Our research goal is to produce interactive computer animations of 3D models rendered in the stippling style in a frame-coherent way.

**Stippling**

In Stippling, shading and texture are provided by the artist by placing points or stipples on the canvas until the desired texture or tone has been achieved.

**Mesh Subdivision**

Since the vertices of an input model may not be enough to fill in dark areas, we perform mesh subdivision to obtain more vertices, or stipple locations.

**Randomize**

Normally, the vertices of our input 3D meshes exhibit regularity on their distribution, generating patterns that are distracting to the human eye. To avoid the presence of these patterns, we randomize the vertices of the input model, and then project the points back to the surface of the input mesh.

**Mesh Simplification**

Large models (like the Bunny) sometimes have more vertices than necessary, especially when the model is projected to a small screen area. We use mesh simplification to create a vertex hierarchy that allows us to discard some vertices.

**View-Dependant Rendering**

When rendering, we perform a test on every potential stipple. If the screen projection length of the relevant neighbors of the potential stipple exceeds a certain screen-space threshold value, the stipple is rendered. The relevant neighbors of a stipple are determined at the time of mesh simplification or mesh subdivision. The threshold varies depending on the amount of illumination at the location of the stipple. In dark regions, the threshold is small (and more stipples are rendered), and in light regions the threshold is large, so fewer stipples pass the test. Since the threshold is tested in screen space, the stippling scales automatically when the viewport size changes or as the model gets closer to the viewer.