CS 557 Assignment Two : Noisy Elliptical Dots

Name: Chiayu Tu

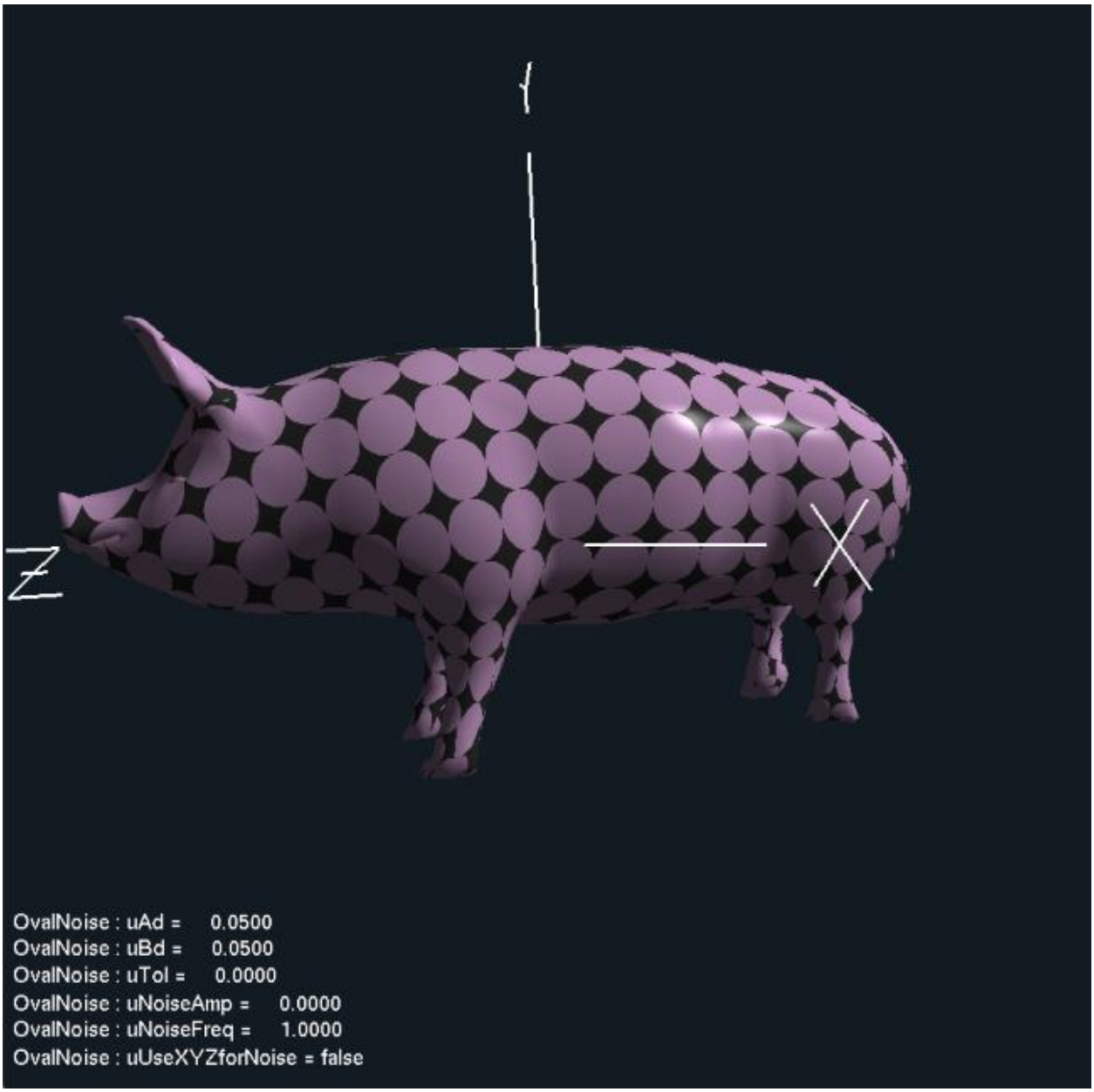
