Hien Vu

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A researcher with expertise in developing effective solutions for machine learning systems, low-power sensing, and electronics optimization. Seeking a challenging role to leverage problem-solving and cross-disciplinary skills to drive impactful research.

EDUCATION

Ph.D. in Electrical and Computer Engineering (expected) 2026
Purdue University, West Lafayette, Indiana, USA

M.Sc. in Electrical and Computer Engineering 2023
University of Wisconsin–Madison (UW-Madison), Wisconsin, USA

B.Sc. in Electronics and Telecommunications Engineering 2018
Hanoi University of Science and Technology (HUST), Hanoi, Vietnam

PROFESSIONAL EXPERIENCE

Research Assistant, **NEIS Lab, Purdue University, WL, IN, USA** 2023–Present

- Engineered a large-scale, multimodal sensor network for real-world data acquisition, integrating custom-designed wearable UWB tags with stationary cameras, and implementing a robust time-synchronization protocol across all nine distinct modalities.
- Developed an end-to-end multimodal sensor fusion pipeline for complex behavior classification that demonstrably improved model accuracy and robustness over any single sensor modality.
- Architected a multi-stage computer vision system for object identification and behavior classification from challenging isometric, multi-view video streams, and developed a novel optimization-based method to generate high-fidelity 3D ground-truth locations from 2D image annotations.

Research Assistant, **WISEST Lab, UW-Madison, Madison, WI, USA** 2021–2023

- Designed a novel, energy-neutral wearable sensor from the ground up, featuring a shared-coil architecture for RFID and wireless charging, which solved critical issues of mutual coupling and device footprint in compact wearable designs.
- Developed the embedded firmware and low-power architecture for the sensor tag, achieving a 15x reduction in the energy cost of RFID scanning through custom on-chip decoding and aggressive power gating.
- Engineered a smart, long-range Wireless Power Transfer (WPT) system with a closed-loop safety protocol, enabling real-time power adjustment based on LoRa feedback of the tag's coil temperature and battery state.
- Fabricated, deployed, and managed a multi-node IoT network in an operational dairy barn, collecting and analyzing over 1,900 hours of real-world data to successfully validate the system's energy-neutral performance and its ability to run for 5 days on a single 13-minute charge.

Research Assistant, **EC Lab, Soongsil University, Seoul, South Korea** 2019–2021

- Designed a flexible, high-energy supercapacitor-based power device for military applications, capable of delivering 840 W in multiple 5-second discharge cycles. Developed an advanced control algorithm that allows the main buck converter to work as a bi-directional buck-boost converter, allowing the system to run continuously without interruption during the operation.
- Developed a pre-heating technique for lithium battery packs working in cold environments using a novel energy exchange process that allows balancing both cell temperature and SOC without requiring precise characterization of the cells.
- Implemented a high-speed design for a customized storage device that consists of an FPGA controller, 512GB of 16 SLC-NAND flash ICs, and more than 1000 other components, while ensuring signal integrity and propagation delay.
- Developed a dynamic voltage-scaling power backup system to extend the lifespan of capacitors in modern SSDs.
- Implemented Extended Kalman Filter on a RISC-V MCU that processes data from a 9-DOF IMU to track 3D pose in real time, which is then combined with Parallel Tracking and Mapping (PTAM) for pose tracking in AR applications (see demo ⏵).

Research Assistant, **SPARC Lab, HUST, Hanoi, Vietnam** 2015–2018

- Developed a gyroscope-based balancing system using Linear-Quadratic-Gaussian regulator for two-wheel vehicles.
- Designed and managed the production of 100 devices for monitoring air quality and deployed around Hanoi city.

KEY SKILLS

- **Software & AI**: Python, C/C++, MATLAB; Machine Learning Models, Signal Processing, System Modeling.
- **System Design**: Embedded/Real-Time Systems, Low-Power/Wireless Systems, Full-Stack System Development.

SELECTED PUBLICATIONS

- Vu, Hien, et al., MmCows: A Multimodal Dataset for Dairy Cattle Monitoring. *NeurIPS 2024 (Spotlight paper, top 5% ratings)*.
- Vu, Hien, et al., eTag: An Energy-Neutral Ear Tag for Real-Time Body Temperature Monitoring of Dairy Cattle. *ACM MobiCom 2023 (acceptance rate 24%)*.
- Vu, Hien, et al., Simultaneous Internal Heating for Balanced Temperature and State-Of-Charge Distribution in Lithium-ion Battery Packs. *Journal of Energy Storage 2023*.