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Introduction

In the natural world there are many fascinating and beautiful effects involving optics. Most of the time we take these effects for granted. Each day optical scientists and engineers discover more about the natural world when we see how new technologies such as photonic crystals mimic the natural world. Photonic crystal-like structures in peacock feathers give the plumes their color. Similar structures in butterfly wing scales provide their iridescent colors.

Beyond these structures there are effects in the natural world such as the aurora borealis or things as everyday as rainbows and oil slicks. Scattering and color effects brighten up our world, while polarization adds a dimension that sometimes becomes visible to the human eye. When we look more closely we notice that plants glow and self-bioluminescence provides information about the state of health of organisms. We may even wonder why it is that parrots have a visual response much further into the ultraviolet than we do.

As optical scientists and engineers, most of us became fascinated with light at some point in our lives. We observe things in our everyday life that we don't often explore or think about, yet there are researchers who spend their careers looking at these effects in nature. All of us can learn to appreciate the natural optical world better by simply becoming more aware of what to see and how to see it.

This conference is the sixth in a series of conferences on *The Nature of Light* that started in 2005 with *The Nature of Light: What is a Photon?* (SPIE vol. 5866, 2005). Other volumes in the series related to Light in Nature include *The Nature of Light: Light in Nature* (SPIE vol. 6285, 2006), *The Nature of Light: What Are Photons? (II)* (SPIE vol. 6664, 2007), *The Nature of Light: Light in Nature II* (SPIE vol. 7057, 2008), and *The Nature of Light: What are Photons? III* (SPIE vol. 7421, 2009).

This year's conference *The Nature of Light: Light in Nature III* was comprised of eleven presentations with authors from seven different countries providing a variety of research involving light in the natural world. Nine of these presentations are represented with a manuscript in these proceedings. The papers have been split into three sessions. Session One focuses on *Learning from Nature,* while Session Two focuses on *Light in Art,* and Session Three focuses on *Light in Physical Systems.* Each of these papers offers its own perspective and provides some insight into the nature of light.

We enjoy having the opportunity to investigate these questions in a forum uniting optical scientists and engineers from all over the world. Thank you for joining us in our exploration of the question "what is light?"

Katherine Creath
Joseph A. Shaw