Introduction to Computer Graphics

2015 Spring

National Cheng Kung University

Instructor: Min-Chun Hu 胡敏君

About This Course

- Lectures:
  - a.m. 9:10~12:00, Thursday
  - R4203, CSIE
- Prerequisites
  - Programming skills in C/C++/Java
  - Data structures
- Lecturer
  - Min-Chun Hu, Assistant Professor
  - Email: anita_hu@mail.ncku.edu.tw
  - Office: R65B08, 11F, CSIE New Building

About This Course (Cont.)

- TAs:
  - 黃均暉 F74006030@ncku.edu.tw
  - 許友綸 F74012138@ncku.edu.tw
  - Office: R65601, 6F, CSIE New Building
- Textbooks:
  - E. Angel, D. Shreiner, Interactive Computer Graphics (A Top-down approach with shader-based OpenGL) 6th Ed., Pearson, 2012.
  - D. Hearn, M.P.Baker, Computer Graphics with OpenGL 3rd Ed., Prentice Hall, 2004.
  - J. D. Foley, A. van Dam, S. K. Feiner, J. F. Hughes, R. L. Phillips, Introduction to Computer Graphics, Addison-Wesley, 1993.

What Can I Learn from This Course?

- Fundamentals of computer graphics techniques.
- Programming ability of 3D graphics pipeline.
- Some of 2D image special effects and usage of editing tools.

Syllabus

- 2/26 Introduction to Computer Grphics + HW1
- 3/5 Coordinates and Transformations + HW2.0
- 3/12 Viewing, Projection and Viewport Transformations + HW2.1
- 3/19 Curves and Surfaces +HW2.2
- 3/26 Scan Conversion, Shaders + HW3.1
- 4/2 Spring Vacation
- 4/9 Shading, Texture Mapping, Material Appearance +HW3.2
- 4/16 Ray Casting and Rendering (I) + HW3.3
- 4/23 Ray Casting and Rendering (II) + Project
- 4/30 Ray Tracing
- 5/7 Acceleration Structures for Ray Casting
- 5/14 Talk by 翁士欽(西基電腦動畫股份有限公司)
- 5/21 Sampling, Aliasing, and Mipmaps
- 5/28 Paper Presentation + Project Checkpoint
- 6/4 Real-time Shadows
- 6/11 Blending, Image Processing (HDR)
- 6/18 3D/Stereo
- 6/25 Final Project Demo

