

# 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

<b>Ph.D. in Electrical and Computer Engineering</b> <i>Purdue University, West Lafayette, Indiana, USA</i>	2024–2026 (expected)
<b>M.Sc. in Electrical and Computer Engineering</b> <i>University of Wisconsin–Madison (UW–Madison), Wisconsin, USA</i>	2021–2023
<b>B.Sc. in Electronics and Telecommunications Engineering</b> <i>Hanoi University of Science and Technology (HUST), Hanoi, Vietnam</i>	2014–2018

## 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

<b>Research Assistant, NEIS Lab, Purdue University, WL, IN, USA</b>	2024–Present
<ul style="list-style-type: none"><li>• Developed a novel respiration sensing system for multiple moving subjects using mmWave radar and advanced machine learning architectures, enabling effective human and livestock health monitoring in harsh environments.</li><li>• 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.</li><li>• 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.</li></ul>	
<b>Research Assistant, WISEST Lab, UW–Madison, Madison, WI, USA</b>	2021–2024
<ul style="list-style-type: none"><li>• 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.</li><li>• 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.</li><li>• 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.</li></ul>	
<b>Research Assistant, EC Lab, Soongsil University, Seoul, South Korea</b>	2019–2021
<ul style="list-style-type: none"><li>• 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 (📺).</li><li>• 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.</li><li>• 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 📺).</li><li>• 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 ▶).</li></ul>	
<b>Research Assistant, SPARC Lab, HUST, Hanoi, Vietnam</b>	2015–2018
<ul style="list-style-type: none"><li>• Developed a gyroscope-based balancing system using Linear-Quadratic-Gaussian regulator for two-wheel vehicles.</li><li>• Managed a team of 10+ people to design, produce, and deploy 100 air-quality monitoring devices around Hanoi city.</li></ul>	

## 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*.