## 3D Rendering and Modeling

### Tools for Modeling

- SolidWorks 2008 - Parametric Solid Modeling
- Rhino 3D Version 4 – Surface Modeling

### Tools for Rendering

- Cinema 4D Version 10 with Advanced Rendering – Beauty Shots, **Figure 1**
- Rhino 3D Version 4 – Quick Renderings with Dimensions and Text, **Figure 2**

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1. Models created in SolidWorks can be imported into Rhino 3D version 4 directly
2. After importing a SolidWorks file in Rhino 3D change the working units in Rhino to inches
3. SolidWorks imported files should be rotated in Rhino 3D so that the objects are pointing up along the Z axis
4. For IGES files imported into Rhino – all modeling components should be joined into an enclosed solid model
5. Export each individual solid component as a polygon 3D Studio (3ds) mesh that needs to have a specific shader applied in Cinema 4D
6. Export the 3D NURBS surface/solid from Rhino 3D as a 3D Studio (3ds) file

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**Figure 1**

**Figure 2**
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7. Control settings in Rhino version 4 for saving the NURBS surface to a polygon (3ds) mesh should be:
   a. Density: 0.0
   b. Maximum angle: 4.0
   c. Maximum aspect ratio: 4.0
   d. Minimum edge length: .002
   e. Maximum edge length: 0.0
   f. Maximum distance, edge to surface: 0.0
   g. Minimum initial grid quads: 0.0

8. Cinema 4D import Preference settings for 3D (3ds) Studio files should be scaled by 75

9. Cinema 4D Basic Units should be set to Inches

10. Cinema 4D Camera should have a minimum Focal Length of between 65 and 70 to cut down on the amount of perspective distortion

11. Three light sources in Cinema 4D should be used:
    a. One Key Light – A Spot Light for casting shadows
    b. Two Fill Lights – Two Omni lights or one Omni light and a Base (8.5 x 11 sheet of paper) that will act like a Fill Light to receive shadows from the model

12. A Sky object can be used in Cinema 4D to project a High Dynamic Range Image (HDRI) to the model in the scene. See Figure 3. This can also act as a Fill Light to illuminate the model. A compositing tag can be added to the Sky object to remove it from the camera view but its source will be used to calculate reflections and refractions on the Computer Graphics (CG) model

13. Preview rendering should always be done with Antialiasing set to None under the Render Settings General in Cinema 4D

14. Output Render Settings should have the Resolution set to 1280 x 1024 with a Film Format of 35 mm Full

15. Image Format should be set to JPEG

16. Render Settings Options should have the Ray Depth set to 6 and Reflection Depth of 4. The Shadow Depth can be adjusted from 6 to 12. Level of Detail should be set to 100 %. Auto Light should not be checked

17. Final Rendering (See Figure 4) settings should have Antialiasing set to Best, Filter - Still Image, Threshold of 5 %. Min/Max Level should be set to 2x2 and 4x4. For a finer level of detail set your Min/Max Level to 4x4 and 8x8.