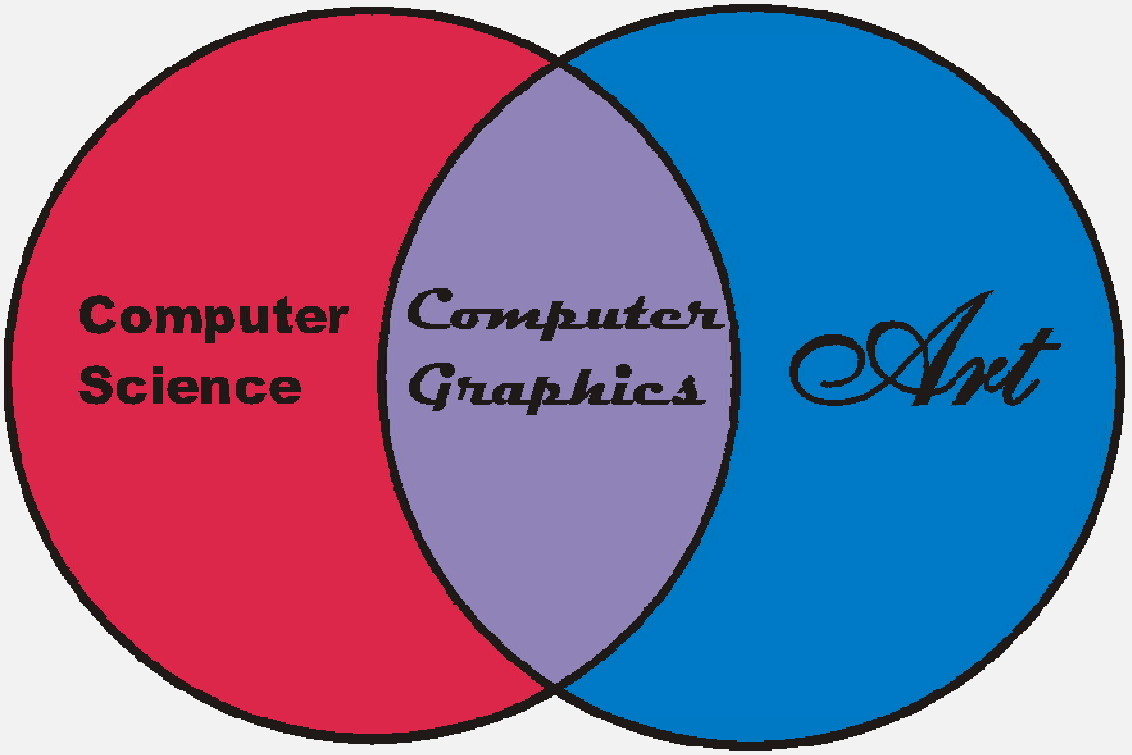
Grading

- HW1: Create your own 3D model by Blender 3D (5%)
  - Deadline: 03/05 pm 10:00
- HW2: Implement the function of projection, geometric transformations, z-buffer and clipping (25%)
  - Checkpoint1: 03/12 pm 10:00
  - Checkpoint2: 03/19 pm 10:00
  - Deadline: 03/26 pm 10:00
- HW3: Implement the shader models (25%)
  - Checkpoint1: 04/09 pm 10:00
  - Checkpoint2: 04/16 pm 10:00
  - Deadline: 04/23 pm 10:00
- Midterm: Paper presentation 05/28 (15%)
- Final: Project (30%)
  - Deadline: 06/24 pm 10:00
  - Presentation (10%)
  - Demo (10%)
  - Report (10%)
  - Bonus (voted by your classmates)

Course Notice

