

Rendering 201

Andrew Glassner
Microsoft Research

Rendering 101



Visibility

Shading

Efficiency

Rendering 201



Realism

Analysis

Aesthetics

What Is The Goal?



- See rendering as a medium
 - Powerpoint slides
 - Pulped wood
 - Television

Media

- The Medium is the Message
so match them:

Control the medium!

The Quest for Control



- Maturity = Control + Ability
- Rendering now:
 - Largely uncontrollable
 - Largely mechanical
- Control requires skill

The Goals



- Realism
- Analysis
- Aesthetics

Realism 1

- The goal:
 - Create a visual experience indistinguishable from a natural visual experience

Realism 2




- Move up the optic nerve
 - Right now: external
 - Stimulate internally
 - Retina
 - Optic nerve
 - Visual cortex

Realism 3



- Ex: Direct retinal stimulation
 - Cell processing
 - Saccades
 - Foveola
 - Glare, lens effects, etc.

Realism 4

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- Moving up the optic nerve
 - Simulate all lower levels
 - Motor sensations and visual input

Realism 5



- How to get there:
 - Direct stimulation devices
 - Higher-level vision models
 - Motor sensing devices

Analysis 1

- The goal:
 - Predict patterns of light transport and accumulation

Analysis 2



- Light prediction
 - Architecture
 - Farming
 - Engineering
- Meant for computer analysis
 - Not much perceptual work

Analysis 3



- How to get there:
 - Measured physical data
 - Natural phenomena
 - Wind, clouds, space dust
 - Parallel processing

Aesthetics 1

- The goal:
 - Creative expression of widely diverse visual points of view

Aesthetics 2



- Abstraction
 - What is left out
- High-level controls
- Low-level controls
 - Requires expertise

Aesthetics 3



- Perception matters a lot
 - It's all communication
 - Channel clarity
 - Selective ambiguity
 - Prediction of sensation

Aesthetics 4



- Technique requires skill
 - Knowledge
 - Experience
 - Control
 - Predictability

Aesthetics 5



- How to get there:
 - Control focus
 - Specify looks, not mechanics
 - Feeling over technique
 - Modeling must be matched

The Future



- Freely mix synthetic & real
- Natural-feeling experience
- The message dominates
- Enhanced vision
 - “We have the technology”

Conclusions



- Big problems remain!
- Direct stimulation
 - Match synthesis to perception
- Artistic expression
 - Predict audience awareness