

Modern Game AI Algorithms: A3

Group 7 - Underwater Ecosystem

Matthias Aarnoutse
Benjamin Havenaar
Job Vink
Niels Witte

Project Overview

- Create a believable and Immersive underwater landscape
- Schools of fish
- Infinite terrain



Schools of fish - Boids

- Fish, Birds
- No orchestrator

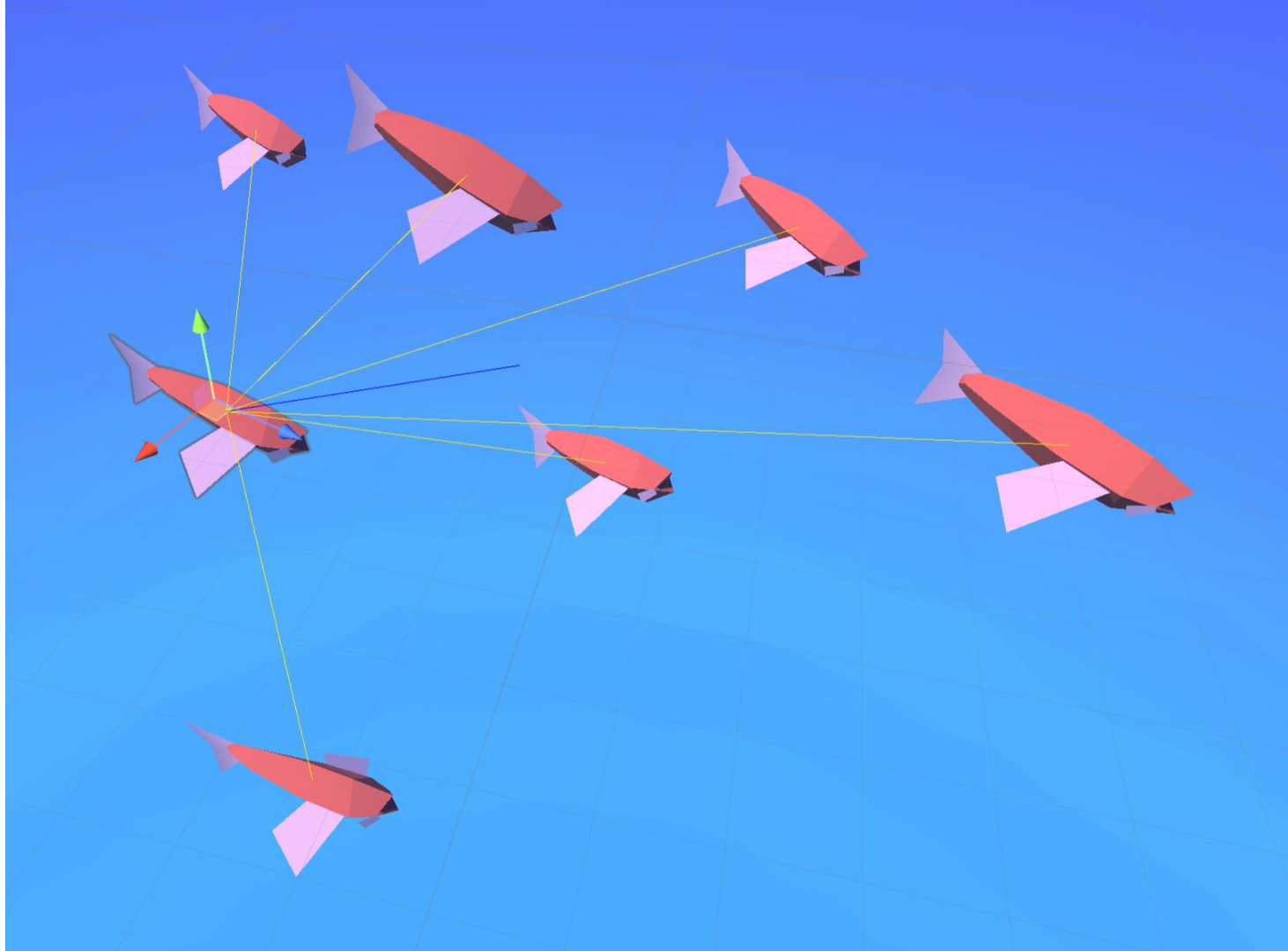


Schooling approximation

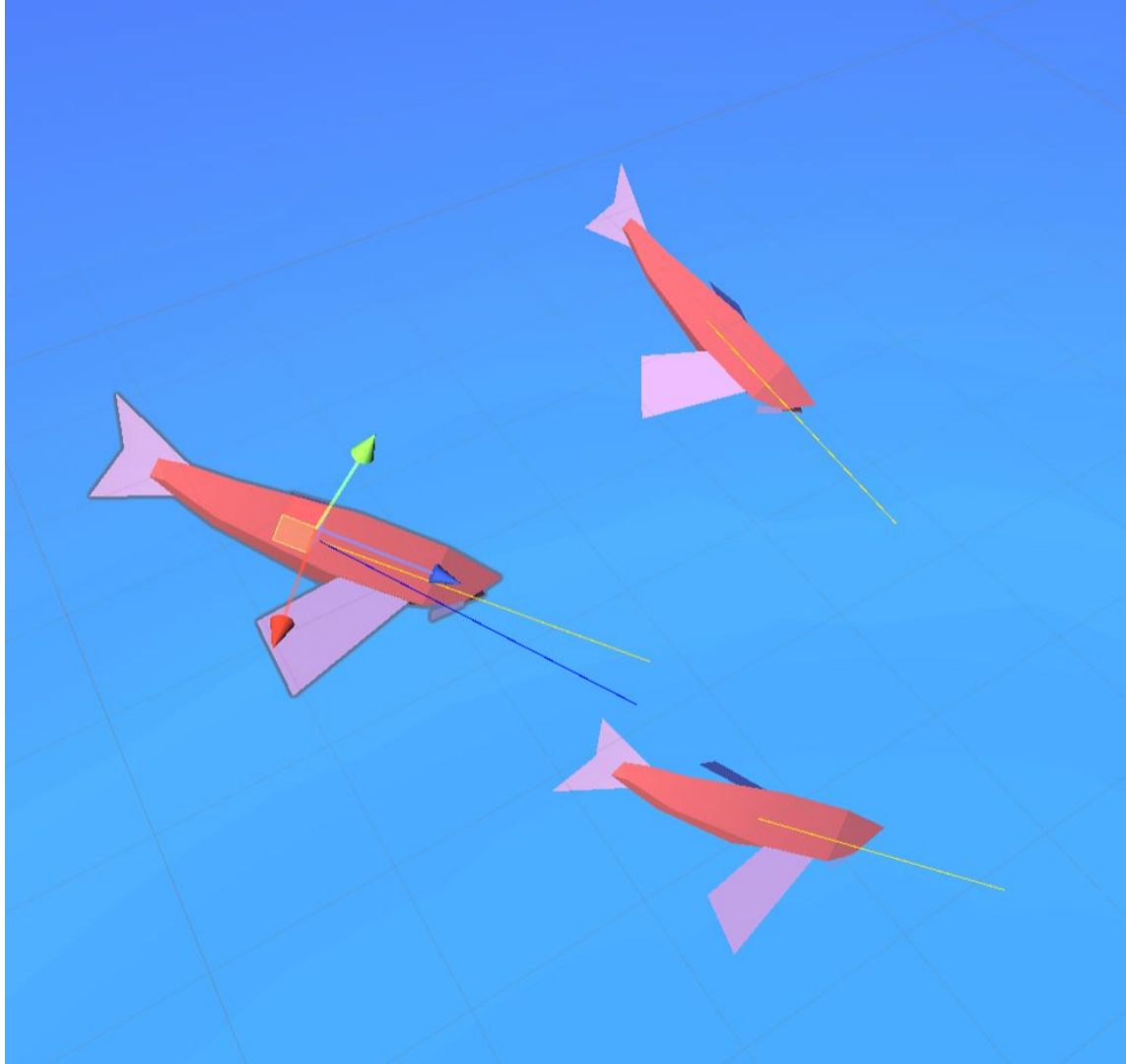
- Cohesion
- Alignment
- Seperation



