

# Dharshan Vishwanatha

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## Education

**University of California, San Diego** (Aug 2019 - Dec 2020)

BS, Mathematics-Computer Science

- GPA 3.7 - **Provost Honors** (Fall 2019, Spring 2020). **iLead, Machine Learning With Big Data** - certified
- Courses: Graph Theory, Numerical Analysis, Real Analysis, Theory of Computability, Mathematical Reasoning, Statistical Methods, Abstract Algebra, and Advanced Data Structure.

**Pasadena City College** (Aug 2017 - June 2019)

AS, Computer Science

- GPA 3.8 - **Dean's Honor** for all semesters. Awarded **Honors in Mathematics**.
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## Skills

C++, Java, C#, Python, OpenGL, OpenCV, TCP/IP, IBM Qiskit, Qt, Jenkins (CI/CD), Docker, Linux, Git, CMake, Unit Testing, Neo4j, SQL, Hadoop, and Apache Spark (MLlib).

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## Student Organizations

**CalTech FSAE** (Oct 2019 - Dec 2019)

- Collaborated with the CalTech FSAE team on building an electric autonomous racecar.
  - Prototyped detecting cones and distance from Kinect's camera, and displayed depth using OpenCV.
  - Discovered that the sun's uv-lights cancels out the Kinect's infrared sensor. Making the Kinect useless in competition, and looked towards LiDAR.
  - Tools used: OpenCV, Contour's, openFrameworks, and ofxKinect.
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## Publication

**Ray Tracer - Simple Introduction** (Oct 2019 - Dec 2019)

- Published a book (link: [rb.gy/ex8n8y](https://rb.gy/ex8n8y)). Step-by-step, in-depth and overarching on the basics of ray tracing.
  - Includes mathematical foundations, code implementations, documentation, and rendered images.
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## Projects

**IBM Quantum Programming** (Python, Aug 2020 - Present)

- Exploring fundamentals of Quantum computing: Mathematical foundations and Circuit Programming
- Learning Qiskit framework, Gates, Superposition, Entanglement, and Quantum Algorithms.

**Ray Tracer** (C++, Aug 2019 - June 2020)

- Implemented Ray Tracer with basic geometry, lighting, reflection, and cubemap. Used in Pixar's RenderMan.
- Learned ray sphere, plane intersection, and using vector operations.

**Octree/QuadTree** (C++, Sep 2019 - Oct 2019)

- Implemented an accelerated spatial data structure, that enables fast lookup of 3d points and triangles.
- Improved ray tracing time complexity between ray and triangle intersection.

**Cloth Simulation** (C++, Aug 2019 - Sep 2019)

- A simple OpenGL cloth simulation that reacts to gravity and wind forces by using Verlet Integration
- Implemented common physics objects such as springs and particles.

**ELocation** (C#, Mar 2019 - Apr 2019)

- An android app that gives the user real time information of 100+ public buses across the United States.
- Learned API requests and parsing the JSON object to represent the bus data. Also, Google's Map API.

**SVD-Image Compression** (C++, Feb 2019 - Dec 2019)

- Implemented a concept from Numerical Analysis course to image compression.
- Learned about Matrix Decomposition, and getting Eigenvalues through Jacobi Iteration.