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## EDUCATION

|                                                                                                            |                     |
|------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Doctor of Philosophy, Electrical and Computer Engineering</b><br><i>University of Windsor, ON</i>       | Sept 2023 – Present |
| <b>Master of Applied Science, Electrical and Computer Engineering</b><br><i>University of Windsor, ON</i>  | May 2019 – Dec 2021 |
| <b>Bachelor of Engineering, Electronics and Communication Engineering</b><br><i>Anna University, India</i> | Aug 2014 – Apr 2018 |

## WORK EXPERIENCE

|                                                                                                                                                                                                                                                                          |                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Doctoral Teaching and Research Assistant, BMS Lab</b><br><i>University of Windsor, ON</i>                                                                                                                                                                             | Sept 2023 – Present |
| <ul style="list-style-type: none"><li>◦ Ph.D. research centered on Li-ion battery modeling, state estimation, and control strategies to enhance the safety, performance, and reliability of energy storage systems.</li></ul>                                            |                     |
| <b>Full-time Research Assistant, BMS Lab</b><br><i>University of Windsor, ON</i>                                                                                                                                                                                         | Aug 2022 – Aug 2023 |
| <ul style="list-style-type: none"><li>◦ Led battery data planning, collection, and analysis in MATLAB to advance battery SOx estimation algorithms.</li><li>◦ Worked with a multidisciplinary research team to prototype a wireless battery management system.</li></ul> |                     |
| <b>Master's Teaching and Research Assistant, Mechatronics Lab</b><br><i>University of Windsor, ON</i>                                                                                                                                                                    | May 2019 – Dec 2021 |
| <ul style="list-style-type: none"><li>◦ Master's research centered on design and development of novel feature-based occupancy map-merging algorithm to improve autonomous multi-robot navigation.</li></ul>                                                              |                     |

## RECOGNITION & SCHOLARSHIPS

|                                                                                                                                     |          |
|-------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>Entrance Scholarship (CDN \$7500)</b><br><i>University of Windsor, Canada</i>                                                    | May 2019 |
| <b>Best Student Paper Award</b><br><i>2017 International Conference on Innovative Research in Engineering and Science, Thailand</i> | Jun 2017 |

## PROFESSIONAL MEMBERSHIPS & CERTIFICATIONS

|                                                                                                |                     |
|------------------------------------------------------------------------------------------------|---------------------|
| <b>Student Member</b><br><i>Institute of Electrical and Electronics Engineers (IEEE)</i>       | Sept 2023 – Present |
| <b>Professional Development Hours (PDH)</b><br><i>IEEE Educational Activities Certificates</i> | 2 PDH               |
| <b>Lithium Battery Safety</b><br><i>Lion Technology Inc.</i>                                   | Oct 2023            |

## MENTORING

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>Graduate Mentor, University of Windsor Formula Electric Team</b><br><i>University of Windsor, ON</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Jan 2023 – Present |
| <ul style="list-style-type: none"><li>◦ A humble part of an incredible journey — from battery module design (2023) to a fully functional EV battery pack (2025).</li><li>◦ Mentored a multidisciplinary undergraduate engineering team in the design and testing of a high-performance EV battery pack and battery management system.</li></ul>                                                                                                                                                                                                                                                                                        |                    |
| <b>Graduate Mentor, University of Windsor Capstone Teams</b><br><i>University of Windsor, ON</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Jan 2023 – Present |
| <ul style="list-style-type: none"><li>◦ FSAE Accumulator Design (2025) — Ali Elshikh, Zuhair Abdo, Sahana Jayatilaka, Jared Brouerius Van Nidek</li><li>◦ SOH Indicator for a Battery Fuel Gauge (2024) — Sam Letwin, Nicolas Manzon, Andy Garro</li><li>◦ Power System Modeling for the Formula Electric Team (2023) — Saad Arshad, Shaan Batra, Aleks Dejanovic, Luka Tojcic</li><li>◦ Ionic Wind Pump for Battery Cooling (2023) — Sabreen Elastal, Asra Kala, Simrat Poonia, Matthew Aguilar, Boron Al-Diraie</li><li>◦ Active Cell Balancing for an EV Battery Pack (2023) — Justin Haddad, Luca Mannarino, Nick Nguyen</li></ul> |                    |

## SYNERGISTIC ACTIVITIES

|                                                                                                                                                      |                |
|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <b>Conference Judge, UWill Discover Student Research Conference</b><br><i>University of Windsor, ON</i>                                              | Mar 2026       |
| <b>Peer Reviewer (9 Reviews for 4 Journals)</b><br><i>Journal of Energy Storage (4), Journal of Power Sources (3), Measurement (1), MethodsX (1)</i> | 2023 – Present |

