

Generative Art

George Legrady © 2022

Experimental Visualization Lab

Media Arts & Technology

University of California, Santa Barbara

Sequence of Automation Complexity (p.10-11)

- 1) Full human participation, software as design tool (using Adobe software like Photoshop)
- 2) User provides various attributes/parameters, software generates results automatically (like fractal design program)
- 3) Encode artist style into rules and algorithms by which software performs (Harold Cohen)
- 4) Transformational: New image is created out of an existing image which is reformulated algorithmically (image processing filtering)
- 5) AI: Collection of existing images are analyzed then iteratively processed, then reduced dimensionally to produce a new image

“Generative art refers to any art practice where the artist uses a system, such as a set of natural language rules, a computer program, a machine, or other procedural invention, which is set into motion with some degree of autonomy contributing to or resulting in a completed work of art.”

What is Generative Art?

Complexity Theory as a Context for Art Theory

Philip Galanter, BA, MFA

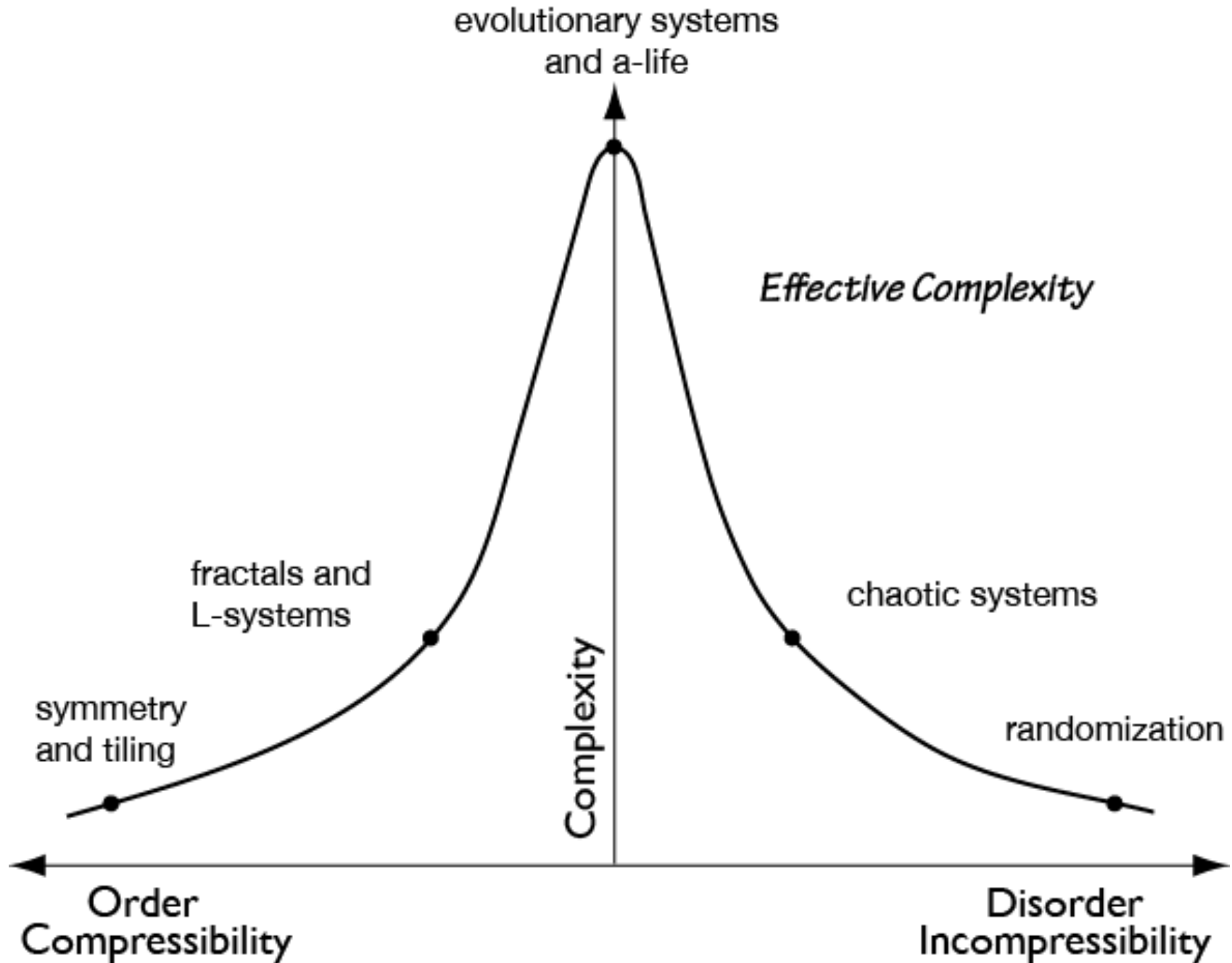
Interactive Telecommunications Program, New York University, New York, USA.

e-mail: galanter@nyu.edu.

Abstract

In this paper an attempt is made to offer a definition of generative art that is inclusive and provides fertile ground for both technical and art theoretical development. First the **use of systems is identified as a key element in generative art**. Various ideas from complexity theory are then introduced. It is noted that systems exist on a continuum from the highly ordered to the highly disordered. Citing examples from information theory and complexity science, it is noted that **highly ordered and highly disordered systems are typically viewed as simple**, and complex systems **exhibit both order and disorder**. This leads to the **adoption of effective complexity, order, and disorder as organizing principles** in the comparison of various generative art systems. This inclusive view leads to the somewhat surprising observation that generative art is as old as art itself.

“Systems in Art Making and Art Theory....”, Philip Galanter



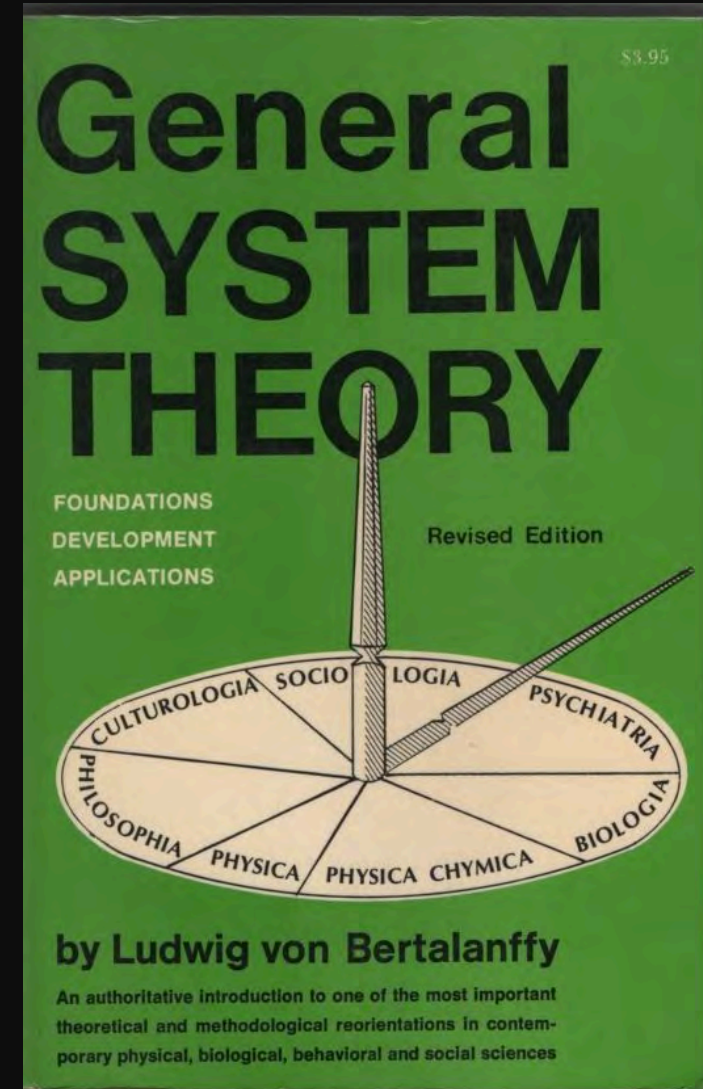
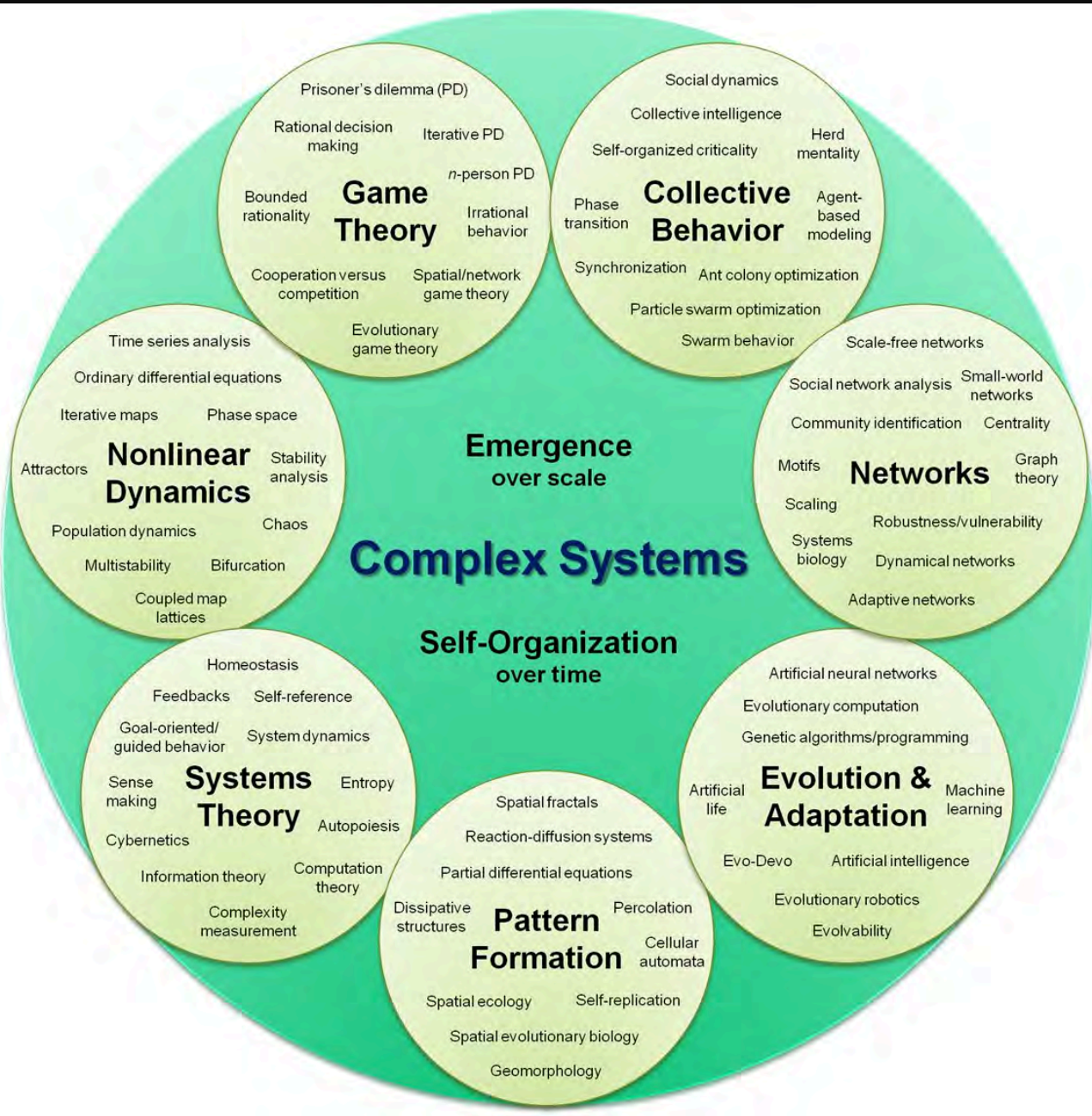
Randomized Autonomous Systems

