# ZACHARY MARTIN

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## EDUCATION

**Stanford University |** *Stanford, CA*

- B.S. Computer Science, Graphics Concentration | June 2024
- Relevant Coursework: Object-Oriented Systems Design, Algorithms, Web Development, Probability for CS
- **Honors:** 3x NCAA Champion, 3x NCAA All-American, CGA Academic All-American, MPSF Academic All-American

## TECHNICAL SKILLS

**Languages:** JavaScript, Typescript, Python, SQL, HTML, CSS, C++
**Frameworks:** React, Node.js, Firebase, PostgreSQL, MySQL, Git, Express.js, AWS
**Concepts:** Full-Stack Development, REST APIs, DevOps, API Integration, Database Design, Responsive Web Design
**Certifications:** Codecademy Full-Stack Developer

## PROJECTS

**Ray Tracing** Fall 2024

- Built a 3D ray tracer in Python and C++ to render photorealistic images by simulating light interactions with objects in a scene.
- Optimized performance using bounding volume hierarchies (BVH) and recursive depth control, improving rendering speed by 20%.
- Implemented Phong shading and material models for accurate light reflection and refraction simulations.

**Greenlight – A proximity based, in-person dating iOS app** Winter 2024

- Designed and developed an iOS app using React Native, Firebase, and Expo, focusing on reducing app screen-time and encouraging in-person interaction.
- Created a proximity-based matching algorithm and integrated user authentication for secure real-time interactions.
- Led a 4-person team, managing Agile workflows, code reviews, and app iterations based on user feedback.

**Focus – An A.I. powered calendar assistant web app** Spring 2023

- Developed a web app using OpenAI API, MongoDB, and React to generate dynamic schedules based on user deadlines and task durations.
- Built RESTful APIs for Google Calendar synchronization, storing and managing user data securely in a MongoDB database.
- Improved task prioritization accuracy by 30% through iterative testing and prompt engineering for AI responses.
- Conducted end-to-end testing, verifying API responses, AI consistency, and database integrity to ensure robust performance across all features.

**Texture Quilting and Image Synthesis Project** Winter 2023

- Applied Dijkstra's algorithm to optimize texture patch selection and reduce visual artifacts in image synthesis projects.
- Designed an algorithm to generate seamless textures from small samples, avoiding visible grid patterns or repetition.

**Rigid Body Animation and Model Training** Spring 2022

- Simulated rigid body dynamics using matrix transformations and reverse kinematics to predict and control object movement.
- Developed a reward-based training model that improved a simulated object's stability by 40% during water tests.
- Implemented spline-based interpolation to create smooth animations between time-steps for realistic motion.
- Designed a physics engine to simulate real-world interactions, including collisions, gravity, and fluid dynamics.

**Heap Allocator** Spring 2021

- Created a custom heap allocator in C++ to efficiently manage dynamic memory allocation and prevent fragmentation.
- Improved memory utilization by 25% through optimized data storage techniques and careful pointer management.

## ATHLETIC EXPERIENCE

**STANFORD MEN'S GYMNASTICS** *2019-2023*

- 3x NCAA Champion and 3x NCAA All-American, demonstrating commitment, resilience, and high performance under pressure.
- Collaborated with a team of 20-25 athletes, fostering teamwork to achieve national titles and top vault rankings for four consecutive seasons.
- Balanced 20+ hours per week of training and competition with academic demands, developing exceptional time-management skills
- As the vault event captain, collaborated with coaching staff to analyze performance metrics, identify areas for refinement, and implement training plan adjustments that enhanced overall consistency