Computer Graphics

Sofia d'Atri & Nicolo' Tafta
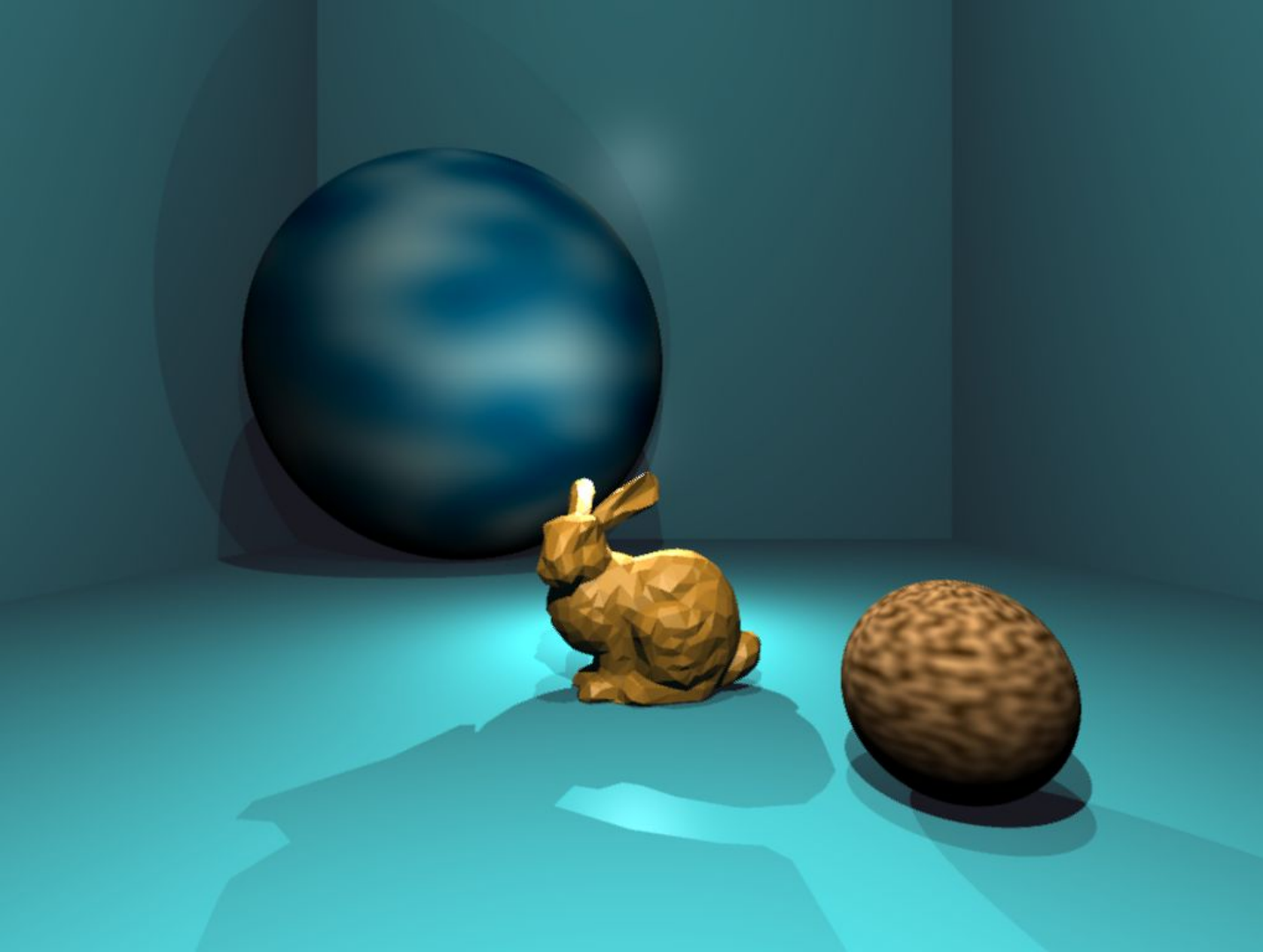
Plain
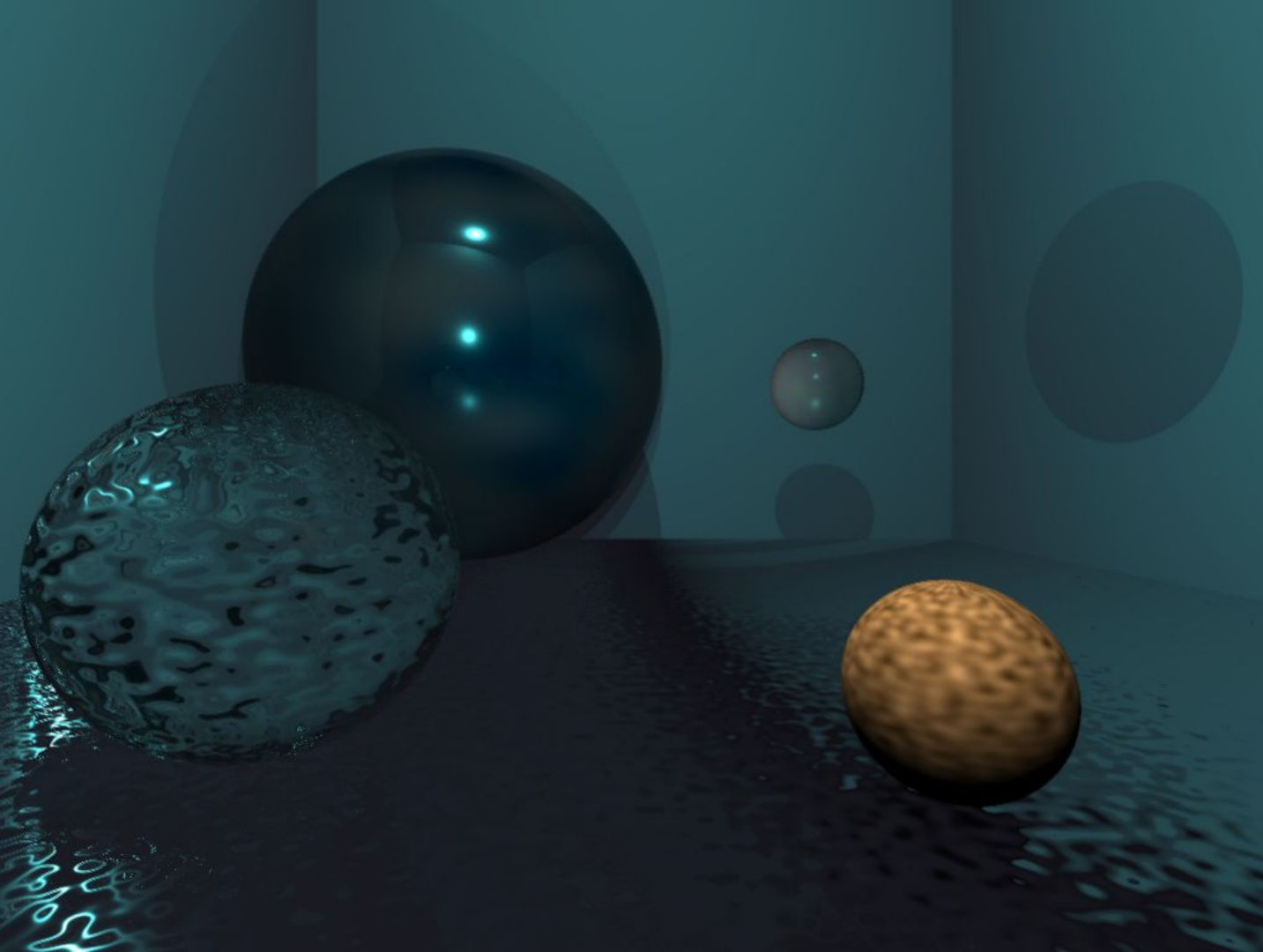