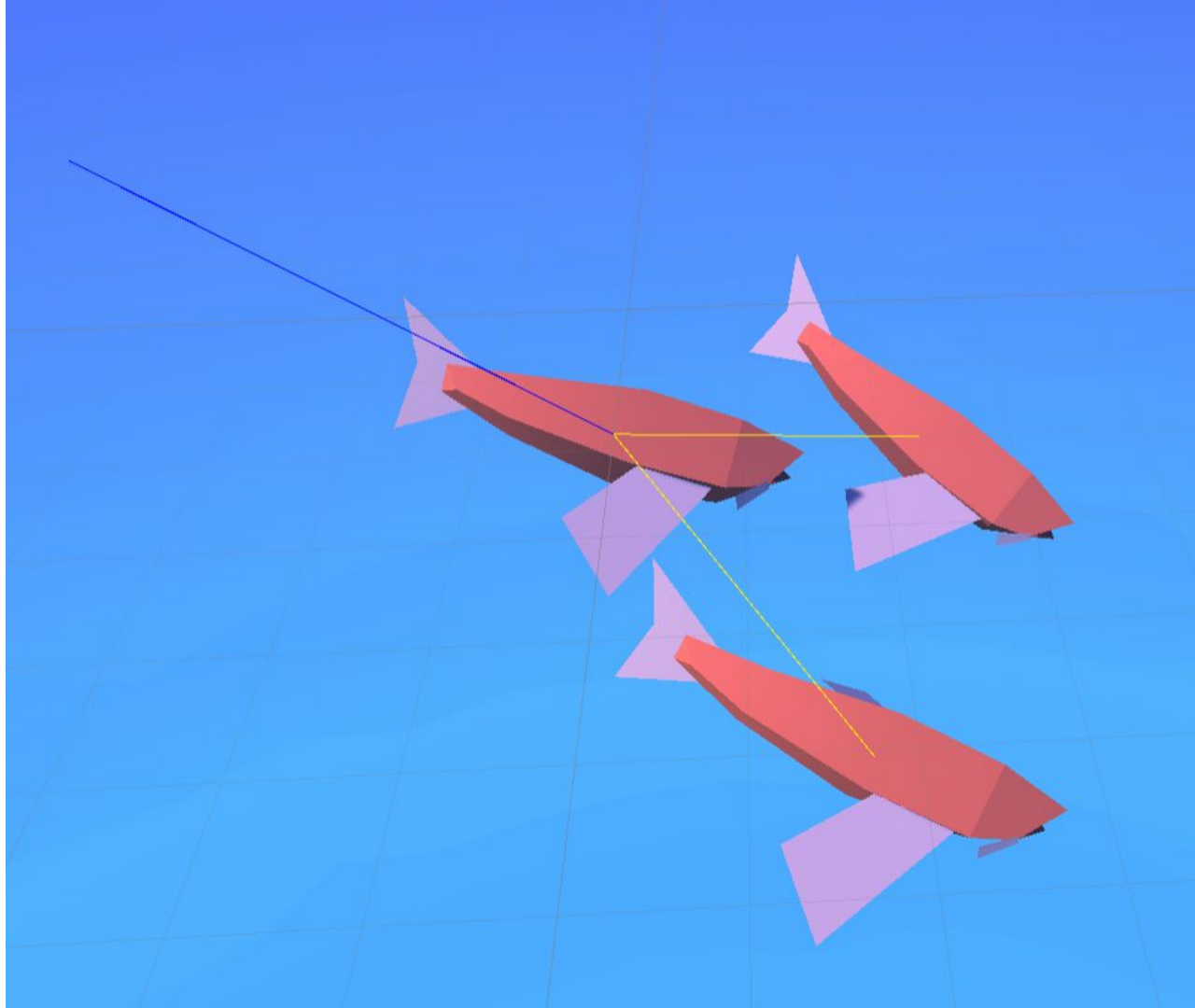
Cohesion



Alignment



Separation



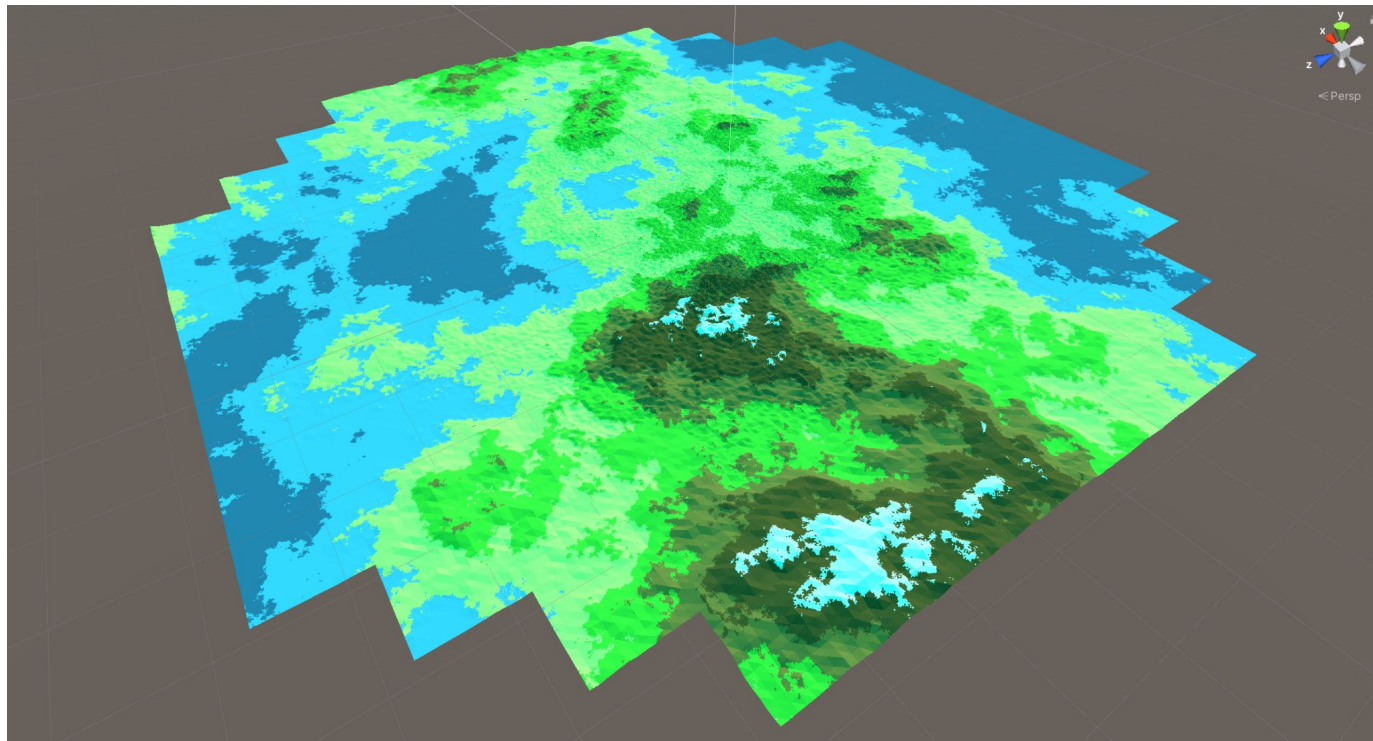
Custom additions

- Obstacle avoidance
- Target tracking
- Stay in the water



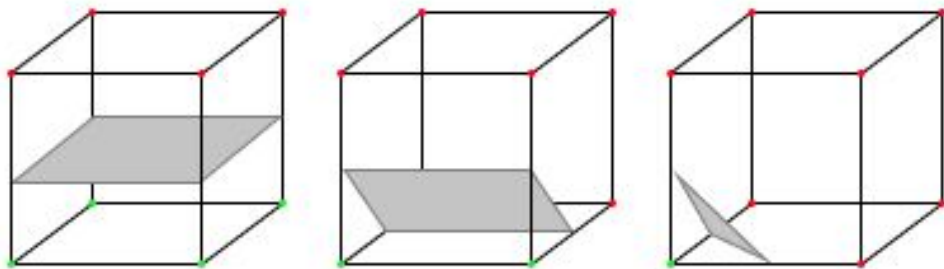
Terrain Generation

A1: Perlin Noise



Marching Cubes

- Divide block into voxels
- Calculate density at every vertex
- Positive = inside terrain negative = outside of terrain
- Compute Polygons