- Office hour:
  - By an appointment
- No late submission of HW !
- Discussion is encouraged, but plagiarize (even the codes from websites) is not allowed !
- Food is ok~
- Zzz…not that ok~

What's Computer Graphics (CG)



What's Computer Graphics (CG)

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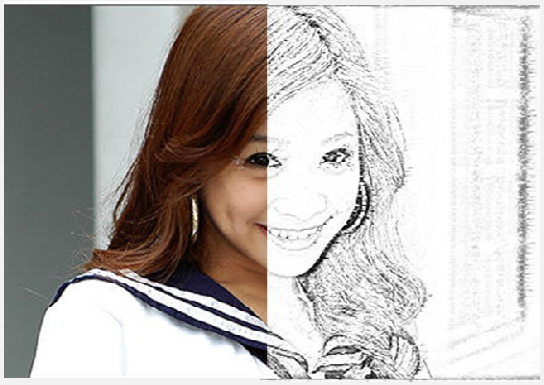
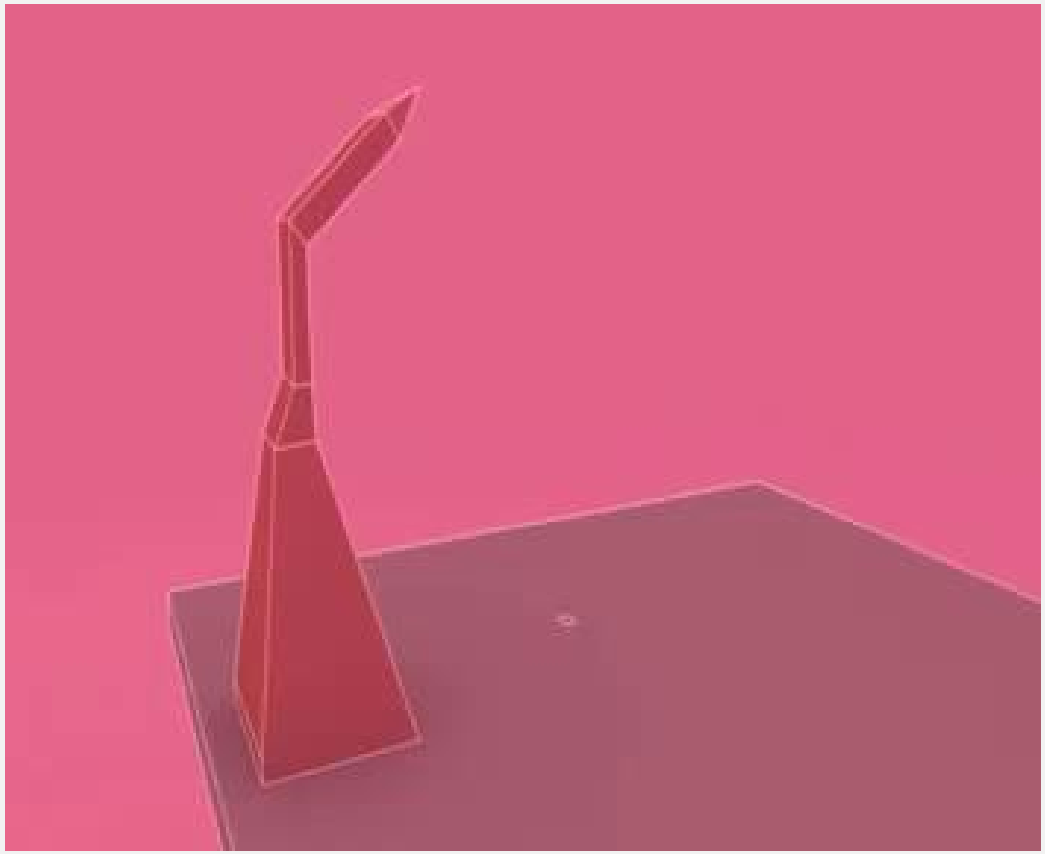
- Computer Graphics
  - Producing pictures or images using computer.
  - Displaying a realistic virtual environment or synthesizing virtual objects in real time.
    - Mainly focusing on 3D graphics
  - Displaying a real scene/object with specific styles.