Email: tuchi@oregonstate.edu

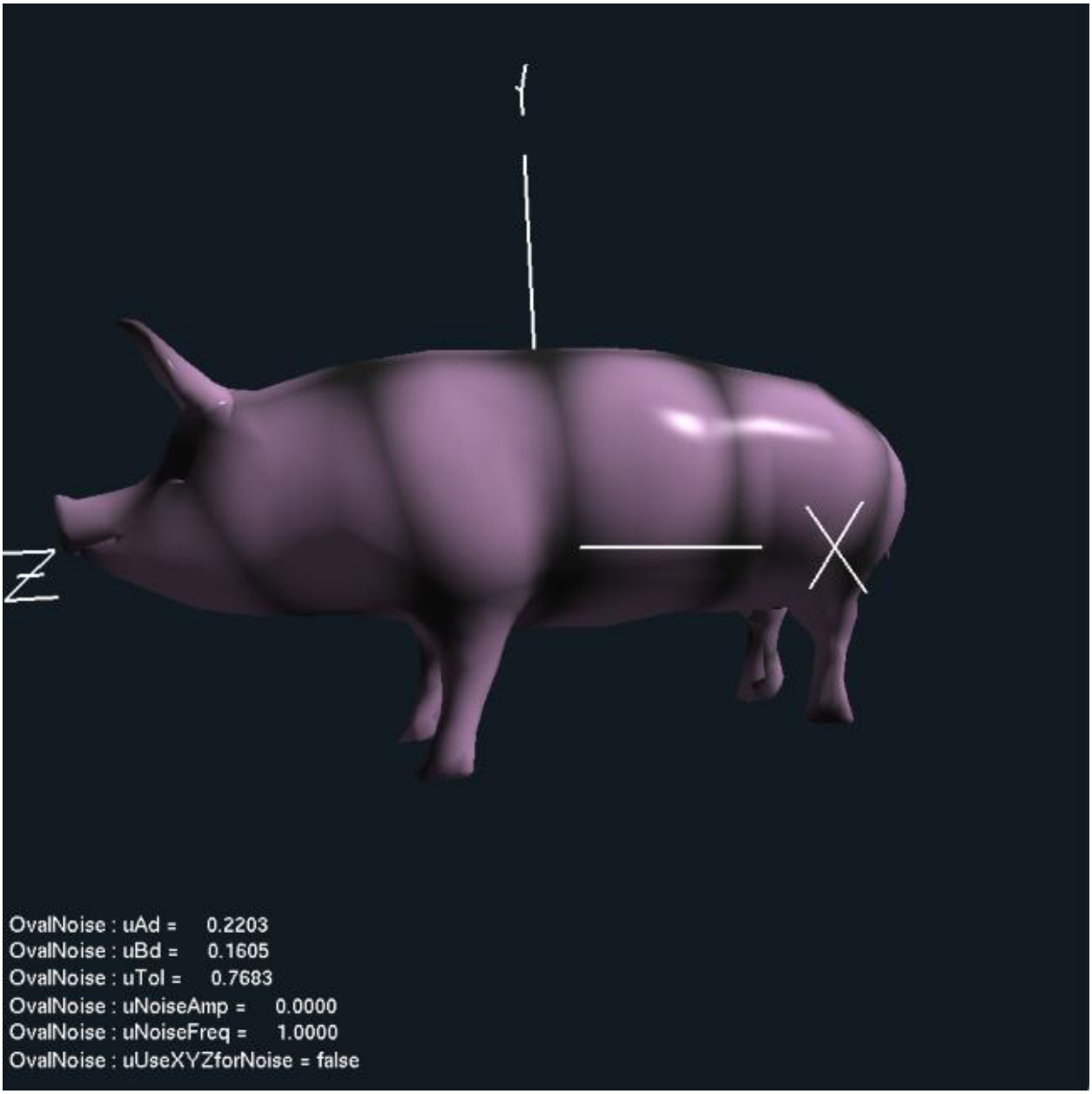
Link: CS 557 Assignment Two - OSU MediaSpace (oregonstate.edu)