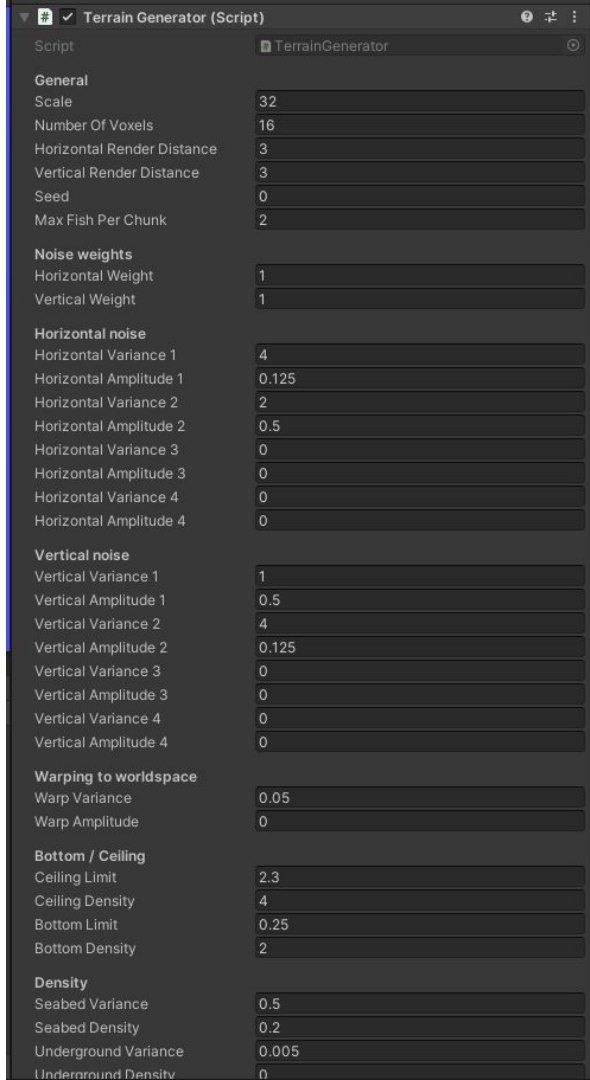
Density function

- Multiple layers of noise
- Vary by height
- A lot of parameters

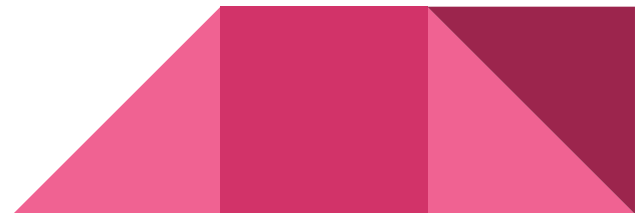
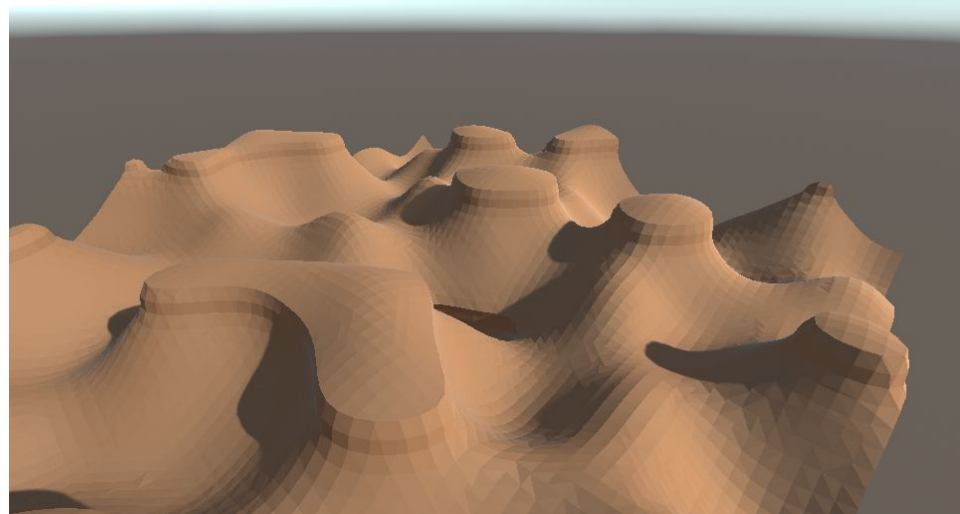
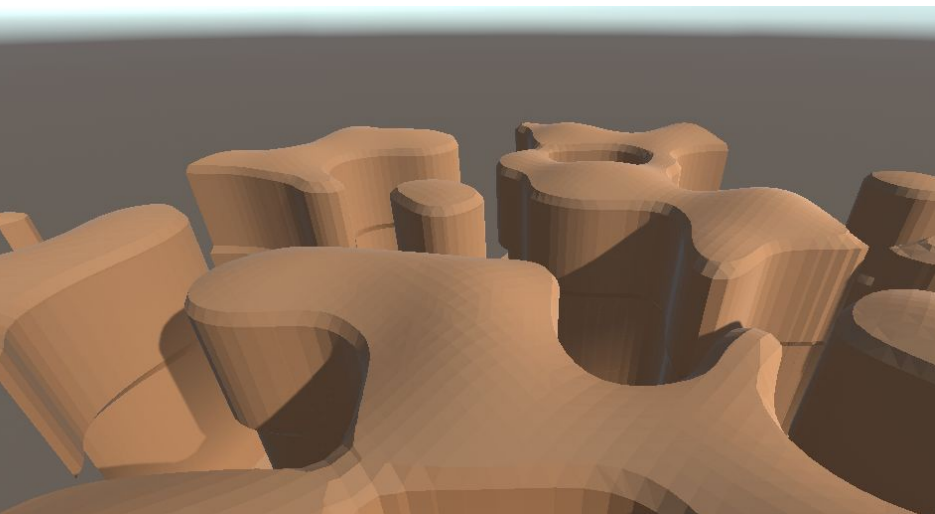


