LILY YANG

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EDUCATION

University of California, Berkeley | B.S. Engineering Mathematics & Statistics | GPA: 4.0 | *Expected May 2028*
Coursework: Real Analysis (Math 104), Lin. Alg. & Diff. Eqs. (Math 54), Multivar. Calc (Math 53), Engin 7.

TECHNICAL SKILLS

- **Languages:** C++, Python, JavaScript, C#, SQL, MATLAB, HTML/CSS
- **Technologies:** Node.js, Flask, Unity, Socket.IO, React, Git, Linux, Docker
- **Concepts:** Systems Design, Algorithms, Machine Learning, Web Security (CTF), OCR

TECHNICAL PROJECTS

Gridfall: Tactical Roguelike | *JavaScript, HTML5 Canvas*

- Designed algorithms for randomized loot drops, reward scaling, and material upgrades.
- Built key gameplay systems: character progression, inventory management, and card-based combat.
- Implemented A* pathfinding and behavior trees to drive distinct enemy AI.

C++ RPG/Strategy Game Engine | *C++, SQL, Systems Design*

- Architected a 50,000+ LOC game engine from scratch, managing memory, physics, and combat.
- Implemented persistent data storage using SQL to handle save states and player progression.

Toolbox: Full-Stack Web Service | *Python, Flask, OCR, Render*

- Deployed a web service for file automation (TXT-to-EPUB, Audiobooks) and Math-to-LaTeX.
- Engineered a custom OCR pipeline with symbol mapping to mathematical notations.

Ultra Ordem: Multiplayer Platform | *Node.js, Socket.IO*

- Developed a server-authoritative backend with state synchronization for real-time card games.
- Implemented complex game logic for Texas Hold'em and Zheng Shang You to create a lightweight, portable alternative to physical card decks.

RESEARCH EXPERIENCE

3D Bin Packing Optimization | *Main Researcher | June 2023 – Sept 2024*

- Modeled a NP-hard logistics bin packing problem using Satisfiability Modulo Theories (SMT).
- Developed a novel algorithm with a 5% improvement in space compared to standard heuristics.

Book Recommendation System | *First Author | Oct 2023 – Jan 2025*

- Implemented a Naïve Bayes classifier from scratch to analyze user preferences without ML libraries.
- Conducted analysis of content-based vs. collaborative filtering methods to evaluate tradeoffs.

Route Optimization (TSP) | *Individual Researcher | April 2022 – July 2024*

- Optimized delivery routes using Graph Theory; transitioned from DFS to Branch-and-Bound to reduce computation time.

LEADERSHIP & AWARDS

- **Leadership:** Pie Queen Ultimate Frisbee (UC Berkeley), Varsity Track Captain (Shanghai), Be My Eyes Volunteer.
- **Awards:** AIME Qualifier (2022, 2023), Int'l Linguistics Olympiad Trials.