IMGD MQP Interests 2011-2012

by Emmanuel Agu
**Project Idea**

- **Project:** Develop new open source *physically-based* game engine

  - Focus on "graphics part" of game engine
    - Game rendering framework
    - OpenGL shader based

  - Physically-based:
    - Light propagation obeys laws of physics
    - New cooler effects possible
Project Idea

- Old game engine: Empirical graphics models, not physically based
- Graphics look fake
- Example: Torque 3D
Project Idea

- New game engine: Crysis
- Physically-based
- Closed source,
- Commercial
Project Outline

- Develop:
  - Graphics engine basics:
  - Basic rendering framework, data structures, instancing, etc
  - NEW real-time global illumination approximation algorithms
    - Spherical Harmonic Lighting
    - Light Propagation Volumes
    - Screen Space Ambient occlusion
    - Time of Day modelling
- State-of-the-art game engine
- Real-time simulation of massive, indirect physically-based lighting
Time Of Day
Project Outline

- Other potential features
  - New reflectance models, materials,
  - Procedural rendering etc

- Scope of the Work
  - You CAN'T do everything
  - Many MQPs will continue to work on this
  - Define reasonable scope, render it
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