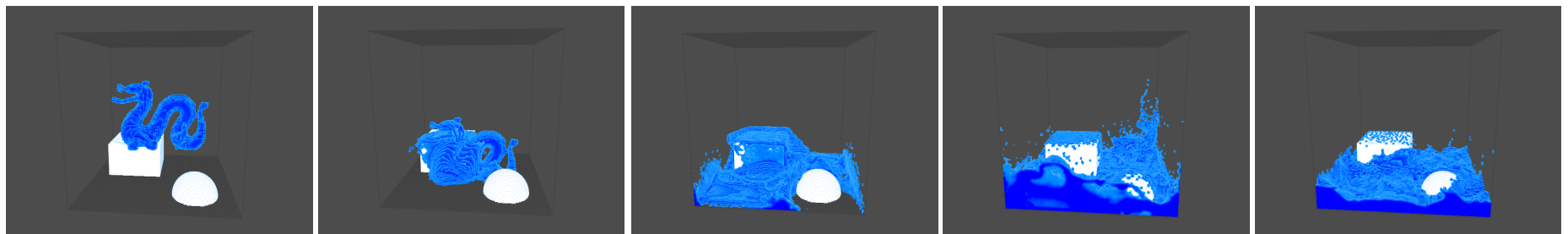


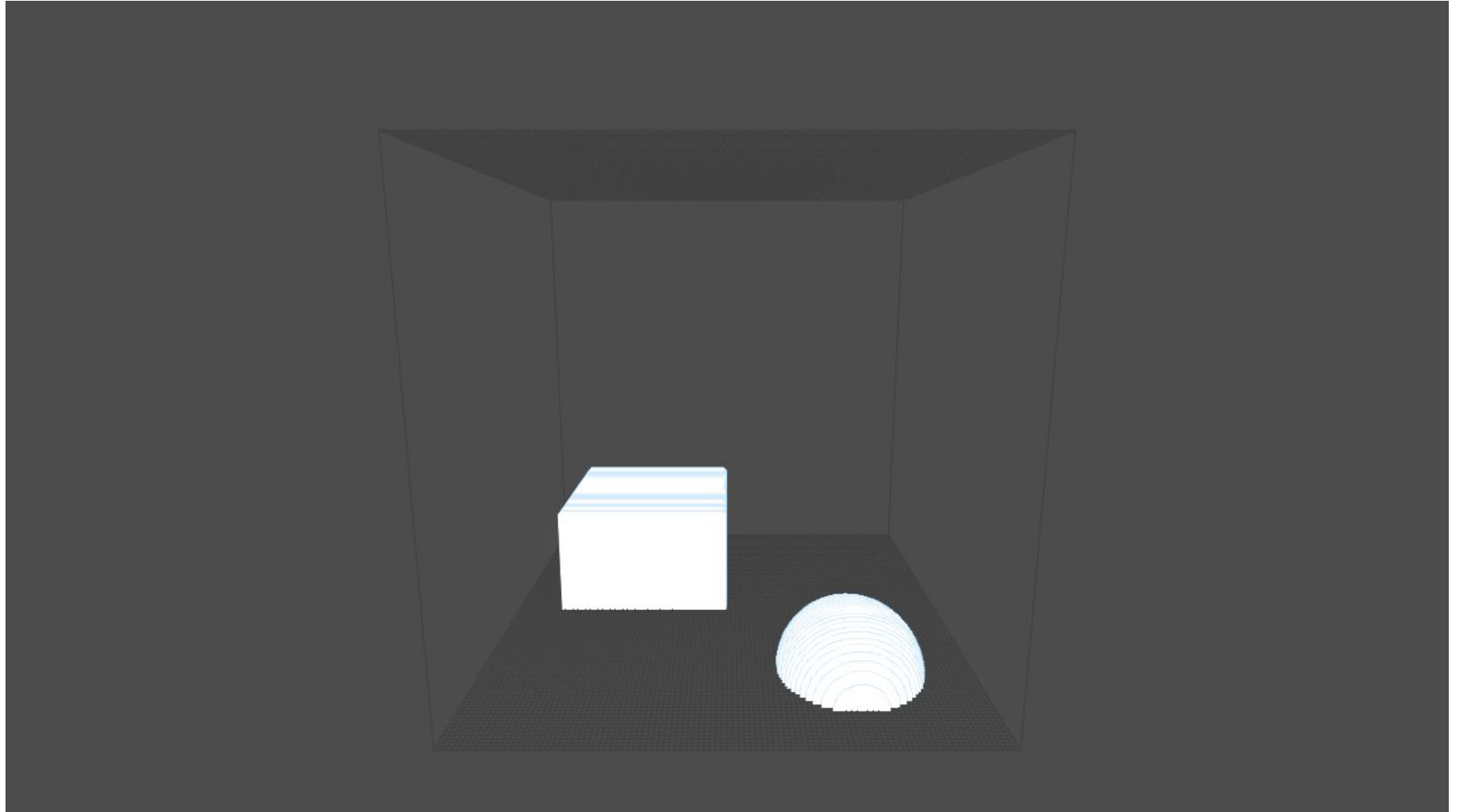
Chocolate Milk

A Fluid Simulation Framework

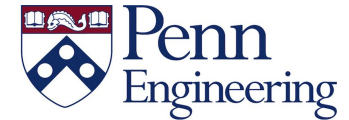


Dan Knowlton

Advisors: Dr. Norman Badler, Aline Normoyle



Goals