## PUBLICATIONS

### Journals:

- [J6] Sunil, S., Pattipati, K.R., and Balasingam, B. (Under Review). Multiple-Model Adaptive Equivalent-Circuit Identification for Li-ion Batteries via Two-Stage Least Squares. *IEEE Transactions on Industrial Electronics*.
- [J5] Sunil, S., Sundaresan, S., Pattipati, K.R., and Balasingam, B. (Under Review). The Role of Open-Circuit Voltage Characterization in Model-Based Capacity Estimation. *IEEE Transactions on Instrumentation and Measurement*.
- [J4] Sunil, S., Pillai, P., Pattipati, K.R., and Balasingam, B. (2025). Two-Stage Least Squares for Equivalent-Circuit Parameter Estimation of Lithium-Ion Batteries Using Pulse-Relaxation Excitation. *IEEE Transactions on Instrumentation and Measurement*.
- [J3] Pillai, P., Desai, S., Sunil, S., Pattipati, K.R., and Balasingam, B. (2025). Least Squares Approach to Improve Standardized Estimation of OCV and Internal Resistance in Batteries. *IEEE Journal of Emerging and Selected Topics in Industrial Electronics*.
- [J2] Sunil, S., Pattipati, K.R., and Balasingam, B. (2025). Piecewise Linear Approximation of Battery Open-Circuit Voltage Characteristics Using Dynamic Programming. *IEEE Transactions on Instrumentation and Measurement*.
- [J1] Sunil, S., Mozaffari, S., Singh, R., Shahrrava, B., and Alirezaee, S. (2023). Feature-Based Occupancy Map-Merging for Collaborative SLAM. *Sensors*, 23(6), 3114.

## Conferences:

- [C11] Sunil, S., and Balasingam, B. (Accepted). An Objective Performance Evaluation of the LSTM Classifier in Time Series Classification. *2026 29th International Conference on Information Fusion*.
- [C10] Sunil, S., Pattipati, K.R., and Balasingam, B. Improved Linear Estimation of Battery Open-Circuit Voltage and RC Model Parameters from Pulse-Relaxation Data. *2025 IEEE 4th Industrial Electronics Society Annual On-Line Conference (ONCON)* (pp. 1–6).
- [C9] Nguyen, N., Sunil, S., Pillai, P., and Balasingam, B. An Offsetting-Based Correction to Improve the Accuracy of Low-Rate OCV Curves for Lithium-Ion Batteries. *2025 IEEE 34th International Symposium on Industrial Electronics (ISIE)* (pp. 1–6).
- [C8] Mahmoodzadeh, M., Sunil, S., Pillai, P., Biondi, F., Strayer, D.L., Cooper, J.M., McDonnell, A.S., and Balasingam, B. Temporal Analysis of Cognitive Workload During Manual and Partial Driving Automation Based on the Detection Response Task. *2025 IEEE 34th International Symposium on Industrial Electronics (ISIE)* (pp. 1–5).
- [C7] Sundaresan, S., Sunil, S., Balasingam, B., and Pattipati, K.R. Joint Estimation of Open-Circuit Voltage and Equivalent Circuit Model Parameters Using State-Space Model Optimization. *2023 IEEE Transportation Electrification Conference & Expo (ITEC)* (pp. 1–6).
- [C6] Sunil, S., Sundaresan, S., Pillai, P., and Balasingam, B. Inverse Characterization of Open-Circuit Voltage for State-of-Charge Estimation of Batteries. *2023 IEEE Transportation Electrification Conference & Expo (ITEC)* (pp. 1–6).
- [C5] Sunil, S., Balasingam, B., and Pattipati, K.R. State-of-Charge Estimation of Batteries Using the Extended Kalman Filter: Insights into Performance Analysis and Filter Tuning. *2022 IEEE 1st Industrial Electronics Society Annual On-Line Conference (ONCON)* (pp. 1–6).
- [C4] Sunil, S., Mozaffari, S., Singh, R., Shahrrava, B., and Alirezaee, S. LiDAR-Based Cooperative SLAM with Different Parameters. *2022 7th International Conference on Mechanical Engineering and Robotics Research (ICMERR)* (pp. 82–87).
- [C3] Sundaresan, S., Sunil, S., Balasingam, B., and Pattipati, K.R. Fast Offline Battery Capacity Estimation Approach with Performance Bounds. *2022 IEEE Electrical Power and Energy Conference (EPEC)* (pp. 188–193).
- [C2] Sunil, S., Sundaresan, S., Balasingam, B., and Pattipati, K.R. Novel Table-Based Kalman Filter for State-of-Charge Estimation of Batteries. *2022 IEEE Electrical Power and Energy Conference (EPEC)* (pp. 200–205).
- [C1] R Dhaya, T. R. Nirmal, M. Sudharsun, S. Sunil, D. Kanthavel (Best Student Paper Award). Resourceful and Proficient Exploitation of MDYMO in Mobile Adhoc Networks. *2017 International Conference on Innovative Research in Engineering and Science (IRES)*

## Theses:

- [T2] S. Sunil. “Heterogeneous Collaborative Mapping for Autonomous Mobile Systems”, *University of Windsor*, Canada, Jan. 2022.
- [T1] S.R. Abhirami, S. Sunil, R. Subashini, K. Venkatesh. “LISI: Language Interpreter for Speech Impaired”, *Anna University*, India, Apr. 2018.