Hien Vu

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A researcher specializing in the end-to-end development and optimization of machine learning models, wireless sensing, and embedded systems. Seeking an R&D role (co-op or full-time) to translate complex research into tangible technological solutions.

EDUCATION

Ph.D. in Electrical and Computer Engineering 2024–2026 (expected)
Purdue University, West Lafayette, Indiana, USA

M.Sc. in Electrical and Computer Engineering 2021–2023
University of Wisconsin–Madison (UW-Madison), Wisconsin, USA

B.Sc. in Electronics and Telecommunications Engineering 2014-2018
Hanoi University of Science and Technology (HUST), Hanoi, Vietnam

KEY SKILLS

- **Software & ML**: Python, C/C++, MATLAB, verilog; machine learning model development, signal processing, system modeling.
- **System design**: Embedded/real-time systems, low-power/wireless system design, full-stack system development, MIPS.

PROFESSIONAL EXPERIENCE

Research Assistant, **NEIS Lab, Purdue University, WL, IN, USA** 2024–Present

- Developed a novel respiration sensing system using mmWave radar and advanced AI that can accurately measure respiration rate of multiple moving subjects, enabling effective human and livestock health monitoring in harsh environments.
- Developed an end-to-end multimodal sensor fusion pipeline for complex behavior classification, providing detailed insights into design trade-offs across various system configurations to optimize cost and complexity for different use cases.
- Recruited, trained, and collaborated with 20+ people to annotate 20,000 RGB images and 300k seconds of data to create a large-scale multimodal dataset for animal identification and temporal behavior classification.

Research Assistant, **WISEST Lab, UW-Madison, Madison, WI, USA** 2021–2024

- Designed a novel wearable sensor tag 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 of the sensor tag that reduces the energy cost of RFID scanning by 15x, and engineered a long-range wireless power transfer system with a closed-loop control protocol, enabling the tag to run perpetually for years.
- Collaborated with a team of animal-science researchers to design and deploy a multi-node IoT network in an operational dairy barn, collecting and analyzing over 2000 hours of real-world data to successfully validate the system's performance.

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

- Designed a portable, 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 (media 🖼).
- 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.
- Managed a team of 10+ people to design, produce, and deploy 100 air-quality monitoring devices around Hanoi city.

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*.