



Photography: Michael Hansmeyer

## Artful architectural iterations

IT'S hard to avoid computer-generated images. We are bombarded with them by television, magazines and the internet. But turning these ideas into reality is a big challenge, says Michael Hansmeyer, a computational architect at the Swiss Federal Institute of Technology in Zurich.

"With all this computing power, it's been possible to create and display forms as complex as mine in virtual worlds for the last couple of years," he says. "The challenge was to

find a way to get them out."

Hansmeyer designs his architectural creations with a type of iterative computer program called a subdivision algorithm. To make his design, he starts with a column. The algorithm divides the surface of the column into four smaller surfaces, which can be distorted to curve in or out, for example. This process is repeated, causing the column to be divided into ever-smaller shapes. Just 10 iterations yields over a million surfaces.

Therein lies the manufacturing problem: how do you build an object with over a million faces? One option is to use a 3D printer, which is designed to make computer-generated shapes. But they cannot cope with objects as complex as Hansmeyer's. "They can do the scale but not the resolution of the columns," he says.

Instead, he chose a novel method of construction. Hansmeyer divides a column into cross sections each 1 millimetre thick, cuts them out of

cardboard and then stacks the cut-out shapes on top of each other. Using steel rods to align the layers, he can build a column 2.7 metres tall that weighs 640 kilograms. The photo above shows the stack of cardboard layers from which a column was cut - effectively a "negative" of a column.

Having conquered the column, Hansmeyer has his eye on more complex architectural shapes. "I'm moving on to designing other objects, such as walls, vaults and arches." Justin Mullins ■