Surface Detail - related to material properties but much more

e.g. craters on the moon, rust pits on sphere

3 basic methods

Texture Map - simplest and easiest - very fake
- most popular
- making Mona Lisa smile in book
- taking an image and mapping onto a surface
  - picture of craters mapped on sphere \rightarrow \text{moon}
  - Approximation of image, not reality
  - Shadows painted on image
- can do this in parallel
- stinks as far as realism is concerned
  - what about shadows
  - moving light source
- good for movies (quick fly-bys)
- good for effects (cartoon-like facial, stretch control points, POWER-600)

Bump Map - pretty good, but more complicated
- array of surface normal changes
- adjust surface normals to follow detail
- no change \rightarrow 0 in array
- will cover whole surface

will affect shading \rightarrow do this first so we can compute shading naturally
pictures are gorgeous

- solves problem of shading and moving light sources
- still looks smooth on edges (surface is not modified)
- can calculate pixel values independently (parallel algorithm)

Displacement Map - most realistic
- similar to bump map - array of records for each surface pixel
  - x, y value \[dx, dy\] to be applied to pixel (a translation-type operation)
  - can interpolate dx, dy to generate map
  - actually modifies surface to give surface details

- good to show evolving surface details (new impact crater)
- actually saves space with solid modeling, \text{moon - we sphere - disp map}
  \text{instead of B-rep definition}

- can do this in parallel as well
- need a lot of memory and compute power