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CS-184/284a: Computer Graphics

Lecture #1: Introduction and Overview

Prof. James O'Brien
University of California, Berkeley

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Today

- Introduction and Course Overview
- Assignments AS0 and HW1

The Subject: Computer Graphics

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

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

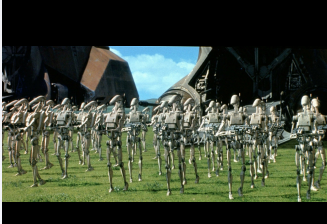## Computer Graphics

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

Computer Graphics

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From Star Wars Episode 1, Lucasfilm Ltd.

Computer Graphics

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From Finding Nemo, Pixar Animation Studios

Computer Graphics

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From Halo 4, 343 Industries

Computer Graphics

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

Game footage copyright 2008 LucasArts, Inc.
Used with permission.
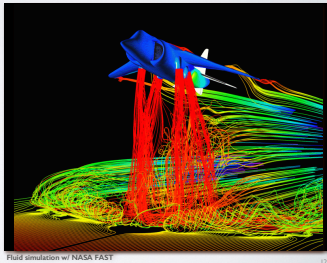
From Star Wars: The Force Unleashed by Lucas Arts

Computer Graphics

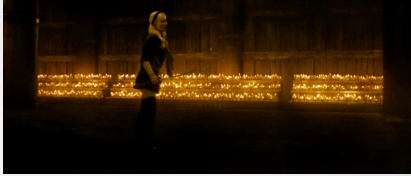- Applications (in other words, why we care)
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From America's Army

Computer Graphics

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Image from CAE Inc.

Computer Graphics

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Carlo Sequin

Computer Graphics

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Fluid simulation w/ NASA FAST

Computer Graphics

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  - Others...

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

Course Topics

- Image representation and manipulation
- 2D and 3D drawing algorithms
- Object representations
- Rendering
- Animation
- Interaction techniques

People

Prof. James O'Brien

Aayush Dawra

Kevin Wu

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

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/fall2014/cs184/home
  - Not reading discussion group... bad idea
- Staff email addresses, office hours, etc on website

Computing Resources

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

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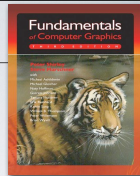
- *Fundamentals of Computer Graphics*
  by P. Shirley, S. Marschner, et al.
  * Get the current version
- Also handouts and other supplemental material will be provided
- See other books listed in course information handout

Grading

- Assignments: 40%
  - Mix of written and programing
  - Average 2 or 3 weeks to do them
- Midterm: 30%
  - Monday, October 20, 2:30pm - 4:00pm
- Final: 30%
  - Thursday, December 18, 3:00pm - 6:00pm

- Check *now* for conflicts!

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

Waitlist

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

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

First Two Assignments

- Assignment #0
  - Setup CS184 account and let us know who you are
  - Get very simple OpenGL program working
  - ***Due Friday Sep. 12th, Midnight***
- Homework #1
  - Tests math prerequisites
    - ***Due Wednesday, Sep. 10th, 5:00pm***

Assignment: Shading   [Ritchie & Cho, F08]

Diffuse Only

Diffuse & Specular

Diff. & Spec. & Texture

Diff. & Spec. & Texture

Toon Shading

Bump Mapping
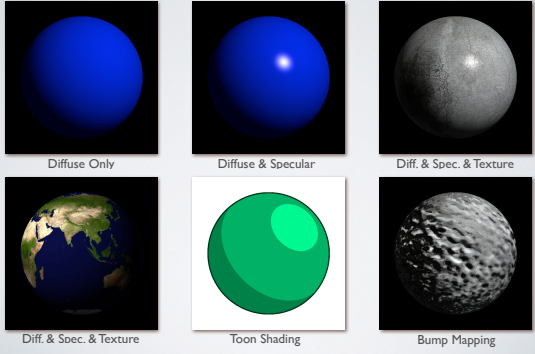
Assignment: Ray Tracing

[Ritchie & Cho, F08]
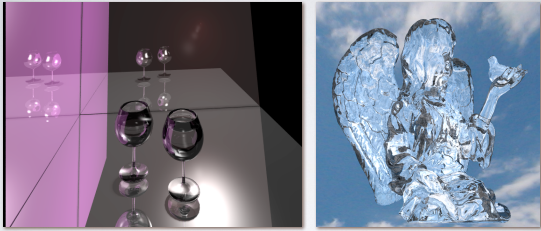
Assignment: Parametric Surfaces