- Hello Games' Sean Murray on No Man's Sky, probably

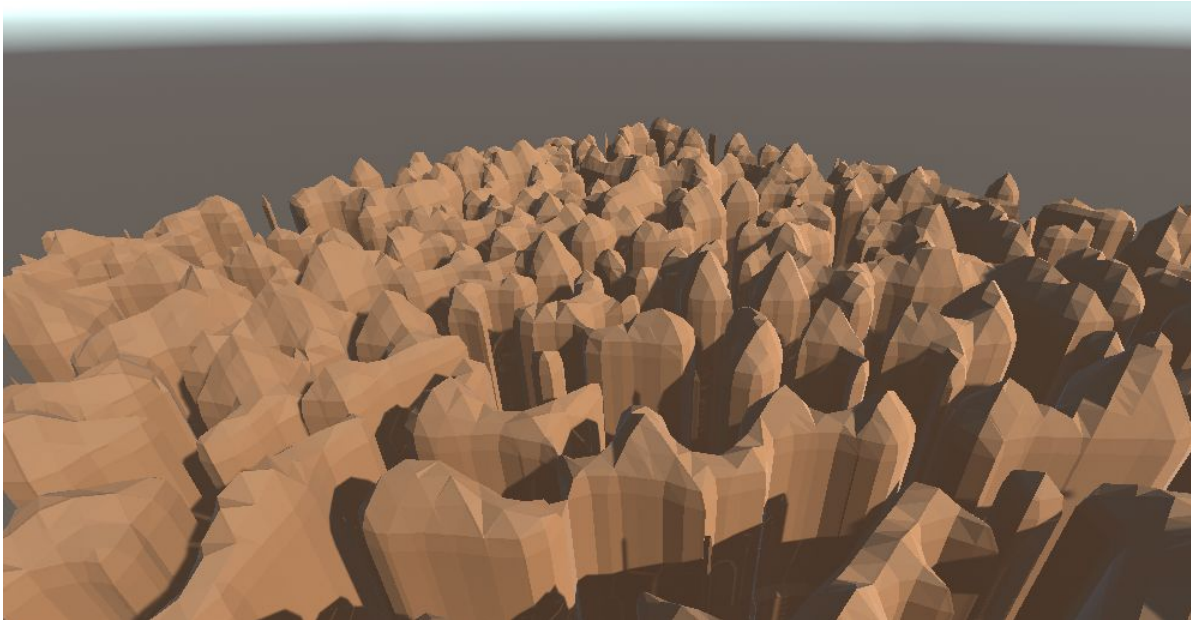
- A lot of parameters



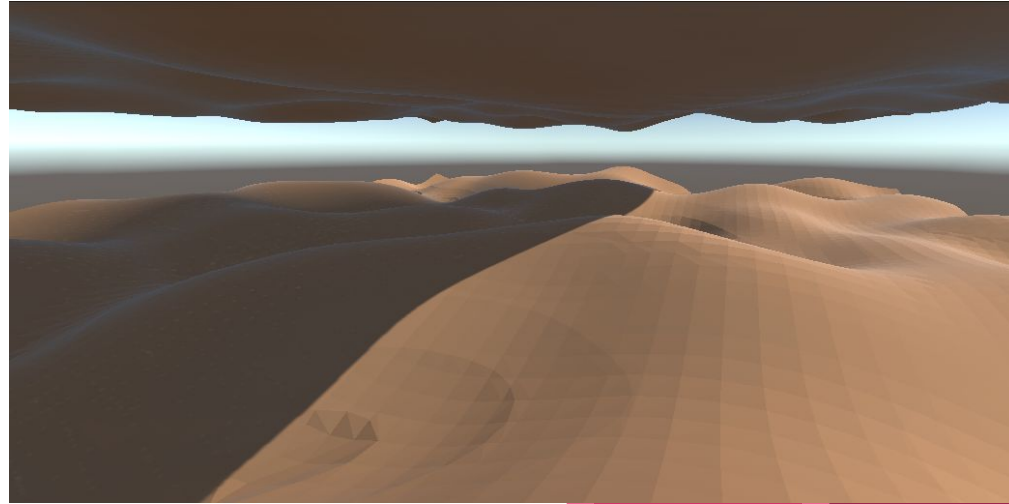
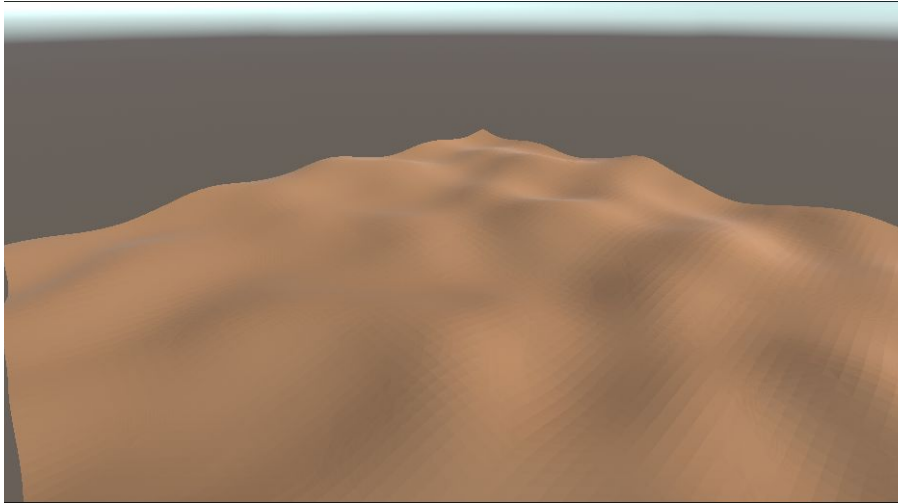
Density function experiments - Low variance