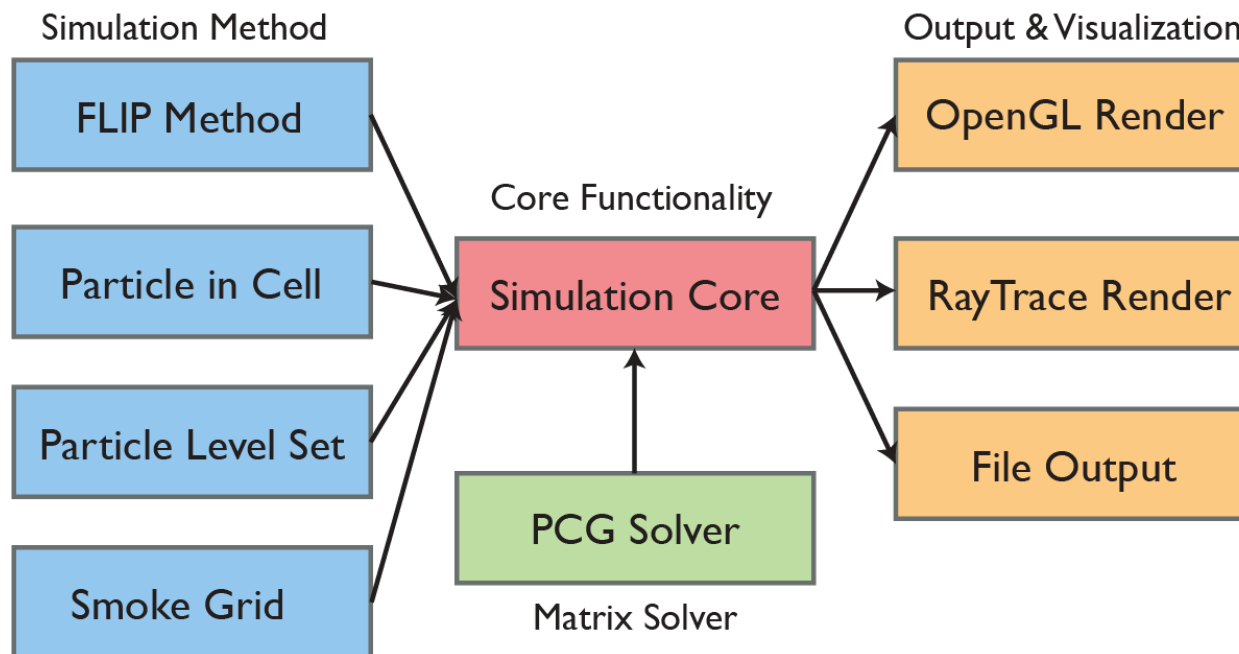
- Develop a fluid simulation framework based on connecting and exchanging individual “modules”.
- Implement a variety of simulation methods concurrently to allow for crossover between methods.

