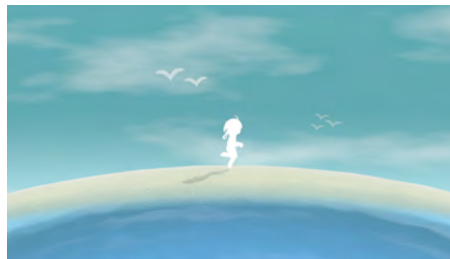


Personal Computer Graphics Projects

“Dreamseasons” Blender Music Video Animation

Jan. 2024 – Oct. 2024

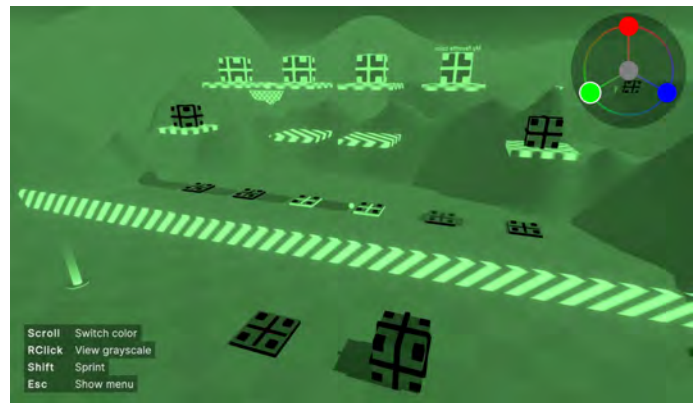
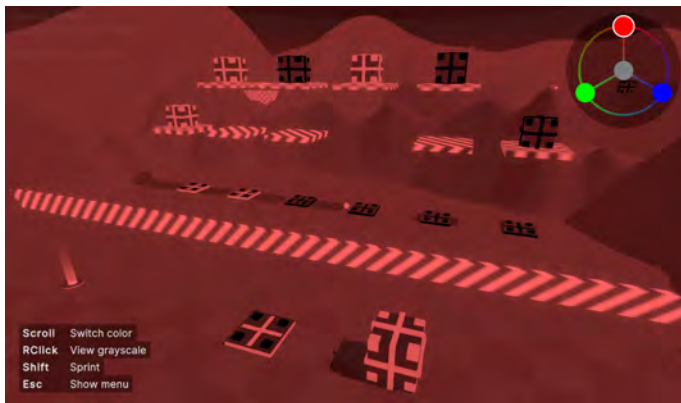
Designed and created a fully animated music video (3 min 33 sec) in Blender 4.2 in collaboration with an illustration artist. The 10-month-long project was an extensive experimentation of character animation, non-photorealistic rendering and post-processing techniques, aiming to replicate hand-drawn, cartoonish aesthetics. Blender’s animation and geometry nodes were heavily utilized to set up 12 different dynamic environments.



“Spectral Affinity” Shader Puzzle Game Development

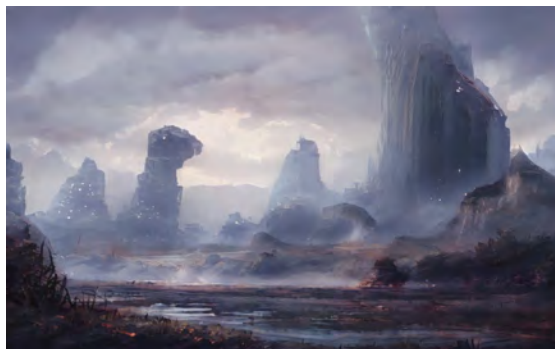
Feb. 2023 – May 2023

Designed and developed an puzzle game prototype in Unity as a 2-week Major Design Experience project at University of Michigan. The core game mechanic is a monochrome filter that can change surrounding objects’ physical properties based on their apparent luminosity. The viewport color filter is implemented with a Full Screen Pass Renderer Feature from Unity’s Universal Render Pipeline. The luminosity-driven physics system is implemented based on Unity’s Shader Graph and custom-made HLSL functions.

**Text-to-Image AI Model Experimentation**

Nov. 2021 – Aug. 2022

Experimented with prompt text engineering on some early image generation models available to the public, including *Deep Daze*, *Big Sleep*, OpenAI DALL-E 2 and *Stable Diffusion*.