- In 1787, Mozart wrote “Dice Game” each sequence selected from 11 precomposed segments selected by dice throw
- “According to the Laws of Chance”, Jean Arp (1933)
<https://www.tate.org.uk/art/artworks/arp-according-to-the-laws-of-chance-t05005>
- Cut-up technique eat author William Burroughs and Brion Gysin:
https://en.wikipedia.org/wiki/Cut-up_technique
- “Music of Changes”, John Cage, indeterminate music, composition through random selection of sounds compositions, and the I Ching (a symbol system used to identify order in chance events)
https://en.wikipedia.org/wiki/Music_of_Changes

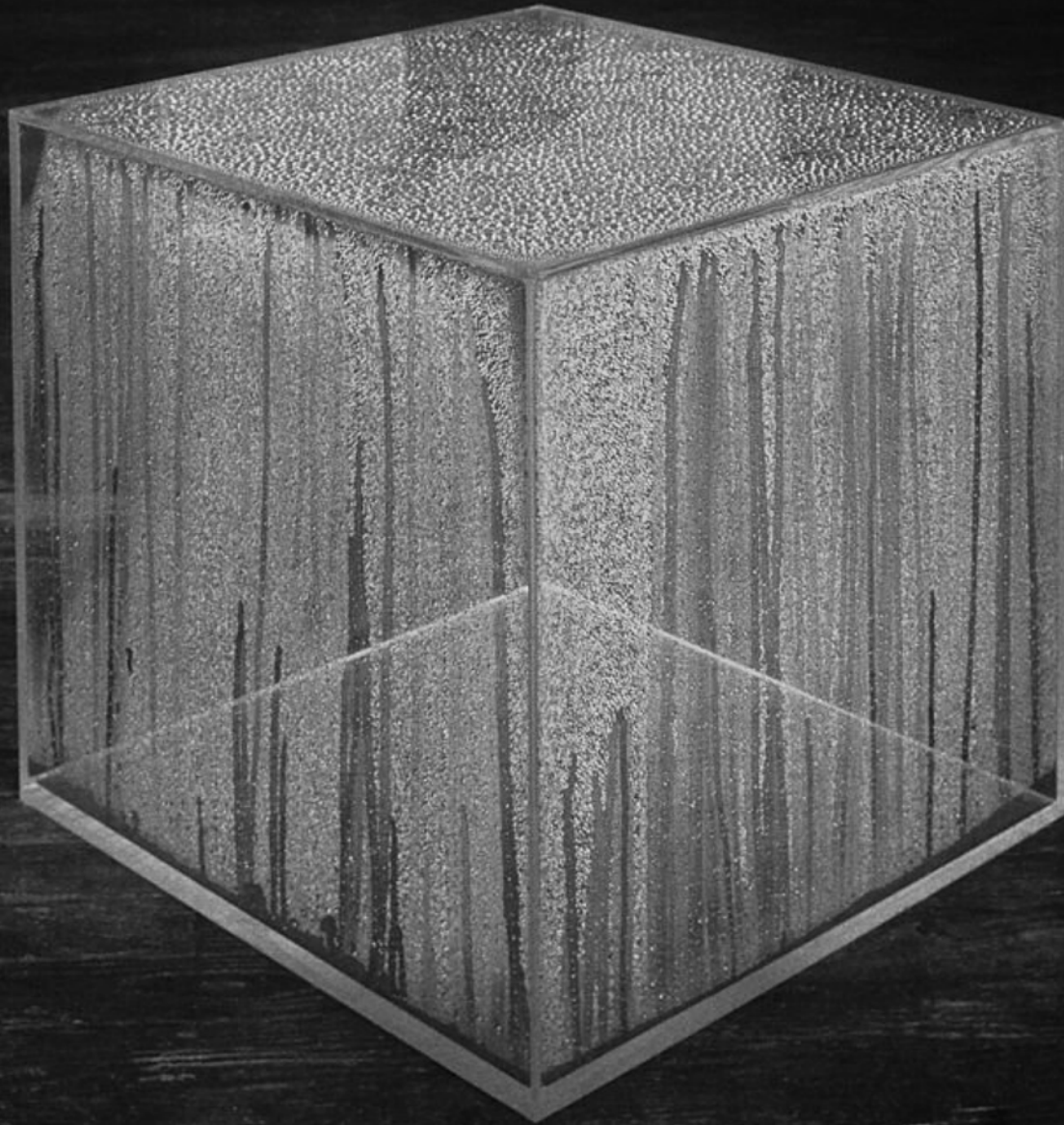
System Art (Artists look at systems) & Related Methods

- System Art (Subset of Conceptual Art), influenced by cybernetics and systems theory
- Cybernetics: Explores regulatory systems, their structures, constraints and possibilities, such as feedback
<https://en.wikipedia.org/wiki/Cybernetics>
- Systems Theory: The study of interrelated and interdependent parts
https://en.wikipedia.org/wiki/Systems_theory
- Emergent behavior: Properties or behaviors which emerge only when the parts interact (school of fish, beehive, water crystals/fractals) – functioning as a collective <https://en.wikipedia.org/wiki/Emergence>

“General Systems Theory”, Ludwig von Bertalanffy (1968)



“Condensation Cube”, Hans Haacke (1965)



<https://www.macba.cat/en/art-artists/artists/haacke-hans/condensation-cube>

A. Michael Noll, Béla Julesz at Howard Wise Gallery, NYC (1965)

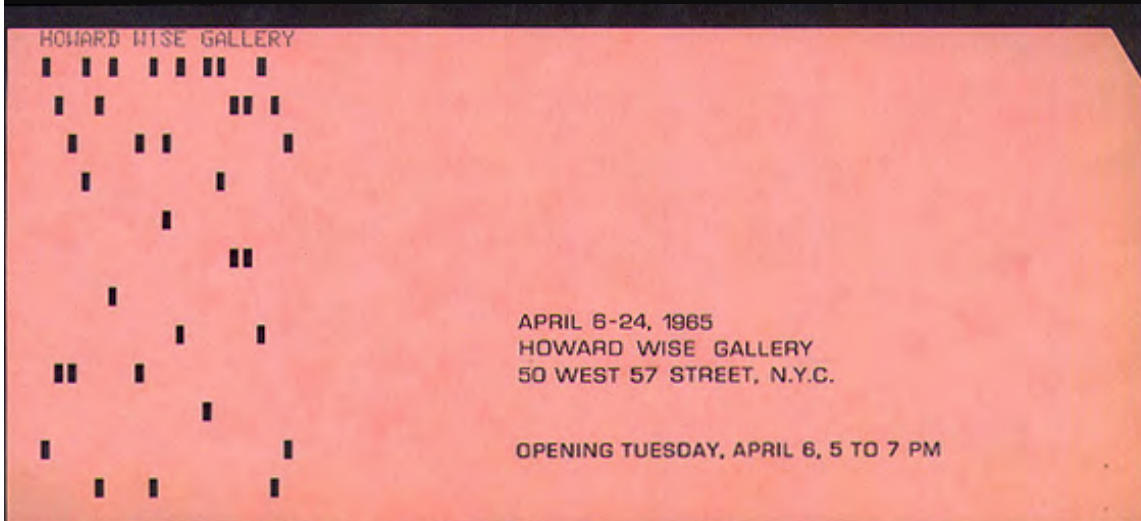


Fig. 3. Gaussian-Quadratic (© A. Michael Noll) is on the left, while two of Bela Julesz's pictures (© Thomas V. Papathomas) are on the far wall. (Photograph courtesy of A. Michael Noll)



Fig. 4. Stereoscopic transparent pictures by Michael Noll and Bela Julesz were suspended from a platform in front of the far wall. (Photograph courtesy of A. Michael Noll)

Noll, The Howard Wise Gallery Show Computer-Generated Pictures (1965) :

“Software”, (1970) Jewish Museum, NYC curated by Jack Burnham

SOFTWARE

Information technology: its new meaning for art



Gerbils match wits
with computer-built
environment

OVERSIZE
TA
167
.J47

Contents

Introduction by Kari Katz	4
The opening was an electric night to remember	6
Notes on art and information processing by Jack Burnham	10
Design for a 'non-museum atmosphere'	15
The crafting of media by Theodor H. Nelson	16
Labyrinth: an interactive catalogue	18
Gerbils in a computerized environment: Seek	20
Interactive paper systems	24
Level of heat	25
Triangulate your thoughts	26
Cremation piece: a life's work goes up in flames	28
A 'lost' painting for Kubler	32
Visitors' profile: a statistical breakdown of spectators	34
Myths, secrets, reporting and betting systems	35
Ultrasonic waves	36
Composer: a music synthesizer	38
Window panes that give off sound	40
The conversationalist	42
Room situation: this man gets too close for comfort	44
An accumulation of information taken from here to there	45
Order idea: a systematic description of the universe	47
Selected mental and physical characteristics of an artist	48
Floor show: simulated behavior of living beings	49
Radio free poetry: a prototype for guerrilla radio	52
An open letter from a 'cafe revolutionary'	53
Vision Substitution System: visual images make a real impression	55
The conceptual typewriter	56
Software films	58
Work: an Allan Kaprow Happening	59
Artist-in-residence exposes himself electronically	60
Systems burn-off X residual software	62
The R.E.S.I.S.T.O.R.S.: teenage computer pros	64
Computers are not what you think by Theodor H. Nelson	66
The 7th investigation: art as idea as idea	68
Biographies	70

Exhibition staff

Jack Burnham: *Curator*
Joanne Lupton: *Exhibition Coordinator*
James Mahoney: *Exhibition Designer*
Theodor H. Nelson: *Technical Adviser*
Deborah Bretzfelder: *Assistant Exhibit Designer*
Skip King: *Organization Consultant*
Peter Finn: *Organization Assistant*
Robert Jakob: *Catalogue Designer*
Judith Benjamin Burnham: *Catalogue Coordinator*
Shunk-Kender: *Catalogue Photographers*
Special Consultant to American Motors Corporation:
Ruder & Finn Fine Arts

OVERSIZE

TA167 -J47
Jewish Museum (New York,
N.Y.)
Software : an exhibition
[held at] the Jewish Museu
September 16 through
November 8, 1970 [and] th
Smithsonian Institutio



“Software”, Exhibition at Jewish Museum, NYC curated by Jack Burnham



70 -

Software is an exhibition which utilizes sophisticated communications technology, but concentrates on the interaction between people and their electronic and electromechanical surroundings. This is the same exploration, in human factors, which we use in the engineering design of our automobiles as a human environment.

This exhibition encourages artists to use the medium of electronic technology in challenging and unconventional ways. The link between art and science, which the artists in *Software* are examining, is the same link we must explore and strengthen in our automotive styling and engineering.

Because of our continuing interest in people, in technological achievement, and in the advancement of modern art forms, our involvement in *Software* has been both rewarding and stimulating.

Roy D. Chapin, Jr., Chairman
American Motors Corporation

TA187 .J47
Jewish Theological Seminar
Software : an exhibition
[held at] the Jewish
Museum, September 16
through November 8, 1970
[and] the Smithsonian

“Software”, Exhibition at Jewish Museum, NYC curated by Jack Burnham



Sonia Sheridan (rear) watches an assistant make a colored faceprint.