Antialiasing
implementation
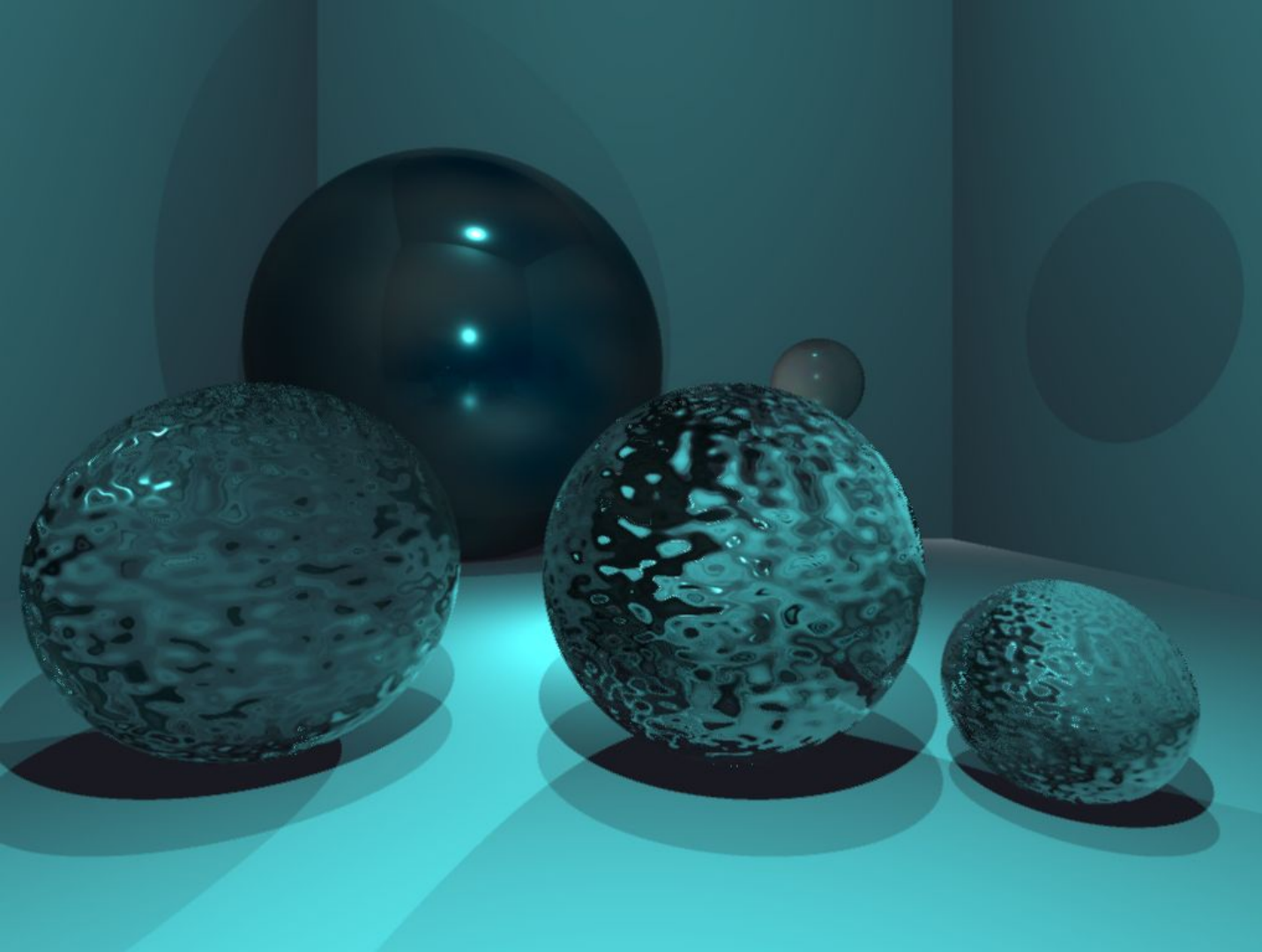