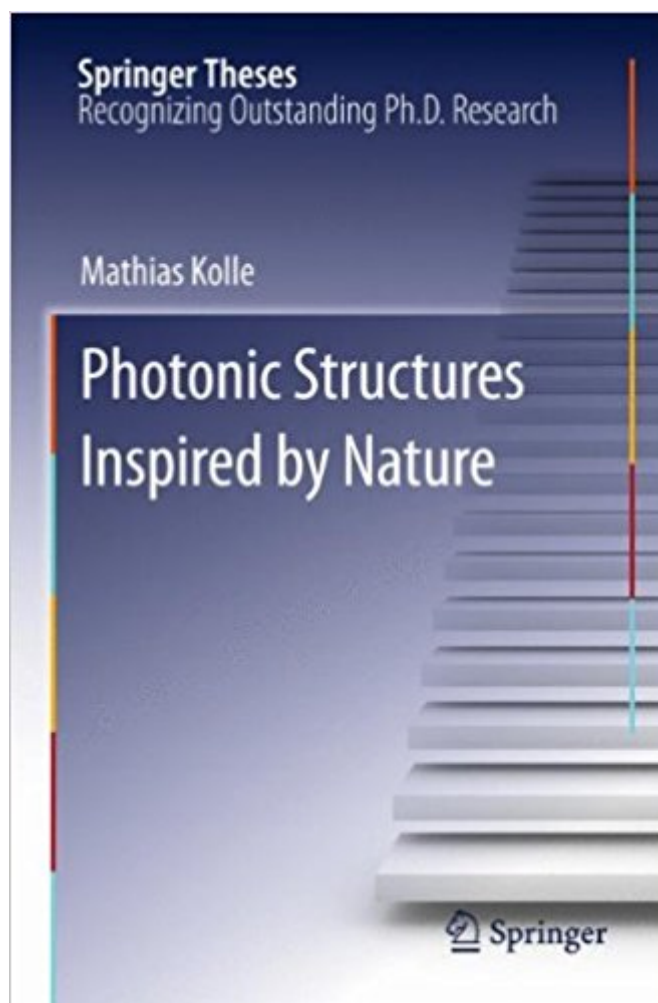# Photonic Structures Inspired By Nature (Springer Theses)

## Synopsis

Unlike most natural colours that are based on pigment absorption, the striking iridescent and intense colouration of many butterflies, birds or beetles stems from the interaction of light with periodic sub-micrometer surface or volume patterns, so called â œphotonic structuresâ •. These â œstructural coloursâ • are increasingly well understood, but they are difficult to create artificially and exploit technologically. In this thesis the field of natural structural colours and biomimetic photonic structures is covered in a wide scope, ranging from plant photonics to theoretical optics. It demonstrates diffractive elements on the petal surfaces of many flowering plant species; these form the basis for the study of the role of structural colours in pollinator attraction. Self-assembly techniques, combined with scale able nanofabrication methods, were used to create complex artificial photonic structures inspired by those found in nature. In particular, the colour effect of a Papilio butterfly was mimicked and, by variation of its design motive, enhanced. All photonic effects described here are underpinned by state-of-the-art model calculations.

## Book Information

Series: Springer Theses

Hardcover: 144 pages

Publisher: Springer; 2011 edition (January 10, 2011)

Language: English

ISBN-10: 364215168X

ISBN-13: 978-3642151682

Product Dimensions:  6.6 x 0.6 x 9.6 inches

Shipping Weight: 1 pounds (View shipping rates and policies)

Average Customer Review:  1.0 out of 5 starsÂ Â See all reviewsÂ (1 customer review)

Best Sellers Rank: #4,292,080 in Books (See Top 100 in Books)   #23 inÂ Books > Science & Math > Biological Sciences > Bioelectricity   #705 inÂ Books > Science & Math > Physics > Nanostructures   #913 inÂ Books > Science & Math > Biological Sciences > Biophysics

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The author uses figures to help explain observed phenomena, and many of these figures are so poorly reproduced that they are useless. Graphs have curves on them that can't be seen, probably because they were originally in color and are reproduced in black and white. Graphs are reduced in size to a point where you need a magnifying glass to view them. For example, one graph containing six curves is about 3/4 inch by 3/4 inch in size.If you want to learn about the mechanisms that

produce structural color in nature, don't waste your money on this book. I recommend the book Structural Colors in the Realm of Nature by S. Kinoshita. It is about twice as long, has beautifully reproduced figures, and is about the same price.

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