Sonia Sheridan Interactive Paper Systems 1969-70

Part of the basic equipment for *Interactive Paper Systems*, a 3M Thermofax machine is simply a revolving belt which permits a treated paper to react to carbon as it passes in seconds through the heated machine. Demanding no special training, it can be used to produce a variety of color transparencies, spirit masters, stencils and opaque copy. Through experimentation we have discovered that some of its artistic uses lie in making large projection transparencies, copy for film making, transparencies for photo screening, freak color separations, instant textile design, image distortion and transparency collages.

The Color-in-Color machine, available for a portion of the exhibition time, is a recent 3M invention which translates into full color any two or three dimensional object which can fit in its 8" x 10" format. This instrument is a major breakthrough in the graphics field, for it can produce an endless variation of images within a span of minutes. In the hands of a creative person neither the size nor the quality of the image is limited. It can be adapted to produce images on either paper or onto a matrix, which is then transferable to any heat resistant material by means of an ordinary iron or a companion Color Processor. We have considered using this instrument for rapid film animation, instant 2-3D books,

24

rapid textile design, light printing with stencils, colorful and dynamic correspondence and a variety of other possibilities. Michael Schumacher has done some fine photomontage work with this machine. Keith Smith exploded the size limitation by cutting up Kodalith positives and ironing them onto a huge quilt combined with silkscreen and photograph. *Cosmo*, a team of Robert Frontier and William McCabe, rephotographed the Adlai Stevenson family album on the machine, took slides and projected them so that black and white photos were completely altered. We have been able to increase the variety and volume of correspondence and to carry on interactive graphics with artists, inventors and businessmen.

The capacity of the new graphic machines for instant production has the most profound implications for the visual world. The artist, who once spent hours rendering an orange can photograph the orange whole, cut up into any variety of forms, or squeezed into juice, and can rephotograph it within minutes. In an hour's time he can produce 120 variations; in eight hours he can have almost 1000 different versions of the orange. It is obvious that this work process becomes another kind of time for the artist as the distance from conception to conception is reduced to minutes and objects change as rapidly as thinking allows.

Equipment on loan from the 3M Corporation

Hans Haacke

Visitors' Profile 1969

with assistance from Scott Bradner (Art & Technology, Inc., Boston) Digital Equipment Corporation (time share PDP-8 computer)

A teletype terminal with a picture scope is connected with a digital computer on a time-sharing basis and serves both as input and output device.

Using the keyboard the visitors can answer questions which are posed to them on the scope. Due to branches in the polling program a number of these questions are personalized and vary from visitor to visitor.

Essentially the questions are of two types. One set asks the visitors for *factual* information about themselves, e.g., age, sex, educational background, income bracket, etc. The other set of questions inquires about their *opinions* on a variety of subjects.

The computer compiles the answers, compares them with information received from other visitors and correlates data relevant for a statistical breakdown.

A terminal prints out the processed information in the form of statistics giving percentages and cross-tabulations between answers, opinions and the visitors' demographic background. The processing speed of the computer makes it possible that at any given time the statistical evaluation of all answers is up to date and available. The constantly changing data is projected onto a large screen, so that it is accessible to a great number of people.

Based on their own information a statistical profile of the exhibition's visitors emerges.

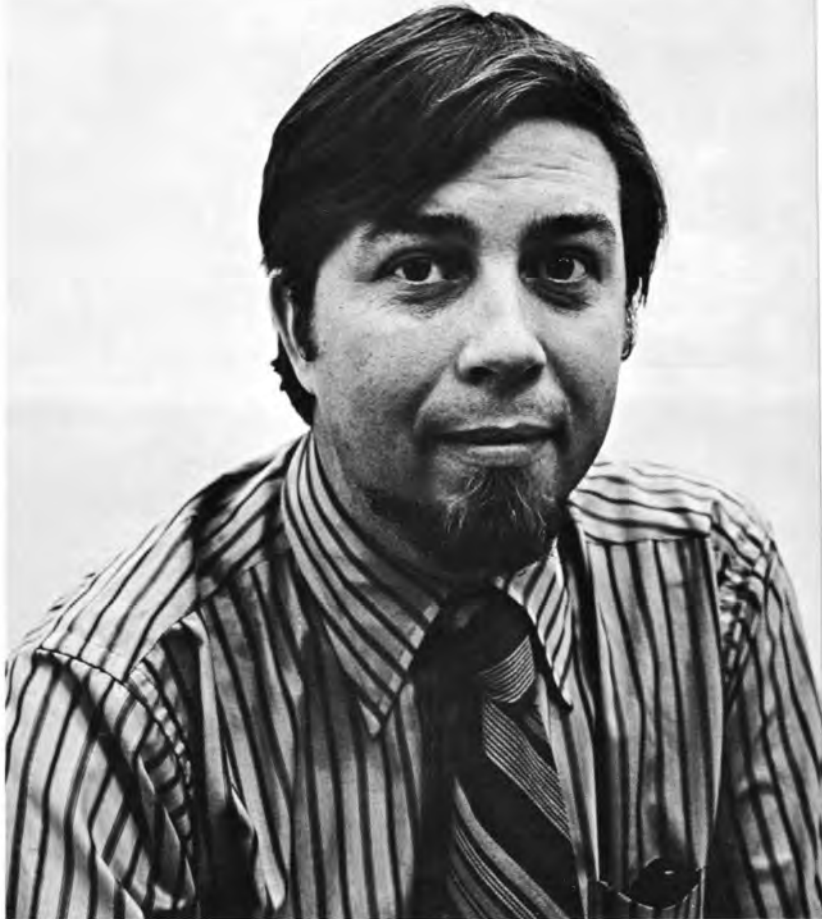
Hans Haacke News 1969

Local, national and international news is being received from U.S. as well as from foreign news services. It arrives in the exhibition via teletype print-out at the same time as it is being received by the other clients of the various news services. The print-out accumulates and piles up behind the teletype machines.

Visitors peruse N



“Software”, Exhibition at Jewish Museum, NYC curated by Jack Burnham



Notes on art and information processing

Jack Burnham

Software is not specifically a demonstration of engineering know-how, nor for that matter an art exhibition. Rather in a limited sense it demonstrates the effects of contemporary control and communication techniques in the hands of artists. Most importantly it provides the means by which the public can personally respond to programmatic situations structured by artists. *Software* makes no distinctions between art and non-art; the need to make such decisions is

left to each visitor. Hence the goal of *Software* is to focus sensibilities on the fastest growing area in this culture: information processing systems and their devices.

In just the past few years, the movement away from art objects has been precipitated by concerns with natural and man-made systems, processes, ecological relationships, and the philosophical-linguistic involvement of Conceptual Art. All of these interests deal with art which is transactional;

Triangulate your thoughts

Agnes Denes

Dialectic Triangulation: A Visual Philosophy 1970

Dialectic Triangulation is a simplification and systematic re-building of complexes of any subject or matter, through various methods, such as re-evaluation, re-grouping or division, at times starting with a single proposition, at others searching for the mean between two extremes. But each time it is the triangulation which institutes the interaction of a particular static state, being the activating force.

To use an example, if a person feels that within his knowledge he does not understand himself and his universe, and decides to attain greater knowledge, he has instituted a triangulation. His initiative, 'the desire to know more', being here the activating force between ignorance and wisdom.

Dialectic Triangulation is a building of progressive trichotomies, failing and succeeding in a dialectic method, each time arriving at a better thesis on a higher level—like changing scientific theories, which always advance and develop in complexity. By appraising the milestones in human knowledge and scientific achievement, we take inventory of it and of ourselves. A new curiosity and insight is born, a new awareness. And since this is an artistic probing, concrete facts are sometimes thrown into abstract corners, and abstract terms are concretized; each getting a sort of bath or soaking in the other's fluids. It is an explorative evolutionary process, the way of nature and man.

Types of triangulations:

inanimate tri-groups representing all of a genus, class or category re-grouping or classification

accepted facts, perceptual or ideational errors re-evaluated, their importance re-established or denied—new ones created whenever possible

arriving at a conclusion derived from two propositions arriving at a mean between two extremes

the building of one proposition through dimensional complication into trichotomies

the building of one proposition through divisional trisection into trichotomies

pure idea groups activated by controversy

interdependent or progressive ideas becoming effective through successive stages of advancement

threefold theories interchangeable—threefold theories not interchangeable, and those forming argumentative conclusions

Agnes Denes

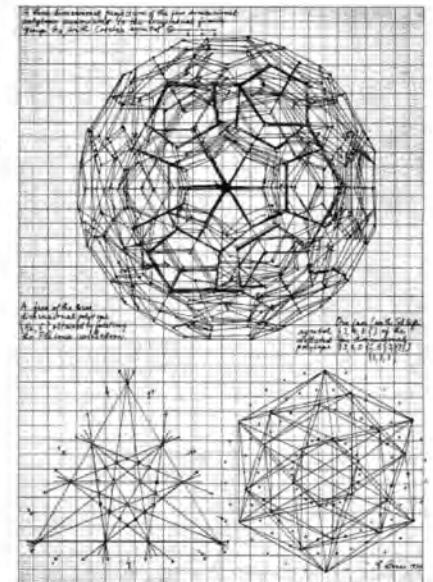
Matrix of Knowledge & Trigonal Ballet 1970

(Work for computer display) with assistance from Members of The R.E.S.J.S.T.O.R.S., Pennington, N. J.: John Levine, Nat Kuhn, Peter Eichenberger and from Theodor H. Nelson

Restoration of the triangulation concepts on the screen can be at best only partial, mentally confronting the participant with the challenge of comparing ideas and the visual consequences of a new structuring. The artist's own structural conjectures are here shared with the viewer.

NOTE: Matrix of Knowledge schedules events in a triangular mesh. List structure is kept comparatively simple by rewriting the display file for each new incarnation of the picture. Trigonal Ballet animates through a succession of frames to obtain its "infinite effect."

The IDIOM, a dynamic display with its own built-in computer, is on loan from Information Displays, Inc. of Mount Kisco, New York.



Studies for thought-complication (completed 1970)

Agnes Denes (right) programmed her computer display with the assistance of Theodor H. Nelson and The R.E.S.J.S.T.O.R.S. (from left) Peter Eichenberger, Lauren Sarra, John Levine (not present: Nat Kuhn).

Art Versus Silicon Valley: Are Artists Losing the Conceptual Advantage?

As startups look towards increasingly abstract schemes, where is the art that answers to today's deeply networked structures?

BY GARY ZHEXI ZHANG IN **OPINION** | 24 SEP 18



Das Haus, view of installation, Fred and Co. & Associates, 1987. Museum of Contemporary Art, Chicago

SYSTEMS ESTHETICS

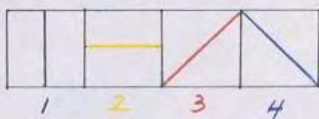
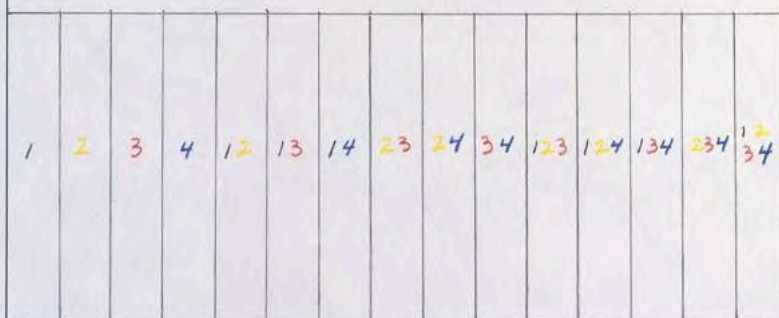
30



In 1968, the conceptual artist and critic Jack Burnham published an essay entitled 'Systems Esthetics'. Burnham began with an acidic critique of the modernist formalism of the day, championed by the likes of Clement Greenberg and Michael Fried, comparing the artistic contributions of 'formalist invention' to the "'new" car of the automobile stylist'. For Burnham, the progression of the modernist art object, like the release of a new iPhone, was all icing and no cake, promising transcendence but always circling back to the same. Instead, he felt that the artistic practice should concern itself with the deep structures forming the cultures around it. Writing at the dawn of the digital age, Burnham argued that information, not objects, would form the structuring paradigm of the emerging socio-cultural environment. He wrote: 'We are now in transition from an object-oriented culture to a systems-oriented culture. Here change emanates, not from *things*, but from *processes*.'