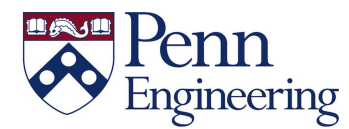
Features



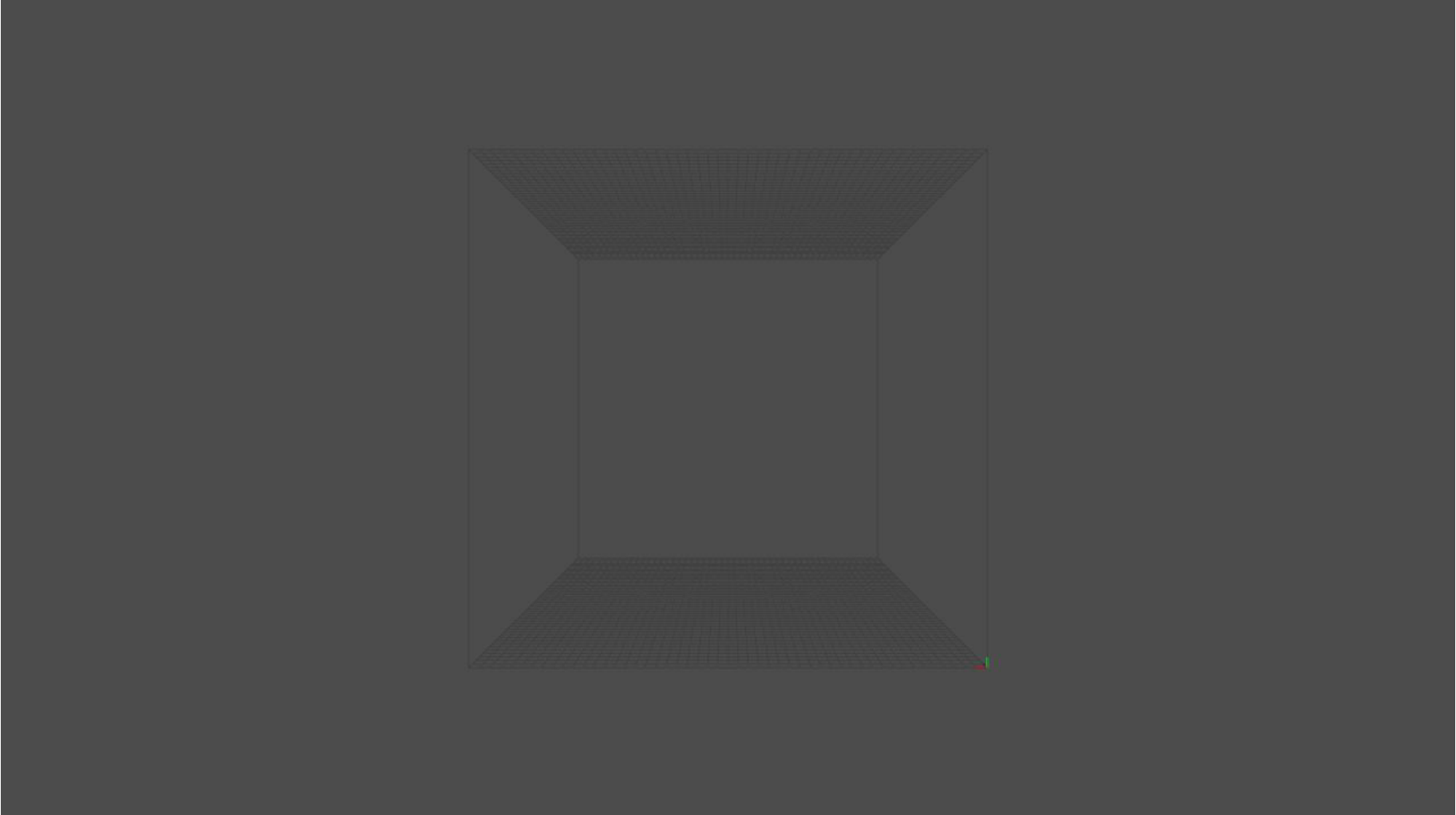
- Marker-and-Cell based fluid simulator with a variety of features:
 - Particle-in-Cell, Particle Levelset, and FLIP simulation methods.
 - Preconditioned Conjugate Gradient Solver
 - Runge Kutta 2nd Order Advection
 - Complex OBJ boundaries and pressure solve
 - Signed Distance Field Renderer
 - Fluid Viscosity
 - Smoke Simulation (with temperature/ density)

