Hien Vu

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Research Interests

- ML-driven system design and signal processing for remote sensing
- Low-power wireless sensing
- Thermal management for Li-ion batteries

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

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

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

Professional Experience

2024–Present **Research Assistant**, Purdue University, West Lafayette, IN, USA
- Working on low-power wireless sensing mechanisms in precision agriculture
- Developing multimodal sensing techniques for health monitoring of dairy cattle

2021–2024 **Research Assistant**, University of Wisconsin–Madison, Madison, WI, USA
- Developed an energy-neutral ear tag for real-time heat stress detection in dairy cattle
- Optimized RFID backscattering for low-power wireless temperature measurement
- Integrated inductive resonant coupling for effective wireless power transfer

2019–2021 **Research Assistant**, Soongsil University, Seoul, South Korea
- Developed control strategies for internal heating of Li-ion batteries in cold conditions
- Designed a high-speed high-performance FPGA-based NAND flash storage system
- Engineered a flexible portable non-interrupt conformal wearable battery for military

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

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

2016 **Design Intern**, Viettin, Hanoi, Vietnam
- Developed IBM-based cloud solutions for automated indoor agriculture

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

Teaching & Mentoring Experience

Fall 2023 **ECE 399 Independent Study**, Research Mentor, UW-Madison, WI
- Project: Analyzing gas compounds for health monitoring of dairy heifers
- Helped an undergrad student develop a wireless sensor suite for measuring gases

Spring 2023 **ECE 399 Independent Study**, Research Mentor, UW-Madison, WI
- Project: Characterizing high-precision pressure sensor for monitoring dairy cattle
- Mentored an undergrad student in analyzing air pressure to detect standing behaviors

Fall 2022 **Undergraduate Research Scholars Program**, Research Mentor, UW-Madison, WI
- Project: Monitoring dairy cattle's comfort using integrated ear tags
- Helped an undergrad student to develop a low-power ear tag to measure ear flicks

Spring 2022 **ECE 315 Introduction to Microprocessor Lab**, Teaching Assistant, UW-Madison, WI
Fall 2021 **ECE 315 Introduction to Microprocessor Lab**, Teaching Assistant, UW-Madison, WI
Fall 2021 **ECE 210 Introduction in Electrical Engineering**, Teaching Assistant, UW-Madison, WI
Spring 2020 **Circuits Laboratory II**, Teaching Assistant, Soongsil University, Seoul, South Korea
Fall 2019 **Circuits Laboratory I**, Teaching Assistant, Soongsil University, Seoul, South Korea
Fall 2018 **Power Electronics**, Teaching Assistant, HUST, Hanoi, Vietnam

Presentations

May 2025 **Purdue OIGP Spring Reception**, Interdisciplinary Graduate Programs
• Title: Multimodal Sensing and Learning for Precision Livestock Farming

January 2025 **Purdue AI Fusion Poster Session**
• Title: Multimodal Sensing and Learning for Precision Livestock Farming

December 2024 **NeurIPS** (The Conference on Neural Information Processing System)
• Title: MmCows: A Multimodal Dataset for Dairy Cattle Monitoring

October 2024 **Purdue ECE Grad Student Symposium**
• Title: MmCows: Multimodal Sensing and Deep Learning Framework for Dairy Cattle Monitoring

August 2024 **ACM/IEEE ISLPED** (International Symposium on Low Power Electronics and Design)
• Title: eTag: An Energy-Neutral Ear Tag for Real-Time Body Temperature Monitoring of Dairy Cattle

March 2024 **NSF CPS PI Meeting** (Cyber-Physical Systems Principal Investigators' Meeting)
• Title: Mitigating Heat Stress in Dairy Cattle using a Physiological Sensing-Behavior Analysis-Microclimate Control Loop

October 2023 **UW–Madison Sustainability Symposium**
• Title: Sustainable Dairy Farming using Wearable Technology for Heat Stress Detection

October 2023 **ACM MobiCom** (International Conference on Mobile Computing and Networking)
• Title: eTag: An Energy-Neutral Ear Tag for Real-Time Body Temperature Monitoring of Dairy Cattle

July 2023 **ACM/IEEE DAC** (Design Automation Conference), Young Fellow Program
• Title: WisTag: An Energy-Neutral Wearable Sensor for Real-Time Animal Monitoring

December 2021 **ACM/IEEE DAC** (Design Automation Conference), Young Fellow Program
• Title: An Optimal Control Scheme for Hybrid Power System with Synchronous Buck Converter

Service

May 2025 Reviewer for NeurIPS (The Conference on Neural Information Processing System)

Media Coverage

Nov 9, 2023 Smart system keeps cows cool. Covered by Agri-View (link).

Oct 18, 2023 Mooooo's in distress? In the barn of the future, smart system will keep hot cows cool. Covered by UW-Madison News (link).

Skills

- **Machine Learning & AI:** ML-based computer vision, sensor data fusion, and real-time ML deployment.
- **Programming:** Python, C/C++, MATLAB, Assembly, and Verilog.
- **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.