The Beginnings of Generative Art

A. Michael Noll

First-Hand history, Engineering and Technology History Wiki (ETHW), IEEE History Center · July 9, 2025 © Copyright 2025 AMN

Original: https://ethw.org/First-Hand:The_Beginnings_of_Generative_Art
Retrieved from the publisher 2026-10-20

I programmed my first digital computer art in the summer of 1962 while I was employed as a Member of Technical Staff at Bell Telephone Laboratories, Incorporated in Murray Hill, New Jersey. Today, this type of digital computer art is called generative or algorithmic computer art. What I made is considered quite early and pioneering, although analogue computers and pen-plotters were also being used to make artistic patterns, notably by Maughn Mason in the United States.

I had a summer assignment from my home department in human factors (on the 4th floor of building 2) to the acoustical research department (on the 5th floor), working for Dr. Manfred R. Schroeder on cepstrum pitch detection. I was well aware of the research in computer music, and believed computer art was a natural extension of it – but programming a computer to make art was not what I was paid to do – this was "fun" on the side (evenings and weekends).

I programmed my computer art in FORTRAN on an IBM 7090 mainframe digital computer with the images plotted on microfilm from a CRT in a Stromberg-Carlson 4020 plotter. The images combined simple mathematical equations with pseudo random numbers calculated by a program. I was combining order with disorder. I made overall decisions, and then left the details to the calculations and chance by the algorithm and computer.

The idea of using the computer to make art came from a summer intern who had used the plotter to display some data, but a bug occurred and what came out on the plotter was a random hodgepodge, which he jokingly called computer art. Abstract crazy "art" was in vogue in the early 1960s. I decided to do computer art deliberately.

I wrote an internal Technical Memorandum describing what I had done ("Patterns by 7090," MM62-1234-14, August 28, 1962). The distribution list included dozens of engineers, researchers, and management at Bell Labs. My bosses told me to use "patterns" rather than "computer art." Many decades alter I discovered that AT&T was critical of the work at Bell Labs in computer music, and I guess that my bosses were sensitive to this criticism and wanted to avoid flossy "art."

Back then, some at Bell Labs believed that "art" should only be applied to work shown in a museum, and "blessed" officially by the art world. Today, examples of my computer art are shown in many museums around the planet. I guess it ultimately "made it."

My images on 35 mm microfilm were printed on large paper sheets. I would then use Magic Markers to color along the lines, sign, and give it away as original "computer art" to hang in someone's office.

I would program dozens of images using the same algorithm and then pick which one I preferred. I would also change the algorithm a little to my preference.

One of the variations I liked much back then was called “Gaussian Quadratic,” and it has become iconic, I am told. The vertical coordinates of the end points of the lines were chosen by a quadratic equation – the horizontal coordinates by a pseudo-random Gaussian process. When the line reached the top, it folded down on itself to renew its vertical ascent. The image reminded me of the cubism of Picasso’s “Ma Jolie” in the Museum of Modern Art, which might be why I liked it so much. The copyright to “Gaussian Quadratic” was registered at the US Copyright Office in the mid 1960s, since a human ultimately programmed it, including the calculation of numbers that appeared random.

Op Art was in vogue in the 1960s. I liked Bridget Riley’s “Currents.” I programmed my computer version of is as 90 parallel sinusoids with linearly increasing periods. To my surprise, it seemed more liked by many people than “Currents.” Wiggling it made me feel dizzy, as some op art is expected to do.

I decided to program the computer to mimic a work of art. I chose a painting by Piet Mondrian, called “Composition With Lines.” It was black and white – as was produced by the microfilm plotter – and consisted of horizontal and vertical short lines of varying lengths and widths. The work I programmed was called “Computer Composition With Lines.” When copies of the two patterns were shown to people at Bell Labs, the majority preferred the computer version and thought the human Mondrian did it. I published a paper in a psychology journal[1] describing the experiment. By today’s hype, this was an early AI experiment, as envisioned by Turing.

My entire computer art stopped around 1964. I become curious about a topic, but once I have investigated it and satisfied my initial curiosity, I move on to other topics and careers. I had intended my computer art as examples to attract “real” artists to the programming of digital art. I wrote published papers and articles back then, including in Computers and Automation[2], IEEE Spectrum[3], the IEEE Student Journal[4], Dance Magazine[5], and elsewhere[6]. I gave talks and presentation to artists and choreographers.

The culmination was in 1965 when Howard Wise invited Bela Julesz and me to show our “patterns” at his gallery of West 57th Street in New York City. This was one of the earliest public exhibitions of digital computer art. It was great fun being in the New York art scene. In fact, all of my computer art, 3D animation, speech technology research, interactive graphics and tactile research at Bell Labs were all great “fun” and material for more “first hand” recounting.

References

1. “Human or Machine: A Subjective Comparison of Piet Mondrian's ‘Composition with Lines’ and a Computer-Generated Picture,” The Psychological Record, Vol. 16. No. 1, (January 1966), pp. 1-10.
2. Computer Art Contest First Prize, Computers and Automation, Vol. 14, No. 8, (August 1965).

3. “The Digital Computer as a Creative Medium,” IEEE Spectrum, Vol. 4, No. 10, (October 1967), pp. 89-95.
4. “Art Ex Machina,” IEEE Student Journal, Vol. 8, No. 4, (September 1970), pp. 10-14.
5. “Choreography and Computers,” Dance Magazine, Vol. XXXXI, No. 1, (January 1967), pp. 43-45.
6. “Computers and the Visual Arts,” Design and Planning 2: Computers in Design and Communication (Edited by Martin Krampen and Peter Seitz), Hastings House, Publishers, Inc.: New York (1967), pp. 65-79.

Archival reading copy rendered from the publisher's page above for the A. Michael Noll collection at bre.art. Text is the author's; this layout is not the original publication's.