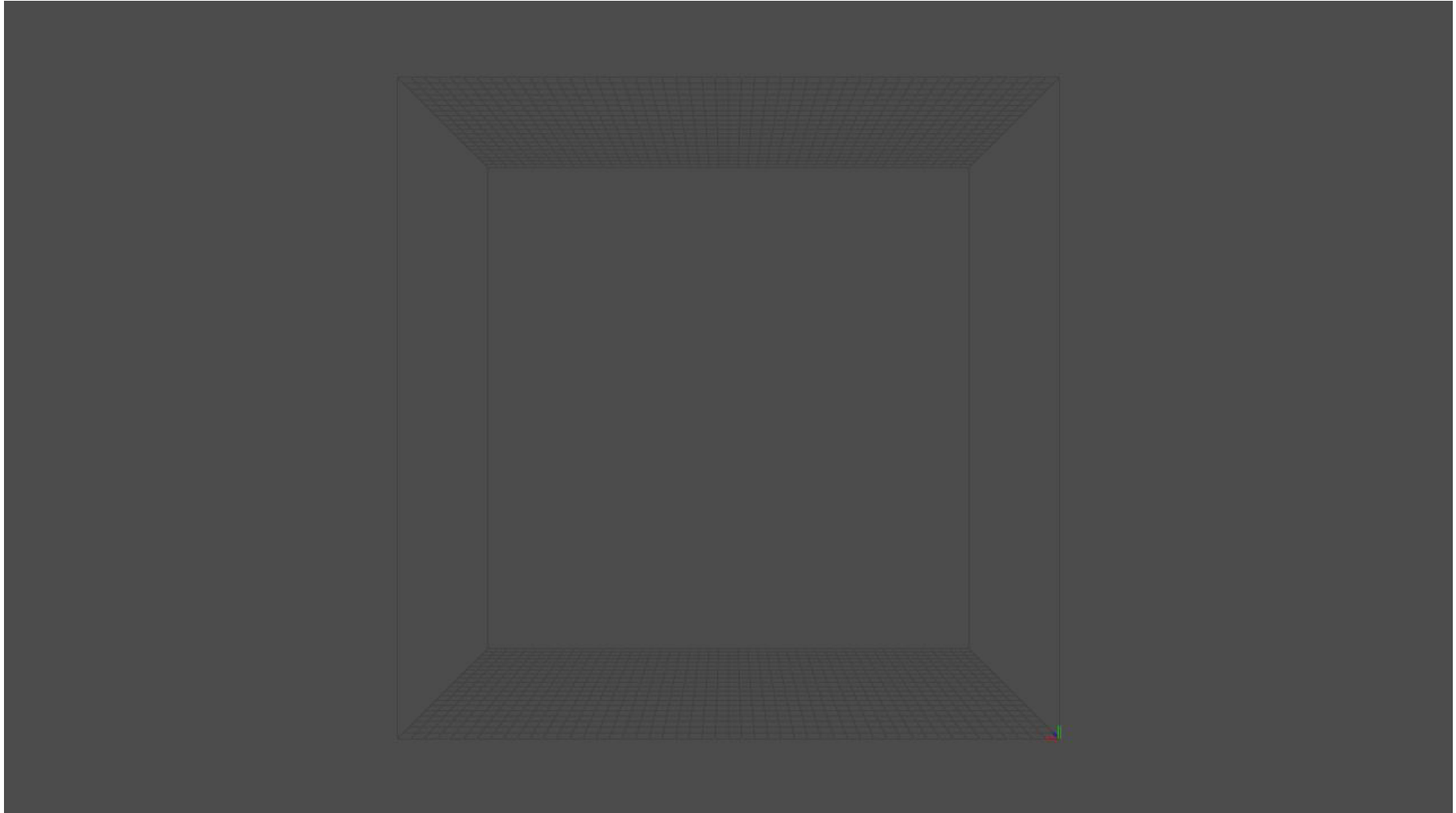
Framework Design

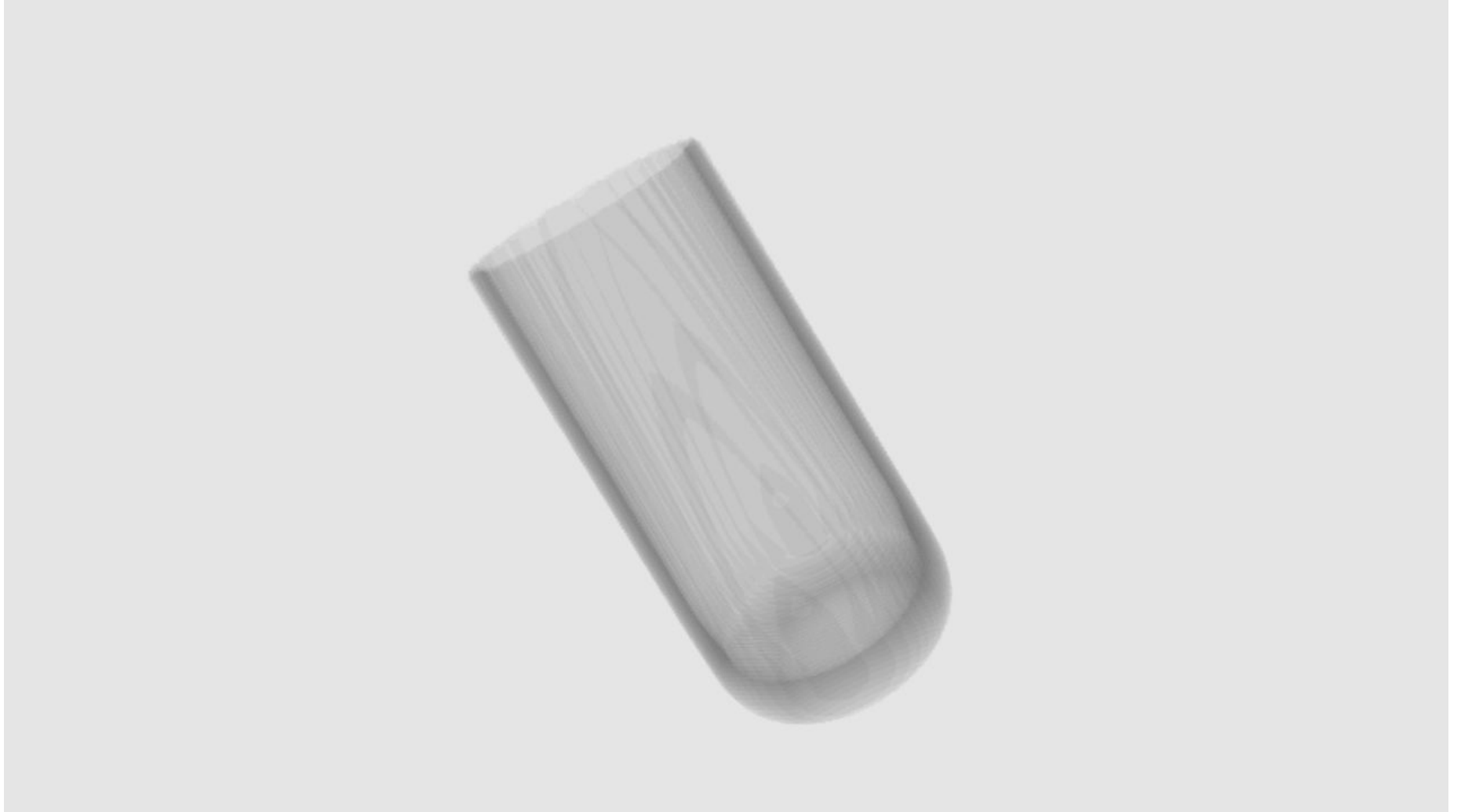


