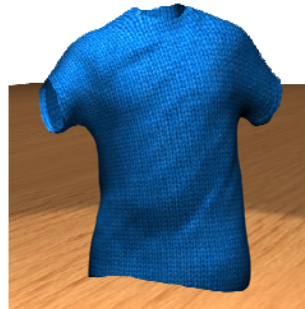




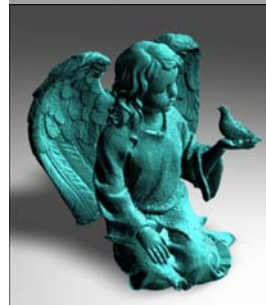
# Reconstruction

## Getting Meshes from Real Objects



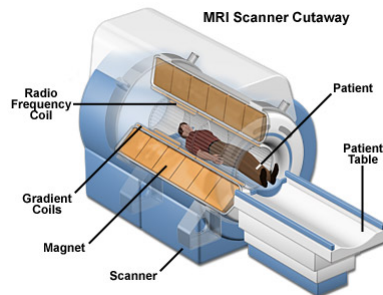
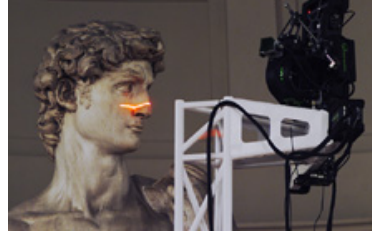
# Reconstruction/Scan Conversion

- Sensing - capture raw data
  - Point set
  - Boundary contours
  - Voxels
- *Conversion to polygonal model*
- Followed by
  - Mesh improvement
    - Smoothing
    - Simplification
    - ...



## Scanner types

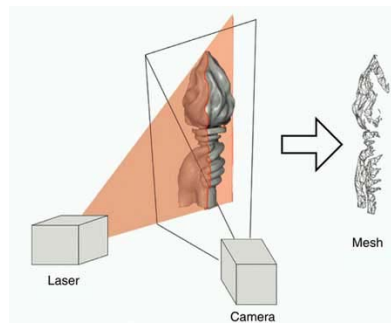
- Range
  - Laser
- Imaging
  - Multiview
  - 3D



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## Acquisition: Point Clouds

- Range Scanner/Multiview Imaging
  - Multiple views for complete object scan
- Extraction: Triangulation
  - Main idea: Determine point 3D position from two views

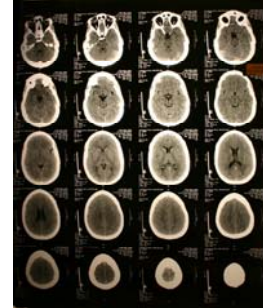


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## Acquisition: Volumetric Data

- 3D Imaging
- Wave based sensors
  - Ultrasound,
  - Magnetic Resonance Imaging (MRI)
  - X-Ray
  - Computed Tomography (CT)



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## Triangulating Point Clouds

- General Idea
  - Connect neighboring points into triangles



Point cloud data



Reconstructed surface



- Issues
  - What does neighboring mean?
    - connectivity (manifoldness/topology)
  - Efficiency

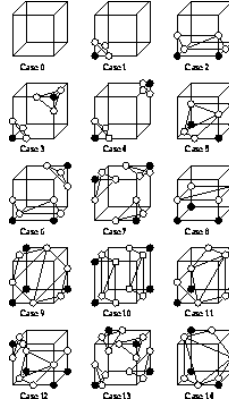
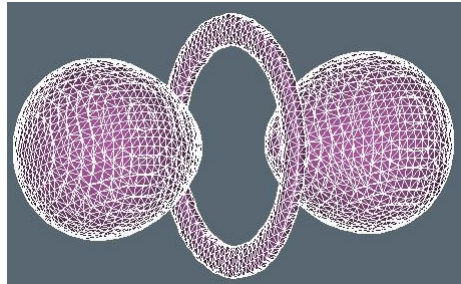


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## Volumetric Data (Voxels)

- Define iso-surfaces (between data values)
- Triangulate iso-surface
  - Rule based (Marching Cubes)



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