

15-463: Rendering and Image Processing

Staff

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Web Page

- <http://www.cs.cmu.edu/afs/andrew/scs/cs/15-463/pub/www/463.html>

Handouts

- signup sheet

Today

Introductions

Overview of the course

Administrative stuff

A bit about me

Brand new faculty (RI/CSD)

Ph.D 2003, from UC Berkeley (signed by Arnie!)

Research Fellow, University of Oxford, '03-'04

Teaching

First time... so bear with me

The plan is to have fun and learn cool things,
both you and me!

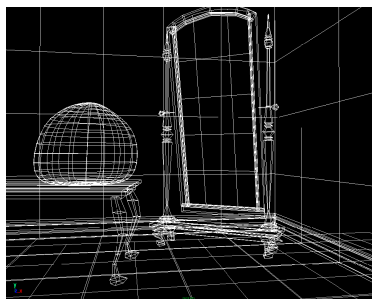
Social warning: don't see well

Research

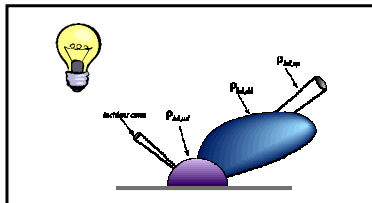
Graphics, Vision, Machine Learning

- Texture Synthesis, Human analysis/synthesis, Webcams!

Traditional Computer Graphics



3D geometry



physics



↑ projection

Simulation

GRAPHICS

State of the Art



- Amazingly real
- But so sterile, lifeless, *futuristic* (why?)

The richness of our everyday world



Photo by Svetlana Lazebnik

Beauty in complexity



University Parks, Oxford

Which parts are hard to model?



Photo by Svetlana Lazebnik

People

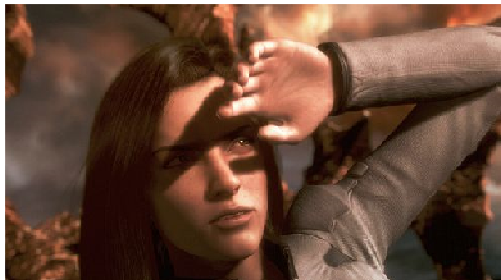


From "Final Fantasy"

On the Tube, London



Faces / Hair



From "Final Fantasy"



Photo by Joaquin Rosales Gomez

Urban Scenes



Virtual LA (SGI)

Photo of LA



Nature



outerspace.com.br

River Cherwell, Oxford



In search of realism...

Graphics is easy:

- We know how to represent geometry (polygonal meshes, splines, subdivision surfaces, CSG, etc.)
- Physics of light transport worked out (ray tracing, radiosity, Monte Carlo techniques, etc.)
- Good progress in participating media (e.g. subsurface scattering)
- Learned it all in 15-462!

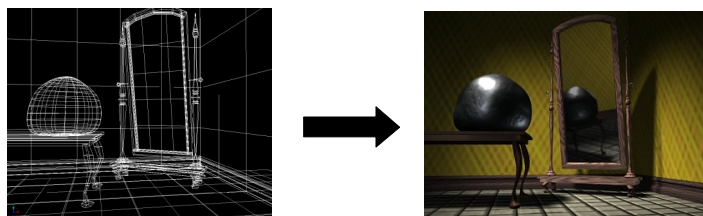
Graphics is still hard:

- We want to model our world (visual realism!)
- How do we create *enough* geometry?
- How do we find reflectance properties for *all* materials?
- Is it feasible? It is even needed? (human perception)
- Can we use texture maps?
- **Where do we get all this DATA?**

Capture it from the real world!

Virtual World vs. the Real World

15-462: we played in our little sandbox



15-463: Now we are ready to embrace the world!



Programming Assignment

1. Images of the Russian Empire -- colorizing the Prokudin-Gorskii photo collection



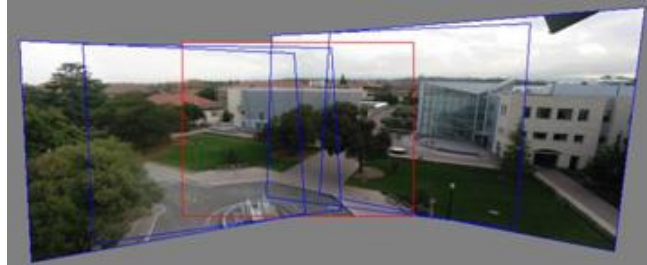
Programming Assignment

2. Face warping and morphing



Programming Assignment

3. Photo Mosaics



Full screen panoramas (cubic): <http://www.panoramas.dk/>
Mars: http://www.panoramas.dk/fullscreen3/f2_mars97.html
2003 New Years Eve: <http://www.panoramas.dk/fullscreen3/f1.html>

Programming Assignment

4. Video Textures?



Other assignment(s) and project

Something cool!!!

Administrative Stuff

Grading

- Programming Projects (60%)
- Midterm (15%)
- Final Project (25%)

Late Policy

- Five late days total, to be spent wisely

Cheating

- Let's not embarrass ourselves

Hardware/Software

- Graphics cluster, Wean 5336 (should have card access and login by now)
- MATLAB!!!

General Comments

Prerequisites

- Linear algebra
- Some computer graphics (or talk to me)

Emphasis on programming projects!

- Building something from scratch (Matlab!)

Cameras

Really cool

Not too expensive nowadays (<\$200)



Canon A70