

## Bach, mapped:

### 75,730 notes of 'Goldberg Variations' visualised

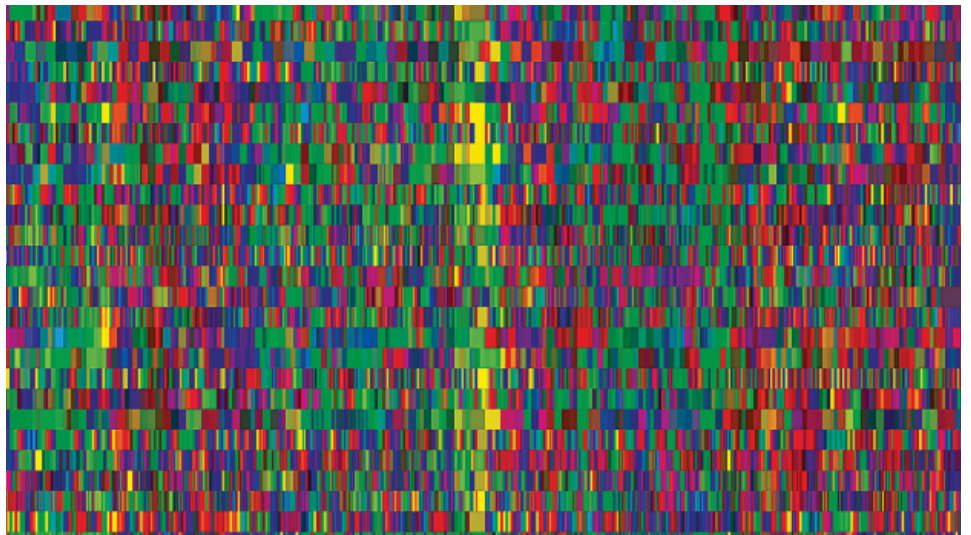
What does music look like? Benjamin Samuel Koren, who runs computational geometry company 1:One, wanted to understand the architecture of Bach's Goldberg Variations.

„If you listen to the music, it's difficult to get a feel for the intricate structure of the piece," says the 30-year-old. „So the idea was to make it visual."

Koren mapped 75,730 notes of the 40-minute piece as discrete Midi „events", then assigned each note a colour. Although the colours are subjective, they are relative to one another, analogous to the notes between musical intervals.

„I had no idea what would come out," says Koren. „But you can see three axes emerging in the piece -- blue, yellow, blue, corresponding to the Variations' fundamental harmony. The play on words may seem trivial, but it does have a golden centre."

Each set of three dots (above) represents one of 384 16th-note samples of the first Goldberg Variation (excluding repeats). The two dots directly below each number illustrate which note each of the piece's two voices are singing in. The third dot under each number combines these two colours and is turned into a pixel-wide strip in the final illustration (see gallery).



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