

Introduction to Computer Graphics

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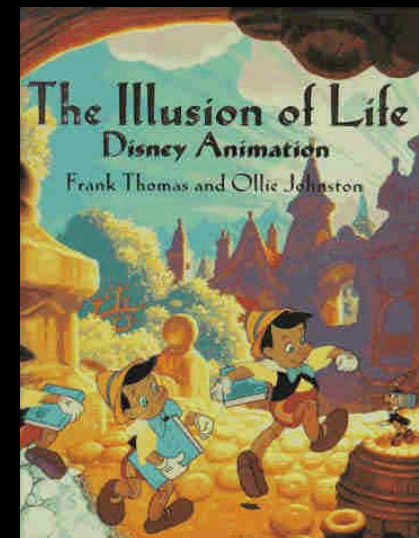
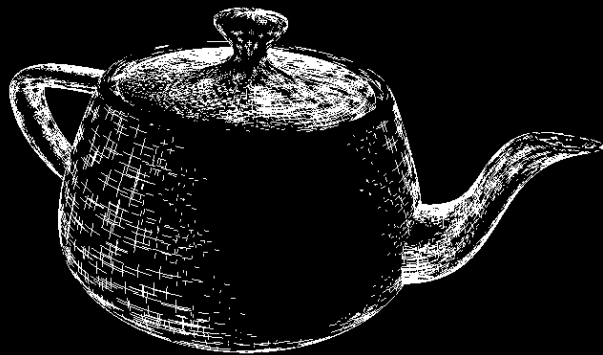
Teapot by Henrik Jensen

About me

- Education
 - Ph.D., CMU, 2005
 - MS & BS, NCTU
- Research interests
 - Texture
 - Computer animation
 - Computer vision
- More? Visit www.cs.nctu.edu.tw/~wclin

What is computer graphics?

- “Any use of computers to create or manipulate images”
- Digital “illustration of life”

