Charles Giessen

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Dedicated to creating useful software and solving engineering challenges

- Education

University Of Tulsa, Tulsa, OK; Fall 2015 – May 2019
  B.S in Computer Science & B.S in Computer Simulation and Gaming
  Minors: Math & Music, Honors College, GPA 3.79 / 4.0
  Selected Courses: High Performance Computing, Compiler Construction, Game Engine Design

- Skills

Languages: C++17, C, Java, C#, GLSL, Python
Technologies: Git, Bash, Eclipse, Visual Studio, OpenGL 4.5, Vulkan, Renderdoc, WPF, MPI, OpenMP,
        Pthreads, OpenCL, Unity3D, Blender, Maya, GLM, Dear ImGui, glTF

- Experience

University Of Tulsa, Tulsa Undergraduate Research Challenge,
  - Summer 2014: Artificial Intelligence Research - Core computer science principles, theory, application, and intro to artificial intelligence research.
  - Summer 2016: High Performance Computing and Attack Graph research - Worked on utility C string functions and parallel programming using MPI.

Tinker Air Force Base, 76th Software Maintenance Group Intern,
  - May 2018 – August 2018: Designed a target viewer app with WPF in C#, Developed radar cross section solver in C++ using MPI, Explored Socket based networking in C# and LabView, And had a introduction to ADA programming.

- Projects

Vulkan Rendering Engine, C++, Game engine designed around the Vulkan graphics API. A testing ground for software techniques, game engine design, and exploring solutions for engineering problems.
  - **Terrain Renderer**, Heightmap based with automatic level of detail adjustment using a Quadtree and Memory pool for quick allocation.
  - **Procedural Noise Texture Generator**, Lets users create noise textures in a visual node graph editor and uses SIMD acceleration for calculation.
  - **Cross platform - CMake based,** with Windows and Linux Support. Tested with gcc and msvc.
  - **Multitasking System**, (WIP) Thread pool based tasking system that enables task based multithreading of various jobs.
  - **Frame Graph**, (WIP) Abstracts all rendering operations and resources into a single graph, enabling global reasoning about how a frame is rendered.

Pascal Compiler, C++, Project for the Compiler Construction course. Tokenizer is complete, with the Parser, AST generation, and integration of the LLVM backend for code-gen in progress.

Orange Sherbert Game Engine, C++, OpenGL 4.0, Project for the Game Engine Design course.

- **Phong Shading**, with diffure and specular texture sampling.
- **Point, Direction, and Spot Lighting**, dynamic lighting of environment
- **Custom Model Loading**, using Wavefront Obj's with optional normal recalculation
- **Transform Hierarchy**, dynamic position, rotation, and scaling supported

Charles Math Library, C++, Graphics focused math library. Supports 2,3, and 4 component vectors, matrix 3x3 and 4x4, quaternions, and functions like perspective matrix calculation.

Project Luna, Unity3D/C#, RTS style game set on the moon with procedural terrain and unit management.

Terrain Explorer, C++, FPS explorer of a given USGS survey data file. Uses OpenGL 3.3.

Contour Line Generator, C++, Uses Marching Squares, creates contour map of given USGS survey data.

Koch Snowflake, C++, generates and draws a koch fractal snowflake.

- Activities
* Student Volunteer at the SIGGRAPH 2018 Conference
* Technical Advisor for campus SIGGRAPH club, 2018-2019
* Volunteering at local elementary schools teaching computer programming, 2017 Spring and Fall
* Member of the University of Tulsa's International Collegiate Programming Competition group
* Participated in the University of Tulsa's Fall Hackathon, Team won 3rd place, November 2015
* Participated in the Heartland Gaming Expo Code Jam, April 2016
* Member of the Phi Eta Sigma Honor Society
* Treasurer of a social gaming club at the University of Tulsa, 2016-2019
* Participated in the 2017 & 2018 Global Game Jam in a team of 6
* Volunteered and gave an Intro to Vulkan talk at the 2018 Heartland Gaming Expo