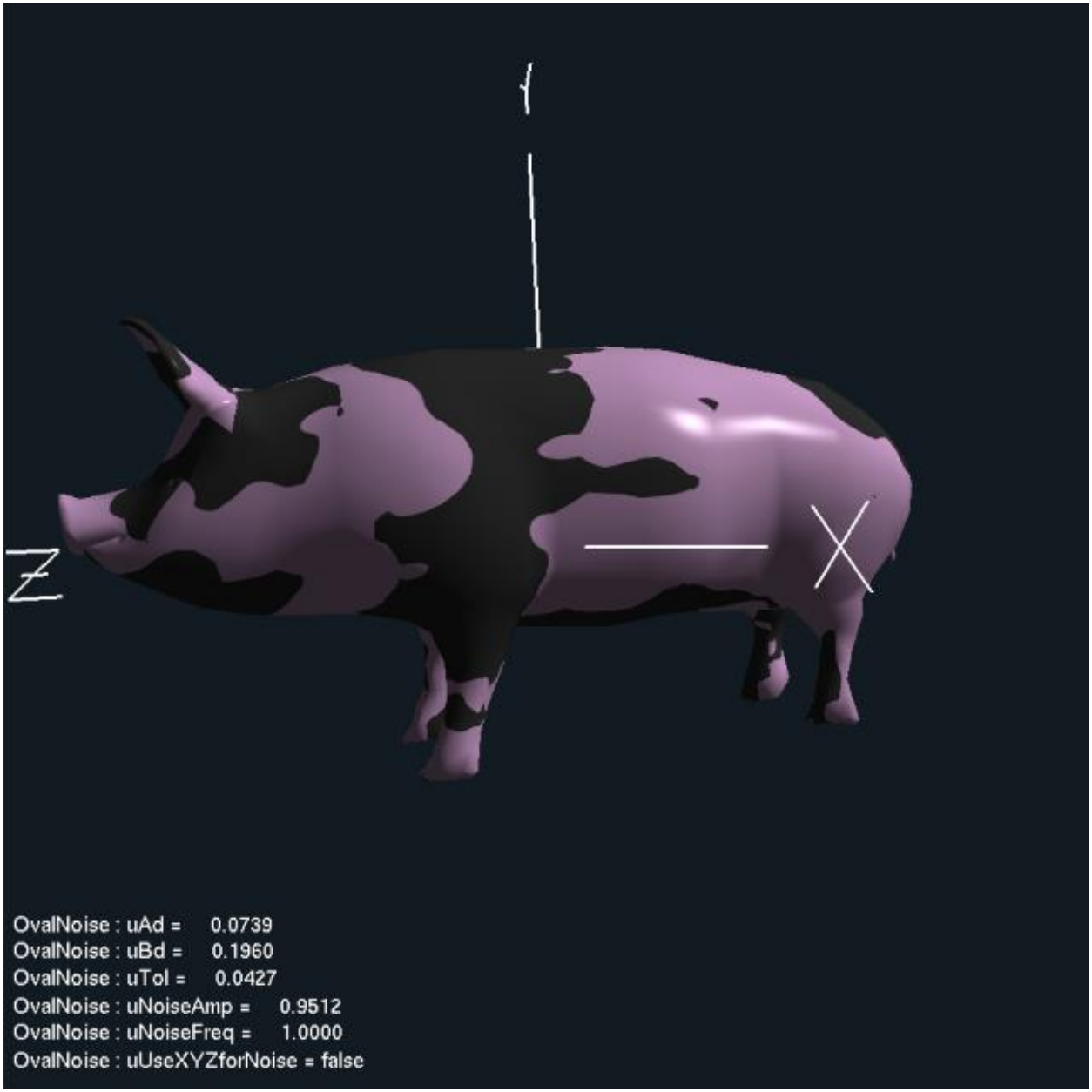
Project Description:

This OpenGL fragment shader, compatible with version 330, is expertly crafted to render a dynamic textured surface featuring an ellipse-based pattern, where the key highlight is the sophisticated integration of noise to modulate this pattern. The shader utilizes uniform variables like uAd, uBd, uNoiseAmp, and uNoiseFreq, along with a 3D noise texture (Noise3), to introduce and manipulate noise values. This results in the distortion and scaling of the ellipses based on texture coordinates (vST) or vertex position (vMCposition), depending on the uUseXYZforNoise setting. In addition to the noise-influenced pattern, the shader incorporates advanced lighting calculations, factoring in ambient, diffuse, and specular components modulated by coefficients (uKa, uKd, uKs) and a shininess factor (uShininess). These calculations are done per fragment, considering the normal vector (vN), the vector to the light source (vL), and the vector to the observer (vE), ensuring that each pixel not only displays the underlying pattern but also realistically responds to the lighting environment. The convergence of the noise-driven pattern variation and realistic lighting effects culminates in a textured surface that is both visually dynamic and responsive to changes in environmental lighting and pattern properties.

Project Screenshot:

