

# Allen Zeng

Electrical Engineering and Computer Science, Student

[allenatberkeley.github.io/](https://allenatberkeley.github.io/)

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## Education

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University of California, Berkeley - EECS

August 2014 - May 2018

- GPA: 3.344

## Current Studies

- Control theory and artificial intelligence, with application towards autonomous vehicles
- Discrete mathematics and probability theory
- Computer graphics and imaging
- Abstract algebra

## Projects Implemented

- **Sixteen** - Robotic vehicle that drives according to voice commands. Speech recognition is done through the K-means clustering of data via principal component analysis
- **PathTracer** - A physics-based parallelized ray tracing program which simulates realistic lighting of 3D scenes. Direct and indirect illumination methods are employed along with bidirectional scattering distribution function sampling to simulate materials: mirror, metal, and glass surfaces. Additionally, a lens system replicates camera effects such as defocus blur, wide angle and fisheye shots, and cell-based autofocusing
- **Reconstructor** - Implements the Ball-Pivoting Algorithm to reconstruct surface polygon meshes from point clouds
- **MeshEditor** - Models polygon meshes through the use of the HalfEdge data structure and implements features such as polygon splitting, mesh upsampling, and 3D texture and environment mapping
- **Rasterizer** - Rasterizes lines and triangles to screen, and maps texture to 2D surfaces. Rendered objects are anti-aliased through supersampling, bilinear filtering, and trilinear filtering
- **Gitlet** - Reproduction of the version control system Git with basic commands, including 'branch,' 'merge,' and 'rebase'
- **WordTries** - Structures a trie and a ternary search tree to hold a dictionary of words and their weights, in order to execute an autocomplete operation based on user input
- **MIPS Assembler and Linker** - An assembler and linker for MIPS, allowing for standard instructions and pseudoinstructions
- **MIPS Processor** - A 32-bit, two-cycle pipelined processor for MIPS designed through Logisim

## Technical Skills

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- Fluency in C, C++, Java, Python, MIPS
- Understanding of GLSL, HTML, CSS, JavaScript, Scheme, SQL
- Proficiency with logic circuit and hardware architecture design, via Logisim and MARS IDE
- Experience with CAD programs DipTrace and SolidWorks
- Comfortable writing technical documentation with LaTeX

## Notable Experience

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University of California, Berkeley - **EE16A Reader/Tutor**

January 2016 - May 2016

- Reader and tutor for the EE16A, "Designing Information Devices and Systems I"
- Responsibilities include grading homework, grading exams, and providing students with general and specific feedback based on their solutions
- Students are notified about errors and are given advice on how to understand difficult concepts

CalSol, UC Berkeley Solar Vehicle Team - **Member**

September 2015 - May 2016

- Collaborated on a mechanical sensor network consisting of accelerometers, strain gauges, rotational position sensors, and temperature sensors for integration into the car, using the SPI and I<sup>2</sup>C protocols
- Designed a quad flat package (QFP) to dual in-line package (DIP) breakout board, compatible with 16 to 80 pin QFP and QFN with 0.40 mm, 0.50 mm, and 0.65 mm pitches.

University of California, Berkeley - **Tutor**

August 2014 - December 2015

- Continued group and individual tutoring of various STEM topics, primarily computer science and math, to younger peers from Bakersfield on a weekly basis. Teaching done through phone and video calling