Portfolio

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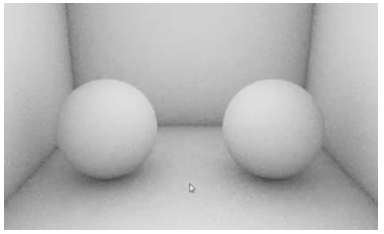
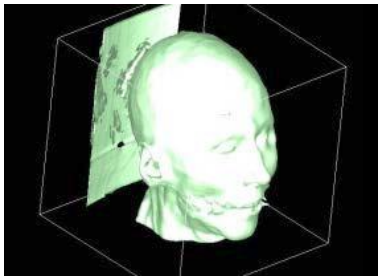
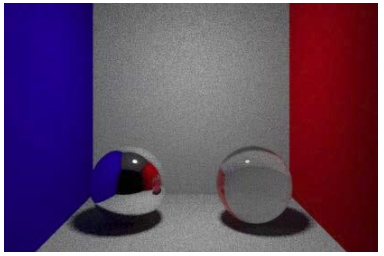
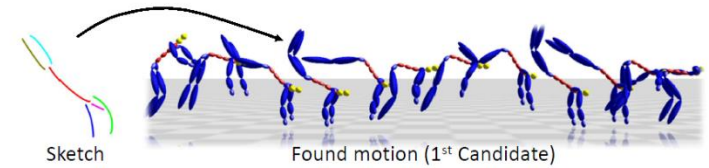


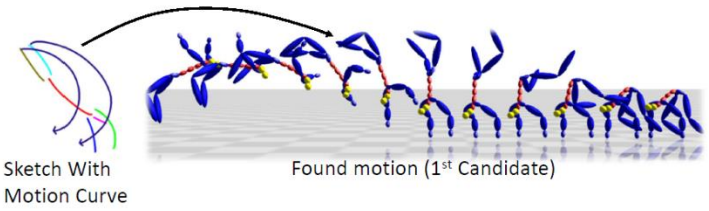


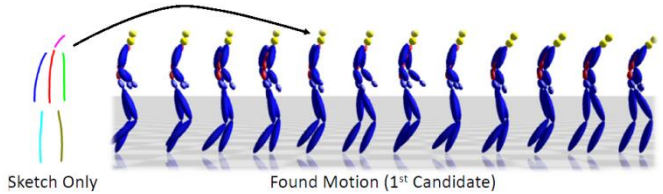


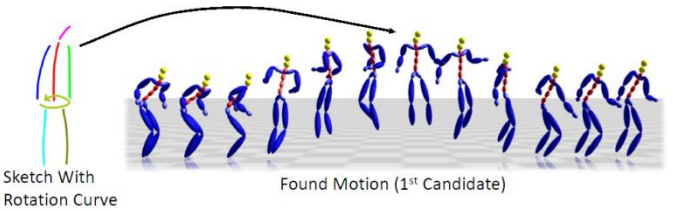
Sketching Human Character Animations by Composing Sequences from Large Motion Database

- Purpose:
  - Quick prototype of 3D animation
  - Creating 3D animation from simple sketches
- Roles:
  - **Motion Capture (ASF/AMC)**
  - Sketching Interfaces
  - **Curve Analysis using Principle Components Analysis (PCA)**
- **The paper accepted to "The Visual Computer Journal"**
- **The poster presented at NVIDIA GPU Technology Conference (GTC)**