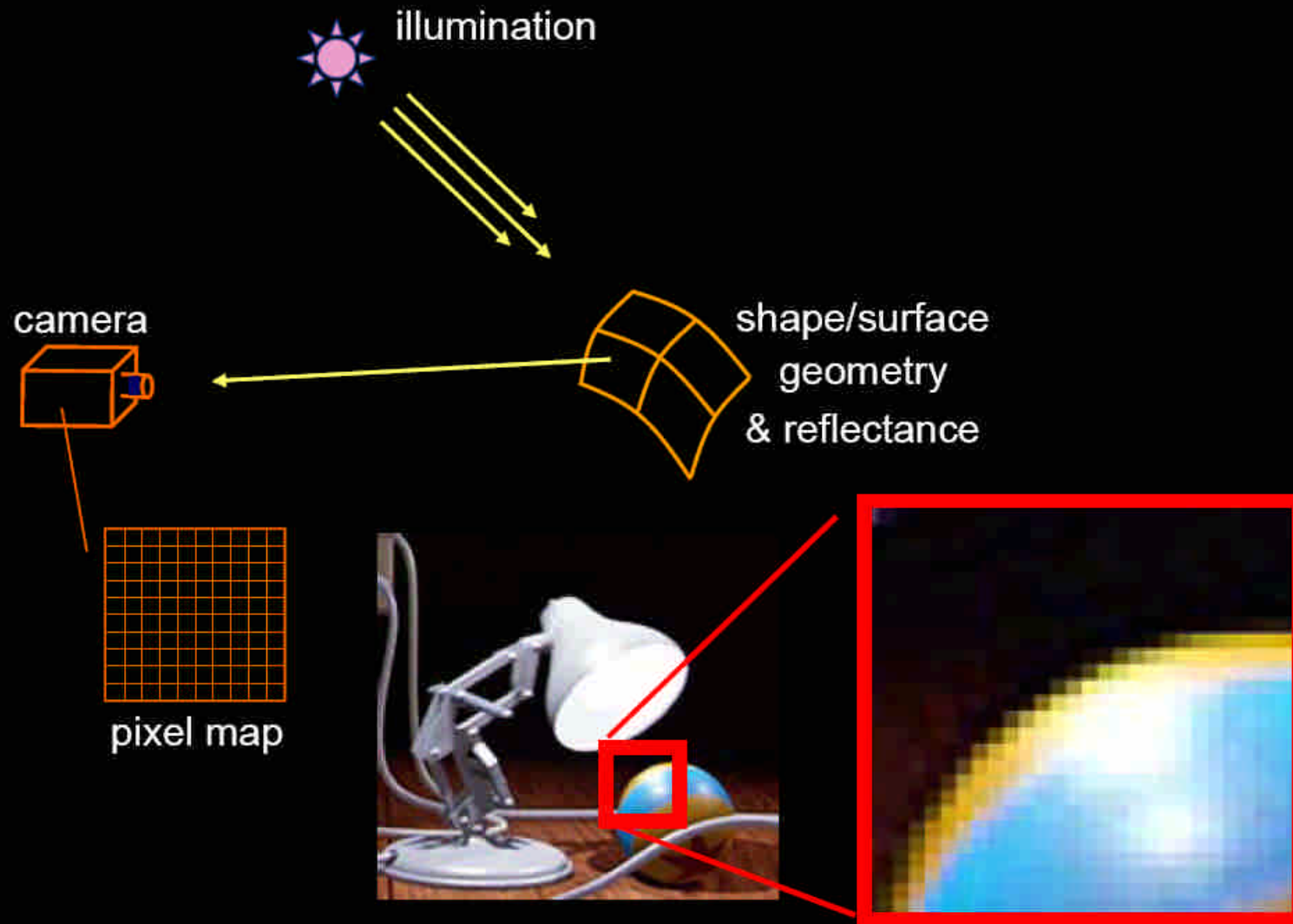


Luxo Jr.

- Pixar's first film, 1986

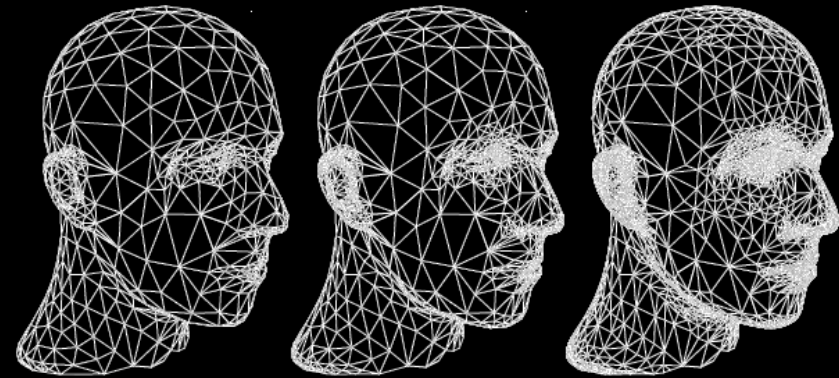


How are images generated?



Areas of computer graphics

- Geometry (Modeling)
- Rendering
- Motion (Animation)



Zorin et al. SIGGRAPH'97



Jensen, SIGGRAPH 2000



Liu & Popović, SIGGRAPH'02

Applications of Computer Graphics

- Video games
- Cartoons
- Film special effects
- CAD/CAM
- Simulation
- Medical imaging
- Scientific & Information visualization