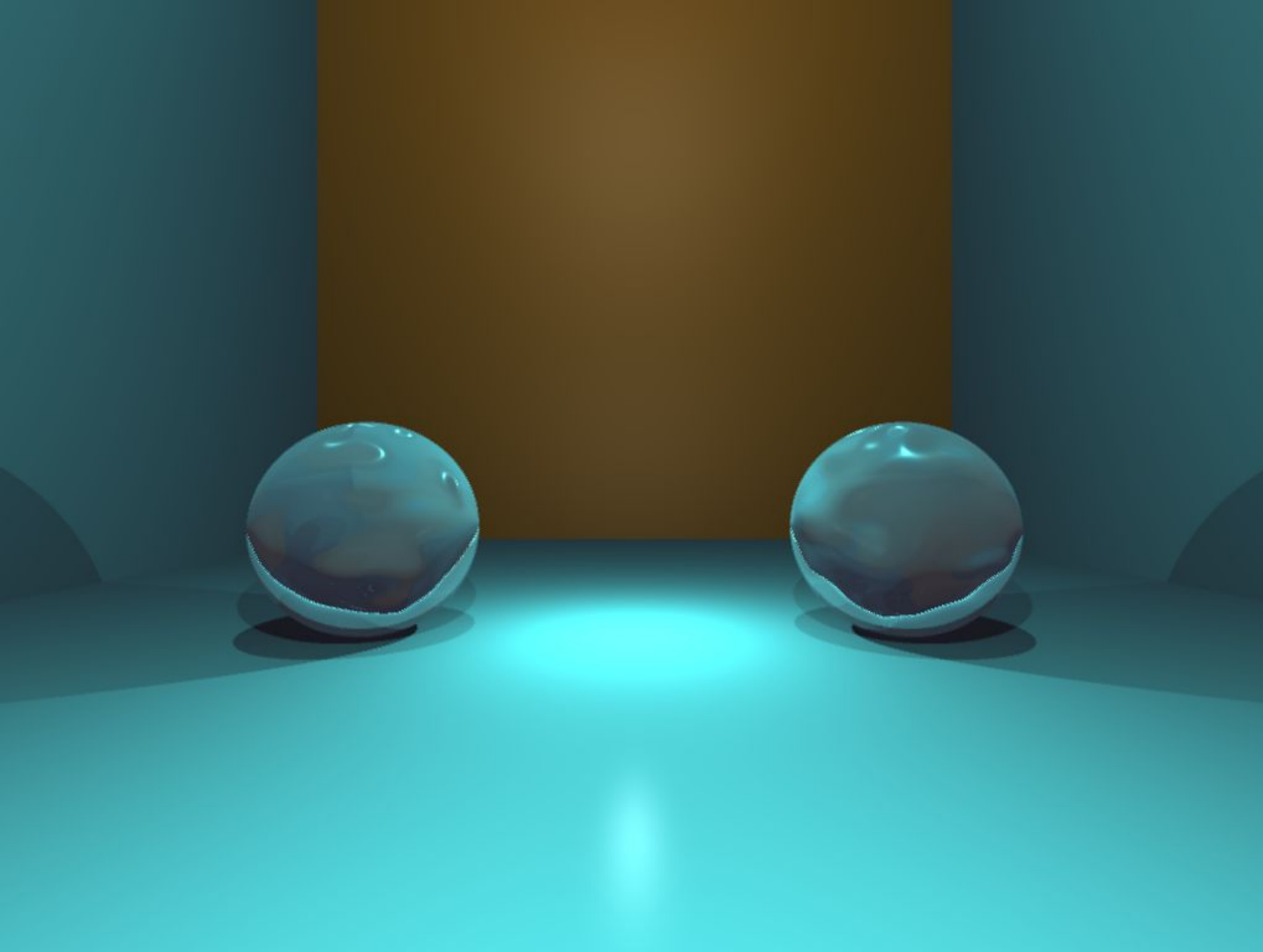
Perlin Noise - Textures