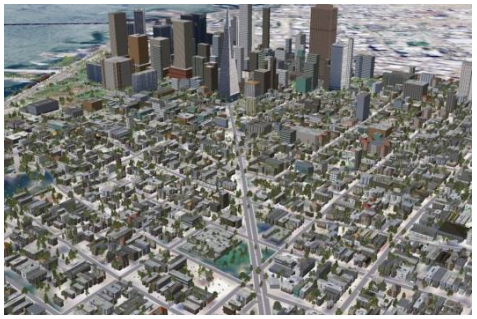






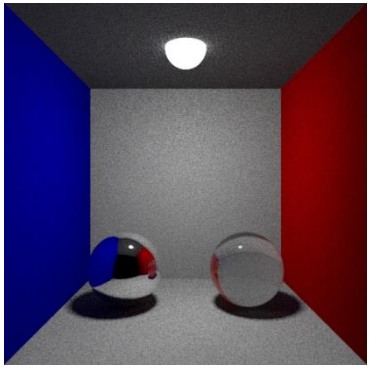
Urban Vision Project

- Purpose:
  - Obtaining digital models of Large-Scale urban structures
  - Simulating physical phenomena and human activity in city-size environments.
  - Procedural Buildings, Landmarks, Street (road graph), Trees, Vehicles, Human, Satellite imagery, and Terrain
- Personal roles:
  - Rendering optimization (Batch Rendering)
  - Character Animation
  - Real-time rendering of 88 GB satellite imagery
  - Terrain (2 GB height map)
- Collaborating with UC Berkeley and Purdue CS.
- Website:
  - http://www.cs.purdue.edu/cgvlab/urban/
  - http://www.urbansim.org/Main/WebHome

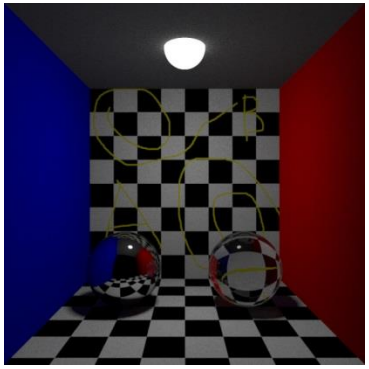


Path Tracing Renderer

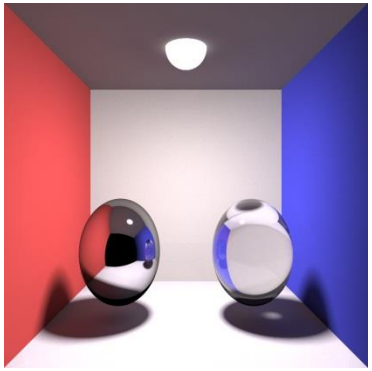
- Purpose:
  - For studying photo-realistic renderer
- Problem:
  - How can we efficiently implement Monte Carlo Path Tracer in CPU
- Solution:
  - Supporting Multi-core CPU
  - Supporting SIMD (Single Instruction Multiple Data) instructions



17 times sampled scene



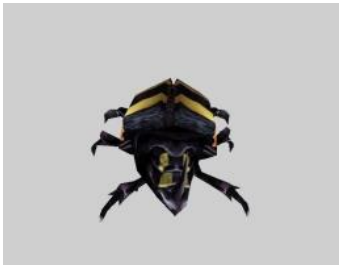
100 times sampled scene with textures



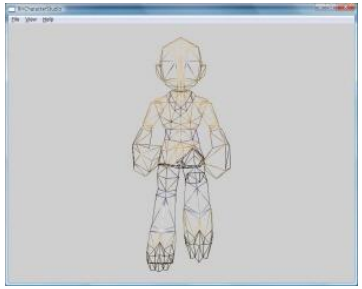
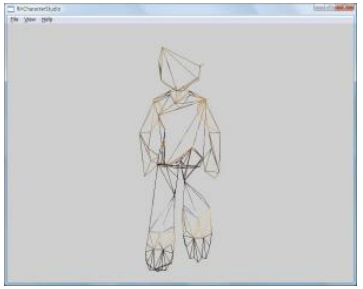
1500 times sampled image with ellipsoid and caustics

Character Animation

- Supporting different types of animation into game
  - Mesh Hierarchies
  - Linear Blend Skinning (LBS)
- Applying Level of Detail
  - Progressive Mesh generation
- Supporting Several File Formats
  - FBX / OBJ / ASE
  - Motion Capture Format (ASF/AMC)





Left side images are the original mesh, and right side images are the minimum level of detailed mesh.

View Independent Progressive Mesh Implementation (VIPM) into Animated Characters By Following Progressive Meshes, ACM SIGGRAPH 1996 Hugues Hoppe.

Others

- Real-time Ambient Occlusion using CUDA
  - Purpose:
    - Calculating Ambient Occlusion in Real-time
    - Using CUDA-Based GPU Calculation
  - Video:
    - http://youtu.be/5Lrt68ZRkW0
- Applying Marching Cubes Algorithms
  - Visualization of Human MRI data
- Particle System
  - Firework including 4 millions of particles
  - Each particle applied different gravity and forces