# JUNHAO WANG

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## EDUCATION

**University of Southern California (USC)**, Los Angeles, CA — Aug. 2019 ~ May. 2021
M.S. in Computer Science — ***GPA: 3.90 / 4.0***

**Israel Institute of Technology (Technion)**, Israel — Jul. 2017 ~ Aug. 2017
Summer Program of Machine Learning (awarded scholarship of half tuition) — ***Top 15%***

**Shantou University**, China — Sep. 2014 ~ Jun. 2018
B.E. in Computer Science and Technology (first-class scholarship twice) — ***GPA: 3.74 / 4.0, Top 2%***

## SKILLS

**Programming Languages** C/C++, GLSL, HLSL, Java, C#, Python, Scala, Objective-C, MATLAB
**Writing & Problem Solving** LeetCode Book [Website]
**Tools & APIs & Libraries** CLion, VSCode, OpenGL, Unity, Emacs, IntelliJ, PyCharm, Xcode, CMake, Git
**Relevant Courses** Computer Graphics, 3D Graphics and Rendering, Linear Algebra, Data Structures

## EXPERIENCES

**Software Development Engineer I, Alexa Speech Recognition, Amazon** — Jul. 2021 ~ Present

**Course Grader, GAMES101: Introduction to Computer Graphics** [Course Website][GAMES Forum] — Jun. 2021 ~ Present
- GAMES101 is a free online course taught by the professor at UCSB and is organized by the graphics forum GAMES in China.
- Helped organize the course in Spring 2021 including scheduling meetings, publishing and grading assignments for students.

**Software Development Engineer (Intern), Alexa Speech Recognition, Amazon** — Jun. 2020 ~ Aug. 2020
- Initiated and developed a Spark aggregator that reduces model rebuild cost and time on Alexa static training models.
- Deployed systems on EMR clusters via CloudFormation and released products on pipelines with unit and integration tests.
- Wrote drafts and documents, worked with **2** external teams, and hosted **6** discussion meetings.
- Delivered high-quality work on time with **12** code reviews and excellent final presentation.

## PROJECTS

**ForkerRenderer: CPU-Based Forward/Deferred Rasterizer** (C++, CMake) [GitHub][Gallery][Shadow] — Dec. 2020 ~ Jul. 2021
- Implemented a software rasterizer that mimics OpenGL behavior without any third-party libraries.
- Developed a parser for *.obj model and *.mtl material files with auto triangulation, vertex normalization, and tangent generation.
- Achieved Blinn-Phong and PBR (Cook-Torrance BRDF) shading as well as texture mapping with wrapping and filtering modes.
- Included perspective/orthographic projections in camera model and achieved Perspective-Correct Interpolation.
- Enabled soft shadow effect in shadow pass using PCF-based Percentage-Closer Soft Shadow (PCSS) algorithm.
- Built G-buffers that support Screen-Space Ambient Occlusion (SSAO) with noise reduction filter (two-pass Gaussian blur).

**ForkerPathTracer: CPU-Based Software Path Tracer** (C++, CMake) [GitHub][Gallery] — Apr. 2021 ~ Jun. 2021
- Developed a software path tracer that generates high-quality image and supports spheres and triangles (Möller–Trumbore).
- Achieved bounding volume hierarchy (BVH) acceleration and sampling in multiple threads to reduce rendering time.
- Included various materials: Lambertian, metal, dielectric, and emissive (area light).

**Plan Odyssey: 3D Exploration Unity Game** (C#, HLSL Shader) [Game Trailer][Gameplay Demo] — Jan. 2021 ~ Apr. 2021
- Collaborated with two students on a Sci-Fi exploration game where players play as astronauts to explore outland planets.
- Implemented smooth player control, Cinemachine cameras, walk/jump animations, jetpack system with particle effect.
- Practiced HLSL shaders under Universal Render Pipeline and made topographic scanner and volumetric light cone effect.
- Learned compute shader techniques and achieved beautiful large-scale grass without noticeable FPS drop. [My Blog Post]
- Designed a beautiful planet with PolyBrush and enabled planet controller script to manage day/night cycle and sunrise/sunset.

**Campus App: Connect Everyone at STU** (Objective-C, Python) [Website][App Store] — Oct. 2015 ~ Aug. 2017
*Team Leader of 3 Members, Co-Founder, iOS Developer, UI Designer*
- Initiated the project Campus App to help students and faculties put school information and resources at their fingertips.
- Created an iOS app in two months and released **14** versions on App Store with a **4.7/5.0** rating and **15,000+** users.
- Conducted surveys on requirement analysis and built **15+** features such as course schedule customization, mobile library, etc.
- Practiced design patterns (MVC, Singleton) and used CocoaPods to manage 15+ libraries (KVNProgress, UmengSDK).
- Ranked **7th** out of **300+** apps in the First China iOS App Development Competition in 2017.