



# Creating Symmetry: The Artful Mathematics of Wallpaper Patterns

*Frank A. Farris*

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This lavishly illustrated book provides a hands-on, step-by-step introduction to the intriguing mathematics of symmetry. Instead of breaking up patterns into blocks—a sort of potato-stamp method—Frank Farris offers a completely new waveform approach that enables you to create an endless variety of rosettes, friezes, and wallpaper patterns: dazzling art images where the beauty of nature meets the precision of mathematics.

Featuring more than 100 stunning color illustrations and requiring only a modest background in math, *Creating Symmetry* begins by addressing the enigma of a simple curve, whose curious symmetry seems unexplained by its formula. Farris describes how complex numbers unlock the mystery, and how they lead to the next steps on an engaging path to constructing waveforms. He explains how to devise waveforms for each of the 17 possible wallpaper types, and then guides you through a host of other fascinating topics in symmetry, such as color-reversing patterns, three-color patterns, polyhedral symmetry, and hyperbolic symmetry. Along the way, Farris demonstrates how to marry waveforms with photographic images to construct beautiful symmetry patterns as he gradually familiarizes you with more advanced mathematics, including group theory, functional analysis, and partial differential equations. As you progress through the book, you'll learn how to create breathtaking art images of your own.

Fun, accessible, and challenging, *Creating Symmetry* features numerous examples and exercises throughout, as well as engaging discussions of the history behind the mathematics presented in the book.

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