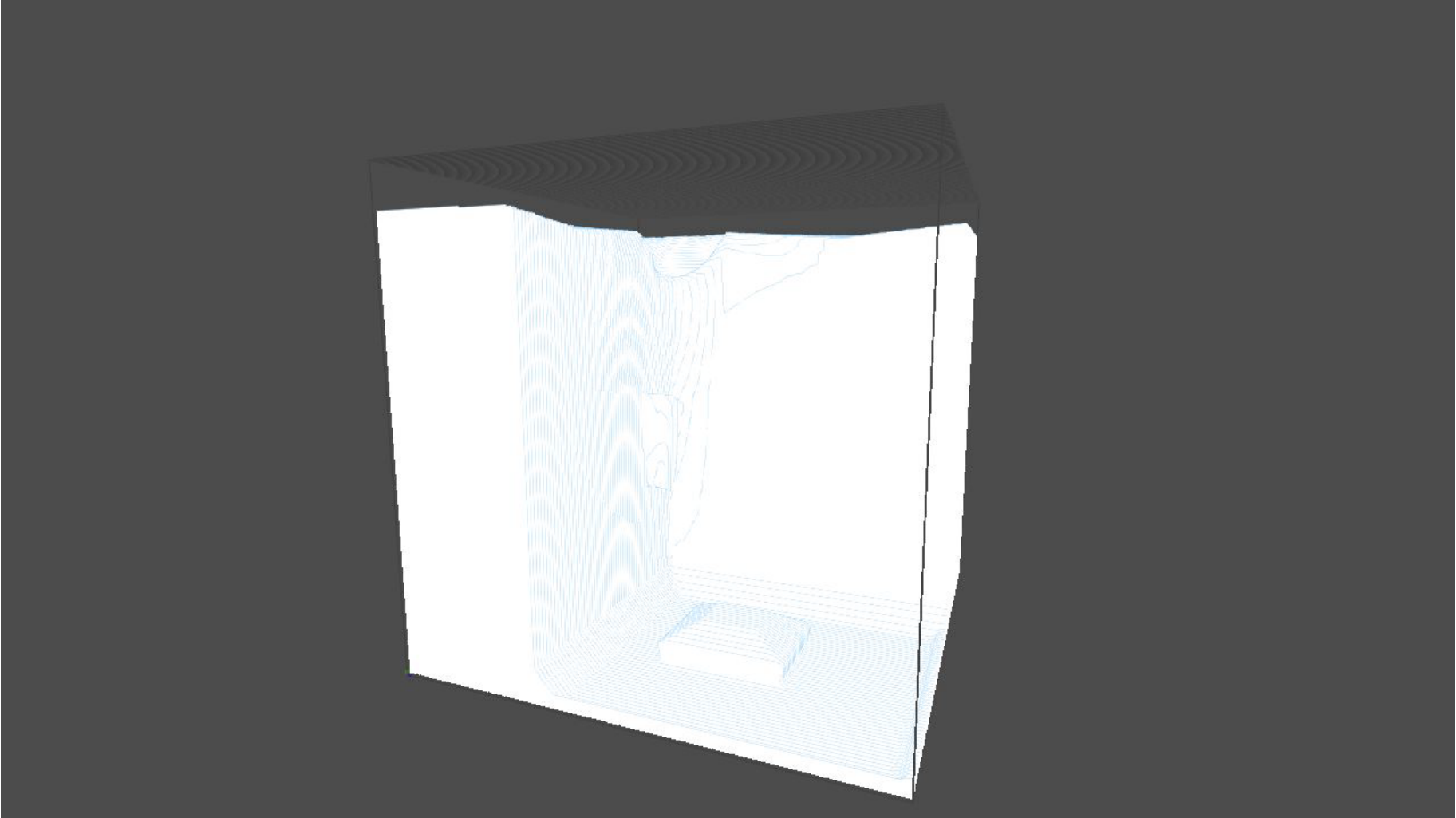


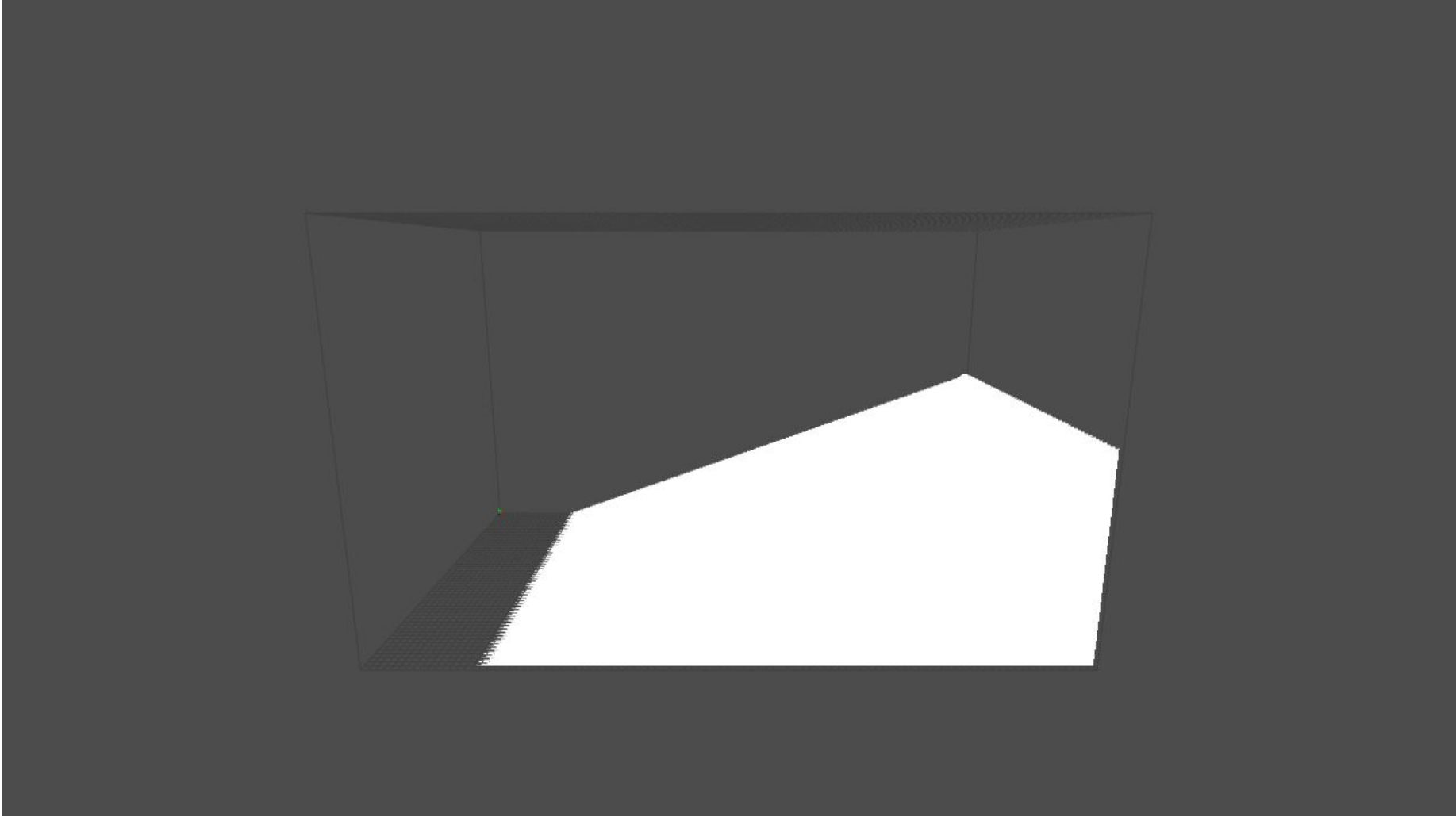
Demos

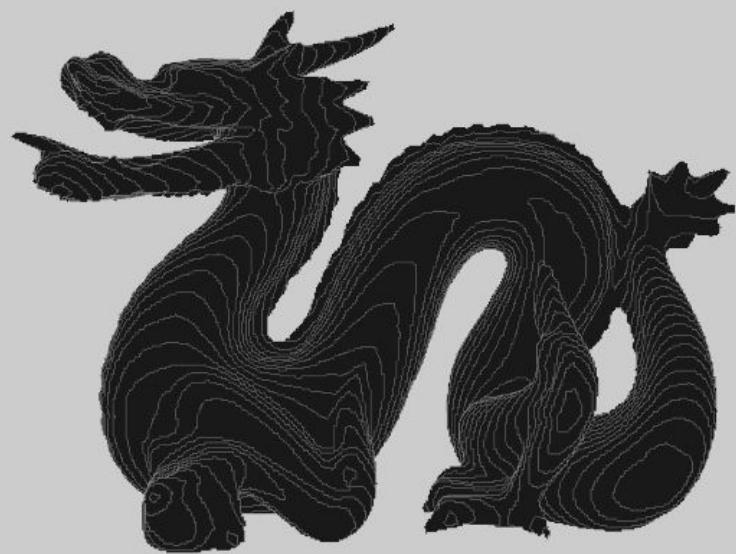