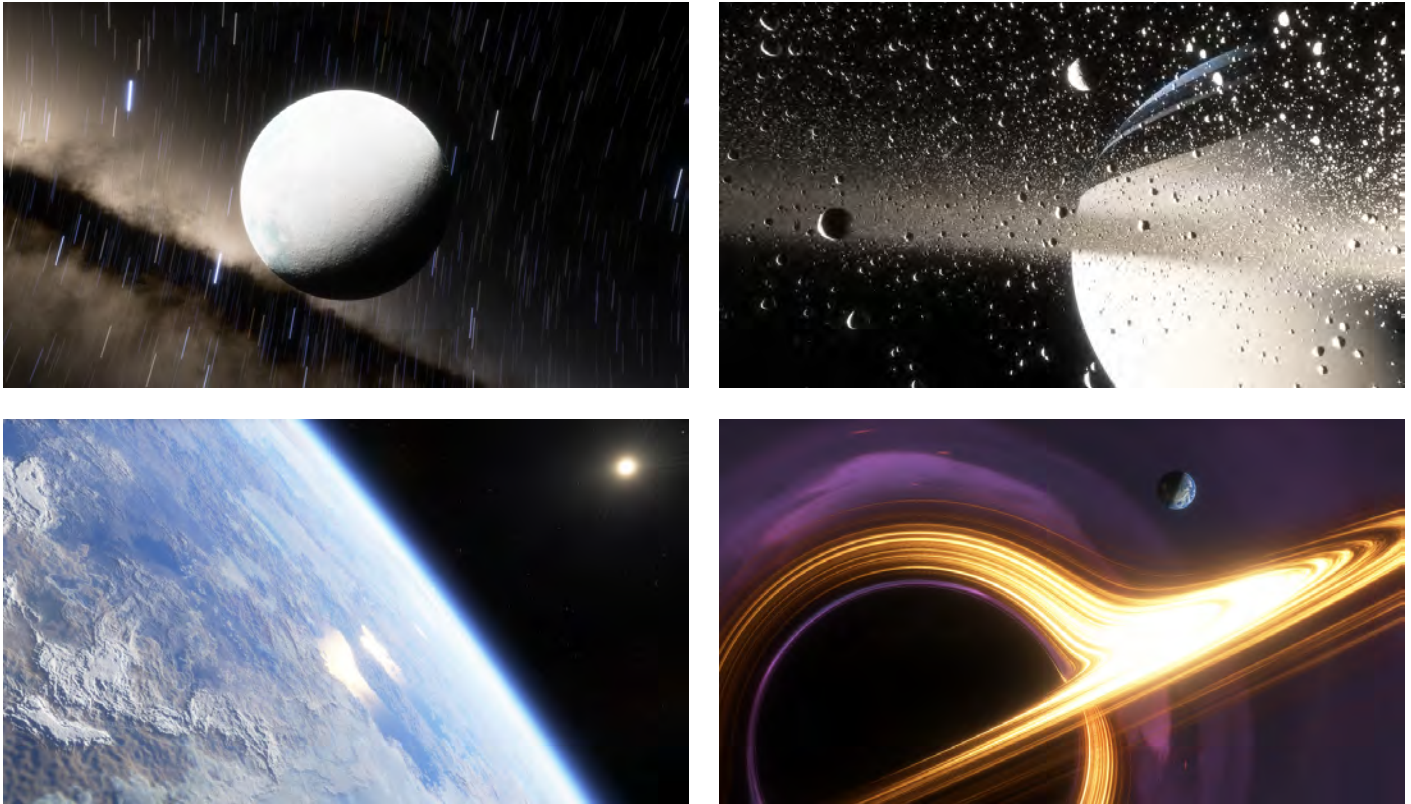




Deep Space Celestial Bodies Visualization

Dec. 2018 – Jul. 2022

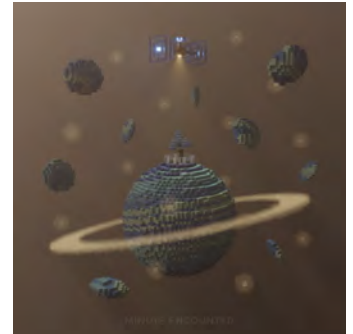
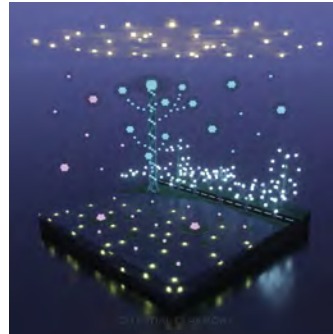
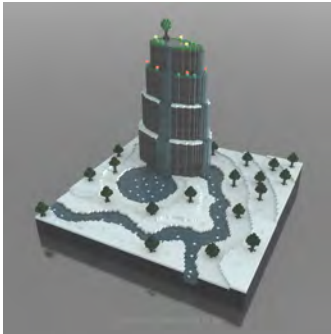
Designed and rendered deep space-themed scenes with *SpaceEngine*, utilizing its versatile high-level scripting system that translates into GLSL to generate configurations and procedural textures for deep space celestial bodies.



“96³: A Fragment of Worlds” Voxel Structure Design

Jul. 2019 – Jun. 2022

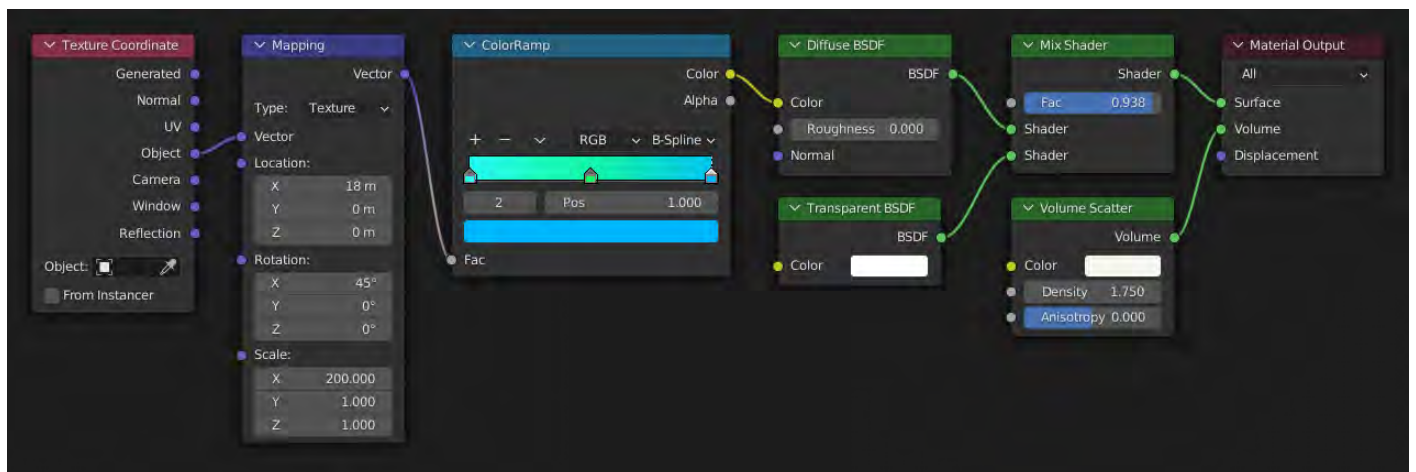
