# Marcos De La Torre

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## Education

University of California San Diego – B.S. in Electrical and Computer Engineering — Expected June 2025

## Skills

**Languages/Tools:** C/C++, gdb, Valgrind, Java, Python, OpenGL
**Technologies:** Linux/Unix, VS Code, Github
**Language:** English (Fluent), Spanish (Native)

## Relevant Coursework

**AI: Search & Reasoning -** Classical Search, Adversarial Search, Reinforcement Learning, Bandits & Monte Carlo Tree Search, Constraint Solving. **AI: Probabilistic Models -** Bayesian Networks, Hidden Markov Models, Markov Decision Processes (MDPs), Reinforcement Learning. **Computer Graphics** OpenGL, Rendering Pipelines, Shading, Ray Tracing. **Computer Animation** Skeletal Animation, Motion Capture, Inverse Kinematics, Physics-Based Animation. **Computer Vision** Image Processing, Feature Extraction, Object Detection, Optical Flow

## Experience

**UCSD Department of Computer Science**
*Tutor* — December 2023 - March 2024

- Collaborated with Professor William Griswold to support the Software Engineering (CSE 110) curriculum.
- Proctored exams, offered guidance during lab hours, attended lectures, and addressed inquiries, in person and remotely for over 200 students.
- Agile Development - Behavior Driven Design (OOD, UML, Design Patterns, Unit Testing). Development done in Android Studio.

## Projects

**Skeletal Animation Engine** — January 2025

- Engineered a real-time skeletal animation system with GPU-accelerated vertex shaders, featuring advanced skinning, bone transformations, and motion blending for high-performance character animation.
- Developed robust keyframe interpolation and an inverse kinematics (IK) system with dual quaternion skinning to ensure smooth, natural character deformations.
- Integrated dynamic physics simulations (e.g. cloth dynamics and aerodynamic force).

**Pathfinding AI for Grid-Based Navigation** — May 2024

- Developed a backtracking-based AI solver for Sudoku using constraint satisfaction problem (CSP) techniques.
- Optimized domain pruning through forward checking and arc consistency (AC-3), reducing search space by ~70%.
- Implemented a minimum remaining values (MRV) heuristic, improving solving speed for complex Sudoku puzzles by ~50%.
- Developed a SAT-based encoding and decoding system, enabling a logical, efficient approach to constraint solving.