Coding to Create Art in 1975

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Abstract

Early computer aided drawings were created in 1975 using Fortran, CalComp subroutines and a CalComp Pen Plotter. The gesture of making a mark was envisioned and experienced through the mathematics, the code and the drawing process. Making an image of something normally invisible to the human eye, came to fruition through this process. Wind gusts blowing against one's face, and light waves reflecting off of irregular surfaces were 'imprinted' on paper through the digital process. I incorporated mathematical formulas that described invisible phenomena from the natural world, into Fortran programs. In order to create drawings from this code, I integrated CalComp subroutines into the programs to implement instructions for the pen plotter.

My intention to create expressive drawings using the computer and pen plotter in 1975 disrupted the normal studio practice at that time. As my hand was not holding the pen, or the brush as it moved across an artist's canvas, there was early skepticism about the expressiveness and the craft of this process. I had an intimate relationship with the programs I developed and thus created very expressive drawings.

Keywords

Computer Aided Drawing
Computational Drawing
FORTRAN Programming Language
CalComp Pen Plotter
CalComp Subroutines

Abstraction

Forms change in the process of creative expression, creating dialogues about media and realms of art-making. Kandinsky explored the ideas of abstraction of form and substance, moving away from representational painting, creating planes of abstracted forms in rich colors. Representation and realism in painting was also threatened with the evolution of photography, as some thought it would replace painting. The integration of computers and coding into the process of artistic expression created a radical shift in the nature of creative studio practice. Waves of disruption in traditional approaches came with the introduction of numerous electronic devices into the field. The contemporary expansion of the digital studio invigorates and inspires the creative process.

New processes such as computational photography and materials and equipment including 3D printers bridge the virtual and the physical realms, between the abstract and the real.

My drawings expressed physical forces in the natural world that are normally invisible to the eye. The movement of air currents, sound, and light waves are intensely visceral, yet invisible. My drawings create the sensations of these experiences. A sense of fluidity and movement resonate in these line drawings. They express the invisible forces embodied in the code. The drawing in Figure 1 illustrates the dynamic trajectory and resonance of the natural world.
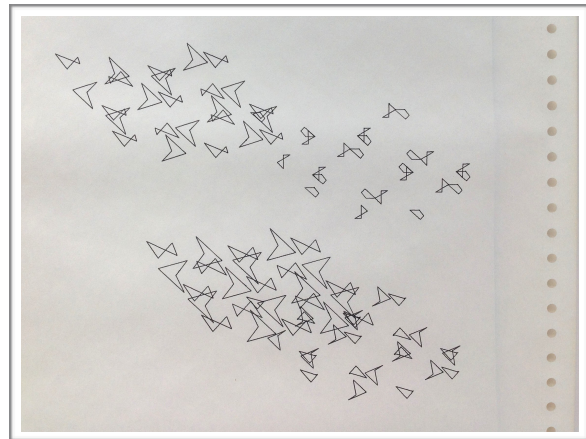

Figure 1. Computer -Aided Drawing 1975
Black ink on sprocketed plotter paper, 12 " Wide.

Digital Drawing

Writing my drawing programs, I created a series of data sets to be drawn by the CalComp pen plotter. Communication with the mainframe computer was through punched cards, much like those used to weave with a Jacquard loom. Each line of code was punched onto a computer card using a keypunch machine. Consequently a program occupied a shoebox full of punched cards. These decks of punched cards were

transported to the computer center and placed in a card reader which communicated the code to the computer. After four or six hours, sometimes 24 hours, a printout of the program and the data was provided. Upon reviewing the code on the printout, the data for the drawings was transferred to a large 16 BPI tape upon request. This tape was in a plastic disk approximately 18 inches in diameter. The tape was taken to the Geography Department where the pen plotter was housed. Technicians mounted the tape on a tape reader, and based on the data, the drawings were drawn out on 12 inch or 30 inch sprocketed rolls of paper.

Cartesian Coordinate System Verses Free Hand Drawing

Code has become an integral part of the contemporary art studio practice. Coding for plotter drawings and for contemporary 3D printing is based in the framework of the Cartesian coordinate system. This framework does not predispose the character of the output to linear, regular forms. The malleability of programming disrupts the linear nature inherent in the Cartesian system, and the repetitive functioning of computers. Coding creates a malleability parallel to that of actual clay. The intent of the artist determines the forms, not the process of coding or the framework of computing.

Digital Physicality

Abstract mathematical formulas that describe invisible phenomena in the natural world remain virtual in their formulaic state. Using a pen plotter these phenomena can be made experiential. Line drawings are created to express these phenomena, and to create an impression of the experience. Scientifically programs use mathematical descriptions to simulate a phenomena, or to represent it. The artist sculpts or molds the geometry into their own vision through coding. Digital descriptions are malleable and given form by the artist through the code.

Color

These early drawings were plotted in a Geography Department that used the plotter to create maps. At that time they used only black ink for the drawings. Envisioning color drawings, I used color xerography to introduce color into the drawings. I created a series of related drawings , each of which would be transferred into individual colors, each on a transparency. The individual color transparencies were overlaid into compositions. The drawing in Figure 2 is a composition created with four individual drawings.
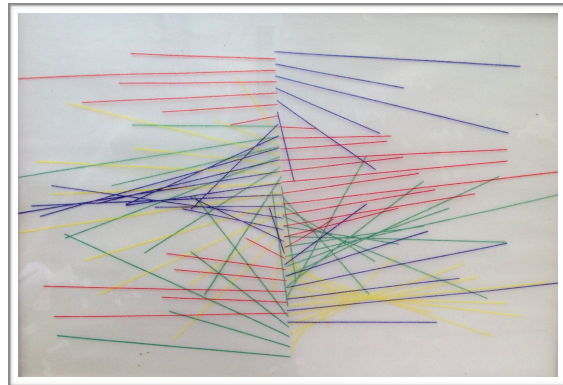

Figure 2. Fourier Transform 1976
The collection of the Block Museum of Art at Northwestern University in Evanston Illinois.

These drawings are in the collections of the Block Museum at Northwestern University in Evanston Illinois and the Art Museum at Northern Illinois University in DeKalb Illinois. The Illinois State Museum has a large collection of drawings that are currently being conserved and prepared for an exhibition in the near future that will include copies of actual Fortran programs. Individual collectors include Eduardo Kac of Chicago and Peter Thompson of Copenhagen. This collection is represented by the Black Box Gallery in Copenhagen. blackboxgallery.com

These drawings with other early artwork are at joantruckenbrodart.com

Author's Biography

Professor Truckenbrod began working with mainframe computers in 1975 creating a series of computer drawings expressing invisible phenomena in the natural world. Using Fortran Programming Language and a Calcomp Pen Plotter, she explored the creative potential for digital artistic practice. In addition to writing and developing code, she used computers to create computer imaging, digital painting and to develop interactive installations. This artwork has been exhibited internationally. In 1988 she published a book titled *Creative Computer Imaging*. She was on the faculty in the Art and Technology Program at The School of the Art Institute of Chicago for 25 years. Currently she is creating *video sculptures*, juxtaposing video and sound with objects. This work is documented in a book published in 2012 titled *The Paradoxical Object: Video Film Sculpture* that includes installations of artists who have inspired her work.