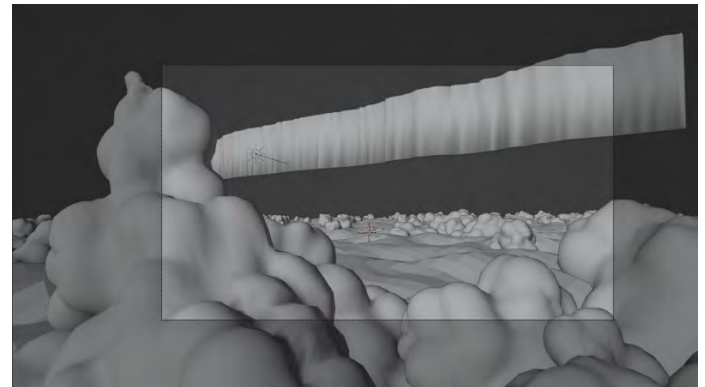
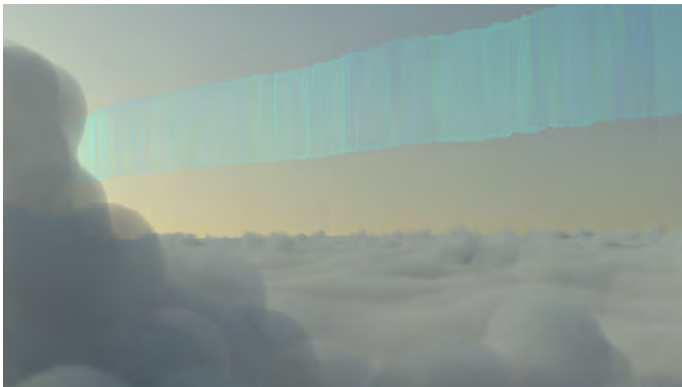
Modeled and rendered a series of 6 scenes (4 shown) with *MagicaVoxel*, utilizing its principled BSDF material engine and stochastic sampling ray-tracing renderer. Each scene is constrained to a $96 \times 96 \times 96$ voxel space (due to *MagicaVoxel*'s chunk size limit) and selectively demonstrates the visual effects of diffuse, reflective, refractive, emissive and volumetric material. All models and rendered images were released at the project's [GitHub repository](#).



