Kevin Walker: An algorithmic approach to mathematical art

Interview by Martin Skrodzki and Milena Damrau | Section: Interviews
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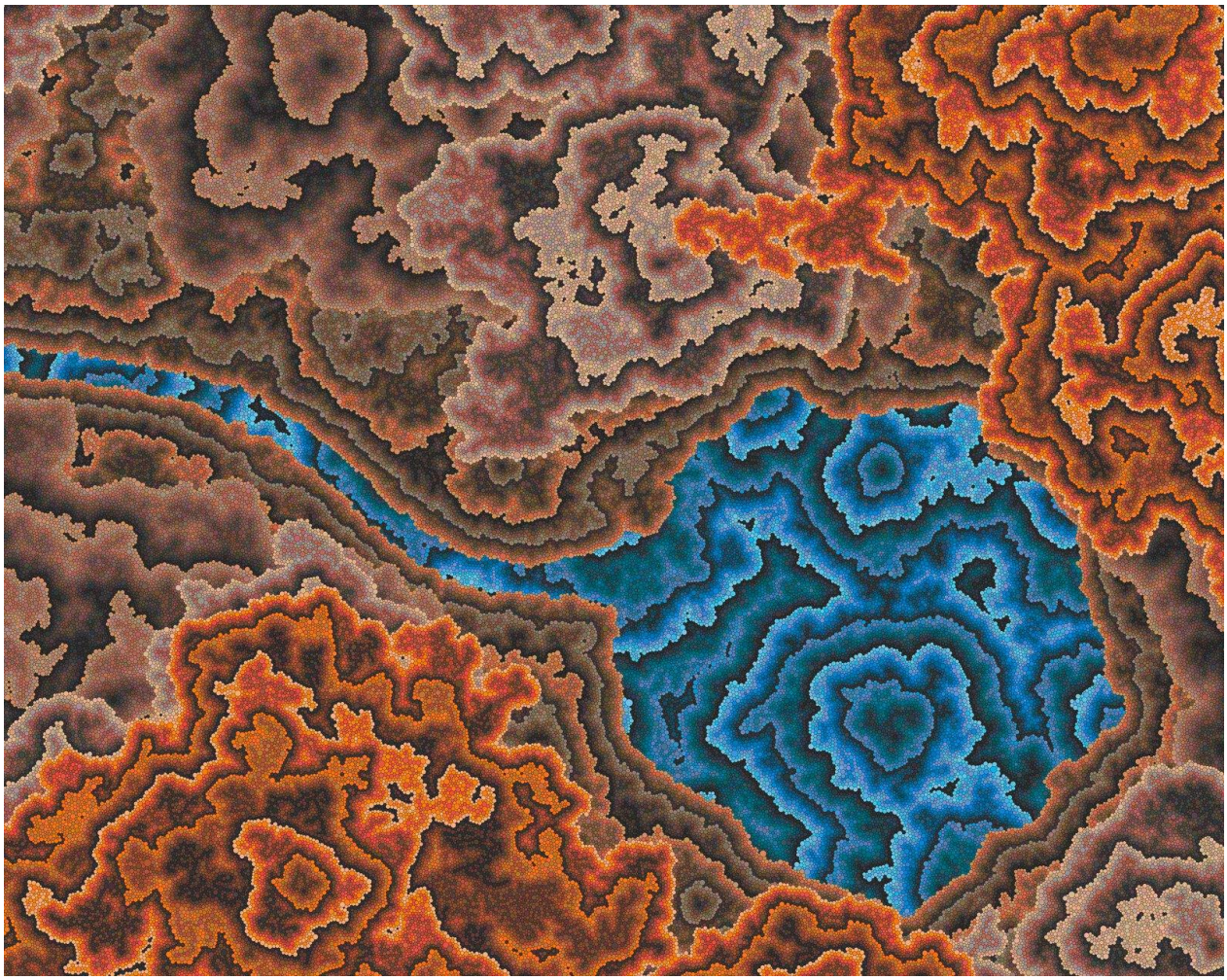
Abstract: In this conversation, Milena Damrau and Martin Skrodzki speak with Kevin Walker about the role of mathematics in his artistic practice. Kevin Walker is a Utah-based artist who finds inspiration for his mathematical art in nature.