NBA Live 2007

Video games

- Real-time
- Multidisciplinary
- 12,000 fish



PSCrowd, Game Developer Conference (GDC) 2006 Keynote demo

Film Special Effects

- Lord of the rings
- King Kong

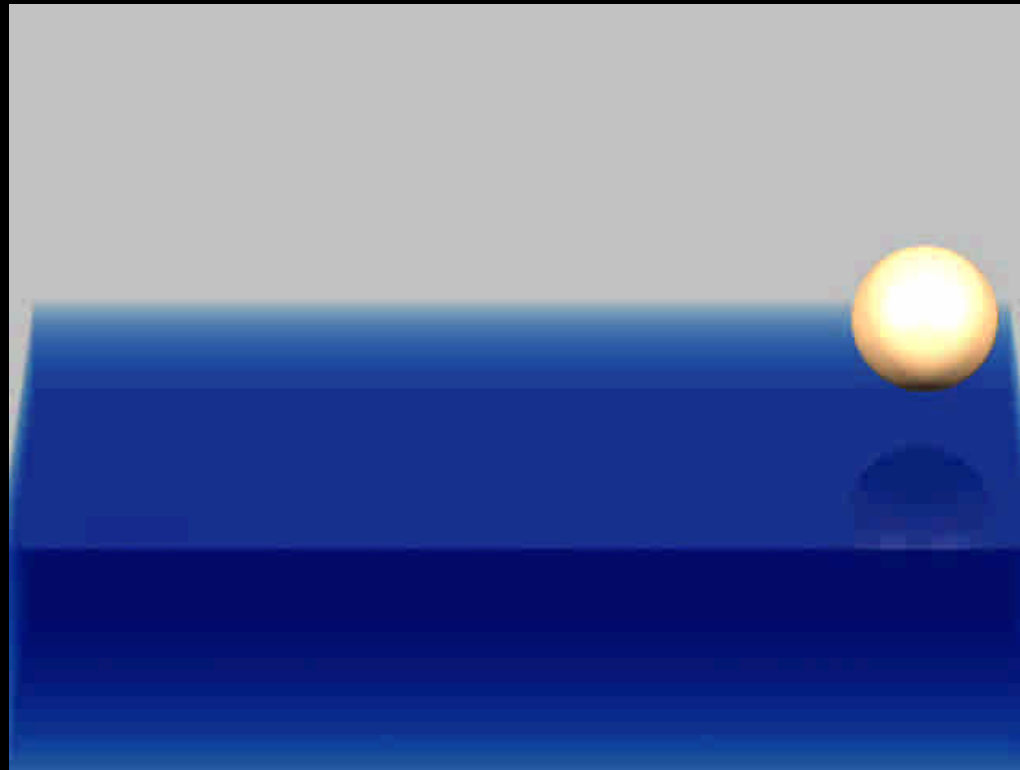


Simulation / Virtual Reality (VR)



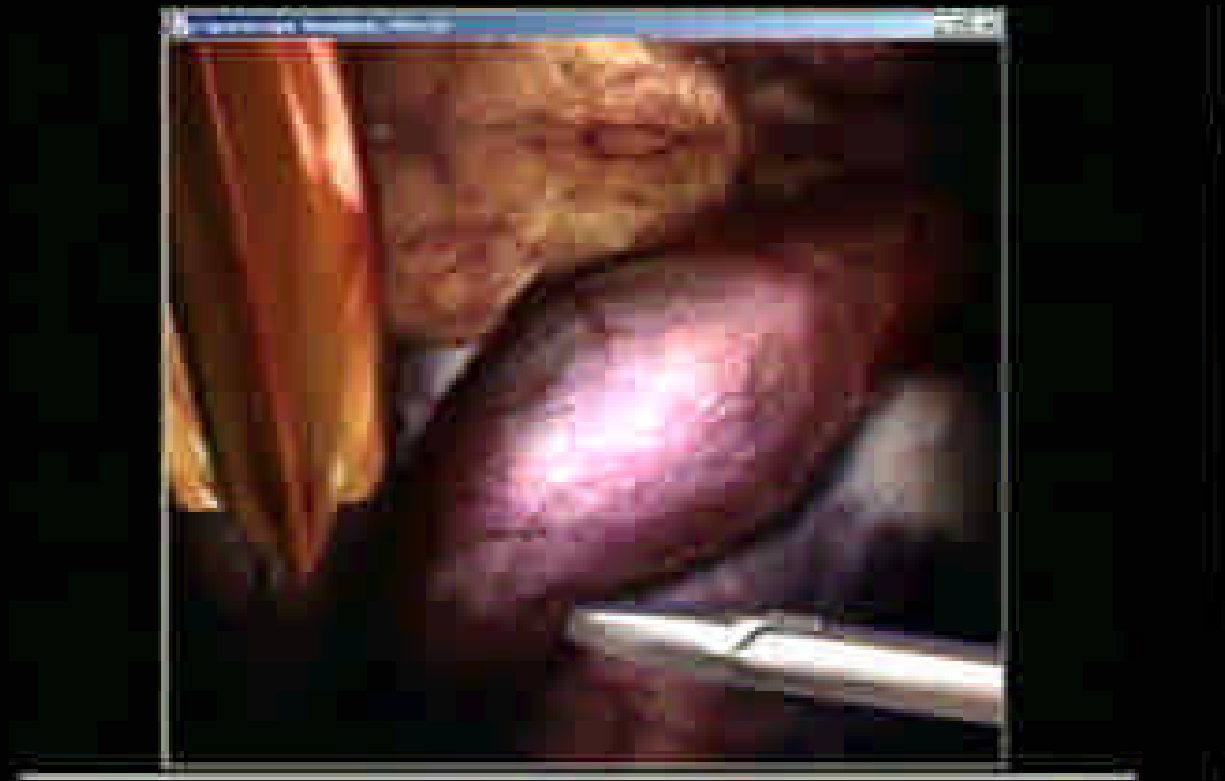
FlightSafety International Beech 1900D Simulator, at the Orlando Training Center