Blender-Based Model and Material Design

Apr. 2019 – Jun. 2019

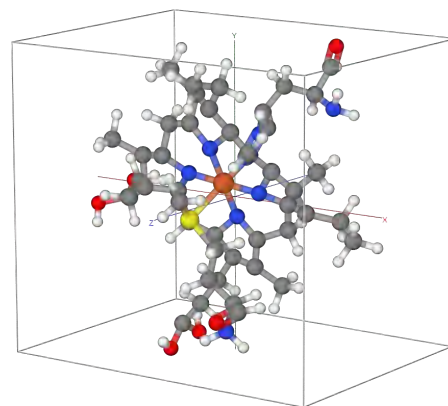
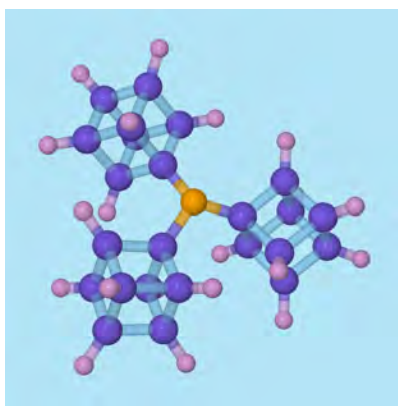
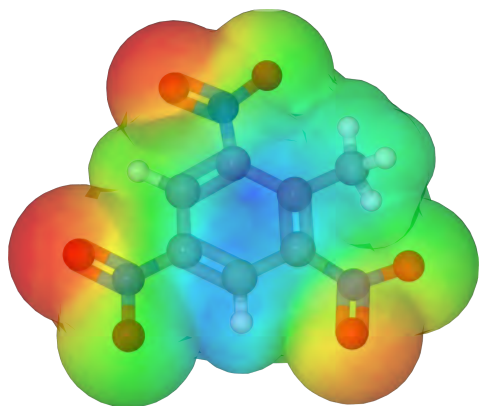
Designed an “aurora over a sea of cloud” scene in Blender 2.81 and rendered with its built-in *Cycles* engine. This scene involved rigorous experimentations with Blender’s node-based material system (to create the “aurora” shader) and particle distribution modifier (to repeat, scatter and randomize individual “cloud” fragments).



Molecular Structure Visualization

Apr. 2018 – May 2019

Generated ball-and-stick and space-filling models for 44 covalent and coordination compounds (3 shown) in *Jmol* and rendered with *POV-Ray* renderer. The goal of this project was to produce more visually pleasing and intuitive study materials for my high school chemistry course.



Planetary Landscape Design

Sep. 2017 – Oct. 2017

Procedurally-generated and rendered exoplanet-like terrain with *MojoWorld Generator 3*, utilizing its fractal-based landscape builder and eroder.



Bryce-Based Environment and Material Design

Sep. 2009 – Sep. 2013

Designed and rendered scenes with *Bryce 5*, *Bryce 6.3* and *Bryce 7*. A total of 209 images (3 shown) and 6 videos were produced over the course of 4 years, featuring an assortment of imaginary objects and sceneries as a preliminary exploration of computer-rendered 3D environments.

