

*Distinguished Lecture Series*

# FFCS COLLOQUIUM

FALL 2008



*Lighting, Reflection and Rendering:  
Appearance for Graphics and Vision*

**Ravi Ramamoorthi**

2007 ACM SIGGRAPH Significant New Researcher Award in Computer Graphics

Much of the beauty of our visual world comes from the effects of richly illuminated indoor and outdoor environments, complex reflections and glossy materials like paints, velvet or silk, and intricate shading effects like soft shadows from the leaves of a tree in skylight. My research program develops the mathematical and computational models for these types of lighting and reflection effects, providing a unified approach to a number of applications of visual appearance in computer graphics and vision.

I will first describe our work in high quality real-time rendering, where our models of lighting and reflection have enabled interactive image synthesis with natural lighting, realistic materials and soft shadows. I will also discuss some more recent work on modeling the volumetric scattering of light in the atmosphere, leading to effects like glows around light sources and dimming and diffusing of surface shading. I then discuss a variety of projects in data-driven appearance capture, modeling and rendering. We describe methods for "inverse rendering" to estimate lighting and reflectance, image-based rendering of faces from a single input image, new data-driven models for human skin, and the acquisition and editing of spatially and temporally varying appearance. Finally, I discuss the use of realistic appearance in computer vision, including low-dimensional subspaces for complex lighting, and more recent work on frequency domain invariants that can be used to detect tampering and splicing in images.

Wednesday

Oct 29th

4:00 - 5:00 pm

306 Soda Hall  
Hewlett-Packard  
Auditorium

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