Physics-based Simulation



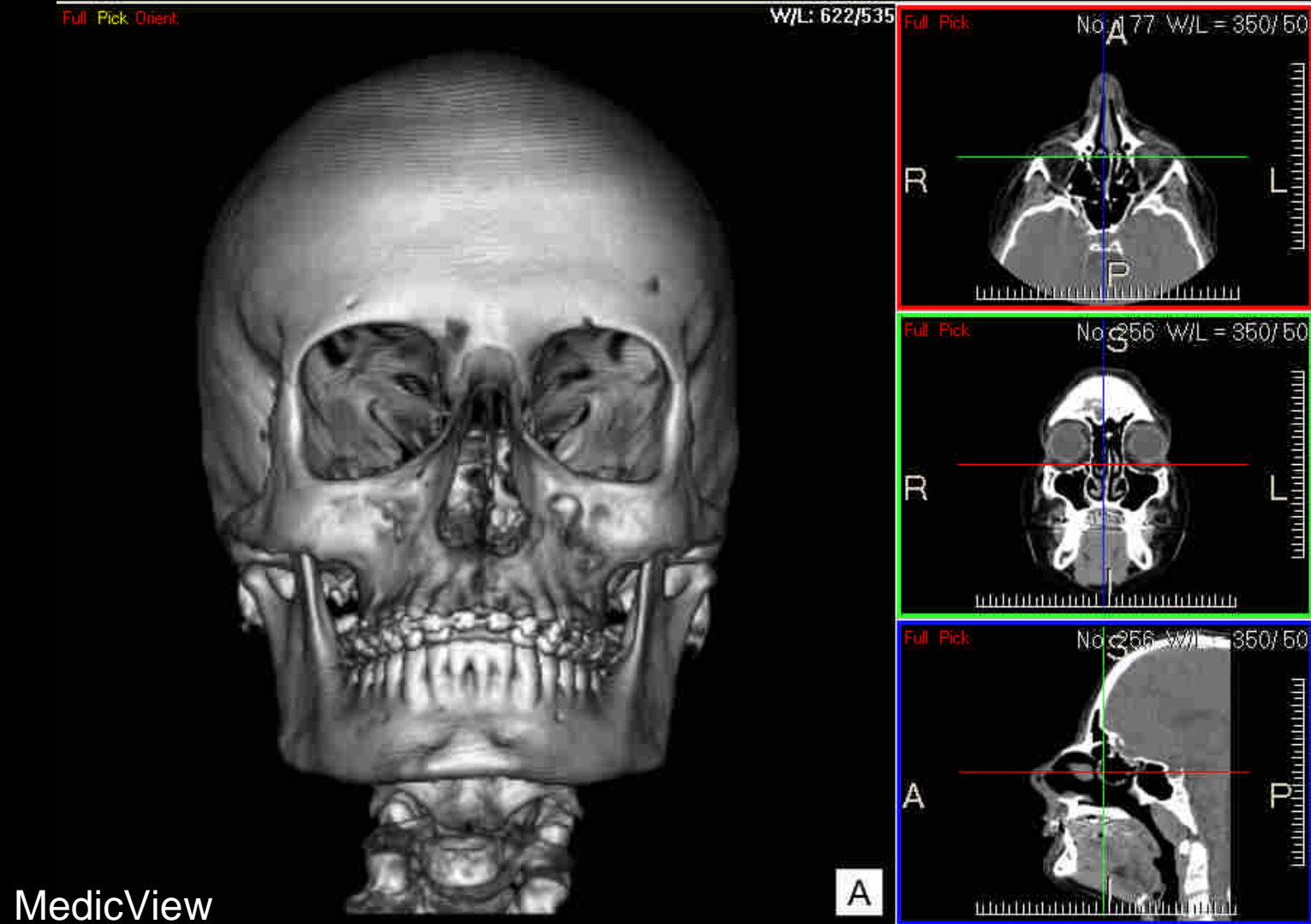
Nick Foster & Ron Fedkiw

Surgical Simulation

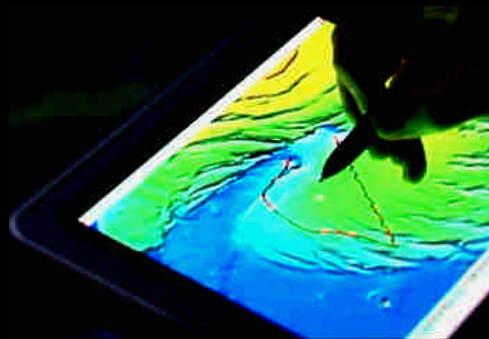
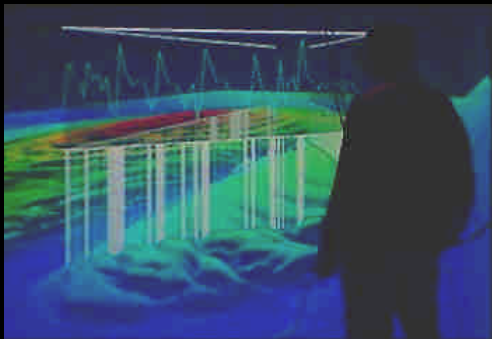
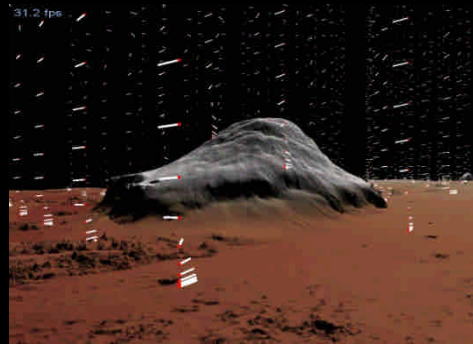
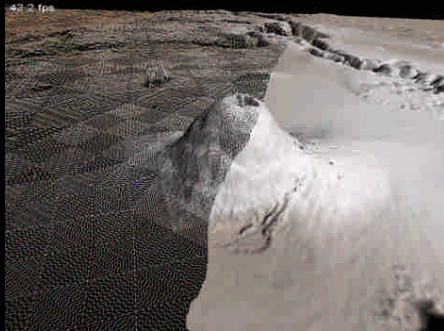


Doug James & Dinesh Pai

Medical Imaging



Scientific Visualization



Mars Data Visualization



Weather Data Visualization

Course Outline

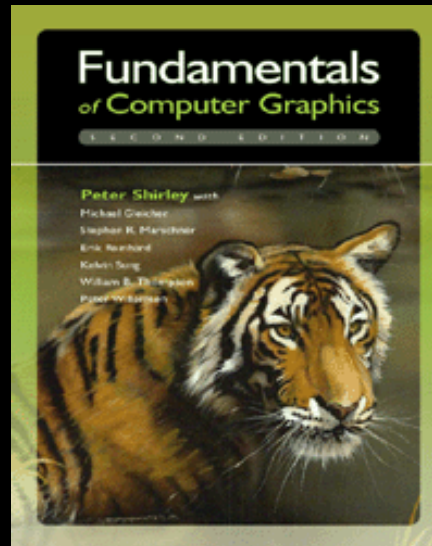
- Overview
- Graphics primitives (raster algorithms)
- Transformation
- Viewing
- Hidden surface removal
- Shading
- Texture mapping
- Graphics pipeline