"A Wall divided into 16 Equal Parts", Sol Lewitt (1970)

D I A G R A M



This is a diagram for the Sol LeWitt wall drawing number 49. It should accompany the certificate if the wall drawing is sold or otherwise transferred but is not a certificate or a drawing.

C E R T I F I C A T E

This is to certify that the Sol LeWitt wall drawing number 49 evidenced by this certificate is authentic.

A wall divided vertically into fifteen equal parts, each with a different line direction and color, and all combinations.

Red, yellow, blue, black pencil
First Drawn by: Chris Hansen, Nina Kayem,
Al Williams
First Installation: Jewish Museum, New York, NY.
June, 1970

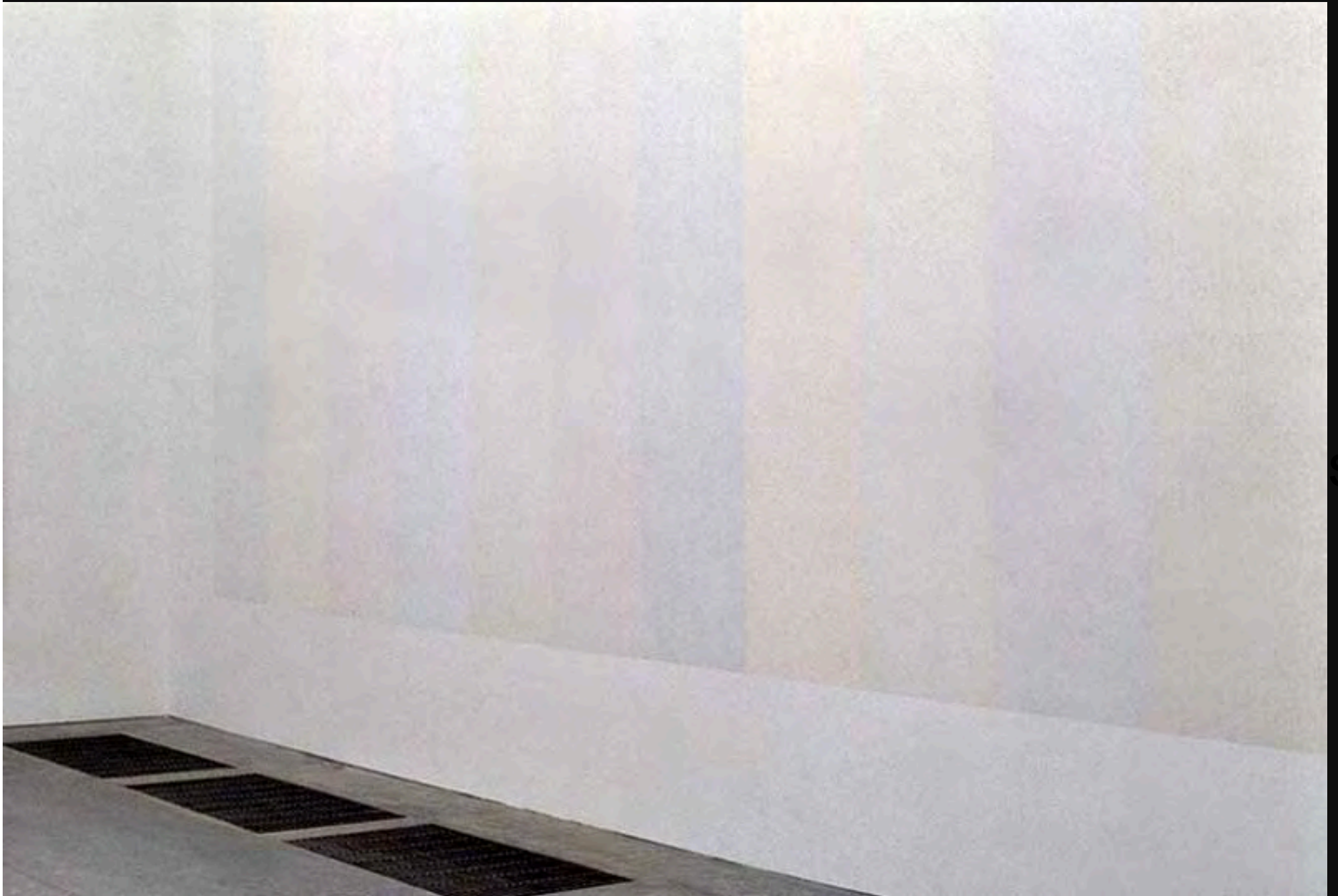
This certification is the signature for the wall drawing and must accompany the wall drawing if it is sold or otherwise transferred.

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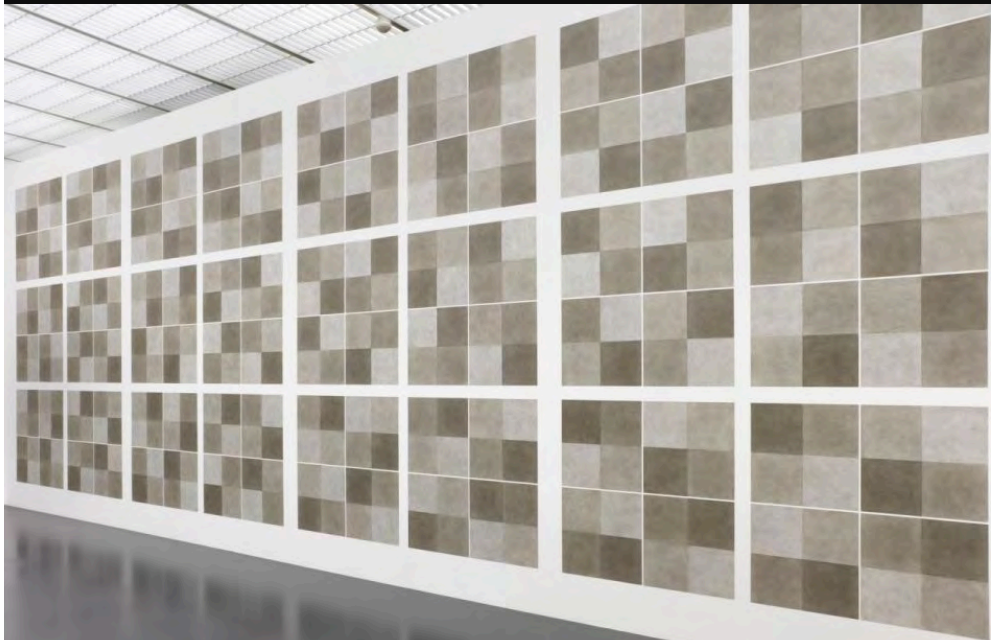
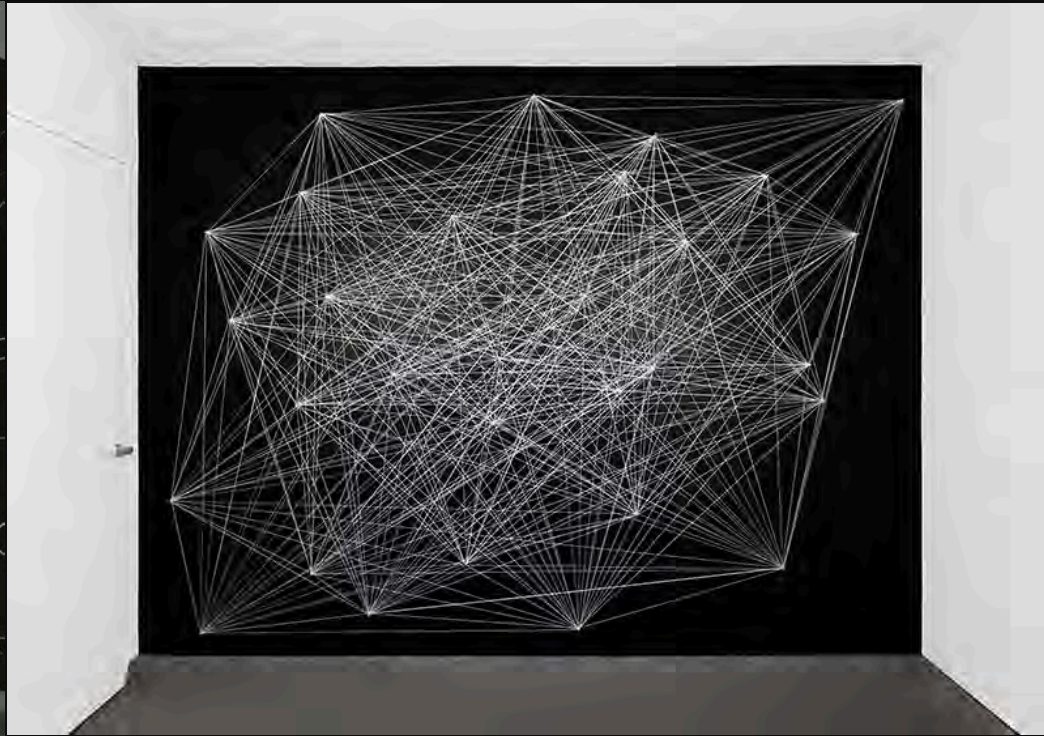
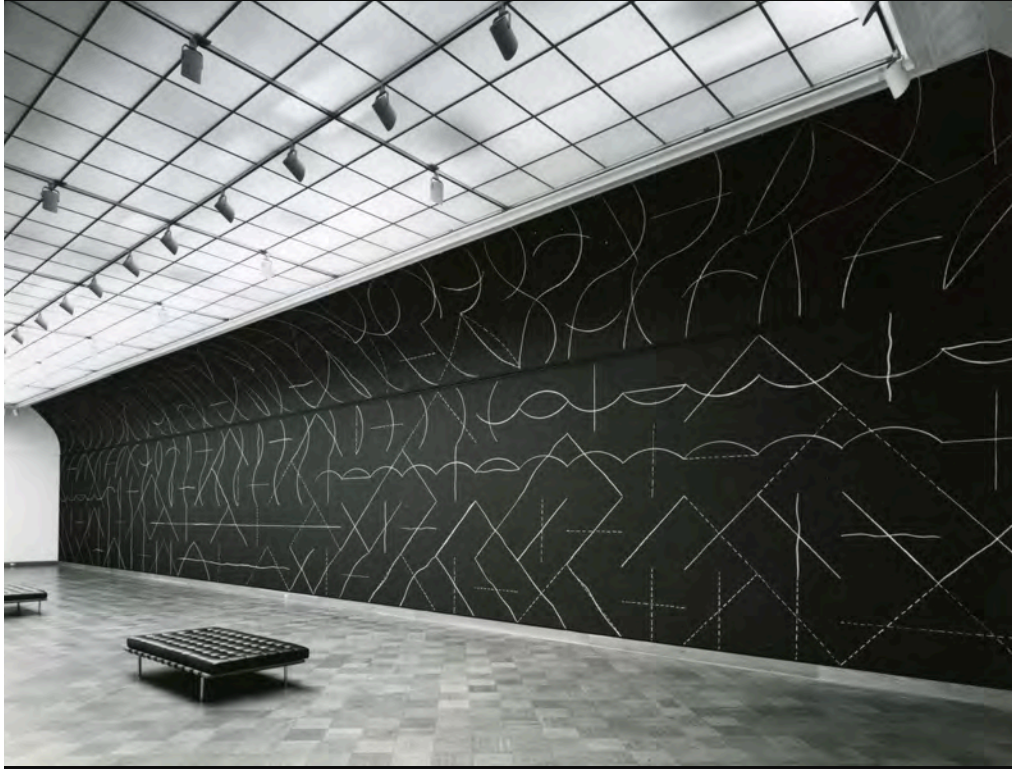
Sol LeWitt