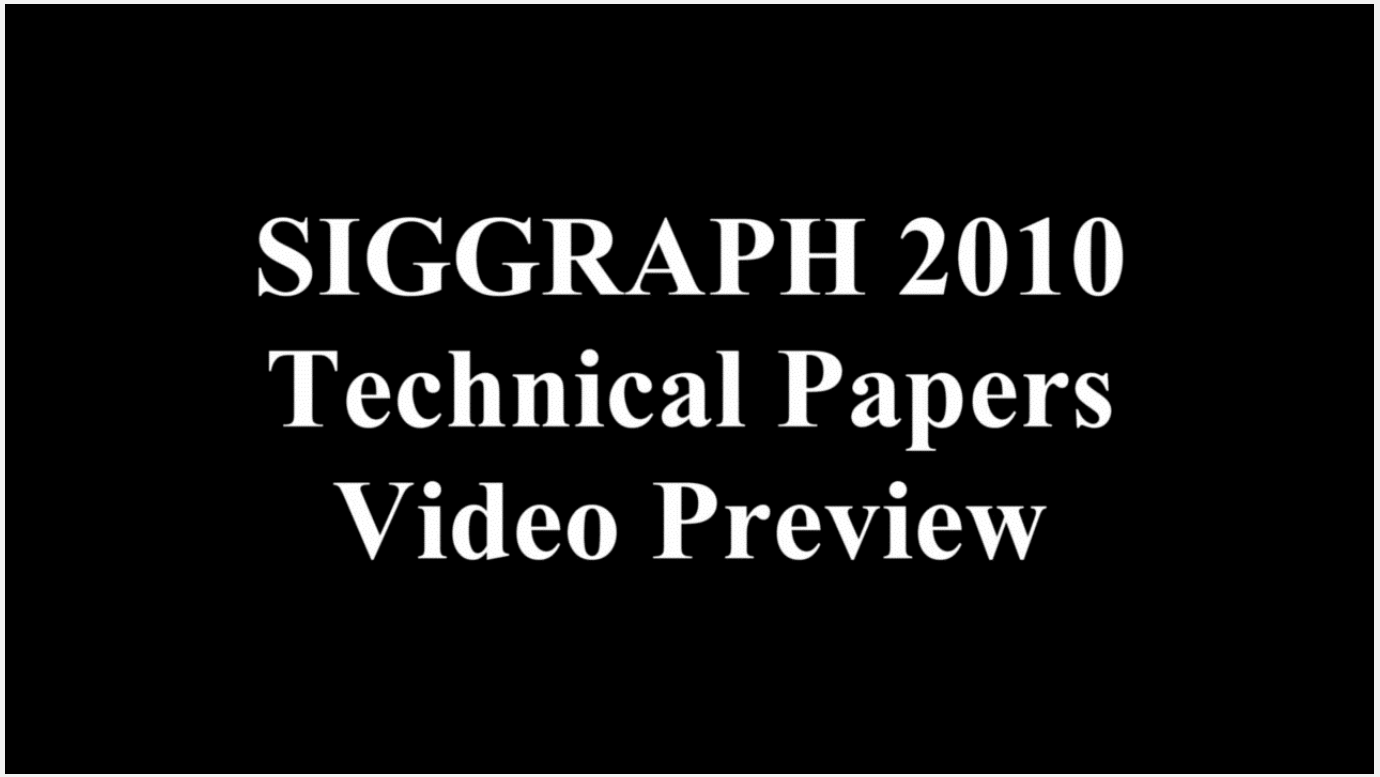
CG or Magic ??

