Jacob Florian

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RESEARCH EXPERIENCE

Stanford University: Zhenan Bao Group — Stanford, CA
Electrolyte design and advanced characterization techniques for Li-ion and Li-metal batteries — *Jan. 2023 – Present*

- Designed a thin, flexible reference electrode for *in situ* Li potential tracking in coin/pouch cells; integrated without disrupting stack pressure and maintained baseline performance (capacity retention within 1%, impedance drift <0.5%).
- Developed a transport/interphase framework to quantify solvent-assisted ion transport and interfacial resistance.
- Led multi-site collaborations (Oak Ridge, SLAC, Germany; Bao/Cui groups), accelerating validation and manuscript-ready datasets.

University of Cambridge: Jacqui Cole Lab — Cambridge, UK
Molecular catalyst discovery for CO_2 reduction — *Oct. 2021 – Aug. 2022*

- Built a descriptor-based screening workflow for Mn CO_2 reduction catalysts; identified top candidates with 10% higher predicted selectivity and 50% higher activity.
- Used DFT to map mechanisms/energetics, isolating rate-limiting steps and proposing tuning strategies for overpotential reduction.

Zebra Technologies — Lincolnshire, IL
Supplies R&D Intern — *May 2021 – Aug. 2021*

- Investigated two-phase nanoparticle designs for activatable environmental sensors, defining activation thresholds and stability targets across 20 prototypes.
- Modeled and validated RF loss/multipath in factory and office settings; reduced read errors by 90%.
- Improved read-range estimates for Zebra RFID antennas by up to 60%.

Northrop Grumman: Multidisciplinary Design Project — Ann Arbor, MI
In Situ Martian Additive Manufacturing — *Jan. 2019 – Dec. 2019*

- Demonstrated in situ resource utilization by extracting alumina from simulated Martian regolith (Mars-like soil) and 3D-printing test parts as proof-of-concept.
- Designed a high-purity alumina extraction process, increasing purity from 40% to 90% with comparable reagent usage; improved yield by 50%
- Presented results to NASA stakeholders and at the International Astronautical Congress (Washington, D.C.).

University of Michigan Chemical Engineering: Goldsmith Lab — Ann Arbor, MI
V^{2+}/V^{3+} Redox Kinetics for Vanadium Redox Flow Batteries — *Sept. 2018 – Aug. 2021*

- Simulated V^{2+}/V^{3+} redox kinetics with quantum methods, improving kinetic parameters for flow-batteries
- Predicted UV–Vis spectra via time-dependent DFT to support experimental peak assignment and species identification.

EDUCATION

Stanford University — Stanford, CA
Ph.D. Candidate in Chemical Engineering — *Nov. 2022 – Present*

- NSF Graduate Fellowship

University of Cambridge — Cambridge, UK
M.Phil. in Physics — *Sept. 2022*

- Churchill Scholarship

University of Michigan — Ann Arbor, MI, US
B.Sc. in Chemical Engineering (Honors); Minor in Mathematics — *Apr. 2021*

SELECTED PUBLICATIONS

- Florian, J., et al. "Revealing Solvent-Assisted Li+ Transport in the Solid Electrolyte Interphase operando", *J. Am. Chem. Soc.*, 2025
- Florian, J., et al. "A Simply Fabricatable Reference Electrode for Studying Li Metal Interfaces", *ACS Energy Letters*, 2026
- Florian, J., et al. "Why Halides Enhance Heterogeneous Metal Ion Charge Transfer Reactions", *Chemical Science*, 2021

SKILLS

Technical: Python, Pytorch, Molecular dynamics Simulation and modeling, Electrochemistry techniques, Materials characterization.

Languages: English (Native), Czech (Native).