© Copyright Sol LeWitt _____ Date _____

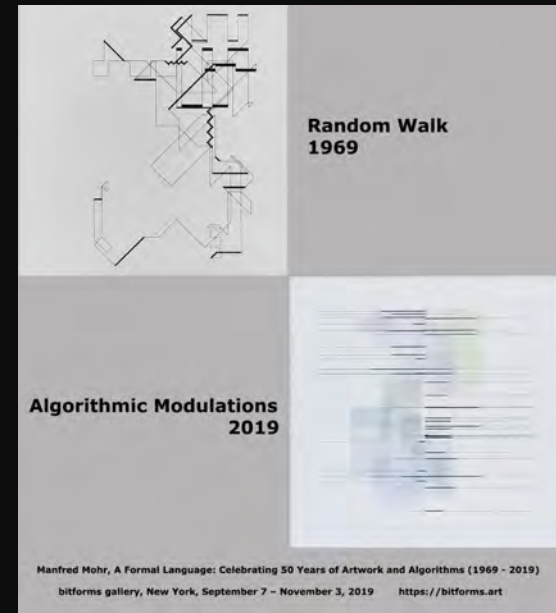
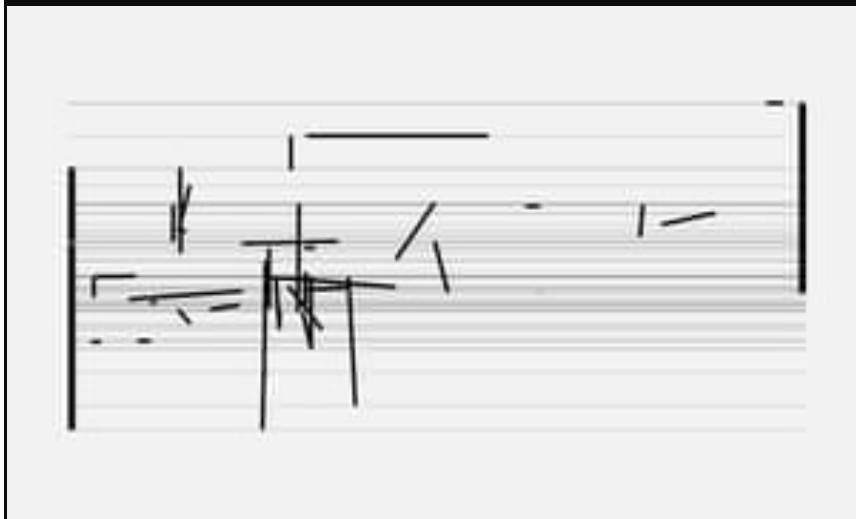
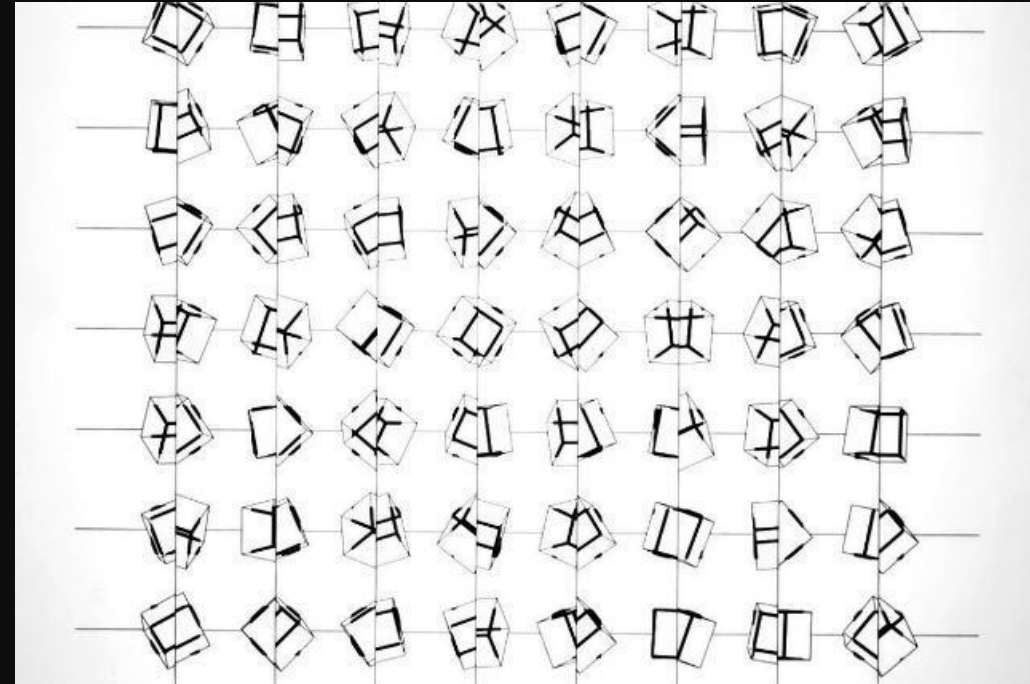
“A Wall divided into 16 Equal Parts”, Sol Lewitt (1970)



“Wall Drawing”, Sol Lewitt (1976)

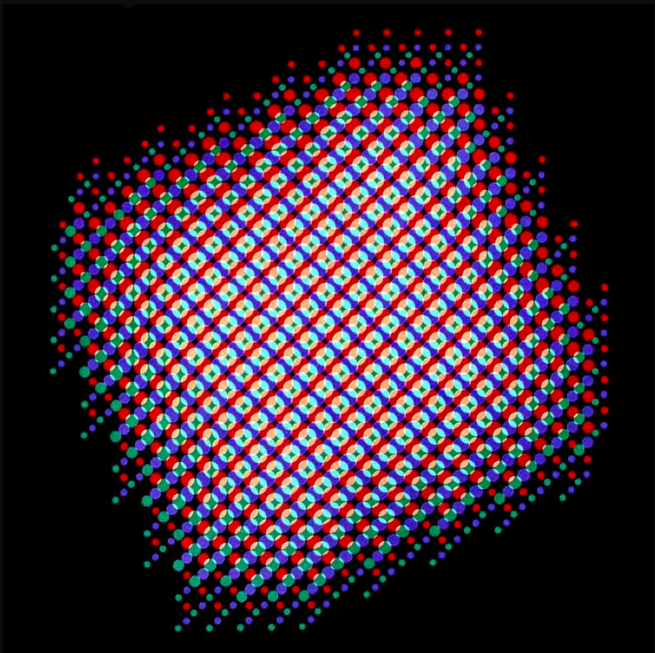


Manfred Mohr (1938, computer-based art since 1969)

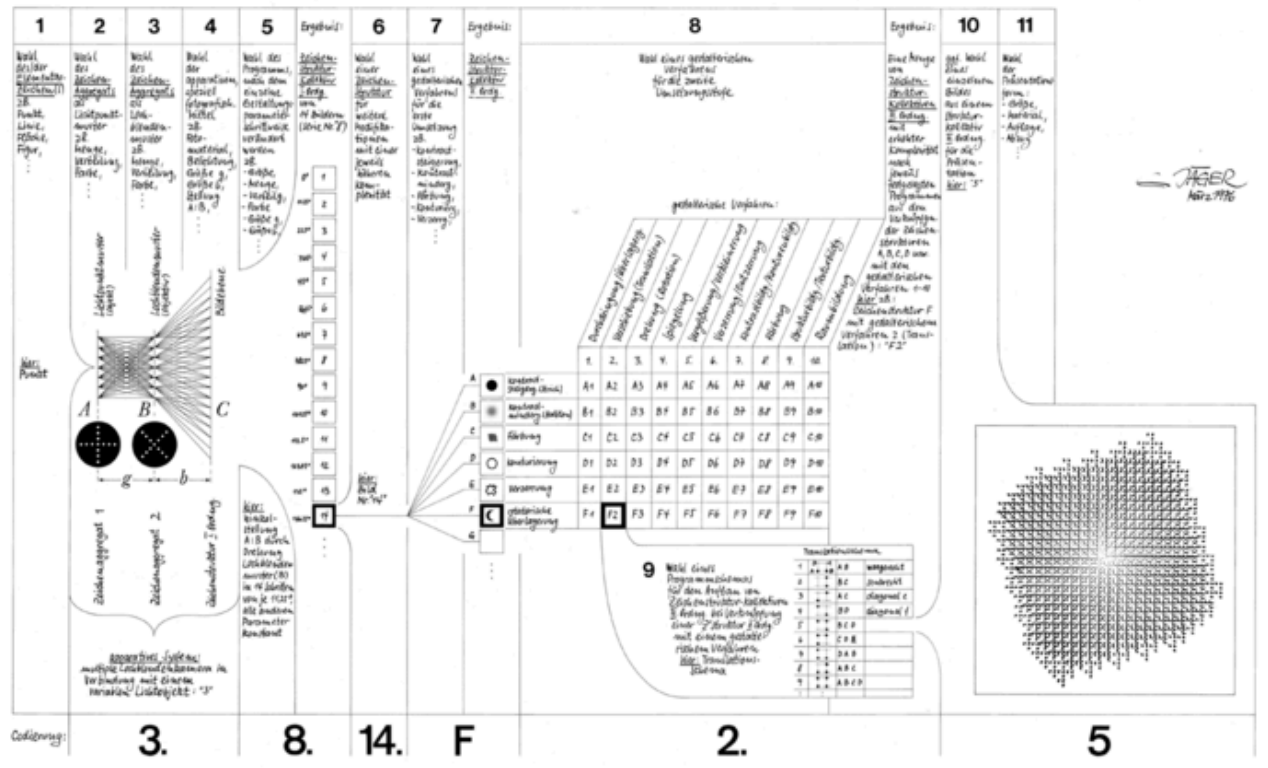


<https://www.theguardian.com/artanddesign/2016/feb/12/manfred-mohr-the-man-who-taught-computers-to-make-art>

Generative Photography: Pinhole Structures – Gottfried Jäger (1968)

