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 join 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

- Image/Volume Rendering Hardware
- Pixar Image Computer
- Rendering Software
- REYES
- RenderMan
- Pixar Animation Studios
- RIB
- Shade Trees
- prman

History of RenderMan, III

1986: Steve Jobs buys Pixar for $10M
Steve Jobs adds another $60M to keep Pixar running

1986: Luxo Jr. – Nominated for an Academy Award

1988: Tin Toy – won Academy Award for Best Animated Short

1993: RenderMan wins a Technical Academy Award

1995: Toy Story

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

2004: Pixar bought by Disney for $7B
Steve Jobs stake now worth $3.5B
RenderMan Pipeline

- RIB File
- Bounding Box Analysis
- Split
- Dice into Microfacets
- Call Shaders
- Do Front-to-Back Compositing
- Assemble Pixels
- Final Image

RenderMan Composites Starting at the Eye

First, let’s think about it back-to-front:

\[
\begin{align*}
\text{color}_{12} &= \alpha_2 \text{color}_2 + (1 - \alpha_2) \text{black}, \\
\text{color}_{01} &= \alpha_4 \text{color}_1 + (1 - \alpha_4) \text{color}_{12}, \\
\text{color}^* &= \alpha_0 \text{color}_0 + (1 - \alpha_0) \text{color}_{01}.
\end{align*}
\]

Substituting gives us the front-to-back equation:

\[
\text{color}^* = \alpha_0 \text{color}_0 + (1 - \alpha_0) \alpha_0 \text{color}_2 + (1 - \alpha_0)(1 - \alpha_0)(1 - \alpha_4)(1 - \alpha_2) \text{black}.
\]
RenderMan Renders at Higher-than-Screen-Resolution