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, Materials characterization

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/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]
- 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***]
- **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)

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

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 σ = 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 (< 1µL) by a microfluidic valve over time
- *Automated Expense Tracking (JavaScript, Siri shortcuts):* Tracks credit card expenses by reading text messages and recording to spreadsheet with the Google Sheets API

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