It's all an illusion!

Brightness illusions
- Most people think of visual perception as a measurement of light
- As it reflects off of objects

Object identification
- A basic task of the visual system is to figure out whether changes in intensity are due to changes in objects (color, paint) or to changes in illumination (light, shadows, veils)
- One problem is that an edge from paint could be the same as an edge from a shadow
- Steps-movie.swf

Ambiguity
- The process of identifying a pattern of light as a set of objects in inherently ambiguous
  - There is no way that you can always be correct!
  - The visual system must use some "tricks" to try to be right as often as possible
  - We can expose those tricks with illusions

Snakes illusion
- The diamonds have the exact same scale of gray

Snakes illusion
- We see a dark transparent veil in front of some rows
- Which means the paint of the diamond behind it must be lighter than the paint of the diamond without the veil
We interpret the shadow as producing a change in intensity.

Which means the object surfaces (paint) must be different.

There are lots of brightness illusions based on this idea.

It’s a side effect of our effort to judge the properties of objects in different kinds of lighting.

- We want to be able to identify an object’s properties regardless of lighting.
- Constancy (color, brightness).

Let’s look at one more.
Demonstration

- Pick up a copy of the image and randomly select a set of instructions.
- Follow the instructions and come back to the classroom within 10 minutes
People can see objects across an amazing range of light levels. Some is due to pupil size and rod vision.

Even within indoor lighting ranges, we see things in a wide variety of levels of light.

Consider a photograph of an office. The light from outside is so bright you cannot see anything. The light on the floor is so dark you cannot see anything.

You can change exposure settings, but nothing really works well. You have to go through a complicated process to take a really good picture.

Photoshop lets you take the over-exposed image and exaggerate the shadows. The makes the details in the dark places of the floor visible.
Photoshop
- Take the under-exposed image and exaggerate the bright regions
- The makes the details in the bright places of the window visible

Photoshop
- Combine everything in the right way, and you get a better picture
- Your brain is doing something similar, but in a much more sophisticated way

Conclusions
- Constancy
  - We want to know the properties of objects
- Ambiguity
  - It is not always possible to know if changes are due to object properties of illumination properties
- Visual system
  - Uses clever tricks to choose
  - Usually correct
  - Sometimes easy to fool

Next time
- Depth perception
- Monocular cues