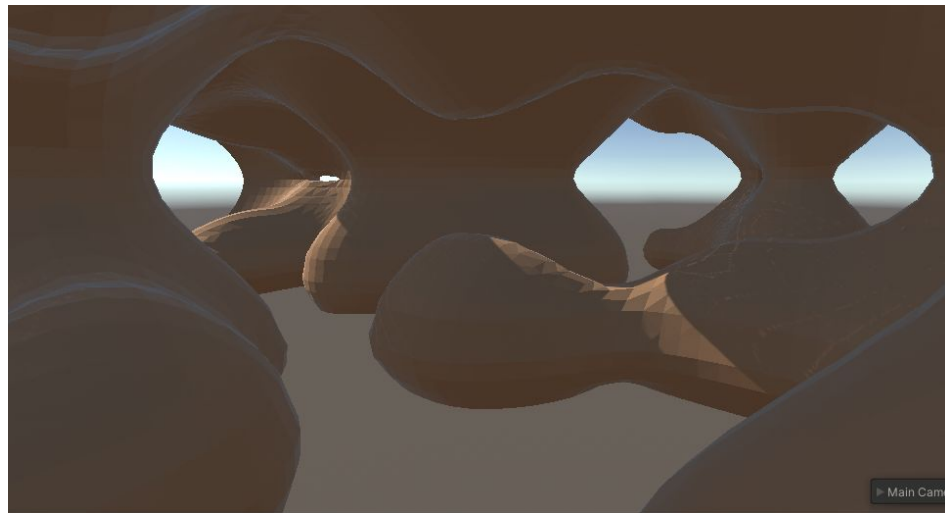
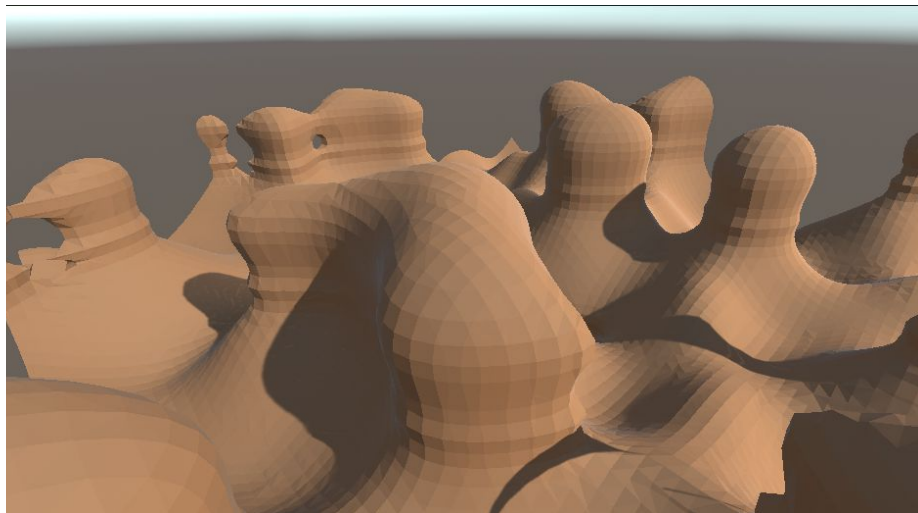
Density function experiments - Horizontal variance



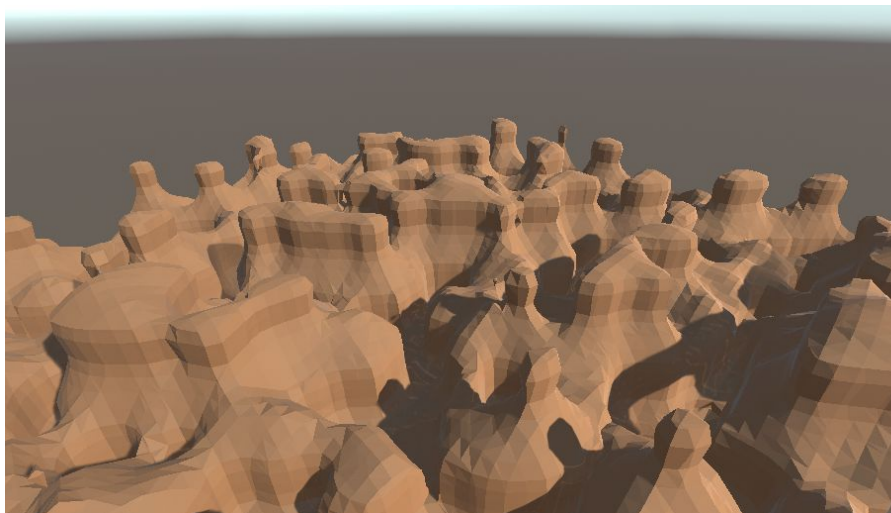
Density function experiments - Vertical variance



