Alexander Jaeger

agjaeger@ualr.edu | 870 504 0997 | http://www.alexjaeger.org

Education

M.S. Information Science — Little Rock, Arkansas
University of Arkansas At Little Rock — *Expected December 2019*

B.S. Computer Science — Little Rock, Arkansas
University of Arkansas At Little Rock — *December 2016*

High School Diploma — Hot Springs, Arkansas
Arkansas School for Mathematics, Sciences, and the Arts — *May 2014*

Work Experience

Intel Corporation — Santa Clara, California
C For Metal Compiler Intern — *June 2018 - Aug. 2018*

- Assisted internal teams on the development of GPU kernels, most notably for GEMM pipelines
- Implemented a Raytracer with the C for Metal language capable of rendering spheres with shadows
- Worked alongside the Shanghai-based build team to rewrite the internal build system for testing and development.

Intel Corporation — Santa Clara, California
Advanced Raytracing Group (ART) Intern — *June 2018 - Aug. 2018*

- Learned how to use C for Media (Intel's GPU programming language for compute)
- Implemented Radix Sort in C for Media and bench marked it
- Began implementation of GPU BVH Tree Builder using Morton Codes
- Worked with the C for Media compiler team by providing unit testable GPU kernels for their regression suite.

Halliburton Landmark — Houston, Texas
Summer Computer Graphics Intern — *June 2017 - Aug. 2017*

- Brought engineering models into a shared AR / VR space where users can see each other and have limited interaction support
- Used Unity3D to produce a single project for the Microsoft Hololens, HTC Vive, Android and Desktop clients.
- Worked on a team of 6-7 people and used Git to manage source code.

UA Little Rock Emerging Analytics Center — Little Rock, AR
Graduate Assistant — *September 2014 - Present*

- Used Unity3D, C#, C++ and OpenGL to produce Virtual and Augmented Reality Applications
- Collaborated with team members to complete projects
- Lead Demonstations and provided information about current projects to potential clients

Projects

CAVE In A Box, Master's Thesis

Emerging Analytics Center, UA Little Rock *Feburary 2016 - Present*

- Designed a CAVE that is focused on mobility and low barrier of entry
- Designed supplemental software in Unity3D and Python to allow other developers to build applications for this CAVE
- Used Autodesk Inventor to design the structure and then built it by hand in the local workshop.
- Presented at the 2016 Arkansas EPSCoR/IDeA Foundation Conference

GPU Raytracer For Learning

Intel Corporation *Summer 2019*

- Wanted to write an example in C for Metal to produce computer generated graphics.
- Followed Peter Shirley's Raytracing in One Weekend
- Resulting raytracer could render spheres with shadows. This limited feature set was intentional to show the minimum amount of work required.
- Most interesting part was the development of the random number generation as the language did not provide primitives to do so.

GPU Radix Sort for Intel Processors

Intel Corporation *Summer 2018*

- C for Metal is the GPU programming language optimized for Intel GPUs
- Previously, a hybrid approach was implemented to use both CPU and GPU. However, the paper "Revisiting Sorting GPGPU Stream Architectures" suggested that a pure GPU solution was better than hybrid approach due to the need for syncing and data transfers.
- Implemented the approached laid out by this research paper and benchmarked against the previous implementation.
- Found that there was a 26% increase in performance and it could handle larger datasets efficiently.

Location-based Visualization on the Web

Emerging Analytics Center, UA Little Rock *January 2018 - present*

- A client has a large dataset of locations and wanted the ability to visualize and discuss the data with colleagues.
- Using React, Redux, WebGL, Leaflet, and ArcGIS
- Provide a number of new visualizations for the data such as area selection, tagging and filtering.

SPARTAN: An automatic tool to help determine patching

Emerging Analytics Center, UA Little Rock *January 2016 - 2017*

- Due to the security and reliability requirements and the sheer number / range of devices, patching is difficult.
- Helped create an initial desktop application to manage and visualize the data that was provided from companies
- Ported desktop application to web interface after reviewing the client's need, further increasing the usability of the tool
- Conducted tests with live data at AECC facility in order to squash bugs and verify use cases.

Porting Landmark Visualization to AR/VR
Landmark Halliburton *Summer 2017*

- Landmark Halliburton had engineering models in a traditional desktop application utilizing OpenGL and wanted to explore using both AR and VR
- Provided functionality to stream data from desktop application to AR/VR space with Unity.
- Developed a shared space where the AR/VR users are colocated by using Proton Networking library.

Haptic Force Feedback
Emerging Analytics Center, UA Little Rock *April 2015 - August 2015*

- Developed a physics simulation in OpenGL and C++ to test a Haption 6DOF Robotic Arm.
- Designed a library and supplemental training materials to make it easier for other developers to learn.

Virtual Reality Touch Table
Emerging Analytics Center, UA Little Rock *May 2015 - October 2015*

- Designed a structure to hold 2 consumer LCD touch screens to create a Virtual Reality experience.
- Shown at the 2015 Supercomputing Conference in Austin, Texas

Stair Climbing Robot, High School Thesis
Arkansas School for Mathematics, Sciences and the Arts *January 2013 - Feburary 2014*

- Designed a Stair Climbing Robot to aid personnel as my end of term project (thesis). Presented at the 2014 FIRM Competition. I recieved second place in the Mechanical Engineering portion.
- Worked with Carl Frank and Nicholas Seward to design this robot in Autodesk Inventor. Used a workshop to construct using wood and 3D printing. Used a Raspberry Pi and Arduino to drive the robot. The Raspberry Pi handled communication and preiphials. The Arduino handled the drivetrain and recieved commands from the Raspberry Pi.

Sign Construction, Eagle Scout Project
March 2014 - June 2014

- Volunteer work for the local Veteran's Memorial Hall exceeding 100 man hours.
- Designed a sign for their newly constructed building using Autodesk Inventor
- Held design meetings with beneficiarys to confirm designs and prototypes
- Orchestrated volunteers and materials remotely in order to complete project.

Conference Proceedings

Fred's Happy Factory DOI: 10.2312/egve.20161454
ICAT-EGVE 2016 - Posters and Demos *October 2016*

- Coauthored with Aaron Baggett, Benjamin Lewis, and Isaac Wardlaw
- Designed as our final project for the Intro to Virtual Reality course taught by Dr. Carolina Cruz-Niera
- Users acted as a small helper robot named FRED as he tries to cheer his coworkers up around the office.

- Coauthored with Dylan Johnson, Connor Taffe, and Brent Blasingame
- Introduced new developers to the fundamentals of Unity and taught how to combine OpenCV and Vuforia to create a more complex Augmented Reality application.
- Combining opencv and vuforia in a single application can allow for post rendering and multiple camera usage.

Skills

Languages: C++, Python, C#, Currently Learning C for Media and CUDA

Operating Systems: Linux (Debian, Arch), Windows 7/8/10

Toolkits: Unity3D, OpenGL, Visual Studio, Git, Exposure to OpenCV and Tensorflow, Currently Learning Vulkan

Hardware: HTC Vive, Microsoft Hololens, Oculus Rift, CAVEs

Miscellaneous: strong verbal and written communication skills, excellent troubleshooting and debugging skills, exceptional problem solving skills, good teams skills