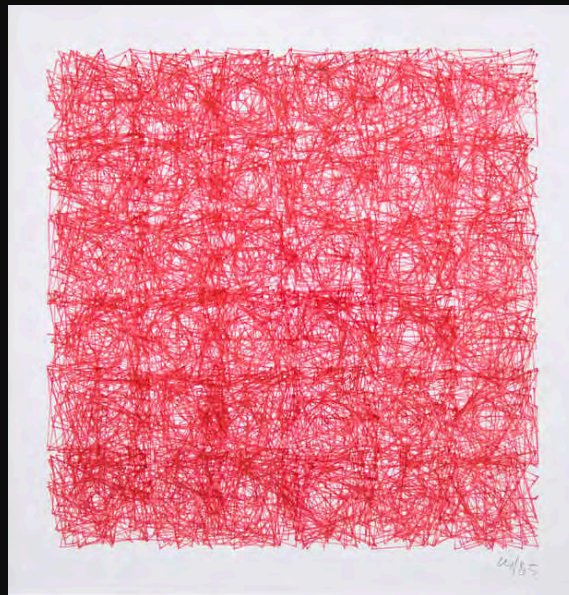
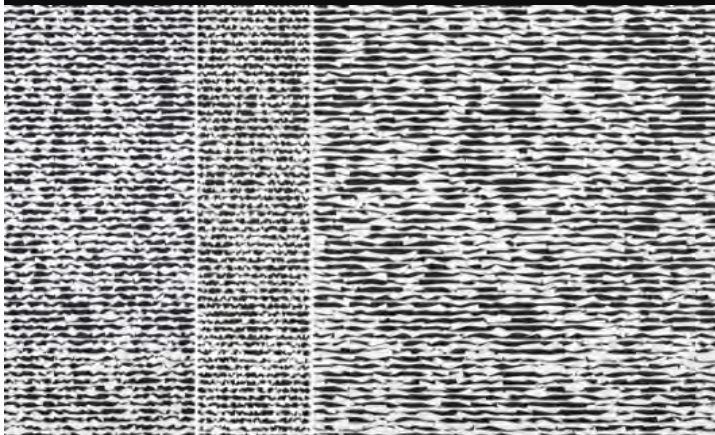
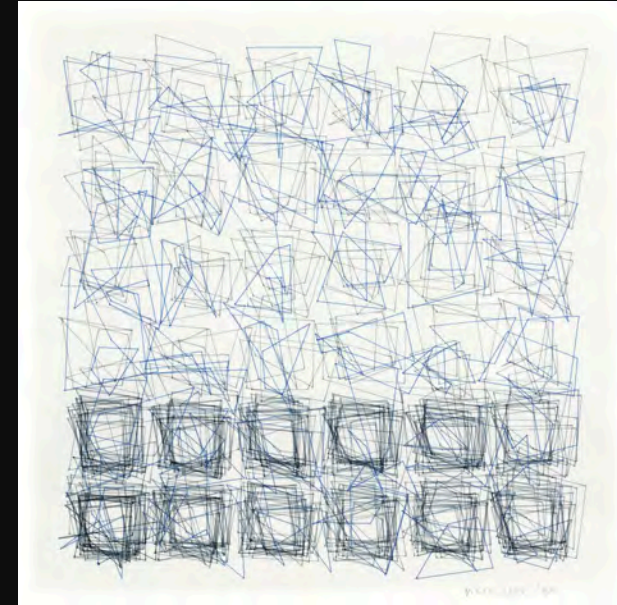
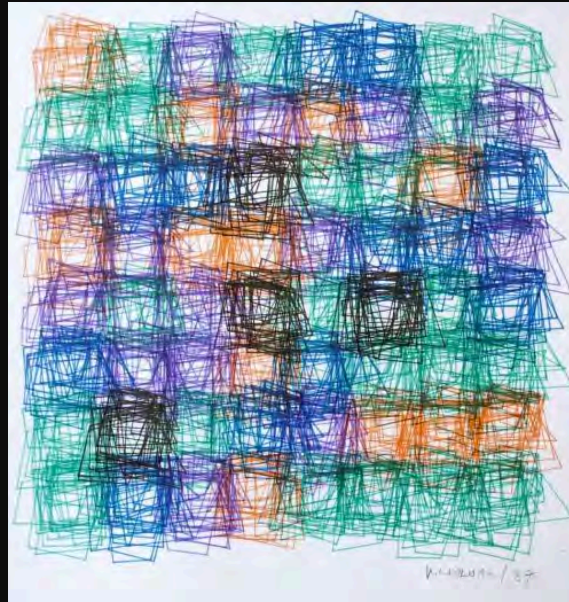


Entscheidungsstufen beim Aufbau modifizierter Lochblendenstrukturen der Serie 3.8.14., 1967

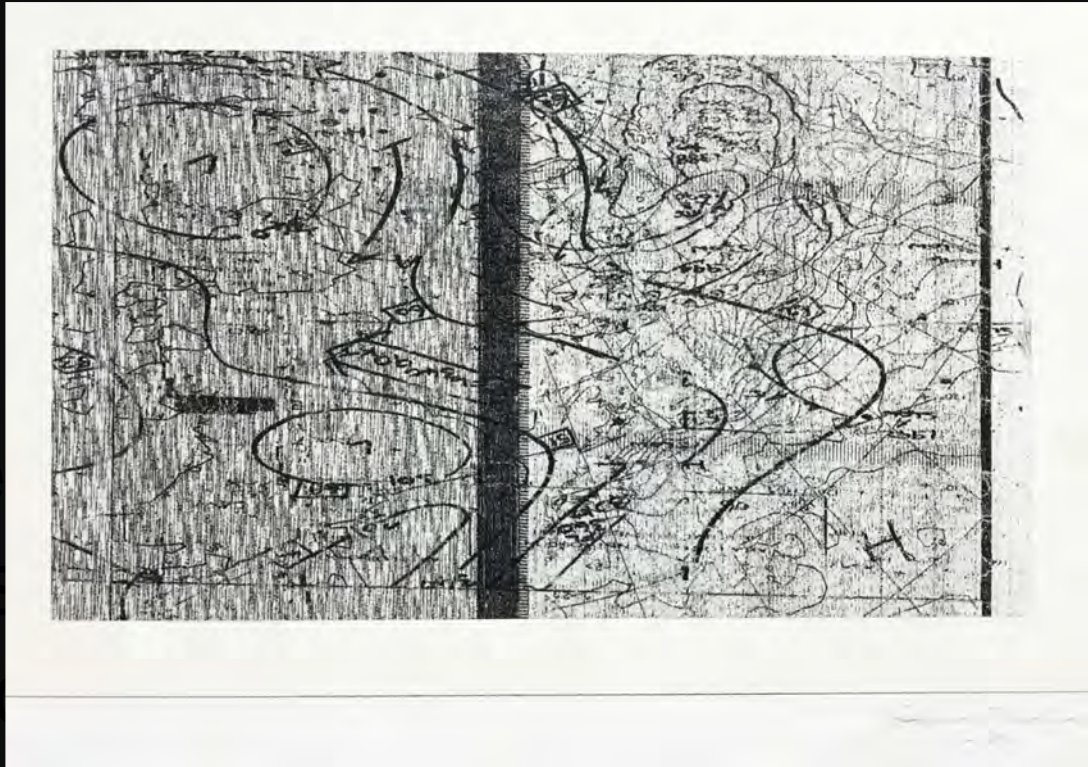
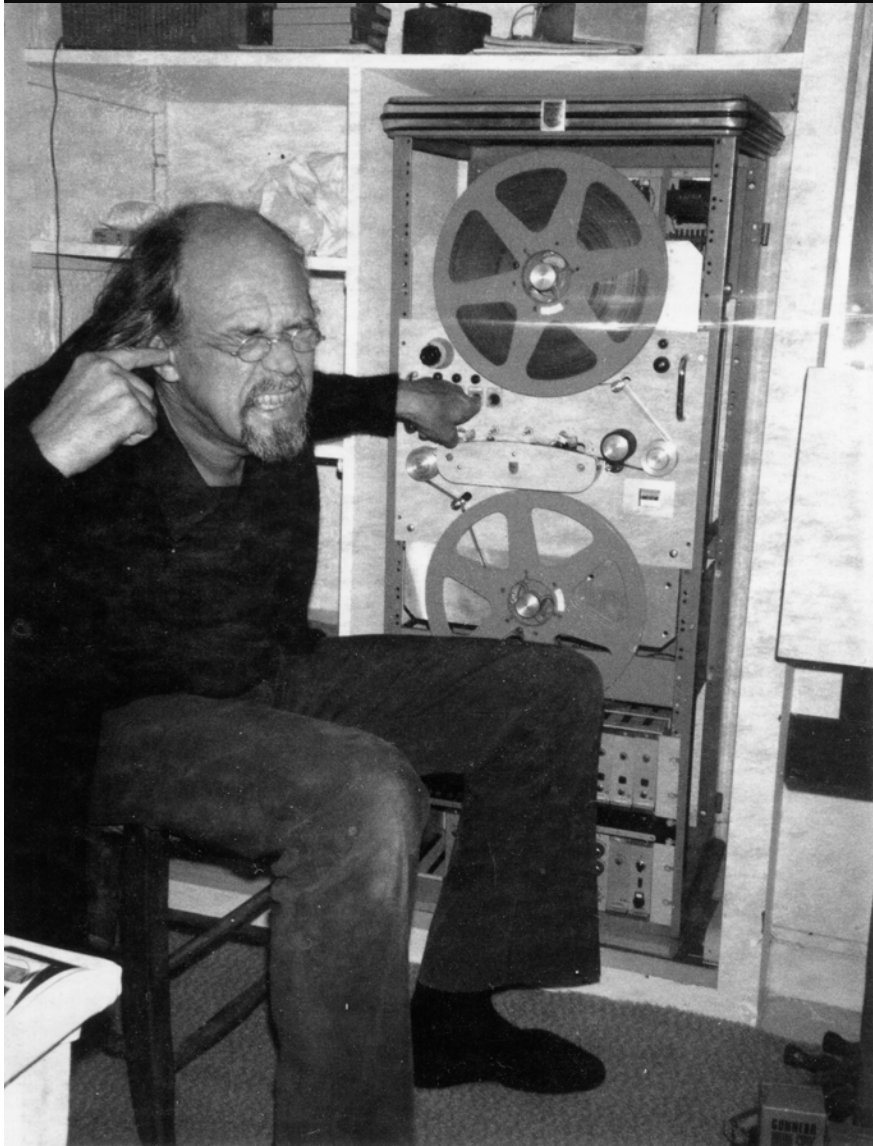


Decision-making stages in the construction of modified pinhole structures of the serie 3.8.14

Vera Molnar(1924-present)



ElectroStatic Works, Lars Fredrikson(1968)



ElectroStatic Works, Lars Fredrikson(1968)



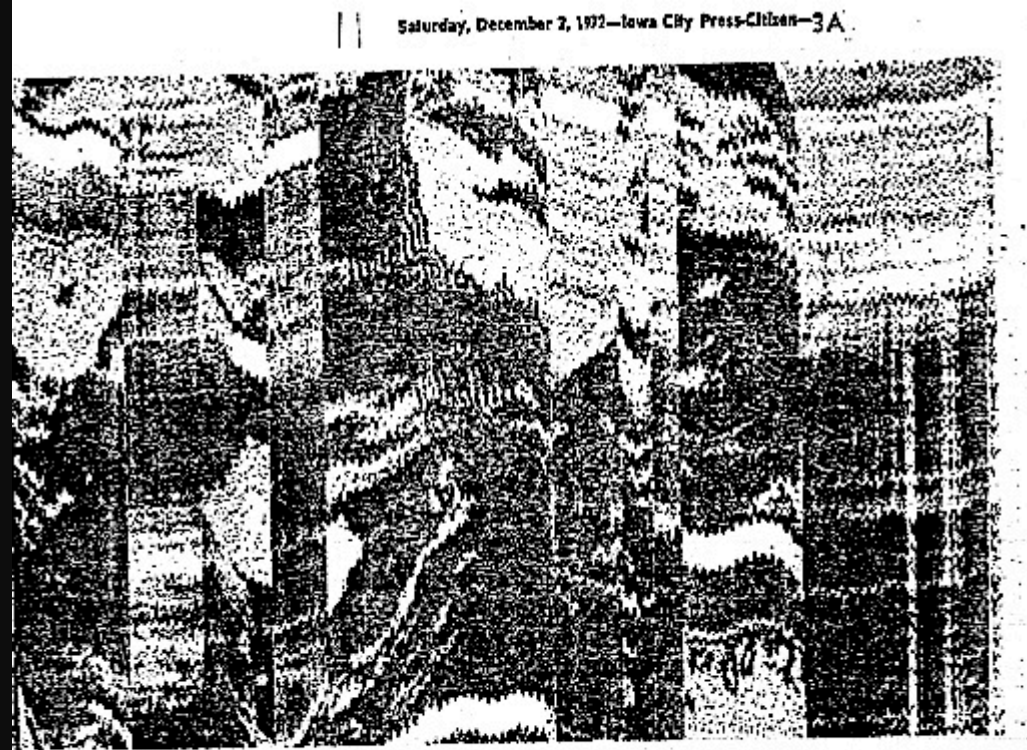
Generative Systems & Electrostatic works, Sonia Sheridan(1968)



Page 2 - IMAGE GENERATION SURVEY

- d. Dip a leaf or similar flat object into the magnetic powder. Shake off the excess. Place on a sheet of paper below the plexiglass and rub the plexiglass with the fur until the leaf begins to move and the powder spreads about. Once you have observed and imaged this process try taping the leaf to the sheet of paper so that only the powder shifts. A clear image of the leaf should appear on the paper.