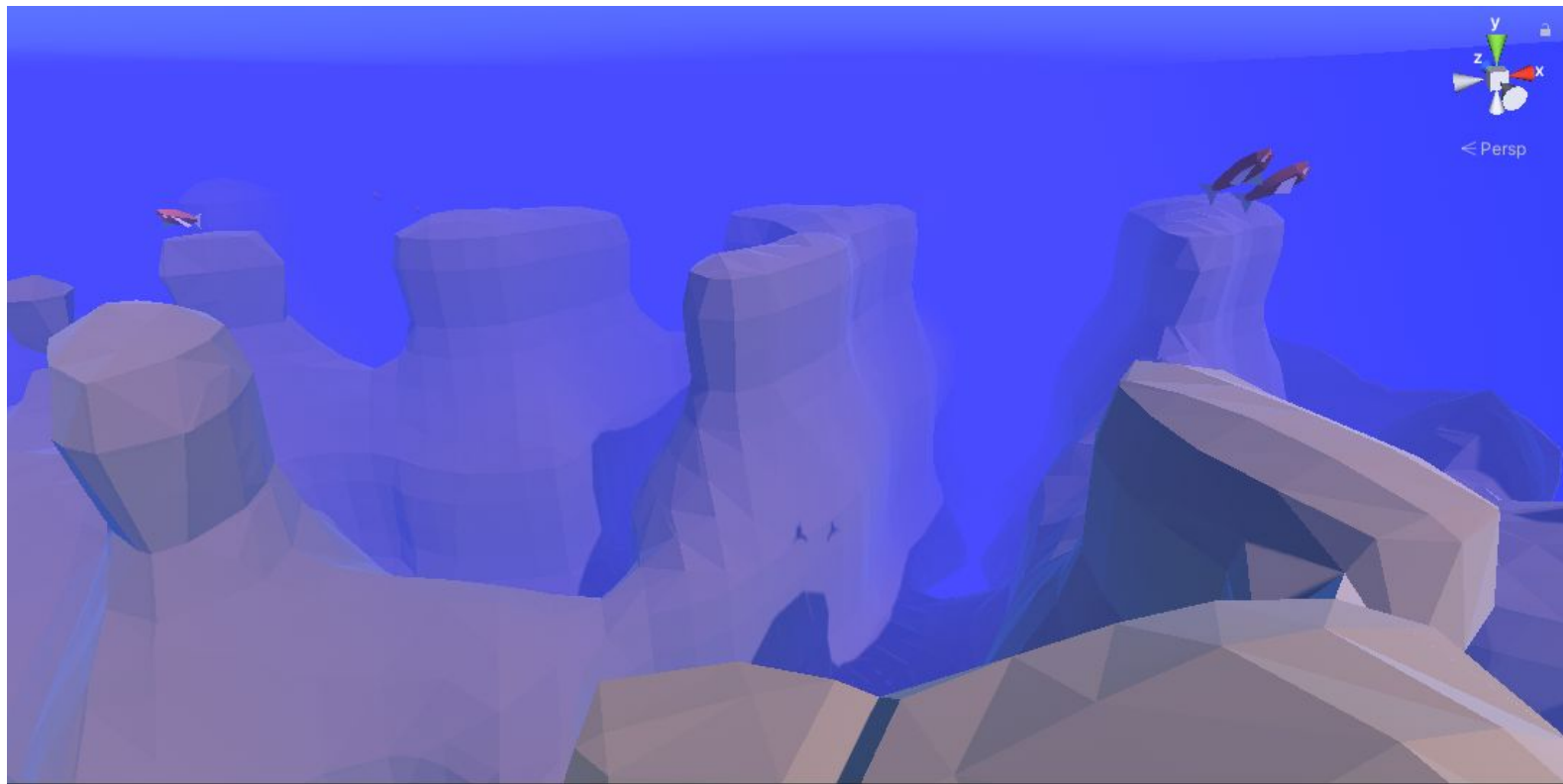
Density function experiments - High amplitudes



Density function experiments - Final results



Fog - Above ground



Fog - Underground



Final touches



Finished product



Conclusion

- Schooling behaviour of fish
- Infinite terrain
- Water environment using fog + animated water



Future work

- Improve detection of predator
 - Vary type of seabed (more noise!)
 - Improve texture of surface water underwater
 - Decorations (coral, seaweed)
- 