CS-184/284a: Computer Graphics

Lecture #1: Introduction and Overview

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University of California, Berkeley

V2014-S-01-1.0

Today

- Introduction and Course Overview
- Assignments AS0 and HW1

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The Subject: Computer Graphics

- Computer Graphics:
  - Using computers to generate and display images

- Issues that arise:
  - Modeling
  - Rendering
  - Animation
  - Perception
  - Lots of details...

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Computer Graphics

- Applications (in other words, why we care)
  - Movies
  - Video Games
  - Simulation
  - Analysis
  - Design
  - Others...

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Computer Graphics

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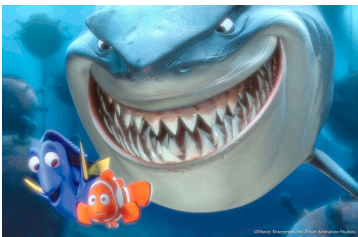 - Analysis
  - Design
  - Others...

From *Star Wars Episode 1*, Lucasfilm Ltd.

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Computer Graphics

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  - Design
  - Others...

From *Finding Nemo*, Pixar Animation Studios

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Computer Graphics

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  - Others...

From Halo 4, 343 Industries

Computer Graphics

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  - Design
  - Others...

Game footage recorded from Xbox 360 version of
Star Wars: The Force Unleashed

Game footage copyright 2008 LucasArts, Inc.
Used with permission.

From Star Wars: The Force Unleashed by Lucas Arts   8

Computer Graphics

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  - Others...

From America's Army

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Computer Graphics

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  - Design
  - Others...

Image from CAE Inc.

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Computer Graphics

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  - Video Games
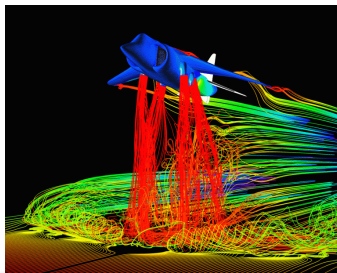 - Simulation
  - Analysis
  - Design
  - Others...

Carlo Sequin

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Computer Graphics

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  - Design
  - Others...

Fluid simulation w/ NASA FAST

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Computer Graphics

- Applications (in other words, why we care)
  - Movies
  - Video Games
  - Simulation
  - Analysis
  - Design
  - Others...

Sucker Punch Copyright 2011 Warner Bros
Visual effects by Moving Picture Company

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Course Topics

- Image representation and manipulation

- 2D and 3D drawing algorithms

- Object representations

- Rendering

- Animation
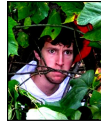
- Interaction techniques

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People

Prof. James O'Brien   Soham Mehta   Sean Arietta   Michael Tao

Send class related email to
cs184@imail.eecs.berkeley.edu

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Contact Information

- Class web site:
  - http://inst.eecs.berkeley.edu/~cs184
  - Handouts assignments, *etc.* will be posted there
  - Lecture notes posted there (*hopefully*) before classes
- Discussion group:
  - Piazza discussion group
  - https://piazza.com/berkeley/spring2014/cs184/home
  - Not reading discussion group... bad idea
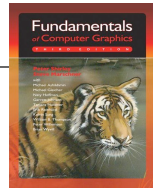- Staff email addresses, office hours, etc on website

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Computing Resources

- Class accounts handed shortly
- Can also use CS Labs
  - Linux
  - Windows
  - Mac

Text Book

- *Fundamentals of Computer Graphics*
  by P. Shirley, S. Marschner, et al.
  * Get the current version
- Also handouts and other supplemental material will be provided
- See other books listed in course information handout

Grading

- Assignments: 40%
  - Mix of written and programing
  - Average 2 or 3 weeks to do them
- Midterm: 30%
  - Wednesday, March 12, in class
- Final: 30%
  - Tuesday, May 13, 8:00 am - 11:00 am

- Check *now* for conflicts!

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Prerequisites

- You must know how to program C or C++
  - Big final project, several programing assignments
  - No hand holding
- Data structures (CS61B)
- Math: linear algebra, calc, trig

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Waitlist

- Quite a few people will drop
- Hopefully everyone will fit...

