

Shengnan Liu

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Education: Graduate and Undergraduate

University of California, Santa Barbara (UCSB)

Santa Barbara, California

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

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

University of California, Santa Barbara (UCSB)

Santa Barbara, California

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

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 **Firestore** 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 **Firestore** 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.

Huizhou, Guangdong, China

Analyst in Lean Lab, Engineer in Quality Research Office

July, 10th, 2023 – Sep., 12th, 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