

# Physically Based Rendering: From Theory to Implementation

Physically based rendering (PBR) is a computer graphics technique that simulates the physical properties of light and matter to create realistic images. This book provides a comprehensive guide to PBR, from its theoretical foundations to its practical implementation.



## Physically Based Rendering: From Theory to Implementation by Matt Pharr

★★★★☆ 4.5 out of 5

Language : English

File size : 50943 KB

Screen Reader : Supported

Print length : 1266 pages



The book begins with an introduction to the basic concepts of PBR, such as the energy conservation equation, the bidirectional reflectance distribution function (BRDF), and the microfacet model. It then covers the different stages of the PBR pipeline, including:

- **Geometry processing:** This stage prepares the geometric data for rendering, including tessellation, subdivision, and level-of-detail (LOD) generation.
- **Material modeling:** This stage creates the materials that will be used to render the scene, including defining the BRDF, the subsurface scattering properties, and the optical properties.

- **Lighting:** This stage simulates the lighting in the scene, including the direct lighting from light sources and the indirect lighting from bounces off of surfaces.
- **Shading:** This stage combines the geometry, the materials, and the lighting to produce the final image.

The book also includes a number of case studies that demonstrate how PBR can be used to create realistic images of a variety of scenes, including indoor and outdoor environments, characters, and products.

## **Benefits of Physically Based Rendering**

PBR offers a number of benefits over traditional rendering techniques, including:

- **Realism:** PBR produces images that are more realistic than those produced by traditional rendering techniques, thanks to its accurate simulation of the physical properties of light and matter.
- **Flexibility:** PBR materials can be easily modified to create a wide variety of looks, making it a versatile tool for creating both realistic and stylized images.
- **Efficiency:** PBR can be used to create realistic images quickly and efficiently, thanks to its use of physically accurate models and efficient algorithms.

## **Audience**

This book is intended for computer graphics professionals who want to learn about PBR, including:

- Game developers
- Film and television animators
- Architects and designers
- Researchers

The book assumes a basic understanding of computer graphics, but no prior knowledge of PBR is required.

## **About the Author**

Matt Pharr is a computer graphics researcher and author. He is the author of several books on computer graphics, including *Physically Based Rendering: From Theory to Implementation* and *GPU Gems 3*. Pharr is also a co-founder of the open source rendering library OpenImageIO.

## **Reviews**

“Physically Based Rendering: From Theory to Implementation is the definitive guide to PBR. It provides a comprehensive overview of the subject, from its theoretical foundations to its practical implementation. This book is essential reading for anyone who wants to create realistic images using computer graphics.”

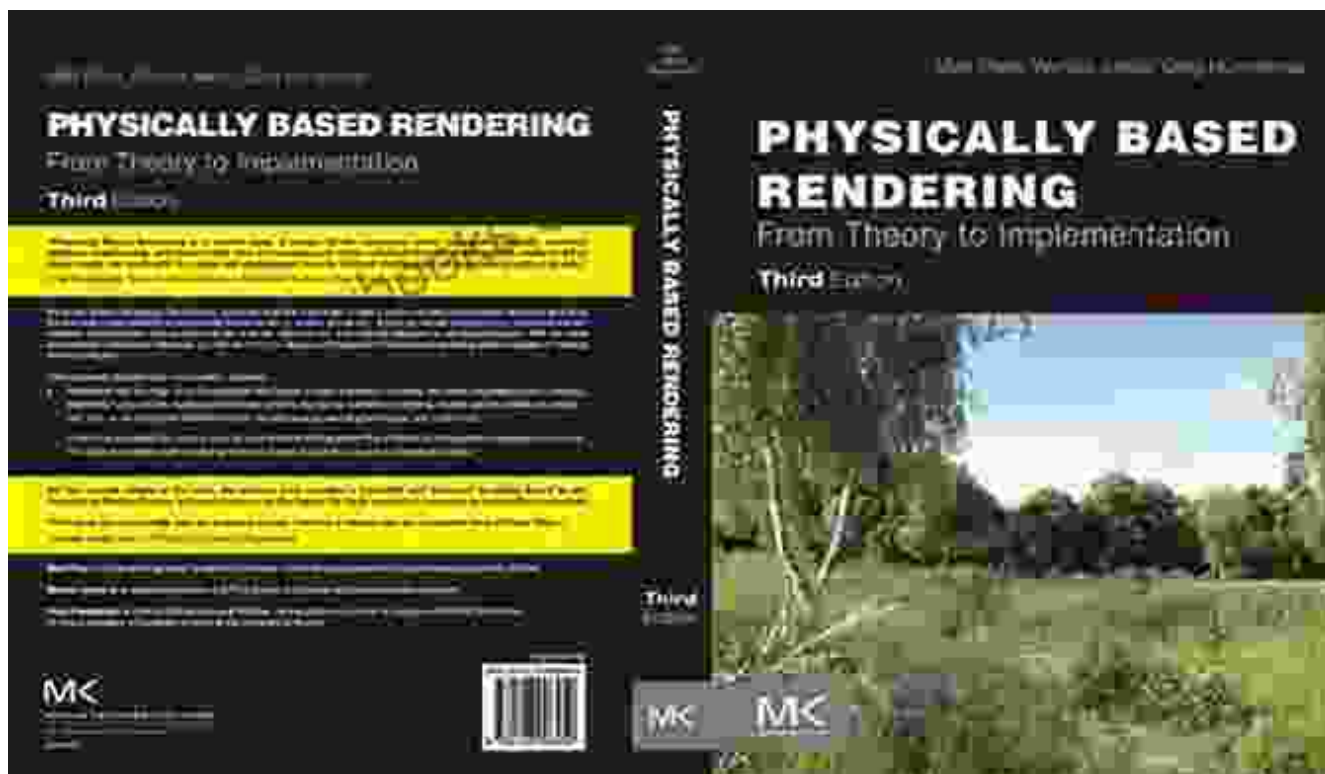
### **—Siggraph Asia 2016**

“Matt Pharr has written a masterpiece. Physically Based Rendering: From Theory to Implementation is the most comprehensive and authoritative book on PBR ever written. This book is a must-have for anyone who wants to learn about PBR.”

—Our Book Library.com

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