Hien Vu

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Education

Purdue University, West Lafayette, Indiana, USA (expected) 2026
Ph.D. in Electrical and Computer Engineering
- Major area: Computer Engineering; Minor area: Computer Science
- Advisor: Dr. Younghyun Kim

University of Wisconsin–Madison, Madison, Wisconsin, USA 2023
M.Sc. in Electrical and Computer Engineering
- GPA: 3.82/4.00

Soongsil University, Seoul, South Korea 2020
M.S. in Computer Science
- GPA: 3.86/4.00

Hanoi University of Science and Technology, Hanoi, Vietnam 2018
B.Eng. in Electronics and Computer Engineering
B.Sc. in Electronics and Telecommunications Engineering

Professional Experience

Research Assistant, Purdue University, West Lafayette, IN, USA 2024–Present
- Working on radar-based wireless sensing mechanisms for dairy cattle health monitoring.
- Developed a multimodal sensing system including high-precision indoor localization, physiological monitoring, and ML-based computer vision for identification and tracking of dairy cattle.

Research Assistant, University of Wisconsin–Madison, Madison, WI, USA 2021–2024
- Developed a lightweight, non-invasive wearable ear tag to monitor dairy cattle body temperature in real-time for heat stress detection.
- Engineered a wireless power system that autonomously charges the tag during 10-minute milking sessions, enabling up to five days of continuous operation on a single charge.
- Fabricated and deployed seven prototype tags in a three-week field trial at UW-Madison's operational dairy barn, assessing real-world performance in cattle management.
- Collaborated with cross-disciplinary teams to ensure seamless integration of hardware, firmware, and data collection systems for accurate and continuous monitoring.

Research Assistant, 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 a bi-directional buck-boost control algorithm to ensure continuous system operation without interruptions.
- Developed pre-heating techniques for lithium battery in cold environments using a novel energy exchange process to balance temperature and state of charge without requiring cell characterization.
- Developed a high-speed, custom storage device using an FPGA controller and 512GB of SLC-NAND flash (with more than 1000 components), optimizing signal integrity and minimizing delay.
- Implemented an Extended Kalman Filter on a RISC-V MCU for pose tracking in augmented reality, processing data from a 9-DOF IMU integrated with Parallel Tracking and Mapping (PTAM).

Research Visitor, Seoul National University of Science and Technology, South Korea 2018
- Integrated CAN bus control for Li-ion batteries in electric vehicles

System Engineer, Interland Inc., Hanoi, Vietnam 2017
- Investigated sensing solutions for measuring dissolved oxygen in water

Research Assistant, Hanoi University of Science and Technology, Hanoi, Vietnam 2015–2018
- Developed a gyroscope-based balancing system for two-wheel personal vehicles
- Designed air pollution monitoring devices and deployed on a large scale

Skills

- **Machine Learning & AI:** ML-based computer vision, sensor data fusion, and real-time ML deployment.
- **Programming:** Advanced proficiency in Python (data analysis, ML, automation), C/C++ (embedded systems, real-time applications), MATLAB, Assembly (MIPS programming), and Verilog (ModelSim).
- **Embedded Systems:** microprocessor design, real-time systems, and sensor integration (RISC-V MCU).
- **Hardware Design:** High-speed/high-power/low-power systems design, wireless sensing systems.
- **Data Analysis & Simulation:** Physical system modeling, multimodal signal processing, MATLAB simulations.
- **Cross-Disciplinary Collaboration:** Worked with diverse teams to develop and deploy complex systems.

Publications

Wireless Sensing in Precision Agriculture

- Hien Vu, Omkar Prabhune, Unmesh Raskar, Dimuth Panditharatne, Hanwook Chung, Christopher Y. Choi, and Younghyun Kim. **MmCows: A Multimodal Dataset for Dairy Cattle Monitoring**. NeurIPS (the Conference on Neural Information Processing Systems), 2024. Spotlight paper, top 5% ratings, acceptance rate 25.3%.
- Hanwook Chung, Hien Vu, Younghyun Kim, and Christopher Y. Choi. **Subcutaneous temperature monitoring through ear tag for heat stress detection in dairy cows**. Biosystems Engineering, 2023.
- Hien Vu, Hanwook Chung, Christopher Y. Choi, and Younghyun Kim. **eTag: An Energy-Neutral Ear Tag for Real-Time Body Temperature Monitoring of Dairy Cattle**. ACM MobiCom (International Conference on Mobile Computing and Networking), 2023. Acceptance rate 24%.

Electrical Energy Storage Management

- Hien Vu and Donghwa Shin. **Simultaneous Internal Heating for Balanced Temperature and State-Of-Charge Distribution in Lithium-ion Battery Packs**. Journal of Energy Storage, 2023.
- Nhat-An Nguyen, Hien Vu, Massoud Pedram, and Donghwa Shin. **An Attachable Battery– Supercapacitor Hybrid for Large Pulsed Load**. IEEE Design & Test, 2022.
- Hien Vu and Donghwa Shin. **Scheduled Pre-heating of Li-ion Battery Packs for Balanced Temperature and State-of-charge Distribution**. MDPI Energies, 2020.

Control Systems Design

- Hien Vu, Nhan Tran, Loan Pham-Nguyen, and Huy-Dung Han. **LQG Regulator for Control Moment Gyroscope based Balancing System**. IEEE ICCE (International Conference on Communications and Electronics), 2018.

Fellowships and Awards

- **Young Fellowship** and **Travel Award**, ACM/IEEE Design Automation Conference 2023
- **NSF Travel Award**, International Conference on Mobile Computing and Networking 2023
- **Young Fellowship**, ACM/IEEE Design Automation Conference 2021