Real-Time Metaballs

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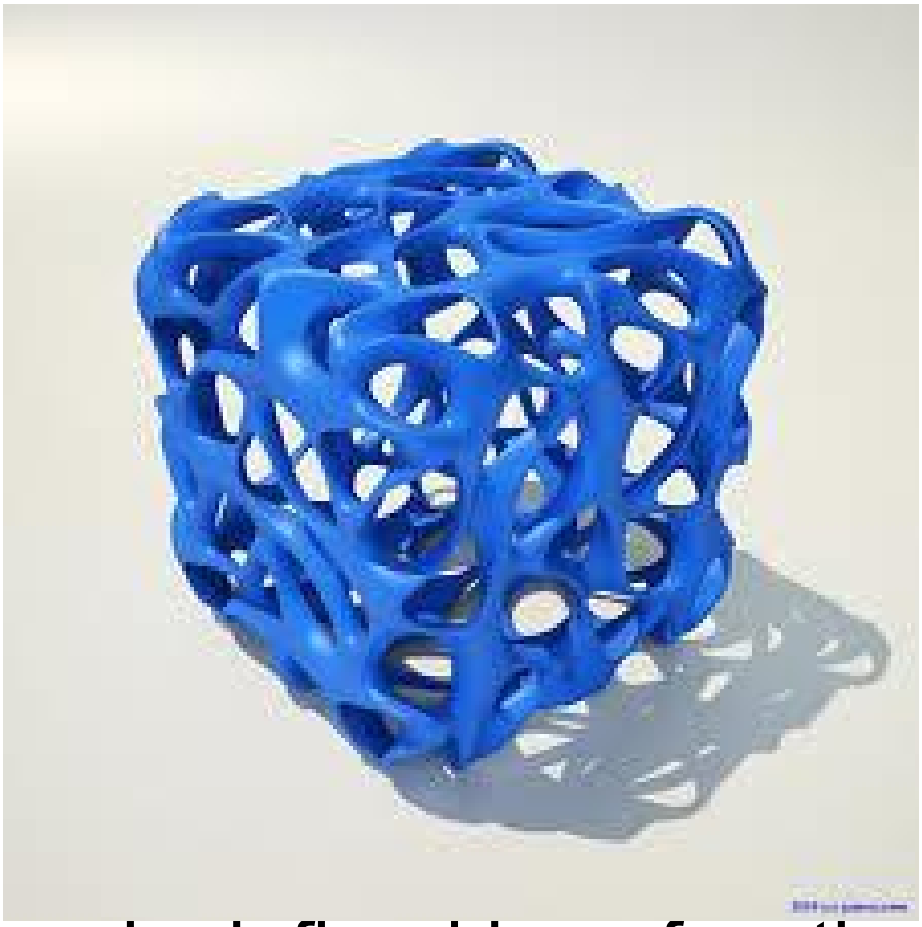
Isosurfaces



An isosurface is defined by a function.

