

# CAROLINE LACHANSKI

clach@seas.upenn.edu  
(908) 209-9098  
[carolinelachanski.com](http://carolinelachanski.com)  
<https://vimeo.com/298670321>

## EDUCATION

**University of Pennsylvania** School of Engineering and Applied Science Philadelphia, PA  
**MSE** in Computer Graphics and Game Technology, **GPA:** 3.93/4.00 Dec 2019  
**BSE** in Digital Media Design, **GPA:** 3.76/4.00, **Minors** in Fine Arts, Mathematics 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