



Making Designs A Reality

The innovative design of the Sydney Opera House stymied builders for years until they realized that all the project's specifications could be met with triangles cut from the same sphere. Since all the pieces were of the same type and from a surface with well-established geometrical properties, the requisite calculations (such as determining structural forces) were simplified considerably and the dream became a magnificent reality.

Many calculations involved in bold plans are made possible by computer-aided design and the mathematics behind it. Architects and engineers model complex shapes using a succession of polygons and simpler curved surfaces – with known characteristics – so that a design's structural properties can be determined. Now, elements of large buildings which were once chosen to be uniform because of complexity considerations, can be as individualistic as their designers.

For More Information: "Mathematical Tour through the Sydney Opera House," *The Mathematical Intelligencer*, Joe Hammer, Fall 2004.



Photo courtesy of Gabriel Ditu, www.gabrielditu.com.



The **Mathematical Moments** program promotes appreciation and understanding of the role mathematics plays in science, nature, technology, and human culture.

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