CS500 Project 5

Synopsis

Enhance your path-tracer with **at least two new features**. A list of suggestions is provided below, but you are invited to invent your own ideas. Since the various features cover a range from **several-lines-of-code** to **beyond-the-scope-of-a-single-semester-course**, please let me know by email what you intend to implement, and we'll negotiate from there.

Gallery

Include several of your best images to be showcased in a class specific online gallery. Provide a small description of each image to be used as a caption in the online gallery.

List of suggested features to implement

(Green indicates my favorite features, providing the highest value for fewest lines of code. Red indicates the easiest features to implement.)

- Textures
  - 2D Images
  - Procedural textures, 2D or 3D
  - Perlin noise procedural textures, 2D or 3D
- Lights
  - Arbitrarily shaped lights instead of just spherical
  - Image Based Lighting, sampled proportional to texel brightness
- Camera
  - Stereo view camera
  - Panoramic view camera
  - Omni-view camera
  - Movie camera
- Path tracing enhancements
  - Depth of field
  - Motion blur
- BRDF enhancements
  - Anisotropic brdfs
  - Layered BRDFs
- Ray marching distance estimate fields
  - Transformations of any model (rotates, scales, translates, others...)
  - CSG the **extremely** easy way
  - Blobs, twists, tapers, super-quadrics, ...
  - Hyper textures
  - Fractals
- Modeling
  - Add a torus
  - Transformations applied to arbitrary models
  - Various mathematical and geometric objects (platonic solids ...)
  - Procedural modeling (with or without noise)
- Dealing with noisy images
  - Adaptive sampling
  - Sampling and reconstruction
  - Smoothing as a post process
- Bump/Normal maps
- Participating medium
  - Air, fog, haze
  - Sub-surface scattering