Examples:

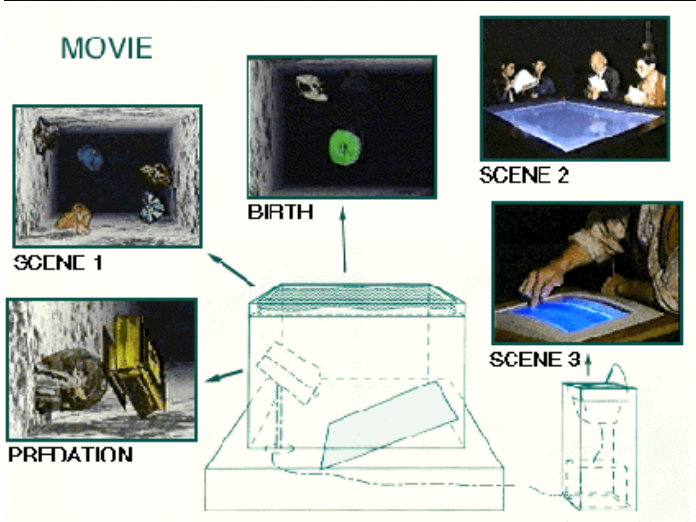


Saturday, December 2, 1972—Iowa City Press-Citizen—3A

Composite Joint Image

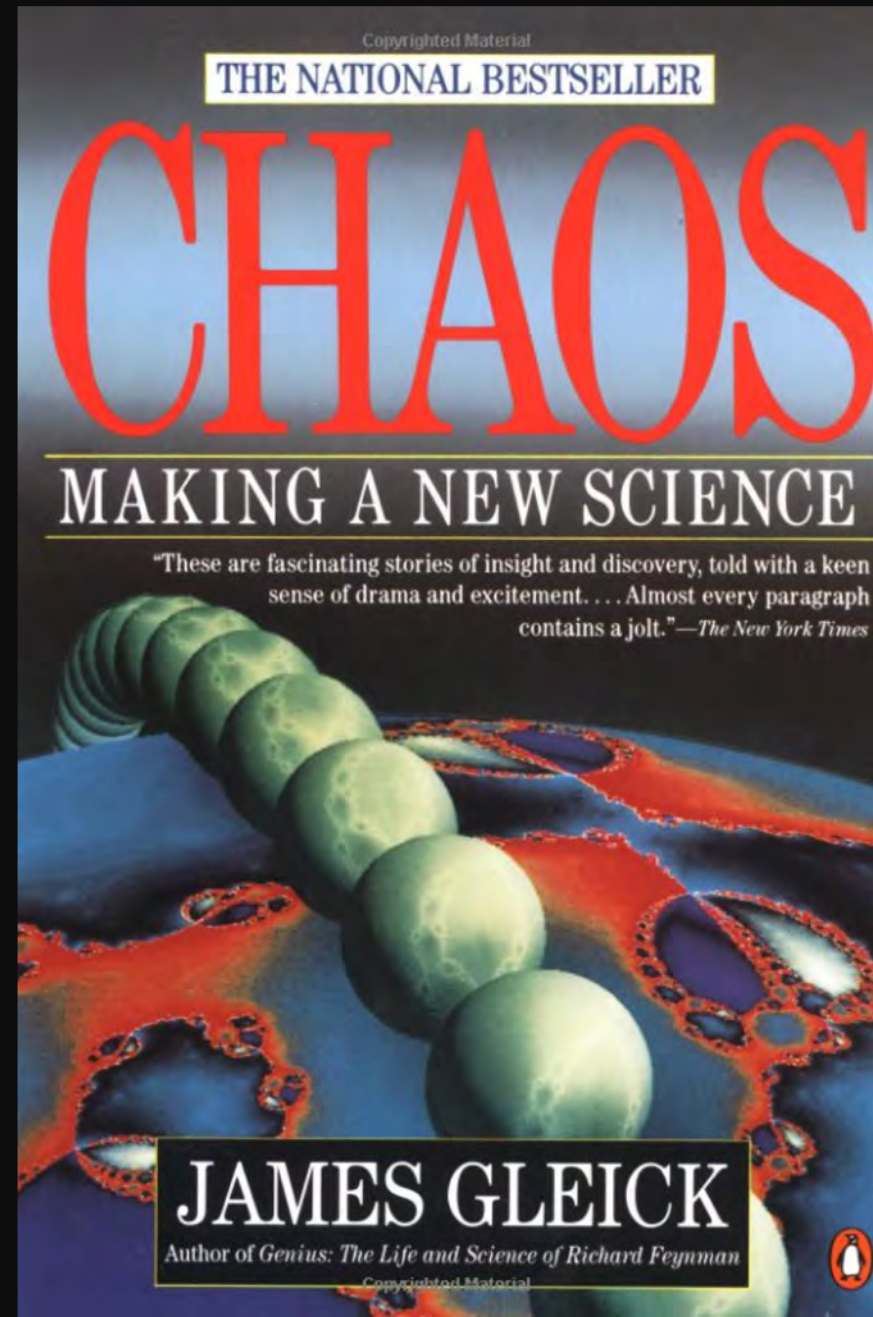
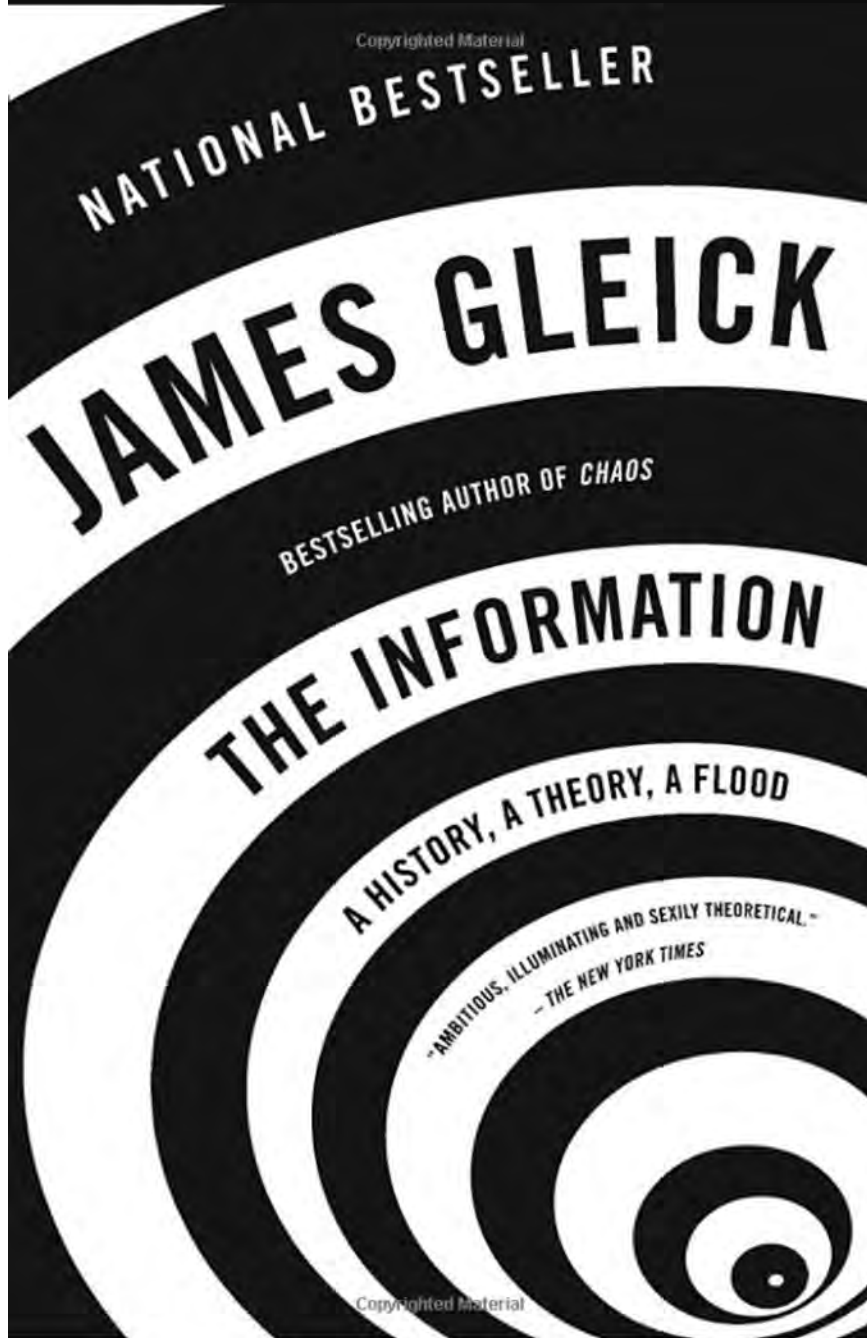
The sounds of raindrops in Iowa City, an infra-red photograph of the sun transmitted from Pittsburgh, and "sequential drawings" transmitted from Chicago produced this "composite joint image." The image was made by transmitting the three sets of signals, in a conference phone call, and picking up a "composite image" on "faestime machines" located in the three cities.

“A-Volve”, Christa Sommerer, Laurent Mignonneau (1992)



(c)94, Sommerer & Mignonneau

“Information” (2011), “Chaos Theory” (2008), James Gleick



https://en.wikipedia.org/wiki/James_Gleick

Related Articles

- Jack Burnham (1968), "Systems Esthetics", in: *Artforum* (September, 1968)
- Edward A. Shanken, "Art in the Information Age: Technology and Conceptual Art," in SIGGRAPH 2001 Electronic Art and Animation Catalog, (New York: ACM SIGGRAPH, 2001): 8-15; expanded and reprinted in *Art Inquiry* 3: 12 (2001): 7-33 and *Leonardo* 35:3 (August, 2002): 433-38

Art in the Information Age: Technology and Conceptual Art

Edward A. Shanken

In the mid-1960s, Marshall McLuhan prophesied that electronic media were creating an increasingly interconnected global village. Such pronouncements popularized the idea that the era of machine-age technology was drawing to a close, ushering in a new era of information technology. Sensing this shift, Pontus Hultén organized a simultaneously nostalgic and futuristic exhibition on art and mechanical technology at the Museum of Modern Art in New York (MOMA) in 1968. *The Machine: As Seen at the End of the Mechanical Age* included work ranging from Leonardo da Vinci's 16th-century drawings of flying machines to contemporary artist-engineer collaborations selected through a competition organized by Experiments in Art and Technology, Inc. (E.A.T.).

