Imaging Science Projects

The projects described in this package have been selected or designed to provide students with an introduction to some of the fundamental concepts of imaging science. The projects become more sophisticated and demonstrate more complex concepts as students move up in rank. After completing all of the projects students will have been exposed to key aspects of almost all of the links in the imaging chain.

Beginner—Color

The activities chosen for younger students will expose them to concepts involving color. These concepts are central to an understanding of multiple links in the imaging chain.

What is color? We all think we know what color is, but try to define it— it’s not easy! Most people think that “color” is one way to describe an object, but in reality objects don’t have color. Color actually exists only in our brains. The color we see depends on three things: the subject, the light that illuminates the subject, and the human visual system (including the eyes and the brain).
Here’s an example of how these three factors determine color – consider the “Reveal” light bulb which is made by General Electric. It’s a light which has a special material inside the bulb which gives it a slightly blue color. When this blue light is reflected off of human skin, it makes it look a little “pinker” than a regular light bulb. Our eyes see this reflected light and our brain tells us that the subject looks more natural than it otherwise would.
Because people expect the things they see to have certain colors, imaging scientists have to understand how to make the right colors (the ones most people expect to see) appear in their photos, computer monitors, and TVs.

The below exercises have been developed by the people at the Crayola Crayon company and the Optical Society of America to help you learn a little about color, where it comes from, and how colors can be combined. We’re also including a demonstration developed by The Exploratorium (http://www.exploratorium.edu) which introduces the concept of image formation, in this case using a pinhole. This will lead to more advanced demonstrations of image formation when students progress.