Metaballs

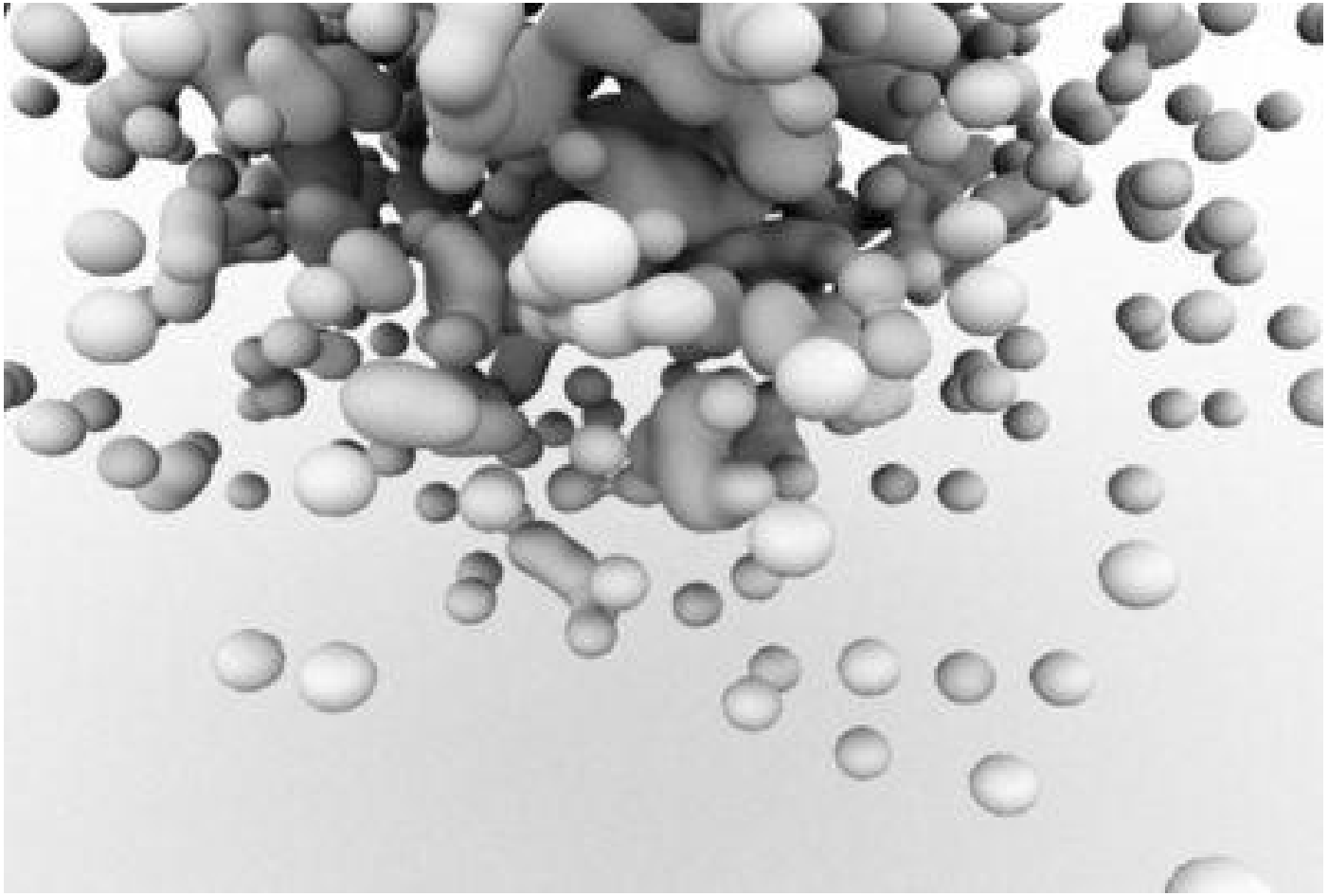
In this case that function is:

$$\sum_{i=0}^{n} \text{metaball}_i(x, y, z) \leq \text{threshold}$$

Where the metaball function is defined as:

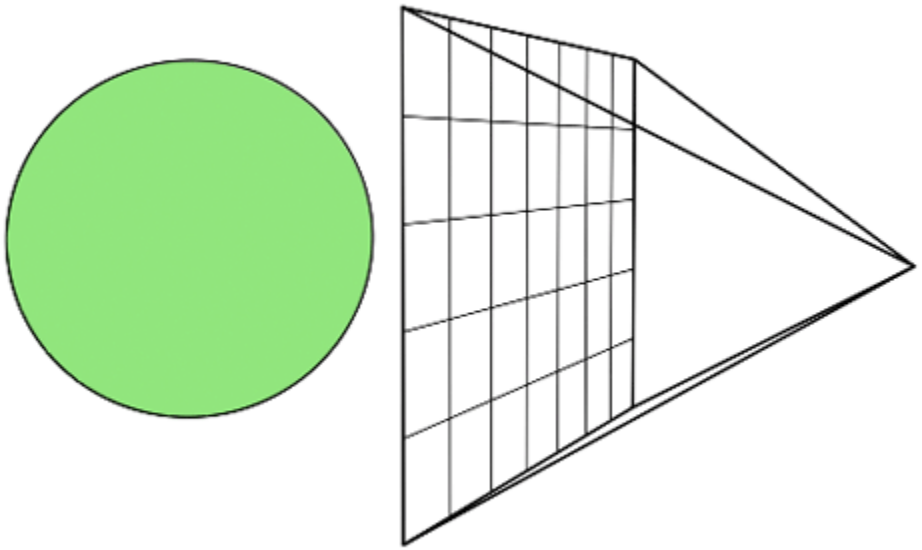
$$f(x, y, z) = 1/((x - x_0)^2 + (y - y_0)^2 + (z - z_0)^2)$$

The Planned Result



Rendering the Metaballs

Two render the metaballs, I'll be using ray casting.



Ray Casting

1. Shoot a ray through each pixel on the screen.

2. Step through that ray until you reach a pixel that is "inside" the isosurface.

3. Calculate normal and color the pixel.

Status

Completed

- Metaballs class
- Isosurface class complete.
- Proper threshold function.

To Do

- Ray casting
- Normal calculation