



Real Time Rendering

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Basic information

- **Instructor: 莊榮宏**
工三館 525, x31829
- **TA: 何丹期 工三館 512, x54787**
- **Course web: cggmwww.csie.nctu.edu.tw**
- **Focus on**
 - **Advanced lighting and hardware supported RTR**
 - **Geometry-based acceleration techniques**
 - **Collision detection/intersection testing**
 - **Image-based and hybrid rendering**
 - **Scene graphics and game engine design**
 - **Non-photorealistic rendering**

Course outline

- **An overview on RTR**
- **A brief overview on 3D Graphics**
- **Advanced real-time lighting**
 - **Vertex and pixel shader**
 - **Shading language**
 - **Advanced texture mapping**
 - **Multi-pass rendering**
 - **Shadowing (hard shadow, soft shadow)**
 - **Real-time global illumination (ambient occlusion, shadow field, PRT, subsurface rendering, skin rendering)**

Course outline

- **Geometry-based acceleration**
 - Level-of-detail modeling
 - Mesh parameterization/re-meshing
 - Visibility culling techniques
- **Collision detection and intersection test methods**
- **Image-based rendering and hybrid rendering**
- **Scene graph and 3D game engine**
- **Non-photorealistic rendering (Toon shading)**

Grading

- **Projects (75%)**
 - Midterm Project (35%)
 - Final project (40%)
 - Both include implementation, demo, and a written report
- **Paper study and presentation (20%)**
 - Each student needs to write a study report for each paper presented.
- **Class Participation (5%)**

Reference books

References

- Real-time rendering, 2nd ed. By Moller and Haines
- Real-time shading, by Olano et al.
- Level-of-detail for graphics, By Luebke et al.
- Real-time collision detection, By Ericson
- 3D Game Engine Design by Eberly
- 3D games by A. Watt/F. Policarpo
- OpenGL Shading Language, by Randi J. Rost
- GPU Gems, Programming Techniques, Trips, and Tricks for Real-Time Graphics, by Randima Fernando
- Selected papers (see course web page)

Course home page

Cggmwww.csie.nctu.edu.tw

Under Course