

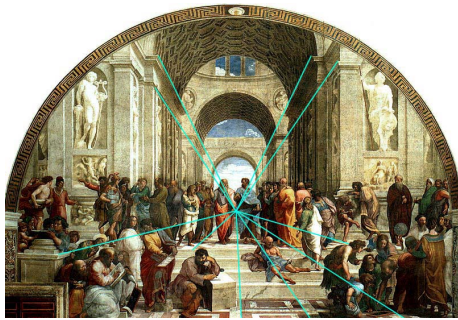
YPMD Talk: Finding Mathematics in Art

Speaker: Jessie Feng

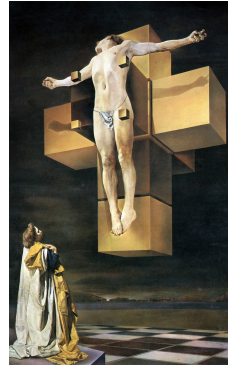
Author: Judy Li

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Before finding maths in art, we found some mathematicians in art: namely, Euclid, Pythagoras and Archimedes in the fresco *The School of Athens*. To gain more insights, Jessie guided us to analyse this fresco from a mathematical perspective: the positions of the figures and the rafters of the arch align to lines that converge at a focal point, creating visual depth and drawing attention to the central figures: Plato and Aristotle. This technique, known as the one-point perspective, is commonly used in Renaissance and landscape paintings to create the illusion of depth. Meanwhile, more contemporary artworks have experimented with incorporating higher-dimensional objects in paintings, such as the tesseract cross in Dalí's *Corpus Hypercubus*.



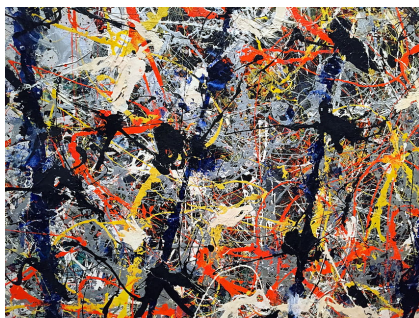
The School of Athens, Raphael



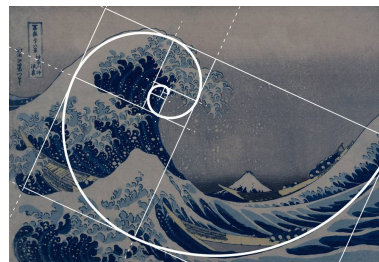
Corpus Hypercubus, Salvador Dalí

Jessie then showed us some abstract art, such as Jackson Pollock's *Blue Poles*. At first glance, it seemed like something any of us can recreate by pouring paint randomly on a canvas, yet fractal analysis (by Mandelbrot himself!) shows Pollock's use of fractal patterns via the paint-dripping process and his motions around the canvas. Indeed, the fractal dimensions of Pollock's works increased over the years as he refined his dripping technique.

Artists have also used the Fibonacci spiral to create balanced compositions, and Polykleitos sculpted *Doryphoros* using the golden ratio to construct the ideal human body. What's more, the ratio of *Doryphoros*'s phalanges, hands, and arms is $1:\sqrt{2}$. If you are ever bored (not in a Prime Time, of course), why not measure your hands and see if you have the ideal proportions!



Blue Poles, Jackson Pollock



Great Wave Off Kanagawa, Hokusai