/Width/Impedance/SNR/Jitter) from channel parameters.
- Automated dataset generation by scripting Keysight ADS using Python and AEL.

Interactive Smart Cutting Board   *Nov 2025*
- **Innovated** a reaction-based wireless IoT system using **ESP32-S3** (Wi-Fi/Bluetooth), integrating AI, I2C thermal sensors, I2S microphones and other sensors to make the cutlery enjoyable.

Integrated Circuit & Amplifier Design | *Coursework & Lab*   *Aug 2024 – Present*
- Designed and simulated BJT and FET-based amplifiers, VCO, Oscillators and PLLs, focusing on frequency response, **linearity**, active filters (Sallen-Key, Butterworth, Bessel) and stability analysis using **Multisim** and **LTspice**.

ORGANIZATIONS

BSA-UNH (Bangladesh Student Association) | Vice President   *Oct 2023 – Present*
- Co-founded the association and managed the logistics for over 10 community events.

IEEE - UNH Student Branch | Executive Member   *Feb 2023 – Present*
- Organized technical competitions including breadboard challenges to foster student engagement.