

# Hien Vu

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## Research Interests

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- Low-power wireless sensing
- Thermal management for Li-ion batteries
- Hybrid electrical energy storage systems

## Education

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- 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

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### 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 Gyro-scope based Balancing System**. IEEE ICCE (International Conference on Communications and Electronics), 2018.

## Fellowships and Awards

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- 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

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- 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

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- 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

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- 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

## Media Coverage

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- 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

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- **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.