

CAROLINE LACHANSKI

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EDUCATION

University of Pennsylvania School of Engineering and Applied Science

MSE in Computer Graphics and Game Technology, **GPA:** 3.93/4.00

BSE in Digital Media Design, **GPA:** 3.76/4.00, **Minors** in Fine Arts, Mathematics

Philadelphia, PA

Dec 2019

May 2019

Coursework: GPU Programming and Architecture, Physically-Based Animation, Interactive Computer Graphics, Computer Graphics Rendering, Computer Animation, Procedural Graphics, Game Design and Development, Data Structures and Algorithms, Linear Algebra, 3D Modeling

SKILLS

Languages: C++, GLSL/HLSL, C#, Java, Python, MEL, CUDA, TypeScript, C

Software/API: Unity, OpenGL, WebGL, Vuforia, Git, Visual Studio, Qt, Blender, Maya API, Unreal, Photoshop, Illustrator

EXPERIENCE

Activision, Central Technology, Portland, ME

May 2019 - Aug 2019

Programming Intern, under Michael Vance (Technology Fellow)

- Helped integrate new subdivision surfaces system using adaptive quadtrees into *Call of Duty* renderer
- Ported tool for collecting shader performance statistics between different game engines
- Used GPU debugging/profiling tools to analyze engine and shader code and look for points of optimization

STRIVR, Menlo Park, CA

May 2018 - Aug 2018

Software Engineering Intern, under Rama Pagadala (Director of Engineering)

- Developed workplace communications training application for Oculus Rift and Go using Unity and C#
- Designed and documented new workflow for storing and accessing project assets with asset bundles
- Implemented 3 new shaders, improved UI/UX, and added new features such as a spherical video scene

University of Pennsylvania Price Lab for Digital Humanities, Philadelphia, PA

Sept 2018 - May 2019

3D Programming Intern

- Develop interactive VR/AR experiences for Oculus Rift, HoloLens, Android, and iOS for visualizing archaeological artifacts and locations using Unity, C#, and Vuforia
- Write step-by-step guides and help run workshops on Unity and VR/AR for Penn community

PROJECTS

GPU Path Tracer: CUDA, C++

Fall 2019

- GPU-parallelized Monte Carlo path tracer featuring ray termination via stream compaction, anti-aliasing, glTF mesh loading with bounding box, thin lens camera, various bokeh shapes, and first bounce caching

Voxel Structures: C++, OpenGL, Qt

Spring 2019

- Implemented a voxel-based version of the wave function collapse algorithm to procedurally generate 3D structures given a set of voxel meshes and adjacency rules, including a build mode

Maya Plugins: C++, Python, MEL, Maya API

Spring 2019

- Developed custom Maya plugins, including a deformer node based on *Dijkstra-based Terrain Generation Using Advanced Weight Functions*, an L-system node, and a random points node, featuring MEL-based menus

CPU Path Tracer: C++, Qt

Spring 2018

- Implemented path tracer, using various integration methods including direct lighting and global illumination with multiple importance sampling, culminating in photon mapper using k-d tree
- Added features such as thin lens camera, implicit surfaces, various light sources (spot, point, and area light)

Procedural Graphics Projects: TypeScript, WebGL

Spring 2018

- Developed interactive, procedural projects, including an art-directable cactus L-system, a planet scene using 3D FBM, Perlin noise, and Worley noise, and a real-time sphere-traced scene using implicit surfaces

LEADERSHIP & INTERESTS

Leadership: Penn SIGGRAPH Board, Residential Advisor, Advancing Women in Engineering Student Advisory Board

Interests: Illustration, film, animation, gaming, fiction novels, women in STEM, K-pop music, embroidery, manga