Textbook

- Peter Shirley et al., *Fundamentals of Computer Graphics*, 2nd Ed., A K Peters

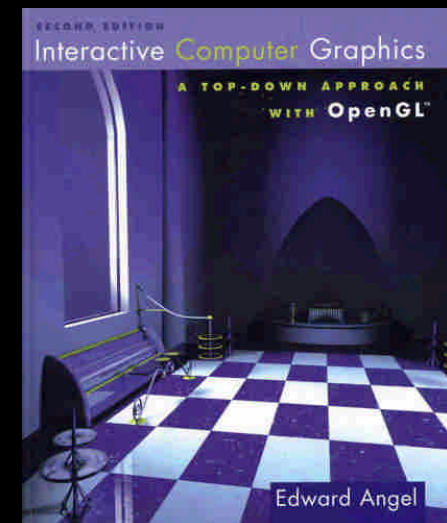
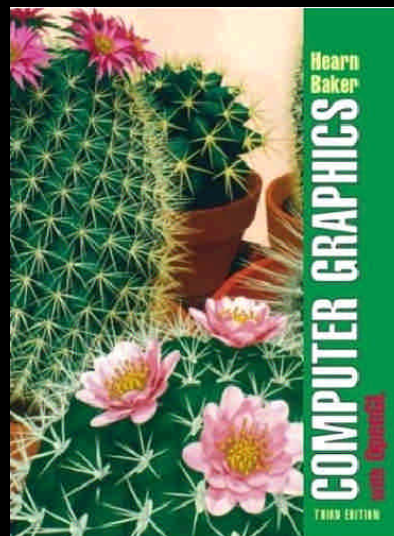
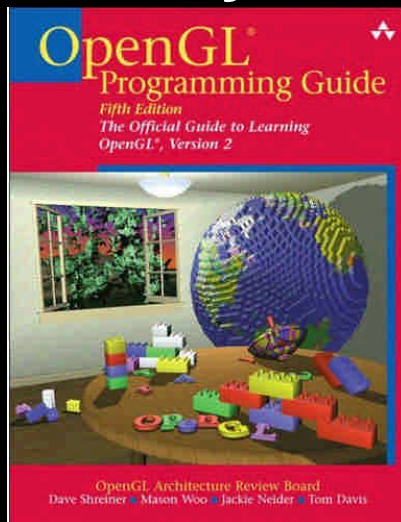
- Errata on author's website

<http://www.cs.utah.edu/~shirley/books/fcg2/>



References

- *OpenGL Programming Guide*, Addison-Wesley
- Hearn & Baker, *Computer Graphics with OpenGL*, Prentice Hall
- Angel, *Interactive Computer Graphics*, Addison-Wesley



Major CG Conferences and Journals

- Conferences
 - SIGGRAPH
 - Eurographics
 - Eurographics Symposium on Rendering (EGSR)
 - Symposium on Computer Animation (SCA)
 - Useful web: <http://kesen.huang.googlepages.com/>
- Journals
 - ACM Transactions on Graphics
 - IEEE Transactions on Visualization and Computer Graphics

Related Courses

- Introduction to computer animation
- Advanced computer graphics
- Real-time rendering
- Computer animation and special effects
- Image-based rendering and modeling
- Texturing techniques
- 3D game programming
- Image processing

Administration

- Office hours: EC707, Tue 3:30 — 4:30 PM
- Course web:
<http://caig.cs.nctu.edu.tw/course/CG2007>
- Class lab: 資工系計中 EC 314
 - Maya
 - 3D Studio Max

Teaching Assistant

- Yu-Ting Tsai (蔡侑庭)
 - E-mail: hiei.cis91g@nctu.edu.tw
- Office Hour
 - Wed 6:30 PM ~ 9:30 PM at EC126
- Recitation
 - Time: 4HY
 - Classroom: to be announced...

Recitation

- OpenGL Programming
 - Step-by-step tutorial
 - Follow lectures and assignments
- Recitation of Selected Lectures
 - Additional supplements if necessary
- Problem Consulting
- Exercises
- Demos
- and More...

Grading

- Scheme A
 - 3 programming assignments (60%)
 - Midterm exam (20%)
 - Final exam (20%)
 - Class and recitation participation (10%)
- Scheme B
 - 2 programming assignments (50%)
 - Midterm exam (25%)
 - Final project (25%)
 - Class and recitation participation (10%)

Late and Cheating Policies

- Late policies
 - Turn in by 11:59 PM of the due date
 - Penalty of 10% of the value of the assignment per late day
- Cheating policies
 - 0 points for any cheating on assignments or exams
 - Allowing another student to examine your code is also considered as cheating

Any question?

