Introduction to RenderMan

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1977: Star Wars IV: A New Hope

1979: Ed Catmull, Alvy Ray Smith, and others leave NYIT to form the Computer Division of Lucasfilm

1984: John Lassiter leaves Disney Animation to join Pixar

Image Processing
Digital Editing and Compositing
Effects
Image/Volume Rendering Hardware
**History of RenderMan, II**

- **Pixar Image Computer**
- **Renderman**
- **REYES**
- **RIB**
- **Shade Trees**
- **prman**
- **Star Trek II (1982)**
- **Young Sherlock Holmes (1985)**
- **Pixar Animation Studios**
- **Image/Volume Rendering Hardware**
- **Rendering Software**
1986: Steve Jobs buys Pixar for $10M

Steve Jobs adds another $60M to keep Pixar running

1986: *Luxo Jr.* – Nominated for an Academy Award

1985: *Toy Story* – won Academy Award for Best Animated Short

1993: RenderMan wins a Technical Academy Award

1995: Pixar IPO -- Steve Jobs’s stake is now worth $1.2B

2004: Pixar bought by Disney for $7B, making Steve Jobs’s stake now worth $3.5B

Steve Jobs is now Disney’s largest shareholder (7%) – way ahead of even Roy Disney (1%)
RenderMan Software Rendering Pipeline

1. RIB File
2. Bounding Box Analysis
3. Split
4. Dice into Microfacets
5. Call the Shaders
6. Do Front-to-Back Compositing
7. Assemble the Pixels
8. Final Image
First, let’s think about it back-to-front:

\[ \text{color}_{12} = \alpha_2 \text{color}_2 + (1 - \alpha_2)\text{black}, \]

\[ \text{color}_{01} = \alpha_1 \text{color}_1 + (1 - \alpha_1)\text{color}_{12}, \]

\[ \text{color}^* = \alpha_0 \text{color}_0 + (1 - \alpha_0)\text{color}_{01}. \]

Substituting gives us the front-to-back equation:

\[ \text{color}^* = \alpha_0 \text{color}_0 + (1 - \alpha_0)\alpha_1 \text{color}_1 + (1 - \alpha_0)(1 - \alpha_1)\alpha_2 \text{color}_2 + (1 - \alpha_0)(1 - \alpha_1)(1 - \alpha_2)\text{black}. \]
RenderMan Renders at Higher-than-Screen-Resolution