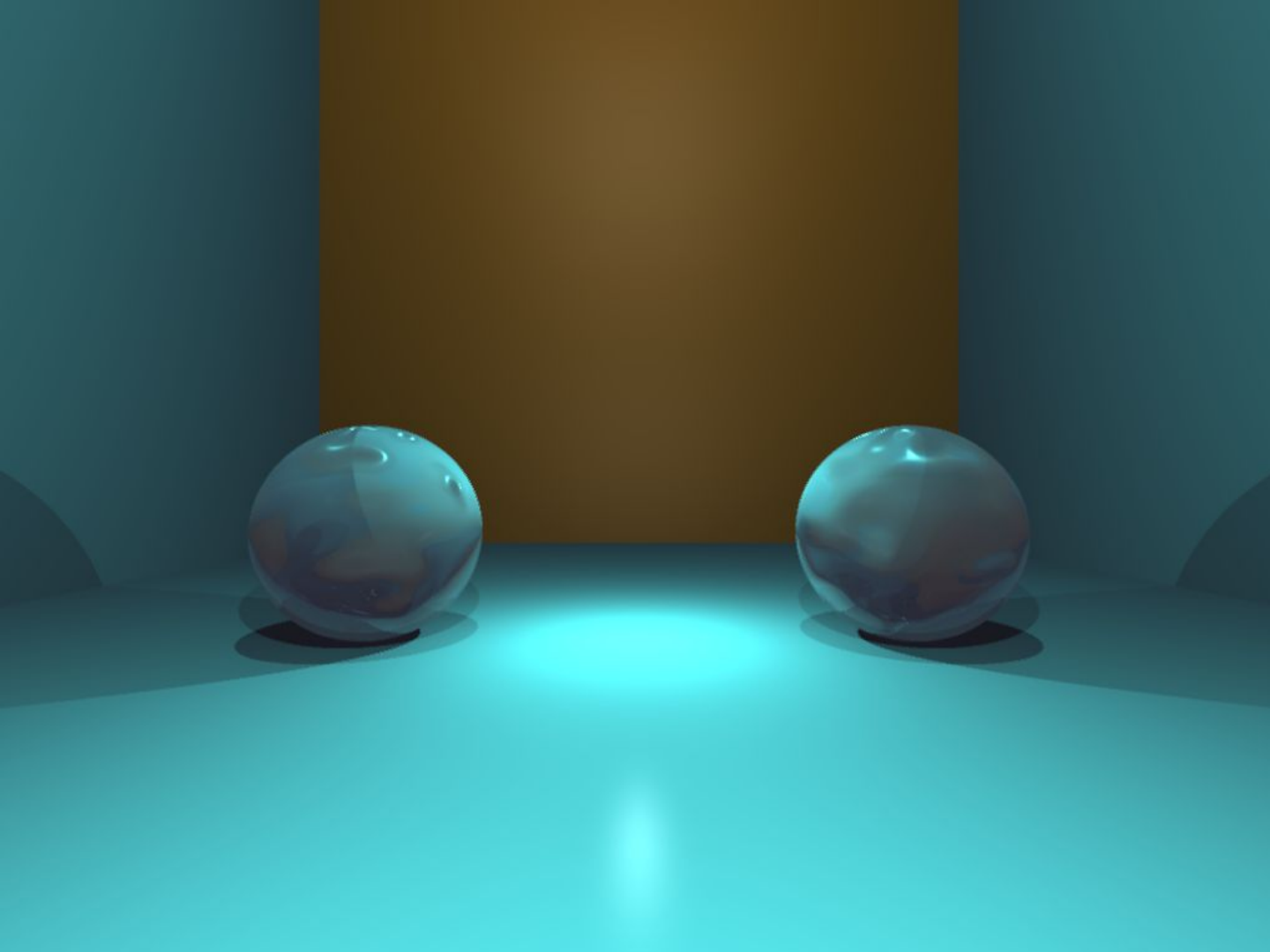Perlin noise - Normal maps

Perlin noise - Normal maps

Reflections - Advanced
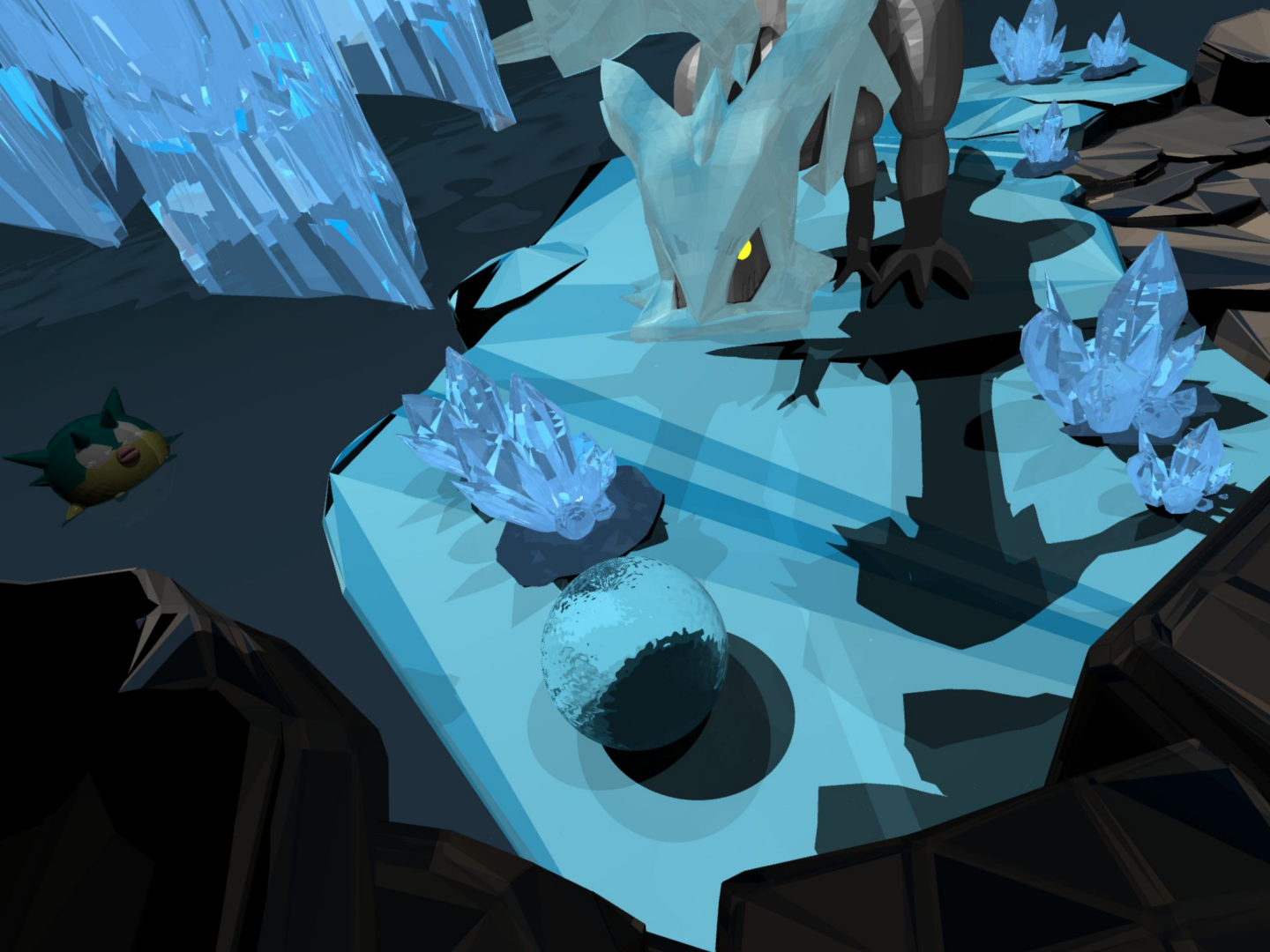
Anisotropy enabled

Reflections - Advanced

Anisotropy disabled

Final Render

Ward anisotropic distribution ✏️

The Ward anisotropic distribution [1]↗ uses two user-controllable parameters a_x and a_y to control the anisotropy. If the two parameters are equal, then an isotropic highlight results. The specular term in the distribution is:

$$k_{\text{spec}} = \frac{\rho_s}{\sqrt{(N \cdot L)(N \cdot V)}} \frac{N \cdot L}{4\pi\alpha_x\alpha_y} \exp\left[-2\frac{\left(\frac{H \cdot X}{\alpha_x}\right)^2 + \left(\frac{H \cdot Y}{\alpha_y}\right)^2}{1 + (H \cdot N)}\right]$$

The specular term is zero if $N \cdot L$ < 0 or $N \cdot V$ < 0. All vectors are unit vectors. The vector V is the viewing direction, L is the direction from the surface point to the light, H is the half-angle direction between V and L, N is the surface normal, and X and Y are two orthogonal vectors in the normal plane which specify the anisotropic directions.

Advanced Reflectance Model

Implemented the formula on the left.