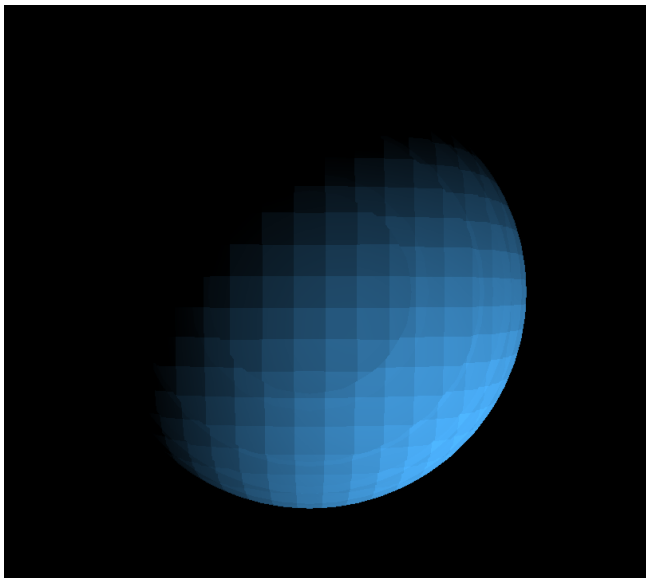




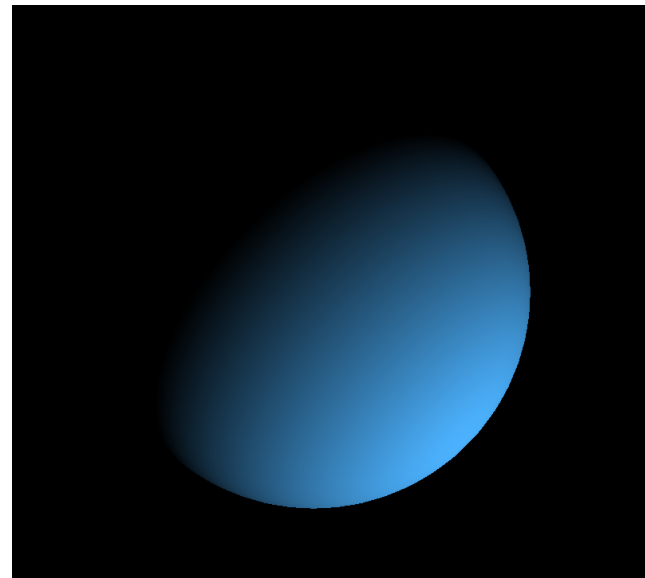


Rendering

- Raytrace signed distance fields
- Gradient of signed distance provides surface normal

