

Lighting and Shading

Textbook Chapter 14

1

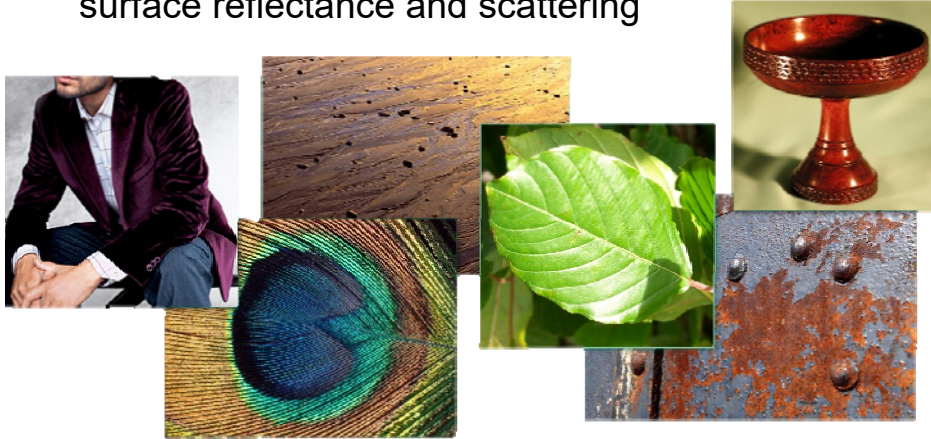
Today

- Announcements
 - Assignment 2 grading this week, sign up asap
 - Assignment 3 out at the end of this week
 - Quiz 2 on October 18 (note: a Wednesday)
 - Friday class will show examples of state-of-the-art rendering, taught by TA
- Lecture
 - Interaction of light with surfaces
 - Phong reflection model

2

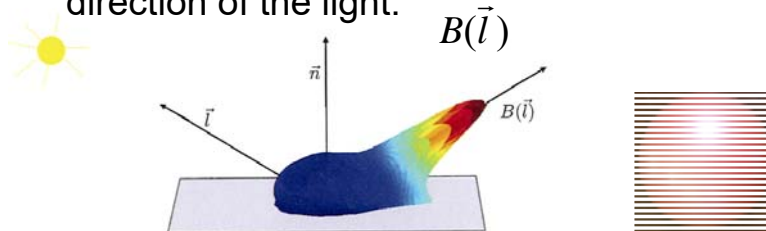
Today: Modeling Material Appearance

- Rich variety of **materials**: characterized by surface reflectance and scattering



Light blob from PVC plastic

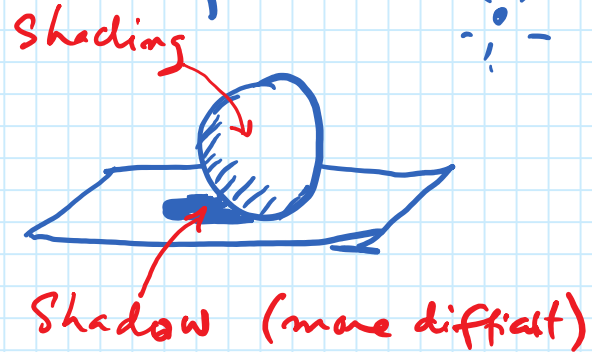
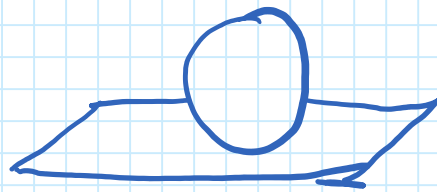
- PVC blob
 - Note that this figure just describes the result of light that comes in from the specific shown direction \vec{l} . For other incoming directions we would need a different blob to visualize the resulting scattering.
 - The plastic will appear brightest when observed in the directions clustered about the 'bounce' direction of the light:



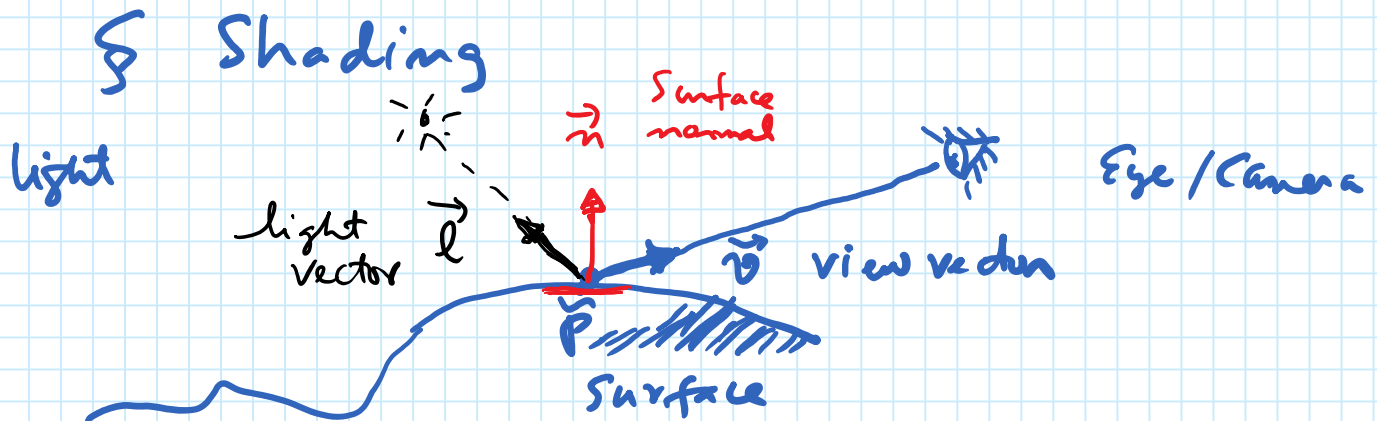
A simple model of Lighting & Shading

October 16, 2017 10:12 AM

Interaction of light with surfaces



Want to capture qualitatively similar phenomena



Build the simplest model of reflection light
Ignored many phenomena (important for advanced apps)

- Distributed light sources

- "Global Illumination"

Efficient algorithms: Radiosity, etc.

We'll make an extremely crude approx with "Ambient light"

- Participating media "fog", etc.

- Subsurface scattering - Camera optics

Goal: determine the color seen along \vec{v}

Again a complex topic

Colors perceived humans can be represented in a basis of three colors "Tristimulus theory"

$$\vec{C} = \begin{pmatrix} \text{Red} \\ \text{Green} \\ \text{Blue} \end{pmatrix}$$

represents intensity of light
each element, scaled to $[0, 1]$

Different bases: $\begin{pmatrix} \text{Cyan} \\ \text{Magenta} \\ \text{Yellow} \end{pmatrix}$

Printing also need Black 'K'

Phong Reflection Model

Approximate real BRDF

Bi-Directional Reflectance Distribution Function.