E.A.T. had emerged out of the enthusiasm generated by *nine evenings: theatre and engineering*, a festival of technologically enhanced performances that artist Robert Rauschenberg and engineer Billy Klüver organized in New York in October 1966. E.A.T. also lent its expertise to engineering a multimedia extravaganza designed for the Pepsi Pavilion at the Osaka World's Fair in 1970. Simultaneously, the American Pavilion at Osaka included an exhibition of collaborative projects between artists and industry that were produced under the aegis of the Art and Technology (A&T) Program at the Los Angeles County Museum of Art.

Ambitious as they were, few of the celebrated artist-engineer collaborations of this period focused on the artistic use of information technologies, such as computers and telecommunications. Taking an important step in that direction, *Cybernetic Serendipity*, at the Institute of Contemporary Art in London in

protocols of computer software and the increasingly “dematerialized” forms of experimental art, which the critic interpreted, metaphorically, as functioning like information processing systems. *Software* included works by conceptual artists such as Les Levine, Hans Haacke and Joseph Kosuth, whose art was presented beside displays of technology including the first public exhibition of hypertext (*Labyrinth*, an electronic exhibition catalog designed by Ned Woodman and Ted Nelson) and a model of intelligent architecture (*SEEK*, a reconfigurable environment for gerbils designed by Nicholas Negroponte and the Architecture Machine Group at the Massachusetts Institute of Technology) [1].

Regardless of these points of intersection and the fact that conceptual art emerged during a moment of intensive artistic experimentation with technology, few scholars have explored the relationship between technology and conceptual art. Indeed, art-historical literature traditionally has drawn rigid categorical distinctions between conceptual art and art-and-technology. The following reexamination, however, challenges the disciplinary boundaries that obscure significant parallels between these practices. The first part describes Burnham's curatorial premises for the *Software* exhibition and in-

ABSTRACT

Art historians have generally drawn sharp distinctions between conceptual art and art-and-technology. This essay reexamines the interrelationship of these tendencies as they developed in the 1960s, focusing on the art criticism of Jack Burnham and the artists included in the *Software* exhibition that he curated. The historicization of these practices as distinct artistic categories is examined. By interpreting conceptual art and art-and-technology as reflections and constituents of broad cultural transformations during the information age, the author concludes that the two tendencies share important similarities, and that this common ground offers useful insights into late-20th-century art.

Text-to-Image Synthesis as Generative Art

The Creativity of Text-to-Image Generation

JONAS OPPENLAENDER, University of Jyväskylä, Finland



Fig. 1. Digital image generated from the prompt “art on the wall” created with Midjourney [29].

Text-to-image synthesis has made a giant leap towards becoming a mainstream phenomenon since 2021. With text-to-image systems, anybody can create digital images and artworks. This provokes the question of whether text-to-image art is creative. This paper expounds on the nature of human creativity involved in text-to-image art with a specific focus on the practice of “prompt engineering.” The paper argues that the current product-centered view of creativity may fall short in the context of text-to-image generation. A case exemplifying this shortcoming is provided and the importance of online communities for the creative ecosystem of text-to-image art is highlighted. We provide a high-level summary of this online ecosystem drawing on Rhodes’s conceptual model of creativity. We provide a discussion on the challenges for evaluating the creativity of text-to-image generation and discuss opportunities for research on text-to-image art in the field of Human-Computer Interaction (HCI).

CCS Concepts: • **Human-centered computing** → *Human computer interaction (HCI); Natural language interfaces*; • **Applied computing** → *Arts and humanities*.

Additional Key Words and Phrases: text-to-image generation, creativity, co-creation

1 INTRODUCTION

Text-to-image systems based on deep generative models have become popular means for creating digital artworks [8, 43]. Given an input prompt in natural language, these generative systems are

Fundamental Question

- If anybody can produce digital images that resemble masterful pieces of art simply by feeding textual prompts into an opaque system, is text-to-image art creative?
- What is the nature of the human creativity involved in generating images with text-to-image systems

“An Analysis of Creativity”, Mel Rhodes (1961)

The 4Ps model

- The 4Ps model was created by Rhodes describing creativity as containing a **person**, **process**, **press** and **products**.
- Rhodes’s notion of creativity comes from his research on creativity, in which he collected forty definitions of creativity and sixteen of imagination, but soon discovered that these definitions overlapped and intertwined with each other.

“An Analysis of Creativity”, Mel Rhodes (1961)

- **Person** - personality, intellect, skills, temperament, physique, habits, attitudes, self-concept, value systems, and overall behavior.
- **Process** - applies to motivation, perception, learning, thinking, and communicating. This infers that the creative thinking process has 4 stages: preparation, incubation, inspiration, and verification; and that the creative process can be taught.
- **Press** - refers to the relationship between human beings and their environment. Rhode finds that everyone perceives the environment surrounding him as unique and this ultimately impacts the way in which ideas are formed. Social communities (Twitter, MidJourney, etc.)
- **Product** - is what is created when an idea transforms into tangible form. Rhodes suggests that if a product were examined and traced back to the moment of inspiration, it might be possible to trace the thoughts and events leading to the idea.

Rhodes determined that the creative process can take only one direction, namely, from person, to process, to product and then to press.

The creative process in text-to-image synthesis

- In traditional arts, the **product** can serve as a **measure** for human creativity
- An artifact needs to be both novel (original, unique, etc.) and useful (appropriate, effective, etc.)
- With text-to-image users **cede control** to artificial intelligence
- Consequently the human creativity lies not in the end product but arises out of the **human interaction** with the AI
- The creativity of text-to-image generation arises from the text-based **interaction** of human users with text-to-image systems and the human-computer **co-creativity** that is determined by the constellation of user and AI

The creative process in text-to-image synthesis

PERSON: the practitioner

- **Prompt Engineering:** Writing effective prompts is a skill linked to a person's knowledge of the training set and the neural networks' latent space, but also the person's knowledge of and experience with different prompt modifiers + configuration parameters
- A learned skill, iterative – take the previous output as input
- Also at the level of **curation** at both image level and portfolio level

PRESS: Emerging text-to-image Ecosystem

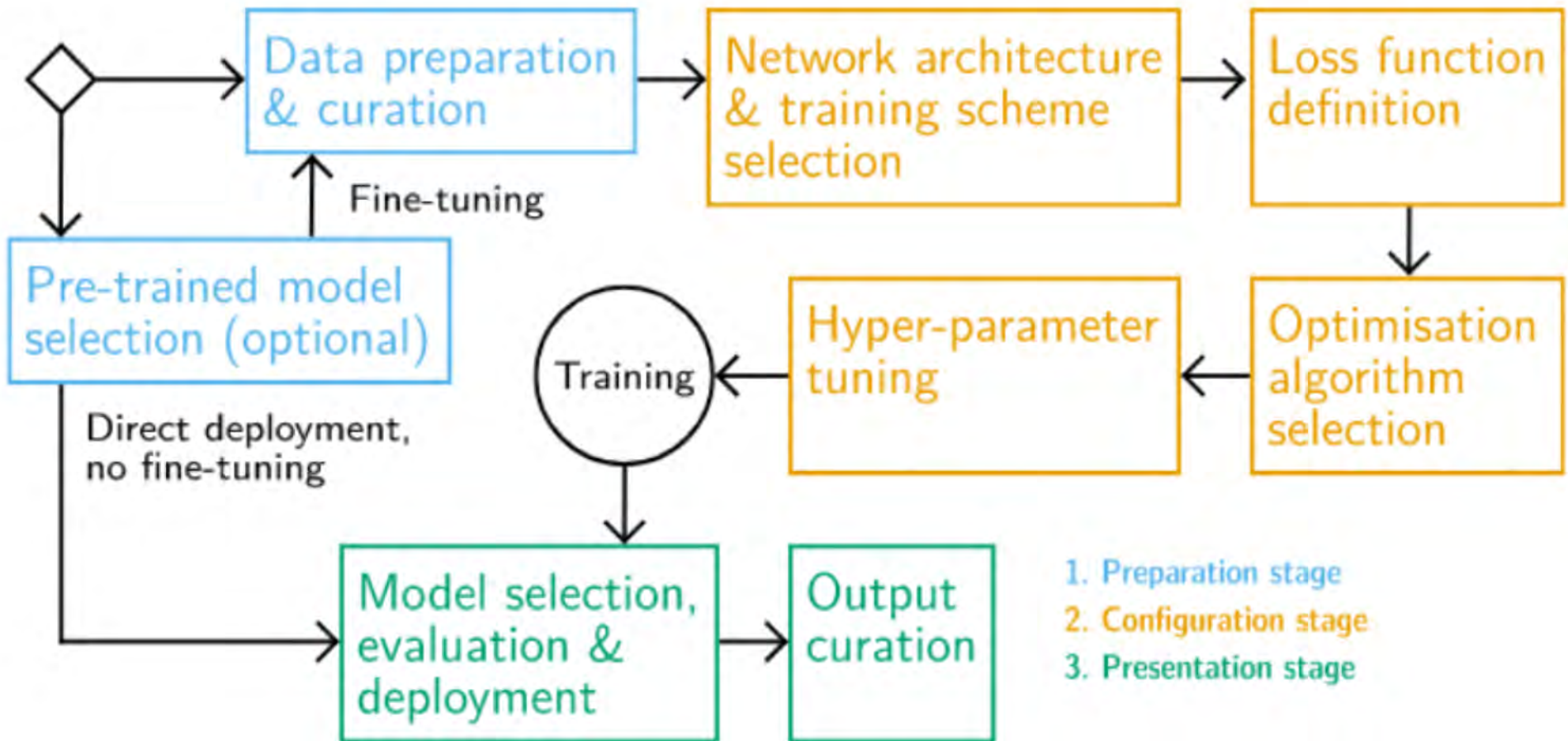
- Online communities dedicated to text-to-image art are – perhaps – the most significant development
- Code and prompt sharing, midjourney a cultural hub, visible what someone else is doing

The curation process as aesthetic determination



Fig. 4. An example of image-level curation. The image was created with VQGAN-CLIP [8] with the prompt “ufo landing, fantastic, on Vellum, trending on /r/art.” The image slowly emerged from the initial random noise used to seed the GAN (step 0). After 100 steps, unwanted details started to emerge and the author aborted the process after 175 steps. The author then selected step 50 as “best” (i.e., most interesting and artistic) image in the batch.

“Automating Generative Deep Learning for Artistic Purposes”



The creative process in text-to-image synthesis

CHALLENGES:

- An opaque process
- Based on the image we can infer little about the system used
- We don't know what text and configurations resulted in the prompt – to access full extent of human creativity, need information on all aspects

More Control & Next Steps

- Google's Imagen proposes: *Increasing the size of the language model in Imagen boosts both sample fidelity and image-text alignment much more than increasing the size of the image diffusion model*
- Implement and contribute to open source coding to gain more individual focus
- Wait for next-generation models

Ethical & Aesthetic Considerations

- Data requirements of text-to-image models have led researchers to rely heavily on large, mostly uncurated, web-scraped datasets.
- Data sets often reflect social stereotypes, oppressive viewpoints, incorrect subjective information, etc.
- Text-to-Image may exhibit limitations when generating images of people, social groups, etc.

- Midjourney software will exhibit aesthetic biases:
 - Prioritize primary colors (R,G,B,Y)
 - Horizon lines, human-forward vantage point
 - abstract patterns > flower oriented
 - drip painterly, reduction towards water color painterly effect
 - Repeating patterns across from different image sources and prompts
 - industrial imagery > repeats itself
 - Etc.

Text-to-Image Synthesis as Generative Art