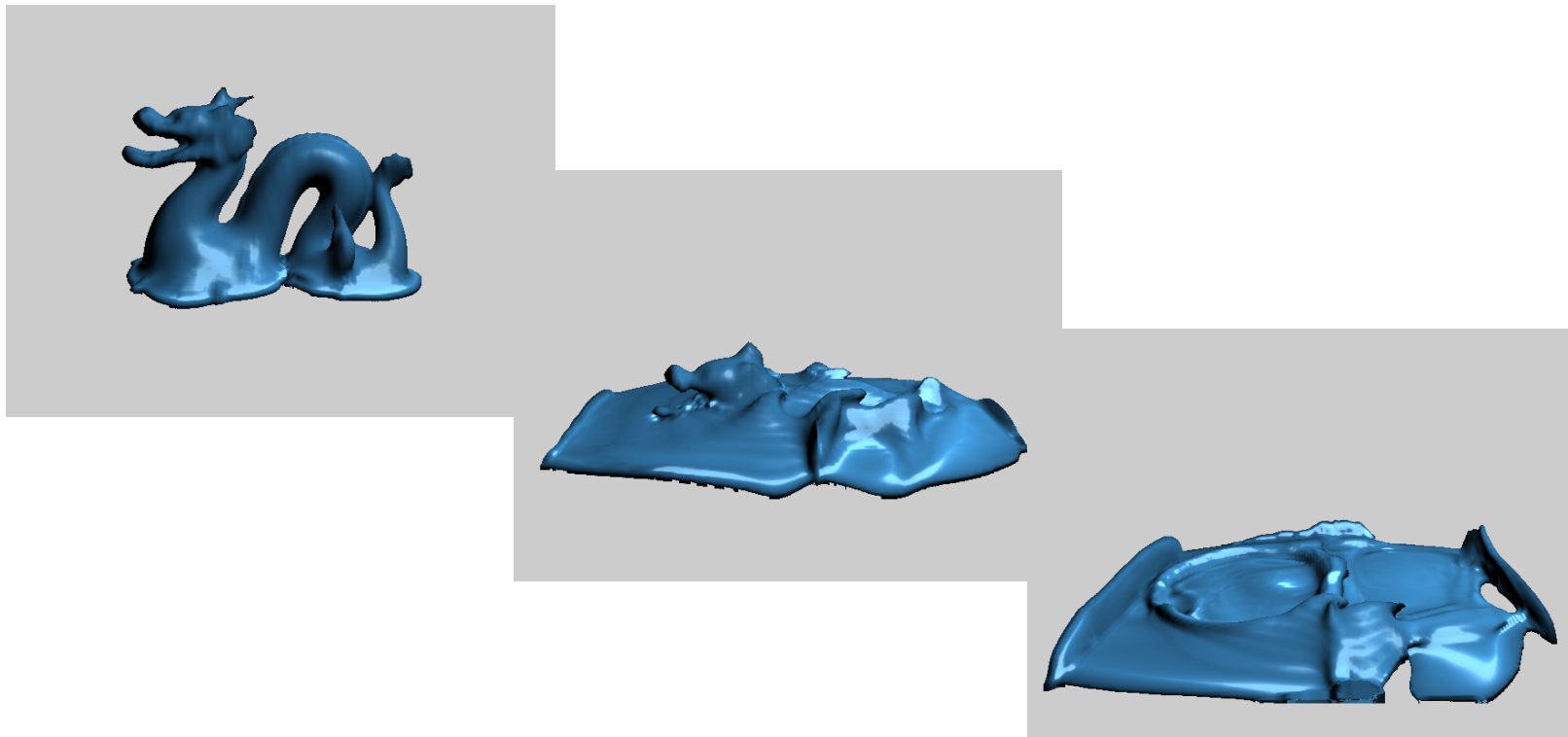


Single Gradient

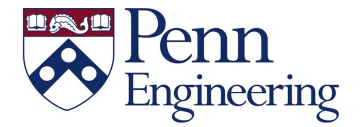


Gradient Interpolation

Rendering



Thanks!



Questions?