Introductions

Pat Hanrahan
- My background is biophysics and computer science
- Founding employee at PIXAR
- Two academy awards: RenderMan / Subsurface scattering
- Research: rendering, graphics systems and architecture, visualization, virtual worlds

Matthew Fisher
- 1st yr PhD student in c.g. from Caltech

Justin Talbot
- 2nd yr PhD student in c.g. from BYU
Motivation

Entertainment

Movies
Toy Story, Pixar

Games
Spore, W. Wright, Elec. Arts
Computer-Aided Design

Computer-aided design
- Electronic blueprints
- Architectural CAD
- Mechanical CAD
- Electronic CAD
Visual simulation and training
- Apollo spacecraft
- Flight simulators
- Driving simulators
- Surgical simulation

Digital Media Technologies

Traditional media (analog to digital transition)
- Desktop publishing and printing
- Digital photography
- Digital video and HDTV

New media
- Multimedia computer and media servers
- Networked graphics and the WWW
- Sharing photos (flickr) and videos (youtube)
- Virtual worlds (Google Earth, Second Life)
Graphical User Interfaces

Desktop metaphor
- Input: Keyboard, mouse
- Output: Cathode-ray tube

Ivan Sutherland, Sketchpad
Light-pen, toggle switches, oscilloscope

Douglas Engelbart
Mouse and bitmapped display

Virtual Reality

Immersive interfaces
- Input: 3D 6-DOF tracking, gloves
- Output: Head-mounted and projection displays

Ivan Sutherland
Head-mounted displays, mechanical tracker

Wolfgang Krueger, Pat Hanrahan
Responsive Workbench
Projection display, magnetic tracker
Visualization

Science, engineering and medicine
Education

Interdisciplinary; Theory AND Practice

Science
- Physics of light, color and appearance
- Geometry and perspective
- Mathematics of curves and surfaces

Engineering
- Hardware: Graphics processors, sensors
- Software: Graphics libraries, window systems

Art and Psychology
- Color: perception and harmony
- Composition, form, lighting, ...
Innovation in Platforms

Game machines
e.g. Alienware, XBOX 360

Personal computers
e.g. MacBook Pro

Consumer electronics
e.g. HD PVR, HD TV

Handhelds
e.g. PDAs, cell-phones, PSP

Innovation in Hardware and Software

GeForce 8800 replaces the pipeline model
The future of GPUs is programmable processing
So – build the architecture around the processor
Topics

Drawing

Sand Dollar - J. Tared 2004
Typography and Page Layout

Input Devices and Interactive Techniques
Digital Cameras

Displays

CS148 Lecture 1
Pat Hanrahan, Winter 2008
Light and Color

Mattes, Layers, and Compositing
Digital Video and HDTV

Modeling and Rendering
Animation