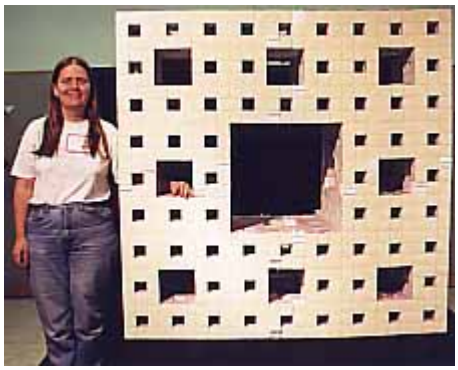
The Geometry Junkyard

Sierpinski Tetrahedra and Other Fractal Sponges

This seems to be everyone's favorite three-dimensional fractal, so much so that I've had to add a separate page for it and several other closely related fractals. The Sierpinski Tetrahedron has Hausdorff dimension two, so maybe it's not really a fractal in the "fractional dimension" sense of the word. It can be formed in many ways: (1) start with a single tetrahedron and remove octahedra from it, (2) recursively combine quadruples of tetrahedra into larger tetrahedra, (3) take "Pascal's Pyramid" of trinomial coefficients modulo two, (4) form the graph of the binary exclusive-or function on the unit square. The last construction shows that if you look down on it from the right direction, it just looks like a square, but from other viewpoints it has plenty of holes, so it can form a sort of "Venetian blind" that casts shadows only in certain directions.

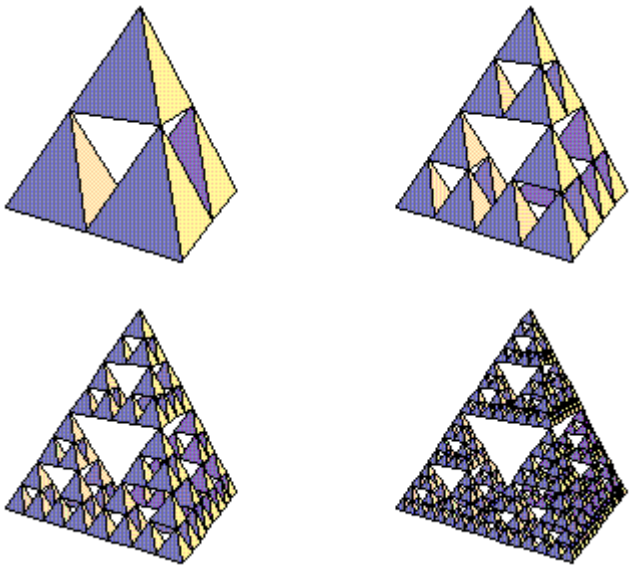
- Animation of the fast Fourier transform of a Menger Sponge.
- ASCII Menger sponge, W. Taylor.
- The business card Menger sponge project. Jeannine Mosely wants to build a fractal cube out of 66048 business cards. The MIT Origami Club has already made a smaller version of the same shape.



- Deconstructing Marty. Tom Beard and Dorking Labs analyze the Sierpinski-carpet-like geometry of New Zealand fractal artist Martin Thompson's works.
- Sylvie Donmoyer geometry-inspired paintings including Menger sponges and a behind-the-scenes look at Escher's Stars.
- The fractal gallery tour: Sierpinski tetrahedron
- Fractal skewed web. Sierpinski tetrahedron by Mary Ann Conners.
- Fractals by da duke. Ray-traced Menger sponges and Sierpinski gaskets.
- Fun with Fractals and the Platonic Solids. Gayla Chandler places models of polyhedra and polyhedral fractals such as the Sierpinski tetrahedron in scenic outdoor settings and photographs them there.
- IFS and L-systems. Vittoria Rezzonico grows fractal broccoli and Sierpinski pyramids.
- Interactive fractal polyhedra, Evgeny Demidov.
- Making a Sierpinski pyramid with Maple, S. Sutherland, Stony Brook.

- Mathematica Menger Sponge, Robert M. Dickau.
- Mengermania!
- Menger Cubes, Peter C. Miller. Including some animated ray traces and a discussion of eliminating irrelevant internal surfaces prior to rendering.
- Menger sponge floating in space. Everyone and his brother makes ray-traced fractals with unlikely backgrounds nowadays, but Cliff Pickover was there first.
- Origami Menger Sponge built from Sonobe modules by K. & W. Burczyk.
- Paperforms. John Vonachen uses laser cutters and spray paint to make and sell paper models of polyhedra, stellated polyhedra, polyhedral complexes, Sierpinski tetrahedra, etc.
- Project X. "a shape that is homogenized, saturated with equalities, inanely geometric, yet also irresolvable, paradoxical, UNHEALTHY"
- Rainbow Sierpinski tetrahedron by Aécio de Féo Flora Neto.
- Rubik's Cube Menger Sponge, Hana Bizek.
- Santa Rosa Menger Cube made by Tom Falbo and helpers at Santa Rosa Junior College from 8000 1-inch-cubed oak blocks.

- Sierpinski cookies. Actually more like Menger cookies, but whatever.
- Sierpinski gaskets and Menger sponges, Paul Bourke. Including stacks of coke cans, radio antennas, crumpled sponges, and more.
- Sierpinski Hamantaschen.
- Sierpinski gaskets and variations rendered by D. H. Hepting.
- Sierpinski pentatope video by Chris Edward Dupilka. A four-dimensional analogue of the Sierpinski triangle.
- Sierpinski pyramid. C++ code for generating the Sierpinski tetrahedron.
- Sierpinski tetrahedron. Awful Mathematica code used by Robert Dickau to generate the following sequence of images.



- Sierpinski tetrahedron animation (MS-video format), Karl S. Frederickson.
- Sierpinski triangle reptile based on a complex binary number system, R. W. Gosper.
- Sierpinski valentine from XKCD.
- Tetrahedral kite. A. Thyssen describes how to make Sierpinski tetrahedra out of soda straws, kite strings, and plastic shopping bags.
- Tetrix. From Eric Weisstein's treasure trove.
- Tune's polyhedron models. Sierpinski octahedra, stellated icosahedra, interlocking zonohedron-dissection puzzles, and more.
- Visualising fractals in 3D. Sierpinski tetrahedron in Stonehenge, and a Menger sponge.
- What is David Fowler making a Sierpinski tetrahedron out of? It looks like toothpicks and marshmallows, or maybe pieces of styrofoam peanuts.
- What to make with golf balls? Dale Seymour chooses a Sierpinski triangle and Sierpinski tetrahedron.