[Ritchie & Cho, F08]
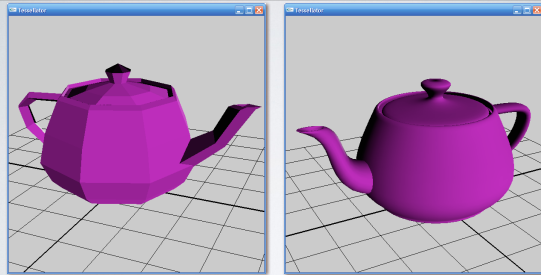
Assignment: Inverse Kinematics

[Egon Pasztor, F10]
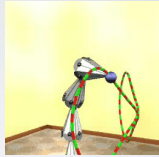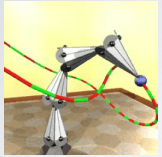
Academic Honesty

- 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
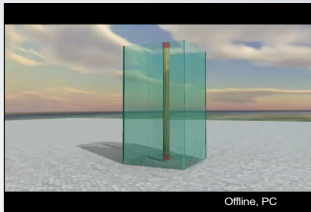 - Getting reported to the University
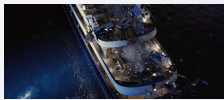 - No exceptions.

Questions?

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
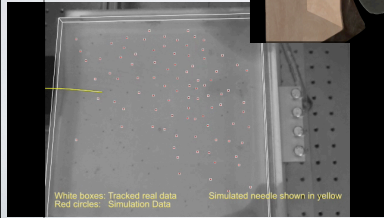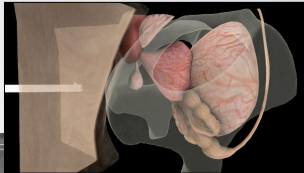
SIGGRAPH Asia 2012

My research

- Simulation

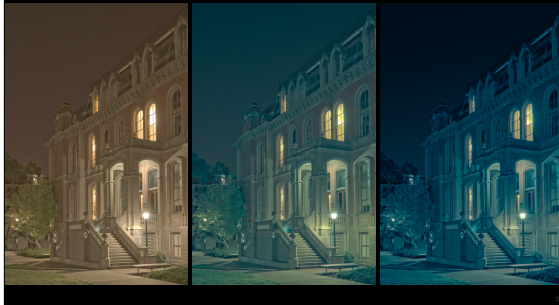With Rahul Narain and
Tobias Pfaff
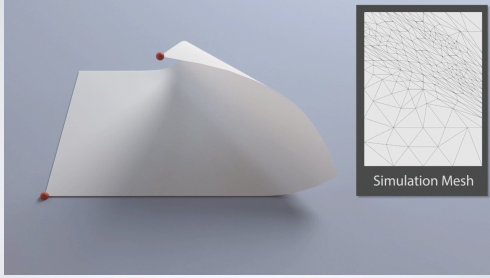
Simulation Mesh

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
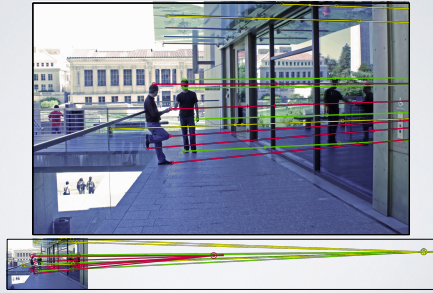
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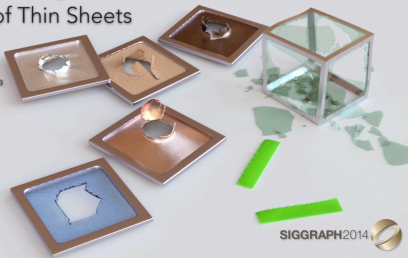
My research

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