

Clement Wong

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Education

University of Michigan

PhD Candidate, Mechanical Engineering

Ann Arbor, MI

Sept 2021 - Feb 2026

- **Advisor:** Anna Stefanopoulou
- **Research focus:** Modeling and Methods for Assessing Health and Safety for Grid-Connected Battery Systems

Carnegie Mellon University

B.S. in Mechanical Engineering, double major in Engineering and Public Policy

Pittsburgh, PA

May 2015 - May 2019

- Graduated with University and College of Engineering Research Honors
- **Advisor:** Venkat Viswanathan
- **Awards:** Undergraduate Excellence in Research Award | Tau Beta Pi | Dean's List | Summer Undergraduate Research Fellowship

Work Experience

Toyota Research Institute (Energy & Materials and Human-Centered AI teams)

Los Altos, CA

Research Scientist Intern – Vehicle-to-Grid (V2G) & Battery Health

July 2024 – December 2024

- Analyzed real-world driving data from 300+ EVs to design user-centric V2G strategies that minimize driver behavior change, reduce battery degradation, and maximize compensation
- Applied k-means clustering to distill 300+ EV usage profiles into 4 representative driving archetypes critical for V2G feasibility analysis
- Simulated the degradation impacts of V2G participation across driver behaviors and Li-ion battery designs
- Developed a web app (simv2g.hcai.tri.global) enabling drivers to visualize V2G schedules, financial benefits, and battery-health impacts
- **Skills:** Python, Li-ion Battery Modeling, Machine Learning, Optimization, Software Development.

Research Experience

Algorithm Development & Modeling for Grid-Connected Battery Systems (with LG Energy Solutions's Battery AI Diagnostics team)

Ann Arbor, MI

University of Michigan

June 2022 – Feb 2026

- Analyzed operational field data from 25 grid-scale ESS modules with 1 Hz measurements up to 180 days to study module-level fault signatures
- Developed algorithms that extract features from operational data to characterize the health of parallel-connected cell groups in the modules
- Applied Gaussian Process regression to decouple operating-condition effects on health metrics and quantify uncertainty in feature estimation
- Statistically evaluated each health feature's diagnostic power to distinguish the faulty parallel-connected cell groups within modules
- **Skills:** Python, MATLAB, Li-ion Battery Diagnostics & Modeling, Machine Learning & Statistical Testing, Uncertainty Quantification

Modeling & Diagnostics for Imbalanced Parallel-Connected Cells

Ann Arbor, MI

University of Michigan

June 2022 – Feb 2026

- Developed scalable physics-based models for nP cell groups to simulate internal current and group voltage caused by cell-level imbalance
- Developed a physics-based algorithm to quantify imbalances in parallel-connected cell groups from noisy group-level voltage and current
- Validated algorithm's robustness with Monte Carlo simulations and experimental results
- **Skills:** Python, MATLAB, Li-ion Battery Diagnostics & Modeling, Algorithm Development & Validation

Autonomous Robot for Battery Electrolyte Discovery (with Toyota Research Institute)

Pittsburgh, PA

Carnegie Mellon University

June 2018 - May 2019

- Developed an autonomous robot that optimizes electrolyte design for batteries using Bayesian optimization.
- Designed and implemented control software with a REST API to link robot with machine learning software.
- **Skills:** Python, Data Analysis & Machine Learning, Software Development

Teaching Experience as Graduate Student Instructor

Lithium Battery Engineering and Lifetime Management Course

Ann Arbor, MI

University of Michigan

Aug 2025 – Dec 2025

- Instructed a 50-student course on battery systems, covering equivalent circuit modeling, pack design for mobile/stationary applications, BMS overview, and lifetime degradation factors

Battery Systems and Control Course

Ann Arbor, MI

University of Michigan

Jan 2025 – May 2025

- Instructed a 65-student course on Battery Management Systems, focusing on system-level modeling, model-based state estimation (SOC, SOH), and diagnostic methodologies for automotive and grid-storage applications

Journal Papers

The potential and viability of V2G for California BEV drivers

C. Wong, A. E. Trewartha, S. B. Torrisi, A. L. S. Filipowicz

Manuscript prepared for submission (2026). 2026

Quantifying imbalances in parallel-connected cell groups using group voltage and current

C. Wong, A. Weng, H. Movahedi, J. Choi, S. Y. Yang, H. Jin, J. B. Siegel, A. Stefanopoulou

Journal of Energy Storage 150 (2026) p. 120507. 2026

Health feature extraction from real-world BESS field fault data

C. Wong, A. Weng, J. B. Siegel, A. G. Stefanopoulou

Submitted for publication (2026). 2026

Current Imbalance in Dissimilar Parallel-Connected Batteries and the Fate of Degradation Convergence¹

A. Weng, H. Movahedi, **C. Wong**, J. B. Siegel, A. Stefanopoulou

Journal of Dynamic Systems, Measurement, and Control 146.1 (2024) p. 11106. 2024

Challenges of a Fast Diagnostic to Inform Screening of Retired Batteries

J. A. Drallmeier, **C. Wong**, C. E. Solbrig, J. B. Siegel, A. Stefanopoulou

IFAC-PapersOnLine 55.24 (2022) pp. 185–190. 2022

Conference Papers

SimV2G: Personalized Interface to Simulate and Promote Vehicle-to-Grid Participation

C. Wong, J. Q. Li, A. Trewartha, S. B. Torrisi, A. L. S. Filipowicz

Adjunct Proceedings of the International Conference on Automotive User Interfaces and Interactive Vehicular Applications (AutoUI), 2025

V2G Validation: A Concept Validation Study of UI Features to Promote Vehicle-to-Grid Adoption

M. P. Van, **C. Wong**, D. A. Shamma, C. Hogan, M. L. Lee, A. L. S. Filipowicz

Adjunct Proceedings of the International Conference on Automotive User Interfaces and Interactive Vehicular Applications (AutoUI), 2025

Differential Voltage Analysis and Patterns in Parallel-Connected Pairs of Imbalanced Cells

C. Wong, A. Weng, S. Pannala, J. Choi, J. B. Siegel, A. Stefanopoulou

American Control Conference (ACC), 2024, Toronto, Canada

Impact of Pretension and Cycling Window on Degradation of Graphite/Silicon Composite Anodes

Z. Wan, S. Pannala, H. Movahedi, **C. Wong**, C. Solbrig, J. B. Siegel, A. Stefanopoulou

ECS Meeting Abstracts, 2024

Voltage Differential Analysis during Power Discharge Operation in Energy Storage Systems

C. Wong, J. B. Siegel, A. Stefanopoulou

ECS Meeting Abstracts, 2023