BENJAMIN LAM

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Education

University of California, Berkeley *Dec 2024*

MS in Materials Science Engineering, **GPA: 3.97**

- Courses: **Thermodynamics, X-ray diffraction**, Additive Manufacturing, Bonding theory, **Inorganic chemistry**, Materials characterization (TEM, SEM), Model predictive control

University of California, Irvine *Jun 2022*

BS in Mechanical Engineering and Materials Science Engineering (Double Major)

- **Major GPA: 4.00, Cumulative GPA: 3.98**, Dean's Honor List (All quarters), Graduated Summa Cum Laude
- Courses: **Materials failure**, **Fuel cells**, Solar energy, Intro to control systems, Thermodynamics, Heat Transfer, Fluid mechanics

Skills

Materials Science: **XRD, SEM/EDS, ICP-OES/MS**, EIS, TGA/DSC, Aqueous Chemistry, Battery Cell Cycling, 3+ years Chem. Lab Experience
Electrical/Programming: **MATLAB (4+ years), Python**, JavaScript, HTML, C++, JAVA, PCB Prototyping, Oscilloscope
Mechanical: SolidWorks (CSWA Certified), Autodesk Fusion 360, Autodesk CFD, Basic shop experience

Work Experience

Ceder Group (UC Berkeley) *Aug 2022 – Present*

Research Assistant

- Research on degradation mechanism of Li-NASICON solid-state Lithium conductors in alkaline environments using time-resolved **XRD, SEM/EDS, ICP-OES** experiments, results contextualized with DFT surface simulations and **Pourbaix diagrams** to uncover **root cause failure mode of cell, eliminates viability of phosphate chemistries**. Data analysis performed with **MATLAB** [In-review to ***Advanced Energy Materials***]
- Research on Li-Garnet **solid-state conductors** in aqueous environments. **Thermodynamics** used to design materials more resistant to Li-extraction to maintain good ionic conductivity
- **Automatic SEM/EDS image processing** (MATLAB) tool made large datasets (>200 scans) able to be evaluated. Utilized Hough transform to identify scale bars and linescans for formatting
- Building custom Li-air battery test system controlled with **Flask/Python/I²C** to cycle cells in PID-controlled relative humidity/gas composition. Performed **mechanical design of Swagelok-type cell** (Fusion 360) for airtight sealing, assembly/control of electronic sensors and actuators, and all software (Python, C++, Javascript, HTML) [Github]
- Led coordination between three research groups facilitating collaboration; set up new experimental SOP and equipment for new project (Li-air)

ASML *Jun 2021 – Sep 2021*

Intern, Droplet Generator

- **Data analysis of in-field** tin droplet generator performance (**Python**): Developed functions to flag heat cycling anomalies indicating **oxide formation and subsequent failure**. These were integrated into the **new dashboard** for engineers
- Failure analysis for droplet generator; corresponded with external lab to investigate mechanism of tin-oxide formation

Bowman Lab (UC Irvine) *Apr 2021 – Jun 2022*

Student Researcher

- **EIS data processing** (MATLAB) library developed for automated nonlinear curve fitting of EIS datasets (> 300 datasets), contributed to **2 papers**: [***ACS Applied Nano Materials*** (2023)] [***Advanced Functional Materials*** (2024)]
- Research on novel **co-precipitation synthesis** method of metal-nitrate coated ceramic powders for direct-air carbon capture

UCI Solar Car *Apr 2019 – Sep 2020*

Battery/High Voltage Team Lead

- Mechanical design of **battery enclosure box**, cell mounting structures (**Solidworks**), air-cooling simulations (Autodesk CFD)
- Oversaw and managed system-level design of high-voltage component interaction (motor, solar panel, battery)

Projects

- *Microfluidic valve design:* Made **new valve design** with truncated valve floor helps improve size variation of generated droplets (down to σ = 1%, **3x improvement in droplet consistency**) [***Micromachines*** (2022)]
- *Computer vision script (MATLAB, Arduino):* Used **image processing** techniques with a digital microscope video stream to track the volume of fluid pumped (< 1µL) by a microfluidic valve over time