**surface mesh interface**

- look over interface document
- = makes copy
- vertex.setPosition changes mesh
- iterator lets you walk around a mesh vertex
- we will use the data structure to set average vertex normals.

**basic geometry**

- mesh surface point, \( p \) and unit normal \( N \).
- this defines an offset endpoint \( s \).
- shell surfaces points are evenly offset between \( p \) and \( s \)
- each triangle of each shell is drawn with the shell texture and with texture coordinates picking out an isosceles triangle.
- we will use the texture value as the alpha value.
  - use special shader.
    - \( u\text{AlphaExponent} \) is a uniform variable that gets larger as we go out in layers.
- so we need to give openGL vertices that are not shared between triangles. (unindexed).
- need to turn on alpha blending
- will draw from inner to outer layers (order of children in scene graph).

**simulation**

- add a tip variable \( t \) and tip velocity variable \( v \).
- \( s \) is defined as above
- \( t \) is initialized at \( t \).
- hair is now drawn from \( p \) to \( t \).
- moving bunny moves \( s \) and not \( t \)
- forces act on \( t \): gravity and spring between \( s \) and \( t \).
- velocity is damped
- length of \( p \) to \( t \) is hard constrained

**curvy hair**

- curved polyline from \( p \) to \( t \)
- little math problem