Briefly describe your own work. Include a description on how your work relates to mathematics. When and how did mathematics and art enter your life, respectively?
I'm a mathematician by profession – I've been interested in math since I was a child. I've also been interested, albeit much more casually, in both observing and creating art since I was a child. I started to spend more time on artistic pursuits around twenty years ago. In a parallel universe in which my drawing skills and patience were much greater than they are in the actual universe, I might have ended up as someone like Daniel Zeller [http://www.danielzeller.net]. I really admire his drawings, and I aspire to create that style of art myself. Since I'm confined to the actual world, in which both my drawing ability and patience are non-exceptional, I've focused on some of my relative strengths: devising algorithms to accomplish artistic goals and writing code to implement the algorithms.

A central theme in my work is a balance or interplay between regularity and irregularity, expected and unexpected, random versus mathematically determined, etc. I produce many thousands of digital images, and print a very small fraction of them. (Only one copy of each – monoprints.)



Kevin Walker: *Untitled* (2019). Photo: Kevin Walker.

What drives/drove you to take an artistic approach to math or a mathematical approach to art?

I definitely think of myself as doing the latter: taking a mathematical approach to art. Mathematicians tend to be more interested in understanding the "space" of all possible X's, rather than any particular example of an X. Applying that attitude to visual arts, one is led to consider the space of all possible visual images. What characterizes the subset of that space that one responds positively to? If we start with an image that we like, what are all the nearby images that we like as well or better? An algorithmic approach facilitates these sorts of explorations.

How did or do you choose which mathematical entities or concepts you use in your MathArt projects? Did or do you research these beforehand or read up on them?

I generally start with an artistic goal, then try to find mathematical/algorithmic ways of achieving that goal. It's an iterative process, and usually the goal evolves along with the algorithm. I start out trying to produce A. Early attempts result in B, which is similar to A but differs in various ways. These differences suggest new directions, and the goal shifts from A to C, which I never would have thought of without first seeing B, the imperfect attempt to achieve the original goal A.

The mathematical techniques I use are a hodge-podge, and are mostly unrelated to the areas of math I study for a living (topological quantum field theories). I tend to take a figure-it-out-myself approach

rather than research options.

Did you learn new aspects about the underlying mathematics from the process of your work?
For the most part no, but there is one exception. Suppose we have a set of tiles, and each tile is decorated with paths which join the midpoints of its sides in one of various different ways. If we assemble randomly chosen tiles into a tiling of the entire plane, the short paths in each tile combine to form larger paths. If we pick a random path segment in this tiling of the plane, what's the probability that the larger path that contains it is finite rather than infinite? The answer will of course depend on the shapes of the tiles and list of possible connection pattern for each individual tile. So far as I know, there is no known procedure for answering questions of this form, though a few very simple cases may have been worked out.

Kevin Walker: *Untitled* (2022). Photo: Kevin Walker.

How explicit is the mathematics in your work? What do you think observers of your artwork learn/gain regarding the underlying mathematics or arts?
In the finished product, not very explicit at all. I try to avoid any hint of mathematical inevitability from my work. Because I'm a mathematically-minded person, and because I work digitally, I'm sure my work

gives off at least a weak mathematical vibe. But I try to minimize that.

Is there anything else you want to mention about yourself, your work, or anything else related to MathArt?

I live in southeast Utah, and much of my art is inspired (indirectly and occasionally directly) by the plants, rocks and landscapes here: lichen growth patterns, ancient juniper trees, cross-bedding in sandstone, sinuous curves in canyon walls. Many people would think of these natural world patterns as the antithesis of “math art”, but of course they are all created by mechanistic, algorithmic processes. So my art is inspired by nature, but more specifically it is inspired by the microscopic, mathematical processes that underlie nature.

Where can people find more about you and your work? (Website, Social Media, Books, …)

Website: https://kevinwalker.info
Instagram: https://www.instagram.com/kevin.walker.art/
Email: kw@kevinwalker.info

Cover picture above the text: Kevin Walker: *Untitled* (2021). “spanning trees of disks” series. Photo: Kevin Walker.

Tags

1. Martin Skrodzki
2. mathematics
3. mathematics and art
4. Milena Damrau