

# Shengnan Liu

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## Education: Graduate and Undergraduate

### **University of California, Santa Barbara (UCSB)**

**Major:** *Master of Science in Computer Science* | **Cumulative GPA:** 3.75/4.00

Santa Barbara, California

Sep. 2024 - June, 2026 (Expected)

**Relevant Courses:** Artificial Intelligence, Reinforcement Learning, Quantum Computing, Security in Machine Learning and Post-Quantum Cryptography, Combinatorial Algorithms, Software Foundations, Computational Geometry, Graph Theory, Graph Neural Networks, Computer Graphics

**Personal Webpage:** <https://dolloading906.github.io/My-Personal-Webpage/>

### **University of California, Santa Barbara (UCSB)**

**Major:** *Bachelor of Science in Mathematics* | **Cumulative GPA:** 3.76/4.00

Santa Barbara, California

Sep. 2020 - June, 2024

**Minors:** Statistics and Data Science; Spatial Science

**Honor:** UCSB College of Letters & Science Dean's Honors during Spring 2024, Winter 2024, Fall 2023, Fall 2022, Spring 2021, Winter 2021

**Relevant Courses:** Linear Algebra, Abstract Algebra, Real and Complex Analysis, Linear and Non-linear Optimization, Graph Theory, Topology, Differential Geometry, Euclidean and Non-Euclidean Geometry, Number Theory, Data Structure, Data Management, Web Design, Linear Regression, Statistical Machine Learning, Stochastic Process, Remote Sensing

## Skills

- **Programming Languages:** Python, JavaScript, Java, C++, C, SQL, R, MATLAB
- **Frameworks:** React, Node.js, Flask, FastAPI, Express
- **Tools & Platforms:** GitHub, VS Code, Git, Figma, PyCharm Community, API Gateway, R-Studio, MySQL, Jupyter Notebook, QGIS, Overleaf, MATLAB, Microsoft Excel, Microsoft Word, Microsoft PowerPoint

## Project Experience

### **“ezLoop”- Mobile App Development (Ongoing Group Project)**

September, 2024 – Current

- Designed UI/UX in **Figma** for Settings, Product Detail, Saved Collection, Login, and Checkout; built component variants, defined the icon library, and exported assets for hand-off
- Implemented front-end pages in **React Native (Expo)** using **VS Code**, writing **JavaScript** and **JSON** configs for navigation/routes and screen states; added a small JSI-based C++ native module to offload compute-heavy utilities used by Product Detail/Saved screens
- Polished layouts by standardizing spacing/typography, aligning colors and iconography to **Figma**, and fixing iOS breakpoint/layout bugs
- Integrated Firebase Auth (email/password) for sign-up/sign-in and session persistence
- Built **Firebase** data layer with real-time listeners and queries; modeled collections for users, products, carts, and saved items to enable live updates across screens
- Implemented product-management APIs and flows (create/read/update/delete, listing, search/sort) and synchronized UI with **Firebase** with payload validation and robust loading/error states
- Localized the UI with i18next (English/Chinese), externalizing strings to **JSON** and auto-selecting language based on device settings
- Collaborated with an 8-member cross-university team via **Git/GitHub** (branching, pull requests, code reviews) and lightweight Agile sprints to plan features and track progress
- Goal: enable international students in North America to buy and sell second-hand furniture and daily necessities

### **Biometric Indicators of Heart Failure (Group Project)**

Santa Barbara, California, USA

Instructor: Saad Mouti, Visiting Assistant Professor at UCSB

April, 2023 – June, 2023

- Analyzed the dataset, visualized the distributions of variables in the dataset, and selected variables of interest for further statistical analysis in **R-Studio**
- Built simple linear regression model and conducted hypotheses testing as well as t-test in **R-Studio**
- Built multiple linear regression model, conducted F-test, and derived confidence and prediction intervals in **R-Studio**
- Performed Lasso and Ridge regression to test for collinearity between predictors in **R-Studio**
- Performed weighted least squares method to explore whether a model with a higher explainability could be built in **R-Studio**

## Research Experience

### **Extending Online Policy Optimization Algorithm to Manifolds (Individual Research)**

Santa Barbara, California, USA

Instructor: James Preiss, Assistant Professor at UCSB

March, 2025 – June, 2026 (Expected)

- (In progress) Developing a differential-geometric theoretical framework for M-GAPS, adapting and extending assumptions and results from two prior lines of work on online policy optimization and contractive perturbations, and introducing new results where necessary
- Derived a standalone Memoryless Gradient-based Adaptive Policy Selection (M-GAPS) (known-model, no residuals/perturbations) by isolating the policy-update mechanics from two prior frameworks, “*Online Policy Optimization in Unknown Nonlinear Systems*” and “*Online Adaptive Policy Selection in Time-Varying Systems No-Regret via Contractive Perturbations*,” achieving O(1) memory with local-regret comparable to GAPS in **Overleaf**

- Structured a comprehensive differential geometry document for educational purposes and for extending M-GAPS to manifolds in **Overleaf**
- Connected with authors from two prior frameworks to discuss potential typos and issues in those papers

## Work Experience

### EVE Energy Co., Ltd.

*Analyst in Lean Lab, Engineer in Quality Research Office*

Huizhou, Guangdong, China

*July, 10<sup>th</sup>, 2023 – Sep., 12<sup>th</sup>, 2023*

- Learnt data collection on factory machines, built corresponding data frames and analyzed the data in **R-Studio**
- Calculated the premium product yield rate and “monetary yield rate” in **Excel** to report whether each factory is in profit or loss based on given computing algorithm and datasets
- Developed a more accurate algorithm for “monetary yield rate” to more precisely assess factory performances
- Applied **Excel** formulas to calculate “continuous excellence date” of all manufacturing processes and used **Python** to obtain the distribution of product deficiency amounts to report which processes need specialized improvements
- Applied **Excel** formulas to determine the existence of error in data transformation across different documents
- Repaired broken **Excel** forms so that future data can be more precisely and efficiently recorded and analyzed
- Participated in the optimization of Work In Process (WIP) management by offering theoretical algorithms and analysis
- Analyzed and optimized the raw material claiming rules using **Python**
- Fixed miswording, format and printing errors, and English authenticity issue of signage inside various factories