

Sravan Pannala, Ph.D.

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SUMMARY

Eight years of physics-based battery degradation and expansion modeling, sensor development, and state estimation at the University of Michigan Battery Control Lab. Seeking an industry R&D role applying predictive lifetime models and low-cost diagnostics to cell and pack design.

EXPERIENCE

Research Fellow, Battery Control Lab, University of Michigan Jan 2025 – Present

- Technical lead and proposal co-author on a \$206K MTRAC commercialization award; took an inductive expansion sensor from redesign to a fab-ready board with firmware, CAN integration, and on-cell temperature.
- Entrepreneurial Lead, NSF I-Corps Great Lakes (2026): 11 customer-discovery interviews.
- Built and validated a 20-channel formation rig: 99.95% logging completeness unattended, noise floor 21–380× below the signal, SNR 199–1,542× on first live measurements.
- Showed sensor response is 1.9× nonlinear over 0.15 in, where a linear fit misreads by up to 376 μm, and defined the calibration that replaced it.
- Built calendar-aging models for high-nickel cells under industry sponsorship; a new cation-mixing mechanism cut capacity-loss error 59% across 18 storage conditions.

Graduate Research Assistant, Battery Control Lab, University of Michigan Jun 2017 – Jan 2025

- Developed a physics-based model predicting capacity loss, resistance rise, and irreversible expansion from one consistent tuning; validated on unseen cycling conditions.
- Designed a \$50/channel inductive expansion sensor against a \$2,000/channel lab standard; instrumented 120 channels, 100+ cells over two years.
- Built accelerated aging simulation resolving intra-cycle degradation, cutting lifetime simulation from days to minutes; developed nonlinear state observers combining voltage, temperature, and expansion under aging-induced parameter uncertainty.

EDUCATION

Ph.D., Mechanical Engineering, University of Michigan 2025

M.S., Mechanical Engineering, University of Michigan 2019

B.Tech., Mechanical Engineering, Indian Institute of Technology Madras 2015

SKILLS

Modeling & simulation: PyBaMM, Reduced-order models, Degradation and lifetime modeling, State estimation

Programming: Python, MATLAB/Simulink, C/C++, Git, Linux

Data & ML: NumPy, pandas, SciPy, scikit-learn, JAX, PyTorch

Experimental & hardware: Battery cycling and characterization (EIS, HPPC, RPT), Expansion and pressure measurement, Sensor and fixture design

SELECTED PUBLICATIONS

Consistently tuned battery lifetime predictive model of capacity loss, resistance increase, and irreversible thickness growth. **S. Pannala**, H. Movahedi, T. R. Garrick, A. G. Stefanopoulou, et al. *JES* 171(1) 010532, 2024

Degradation and expansion of lithium-ion batteries with silicon/graphite anodes: Impact of pretension, temperature, C-rate and state-of-charge window. Z. Wan, **S. Pannala**, C. Solbrig, T. R. Garrick, et al. *eTransportation* 24, 2025

Low-cost inductive sensor and fixture kit for measuring battery cell thickness under constant pressure. **S. Pannala**, A. Weng, I. Fischer, J. B. Siegel, et al. *IFAC* 55(37), 2022 • **Best Paper Runner-Up**

Full record: scholar.google.com/citations?user=bgQ-6TcAAAAJ · 378 citations, h-index 10 (Aug 2026)

PATENTS

Accelerated battery lifetime simulations using adaptive inter-cycle extrapolation algorithm. US App. 18/122,361 (pending), 2023.

Detection of an internal short circuit in a battery. US 11,355,824 B2, 2022.

HONORS AND AWARDS

2025: Best Poster, Electric Vehicle Center Symposium, University of Michigan

2022: Best Paper Runner-Up, Modeling, Estimation and Controls Conference (MECC)

2021: Best Paper Runner-Up, Modeling, Estimation and Controls Conference (MECC)