BUI THANH DAT

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HCMc, Vietnam

Graduated B.S. with hands-on experience in FPGA prototyping, DMA/controller integration, and hardware verification. Incoming Clemson Ph.D. student in Computer Science focused on computer architecture and systems security; seeking a Marvell Vietnam internship in hardware validation, design, or verification.

Education

Clemson University *Expected Start: Aug 2026*
Incoming Ph.D. in Computer Science South Carolina, USA

- Research assistantship with Dr. Zhenkai Zhang for GPU Systems Security; full tuition support and living stipend.

University of Science, VNUHCM *2021–2025*
B.S. in Electronics and Telecommunications Engineering Ho Chi Minh City, Vietnam

- GPA: 8.72/10.0 (3.7/4.0)

Research Experience

Pre-Doctoral Independent Study in Computer Architecture and Hardware Security *Aug 2025–Present*
Research Mentee under Prof. Zhenkai Zhang Remote

- Working on pre-doctoral research preparation, covering operating systems, computer systems, computer architecture, vector/GPU architecture, and cache side channels; distilled into weekly reports.
- Surveyed memory-hierarchy attack mechanisms and mitigations, including FLUSH+RELOAD, Cache Template Attacks, GPU memory hierarchy behavior, gather-scatter access, and SIMT execution.

Remote Collaboration in Black-Box Adversarial Attacks *2023–Present*
Undergraduate Research Student, advised by Prof. Tung Kieu Aalborg University

- Investigated unsupervised black-box adversarial attacks against Deep One-Class Classification models in the time-series domain.
- Explored unsupervised meta-learning for generating effective and transferable adversarial examples, strengthening understanding of model robustness and experimental analysis.

Computer Embedded Systems Laboratory (CESLAB), HCMUS - VNUHCM *2022–2025*
Undergraduate Research Student, advised by Dr. Huu Thuan Huynh Ho Chi Minh City, Vietnam

- Contributed to the design, implementation (Verilog), FPGA verification, and system integration of hardware accelerators and SoC components, with hands-on simulation and hardware debugging.
- Studied the RISC-V ecosystem through the design and evaluation of a Linux-capable SoC with a tightly coupled DNN accelerator.
- Prototyped open-source systems on Xilinx VC707 and integrated custom peripherals, including a DMA controller with Avalon-MM interfaces, into Nios V-based SoCs.

Selected Projects

Open-Source RISC-V SoC Implementation with DNN Acceleration: A Chipyard Framework Study with FPGA Prototyping *Apr 2025–Aug 2025*
Undergraduate Thesis Project, CESLAB

- Designed, implemented, and verified a Linux-capable RISC-V SoC on a Xilinx VC707 FPGA using the Chipyard framework.
- Integrated a custom Gemmini DNN accelerator via the RoCC interface and achieved a 1,300x speedup on optimized workloads versus a software-only approach.
- Managed the full flow from Chisel/Scala hardware generation to successfully booting Debian Linux on the prototype.

Design and Integration of a Custom DMA Controller on FPGA in a Nios V/m SoC System *Jan 2025–Apr 2025*
Internship Project and Report, CESLAB

- Designed a Verilog DMA controller with Avalon-MM master (read/write) and slave (control/status) interfaces.
- Integrated and tested the full system on an Intel DE10-Standard FPGA board using Intel Platform Designer; developed C code to configure transfers, move data between on-chip memories, and verify data integrity.
- Documented the design, implementation, and testing workflow in a formal internship report.

Digital Communication System Simulation *Jan 2024–Apr 2024*
Group Project, Digital Communications Course

- Provided theoretical insights and verified final simulation results for the project team.
- Analyzed A-Law and μ-Law companding techniques for speech signal processing using MATLAB, evaluating signal-to-quantization noise ratio (SQNR).

ZF & MMSE Equalizer Simulation for Wireless Channels *Sep 2024–Nov 2024*
Group Project, Wireless Communications Course

- Contributed to the MATLAB simulation of a QPSK communication system over a frequency-selective AWGN channel by analyzing channel effects, multi-tap impulse responses, and calculated frequency responses (FFT).
- Researched and analyzed the performance of frequency-domain Zero-Forcing (ZF) and Minimum Mean Square Error (MMSE) equalizers used to mitigate Inter-Symbol Interference (ISI).
- Calculated and compared the Signal-to-Noise Ratio (SNR) before and after equalization, visualizing the received and equalized signals using constellation diagrams and eye diagrams.

Selected Publications (co-authored)

- **ISRITI 2024**: "A Configurable 2D-Integer DCT Hardware Accelerator Compatible with H.266 Standard based on RISC-V Architecture."
- **ICCSA 2024 Workshops**: "Designing and Implementing a 2D Integer DCT Hardware Accelerator Fully Compatible with Versatile Video Coding."
- **ICDV 2025**: "Efficient AI Model and Hardware Architecture Based on CNN for Arrhythmia Prediction."
- **ICISN 2025**: "An Efficient Algorithm Compatible with Low-performance Hardware for AI Edge Devices in Arrhythmia Prediction."

Technical Skills

Programming	C/C++, Python, MATLAB, Bash
RTL / Hardware	Verilog HDL, Chisel/Scala exposure, Digital Logic Design, SoC Design and Integration, Hardware Acceleration
Architecture	Computer Architecture, Memory Hierarchy, Cache Coherence, Memory Consistency, RISC-V, DMA, FPGA prototyping
Tools	Vivado, Intel Quartus Prime, Platform Designer (Qsys), ModelSim/Questa, Git, Linux
Embedded / Interfaces	STM32, ESP32, Silicon Labs EFR32 Gecko, Raspberry Pi, UART, SPI, I2C, BLE, MQTT
Communication / Analysis	Digital Communication systems, ZF/MMSE equalization, SNR analysis, constellation and eye-diagram analysis

Honors and Awards

University of Science, VNUHCM

- **Certificate of Merit for Excellent Achievements in Student Scientific Research** (AY 2022–2023 & 2024–2025)

Long An High School for the Gifted

- **National Round Participant, Vietnam Olympiad in Informatics** (in 2 consecutive years 2020 & 2021); qualified via Provincial Third Prize (2019) and Second Prize (2020)
- **ICPC National Round Qualifier**, Vietnam Southern Regional (2020)
- **Gold Medal**, Southern Summer Camp Olympiad in Informatics VI (2019)

Languages

Vietnamese (native)
English (proficient)

- IELTS Academic: 7.0 (Dec 2021) [Certificate]
- Duolingo English Test: 125 (Dec 2025) [Certificate]