Real-Time Shading Languages

Marc Olano
John Hart
Wolfgang Heidrich
Bill Mark
Ken Perlin
Overview

8:30 – 10:15 Background & Building Blocks
  • 8:30 Introduction — Marc Olano
  • 8:50 Noise Hardware — Ken Perlin
  • 9:30 Hardware Shading Effects — Wolfgang Heidrich

10:15 – 10:30 Break

10:30 – 12:15 Shading Language Systems

12:15 – 1:30 Lunch

1:30 – 3:15 Shading Language Systems (cont)

3:15 – 3:30 Break

3:30 – 5:15 Future
What is Shading

Ultimate control of appearance

Programmable
- Arbitrary computation

Procedural
- Simple procedures
- High-level language
Shader Types

Compute what?

- Surface color
- Light color and direction
- Fog density and attenuation
- Surface displacement
Non-Real Time / Real Time

Not Real-Time
• Seconds to hours per frame

Real-Time
• Tens of frames per second
Interactive Rendering

Illusion of Presence

• 10 – 30 – 60 frames per second
• Immediate response
• Simple appearance
Interactive Rendering

Vector

Flat

Gouraud

Texture

+Fragment Lighting

? Shading
Uses for Real-Time Shading

More realistic appearance
  • Automotive styling

Visualization
  • Data fields on surfaces

Non-realistic appearance
  • Games, Illustration
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  • 10:30 In the Beginning: The Pixel Stream Editor — Ken Perlin
  • 11:00 PixelFlow Shading — Marc Olano
  • 11:40 Procedural Solid Texturing — John Hart

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  • 1:30 Shading through Multi-pass Rendering — Marc Olano
  • 2:05 Complex Single and Multi-Pass Shading — Bill Mark
  • 2:45 Sampling Procedural Shaders — Wolfgang Heidrich

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  • 3:30 Multi-Pass RenderMan — Marc Olano
  • 4:10 Analysis of Shading Pipelines — John Hart
  • 4:45 Panel Discussion and Q & A — All