# Ying Kung

Personal Website: https://phd-portfolio-jw42.vercel.app/ Tel: (+886)976976829 | Email: evan08292001@gmail.com


## EDUCATION

**National Taiwan University (NTU)** Taiwan
Master in applied mechanics Aug 2023 – Jul 2025
GPA: 3.62
Relevant courses: Applications of Deep Learning in Science and Engineering; Principles and Experiments of Mechatronic Systems; Stochastic Control; Electronics Laboratory

**National Yang Ming Chiao Tung University (NYCU)** Taiwan
B.S. in Civil Engineering Aug 2019 — Jul 2023

## RESEARCH INTERESTS

Battery state analysis, electrochemical parameter estimation, and predictive modeling for energy systems; applications of artificial intelligence in robotics, autonomous systems, and electric vehicles

## PUBLICATIONS

- **Ying Kung**, Yu-Hong Zhang, Chi-Jyun Ko, & Kuo-Ching Chen (2024). Predicting the onset of lithium plating by the full-cell voltage: A pseudo-P curve approach. Under review, *Energy Storage Materials*

## CONFERENCE PRESENTATIONS

- **Ying Kung**. Onset prediction of lithium plating from full-cell voltage and its application to charging strategies. Accepted for presentation at the 35th Annual Conference on Combustion and Energy, National Tsing Hua University, Taiwan, *May, 2025.*
- **Ying Kung**. Frequency-specific modeling for battery parameter identification under battery aging. Submitted to the 2025 International Conference on Green Energy Technologies – National Cheng Kung University, Taiwan, *scheduled for Nov, 2025.*

## RESEARCH PROJECTS

**Concrete Boat Design and Fabrication Project**
*Undergraduate Capstone Project | Dept. of Civil Engineering* NYCU, Jan 2023 – Jun 2023

- Designed and built a functional concrete boat inspired by international collegiate competitions.
- Performed buoyancy and structural calculations; created CAD models in Rhino and Fusion 360.
- Produced molds via 3D printing and polystyrene cutting; developed custom concrete mix for high workability.

**Research on Lithium Plating Onset Prediction and Charging Strategy Optimization**
*Graduate Research | Advisor: Prof. Kuo-Ching Chen* NTUIAM, Nov 2024 – Apr 2025

- Developed a pseudo-P curve method to detect lithium plating onset in LIBs from full-cell voltage only, eliminating the need for reference electrodes.
- Validated the method via PyBaMM simulations at 0 °C, achieving onset prediction errors within 3.44% of total capacity.
- Designed multi-stage constant-current step-charging protocols that completely prevent lithium plating, reaching 99.72% Coulombic efficiency at 0 °C.
- Evaluated charging strategies across various C-rates and initial SOCs, providing guidelines for safe and efficient operation.

**Frequency-Specific Modeling for Battery Parameter Identification Under Aging**
*Graduate Research | Advisor: Prof. Kuo-Ching Chen* NTUIAM, May 2025 – Present

- Developed a physics-informed, segment-specific ML framework for estimating electrochemical parameters from partial Electrochemical Impedance Spectrum (EIS) measurements without current–voltage history.
- Applied two-stage Sobol sensitivity analysis to identify the most sensitive parameters in each frequency band, enabling targeted regression.
- Trained compact Transformer models on 20,000 simulated samples per band, achieving $<1\%$ MAPE for SOH $\geq 75\%$ and $<3\%$ under severe aging, with inference time of $\approx 0.3$ s.
- Reduced computation cost by 5 orders of magnitude compared to full-spectrum GA inversion, enabling real-time onboard BMS parameter identification using 9–19 frequency points.

## AWARDS & SCHOLARSHIPS

- Honorable Mention, Student Paper Competition, 35th National Conference on Combustion and Energy May 2025
- Dean's Award, College of Engineering, National Taiwan University Aug 2025

## SKILLS & INTERESTS

- **Languages:** Mandarin Chinese (native), English
- **Programming & Data Analysis:** Python (NumPy, Pandas, scikit-learn, Matplotlib), MATLAB, PyTorch
- **Software and Tools:** COMSOL, LaTeX, Excel
- **Interests:** Fitness, Gaming, Culinary exploration