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Class Participation

- Reasons to participate
  - More fun for me and you
  - You learn more
  - I won't give stupid little annoying quizzes in class
- How to participate
  - Ask questions
  - Make comments
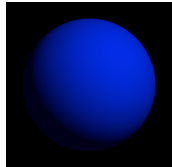- Stupid questions/comments
  - That's okay

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Assignments #1 and #2

- Assignment #0
  - Setup CS184 account and let us know who you are
  - Get very simple OpenGL program working
  - *Due Friday Jan. 31st, Midnight*
- Homework #1
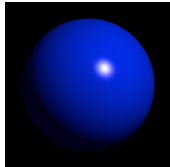 - Tests math prerequisites
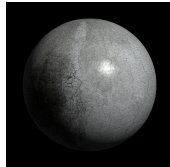   - *Due Thursday Jan. 30th, 5pm*

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Assignment: Shading   [Ritchie & Cho, F08]
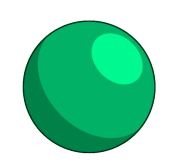
Diffuse Only	Diffuse & Specular	Diff. & Spec. & Texture
Diff. & Spec. & Texture	Toon Shading	Bump Mapping
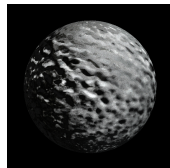
Assignment: Ray Tracing
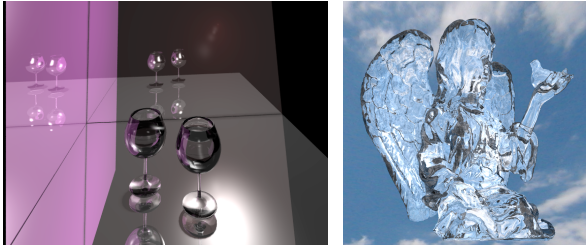
Assignment: Parametric Surfaces
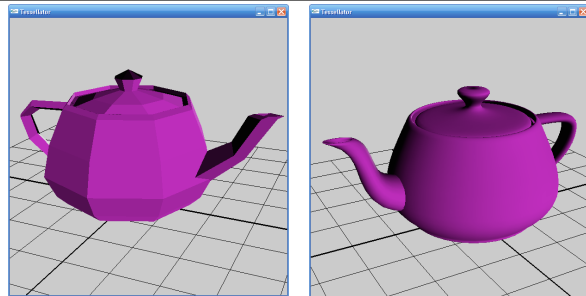
Academic Honesty

- If you use an external resource cite it clearly!
- Don't do things that would be considered dishonest... if in doubt ask.
- Cheating earns you:
  - An 'F' in the class and
  - Getting reported to the University
  - No exceptions.

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Questions?

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My research

- Simulation
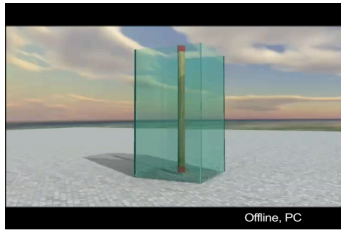
Offline, PC

With Eric Parker

My research

- Simulation

Cloth Draping

With Huamin Wang
and Ravi Ramamoorthi

My research

- Simulation

With Rahul Narain and
Armin Samii

Adaptive Anisotropic Remeshing
for Cloth Simulation

Rahul Narain, Armin Samii, James F. O'Brien
University of California, Berkeley

SIGGRAPH Asia 2012

My research

- Simulation

With Rahul Narain and
Tobias Pfaff

Simulation Mesh

My research

- Simulation

With Nuttapong Chentanez,
Ron Alterovitz, Daniel Ritchie,
Lita Cho, Kris K. Hauser,
Ken Goldberg, and
Jonathan R. Shewchuk

White boxes: Tracked real data   Simulated needle shown in yellow
Red circles: Simulation Data

My research

- Simulation   With Adam Kirk

My research

- Forensics

With Hany Farid

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My research

- Forensics

With Hany Farid

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SIGGRAPH Submissions

Adaptive Tearing and
Cracking of Thin Sheets

Submission ID 0144

Adaptive Tearing and Cracking of Thin Sheets
Tobias Pfaff, Rahul Narain, Juan Miguel de Joya, and James F. O'Brien

SIGGRAPH Submissions

Optimal Presentation of Imagery
with Focus Cues on Multi-Plane Displays

Submission ID 0277

Optimal Presentation of Imagery with Focus Cues on Multi-Plane Displays
Rahul Narain, Rachel A. Albert, M. Abdullah Bulbul, Gregory J. Ward, Martin S. Banks, and James F. O'Brien
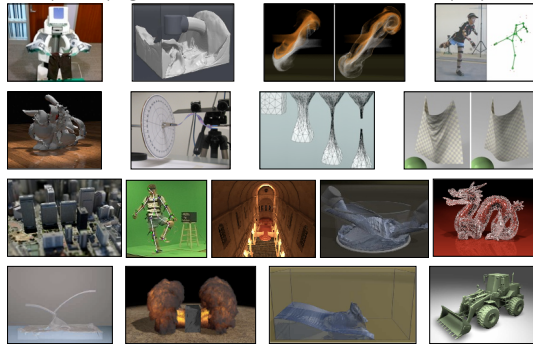
SIGGRAPH Submissions

Watch live demo

Self-Refining Games using Player Analytics
Matt Stanton, Ben Humberston, Brandon Kase, James F. O'Brien, Kayvon Fatahalian, and Adrien Treuille

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My research

See my webpage for more information and other projects...

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