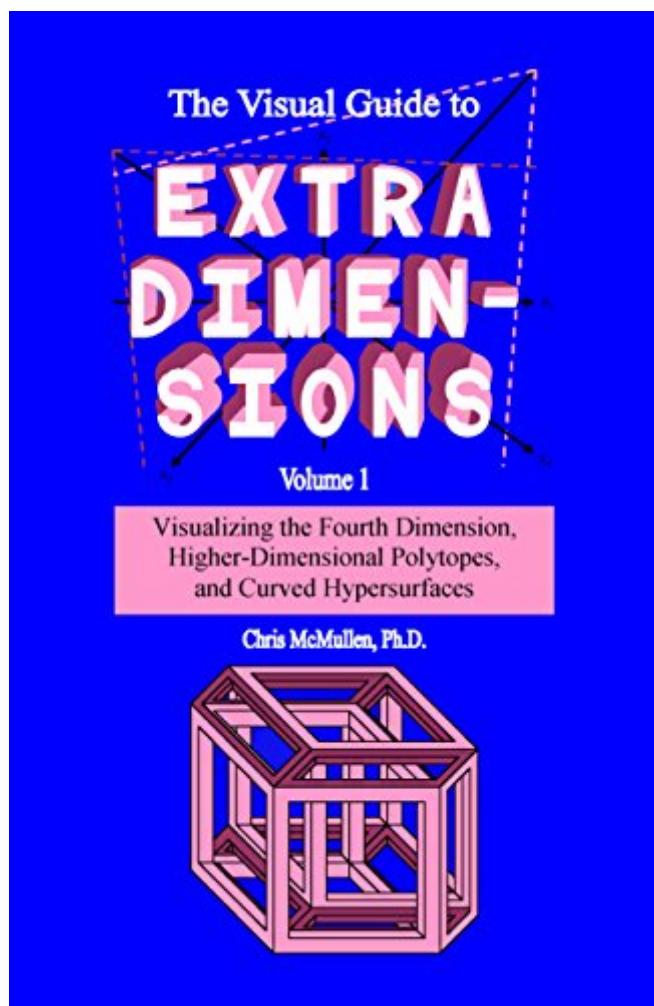


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# The Visual Guide To Extra Dimensions: Visualizing The Fourth Dimension, Higher-Dimensional Polytopes, And Curved Hypersurfaces



## Synopsis

**AUTHOR:** Chris McMullen earned his Ph.D. in particle physics from Oklahoma State University. Dr. McMullen currently teaches physics at Northwestern State University of Louisiana. His background on the geometry and physics of a possible fourth dimension of space includes a half-dozen research papers on the prospects of discovering large extra dimensions at the Large Hadron Collider.

**DESCRIPTION:** This book takes you on a visual tour of a fourth dimension of space. It is much more visual and conceptual than algebraic, yet it is detailed and technical, with the intention of satisfying the needs of mathematically-minded readers familiar with the fundamentals of algebra, geometry, and graphing. Here is a sample of what you will find:

A fascinating tour of the second and lower dimensions, which will help to understand the fourth dimension by analogy. A chapter dedicated toward imagining what it might be like to live in a hypothetical 4D hyperuniverse. This includes details like 4D wheels with axles, a 4D staircase, and a 4D room. Pictures of flat 4D objects called polytopes, like the tesseract, pentachoron, and icositetrachoron. A unique graph of a hecatonicosachoron has 12 of its 120 bounding dodecahedra highlighted to help visualize its complicated structure. In-depth discussion of the hypercube, including numerical patterns, rotations, cross sections, and perspective. Watch a tesseract unfold. Visual intersections of 15 pairs of perpendicular planes and 6 pairs of orthogonal hyperplanes in 4D space. Unique graphs of curved hypersurfaces in 4D space, like the glome, spherinder, cubinder, and hyperparaboloid.

**PUZZLES:** Several puzzles are included to challenge the reader to contemplate the fourth dimension. Answers are included at the back of the book.

**AUDIENCE:** This book is highly visual and very conceptual such that anyone with an appreciation for geometry may understand it, while at the same time including ample detail to also satisfy readers with a strong background in mathematics.

## Book Information

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## Customer Reviews

McMullen's "Visiual Guide" is well-written and engaging. The hard-core math was downplayed in an effort to present the material in a way that most laymen could follow. Extra-dimensional space is still a bit of a visual mind-bender to me, but McMullen provides a good introduction to the topic.

Very nice illustrations. Still very hard to visualize the 4th dimension.

Great book! Complex concepts are made easily understandable, and fun. The author encourages investigative thought and abstract thinking. I love how the book builds on itself - you grow with the book. I have a new way to visualize extra-dimensions and have had fun building with pipe cleaners and my kids to try out these different constructs of dimension. This book really pulls you in and keeps you hooked on one concept after another. A nice educational tool and fun read.

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