Proud of Taiwan !!!

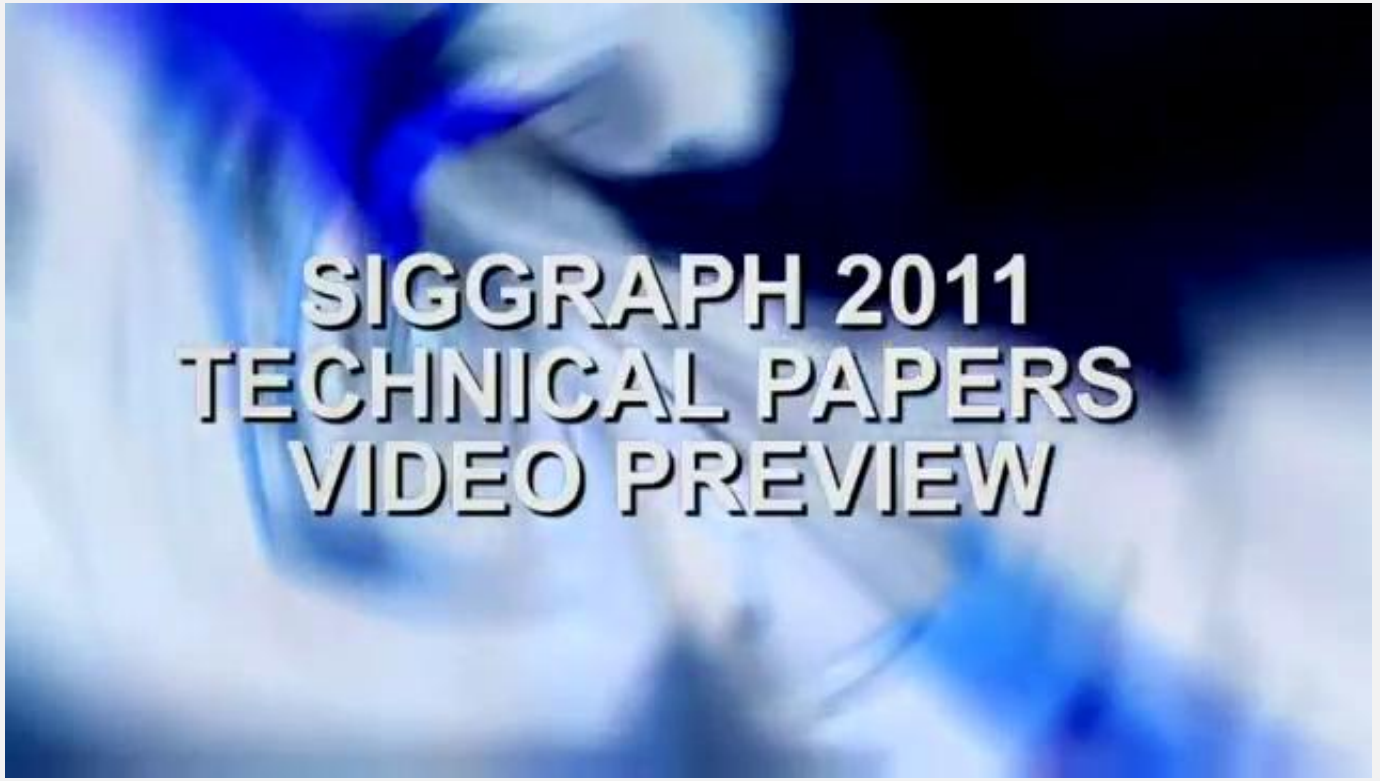


獲2005年ACM SIGGRAPH 國際動畫展「電子劇院」觀眾票選第一名。導演全明遠，編劇孫春望。

SIGGRAPH 2010



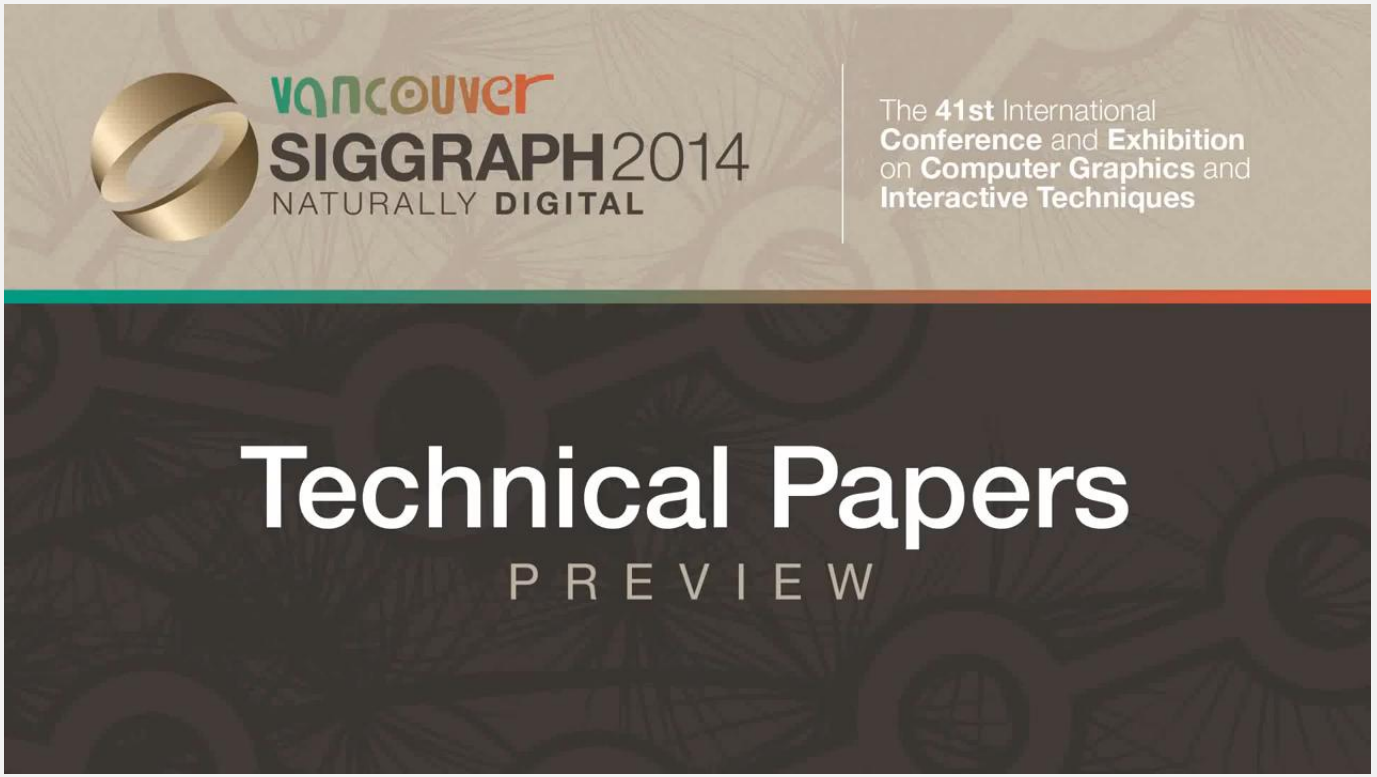
SIGGRAPH 2011



SIGGRAPH 2012

SIGGRAPH 2013

SIGGRAPH 2014



Q & A ?