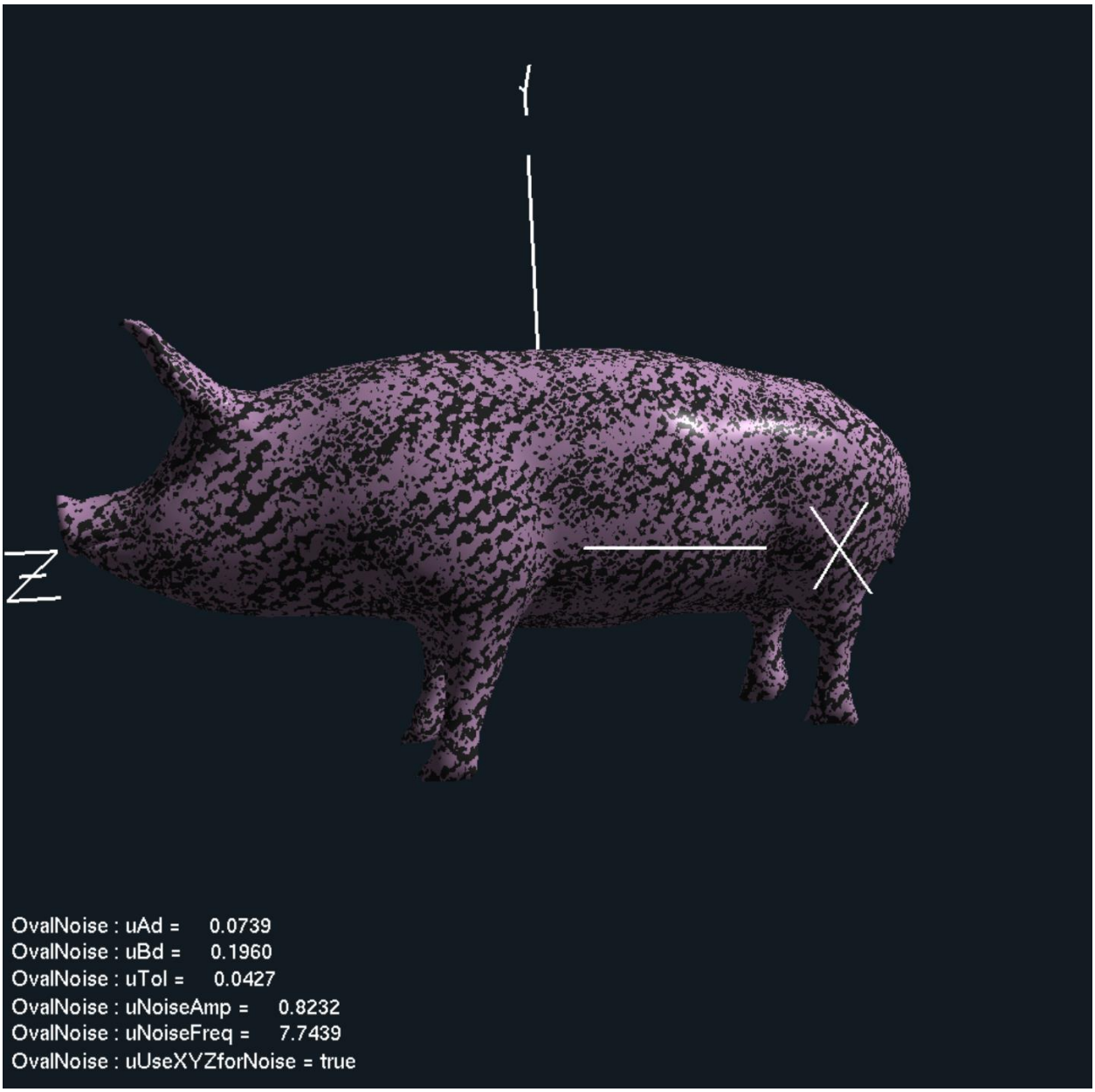

Y
Z
X
OvalNoise : uAd = 0.0500
OvalNoise : uBd = 0.0500
OvalNoise : uTol = 0.0000
OvalNoise : uNoiseAmp = 0.0000
OvalNoise : uNoiseFreq = 1.0000
OvalNoise : uUseXYZforNoise = false


Y
Z
X
OvalNoise : uAd = 0.2203
OvalNoise : uBd = 0.1605
OvalNoise : uTol = 0.7683
OvalNoise : uNoiseAmp = 0.0000
OvalNoise : uNoiseFreq = 1.0000
OvalNoise : uUseXYZforNoise = false


Y
Z
X
OvalNoise : uAd = 0.0739
OvalNoise : uBd = 0.1960
OvalNoise : uTol = 0.0427
OvalNoise : uNoiseAmp = 0.9512
OvalNoise : uNoiseFreq = 1.0000
OvalNoise : uUseXYZforNoise = false


Y
Z
X
OvalNoise : uAd = 0.0739
OvalNoise : uBd = 0.1960
OvalNoise : uTol = 0.0427
OvalNoise : uNoiseAmp = 0.9512
OvalNoise : uNoiseFreq = 5.6341
OvalNoise : uUseXYZforNoise = false


Y
Z
X
OvalNoise : uAd = 0.0739
OvalNoise : uBd = 0.1960
OvalNoise : uTol = 0.0427
OvalNoise : uNoiseAmp = 0.8232
OvalNoise : uNoiseFreq = 2.8293
OvalNoise : uUseXYZforNoise = true


Y
Z
X
OvalNoise : uAd = 0.0739
OvalNoise : uBd = 0.1960
OvalNoise : uTol = 0.0427
OvalNoise : uNoiseAmp = 0.8232
OvalNoise : uNoiseFreq = 7.7439
OvalNoise : uUseXYZforNoise = true