

# BENJAMIN LAM

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## Education

### University of California, Berkeley

Dec 2024

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

- Courses: **Model predictive control**, Signals and systems, **Additive Manufacturing**, Thermodynamics, X-ray Diffraction, Materials characterization (TEM, SEM), Bonding Theory, Inorganic chemistry

### 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: **Intro to control systems**, Thermodynamics, Heat Transfer, Fluid mechanics, **Materials failure**, Fuel cells, Solar energy

## Work Experience

### Ceder Group (UC Berkeley)

Aug 2022 – Present

Research Assistant

- Building custom Li-air battery **test system** controlled with **Flask/Python/I<sup>2</sup>C** 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. Adds Li-air battery test capabilities to our lab (Python, C++, Javascript, HTML) [[Github](#)]
- Research on degradation mechanism of Li-NASICON solid-state Lithium conductors in alkaline environments using time-resolved XRD, SEM/EDS, ICP-OES experiments, data analysis performed with **MATLAB**. Results contextualized with DFT surface simulations and Pourbaix diagrams to **uncover root cause failure mode of cell, eliminates viability of phosphate chemistries**. [In-review to **Advanced Energy Materials**]
- **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.
- Led coordination between three research groups facilitating collaboration; set up new experimental SOP and equipment for new project (Li-air) to enable our lab to have aqueous chemistry capabilities

### 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, which were integrated into the **new dashboard** for engineers to view events indicating oxide formation and subsequent failure
- Failure analysis for droplet generator; corresponded with external lab to investigate mechanism of tin-oxide formation

### Hui Lab (UC Irvine)

Aug 2020 – May 2021

Student Researcher, Microfluidics

- Developed a simulated model for a **microfluidic valve**. **Made new valve design** with truncated valve floor helps improve size variation of generated droplets (down to  $\sigma = 1\%$ , **3x improvement**) [[Micromachines \(2022\)](#)]
- Created PCB for solenoid array controller to provide pressure regulated vacuum source for microfluidic chip testing

### UCI Solar Car

Apr 2019 – Sep 2020

Battery/High Voltage Team Lead

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

## Projects

- **EIS data processing (MATLAB)**: Custom MATLAB library developed for nonlinear curve fitting of EIS datasets (> 300 datasets), contributed to **2 papers**: [[ACS Applied Nano Materials \(2023\)](#)] [[Advanced Functional Materials \(2024\)](#)]
- **Computer vision script (MATLAB, Arduino)**: Used **image processing** techniques with a digital microscope video stream to track the volume of fluid pumped (< 1 $\mu$ L) by a microfluidic valve over time

## Skills

**Mechanical: SolidWorks (CSWA Certified)**, Autodesk Fusion 360, Autodesk CFD, Basic shop experience

**Electrical/Programming: MATLAB (4+ years)**, Python, JavaScript, HTML, C++, JAVA, PCB Prototyping, Oscilloscope

**Materials Science: XRD, SEM/EDS, ICP-OES/MS, EIS, Aqueous Chemistry, Battery Cell Cycling, 3+ years Chemical Lab Experience**